Environmental monitoring is traditionally geared towards governments and producers, providing them with information required to formulate environmental policies and environmental management strategies. More recently, environmental monitoring has come to serve a different function. In line with the increasing popularity of notions such as accountability, transparency and availability of information, environmental monitoring is now also used as a tool to gather environmental information for, and disseminate it to, ordinary citizen-consumers. This thesis aims to analyse how this change in environmental monitoring affects the role of citizen-consumers in environmental governance.

Governance through information

Sander van den Burg

1. De opkomst van op informatie gebaseerde beleidsarrangementen biedt de nationale overheid nieuwe mogelijkheden een meer controlerende rol te spelen in het milieubeleid. (dit proefschrift)

2. De impact van 'politiek consumeren' kan alleen begrepen worden door zowel echte als imaginaire en gerepresenteerde consumenten in beschouwing te nemen. (dit proefschrift)

3. De mogelijkheid om in warenhuizen te stemmen enerzijds en het toenemende aantal labels dat consumptie tracht te 'politiseren' anderzijds illustreren dat het onderscheid tussen burger en consument in toenemende mate irrelevant begint te worden.

4. De totstandkoming van een geliberaliseerde en consumentgeoriënteerde energiemarkt wordt bovenal verhinderd door hardnekkige associaties met het 'nutsbedrijf. '

5. Indachtig Anthony Giddens' principe van de dubbele hermeneutiek gaan commercieel succesvolle sociologen verder dan het louter beschrijven van de maatschappelijke realiteit; ze creëren een eigen realiteit die appelleert aan gevoelens en sentimenten van hun publiek. (Giddens, A. (1984), The constitution of society, Polity Press, Cambridge)

6. Promovendi moeten aan een maximum aantal te lezen boeken en artikelen worden gehouden.

7. Het teruglopende aantal studenten milieukunde valt te wijten aan het feit dat duurzame ontwikkeling 'in' is.

8. Duran Duran heeft de theorie van reflexieve modernisering het krachtigst samengevat: Every little thing the reflex does must be answered with a question mark. (Uit the Reflex, Seven and the Ragged Tiger, 1983)

Stellingen behorende bij het proefschrift "Governance through information" van Sander van den Burg, in het openbaar te verdedigen op dinsdag 18 april 2006 des namiddags te vier uur in de Aula van Wageningen Universiteit.

GOVERNANCE THROUGH INFORMATION
Environmental monitoring from a citizen-consumer perspective

Promotoren:

Prof. dr. ir. A.P.J. Mol
Hoogleraar Milieubeleid
Wageningen Universiteit

Prof. dr. ir. G. Spaargaren
Hoogleraar Milieubeleid voor duurzame leefstijlen en consumptiepatronen
Wageningen Universiteit

Promotiecommissie:

Prof. dr. M.J.J.A.A. Korthals
Wageningen Universiteit

Prof. dr. P.C.M. van Seters
Universiteit van Tilburg

Prof. dr. ir. C.J.A.M. Termeer
Wageningen Universiteit

Dr. M.P. Wolsink
Universiteit van Amsterdam

Dit onderzoek is uitgevoerd binnen de onderzoeksschool WIMEK/SENSE.

GOVERNANCE THROUGH INFORMATION
Environmental monitoring from a citizen-consumer perspective

SANDER VAN DEN BURG

Proefschrift
ter verkrijging van de graad van doctor
op gezag van de rector magnificus
van Wageningen Universiteit,
Prof. dr. M.J. Kropff
in het openbaar te verdedigen
op dinsdag 18 april 2006
des namiddags te vier uur in de Aula.

Sander van den Burg
Governance through information: Environmental monitoring from a citizen-consumer perspective / Wageningen: Wageningen University

PhD-thesis Wageningen University
ISBN 90-8504-425-1

VOORWOORD

Wie een proefschrift schrijft over monitoring, over het verzamelen van informatie betreffende de prestaties van anderen en de impact hiervan op de relaties tussen verschillende actoren is zich extra bewust van het feit dat ook hij het onderwerp van monitoring is en dat er ook mensen hem in de gaten houden, namelijk promotoren. Ik kan mij gelukkig prijzen dat Arthur Mol en Gert Spaargaren altijd makkelijk bereikbare en bovenal positief meedenkende promotoren zijn geweest en niet aan eenzijdige *top-down* monitoring doen. Dankzij hun is dit proefschrift geworden is tot wat het nu is. Promotoren zijn een belangrijk onderdeel van de werkomgeving maar er is meer dan dat en ik kan gelukkig zeggen dat de leerstoelgroep Milieubeleid altijd een goede en stimulerende werkomgeving is geweest, niet alleen door de vaste krachten maar ook door de aanloop van nationale en internationale studenten en gastmedewerkers. Ik ben blij dat ik bij Milieubeleid verder kan werken op het CONTRAST onderzoeksproject. Op het gevaar af anderen tekort te doen wil ik in het bijzonder Corry bedanken voor de hulp bij alledaagse problemen (van computerprobleem tot het ontcijferen van een promotor zijn aantekeningen), Loes voor de hulp bij het methodologisch intermezzo en Susan voor de gezelligheid in het ietwat bouwvallige IMAG gebouw. Over the years, I have not only shared an office but also exchanged knowledge and experiences with various international visitors. I would like to thank David Goldblatt, Michael Carolan, David Sonnenfeld and Pham Hong Nhat in particular for their pleasant company. Buiten de Wageningen Universiteit wil ik Stephan Slingerland, Hugo Schönbeck, Sietze Bottema, Xantho Kleinsma en Ron Oei bedanken voor de prettige samenwerking in het Energiehuis project.

De totstandkoming van een proefschrift is ook altijd een mooie gelegenheid om dank uit te spreken richting vrienden en familie die, op allerlei mogelijke manieren, een bijdrage hebben geleverd aan de promovendus zijn werk. De talloze (of om eerlijk te zijn ontelbare) mailtjes van Albert, Willem, Jeroen en Daan hebben voor de broodnodige afleiding gezorgd. Het zondagse voetbal met onze naamloze verzameling nog niet ontdekte talenten is een mooie wekelijkse inspanning voor een bureaugebonden academicus. Bepaald niet naamloos, al is de titel 'socio-nerds clubje' misschien niet direct vleiend, is het leesclubje met Harald, Hotze en Albert. Niet alleen heb ik geleerd van anderen hun ervaring met het schrijven van een proefschrift, ik heb ook geleerd van de bespreking van delen van dit proefschrift, waarvoor heel erg bedankt. Willem en Roelof wil ik alvast bedanken voor hun rol als paranimf maar natuurlijk ook voor het poolen respectievelijk mountainbiken en de kroeggebonden discussies over het breedst denkbare scala aan onderwerpen.

Met de komst van een kleine wordt het ritueel van de dagelijkse planning, en de uitvoering daarvan, een stuk ingewikkelder en ik denk niet dat we in deze zonder de hulp van de opa's en oma's zouden kunnen (noch zouden willen). Heel erg bedankt voor alle hulp. Speciale dank gaat uit naar mijn ouders Remko en Sophie voor hun steun bij en interesse in de zaken die mij bezighouden, of dat nou een proefschrift, een fietstocht of een skivakantie is.

Traditiegetrouw is het belangrijkste tot het laatst bewaard. Maarten is de liefst denkbare zoon en het is elke dag weer een plezier om te zien hoe hij de wereld ontdekt en om hem daar in bij te staan. Ik prijs mij extra gelukkig dat ik dat samen met Karin mag doen. Zij is meer dan een voortreffelijke moeder en meer dan steun en toeverlaat; zij is mijn grote liefde.

TABLE OF CONTENTS

	Voorwoord	V
	Part I: Introduction	
1.	Monitoring and environmental change	3
	Part II: Theoretical framework	
2.	A theoretical perspective on environmental monitoring: Ecological modernisation theory	15
3.	The changing context: Environmental monitoring in an age of information	45
	Intermezzo: Research methodology	67
	Part III: Empirical analyses	
4.	Consumer-oriented monitoring and environmental reform	79
5.	Monitoring domestic energy flows	103
6.	Fuel efficiency labelling in Europe	121
7.	Informing or empowering? Disclosure in the United States and the Netherlands	139
	Part IV: Conclusions	
8.	Conclusions: Governance through information	157
	References	175
	List of interviews	191
	Notes	193
	Summary	203
	Samenvatting	207
	Over de auteur	211

Part I: Introduction

Ein weiter Schritt besteht darin, das ausmaß der Umweltbelastung genau zu registrieren, etwa durch ständige Messungen des Lärmpegels, der Verunreinigungen und Gifte in Luft, Wasser, Erde, Pflanzen, Tieren und Menschen, oder der Beobachtung von klimatischen Veränderungen. (…) Die Vereinten Nationen wollen in naher Zukunft ein globales Öko-Satelliten einrichten. Hunderttausende von Meßinstrumenten vom Nordpol bis zum Südpol in Verbindung mit Öko-Satelliten werden in Weltregionen vernetzt, und diese mit einem Zentralcomputer auf der New Yorker UN-Plaza. (Huber, 1982, 104)

The eco-computer will emerge as the fruit of a deterministic process. It will be brought about by the convergence of many disparate but linked technologies: in particular, by the convergence of computing, communications and sensor-based artefacts. The emergence of the eco-computer will be accompanied by a progressive exclusion of human beings from important decision-making loops, by a progressive transfer of computational activities from human beings to machines. (…) Within decades a discernible eco-computer will be set in place; within centuries there will be few, if any, eco-processes (i.e. activities within the eco-sphere) that the global eco-computer will not monitor, analyse and regulate – after a fashion. (Simons, 1987, xiv)

Virtual ecosystems will be housed in environmental information infrastructures. They will include realistic representations of ecosystems and associated databases and models. (…) Movies will run continuously, but may be interrupted at any time. Then they become interactive and enable three-dimensional exploration. (…) The public and decision-makers will play with interactive movies as they do with games. Interactive movies representing impact statements and plans will be designed to have plays and will generate results for those plays. They will include interactive three-dimensional visualisation capacities, two-, and three-dimensional interaction tools. (Camara, 2002, 267)

CHAPTER 1

MONITORING AND ENVIRONMENTAL CHANGE

1. Introduction

From the early 1980s onwards, various visions about all-compassing environmental monitoring systems have been published. As is often the case with such visions, practical considerations about the technological possibilities and impossibilities are somewhat downplayed, emphasizing the imagined benefits and the general direction of change instead. Yet this absence of a technological 'sense of reality' makes it all the more interesting to compare the visions articulated in the 1980s with those from early this century (see also Maguire and Longley, 2005, Tait, 2005).

A first thing to note is that the potential of environmental monitoring to contribute to (the improvement of) environmental decision-making is continuously recognised. The (envisioned) developments in measuring, modelling and visualisation techniques are believed to contribute to societies' understanding of (the complexity of) environmental problems. Through these technologies the environment and environmental problems, often invisible for the human senses, are made 'visible'.[1] This improved understanding of the environment in turn is believed to lead to better environmental decision-making processes. The rational behind this line of reasoning is a rather positivist one; science and technology are believed to provide decision-makers with valuable and undisputed knowledge, to be used in rational decision-making processes. Building upon this line of thought, one pathway for research on environmental monitoring could lead one to examine the extent to which current monitoring systems – such as the European 'Envisat' satellite – contribute to our under-

standing of global eco-systems and the damage done to them. [2] This however is not the pathway taken in this thesis.

From the three quotes on page 1, one can derive the contours of an alternative pathway for research, one that is sociologically more interesting. A major difference between the visions of the 1980s and those of this century lies in the way in which the information that is gathered through environmental monitoring is appropriated and used in decision-making processes. Huber's (1982) dystopian vision is one in which eco-satellites will provide a global authority – the United Nations – with (undisputable) detailed scientific information to be used in top-down, technocratic global decision-making processes. According to Simons (1987), decision-making will increasingly take place by the technological artefacts themselves; human agency is replaced by computing power. In this respect, the 21st century vision of Camara (2002) is markedly different; it assigns a far more modest role to the technologies within the decision-making process. The technologies, however advanced they may be, are there first and foremost to serve and inform the public and policy-makers. The positivist idea that information in itself will 'automatically' lead to just decision-making processes (either by human agents of by computers) gives way to the acknowledgement that information only exerts influence through its embedding in social networks. This difference in the foreseen role of environmental monitoring puts us on the track of analysing the social dynamics underlying the development and use of environmental information systems. Rather than analysing what the best way (and technology) to collect information could be, the emphasis lies on the study of the social networks and dynamics through which environmental monitoring is developed and made to function.

The study of these social dynamics behind environmental monitoring is all the more interesting since the developments in information and communication technologies (ICT) mean that more and more information can be collected and provided, and because notions of transparency and accountability are increasingly seen as critical in (environmental) governance. Whether it concerns spatial zoning plans, emissions from companies, the names of child molesters, the quality of schools and hospitals, the environmental risks we are exposed to, the production methods used for our daily cup of coffee or government expenses, it is argued more often and more vigorously that citizen-consumers have a 'right to know'.[3] This development cannot be understood by sole reference to the developments in the field of information and communication technologies; it is part of more general change in the ideas on, and practice of, governing and governance, and the role of information and citizen-consumers in these processes.[4] The provision of information to the public is nowadays often presented as the panacea for hard-headed and sensitive so-

cial problems; it is part of a conscious effort (by politicians, civil society actors or corporations) to redefine societal arrangements for governance.

2. The changing purpose of monitoring

As environmental issues gained importance in the 1960s and 1970s, it was recognized that knowledge about the environment, the flows of pollutants and their effect on ecosystems was necessary to initiate processes of environmental reform. Governments acknowledged that it was necessary to monitor the environment if they were to design and implement effective policy-measures and as corporations were faced with the challenge to reduce their environmental impacts they increasingly came to monitor the environmental consequences of industrial processes. Environmental monitoring efforts by governments resulted in various national environmental databases (for example the Dutch 'Milieumonitor') which are nowadays increasingly brought together in multinational datasets, run by for example the European Environment Agency.[5] For corporations, the developed standards on environmental management, as laid down in for example the ISO 14001 or EMAS guidelines, prescribe the regular and systematic monitoring of environmentally relevant substance flows.

According to the dictionary, monitoring encompasses those acts aimed at keeping track of, or watching, something for a special purpose.[6] In the aforementioned instances, the collection of information is particularly geared towards what could be labelled 'internal purposes'; governments monitor to design better policies and corporations monitor to increase their (environmental) performance.

While these are the 'traditional' purposes associated with environmental monitoring, they are nowadays supplemented with a new purpose; environmental monitoring is increasingly used to collect and disseminate environmental information to the general public. Increasingly, monitoring also serves an 'external' purpose as it is used to inform other societal actors about the environmental quality of products and production processes and, as such, environmental monitoring has a new function in enrolling citizen-consumers into environmental governance arrangements. The archetypical examples here include the wide array of environmental labels, various disclosure schemes and the development of new monitoring and metering techniques aimed at providing households with information about their domestic consumption levels. Once monitoring is no longer solely used to develop regulation, but turns into a regulatory tool itself, new questions about the (desired) form and function-

ality emerge. How can we explain the emergence of new forms of monitoring, and analyse them? What can we say about the emergence of these information-based governance arrangements and the prospects of specific forms of 'consumer-oriented' environmental monitoring?

3. Theorising about the changes in monitoring

To understand the changes in the nature of environmental monitoring and information from a tool for policy-making to an instrument in itself, a social scientific angle of analysis is required. Rather than focusing on the availability, accurateness and appropriateness of measuring and modelling techniques, a distinctively social scientific approach can grasp, name, and discuss the dynamics at play and the key actors involved. In analysing the social dynamics behind environmental monitoring, in the context of new ICT technologies, one inevitably runs into a number of academic debates and theories which together constitute the background for the research.

When it comes to understanding and theorising environment induced transformations in production and consumption chains, ecological modernisation theory constitutes one of the prominent schools of thought (Huber, 1985, Jänicke, 1986, Hajer, 1995, Mol, 1995, Buttel, 2000, Mol and Spaargaren, 2000, Spaargaren, 2000b, van Vliet, 2002, Mol and Spaargaren, 2005). Within ecological modernisation theory, various scholars have argued that proper environmental monitoring is essential in bringing about processes of environmental reform; knowledge and information are at the basis of identifying and implementing alternative technologies and policy arrangements (Huber, 1982, Spaargaren, 2000a). In various studies, key concepts of ecological modernisation theory have been applied, validated and/or modified; for example through elaborating on the role of ecological modernisation as a discourse (Hajer, 1995), as a process of political modernisation (van Tatenhove et al., 2000) or in understanding the (changing) role of civil society groups in bringing about environmental reform (Mol, 2000), yet the pivotal role of monitoring has received little attention. This thesis seeks to contribute to the development of ecological modernisation theory by studying the new modes of consumer-oriented environmental monitoring. In doing so, it builds upon the recent emphasis that has been put on the role of consumption and citizen-consumers in processes of ecological modernisation (Spaargaren, 1997, Spaargaren and van Vliet, 2000, van Vliet, 2002). Put differently, the main research issue discussed here whether or not, and to what extent, new forms of environmental monitoring and information provision require us to

rethink the role of consumption and citizen-consumers in environmental governance arrangements. In elaborating on these questions, I will draw upon three different fields of social theory.

First of all, I will discuss the impact of the developments in information and communication technologies on environmental governance. Where it was initially stressed that through ICT, physical artefacts (such as paper and books) and corporeal travel (for example, going to conferences) could be replaced by ICT-based alternatives (the paper-less office, tele-conferencing, et cetera) (see for example Brown and Duguid, 2000), contemporary studies on the relation between ICT and the environment have added two different lines of investigation. Not only is there an increasing concern about the environmental impacts of the production and use of ICT (see for example Smith et al., 2006), the analysis of the impact of ICT on societies at large, their social and economic organisation and their mechanisms for dealing with environmental issues in particular, has also gained importance. The classic work in this respect is Manuel Castells' trilogy on 'The Information Society' (Castells, 1996, 1997, 1998). To understand the impact of ICT on society, Castells analyses the co-evolution of technologies and capitalism, both at the global as well as at regional territorial level. He argues that the developments in ICT enable new means to organise businesses across the globe, pose new challenges for governments to regulate the 'space of flows', and lead to new forms of local resistance and protest. To capture this variety of processes, the notion of 'informational capitalism' is coined; the rapid spread of information through networks fundamentally alters the organisation of the capitalistic economy. It means that for all societal actors it becomes highly important to have access to these networks, as well as to be able to find one's way through the available information and network nodes. Furthermore, Castells touches upon to the subject of globalisation, the proliferation of global networks means that regions and localities are increasingly influenced by 'external' global forces. Consequently, they are faced with the challenge to proliferate themselves in global networks, while at the same time maintaining their local economy and identity. The work of Castells has not only had a major influence on later social theories, for example the work of Urry (2000, 2003) and others (see Webster, 2002), it also significantly changed the discourse through which the relation between ICT and the environment was discussed. The emphasis lies no longer on the reduction of paper consumption but on the political dimension of ICT, and their impact on the social relations between different groups of users (and non-users), instead (for an early study on this aspect of ICT see Leeuwis, 1993).

Secondly, I will draw upon the debate on the change from 'government' to governance. The processes of globalisation and the developments in ICT

challenge the role of national governments in dealing with environmental issues; the traditional style of policy-making, based on rule-setting and enforcement by institutions of the nation-state is replaced and/or supplemented by a range of other 'governing styles'. Nation-states experiment with, and deploy, new policy-instruments, making use of for example voluntary agreements, regulation through the market by means of environmental taxes, labelling et cetera. These processes are illustrative of the processes whereby the nation-states redefine their role in (global) environmental governance, and are captured under the notions of political modernisation (van Tatenhove et al., 2000) and new environmental policy-instruments (Jordan et al., 2003b). Next to that, the notions of governance and sub-politics emphasize that the roles and responsibilities of state *and* non-state actors come to shift and intermingle (Beck, 1992, Leroy and van Tatenhove, 2000). It is argued that companies are no longer passive recipients of rules and regulations; they are – as the environment becomes an issue in itself – increasingly working in a pro-active manner. Civil society groups which used to focus on lobbying and campaigning to influence the (national) governments are now working to develop new means to co-operate with corporations and/or seek to draw upon the power of citizen-consumers (O'Rourke, 2005). It is through the notion of sub-politics that Beck (1992) seeks to emphasize that politics are increasingly given shape at other 'levels'; (global) politics are increasingly shaped by the decisions and activities of civil society groups, media, citizen-consumers, and corporations (see also Anheier, 2001, Glasius, 2002 on global civil society).

Thirdly, I will reflect on the changing position, and responsibility, of citizen-consumers in the governance of the production-consumption chains. Organised civil society groups have over time come to play an important role in environmental governance, but more recently it is emphasizes how individual citizen-consumers also (and increasingly) come to exert influence through their (politicized) consumption choices. The notion of political consumerism describes how (changes in) individual consumption choices are more and more seen as means to achieve public goals (Micheletti, 2003). This thesis is particularly concerned with analysing and conceptualising the changing role of citizen-consumers in processes of environmental reform. In doing so, I wish to look beyond mere behavioural changes and focus instead on the relation between changes in individual consumption patterns and the changes in the systems of provision. Concerns about the role of citizen-consumers and their position vis-à-vis producers, and the question how to frame these interrelations in theoretical terms, are not unique to ecological modernisation theory. For example, in transition theory (Rotmans, 2003, Elzen et al., 2004, Geels, 2005) it is acknowledged that the role of consumption, and end-users of technologies, has long been oversimplified. The question how to deal with citizen-

consumers, whether they are represented, imagined or real end-users, is now open to consideration (Schot and de la Bruheze, 2003, Geels, 2004). Within the sociology of consumption a comparable tension can be felt; the question up for debate is if one should think of consumers as malleable passive recipients of goods or as active, knowledgeable agents of change. If the former is the case, attempts to reform production and consumption should focus predominantly on innovation in the production-sphere (as argued by Huber, 2004). If however consumers are believed to possess agency, the road towards the involvement of citizen-consumers in changing practices, changing systems of provision and governing the environment is opened up (Micheletti, 2003, Shove, 2003, Spaargaren and Martens, 2004). My aim is to overcome these simple dichotomies and analyse the role that citizen-consumers (can) play in contemporary, information-based, environmental governance arrangements.

4. Central research questions

This thesis aims to understand and theorise the changes in the nature of environmental monitoring within the framework of ecological modernisation theory. In the previous paragraphs, I have illustrated that this thesis revolves around three related and broadly defined concerns: information, governance and citizen-consumers, each with its associated theories. In narrowing down these concerns, and making them researchable, the following research aim and questions are defined. *The aim of this study is to analyse how the changing nature of environmental monitoring affects the roles of citizen-consumers in environmental governance.*

The following questions are used to organise the research:

1. How can we understand and describe the traditional role and function of environmental monitoring in (bringing about) environmental reform?
2. How does the 'Information Society' affect and change the role of environmental monitoring, and the processing and dissemination of information for environmental governance?
3. What do these changes in environmental monitoring mean for the (potential and actual) roles of citizen-consumers vis-à-vis other, state and non-state, actors in bringing about environmental reform?
4. What can we learn from these developments in environmental monitoring and information processing in further developing ecological modernisation theory?

To answer these research questions, I juxtapose a theoretical argument with empirical data, organised in the form of three major case-studies.

To construct a theoretical argument, I start with a description of ecological modernisation theory and its development over time. After concluding that ecological modernisation theory is facing the challenge to incorporate issues of globalisation and the impact of contemporary flows of information, I turn towards a number of other relevant fields of social theory that can contribute to the development of an ecological modernisation perspective on monitoring and environmental information.

In the empirical part, three in-depth case-studies are performed that all revolve around issues of monitoring and environmental information. In these case-studies, my aim is not to 'test' (and thus accept or reject) the theory but to illustrate that the developments in ICT and the changing nature of environmental monitoring require further elaboration of ecological modernisation theory on a number of concepts and concerns.

5. Outline of the thesis

The second part of the thesis offers a theoretical elaboration on the role of environmental monitoring and information from an ecological modernisation perspective. In the third part, this is followed by the empirical case-studies. In the fourth part, I return to the theoretical framework to describe how the acquired empirical findings are to be accommodated.

In chapters 2 and 3, the theory of ecological modernisation is discussed and related to other relevant social theories on the environment and on information flows. The aim is to derive key concepts that can guide the research in empirical sections. In chapter 2, I elaborate on ecological modernisation theory. Through a description of the history of ecological modernisation theory, the critique that has been voiced and the responses given, I argue that the development of ecological modernisation theory can be characterised by three different phases (labelled *EcoMod 1* to *EcoMod 3*). The transformation from *EcoMod 1* to *EcoMod 2* took place in the mid 1990s. Currently, we are in the midst of the transformation towards *EcoMod 3*, and therefore need to discuss the 'compatibility' of ecological modernisation theory and the sociology of flows. The changes in the nature of monitoring can, I argue, be considered illustrative in the light of this transformation. For further analysis it is, I argue, important to focus on three theoretical points of concern: (i) access and the

social embedding of information flows, (ii) government and governance, and (iii) the roles of citizen-consumers.

Chapter 3 continues the theoretical exploration, now with a strong focus on information and monitoring. By de- and reconstructing the concepts of monitoring and surveillance in relation to environmental issues, I argue that as the nature of environmental monitoring alters, its role in environmental governance is likely to change. New modes of governance emerge which revolve around the collection, provision and use of environmental information. Drawing particularly upon the works of Giddens and Beck, I elaborate on the key characteristics of environmental monitoring in a theoretical manner. In particular, attention is given to the changing nature of surveillance, the changing role of the (institutions of) the nation-state and the consumerist-turn in environmental policy-making. In bringing this chapter to a close, I develop four key concepts which will structure the analysis in the empirical sections: (i) the appraisal of surveillance, (ii) the issue of access, (iii) the re-invention of the nation-state, and (iv) the citizen-consumer as agent of change.

In between the theoretical and empirical part of the thesis, I elaborate on the choice for a case-study research as a means to do explorative and theory-building research in a brief methodological intermezzo. In this intermezzo, the methods used for data collection are also discussed.

Chapter 4 can be regarded as the bridgehead between the theoretical and the empirical chapters. The chapter serves three main purposes. First of all, it builds upon chapter 2 and chapter 3 in discussing the validity of studying consumer-oriented environmental monitoring schemes. Secondly, a typology of environmental monitoring schemes is developed to illustrate the diversity of consumer-oriented environmental monitoring schemes. Thirdly, some examples of consumer-oriented monitoring schemes are briefly presented and discussed as an introduction to the in-depth analyses provided in the case-studies.

The chapters 5 to 7 are the empirical core of this thesis as they analyse the emergence and functioning of new informational governance arrangements in three different fields; infrastructural networks, production-consumption chains, and public space. In chapter 5, I elaborate on the changes in the monitoring of domestic flows, with a particular emphasis on energy. Commodities such as water and energy, provided through collective socio-material systems, are traditionally related to metering and monitoring but in these domains one can witness a broadening of the range of functions of monitoring. The impact of these changes for citizen-consumers is discussed by elaborating on monitoring in relation to two dimensions of empowerment; the horizontal and vertical dimension. Chapter 6 deals with the fuel efficiency labelling of cars. In this case, producers and citizen-consumers are less strongly interconnected and

there is no history of monitoring. Yet we do see that, instigated by the European Union, a labelling scheme has been developed which provides citizen-consumers with information about the fuel efficiency of various vehicles. Finally, chapter 7 is concerned with the provision of environmental information concerning public space to citizen-consumers. Numerous disclosure schemes worldwide aim at informing the public about the environmental quality of the surroundings, often including data on the emissions of particular companies. By comparing the development of such disclosure schemes in the Netherlands with the developments and experiences in the United States, this chapter investigates the means by which disclosure enables citizen-consumers to participate in environmental governance.

In the concluding chapter, I return to the formulated research questions and, by juxtaposing empirical developments and theoretical concepts and concerns, discuss in what ways ecological modernisation theory should be further developed to conceptualize the changes in the nature of environmental monitoring.

Part II: Theoretical framework

CHAPTER 2

A THEORETICAL PERSPECTIVE ON ENVIRONMENTAL MONITORING: ECOLOGICAL MODERNISATION THEORY

1. Introduction

In the previous chapter I introduced the research topic: the changing nature of environmental monitoring, in all its variety, affects the relations between citizen-consumers, governments and corporations and leads to the emergence of new modes of governance. The next two chapters are aimed at developing a theoretical framework within which these developments can be discussed. Ecological modernisation theory, the subject of this chapter, is the first building-block of this framework. As one of the dominant social theories on environmental change, ecological modernisation theory has not only explicitly dealt with the role of monitoring and environmental information but has also discussed the (changing) role of citizen-consumers as agents of change in environmental governance arrangements. It thus constitutes a relevant and appropriate framework for the analysis of monitoring and regulation through information.

The outline of this chapter is as follows. The first section provides the general background to ecological modernisation theory. After a brief history of the theory, and a description of the work of two founding fathers, this section ends with some general characteristics of ecological modernisation theory. In the second section, I discuss how these general characteristics have been conceptualised and operationalised differently in two 'versions' of ecological modernisation theory (*EcoMod 1* and *EcoMod 2*). The critique that has been

raised is discussed, as well as how ecological modernisation scholars have responded to this criticism. In the third section, more contemporary criticism against ecological modernisation theory are discussed, as well as the responses to these arguments. This is a first step towards the fourth section in which the analysis of ecological modernisation theory is taken a step further. By describing how ecological modernisation theory relates to the emergent sociology of flows, I argue that a new 'version' of ecological modernisation theory is in the making, labelled *EcoMod 3*. In the concluding section a number of critical issues are identified that, in the light of this shift from *EcoMod 2* to *EcoMod 3*, require further attention.

2. Origins and core characteristics of ecological modernisation theory

Early social theories on the environment

To understand ecological modernisation theory, and how it relates to other social theories on the environment, one can best start with a description of the 'Zeitgeist' of the 1980s when the notion of ecological modernisation was first coined. It was almost 20 years after some of the first major controversies about the quality of the environment aroused public debate.[1] The 1970s had witnessed the emergence of the modern environmental movement, distinct from the much older nature conservation movement, as (by now) major organisations such as Greenpeace and Friends of the Earth were founded and gained large public support.

Ideologically, this emergent environmental movement was founded on three pillars (Mol, 1995). The neo-Marxists school of environmental sociology framed environmental issues as a problem of the relations of production and their solution was based on the socialisation of production. For (post-) industrial society theorists, the cause of environmental decay was industrial development, and the solution was thus the development of ecologically adapted industries and the proliferation of post-materialism. The third and arguably most influential ideological pillar was constituted by counter-productivity theorists. Following publications such as the 'Limits to Growth' (Meadows et al., 1972) and 'Small in Beautiful' (Schumacher, 1973), a school of thought emerged that embraced the concept of counter-productivity to describe the consequences of technological developments and capitalism. Rather than contributing to societies welfare, their negative environmental impact was of such magnitude that overall welfare declined, hence the term counter-productivity.

Theorists such as Ullrich (1984), Schumacher (1973), Commoner (1976) and Achterhuis (1988) argued that the cause of environmental decay lay in the forces *and* relations of production. Capitalism and industrialism, they argued, were geared towards the deployment of large-scale, footloose technologies and failed to take the 'real costs' into account. Their proposed solution to the environmental crisis included a radical change in the organisation of modern societies and heavily depended on the deployment of small-scale, convivial technologies by means of decentralized organisations.

The 1970s also saw the establishment of environmental ministries and/or agencies such as the United States' Environmental Protection Agency (in 1970) and the Dutch Ministry of Environment (in 1971). Environmental protection was a new rationale for government intervention and the governments acted by the development and employment of environmental policy-instruments. These instruments were predominantly based on the principle of 'command-and-control' as the governments set, and enforced, strict standards concerning the allowed emission levels and the environmental impacts of production processes. In the same period, companies responded the environmental problems by the development and implementation of environmental technologies. The urgent environmental problems and governmental requirements asked for pragmatic solutions which were predominantly found in the deployment of, what became known as, first generation or end-of-pipe environmental technologies.

In the 1980s, there was a considerable 'gap' between social theorists, advocating a fundamental change in the organisation of capitalist societies, and policy-makers and corporations working on practical solutions. This facilitated the emergence of ecological modernisation theory as "a response to what many saw as the polarisation between, on the one hand, 'anti-growth' and 'oppositionalist' environmental activists and, on the other hand, governments who saw emerging ecological issues as discrete problems to be dealt with in reductionist terms" (Toke, 2002, 147). In this context, publications such as the World Conservation Strategy (IUCN et al., 1980) which "indicated the political potential of an environmentally sound argument argued in a reasonable manner" (Hajer, 1995, 97) were instrumental in realigning views on the relation between environment and technology along the newly emerging lines of ecological modernisation.

The founding fathers of ecological modernisation theory: Jänicke and Huber

The notion of ecological modernisation was first developed by two influential German authors, Martin Jänicke and Joseph Huber, who took the initial steps to develop a theoretical framework for analyzing environmental change within the conditions of modernity. In the work of Jänicke, the role of the nation-state, whether positive of negative, has always been a significant point of concern. The environmental crisis was most of all seen as the failure of the modern state to deal with environmental problems (Jänicke, 1986). This failure had the potential to disrupt the legitimacy of the nation-state; as environmental problems grew bigger the trust in the institutions of the nation-state could diminish with disruptive effects. In his early work Jänicke stressed that the environmental crisis should thus be used by the nation-state to increase their legitimacy and trust; which could be achieved if the nation-state would rethink its role in finding solutions to the environmental crisis. Instead of acting 'curative', a 'preventive' approach could be beneficial in overcoming the observed failure of the nation-state, thereby supporting processes of ecological modernisation.

In later work, the insights have changed somewhat. Rather than promoting the expanding state per se, Jänicke and others have focussed on the enlargement of the state's steering capacity. The focus is nowadays more on the modernisation of politics that is both required for, and results from, the state dealing with environmental problems (see for example van Tatenhove et al., 2000). In various (predominantly industrialized) countries, there has been ample experience with these forms of regulating; hierarchical and universalistic regulation gives way to a new style of regulation which is characterized by the principles of horizontal cooperation, consensual- and dialogical decision-making and by the growing importance of actors at the de-central level (Mol et al., 2000, Gunningham and Sinclair, 2002). Within this framework, the processes of ecological modernisation are equated with processes of political modernisation, characterised by the development of new regulatory arrangements (whether or not involving the nation-state as the leading actor).

According to Joseph Huber, the 1980s witnessed a variety of initiatives and strategies for environmental reform which could not be grasped within the theoretical framework of the modernisation of politics (Huber, 1982, 1985). What happened in the environmental realm exceeded the sphere of traditional, nation-state based policies; civil society groups sought to negotiate with corporations, consumers exerted power through boycotts, and companies increased the pressure on their suppliers to take environmental issues into account. These developments are illustrative of expressed concerns from the 'socio-sphere' that, together with the damage done to the physical environ-

ment (or the 'bio-sphere'), challenge the industrial system. Huber argues that in order to deal with this challenge, and overcome the voiced environmental concerns and problems, the industrial system has to re-invent itself through the ecological modernisation of production and consumption.

This was a fundamental break with the (at that time) dominant social theories on the environment because it was not assumed that the capitalist system *sec* is the problem. "By stating that the environmental design fault of modernity refers to its industrial dimension", Huber and other EM theorists thus in principle agree that "the dynamics of capitalism can also (be made to) work in the direction of sustainable production and consumption" (Spaargaren, 2000, 48). The solution lies in adapting the industrial system to the demands posed by ecology; key technologies have to be picked up by innovative entrepreneurs who bring about a new wave of industrial innovation. More than any other author at that time, Huber emphasized how environmental problems are linked to the organisation of production and consumption, including the technologies that are used. "His elaboration does not evolve into a cultural critique of modernity or into a post-industrial or even postmodernist perspective, but instead puts at the centre of attention the institutions which are most important in bringing about the switch-over into more sustainable production and consumption cycles: economy and technology." (Spaargaren, 2000b, 50)

Core characteristics of ecological modernisation theory

Reduced to its essence, the notion of ecological modernisation points to the growing independence of the ecological sphere (Mol, 1995, Spaargaren, 1997). Within the organisation of production and consumption, environmental concerns are increasingly taken into consideration as an independent concern and not merely in relation to economic or social concerns. With this emancipation of ecology, a set of processes are set in motion which alter the way societies (are made to) deal with environmental concerns. According to Huber (1982), the monitoring of environmental flows (whether at a global level or at the level of a society or company) is a prerequisite if processes of environmental reform are to be set in motion. Monitoring provides one with the required knowledge about losses, spills, impacts, and about possible options for improvement. Through the monitoring of environmental flows ecological concerns become tangible; by making the invisible visible and enabling the monetarisation of environmental flows, monitoring enables the incorporation of those concerns into political decision-making processes and industrial design. In this process, Huber argues, ecology loses its innocence since it can only be properly incorporated into political and economic rationales once it reformulates its concerns into 'hard' indicators for environmental flows, pol-

lution, et cetera. Although this line of reasoning appears rather instrumental and deterministic, Huber emphasises that the societal consequences of these processes are not determined at forehand. Although he considers it inevitable that ecological concerns will be dealt with through further industrialisation, this development might take various pathways: "*Die Superindustrialisering kann härtere and sanftere Wege gehen. Das steht in keinem Techno-Horoskop. Es ist und bleibt letzlich eine Frage der politischen Auseinandersetzungen*." (Huber, 1982, 13)[2]

The actual process of environmental reform – including the processes of developing, implementing, using and interpreting environmental monitoring schemes – is thus given shape by the actions undertaken by various societal actors. Ecological modernisation theory aims to contribute to the understanding of these actions and processes by providing concepts that are instrumental in illuminating and understanding these developments. Based on the work of Mol (1995, 2001) and Spaargaren (1997) five core features can be identified to structure the study of environment-induced transformations of social practices and institutions from an ecological modernisation theory perspective.

(i) The pivotal role of science and technology in bringing about environmental reform

In the counter-productivity paradigm science and technology are considered to be the cause of, rather than the solution to, environmental problems. As ecological modernisation theorists have argued, we have, in the last decades, increasingly seen how science, by the development of notions such as 'multiple stress' and 'critical load', and technology, through developments in both end-of-pipe and preventive technologies, have contributed to the processes of environmental reform (Huber, 1991, van Vliet, 2002, 2004). In the ecological modernisation paradigm, the negative view on the role of science and technology has been replaced by a more optimistic view, focussing on the possible contributions of science and technology to the redemption or solution of environmental problems and in bringing about a more sustainable organisation of production and consumption. In the light of this thesis' subject, the role of new information- and communication technologies takes a central position.[3]

(ii) The increasing role of economic and market dynamics and agents in responses to environmental change.

The theory of ecological modernisation postulates that the tasks and responsibilities in bringing about environmental reform are on the move. It is no longer solely the state that promotes environmental protection; private actors such as corporations and consumers increasingly play a role. In a process that

could be labelled *horizontal clustering*, new networks between private actors and public actors emerge around – and attempt to find solutions to – environmental issues. Horizontal networks built upon new mechanisms of power and influence, making use of economic instruments, as opposed to the vertical networks in which direct hierarchical control stands central. Environmental reform is no longer only dependent on the authority and power of public actors, but is increasingly realised through market mechanisms. Economic agents such as consumers, certification institutions, branch organisations, and corporations thus come to play a role in bringing about environmental reform and gain importance vis-à-vis governmental institutions.

(iii) Various transformations regarding the central role of the nation-state in environmental reform.

Based on the pioneering work of Jänicke, ecological modernisation theory has continued to analyse the role of the nation-state in governing environmental problems. Captured under the heading of political modernisation (van Tatenhove et al., 2000), a range of transformations is described, broadly covering (a) a shift from responsive to anticipative politics, (b) a change from command-and-control regulation to 'new environmental policy instruments', and (c) the increasing involvement of non-state actors in politics (Mol et al., 2000, Jordan et al., 2003b). The internationalisation of environmental governance has added another dimension to these transformations, for example through the development of international treaty's, the increasing influence of supranational institutions as the European Union, and the establishment of new (global) institutions (such as the United Nations Environment Programme).

(iv) A modification of the position, role and ideology of social movements.

Social movements traditionally play a role in scrutinizing decision-making processes, whether by governments or corporations. What has changed in the environmental domain is the perspective and vision of the environmental movements. The majority of the environmental movement in the 1970s and 1980s developed a 'total-critique' on the organisation of industrialism and capitalism, but the 1990s have witnessed a change in perspective. Although part of the environmental movement continues to oppose the capitalist market system, most notably when it comes to globalisation, the major environmental groups came to acknowledge that the solution to discrete environmental problems could also be found in the ecological modernisation of production and consumption.

Consequently, a change occurred in the tactics and strategy of environmental movements, with greater emphasis on negotiating and establishing co-operations between various actors (Mol, 2000). In combination with the ongoing professionalization of the environmental movement, where the amount of expert-staff has increased significantly, the movement became more and more accepted as a knowledgeable representative of environmental interests, both in their relation with governments and in their relation with corporations. Overall, these developments enabled new forms of activism. The focus of actions needed no longer to be exclusively on the government; corporations could also be interested in improving their environmental track record and make agreements with civil society groups (even though this might require one to put pressure on the companies). The potential of consumer-oriented strategies was also discovered; through product testing and labelling, environmental organisations could attempt to influence consumer-choice, and thereby the producers (Micheletti, 2003).

(v) Changing discursive practices and the emergence of new ideologies in political and societal arenas.

In contemporary environmental discourses, the fundamental juxtaposition of environment and economy, so characteristic of the 1970s, can hardly be found anymore. This goes for discourses as found in policy-making circles, within the environmental movement and within corporate circles. In current environmental ideologies "neither the fundamental counter-positioning of economic and environmental considerations nor a total disregard for the importance of environmental considerations are accepted any longer as legitimate positions" (Mol, 2003, 62). Notwithstanding the fact that there is often a gap between ideology and practice, environmental arguments are by now an indispensable part of decision-making practices which cannot easily be done away with by governments and/or corporations.

3. Original formulations, critique and modifications

Having described its history and core characteristics, I now proceed by describing two different versions of ecological modernisation theory which represent the first and second formulation of ecological modernisation theory. To understand the plurality of visions, ideas and concepts that are captured under the heading of ecological modernisation theory - and also to understand some of the critique and how that is rebutted – it is important to acknowledge that

each version of ecological modernisation theory is a blend of normative and descriptive elements.[4]

EcoMod 1: First formulations of ecological modernisation

The first references to the process of ecological modernisation were inspired by the (empirical) observation that within the field of environmental policies, a number of developments occurred that did not match the prevailing social theoretical thinking about the environment. These empirical developments, such as the deployment of certain policy principles like the polluter-pays-principle, the use of (new) environmental policy-instruments, and the development of environmental auditing schemes, were increasingly seen as constituting the process of ecological modernisation. "The main conclusion here can and must be that environmental issues moved from the periphery to the centre of concern for a great number of different social groups and organisations" (Spaargaren, 2000b, 53). The influence of these early formulations of ecological modernisation theory stretches beyond mere historical descriptions. Ecological modernisation was also framed as a normative social-political program in which the deployment of these instruments to deal with the environmental problems of that time was discussed.

Subsequently, ecological modernisation as a normative program was embraced by policy-makers, corporations and part of the environmental movement as way of dealing with environmental concerns under the conditions of modernity.[5] The first formulation of ecological modernisation, *EcoMod 1.0,* is characterised by its specific interpretation of some of the core concepts, emphasising in particular the beneficial role of science, technology and new managerial structures. By developing an appropriate managerial structure for dealing with environmental issues – a structure which would be more susceptible to environmental concern and would seek to identify win-win situations – environmental gains would more or less automatically follow out of technological progress and modernisation. Representing the optimistic, technocratic storyline so often criticised, this 'simple' interpretation of ecological modernisation marginalizes the pivotal role of civil society, citizen-consumers and even political institutions in creating a 'sense of urgency' and directing attention to the relevant environmental issues.

In response to this optimistic story-line, a parallel line of thought emerged which argued that this interpretation of ecological modernisation might "involve little more than a rhetorical rescue operation for a capitalist economy confounded by ecological crisis" which would "defuse the radical potential of environmentalism and deflect the energies of green activists" (Dryzek, 1997, 148). The process of ecological modernisation should be accompanied with

parallel processes of social innovation, giving rise to new arrangements between producers, governments and civil society. Within this more reflexive variant of ecological modernisation theory – *EcoMod 1.1* – the development of new institutional arrangements and radical social choices are considered as key factors in improving the environmental performance of societies. "The challenge for reflexive ecological modernisation lies much more in finding new institutional arrangements in which different discourses (and concerns) can be meaningfully and productively related to one another, in finding ways to correct the prevailing bias towards economisation and scientification, and in active intersubjective development of trust, acceptability, and credibility." (Hajer, 1995, 281)

By linking ecological modernisation to the democratic processes of deliberative social choice, Hajer links up with the work of Habermas and the critical theorists. In this field of literature, much attention has been given to the pragmatic and normative need for democratic reform. Dryzek has written extensively on democratisation and the environment with as central argument that environmental democracy should be based on the strengthening of the public sphere, with non-state actors challenging the primacy of the state (Dryzek, 1990, 1996). In *EcoMod 1.1*., "experts would lose their privilege, and authority in general would be reconstituted in networks which would cross the traditional boundaries of the state, economy, and society" (Dryzek, 1997, 149). The work on new policy innovations (Mol et al., 2000, Jordan et al., 2003c), on the role of citizen-consumers (Spaargaren, 1997, 2000a), and on the changing relations between citizen-consumers and producers (van Vliet, 2002) should be placed in this perspective; all have contributed to the development of ecological modernisation theory as more than a technocratic, overly optimistic story-line.

The critique on EcoMod 1

Up to the mid-1990s, ecological modernisation received significant criticism from neo-Marxist and deindustrialisation perspectives since it claimed, among others, that under capitalist conditions technological progress can make a substantial contribution to solving environmental problems, rather than arguing that capitalism is inherently incompatible with environmental concern (see e.g. Hannigan, 1995). As Mol and Spaargaren (2000) have argued, the initial critique on ecological modernisation theory as an technocratic optimist theory is outdated since (i) the theory has profited from the critique and reformed and refined itself, (ii) the changes in the academic discourse meant that the contemporary debates deviate from those in the late 1970s and 1980s (when the deindustrialisation and small-is-beautiful movement was at its peak). Fi-

nally (iii) the social circumstances concerning environmental problems, reforms and the role of different actors have changed considerably.

Later ecological modernisation studies showed a less deterministic view of technological innovation and focussed more on the dynamics between state and market in bringing about environmental change (Weale, 1992). "During this phase, the institutional and cultural dynamics of ecological modernisation were given more weight, as well as the role of human agency in environment-induced social transformation." (Mol, 2003, 58) In policy-making circles, the theory might indeed have been interpreted as a plea for more technology, without rethinking the social structures underlying environmental deterioration. In the academic debate ecological modernisation theory evolved, influenced by this debate, into a reflexive variant, *EcoMod 1.1,* where it was recognised that ecological modernisation must entail more than just a 'technological fix'. The need to find new ways to deal with environmental problems, based on (new) policy-instruments and societal arrangements which facilitated the involvement of the various state, market and civil society actors, was acknowledged, although these do not necessarily entail doing away with the institutions of modernity.

EcoMod 2: Reformulating ecological modernisation theory

From the early 1990s onwards, ecological modernisation theorists have increasingly been concerned with the embedding of ongoing developments in the field of environmental protection and policies in social theory. Through the reflection on the empirical developments described above, juxtaposing them to existing sociological theories and conceptual frameworks, ecological modernisation theory developed into a social theory of environment-induced change, labelled *EcoMod 2*. The core of ecological modernisation theory as a social theory is the claim that we witness the 'emancipation' or growing differentiation of an ecological sphere and an ecological rationality (Mol, 1995, Spaargaren, 1997). Before this 'emancipation', ecological concerns were conceived of only in relation to the economic rationality and primarily dealt with by economic institutions. Under the conditions of ecological modernisation such concerns gain a relative independent position; "the environmental crisis becomes the vehicle for a further modernisation process, where new subsystems arise to deal with (ecological) issues because they cannot be properly dealt with within the existing institutional make-up of modern societies" (Spaargaren, 2000b, 54). The establishment of this new, ecological subsystem is illustrated by the emergence of new social, political, economic and scientific concepts which facilitate "the integration of ecological rationality as a key variable in social decision making" (Hajer, 1996, 252).

On various occasions, ecological modernisation theory has been linked to other (general) social theories such as structuration theory (Giddens, 1984, 1990), risk society theory (Beck, 1992), and reflexive modernisation theory (Beck, 1994). Giddens' structuration theory, as elaborated in Constitution of Society (Giddens, 1984), is first and foremost a formal theory aimed at understanding the general underpinnings of societies. However, some of the key concepts - such as the duality of structure – and some of the core methodological approaches – focusing on middle-range concepts such as social practices – have found their way into the ecological modernisation discourse.[6] In later work, Giddens (1990) has described the consequences of processes of time-space distanciation, globalisation and the increased 'reflexivity' of modern social life on the institutions of modernity, thereby influencing ecological modernisations analysis of globalisation (see for example Mol, 2001).

With the translation of Beck's 'Risk society' (1992) the notion of risks became inextricably linked to the environmental social sciences. [7] Through an analysis of contemporary risks, Beck criticised the role of modern science and technology. Science and technological progress have contributed to the construction of man-made, technological risks, yet are unable to assess, let alone prevent, such risks properly. In 1992, Spaargaren and Mol (1992) argued that the work of Beck on the risk society first and foremost contradicted ecological modernisation theory as it fundamentally criticized science and modern technology; "in fundamentally criticising science and technology, the earlier contributions to risk society theory paralleled deindustrialisation/ demodernisation perspectives to a major extent" (Mol and Spaargaren, 2000, 21). Consequently, it was argued that the ideas and concepts of ecological modernisation theory contradicted some of the radical formulations of risk society theory (Blowers, 1997, Cohen, 1997, Mol and Spaargaren, 2000).

The work on reflexive modernisation theory, most notably that of Beck, Giddens and Lash (1994), has contributed to a further refinement of ecological modernisation theory. Without discussing the origins and consequences of reflexive modernisation in detail, it is possible to identify a number of features that are shared with ecological modernisation theory. Common features of both theories are the transformation of political institutions, the emergence of sub- and supra-national political arrangements (see for example Beck's notion of sub-politics), the changing role of civil society and the changing role of markets and economic actors in triggering environmental change. For Beck, 'reflexive modernisation' means foremost "self-confrontation with the effect of a risk society that cannot be dealt with and assimilated in the system of industrial society" (Beck, 1994, 6). Building on the risk society theory, Beck argues that contemporary (mostly environmental) problems can no longer be dealt with under conditions of simple modernity (characterized by an empha-

sis on experts, science and state-based rule-setting). As we are heading towards a condition of reflexive modernity, science and technology are forced to open up to societal concerns; expert knowledge is supplemented with lay-knowledge and sub-politics – where "agents outside the political or corporatist system are allowed to appear on the stage of social design" (Beck, 1994, 22) – come to play an important role. The consequence is not only that science has to open up to a process of democratisation, but also that civil society and individual citizens gain greater transformative powers.

The close linkage between risk society theory and the theory of reflexive modernisation (Beck et al., 1994), in combination with the apocalyptic nature of the former, at least suggested that the ideas of reflexive modernisation theory contradicted ecological modernisation theory. However, "more recently, the similarities between reflexive modernisation as the umbrella theory, and ecological modernisation and risk society theory as its substantial parts, have been highlighted" (Mol and Spaargaren, 2000, 21). As an umbrella theory, reflexive modernisation describes the changing societal conditions as simple modernity is replaced by a reflexive, second modernity. The argument is that the decreasing authority of expert knowledge, somewhat paradoxically accompanied with the increasing awareness of (environmental) risks, requires societies to become reflexive. Herein lies a significant point of overlap; both risk society theory and ecological modernisation are primarily concerned with the societal responses to environmental risks and issues and discuss the impact of reflexivity and of processes of reflexive modernisation. However, there continue to be some differences. Within risk society theory, the negative logic of the distribution of risks, determining how they should be dealt with, is believed to be of overriding dominance. Ecological modernisation theory stresses that although environmental issues gain independence, they are dealt with in a context where other societal and economic considerations are taken into account (and consequently, they should also be analysed within this context).

4. Contemporary critique on *EcoMod 2*

From the mid 1990s onwards, the critique on ecological modernisation theory changed somewhat in nature as the dominant critique from the de-industrialisation perspective gave way to new kinds of criticism. As illustrated by Mol and Spaargaren (2000), the most important of these come (in no specific order) from post-modernists, eco-centrists and, having reformulated their critique, neo-Marxists.

Post-modernist critique: the social construction of environmental problems

The controversy between ecological modernisation scholars and post-modernists focuses on the materiality of environmental problems. Historically, issues of environment and nature were given little attention in the social sciences, being seen as irrelevant for the study of humans and societies. The fact that these issues were gradually taken up into the social sciences can be attributed to the emergence of human ecology. The critique on human ecology has always been that it oversimplifies concepts such as nature and environment, not paying attention to the fact that such concepts are socially constructed. Subsequently, a debate emerged around the question to what extent concepts such as nature and environment are socially constructed. Post-modernists take the arguments to the extreme, arguing that there are no such things as 'real' or 'objective' environmental problems (Blühdorn, 2000). "The main objective of these radical postmodernists seems to be to show that all borders are time- and spacebound 'social constructions' which can be 'played upon' now that we have become aware of this fact in our post-modern times." (Mol and Spaargaren, 2000, 29) The consequence is that it makes no sense to speak of sustainable development or ecological modernisation as a new grand narrative organising contemporary societies.

Although ecological modernisation scholars have juggled with these epistemological issues (for example Hajer, 1995), the radical points of view that environmental problems are only social constructions has not been embraced. At the same time, this does not imply that environmental issues can be described, analysed and solved solely by reference to undisputed facts, particularly since science and technology are contested under conditions of reflexive modernisation. The analysis of environmental problems and arguments should thus take two perspectives; they "belong to the type of problem which needs to be analysed and understood not only as social constructs but also in terms of the language of the natural and biological sciences" (Mol and Spaargaren, 2000, 31).

Radicalism versus reformism

Another recurrent critique on ecological modernisation theory is that it is too modest. Radical eco-centrists criticize ecological modernisation theory because it does not 'automatically' put environmental problems at the centre of the stage. To a certain extent, this debate resembles the earlier HEP-NEP debate within environmental sociology in which the Human Exemptionalist Paradigm was juxtaposed to the New Ecological Paradigm (see for example Dunlap and Catton, 1979). The pivotal question is whether or not environmental issues should be given priority over other societal concerns, as eco-

centrists would argue (Dryzek, 1987), or not. In describing this juxtaposition, Dobson (1990) has made a distinction between ecologism and environmentalism. Ecologism is radical: it is about fundamental changes in the existing ordering of societies. Environmentalism on the other hand takes a more moderate 'reformatist' position, aiming to incorporate environmental care within existing institutions and the existing organisation of production and consumption.

Ecological modernisation perspectives should, in the light of this dichotomy, be characterized as example of environmentalism. "Ecological modernisation perspectives do not give environmental objectives an undisputed priority over other societal objectives" and "proposals for environmental improvement do not automatically entail radical social change in the sense promoted by eco-centrists" (Mol and Spaargaren, 2000, 35). Although this should not lead one to conclude that ecological modernisation theory suggests that societies' structure and culture are not part of the cause of environmental problems, radical ecological perspectives are rejected because of their one-sidedness and because the radical critique is more of a contemplative character and cannot easily be translated into real-life policy proposals.

This dichotomy between reformist and radical solutions to environmental problems can also be found in debates on the (environmental) consequences of globalisation. As argued in the influential yearbooks on global civil society, civil society positions to globalisation can be categorized as supporters, rejectionists, reformists and alternatives. Whereas radical ecologists generally take a rejectionist position vis-à-vis globalisation – characterised by the rejection of global capitalism and an emphasis on national sovereignty – ecological modernisation theory is seen as part of the reformist camp (Anheier et al., 2001).

Neo-Marxist critique: downplaying issues and power and inequality

Neo-Marxism was one of major schools of thought on environmental issues in the 1970s, characterised by a strong criticism on the relations of production and the consequent inability of societies to deal with environmental concerns properly. Early critique from the neo-Marxists field focussed primarily on ecological modernisation theory its naïve view on societal change, as predominant in early formulations of ecological modernisation theory. Although ecological modernisation theory has come to respond to this line of critique by acknowledging the (sometimes) conflictual nature of environmental reform, contemporary neo-Marxists critics continue to stress that notions of power and inequality remain under-theorized (Schnaiberg, 1980, Blowers, 1997). In response to this issue, some have argued that the distribution of contemporary environmental problems and risks follows new patterns, predisposing some

neo-Marxists viewpoints. Beck (1992) has emphasised that the 'old' class distinctions lose some of their explanatory power under the new distribution of risks. New environmental problems and risks are distributed along new lines (for example vegetarians versus those that do consume meat) or even distributed homogeneously (the prime example being the risk of nuclear accidents). Various authors (see for example Buttel, 2000b) have rightfully argued that it is an exaggeration to state that risk are by now evenly distributed; the well-off have better means to avoid risks or protect themselves.[8]

Although Beck has made the point that the classic distribution of environmental risks along the lines of economic well-being is no longer the sole axis along which distributional issues can, and should, be analysed, neo-Marxist environmental sociology has succeeded in putting the issue of inequality on the agenda. "It has been especially neo-Marxists that have contributed to our understanding that (i) environmental problems are unequally distributed among groups/classes in modern societies, (ii) radical environmental reforms are obstructed by the contemporary capitalist structure of modern society, and (iii) radical environmental reforms in this society often results in unequal consequences or distributional effects." (Mol and Spaargaren, 2000, 39) The emergence and institutionalisation of the environmental justice movement is further evidence that the classical Marxists notion of inequality continues to be relevant in relation to (the analysis of) environmental reform.

The neglected role of consumption and consumers

Up till the 1990s, environmental policy-makers and ecological modernisation theory scholars focused predominantly on the role of producers and governments in dealing with environmental problems, thereby overlooking the important role of consumers in both causing and solving these problems. In the 1990s it was gradually acknowledged within policy-circles that consumers should be targeted as well; the consumer moved out of the periphery and occupied a more central position in the process of bringing about environmental reform.

When attempting to incorporate the issue of consumption into the framework of ecological modernisation theory, two major obstacles emerged. First of all, existing social scientific research concerned with consumer-choice tended to be based either on economic theories or on the attitude-behaviour model derived from social-psychological studies (see for example Ajzen, 1991). This perspective has influenced the discourses on consumption and environment for a long time (of more recent date is for example Steg, 1999) but has neglected to study the relationship between attitudes and behaviour on the one hand, and the context, or infrastructures, of consumption on the other.

Secondly, general sociology was of relatively little value since it tended to study consumption predominantly as a derivate of production, turning consumers into passive, seduced and addicted victims of an artificially created consumer culture. When discussing consumption, sociologists generally did not think in terms of agency, but rather in terms of construction, manipulation and signs (Appadurai, 1996, Slater, 1997, Baudrillard, 1998). It was not until the spread of post-Fordism that consumption was placed on a more or less equal level with production; "the post-Fordist turn has established a perspective that recognizes the crucial position of consumers and consumer groups in structuring production-consumption cycles under the condition of (late or reflexive) modernity. The concept of consumer society is no longer seen as a starting point for criticising over-consumption, but it is recognised instead as the key concept to a better understanding of the dynamics of industrial societies" (Spaargaren, 2000a, 327).

When studying the role of citizen-consumers in processes of ecological modernisation, an insightful starting point might be to make an artificial distinction between two different aspects. In a narrow sense of the word, the ecological modernisation of consumption refers to the development and appropriation of new products, technologies or codes of conduct by citizen-consumers. Such an approach runs the danger of focussing too much on single products and personal attitudes whereas one also has to take the systems of provision into account; "to understand why, how and to what extent domestic routines incorporate the new equipment, products, goods or (utility) services, one has to study the ways in which these socio-technical devices are produced, made available, acquired and used by different actor groups in the chains or cycles or production and consumption" (Spaargaren, 2000a, 328). Innovations (of different kinds) need to find their way to consumers and be included in the organisation of everyday life and this happens (or does not happen) through various arrangements revolving around technical, social and economic ties. In this process, innovations run the risk of falling into various slots, hindering their further incorporation into social practices (Spaargaren and van Vliet, 2000).

In a broader sense, the ecological modernisation of consumption *and* production refers to those processes by which consumer-choice can be instrumental in pushing governments and corporations towards the development of environmentally friendly policies, strategies and products. For a number of reasons, the importance of consumers in the organisation of production and consumption is believed to increase. The aforementioned theory of post-Fordism related this development primarily to the organisation of production but other developments are at stake. At the political level, liberalisation has introduced the notion of consumer-choice to formerly closed markets (such as the elec-

tricity market). Environmental issues have also become a playing ground for experimenting with new instruments for governance and a number of these instruments, labelling being the most visible example, tap on the power of consumers in bringing about change (see for example Jordan et al., 2003b). In line with arguments on the changing role of the nation-state, ecological modernisation theorists "point to the need for a paradigm shift in policy-making that takes its point of departure in developing sustainable lifestyles and changing consumer behaviour rather that in legislation and policy-tools that rely on state intervention and regulation" (Micheletti, 2003, 8). The use of new forms of governance is not restricted to government agencies. Non-governmental organisations have increasingly (sometimes in conjunction with companies) sought to develop new means for regulation, such as labels or the disclosure of environmental information.

5. Towards *EcoMod 3*: Globalisation, flows and environmental reform

Up to this point, the past developments within ecological modernisation have been discussed as well as the responses to various forms of criticism. Recent notions such as internationalisation and globalisation pose new challenges to ecological modernisation theory. In this section, I describe how these processes challenge theories of environmental reform and has an impact on some of the core notions of ecological modernisation theory. Drawing upon the emergent sociology of flows, I aim to identify possible points of convergence which can be instrumental in updating ecological modernisation theory towards *EcoMod 3*.

Globalisation as a challenge to ecological modernisation theory

As illustrated before, ecological modernisation theory originated in North-Western Europe in the early 1980s as a result of the responses of governments and civil society to emergent environmental issues. Although it is argued that the applicability of the theory – in geographical terms – is limited to industrialized, or OECD, countries, the 1990s have witnessed the proliferation of research aimed at analysing the usefulness of ecological modernisation theory in various contexts such as the former communist transition economies (Rinkevicius, 2000), sub-Saharan Africa (Frijns et al., 2000) and South-East Asia (Lei, 2002, Phuong, 2002, Dieu, 2003). The preliminary conclusion to date is that "in some of these developing countries ecological modernisation heuristics

are at best of partial value in analyzing environmental reform processes and practices" (Mol, 2003, 64). It is argued that the applicability in for example sub-Saharan Africa is marginal, whereas the ideas of ecological modernisation theory are more appropriate in newly industrializing countries and the Central and Eastern European countries. Although this line of research continues to be explored, the processes of globalisation pose new challenges to ecological modernisation theory.

The emergence of global environmental problems and the increasing time-space distanciation confront ecological modernisation theory with challenges of a different order. Predominantly local and national environmental concerns, which determined the environmental agenda in the 1970s and 1980s, were tackled by the development of national environmental policies but the 1990s witnessed the emergence of global environmental concerns and subsequent responses. Issues such as global warming, decreasing biodiversity and the decay of the ozone layer required new forms of international collaboration and new institutions. In roughly the same period, the notion of globalisation became increasingly popular in academic and non-academic debates.[9] Companies and governments refer to the effect of globalisation on their (limited) capabilities to set and enforce environmental standards (whether legitimate or not). A global civil society emerged within which pleas for a different kind of globalisation go hand-in-hand with concerns about environment and sustainable development.[10] In the (popular) scientific literature, the negative consequences of globalisation on the environment, whether caused by a 'race to the bottom' or the inability of nation-states to set and enforce environmental regulations, are stressed (see for example Klein, 2000, Hertz, 2001). Others argue that environmental protection is possible under conditions of globalisation, that the development of global environmental standards can have a positive impact in developing countries, and that the emergent global critical consumer movement can play a role in greening production and consumption chains.

Analysing globalisation from an ecological modernisation perspective

As argued by Mol (2001), the relation between globalisation and environmental reform (or ecological modernisation) cannot be understood through simple dichotomies, it is not predominantly positive or negative. What matters is that under the heading of globalisation, a number of processes take place which alter the roles of, and relationships between, various involved actors. Mol (2001) argues that one should recognise that globalisation in itself is a multi-facetted concept with both positive and negative consequences for the environment. Thus, when analyzing the environmental impacts of globalisa-

tion, "we have to realize that it is not the mere quantities or locational characteristics of services, goods, and capital globally transported or produced that are decisive. Modes of production, regulation styles, internationalisation of competition, preferential treatment by national or regional governments, investment patterns that are increasingly beyond national control, technological innovations and diffusions, interference of local communities and NGOs, and other factors all contribute to the final environmental outcome of the processes of globalisation" (2001, 38).

To analyse the debate on the relations between globalisation and environmental reform in the terms of ecological modernisation theory, I return to the core characteristics of ecological modernisation theory as discussed earlier.

(i) The pivotal role of science and technology in bringing about environmental reform.

In the 1980s and 1990s environmental technologies – integrated or end-of-pipe – proved to contribute to the reduction of pollution levels. The argument that technologies are the cause of, rather than part of the solution to, environmental problems consequently now sounds somewhat outdated.[11] Discussions on the relation between technological development and (solutions to) environmental problems have in recent times focussed more and more on the (global) governance of technological development, on the appropriation of technological developments by various societal actors, the proper adjustment of technologies to the societies in which they are to be embedded (appropriate technology), and on the transitions of socio-technical systems (Rotmans, 2003, Elzen et al., 2004). The processes of globalisation thereby add a new dimension to social theories on technology, being confronted with questions about the extent to which technologies are globally useable, and the extent to which the benefits of technological development are equally distributed.

(ii) The increasing role of global economic and market dynamics and agents in responses to environmental change.

Processes of globalisation have broadened the range of actors involved in the development and functioning of governance arrangements. "Under conditions of globalisation, political arrangements and institutions are no longer restricted to the level of the nation-state system. Both the agents of civil society and the agents of economic interests are beginning to become active and powerful in environmental politics at the sub- and supra-national levels." (Mol, 2003, 208) The increasing importance of economic and market dynamics and economic agents is exemplified by the increasing influence of non-state actors

in governance arrangements, as seen in for example the active engagement of civil society groups, corporations and private actors – such as certifying institutions.

Within production and consumption chains, new dynamics also provide actors with new means to exert influence. The 'crisis of mass production' is central to what Lash and Urry (1987) label the 'end of organised capitalism'. The rise and promotion of individualist modes of thought and behaviour, the increasing plurality of lifestyles and personal values and the privatisation on domestic life and leisure pursuits are characteristic of the post-Fordist condition. As consumers demand choice and flexibility they become more influential in the organisation of production and consumption; companies have to respond to the demands of consumers, rather than the other way round. This argument is also central to theories of post-Fordism which, according to Kumar (1995), point primarily at a change in the forces of production; one of the most important sources of post-Fordist production is the emergence of a demand for more varied and customised goods, produced in short series. The processes of privatisation and liberalisation have a similar effect; the influence of consumer-choice on the organisation of production and consumption chain changes.

Apart from the changes that took place within corporations, the 'discovery' of the consumer as a possible agent of change has also led to a change in the range of policy instruments available to, and used by, the institutions of the nation-state. Often strict command-and-control forms of regulation are replaced by 'demand-pull' strategies which seek to influence consumer behaviour and, through that, producers.

(iii) Various transformations regarding the role of the nation-state under conditions of globalisation.

Arguably the most debated consequence of globalisation is the decreased authority and sovereignty of nation-states in developing, implementing and enforcing environmental legislation and policy. In various ways, globalisation limits the range of available intervention possibilities. The most visible manner through which this takes place is the emergence of global political institutions, such as the World Bank, and the development of international agreements which affect the position and available range of policy-options for national governments. Obvious examples are the limitations imposed by the World Trade Organisation whose agreements enable states to question the legitimacy of environmental regulations because of their (supposed) trade-restrictive character.[12] At a more abstract level the increased fluidity of international capital and labour has made it more difficult for nation-states to implement

and enforce efficient national regulation. The increased proliferation of global networks causes a general change in the nature of 'governing'. Referring to the work of Bauman, Urry (2000) describes this change as the shift from gardening states – in the position to change the course of things in detail – towards gamekeeping states – much more limited in their ability to enforce change and only able to set the rules of the game.

Even so, the transformations regarding the traditional role of the nation-state in environmental reform do not mean that the nation-state in itself is rendered powerless (see for example Held et al., 1999, Jänicke, 2002), nor that the concept of the nation-state is useless in social theory. In attempting to overcome problems of legitimation and authority, nation-states have come to experiment with new environmental policy instruments which promise to overcome the shortcomings of the old policy instruments (van Tatenhove et al., 2000, Jordan et al., 2003b). In these new arrangements for environmental governance – for example voluntary agreements, partnerships, and eco-labelling – the nation-state is no longer the bogeyman who commands and controls but has re-invented itself as one of the actors in newly established networks for environmental governance.

(iv) A modification of the position, role and ideology of social movements under conditions of globalisation.

Processes of globalisation also have an impact on the relation between the nation-state and (national) civil society groups. In the case of those environmental problems that are still predominantly governed through the co-operation of individual nation-states – think of the Kyoto protocol – the environmental movement continues to pressure the nation-state to develop stringent international agreements. However, as new forms of policy-making are employed – based on consultation and the cooperation with various groups of actors – civil society actors are provided with new means to exert influence.

The rise of global networks in the corporate and political domains has been paralleled by a modification of the position, role and ideology of social movements. NGOs, and the environmental NGOs are of particular importance here, have become embedded in (national and international) policy-networks, and the described shift from gardening to gamekeeping politics opens up new possibilities for NGOs to engage in environmental governance arrangements. According to some, the developments in the field of ICT and the rise of global media networks have not only caused a change in the tactics used by the environmental movement but also contributed to the globalisation of the movement (Pickerill, 2003, Bach and Stark, 2004). This latter development comprises both the increasingly global orientation of major environmental organi-

sations such as Greenpeace, as well as the emergence of a global network of mutually cooperating civil society groups and international linkages, based on shared ideas and values (Anheier et al., 2001).[13]

(v) Changing discursive practices and the emergence of new ideologies in global political and societal arenas.

The global adoption of the notion of sustainable development meant a decisive break with the old juxtaposition of economic and environmental interests; they are now discussed as mutually dependent issues. However, contemporary discussions focus not only on the question how sustainable development can be operationalised but also on the question what sustainable development actually entails under conditions of globalisation. More and more, the question becomes how global economic processes and production-consumption chains, and the environmental problems that go along with them, are distributed, both on a local and on a global scale. The various attitudes towards globalisation – as defined earlier – often represent different ideologies when it comes to the relation between environmental care and globalisation. Anheier et al. (2001) distinguish between supporters, rejectionists, reformists and alternatives on the basis of attitudes towards (the advantages and disadvantages of) globalisation. For example, supporters favouring global capitalism are positive towards plant biotechnology and favour de-regulation and free trade; rejectionists include radical ecologists who condemn global capitalism and plant biotechnology and favour national protection of markets, and ecological modernisation scholars generally are part of the reformists who aim to civilise and ecologize globalisation.

Reflecting on the impact of globalisation on environmental reform, in relation to the five core characteristics of ecological modernisation theory, it can be argued that global environmental problems, the global organisation of production and consumption, and the emergence of global (networks of) civil society groups pose new challenges to the theoretical understanding of environment induced transformations in general and to ecological modernisation theory in particular. Two key theoretical challenges are apparent. First, there is the question how globalisation affects the roles of responsibilities of various actors involved in bringing about environmental reform. Secondly, there is the question how these changes challenge conventional social theory on the environment and direct us towards the sociology of flows (cf. Castells, 1996, Urry, 2000, 2003).

Juxtaposing the sociology of flows and ecological modernisation theory

The question is how these developments related to processes of globalisation are to be analysed from a sociological perspective – particularly focussing on their environmental dimensions. According to some, the consequences of globalisation are of such a nature that traditional sociological frameworks no longer suffice in analyzing these consequences. Changes in the conditions of modernity have instigated a (theoretical) debate on the most appropriate way of framing these developments within sociological theory and this debate spills over in the discourse of (environmental) sociology. It is argued that *EcoMod 2* is in need of revision, with a greater emphasis on global dynamics, the changing role of nation-states, corporations and citizen-consumers, and particular attention for flows as an analytical concept. This could also be the start for resolving some of the controversies between ecological modernisation theory and other, most notable neo-Marxists, social theories on the environment since " these debates are in need of reformulation, especially against the background of a rapidly changing global world order and the related emergence of new social theories" (Mol and Spaargaren, 2005).

The building blocks for the sociology of flows were laid down by Castells (1996) and Urry (2000, 2003). As was briefly discussed in the previous chapter, Castells' analysis on the emergence of 'informational capitalism' emphasized how the use of new information and communication technologies has not only changed the (internal) organisation of (global) businesses but also challenges nation-states, corporations and civil society to situate themselves under the changing conditions of modernity. Castells stresses the pivotal role of networks in the organisation of modernity; contemporary flows of people, money and ideas, which are routed through nodes such as the mega-cities like Hong-Kong and New York, are increasingly footloose. Facilitated by ICT, the ease with which these flows cover various geographical territories, and the ease with which they can omit certain regions in favour of others, increases. They are increasingly 'fluid', more difficult to regulate than before. Traditional institutions like the nation-state thus increasingly face difficulties in governing these flows, not only because they transcend the jurisdiction of individual governments but also because their fluidity means that attempts to regulate them might lead them to take another course.

While Urry recognises the importance of the work of Castells in bringing the notions of networks and fluids, and their interrelations with processes of globalisation, to the fore, his analysis takes some further steps in developing a sociology of flows and mobilities (Urry, 2000, 2003). According to Urry, one should not think of globalisation as one uniform, linear process through which regional and national differences and varieties will ultimately be subsumed by

a global order and global structures. Globalisation is a set of multi-facetted and complex processes which should be analysed from a network perspective.

Both Castells and Urry share the perspective that the networked character of globalising societies is exemplified by the emergence of flows – of people, information, money et cetera – which are moving through the junctures and disjunctures of various global 'scapes' which comprise the physical and organisational structures through which various actors, technologies, ideologies et cetera are linked (Appadurai, 1996, Urry, 2003). The proliferation of such networks implies that a major shift occurs when it comes to the questions who is in control - who steers these networks – and what means are available through which flows and networks can be steered. A directly related concern is that flows and networks create new inequalities as access to the global flows and scapes is unevenly distributed (Graham and Marvin, 2001).

Against this background Urry argues that the role of agency is rather limited, whether at the individual or collective level. At the level of concrete social practices, the role of technologies and material objects – think of the infrastructures through which personal mobility, energy consumption, et cetera take place – is of such order that "the development of these networks cannot and should not be 'directly and uniquely' connected to human intentions and action" (Mol and Spaargaren, 2006). At the collective level, Urry argues, the complexity and unpredictability of the processes of globalisation add to the loss of agency. Consequently, nation-states "seem to fall away as mediators between the space of flow and the space of place, which render the concept of governance problematic" (Mol and Spaargaren, 2006, 52).

In taking the first step towards analysing what environmental sociology can learn from the sociology of flows, Mol and Spaargaren (2006) have illustrated how various developments within environmental sociology ran parallel with – and sometimes inspired – the development of the sociology of flows; the international character of many environmental problems and the subsequent inapplicability of nation-state oriented sociological modes of analysis, the changing boundaries between state, market and civil society, and the (reoccurring) debate on the relation between social, natural and material aspects in framing environmental problems. Subsequently, there seems to be common ground for a mutual exchange of ideas and concepts. At a general level it is thus argued that "reinterpreting and reconsidering environmental flows in ways suggested by the sociology of flows is beneficial for the environmental social sciences" (Mol and Spaargaren, 2005, 99). Having said that, there continues to be a number of issues on which the similarities between the sociology of flows and ecological modernisation theory are not as obvious, or absent, and where further elaboration is thus required.

From a methodological point of view, the question what constitutes a flow (and what not) remains problematic. Within the environmental sciences, flows generally refer to the movement of species, nutrients and perhaps products within and across regions. In the work of Castells and Sassen (2000), flows are defined in relation to the global economy and information and communication technologies. With Urry, the notion of flows comes to comprise virtually everything that moves, and although one could make a distinction between material, social and hybrid flows, there is a danger that the concept of flows loses its explanatory power.

Secondly, the issue of agency also requires further attention. With Castells' and Urry's emphasis on technological artefacts and networks, combined with the belief that (global) developments are inherently unpredictable, the fact that the course of action is influenced by the work of human agents (whether individually or collectively) is easily downplayed. As flows enter the picture, notions of agency seem to disappear. Exemplary in this light is Castells' analysis of the role of civil society where such groups are grouped as being part of the space of place, and consequently considered unable to have an effect on what happens in the space of flows. This does not do full justice to the range of activities that are employed by national and global civil society groups in governing environmental flows.

The emergent sociology of flows presupposes a fundamental reconsideration of the role of governments and governance. The role assigned to the nation-state has changed over time as nation-states are increasingly seen as part of regulatory networks; governance – where various societal actors come to interact to achieve socially desirable goals – has come to supplement 'government' – the strict rule-setting and enforcement by the institutions of the nation-state. The emergent sociology of flows has a somewhat problematic attitude concerning the role of government and/or governance. On the one hand, the changing roles of civil society, corporations and nation-states – where the latter turn into 'gamekeepers' rather than 'gardeners' – is discussed as a characteristic of the sociology of flows. In more recent work however, Urry (2003) comes to emphasize the notions of unpredictability, complexity and iteration, rendering virtually any notion of governing impossible. As argued by Mol and Spaargaren (2006) such a conceptualisation seems hard to reconcile with (classic and contemporary) environmental sociology in which ideas of governing and reform (nation-state oriented or not) have always played a central role.

Finally, the sociology of flows again emphasises the relevance of questions of access and power for environmental sociology. These issues can no longer solely be related to the ownership of capital (the classical neo-Marxist per-

spective). In the 'age of access' (Rifkin, 2000), questions of access to information and to flows of capital and people take centre-stage. "In following this analytical pathway, a sociology of environmental flows would pay attention to the conditions for access to environmental flows and to the scapes which structure the current dynamics of strategic environmental fluids, and analyse in some detail the consequences for groups, actors and organisations to whom access is denied or who do not mange to establish links with the relevant networks." (Mol and Spaargaren, 2006, 69).

Although it is too early to speak of a full incorporation of the sociology of flows within environmental sociology, the emergent sociology of flows does require environmental sociologists to reconsider their analysis on environmental governance, moving from place-bounded governance to the governance of mobilities, from questions of state sovereignty to questions of network governance, and from an emphasis on state-market relations to an emphasis on flow-place relations (Mol and Spaargaren, 2005). These issues provide the context in which the transformation of ecological modernisation theory from *EcoMod 2* towards *EcoMod 3* will be discussed.

6. Resume

Up to this point, this chapter has taken a backward-looking perspective by describing the development of ecological modernisation theory from its early years (*EcoMod 1.0* and *1.1*), via the debates in the 1990s (*EcoMod 2*), up to the current debates about the sociology of flows. As I have attempted to illustrate, the transition from *EcoMod 2*, which emerged as a response to some of the early critiques, towards *EcoMod 3* is by no means a *fait accompli*. Drawing upon the voiced critique against ecological modernisation theory and the emergent sociology of flows – with its own problems – I aim to sketch this thesis its research agenda.

My argument is that the analysis of environmental information flows can contribute to the debate on the development from *EcoMod 2* towards *EcoMod 3.* Information flows can be seen as the archetype of modern flows, routed through advanced information and communication technologies. Furthermore, the development of new monitoring technologies, and the way in which they are used – as sketched in chapter 1 – not only means that more and more actors, such as citizen-consumers, are involved in networks for governance but also has as a consequence that their role in environmental governance arrangements changes.

In this resume, I want to single out the core issues that follow from the overview of (the development of) ecological modernisation theory, and that are given centre stage in the current analysis of environmental information flows. Three general clusters of questions can be distinguished which connect relevant issues in the debate on ecological modernisation theory with the changing nature of environmental monitoring and emergent flows of information.

(i) Access and the social embedding of information flows

The debate between ecological modernisation theory and social-constructivism points us to the contested nature of environmental knowledge, including environmental information. Without embracing the radical constructivist perspective that environmental problems are first and foremost social constructs (and thereby downplaying their real consequences), ecological modernisation theory has to draw upon social constructivism as the latter illustrates that environmental knowledge (and thus information) cannot be considered undisputed facts. Following this perspective, environmental information flows must be deconstructed by asking questions about the object, range and method of monitoring, as well as about the kind of information that is made publicly available. Inspired by neo-Marxist perspectives, one must conclude that these processes of shaping and applying information based governance arrangements cannot be seen apart from questions of power and equality. To understand the distributional impact of environmental information flows, issues of ownership, monopolisation and distribution have to be taken into account. The question here is how access to information flows and access to the means to use the potential power of information are distributed; how do flows of environmental information actually flow; which actors are involved, and which are excluded?

(ii) Government and governance

The changing role of the nation-state in protecting the environment continues to a subject of study, whether that role changes as part of a deliberate strategy for political modernisation or as unwanted side-effect of globalisation. The question here is how (established, new or redirected) flows of information relate to (established or new) arrangements for environmental government and governance. As discussed, the sociology of flows argues that the increasing importance of flows means that the nation-state loses agency. With respect to the role of governments, the question is however not only how informational governance arrangements challenge the position and power of the traditional political institutions ('does the nation-state still matter?'). Acknowledging

that the nation-state has historically played an important role in the development of informational governance arrangements, and assuming that it still plays a role, a second set of questions emerge about the role of national political institutions in developing, facilitating or holding back flows of information.

The role of non-state actors in establishing, directing and utilising flows of information forms another subject of analysis. As civil society groups, businesses, and citizen-consumers are repositioning themselves in contemporary networks for environmental governance, questions about the roles and relative influence of these actors come to the fore. Civil society groups can play various different roles in informational governance arrangements, each of which with different consequences for the abilities of citizen-consumers to exercise countervailing power.

(iii) Bringing in the citizen-consumer

In line with the previous points, particular attention is given to the changing role of the citizen-consumers in environmental governance. One of the prepositions of this thesis is that, through environmental information flows, citizen-consumers are increasingly involved in new governance arrangements. There are a number of researchable issues here. At the more practical level, one can analyse how the chosen formats for information provision and dissemination determine the usefulness for citizen-consumers – and with that determine if and how they can exercise countervailing power. Taking the analysis one step further, one can examine the influence of citizen-consumers on the emergence of these informational governance arrangements. This exercise not only leads on to examine how citizen-consumers are involved in the actual development of countervailing monitoring; it also leads one to examine how public and private actors refer to citizen-consumers as actor in environmental governance (either in positive or negative terms).

CHAPTER 3

THE CHANGING CONTEXT: ENVIRONMENTAL MONITORING IN AN AGE OF INFORMATION

1. Introducing monitoring and surveillance

In chapter 2, I have not only illustrated that ecological modernisation theory underwent a transformation from *EcoMod 1* to *EcoMod 2*, but also that a new transformation, towards *EcoMod 3,* is in the making. Within *EcoMod 3*, the analysis of networks and flows is expected to gain dominance as the relative influence of static entities (such as nation-states) decreases. In seeking to contribute to this debate, this thesis focuses specifically on the role of flows of environmental information in bringing about environmental reform.[1] The existence of environmental information, and the fact that this information 'flows' to various societal actors is by no means a novelty. My argument will be that in conjunction with some more general changes in the organisation of modernity, a new dimension is added to these flows of environmental information. They are employed in new contexts, enrolling new actors, and setting in motion new processes of environmental reform. This raises new questions for environmental sociologists.

As argued in the previous chapter, juxtaposing the sociology of flows with ecological modernisation theory brings forth a number of issues worth investigating. Three clusters of questions were identified, focussing on (i) access and the social embedding of information flows, (ii) questions of government and governance, and (iii) the process of 'bringing in' the citizen-consumers. In this chapter, I relate these issues to the discussion on informational governance ar-

rangements. Taking a number of consecutive steps, I aim to de- and reconstruct environmental monitoring as a subject for sociological investigation. [2] First, I illustrate that the processes of environmental monitoring is relevant for sociological investigation by 'opening up' monitoring. Having done that, I proceed by reconstructing monitoring through a theoretically informed analysis of what monitoring exactly does (particularly in relation to environmental issues). After arguing that monitoring can contribute to a specific form of environmental reflexivity, I describe how this reflexivity is used in the construction of environmental governance arrangements. The last part of this chapter is aimed at the development of four theoretically informed key concepts that guide the analysis of informational governance arrangements in the following chapters.

2. Why study environmental monitoring?

The relevance of environmental monitoring

A quick search on the Internet quickly reveals the omnipresence of environmental monitoring as, for example, a task of environmental agencies, a field of business, an activity of civil society groups, or as a subject for academic journals.[3] The conventional usage of the term environmental monitoring refers to the range of activities undertaken by state-agencies or companies to measure the environmental quality in general, and emissions at particular points in the production process in particular, over a specified period of time.

What is monitoring exactly? If one digs deeper, one can find a wide variety of popular and scientific forms (and definitions) of monitoring. Monitoring can be used to supervise individuals, thereby exercising power in interpersonal relationships. On a more aggregate level, it can also be used to collect information on larger entities, such as populations of wild-animals or a group of people particularly vulnerable to certain risks. Monitoring can take place continuously, or be done on the basis of samples (for example when monitoring product quality). Drawing upon Lyon (1994, 2001), one could say that the common denominator within this variety is that through monitoring, information is collected and processed with the purpose of influencing and managing the subject on which, or whom, information is gathered.

Within ecological modernisation theory, monitoring is considered as an essential step in bringing about environmental reform since it is instrumental in 'making the invisible visible' (Shove, 1997). The process of ecological modernisation is believed to comprise the development of monitoring schemes

(whether based on actual measurements or modelling) through which information is gathered about substance flows. Through the acquired information, a number of consecutive steps are (or can be) set in motion by which the concerned actors seek to reduce the environmental impacts. Spaargaren considers monitoring to be of crucial importance for the processes of ecological modernisation. To understand the essence of ecological modernisation theory, one should not focus too long solely on the economic gains of environmental protection, win-win situations, et cetera; "what is essential is not the fact that the greening of production can bring about profits, but the fact that it will, eventually and inevitably, result in a process of monitoring and 'guarding' of all the major substance flows" (Spaargaren, 2000a, 325).

From there onwards, environmental considerations can be taken into account in their own right, being emancipated from purely economic considerations. The monitoring of substance flows can set in motion a number of processes which, intentionally or unintentionally, affect the position and responsibilities of state, market and civil society. Monitoring can be followed by 'monetarisation' where prices are attached to substance flows (for example the emissions of harmful substances). Alternatively, the monitoring of environmental impacts can trigger the development of policy instruments geared towards the redemption of consecutive problems. For example, corporations can use information to assess when pollution prevention pays, and civil society groups can, based on the acquired information, put pressure on governments and corporations.

Opening up: monitoring as a subject for sociological investigation

Arguably the most elaborated analysis of the usage of monitoring in relation to processes of environmental reform took place within the 'Domestic Consumption, Utility Services and the Environment' (DOMUS) research (Chappells et al., 2000). The role of monitoring in the changing relation between consumers and the utility sector was one of the central objects of research (van Vliet, 2000). It was described how monitoring was traditionally employed as a means of charging consumers individually (companies monitor consumption levels which enables them to send out individual bills). However, the utility sectors find themselves in a process of change where the traditional role of the utility company – to provide a specified geographic area with the required services – is transforming and this affects monitoring as well. This transformation is the result of the liberalisation and privatisation of the sector and, related to that, the fact that the utility sector is in a process of far reaching diversification, not only in terms of the clients being served, but also in terms of the products offered and the production methods that are used

(Guy and Marvin, 1996, Graham and Marvin, 2001, Guy et al., 2001, van Vliet, 2004). Taken together, these processes result in the fragmentation of the utility sector, as the traditionally principles of 'one provider serves all' and 'one products serves all' are replaced by the diversification of providers and products.

This fragmentation of the utility sector necessarily means that monitoring comes to play a more important role. Not only does the increased variety in terms of products and clients require more monitoring (not only to make sure that the right bill is delivered but also for example to secure the validity of green electricity schemes), monitoring also turns into a commodity itself. Influenced by the developments in the field of information and communication technologies (ICT), we witness the proliferation of new monitoring schemes that promise the consumer better insight into their domestic consumption levels, lower energy-bills, higher comfort, or more convenient meters.[4] New meters are however also designed to serve other goals, for example to facilitate the disconnection of non-paying consumers (an aspect stressed by Marvin et al., 1999).

By analysing various contemporary monitoring practices in the Netherlands, van Vliet (2000, 2002) comes to conclude that the rationality of many monitoring schemes is predominantly that of the provider. Monitoring schemes are often first and foremost meant to provide the provider with information but even if they are principally consumer-oriented the provider rationality commonly determines the eventual shape of the monitoring scheme (for example in terms of the formats and parameters in which information is provided). When it comes to the contribution of these monitoring schemes to the process of ecological modernisation, van Vliet argues that monitoring should include information concerning environmental performance on both sides of the meter with the aim of empowering consumers vis-à-vis producers. However, on the basis of existing practices, it is "too early to assess that contemporary monitoring in water and electricity systems makes these systems transparent and accountable in terms of environmental performance" (van Vliet, 2002, 107). In this context, Goldblatt (2002) has distinguished between two different approaches to increase the visibility of environmental problems (with an emphasis on energy consumption). The prevailing 'energy-revealing' approach comprises the increase in transparency by making use of the parameters familiar to economists and engineers (whether those indicators are euro's, kWh's, cubic metres, et cetera). A 'socially revealing' approach on the other hand would conceptualise energy consumption somewhat broader, taking energy consumption not only as an indicator for sustainability but also as a starting point for rethinking social practices and structures from a sustainability perspective. Such a 'socially revealing' approach, it is argued, would be more

suitable to encourage consumers to reduce energy-consumption and to stimulate institutional change (Goldblatt, 2002).

Briefly summarized, one can state that to understand monitoring, one should not focus solely on the technological aspects but should also recognise that monitoring is as much about "quantifying, labelling and evaluating the relations between consumers and providers" (van Vliet, 2002, 91); studying monitoring requires a focus on what is being revealed to whom. A narrow, instrumental view on monitoring might incorrectly suggest that monitoring is an autonomous process with pre-established objectives and outcomes. Monitoring should also be considered a social process – and thus open to sociological investigation. Concerning this process of monitoring, one can ask sociologically relevant questions about, for example, the capacity of involved actors to determine what is being monitored, how it is monitored, and to whom the collected information is provided.

Environmental monitoring – in all its diversity – is traditionally geared towards the needs of governments and their institutions, and the corporate sector. Nation-wide monitoring projects, as for example set-up by the Dutch National Institute for Public Health and Environment, are aimed at providing governments with the information to design better policies. Companies have developed monitoring schemes with the aim of getting insight into input, throughput and 'leaks'. The continuous development of metering, modelling and visualisation techniques – ranging from all-compassing satellite monitoring to the development of geo-portals (see for example Maguire and Longley, 2005) – ensures that these will continue to be important applications of monitoring. However, as I seek to illustrate here, monitoring is not solely of interest to technicians, nor is it a value-free technology or construct. Monitoring is open to sociological investigation, it is the result of political choices and conscious efforts to exercise power, and it has a real, perhaps unevenly distributed, effect on (the relations between) the various actors in the production-consumption chain and on their environmental performance.

3. Deconstructing monitoring and surveillance

The functionality of monitoring and surveillance

After having illustrated that (environmental) monitoring as a subject is open to sociological investigation, this section aims to reconstruct monitoring from a sociological perspective. It is particularly in the work of Giddens that the crucial role of surveillance in establishing and maintaining social relations, both at

the level of individual levels as at the level of societies, is discussed in detail. It is thus on this work that I draw in particular.

At the individual level, the monitoring of day-to-day conduct serves to provide direction and meaning to ones personal choices; it enables forms of reflexivity through which personal choices are related to the intended and unintended consequences of that exact choice. This entails more than just being aware of ones actions; it comprises a set of recursive practices through which actions and effects are evaluated and reconsidered as, through monitoring, information on these exact actions and effects becomes available. "Reflexivity hence should be understood no merely as 'self-consciousness' but as the monitored character of the ongoing flow of social life." (Giddens, 1984, 3) The purpose of this monitoring of conduct is twofold. At the most pragmatic level, it is a means to reflect on own conduct, for example to ensure that intended consequences are reached or that the unintended consequences remain acceptable. As such it is part of the rationalisation of action. At a somewhat 'higher' level, the monitoring of conduct is part of tying ones actions together in a more or less coherent lifestyle through which one is exposed to others; it is part of the construction of a self-identity through reflexively organised endeavour (Giddens, 1991). At the level of individuals, monitoring thus enables reflexivity over ones actions, its intended and unintended consequences, and how these fit into a 'narrative of the self'.

When it comes to the role of monitoring and surveillance in the development of organisations, Giddens argument can somewhat bluntly be summarized by the statement "that routine surveillance is a prerequisite for effective social organisations" (Webster, 2002, 205). [5] According to Giddens, surveillance constitutes one of the four institutional dimensions of modernity, next to capitalism, industrialism and military power. It is a necessity for nation-state since it is a tool for gathering information about their citizens, and ensuring that they behave in accordance to the nation-state's regulation (for example that they pay taxes). Surveillance is a constitutive element in the development of the nation-state as a power container; "surveillance as the mobilising of administrative power – through the storage and control of information – is the primary means of the concentration of authoritative resources involved in the formation of the nation-state" (Giddens, 1985, 181).

For Giddens, surveillance and monitoring are prerequisites for reflexivity and there are two dimensions of reflexivity which will appear throughout this thesis.[6] First, reflexivity can concern the (re)consideration of personal choices due to incoming information about intended and unintended consequences. Secondly, reflexivity can be used in the relationship between various actors as

incoming information about (ones own and the others) actions and consequences turns monitoring and surveillance into a 'technology of power'.

Reflexive modernisation and the need for more monitoring and surveillance

Under conditions of (reflexive) modernisation, the need for (both these two dimensions of) surveillance and monitoring increases; "modernity being a matter of increased choices made at every level necessitates heightened reflexivity, by which Giddens means increased surveillance (information gathering) so that we may develop knowledge upon which may be made choices about ourselves and the sort of society we want" (Webster, 2002, 205). This heightened reflexivity is required for a number of reasons.

First of all, the transformation from a traditional to a modern society means that established, 'fixed' life patterns are increasingly dismantled. Individual choices, as well as social structures, can no longer be justified by sole reference to tradition, "many of our day-to-day activities have in fact become open to choice or, rather, choice has become obligatory" (Giddens, 1994, 75). If traditions no longer provide individuals with a finite set of options to shape their life, a whole process of imagining who one wants to be (and attempting to achieve that) is set in motion (Appadurai, 1996). Once the course of actions and life are no longer justifiable solely by reference to traditions and traditional values, reflexivity takes one a new meaning; "the reflexivity of modern social life consists in the fact that social practices are constantly examined and reformed in the light of incoming information about those very practices, thus continuously altering their character" (Giddens, 1990, 38). The relevance for environmental sociologists here lies in the use of information in the reflexive construction of a 'environmental narrative of the self' (Spaargaren and van Vliet, 2000); the image one wants to convey about oneself in relation to environmental concerns.

Secondly, it is generally acknowledged that under conditions of modernity, science and expert knowledge have replaced traditional norms and values as a means for justifying individual and collective action; "all areas of social activity come to be governed by decisions – often, although not universally, enacted on the basis of claims to expert knowledge of one kind or another (Giddens, 1994, 76). However, as argued by reflexive modernisation theorists, this modernist project approach has run into problems (Beck, 1992, Beck et al., 1994). In the 'risk society', fundamental insecurities about nationalism, mass poverty, economic crises, ecological crises, wars and revolutions (to name just a few of Beck's examples) erode the faith in the modernist project and drive us into a state of reflexive modernisation where we are increasingly confronted with negative and uncontrollable side-effects of modernisation.

Under such conditions, we are, Beck argues, in need of new forms of reflexivity, also in the realm of environmental policy-making.

Recapitulating

To close the loop and return to the subject of this section, the argument elaborated above points us towards three important aspects relating reflexivity with monitoring and surveillance. First of all, I have illustrated how there are two dimensions to monitoring and surveillance as means for enabling reflexivity, either at an individual level or within organisations and societies at large. Secondly, I have argued that contemporary societies become more and more reflexive as traditional and 'modern' justifications for actions lose ground. Thirdly, with Beck, the environmental dimension was introduced in the reflexive modernisation debate. Although he focuses somewhat more on the possible apocalyptic events, Beck has pointed us to the uncertainties about environmental problems and their solution.

The rather straightforward assumption about what environmental monitoring is and how it is instrumental in bringing about environmental reform must now be refined. Environmental monitoring creates environmental reflexivity, providing various actors with information about the (effect of their actions on the) environment. Under conditions of reflexive modernisation, the need for environmental monitoring increases but not solely as a tool for 'modernist' policy-making. As uncertainties and risks require new forms of societal reflexivity, new forms of environmental monitoring might emerge.

4. Reconstructing monitoring in informational governance arrangements

Having introduced the logic behind environmental monitoring and surveillance from a rather theoretical point of view, I now wish to proceed by analysing in detail how environmental reflexivity is increasingly translated into new forms of environmental monitoring and thereby in, what will be labelled, informational governance arrangements.[7]

In the 'classical' view on the relation between environmental information and regulation, information is first and foremost a tool in the development of regulation. Through monitoring, environmental concerns are identified and diagnosed in terms of the sources, distribution and impacts of pollution; monitoring is used to describe the state of the environment. There can be no doubt that this is still an important facet of environmental monitoring as the

regular appearance of publications such as national state of the environment reports (such as the 'Milieubalans' in the Netherlands), the European Environment Outlook, or the World Watch Institute's 'State of the World' illustrate. In a similar line of thought one can place the activities of civil society groups aimed at the collection of reliable environmental information, whether or not in conjunction with (local) academics. What all these forms of monitoring have in common is that they are means to enable other activities, whether that be policy-making or campaigning. This, I argue, is changing. We are witnessing a shift as the collection and publication of environmental information more and more turns into a goal in itself, it turns into a new style of governance, part of a new wave of environmental regulation (Gunningham and Sinclair, 2002).. Environmental information is no longer only at the basis of policy-instruments and non-governmental organisations' campaigns; it becomes the policy-instrument or the campaign in itself.

This upsurge of informational environmental policy instruments (whether employed by the nation-state, supra-national institutions or civil society actors), and their role in environmental governance supplementing or even replacing conventional styles of policy-making, must be understood in relation to wider changes in modernity. In this section, I distinguish four different reasons why regulation through information has increased in significance. [8]

Political modernisation and governance in the space of flows

In general, the development and emergence of information-based governance arrangements should be understood as part of the ongoing process of political modernisation, which encompasses the development of new environmental policy instruments, suited to tackle (new) environmental problems under (changing) societal conditions. Under the heading of new environmental policy instruments, a variety of instruments can be found that supplement and/or replace the, by now 'traditional', strict command-and-control regulation. These new instruments, including instruments such as interactive policy-making, environmental taxes, voluntary agreements, labelling, and disclosure, are increasingly popular (Mol et al., 2000, van Tatenhove et al., 2000, van Woerkum, 2002, Jordan et al., 2003a, Jordan et al., 2003b).

This quest for new policy-instruments based on the collection and dissemination of information is inspired by a number of factors. First of all, new instruments are sometimes required to solve problems that cannot be tackled effectively through existing regulatory frameworks. In this context, the difficulties in for example the development of an environmental consumption policy are illustrative. Issues that are surrounded by significant controversy, such as genetic technology, also ask for new forms of (sub-)political intervention.

Secondly, the processes of globalisation have spurred the development of new environmental policy instruments, among which informational instruments. The most obvious consequence of (institutional) internationalisation and globalisation is that, based on the dogma of capitalist liberalisation, organisations such as the World Trade Organisation and the European Union pre-empt the employment of policy instruments that could hinder free and unrestricted trade. At a more abstract level, processes of globalisation have rendered existing styles of regulation inappropriate (although not necessarily illegal). The traditional mode of regulation took place in the space of place; regulators, primarily the institutions of the nation-state, sought to create positive effects (economic, employment, et cetera) while seeking to minimise accompanying negative effects (pollution, social instability, et cetera). In the network society, this place-bounded form of regulation is increasingly rendered useless. As services, commodities and finances 'flow' over the world more easily and rapidly then ever (a process known as time-space distanciation), nation-states lose the means to regulate the whole chain or network and new forms of regulation need to be found.

As described by Power (1997), governments more and more rely on the rituals of auditing and verification for achieving social goals (rather than commanding and enforcing). Grabowsky (in Power, 1997, 66) argues that "the challenge facing governments in the new century is one of 'meta-monitoring'." These transformations put monitoring in an entirely different perspective; "as the regulatory state shrinks to the role of monitor of last resort, new forms of managerial capacity are being stimulated and hitherto private practices, like internal control, are being governmentalised and formalised. From this perspective auditing, internal or external, leads towards more 'control of control' as part of ever deeper loops of reflexive self-ordering" (Power, 1997, 66). Monitoring thus comes to play a major role as nation-states change from being 'gardeners' to 'gamekeepers' (Bauman, 1987, Urry, 2000). As a consequence of the changing role of the nation-state in environmental governance, new forms and applications of (environmental) monitoring and information provision supplement, or even replace, traditional forms of regulating.

Risks and the decreased authority of conventional policy-making

One of the related factors that have contributed to the emergence of regulation through information was the shown inability of the conventional style of policy-making – and related to that of 'simple modernity' science – to deal with unpredictable and/or stubborn environmental problems. Beck's risk society thesis (1992) is illustrative here. Beck developed the notion that in con-

temporary societies, risks are increasingly unmanageable and unpredictable. Many environmental issues are nowadays contested and consequently one can not base oneself on an undisputed scientific analysis of pros and cons to identify and solutions and formulate appropriate policies.

The most obvious examples of failures of the technoscientific rationality are of course accidents and explosions, such as the accidents in Three Mile Island, Chernobyl and Bhopal. Accidents like these not only undermine the faith in techno-scientific expertise but also painfully point out the lack of public knowledge and understanding concerning daily risks. This is why, in a number of cases, industrial accidents have been followed by pleas for disclosure about the risks citizens are subjected to (Fortun, 2001, van den Burg, 2004). Of a different nature are those instances where science is unable to provide a satisfactory reply to societal concerns, often resulting from the fact that the problem is badly structured, or even unstructured (Hisschemöller et al., 2000). What was once presented as incontestable scientific security now proves to be questionable and open to debate. Once such controversies over (the assessment of) risks reach the public stage, science loses its authority in the face of the public. "Unlike losses in income and the like, news of toxic substances in foods, consumer products, and so on contain a double shock. The threat itself is joined by the loss of sovereignty over assessing the dangers, to which one is directly subjected." (Beck, 1992, 54) The cause of this decreasing authority lies not in the irrational or 'emotional' responses of those affected, "the origin of the critique of science and technology lies not in the 'irrationality' of the critics, but in the failure of technoscientific rationality in the face of growing risks and threats from civilisation" (Beck, 1992, 59). Because of this 'failure' of the techno-expert system, new styles of policy-making are required in which doubt, uncertainty and lay-experiences and –knowledge are given a place. Subsequently, "in their concern with risks, the natural sciences have involuntarily and invisibly *disempowered themselves somewhat, forced themselves toward democracy*" (Beck, 1992, 58).

Under these conditions, knowledge and information come to play an essential role. If there is no longer an *a priori* trust in the functioning of science and the institutions of the nation-state, the notion of an unambiguous instrumentally rational policy-making process is rendered useless. Turning into a contested process, policy-making is forced to open up to new forms of knowledge and expertise, each with their accompanying flow of information. "In an era in which 'simple modernity' mechanisms, doctrines and institutions prove not always adequate and sufficient, state actors, economic organisations and civil society representatives are forced and have started to redefine and reposition their role in generating and sustaining environmental trust. Informational

processes play a key role in (re)building trust and in legitimizing activities that have increasingly become subject to questioning and doubt." (Mol, 2004, 7)[9]

Skogstad's (2005) discussion of the policies on genetically modified organisms (GMO) is illustrative here. She argues that the European regulatory framework for the licensing and commercialisation of GMO's, as was established in the 1990s, was based on a combination of 'state-centred' and 'expert/credential' authority; on the basis of scientific knowledge the nation-states formulated and implemented a policy. By the late 1990s, this regulatory model of state-centred and expert informed governance had however lost its legitimacy, due to increasing societal concerns over GMO's, and ran into a regulatory deadlock (see also Toke, 2002, Oosterveer, 2005). In overcoming this deadlock, the European Union had to look for new 'sources' of political authority. As such, the regulatory framework based on the mandatory labelling of products containing GMO's, attempting to regulate companies though consumer preferences, draws upon market mechanisms as a source of authority.

The increasing involvement of non-state actors in governance arrangements

The upsurge of regulation through information is not only the result of deliberate choices made by the institutions of the nation-state. The changing relations between state, civil society and corporations, where the latter have become more concerned with their corporate responsibility (Cramer and Loeber, 2004), have opened the door for the new forms of governance. In many cases, non-state actors have developed or initiated informational governance arrangements, for example through market campaigns (O'Rourke, 2005) or labelling (Micheletti, 2003). In this light, many contemporary developments in the field of monitoring are illustrative of the changing roles and responsibilities of state and non-state actors, and of the increasing importance of the latter in bringing about these informational governance arrangements and in making them work.

A range of examples can illustrate this point. We see how nature organisations nowadays monitor the presence of wild-life species, in monitoring local environmental quality (Gasteyer and Flora, 2000) and how environmental organisations monitor for example the presence of chemicals in sun cream.[10] Although corporations have monitored their environmental performance for a longer time, the collected information is now increasingly accessible to the public via environmental reports. In the international private sector-trade, the International Standards Organisation (ISO) has developed a number of standards that have an identifiable impact on (business-to-business) trade. With the development of the ISO 14001 standards, a new form of international

standards were developed targeting environmental management schemes (Krut and Gleckman, 1998). In this process the ISO has created a standard which has come to compete with government-mandated environmental management schemes, such as the European EMAS scheme (Kolln and Prakash, 2002). Other economic actors which have come to play a major role in new governance arrangements are for example investors who have increasingly incorporated considerations of sustainability into their decision-making process, for example by means of the Dow Jones Sustainability Index (Cerin and Dobers, 2001, Knoepfel, 2001).

Last (but not least) we also witness the codification of existing, ad hoc informational governance arrangements into official policies. Such nation-state sanctioned informational governance arrangements can be developed following pressure from civil society (who built upon experiences from other countries) or by transforming private initiatives into public policies. The Aarhus Treaty, which specifically states that governments should develop electronically accessible databases of environmental information and grant citizens the opportunity to participate in decision-making processes – is an example of the former. Many developments in the field of environmental labelling are an example of the latter; private initiatives to develop environmental labels received, in a later stage, official support from the nation-state.[11]

Regarding the role of non-state actors, we can thus not only say that new means for monitoring provide them with new means for exercising pressure, but also affect the relations between the various actors and the relations with the institutions of the nation-state. "The redefinition of the role of the state in environmental reform links an informational mode in environmental reform with the literature on shifting governance. For one, the actors involved in the informational mode of environmental reform go beyond the environmental state and include consumers, customers, non-governmental organisations, communities, media actors, producers, business associations, insurance companies and the like." (Mol, 2004, 8)

The consumerist turn and the provision of information

The fourth factor underlying the emergence of new forms of regulation through information is, what has been labelled, the 'consumerist turn' in the social sciences at large and the environmental social sciences in particular. When it comes to analysing the role of consumers, the dominant view has for a long time been rather negative; the consumer was seen as malleable, "passive and foolish, immersed in self-illusions" (Gabriel and Lang, 1995, 1). Following this line of thinking, one could argue that the whole idea of assigning power to the consumer is an illusion; "these images of agency are increasingly

distortions of a world of merchandising so subtle that the consumer is consistently helped to believe that he or she is an actor" (Appadurai, 1996, 42). This negative appraisal of consumption in the social sciences is mirrored in the environmental (social) sciences and environmental policy when it comes to the available means to make consumption more environmental friendly. Some argue that the only sensible option is to 'retreat' from the consumer-society through decreasing consumption, voluntary simplicity and self-provision. Others argue that one should analyse consumption from the perspective of personal norms and attitudes. In that line of reasoning, environmental policy-instruments should be aimed at a change in attitudes, leading to a reduction of the environmental impact.

The latter approach has proven to be problematic for two reasons. First of all, the underlying image of the consumers was often that of the rational, yet disembedded consumer whose behaviour could be changed by providing relevant information (which is believed to change personal attitudes). It presupposes that we have a clear understanding of how consumption choices are made. Combined with a (disproportionate) emphasis on the individual consumer – analysing consumption 'out of context' – this easily leads one into simplistic models for analysing the relation between attitude and (environmental) behaviour. As illustrated by for example Fine and Leopold (1993) or Otnes (1988) consumption takes place within existing systems of provision, comprising both social and technical infrastructures. The relation between the individual and the infrastructures of consumption is something which has only recently attracted more systematic attention (Spaargaren, 2000a, Shove, 2003). Secondly, by looking at individual attitudes and consumption choices this conceptualisation of consumption not only problematises consumption solely at an individual level, it also overlooks the fact that consumption choices also influence other actors in the chain and as such can be used for realising public goals.

In recent writings, the transformative role of the consumer in production-consumption chains has been discussed in more detail. The understanding – inspired by notions of post-Fordism (see for example Kumar, 1995) – that consumers are also agents of change in the organisation of systems of provision emerged after the 'consumerist turn' which took place in the 1990s (Spaargaren and van Vliet, 2000, Spaargaren, 2003). Transcending the level of individual consumption patterns, it was recognised that consumers also influence producers and that companies do become more sensitive to consumers as one of the relevant stakeholders (Cramer, 2000, 2002). This recognition has not only emerged in the anti-globalisation literature (see for example Klein, 2000, Hertz, 2001) but also in the debate on (ecological) citizenship. As the politics of products are increasingly visible, and the public grants them more signifi-

cance, consumers no longer only act on the basis of private considerations. With the notion of political consumerism Micheletti (2003) points to the inclusion of public concerns in private consumption choices. Ordinary consumption is thereby turned into political consumerism and contributes to the establishment of ecological citizenship, not trough formal political processes but through everyday choices (see also Seyfang, 2005).

The recognition that consumption choices affect production-consumption chains is in various instances translated into governance arrangements that attempt to influence consumer behaviour in order to realise public goals. Product testing is a more than familiar attempt to inform the consumer on the qualitites of certain products (Aldridge, 1994). In these product tests, we witness a development where sustainability considerations are increasingly taken into account as well.[12] Boycotts and 'buycotts' are among the more traditional examples of consumer activism with the specific aim to influence producers (Garrett, 1987, Friedman, 1996). Yet it is the development of various consumer-oriented labelling schemes which provides the most obvious example of the attempts to tap on the power of the consumer in bringing about environmental reform. Instead of making a normative appeal for responsible consumer behaviour, new feedback loops are established which aim to connect individual consumption choices with the achievement of public goals. This creates a particular form of reflexivity in which consumption choices becomes linked to the entire production-consumption chain, including for example formerly invisible environmental consequences such as greenhouse gas emissions or the local working conditions in developing countries. Such labelling schemes can take various forms with regards to the involvement on state and non-state actors yet all have in common that it is increasingly attempted to harness the power of the consumer in bringing about environmental reform.

5. Questioning informational governance arrangements

Up to this point, I have sketched a framework for understanding monitoring and surveillance, in particular in relation to processes of (citizen-consumer induced) environmental reform. Monitoring was presented as a form of reflexivity which can enable citizen-consumers to voice their concerns and exercise power. In the previous chapter, I have identified three clusters of questions which accompany the possible transformation of *EcoMod 2* into *EcoMod 3*. With the newly acquired information from this chapter I aim to further refine these clusters of questions into a limited set of key concepts which serve as a guide in the coming chapters.

Access and the social embedding of information flows

From the debate between ecological modernisation theory on the one hand and social-constructivism and neo-Marxism on the other, it became clear that the distributional dimension of environmental problems, and of access to solutions, was given insufficient attention within ecological modernisation theory. This is a relevant concern in relation to informational governance arrangements; the crucial questions here are how information flows are established and how access to information flows, and how access to the means to use the potential power of information, is distributed. In other words: how do environmental information flows flow; which actors do they involve, and which are excluded? By acknowledging that information flows – and the truth claims that are part of them – are social constructs and by opening up monitoring for sociological analysis, questions of the distribution of power, access and non-access appear on stage.[13]

If one looks at the general appraisal of monitoring and surveillance, it is not uncommon to describe them as inherently negative, particularly in relation to the developments in ICT. The technological dystopia is one of 'hyper-surveillance' where everybody is constantly watched; critics voice concerns over privacy protection and the unjust categorisation and stigmatisation of individuals under these conditions (Bogard, 1996, Whitaker, 1999). The first question thus is if, in the light of these negative connotations, it makes any sense to talk about surveillance technologies as a tool in environmental governance to empower citizen-consumers, or if the enlargements of measuring and monitoring capacity will 'automatically' lead us into the 'eco-Panopticon' (see Foucault, 1977). On the other hand, there is an increasing amount of optimism concerning the possibility to use information, monitoring and surveillance to empower civil society groups and citizen-consumers. Technological developments fuel the enthusiasm about the possibilities to develop 'counter-surveillance'; "the Internet could be used by citizens to watch their government, rather than by the government to watch its citizens. It could become an instrument of control, information, participation, and even decision-making, from the bottom up (Castells, 2001, 185). These two stories about the development of surveillance and/or counter-surveillance are two extremes which provide the background of this study. Assuming that both stories are at least partially true (and partially not), the question is under which conditions surveillance can be made to work in favour of citizen-consumers, rather than as a tool for top-down repression and control.

One of the key concepts here is the notion of access; when thinking about environmental information flows, and the possibility to use incoming information to develop counter-surveillance, one is led to question how the availabil-

ity of environmental information is distributed.[14] A (too) narrow interpretation of access would lead one to the notion of the Digital Divide. Early original formulations of the Digital Divide were predominantly based on the observation that the upper- and middle-classes had much easier access to the required technologies to use ICT. Although this could still be a point of concern in a great number of countries, the penetration of ICT and Internet access in many Western countries requires us to rethink not only if a Digital Divide exists, but also how it nowadays divides. Access entails more than just the physical access to information networks; in refining the notion of access in relation to ICT based form of political participation Hague and Loader (1999) distinguish between five dimensions of access.[15] Obviously, access to ICT and access to information are important aspects but Hague and Loader emphasise that access is also about the access to valuable content and to meaningful networks in which the acquired information can be put to use. The importance of (these different dimensions of) access is also recognised in research on public participation showing that the engagement of citizens is not determined by the access to advanced technologies but that the availability of resources, including time, skill and money, largely explains who engages in civic and political life (Verba et al in Wilhelm, 1999, 158).[16] At this point it is also important to keep in mind that many contemporary examples of environmental information flows, think of environmental labelling, are not dependent on advanced telecommunications.

The notion of access, of crucial importance in analysing how information flows can contribute to the development of counter-surveillance, embraces various (rather different) aspects. The common denominator is however that the notion of access entails not only the physical access to information flows but also includes the possibilities of embedding information into meaningful personal and social networks. Consequently, access, as an analytical concept, must be redefined; what then counts as well is for example if citizen-consumers are able to buy such products (in terms of either availability or price), if the provided information is comprehensible, meaningful, and can be related to the personal life-world, et cetera.

Government and governance

In the analyses of contemporary environmental policies the notion of governance is increasingly popular. Often it is presented as the alternative to 'government'; it is then argued that the traditional style of policy-making – based on command-and-control instruments – is no longer a suitable way to deal with the complexities and uncertainties that surround environmental issues (see also chapter 2). Notwithstanding a variety in definitions, the common de-

nominator is that through governance, new instruments are used and new actors involved in the processes of bringing about environmental reform. Debates on the consequences of globalisation have further fuelled the popularity of governance as a concept; it is argued that globalisation forces nation-states to develop new policy-instruments, but it is also argued that globalisation enables a new form of supranational environmental governance. The resulting pivotal question here is, as formulated by Sonnenfeld and Mol (2002, 1321), "do national environmental governance and the sovereign 'environmental state' wither away in an era marked by globalisation, or can we witness new forms of national, sub- and supranational environmental governance mediated, facilitated, and challenged by that globalisation?"

Empirical analyses have rebutted the idea that globalisation leads to a withering away of the nation-state (Held et al., 1999, Jänicke, 2002). "Contrary to the thesis on the withering away of the nation-state, we are able to show with respect to the European situation that state-anchored forms of environmental governance in some respect even gain importance under globalisation" (Jänicke, 2006, 83). This analysis of the role of the nation-state in bringing about environmental reform coincides with a more general reconsideration of the role of the institutions of the nation-state. The terrorist attacks in (among others) New York, Madrid and London have provided new grounds for an extension of the nation-state's regulatory capacity, particularly when it comes to the enlargement of surveillance capacities. Although the extent to which such development will affect informational governance arrangements is yet unknown, it surely reinvigorates debates on the role of the institutions of the nation-state and the consequences of regulation through information (Cohen, 2002).[17]

If the question is no longer whether or not the nation-state completely withers away due to processes of globalisation (the hypothesis that it does being rebutted), the question to guide this research must be reformulated. The relevant subject of study in this thesis is the reciprocal relationship between processes of globalisation and reflexive modernisation on the one hand, affecting the functioning of the institutions of the nation-state, and the impact of flows of environmental information on these institutions. Thus, relevant questions are not only how the nation-state is affected by the aforementioned processes, but also how it responds to these processes, how it reinvents itself, attempting to find a new role in new informational governance arrangements.

Bringing in the citizen-consumer

The final cluster of questions to be elaborated upon here is the increasing role of citizen-consumers in bringing about environmental reform, and partially

this also relates to the notions of governance as described in the previous section. Questioning the processes through which citizen-consumers are given a role in environmental governance proceeds along three lines.

Critics of the consumerist turn have argued that the emphasis on consumers and consumption – while justifiable in terms of their environmental impact – runs the risk of focussing on the wrong actor. As Princen et al. (2002) have argued, processes of commoditisation, distancing (increasing the distance between resources and final product) and individualisation might appear to open up new possibilities for consumer-based environmental politics, but in reality, such a consumer-oriented approach only distracts attention from what really matters; "when responsibility for environmental problems is individualized, there is little room to ponder institutions, the nature and exercise of political power, or ways of collectively changing the distribution of power and influence in society" (Maniates, 2002, 45).

This line of reasoning stands in sharp contrast to the argument that consumers are more and more able to express public concerns through private consumption choices; enabling forms of political consumerism (Micheletti, 2003). The upsurge of political consumerism, Micheletti argues, results from a governability crisis and the quest for new policy-instruments, and is enabled by new means for disseminating environmental information. However, the notion of political consumerism remains somewhat vague on a number of issues. The aim of this thesis is to analyse the notion of political consumerism as a new tool for governance, whilst at the same time investigating which mechanisms of power are at work.

Finally, these developments relate to the transformation of the public into the private, with subsequent consequences for the legitimacy, effectiveness and functioning of democratic policy-making. In line with Sheller and Urry (2003, 108), one could take as a starting point that "the new hybrids of private-in-public and public-in-private do not automatically imply a decline in politics or a collapse of democracy, but may instead point to a proliferation of multiple 'mobile' sites for potential democratisation". This point of view moves us away from deterministic accounts on the demise of the public sphere and, at the same time, it paves the way for a number of questions discussing under what conditions, and through which possible mechanisms, the consumerist turn can lead to democratic, legitimate and effective informational governance arrangements.

6. Resume; a guide for the reader

In bringing this chapter to a close, I wish to briefly restate the key concepts as derived from the theoretical sections, and relate them to the upcoming chapters. I have argued that heightened environmental reflexivity, achieved through monitoring, leads to new governance arrangements in which various actors come to play new or different roles. This development however goes together with a number of concerns and questions that are captured through four key concepts.

Key concept 1: The appraisal of surveillance

The (influential) negative appraisal of monitoring and surveillance as being predominantly tools of repression requires further scrutiny. Does it make sense to talk about the positive effects of surveillance, or, can we think of the relation between surveillance and environmental reform without necessarily ending up in an eco-Panopticon (cf. Foucault, 1977)? Can we not discuss the emergence of informational governance arrangements in the light of the proliferation of counter-surveillance, where new forms of watching and controlling provide citizen-consumers with new means to exert influence over governments and producers?

➲ Discussed in chapter 4, chapter 5 & chapter 7

Key concept 2: The issue of access

As argued, the analysis of the (unequal) distribution of access to environmental information flows falls apart in a number of sub-questions. It is not only about the means to retrieve information, it is also about the possibilities to construct information flows and the available means to put such flows of information to use in meaningful social networks and political arrangements.

➲ Discussed in chapter 6 & chapter 7

Key concept 3: The re-invention of the nation-state

The argument that the (institutions of the) nation-state lose influence due to processes of globalisation is a third recurrent theme. How does the decreasing authority of the nation-state relate to the informational governance arrangements? The notion of governance does not imply the total disappearance of the nation-state. New informational governance arrangements might also enable the nation-state to tackle certain issues, and/or re-invent their role in environmental governance. This in turn also affects the relation between the na-

tion-state and citizen its citizens. Do shifting roles of economic actors in governance arrangements require a reconsideration of the notion of citizenship and of the differentiation of private and public actors (between consumers and citizens)?

➲ Discussed in chapter 6 & chapter 7

Key concept 4: The citizen-consumers as an agent of change

Critics of the consumerist turn in environmental policy making have argued that by focussing on consumers, one draws away attention from what really matters; namely the role of institutions and infrastructures. The notion of political consumerism on the other hand points towards the increasing importance of politicized consumption choices in the achievement of public goals. What can we say about this tension? And if we focus on the citizen-consumer as an agent of change, what can we say about political consumerism 'at work'; what are the mechanisms of power at work and how are the roles and responsibilities of the various involved actors affected?

➲ Discussed in chapter 4, chapter 5 & chapter 6

INTERMEZZO

RESEARCH METHODOLOGY

1. Introduction

As the main research question, formulated in chapter 1, illustrates, the objective of this research is to analyse how new forms of environmental monitoring come into existence, how they are used as a particular form of governance, and how this affects the role of citizen-consumers in processes of environmental reform. A qualitative research approach was chosen for the accomplishment of these objectives. Given the nature of the questions, empirical testing of hypotheses through a quantitative approach is no option; the research questions focus on explaining why certain developments take place and how they affect roles and responsibilities played by various societal actors, rather than measuring and quantifying the effects of these developments.

From a theoretical perspective, the thesis aims to contribute to contemporary discussions on ecological modernisation theory. Ecological modernisation theory provides – it is argued – the most suitable background to frame the analysis of environmental monitoring. As a theory of environment-induced social changes, it is explicitly concerned with the type of issues at stake. At the same time, this analysis of the changing nature of environmental monitoring can also contribute to the debate on the transformation of ecological modernisation theory from *EcoMod 2* to *EcoMod 3* (see chapter 2).[1]

Before proceeding to the empirical chapters of this thesis, this intermezzo addresses a number of methodological concerns. In the second section, a brief introduction to the methodologies for doing theory-informed qualitative re-

search is provided, with special emphasis on case-study research. In the third section, I reflect on the methodologies used in this research. I discuss the position of the different case-studies within the overarching research design and describe the methodologies and methods used within the case-studies in more detail.

2. Qualitative research methodologies

The choice for a qualitative research approach to theory development in itself still leaves open various options. Most well-known are the approaches known under the heading of the grounded theory approach, as developed by Glaser, Strauss and others (Glaser and Strauss, 1967, Strauss and Corbin, 1998), and the case-study approach as elaborated by, among others, Yin (1993, 1994, 1998). The main difference between these two approaches lies in the role of theory within the research design. The grounded theory approach was explicitly designed as a means to use qualitative research to contribute to the development of theory. Grounded theory states that the process of theorising involves more than just applying a theory to one's data, it requires the constructing of new theories and extending or broadening of existing ones. Qualitative research can contribute to this process by validating theory through "a process of comparing concepts and their relationships against data during the research act to determine how well they stand up to such scrutiny" (Strauss and Corbin, 1998, 24). Theory development is seen as an inductive and iterative process in which empirical facts are repeatedly juxtaposed to the theoretical concepts, both in the early and final stages of doing research (Dey, 2004). The analytic toolbox required to undertake this process consists, according to Glaser, Strauss and others, of a set of coding procedures which enable the researchers to categorise and systematise empirical facts.

The case-study approach differs. "The role of theory development, prior to the conduct of any data collection, is one point of difference between case-studies and related methods such as ethnography and grounded theory." (Yin, 1994, 27) Contrary to what is sometimes believed, case-studies are not solely useful for generating hypotheses but can also be used for testing them or for building theory (Flyvbjerg, 2004). Within the case-study approach, the development of a theoretical framework is required prior to the collection of data through the empirical stages of the research. The theoretical elaboration is meant to develop a 'guide' for doing empirical research and analysing the findings.

In this research, a case-study approach will be used. The justification for this decision lies in the fact that this thesis builds upon a distinctively theoretical starting-point. The more inductive approach as prescribed by grounded theory would provide too little guidance in this context; the emphasis is not on the theorizing of real-life events, but on the discussion of a distinct theoretical perspective through the analysis of illustrative and exemplary real-life cases.

Case-study research

Having introduced the case-study approach as a general research strategy, methodological considerations such as the case-study design, the sources of evidence and the analytic strategy, require further elaboration. Yin (1994) distinguished between four ideal-types of case-studies (see also Hamel et al., 1993). A first difference lies in the number of cases the research design encompasses, where one can distinguish between single-case and multiple-case design. Single-case designs are appropriate if the case represents a critical example for testing an already well-developed theory, if the nature of the case is so unique that comparison would not make sense, or if the case that is analysed can be considered as typical case for a larger group of (more or less comparable) cases. The drawback of single-case-studies is obvious; not only does the lack of options to compare cases hinder the analytic process, it also limits the general applicability of the outcomes. The second line of demarcation, between holistic and embedded case-studies, is dependent on the number of units of analysis. Holistic case-studies are suitable when the emphasis lies on the analysis of holistic units within which no sub-units can be identified, or when the theory underlying the case is of a holistic nature. If there are more units of analysis, often identified by breaking down the general subject of analysis into smaller pieces, the design is labelled 'embedded'.

Within multiple case-designs, the methodological challenge is to select cases and examine them in such a way that comparison is possible. As is argued by Yin, in a multiple case-design, one should not consider each case as the equivalent of a respondent in an experiment, since this would imply that the multiple cases can be analysed and compared through a fixed set of parameters and indicators. Rather, each case should be considered an experiment in itself and the logic underlying the multiple case-design should be that of 'replication'. "Each case must be carefully selected so that it either (a) predicts similar results (a *literal replication*) or (b) produces contrasting results but for predictable reasons (a *theoretical replication*)." (Yin, 1994, 46)

Once decisions about the case-study design and the selection of cases have been made, the various possible methods of data generation must be identi-

fied. Six methods can be identified, each with its own strengths and weaknesses: documentation, archival records, interviews, direct observations, participant observation and physical artefacts. Ideally, one would use as wide a variety of sources as possible.[2] However, the nature of the case selected usually renders a number of sources inapplicable (if for example physical artefacts are absent).

The information found can be used through various forms of analyses, the selection of which depends on the nature of the phenomena subjected to the study and the used sources of information. Two approaches, which presume the availability of a rather elaborate theoretical framework, are pattern-matching and time-series analysis.[3] Pattern-matching is based on the comparison of empirically found patterns with the predicted one(s). In the case of time-series analysis, the patterns sought for are explicitly linked to the chronological order in which events appear. A third approach for analysing information, explanation-building, differs from the other approaches as it not only draws upon the theoretical framework more often (more iteratively) but also allows this framework to be altered repeatedly, should the incoming information require so. Explanation-building is a series of iterative processes which commonly consists of the frequent revision of theoretical statements as the multiple cases are analysed. In this process, an initial case-study can be helpful to test theoretical statements or ideas before the other case-studies are performed.

3. Researching informational governance arrangements

Research design

This thesis consists of three different case-studies which are all discussed from the theoretical perspective as elaborated in the chapters 2 and 3. In each of the case-studies a slightly different methodological approach is taken, even though the objective of all three case-studies is the same; through an in-depth study of one or multiple cases, I aim to gather insight into the processes underlying the emergence of informational governance arrangements. The aim is not to test (and accept or reject) the theory; I examine and question the selected cases by drawing upon on various identified theoretical points or key concepts (see chapter 3) and use the findings of the case-studies to reflect on the theoretical framework. The nature of the case-studies is thus explorative, rather than explanatory. In terms of the general analytic strategy, this research depends on the development of theoretical propositions or concepts which guide the more

empirical case-study analyses. To analyse the data, an explanation building approach has been used which consisted of a process in which theoretical concepts and empirical findings where juxtaposed.

In the overarching research design, chapter 4 constitutes, in various ways, the junction between the theoretical and empirical chapters. Continuing upon the development of key concepts in chapter 3, it addresses two theoretically-formulated concerns which need to be resolved to ensure the validity of analysing consumer-oriented monitoring schemes. Next to that, an exploratory analysis of 4 cases of consumer-oriented monitoring is done, aimed to become acquainted with the issues that are at stake. In the chapters 5 to 7, the in-depth case-studies are presented. Each of these cases represents a particular kind of consumer-oriented environmental monitoring.

Categorising the cases

This research was instigated following the observation that the range of functions assigned to environmental monitoring increases. The consequence is not only that there is a greater variety of environmental monitoring schemes but also that these schemes develop into informational governance arrangements. Keeping this variety in mind, a number of key concepts were derived from the aforementioned theoretical perspective. To say something meaningful about these informational governance arrangements on the basis of three case-studies, it should be made clear how the empirical research relates to the observed developments 'at large'.

A threefold classification of environmental monitoring schemes is the basis on which the case-studies are selected – which is thus an information-oriented selection (Flyvbjerg, 2004). The observed developments in the field of environmental monitoring can be categorised along a number of different axis – such as the role of state and non-state actors, or the nature of the information provided – but the position of the consumer vis-à-vis producers and providers is the most relevant, theory-inspired, dividing line in this research. Each of these categories is analysed in greater detail through one particular case-study, which is purposefully chosen as a way of getting insight into the developments in general (as opposed to random sampling). As will be illustrated in the following paragraphs, the rationale for the selection of each particular case varies.

In methodological terms, the cases are selected using the principle of theoretical replication; the outcomes are expected to differ among the cases, but for logical reasons. Since the cases cannot be considered entirely representative for the categories, their contribution to this thesis' line of argument is of an explorative nature. The approach taken here is to study a limited number

of cases that can be considered illustrative, and not fully representative, for the general developments discussed.

Monitoring domestic energy flows; a unique case-study

The first category of environmental monitoring schemes – captured under the heading 'monitoring domestic flows' – can be found in relation to utility provisioning, such as energy and water provision or waste removal. In this context, the relation between consumers and providers is characterized by the continuous flow of commodities from producers to the household, the existence of established forms of monitoring, the mundane character of the goods provided, and the fact that they are consumed in and through an established domestic infrastructure – consisting of physical networks and appliances, as well as social norms and routines. In this case-study, I focus on energy monitoring. The broadening of the range of functions assigned to monitoring, as witnessed in various smart metering projects or the development of 'domotica', brings up a number of concerns. Not only do these new forms of monitoring need to be 'fitted in' the existing relation between provider and consumer, there are also a number of challenges concerning the comprehensibility of environmental information, the usability for citizen-consumers, and the possibilities for strengthening their role in the organisation of the energy-chain.

The case-study that is exemplary of this domain of environmental monitoring, discussed in chapter 5, is a 'unique' case. A number of consumer-oriented monitoring projects are discussed and classified, but the emphasis lies on the Energy House project (Het Energiehuis). This project can be classified as an experiment in which a selected number of households (in total 66) participated. The overarching aim of the experiment was to assess the feasibility of Internet-based energy monitoring in combination with tailored energy-saving advice (for more information see Slingerland et al., 2003). Beforehand, a 10% reduction in direct energy consumption was aimed for. The exact consumption levels, and achieved reductions, were however not of interest to this research. As part of this project, a digital platform was established on which participants could discuss various energy-related issues. The researchers acted as moderators and, on various occasions, brought up issues related to energy monitoring.[4] In some ways, this platform acted as a digital focus-group, even though for example the interaction was not face-to-face, spread over time, and the participants had all freedom to choose whether or not to respond (on focus groups, see Kreuger and Casey, 2000, Bloor et al., 2001). To supplement the information gathered from the digital platform, the participants were interviewed twice, once just after the start and once when the experi-

ment approached completion. These were structured interviews, the majority of which were conducted by telephone.

The aim of these procedures was to discuss issues of consumer-oriented monitoring and countervailing power with a selected group of citizen-consumers. What makes the case-study 'unique' is that the participants were not chosen randomly but represent a well-informed, motivated segment of the population. Hence, one can assume that the outcomes of the discussion show the phenomena *in extremis*.

Monitoring the chain; a typical case-study

A second category of environmental monitoring schemes, labelled 'monitoring the chain', can be found within those production and consumption chains in which the link between producer and citizen-consumer is distinctively different; monitoring does not take place because of the characteristic of the product but takes place with the aim to provide citizen-consumers with information on the tangible and intangible qualities of the product. The diversity of such chain-oriented forms of monitoring and labelling is overwhelming. Labels can provide information about the quality of the product or the quality of the production process, can provide information about the relative performance of a product (for example washing machines) or be merely 'seals of approval' (for example FSC labelling), can be compulsory or voluntary, and can be government-initiated or private initiatives.[5] What they share is their ambition to provide citizen-consumers with information on what happens throughout the chain and this information in turn is believed to influence citizen-consumers decision-making processes. Through these mechanisms, such monitoring schemes seek to tap on the power of citizen-consumers to bring about environmental reform. Relevant issues to analyse not only concern the 'direct' and indirect impacts of labelling but also concern for example the representation of consumer interests in the development of labels.

The case-study that is exemplary here is about fuel efficiency labelling. In the European Union, new cars that are displayed in for example a showroom must be accompanied by a label which provides the potential buyer with information on the fuel-efficiency of this particular car. As will be discussed in more detail, the exact shape of the label is not fixed but dependent on the national policy-making process. In this process, we thus witness various arguments for introducing (or not introducing) a consumer-friendly type of label. This case is considered to be a typical case; it is, certainly in terms of the role of citizen-consumers, by no means an extreme or unrepresentative case. Although the findings of such a typical case cannot be generalised in any rigorous sense, they are considered illustrative and illuminating for a larger number of

labelling programs (see for more information on typical case-studies Patton, 1980, 101-102).

Monitoring the public space; a multiple case-study

In the third category of monitoring schemes, the provided information has little to do with actual products. When it comes to the monitoring of the public environment, the disseminated information is about the quality of the environment at large, either by providing information on the general levels of pollution or on the emission of specific companies. As a consequence, these schemes, in their functioning, draw not so much on the interests of consumers but more on the interests of citizens. With respect to these cases of monitoring, there is considerable diversity for example with respect to the initiator (government-induced such as the Toxics Release Inventory, or NGO-initiated like Factory Watch), or with respect to the format of information provisioning (compare 'recht-om-te-weten' to the Ozone monitoring instrument of the Royal Netherlands Meteorological Institute).[6] From a citizen-consumer perspective, apparent challenges lie in the access to, and comprehensibility of, the provided information, and the means available to put the information to use. From an institutional perspective, the questions raised are concerned with the function and effect of providing information to citizen-consumers, not only in terms of the pressure put on producers but also concerning for example homeland security.

The analysis of disclosure schemes in this thesis is based on a multiple case-study. Three different cases of disclosure were analysed in detail; two from the United States and one from the Netherlands. It was expected in advance that the differences in the 'style' of politics would influence the eventual use of disclosure as an informational governance arrangement.

In the research on fuel efficiency labelling (chapter 6) and on disclosure (chapter 7) similar research methods have been used to collect data. In both cases, the primary sources of information are both documentation (including scientific and non-scientific literature) and in-depth, semi-structured interviews with key informants. As a supporting source of information, archival records have been used where available and meaningful.

In both these case-studies, the choice for interviewing as a means of data generation, as well as the style of interviewing used, follow from the research design. The information primarily needed is of a qualitative nature; it is information about the processes through which the roles and responsibilities of governments, civil society and citizen-consumers come to shift, leading to the

proliferation of informational governance arrangements. Through interviews, social explanations can be constructed which provide more depth and complexity than for example questionnaires (Mason, 1996). In this context, the interviews turn into expert-interviews which serve two purposes. First of all, the interviewees are sources of knowledge since they have been working in the field subjected to study and therefore possess knowledge on the dynamics studied. At the same time, the close connection between the interviewees and (policy-) practice means that the interviewees themselves take part in the processes studied, and were thus asked to reflect on their own position as well. The interviews where recorded and transcribed when allowed. If recording was not allowed by the interviewee, notes were taken.

When it came to the use of the outcomes of the interviews, I choose not to use coding procedures as a means to investigate recurrent themes and 'identify' findings. Instead, I considered the interviews to be a part of the analytical process. The findings of literature study, earlier held interviews et cetera were all use while interviewing and the interviews turned into a part of the analytical process, as a means of 'working together' to produce knowledge (see Rapley, 2004). The outcomes of the interview are thus considered to be (partial or biased) analyses which are juxtaposed to arguments from other, competing, analyses.

Part III: Empirical analyses

CHAPTER 4

CONSUMER-ORIENTED MONITORING AND ENVIRONMENTAL REFORM*

1. The concept of consumer-oriented monitoring

The changing relations between producers and citizen-consumers are a hot topic in contemporary environmental sociological debate and research. The increasing influence of citizen-consumers in the organisation of production and consumption chains is stressed by several (post-Fordist) theories. However, considerable debate exists with respect to the nature of these transformations and the possibilities and limitations of this development for the greening of production and consumption. In this chapter we argue that this development can have a positive influence on (consumer-oriented) environmental policy making because it can enable the emergence of new forms of monitoring that empower citizen-consumers. In brief, we seek to investigate if and how forms of environmental monitoring that are explicitly aimed at citizen-consumers can be useful in realising democratic environmental reform.

* This chapter was written together with Arthur Mol and Gert Spaargaren and published as S.W.K. van den Burg, A.P.J. Mol & G. Spaargaren (2003), Consumer-oriented monitoring and environmental reform, *Environment and Planning C*, 21, 371-388

Citizen-consumers and monitoring

In earlier research we examined the role of citizen-consumers in the ecological modernisation of household-related public utility sectors (Chappells et al., 2000). The key question dealt with in the DOMUS (Domestic Consumption and Utility Services) research project was if and how environmental innovations, such as new technologies, organisational structures, and (environmental) policy arrangements, fundamentally altered the relation between producers and citizen-consumers, enabling citizen-consumers to play a more active role in the greening of production and consumption. One of the subjects we touched upon in the DOMUS project was environmental monitoring, defined as the measurement and quantification of different environmental flows. Monitoring, it was concluded, has an important function in 'making the invisible visible' (Shove, 1997), and can be regarded as a prerequisite for the ecological modernisation of the provision and consumption of water and energy. It was recognised that in several European countries, new developments in the monitoring of material and energy flows were in the making, partly as a result of the changing provider-consumer relations. We stated that a more active role of citizen-consumers in the greening of these sectors would not so much call for more, but rather for different monitoring schemes. It would require monitoring schemes explicitly oriented towards the 'needs', logics and rationalities of citizen-consumers as knowledgeable and capable agents.

In this chapter, we build upon, and try to elaborate, this perspective by arguing that consumer-oriented monitoring schemes can be considered useful instruments for realising democratic environmental reform, both in utility sectors and other societal fields. Furthermore, these schemes can offer new possibilities to approach, and more actively involve, individual citizen-consumers in environmental policy-making.

In times of liberalisation, post-Fordism and chain-inversion, knowledge about citizen-consumers' wishes and concerns is highly valued by companies. Consequently, different domains of domestic consumption are subjected to monitoring. This is illustrated by, for example, the expanding number of customer loyalty cards that open up new possibilities for tailored sales and marketing strategies. Monitoring reveals what was previously hidden or invisible: individual behaviour and consumption patterns in daily life. Both academic scholars and critical consumers (and consumer organisations) usually look upon the monitoring of citizen-consumers and consumption with some suspicion for two reasons. [1] First, focussing (only) on the consumer side of production and consumption might distract attention from the 'real' powers in the production chains and contribute to the individualization of environmental (and other) problems as socio-political problems (Princen et al., 2002). Sec-

ond, fear is expressed that governments and corporations watch and monitor individual behaviour to an extent previously unknown and that surveillance permeates deeply into individual life-worlds, such as into the kitchen and bedrooms of households (Whitaker, 1999). The information that is gathered may not be equally available for all and may create, maintain or strengthen unequal relations of power. Monitoring consumers is often seen as an instrument for producers to gain insight in, and by that control over, consumers' practices. This control could be strengthened with the continuing spread of monitoring and surveillance systems. Environmental monitoring – no less than other kinds of monitoring – of citizen-consumers might then become associated with George Orwell's Big Brother (Lyon, 1993, Lyon, 1994, Whitaker, 1999), jeopardising one of the prerequisites for effective and democratic environmental reform.

In this contribution, we argue that the monitoring of environmental flows by citizen-consumers and at the end-users side of production-consumption chains, does not necessarily have to be associated exclusively with increased surveillance and social control by providers. Studying monitoring from a citizen-consumer perspective might offer new insight into the relations between citizen-consumers, providers and producers and facilitate the incorporation of environmental concerns into consumption and production practices at different levels of, and localities in, the chain.

Objectives and outline

The existing dominant paradigms on the monitoring of environmental flows do not allow for a consumer-oriented analysis since they usually refer to a situation where information gathering is monopolised by institutional actors in order to enhance surveillance and social control over citizen-consumers. We need to develop a complementary analytical approach that emphasises the notion of citizen-consumers gaining countervailing power.

In elaborating on this, what we label the 'consumer-oriented perspective' will investigate recent empirical developments in the field of monitoring. We will discuss monitoring schemes and practices in which the collection and dissemination of information is specifically tailored to the needs of citizen-consumers, enabling them to influence, or contribute to, the dynamics of environmental change. By exploring some new monitoring practices we aim to: (i) analyse how innovations in monitoring environmental flows relate to more general changes in producer-consumer relations; (ii) describe the diversity of emerging consumer-oriented monitoring schemes; while (iii) investigating the possibilities offered by consumer-oriented monitoring schemes for a more

democratic and effective involvement of citizen-consumers in the ecological modernisation of production and consumption.

We will start our analysis with a theoretical introduction on monitoring, power and questions of surveillance (section 2). In order to deal with the diversity of (consumer-oriented) monitoring-projects and to clarify the differences between them, a categorisation will be developed (section 3). Environmental monitoring projects, in the Netherlands and the United States, will be used to illustrate this categorisation and to investigate the differences between conventional and consumer-oriented monitoring. We will comment in more detail on four contemporary consumer-oriented monitoring projects (section 4) to answer the key research question in this chapter: can we identify the emerging contours of new practices and a new discourse on environmental monitoring, which focuses on the possible contribution of consumer oriented monitoring to democratic environmental reform?

2. Producers and consumers; surveillance and counter-surveillance?

In ecological modernisation theory, the monitoring of substance-flows is generally considered to be the first step in restructuring production and consumption processes, to be followed by the monetarisation of the environment and the development of environmental friendly practices, technologies, and political and institutional arrangements (Huber, 1985, Huber, 1991, Spaargaren and Mol, 1992, Mol, 1995, Mol and Spaargaren, 2000). From an ecological modernist point of view more monitoring is desirable, as it increases the amount of information on substance flows available. At the same time, monitoring makes the environmental impacts of production and consumption activities visible to all the relevant actors involved.

There is, however, a negative side to an increase in monitoring activities, especially when consumer-oriented schemes are at stake. Following the existing discourse on monitoring, an increase in monitoring-efforts targeted at citizen-consumers might be considered a 'double-risk exercise'. First, consumer-oriented monitoring schemes might be considered to focus on the 'wrong' actor in the production-consumption chain, as it would be more appropriate to focus on, and seek to influence, producers. Second, monitoring devices might contribute to the colonisation of the life-world, increasingly subjecting citizen-consumers to an extended and far-reaching form of surveillance by institutional actors. We will confront both 'risks' at a theoretical level.

Monitoring and power

The first 'risk' of consumer-oriented monitoring is that it focuses on the 'wrong' actor, the consumer. In the environmental social sciences, environmental problems are often discussed primarily in relation to (utility) providers and other institutional actors. Providers are considered not just responsible for, but also capable of changing, current unsustainable practices of production and consumption into more environmentally sound directions. From a productivist perspective, one could argue that our citizen-consumer oriented perspective on monitoring tends to overlook the following three facts. First, individual citizen-consumers operate in the context of institutions and infrastructures which to a large extent influence their behaviour and thus the degrees of freedom, or constraints, to change their individual consumption patterns. Second, the most substantial contributions to the greening of 'infrastructures of consumption' are to be expected from producers, enterprises and institutional actors. Third, the influence of citizen-consumers at 'the other end' of the production-consumption chain will in most cases be limited, exactly because of the unequal division of power throughout the chain. With respect to these critical warnings, we argue that at least some of them will have to be reconsidered in an era marked by post-Fordism, chain inversion and liberalisation.

As argued before, "the 'post-Fordist' turn has established a perspective that recognises the crucial position of consumers and consumer groups in structuring production-consumption cycles under the condition of (late or reflexive) modernity" (Spaargaren, 2000a, 326). In fragmented markets, where product development, design and diffusion are no longer dominated and monopolised by producers and providers, monitoring can generate valuable information and knowledge for citizen-consumers. For example, consumer- and environmental organisations have some tradition in the collection of information on product-quality or environmental effects, but their efforts were often blocked following information gaps, secrecy policies or unwillingness to participate from the side of the providers. Enhanced consumer-oriented monitoring schemes can increase the resources for such organisations to develop counter-surveillance strategies. We agree with the warnings as issued by Princen et al. (2002) that there is a danger in confronting consumption solely at the end-user side of the chain, as that might contribute to the development of isolated, individualised strategies for more sustainable production and consumption. However, we do not consider this an inevitable consequence of economic power moving downward through the chain, as this process could equally contribute to the development of countervailing power.

We believe that the monitoring of environmental aspects of consumer behaviour, and increased transparency of producer behaviour, can be a crucial element in furthering the countervailing power of citizen-consumers and in incorporating environmental concerns in the (changing) relation between providers and citizen-consumers. To avoid the risk of 'blaming the consumer' by solely looking at consumer-behaviour, we must recognise that consumer-oriented monitoring can and should be organised at all levels and at all the major spots in production-consumption chains. Monitoring schemes as organised at the provider-side of the chain, and increasing transparency through public disclosure, could as well be evaluated from the perspective of citizen-consumer interests and everyday life rationalities as the ones organised at the consumer-end of the chain.

Colonisation of the life-world?

The monitoring of everyday routines or social practices increases the amount of information and knowledge available, not just on the environmental dimensions of behaviour but at the same time also on the whereabouts of the actors involved.[2] When more and more detailed information is gathered and released there exists a danger that providers increasingly subject citizen-consumers to surveillance and social control. In Habermasian language, this can be referred to as the colonisation of the life-world: the penetration of system elements – now via monitoring by state, institutional and economic actors – into the private life of individual citizen-consumers.

With Foucault, monitoring and surveillance are evaluated in terms of power and control exerted by institutions of the state and the economy over individual citizen-consumers. Foucault's analysis of surveillance has been criticised for the ways in which surveillance and discipline are linked with issues of power and interests. "The whole question of the relationship between interests and the disciplinary structures is pushed to the margins of Foucault's concerns" (Dandeker, 1990, 28). The point is that in many cases surveillance does not establish, but results from, the unequal distribution of power. A second point of critique concerns the rather deterministic outlook of Foucault's work. His point of departure is that 'the few see the many' but there has always been a strong counter-tendency "including the development of unique and extensive systems enabling the many to see the few" (Mathiesen, 1997, 219); both panopticism and 'synopticism' are characteristics of our society. The development of mass media and the networks of civil society (whether related to environment, labour, human rights, or other) are prime examples of synopticism, enabling the many to follow – to some extent at least - the actions and whereabouts of the few, of the elite. The spread of surveillance has

made it 'rhizomatic'; no major population group or institution nowadays stands "irrefutably above or outside of the surveillant assemblage" (Haggerty and Ericson, 2000, 618). For example, civil society related interests groups and loosely organised transboundary networks of individuals have developed their own monitoring systems and strategies to discipline and control businesses and the cultural and political elite.

When studying consumer oriented monitoring systems, we use the concepts of surveillance and power but not in a non-deterministic way. According to Giddens, surveillance is a structural property of both traditional and modern societies. Although in modern societies surveillance reaches "an intensity quite unmatched in previous types of social order" (Giddens, 1985, 312), it, like any other structural property or principle, does not act on individuals in a deterministic way, like the forces of nature. The social effects are dependent on the specific design of the monitoring and surveillance schemes and the related interests.

This is not to say that monitoring of consumption and consumer behaviour does not involve any risk of an increased colonisation of the life world and social control. We argue, however, that due to the nature of the social world, monitoring will not 'automatically' lead to monopolistic social control. Potential detrimental social consequences of monitoring social practices are related to the design of surveillance and monitoring schemes and the underlying interests and power relations. The risk of surveillance is an issue but with changing relations of power in production and consumption chains, as we mentioned above, monitoring and surveillance might as well be related to countervailing power as it can be an instrument for the colonisation of the life-world.

3. Exploring environmental monitoring schemes

From the theoretical discussion on monitoring devices it was concluded that, although we should be aware of its potential drawbacks, we can look for ways to use consumer oriented monitoring in the process of the greening of production and consumption. In this section we develop the conceptual tools which help to assess the general characteristics of environmental monitoring against the backdrop of the power relations between producers and citizen-consumers.

Distinguishing monitoring-schemes

When categorising monitoring schemes, we are on the one hand interested in the question 'who measures'; which actor is responsible for and in charge of measuring for example consumption levels and environmental effects or aspects of production. On the other hand, we are concerned with the question: who or what is the subject of measurement; which actor and social practice are monitored? With these two dimensions of monitoring combined, we have distinguished five-ideal types of monitoring: (1) internal monitoring, (2) producer-oriented monitoring, (3) self-monitoring, (4) consumer-control and counter-surveillance, and (5) third-party control (figure 4.1).

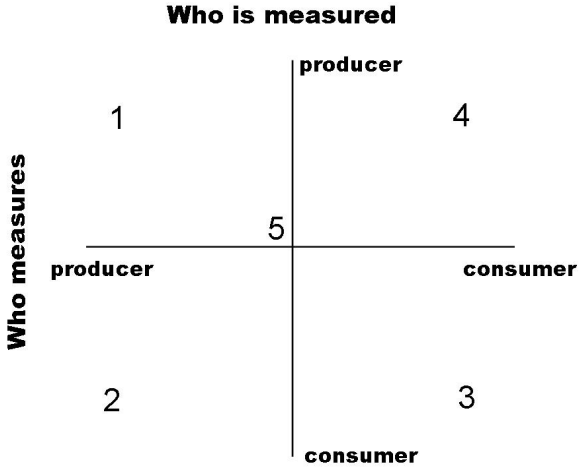

Figure 4.1: Five types of monitoring

As can be concluded from the literature on environmental management within and between companies, internal monitoring of substance flows is important to follow production processes, to enhance efficiency of natural resource use, but also as a means to fulfil state requirements and to acquire, for example ISO certification (van Koppen and Hagelaar, 1998). In category two – producer power and surveillance – institutional actors collect information and knowledge on citizen-consumers' consumption behaviour primarily for their own use. A well known example here, for instance, are the traditional utility-related metering systems for domestic use of energy and water. These monitoring schemes are important because they enable the development of so

called Demand Side Management strategies by utility companies (Guy and Marvin, 1996, van Vliet, 2002). The risks of these schemes are the possible loss of privacy and increased surveillance of individuals as captive consumers of utility companies. The third category comprises monitoring schemes where citizen-consumers themselves monitor their consumption levels and behaviour. The prime example here is provided by the Empowerment Institute's (formerly Global Action Plan) Ecoteams which are based on voluntary regular monitoring of energy and water consumption and waste production by households (Staats and Harland, 1995, Harland, 2001). In the fourth category, we find monitoring schemes where citizen-consumers or (most likely) consumer organisations collect data on pollution levels, industrial emissions, water quality, product quality or transport performance of producers. This provides citizen-consumers with the opportunity to step up to providers, producers or state institutions and demand better environmental performance or increased product quality. The notion of counter-surveillance is relevant here since citizen-consumers or civil society organisations develop the means to monitor and influence the behaviour of those actors higher up in the chain, who can be regarded as the more powerful actors when compared to citizen-consumers. As we will discuss below in more detail, variants of the 'right-to-know' principle might serve as an example here. In the last category, monitoring is carried out or controlled neither by citizen-consumers nor by producers, but by a third party (a state authority, an independent organisation, or a corporation of producers and citizen-consumers). These third parties can either monitor production or consumption practices. Usually these monitoring schemes take place by or on behalf of the state or are sanctioned by the state. Sometimes however, environmental NGO's play an important role in this as, for example, in the emerging market of green electricity schemes.

This broad categorisation of monitoring-schemes enables us to define consumer-oriented monitoring schemes in more detail. We regard environmental monitoring schemes as being consumer oriented if they involve citizen-consumers (or civil society and consumer organisations) in the process of measurement and thereby provide them with the information and knowledge required for changing production-consumption practices (at different levels in the chain), in the direction of lowering their total environmental impacts. At the other end of the continuum, we find the producer or provider-oriented monitoring schemes, where providers and producers are the key agents in measuring and monitoring environmental flows. There exists a grey area between completely producer-oriented and fully consumer-oriented monitoring schemes, mostly including monitoring schemes where third parties are involved. We label this area 'state-sanctioned surveillance', as in these cases the

state is usually involved, one way or the other, in the monitoring of producers or citizen-consumers (figure 4.2).

Figure 4.2: Naming consumer-oriented monitoring

Consumer-oriented monitoring includes self-monitoring schemes, as well as schemes where citizen-consumers disclose the behaviour of producers to develop countervailing power. While both forms are brought together under the label of consumer-oriented monitoring, the objectives are different. Self-monitoring is concerned primarily with attempts to rationalise individual behaviour from an environmental point of view. Actors in this case do not gather information in order to get involved in processes of change at the level of the infrastructures of consumption. The aim of counter-surveilling monitoring is to build up control over the main public and corporate actors (companies, government agencies, et cetera.) that are so influential in determining the general direction and speed of environmental change. To illustrate the categorisation, a number of monitoring projects targeted at environmental flows are given in Figure 4.3.

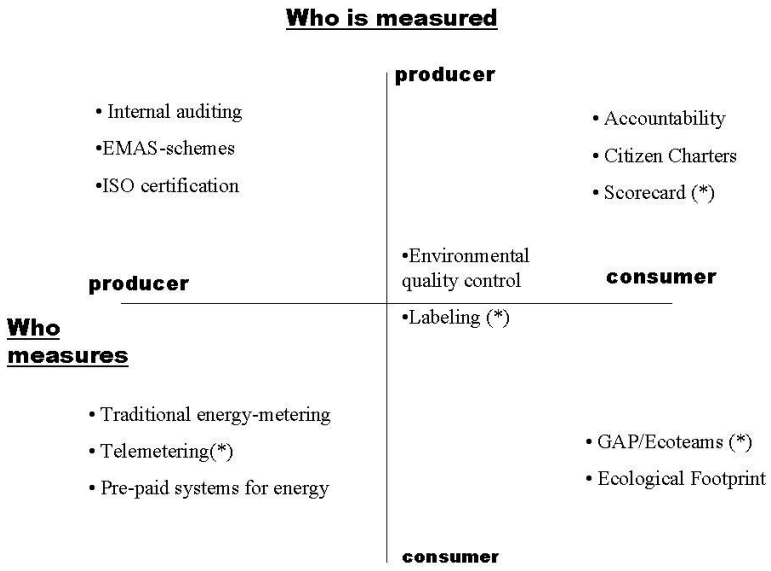

Figure 4.3: Examples of consumer-oriented monitoring
(*) Monitoring projects that are discussed in more detail

Characteristics of consumer-oriented monitoring

An analysis of the differences between consumer-oriented monitoring and conventional monitoring schemes can offer more insight in the potential new roles of citizen-consumers in the ecological modernisation of production and consumption. We will take the (history of) monitoring of domestic (utility-related) flows as a starting point to explore the potentials of consumer-oriented monitoring (Shove, 1997, Marvin et al., 1999, van Vliet, 2000, 2002).

Conventional monitoring of utility related substance-flows originated in network-based systems of provision where, for reasons of so-called Demand Side Management, producers used information on use-patterns to manage supply and network capacity (Guy and Marvin, 2001). Furthermore, monitoring in energy and water networks was necessary for the introduction of individual payment systems. In some cases, consumers actually asked for the introduction of monitoring and individual payment systems as they felt they were overcharged (van Vliet, 2000). Following the energy crises of the 1970s and the upsurge of environmental concern, the existing (individual) water-

and energy-meters were also considered a key technology in reducing domestic consumption of these utility-provided commodities. Monitoring technologies were thought to make the invisible visible, linking individual or household behaviour and consumption to prices and environmental consequences. These links were considered to be incentives for environmental-friendly behaviour.

From these examples, as well as from the literature on 'classical' monitoring, we can conclude that the organisation of conventional monitoring-schemes clearly reflects the underlying power-relations between providers and citizen-consumers and thus 'prescribes' in a rather detailed and top-down way the kind of actions that citizen-consumers are supposed (not) to take. Regarding utility meters, 'the precise technical configuration of the meter is strongly shaped by the often conflicting objectives of agencies involved in developing and implementing the systems' (Marvin et al., 1999, 113). In conventional or producer-oriented monitoring schemes the collected data usually are presented by means of technical units. Electricity-use is expressed in kWhs, gas consumption in joules and water consumption in cubic metres. Furthermore, the results of monitoring are commonly made available only a few times a year, on a more or less aggregated basis. For example, the bills which are supposed to provide citizen-consumers with relevant information on individual or household consumption levels are quite complex and not easy to understand.[3] Such monitoring schemes do not provide citizen-consumers with a detailed understanding of what is going on within the household. They also do not link the consumption of water and energy to recognisable routines or actual practices of consumption. In addition, the data presentations often fail to give citizen-consumers a better understanding of the savings realised or possible and the environmental effects of the use-patterns.

Consumer-oriented monitoring differs from these conventional monitoring schemes because they are designed and implemented to empower citizen-consumers and by keeping the explicit wishes and demands of citizen-consumers in mind. For example, empowering forms of energy-monitoring would not only be related to what happens 'behind the meter' (at the consumer side), but also include information of what happens at the provider/producer side: which energy source is used in producing electricity, which emissions take place and where the power plant is (to be) located. Consumer-oriented monitoring schemes could also change the organisation of the sector; for example, by enabling the coupling of (consumer-owned) decentralized production capacity with the grid. Finally, consumer-oriented monitoring strategies should find ways to process or translate the (usually) technical information into an understandable and useful format, related to daily practices and routines.

Before we go on to analyse a few consumer-oriented monitoring projects in more detail, we have to specify our general research question into a set of sub-questions that can be used in the following empirical section. These sub-questions can be formulated as follows:

- How can the monitoring scheme be classified in terms of our ideal-types; is it producer-oriented monitoring, third-party control, counter-surveillance or self-monitoring?
- In what way, and to what extent, does the monitoring scheme reflect broader changes in the relations between providers and citizen-consumers?
- What can be said about the risks of surveillance and social control of citizen-consumers, which come along with the monitoring schemes? And in what ways does the monitoring scheme 'empower' citizen-consumers in their role as agents of change?
- Which part of the production-consumption chain is (potentially) most affected by the (behavioural) changes that come along with the monitoring scheme? Does the monitoring scheme primarily contribute to changes in individual consumption patterns or at the side of the providers?

4. Case-studies in consumer-oriented monitoring

We will use these questions in analysing four case-studies that were selected from a number of empirical examples (figure 4.3). The four different cases represent different ways in which citizen-consumers can become involved in the process of monitoring and usage of data. Taken together, they are examples of the different types of monitoring, with different arrangements (who is monitoring, who is being monitored), and provide a good overview of the contemporary developments and the possible directions in which consumer-oriented monitoring might or should evolve. As they are from different geographical, yet all Northern industrialised, settings, we have the scope for generalising the findings to other societies.

Environmental labelling

Environmental labelling schemes are usually introduced to stimulate the market for environmental friendly products and consumption practices. An eco-label can be regarded as a positive statement regarding the environmental quality of specific products in relation to like-products; those products awarded with the label are considered to be more environmental friendly than others. Criteria to measure the environmental impacts of product-groups are often developed by para-statal organisations, usually reflecting various interests (the state, producer organisations, consumer organisations, and independent scientists). Governmental or para-statal certification agencies are given the task to control companies and decide whether or not practices comply with the criteria.

Figure 4.4: Four examples of labelling

As environmental labelling developed, a number of distinct labels emerged. Nation-states developed their own standards or sanctioned labels developed by private or independent entities ('Milieukeur' in the Netherlands, the Red Ø in Denmark, the 'Blue Angel' in Germany, the Nordic Swan). In addition, the European Union introduced a label (European Eco-label) and private branch organisations (e.g. the 'EKO-label' in the Netherlands) and large retailers (for example the Dutch retailer Albert Heijn) did the same. Some labelling schemes, such as the FSC-label (Forest Stewardship Council) for sustainable produced timber, were jointly developed by civil society and a selected number of companies, as a kind of subpolitical arrangement. Nowadays, the plurality of labels is not only considered to lower the effectiveness of labelling-schemes but also can be said to reflect the underlying struggles and conflicts of interests which play a role in the development of a uniform labelling-scheme. The majority of the companies are rather reluctant to implement labelling, with the harmonisation of labels (nationally, but even more internationally) being an especially major issue. Despite this, labelling is still a popular instrument. This is reflected by the heated debates on labelling in the framework of the World Trade Organisation (WTO), as it might interfere with the trade regime under the WTO/GATT (Appleton, 1999, Motaal, 1999). Further-

more, labelling is frequently considered a proper solution in the debates surrounding new – controversial – products, such as genetically modified food.

Environmental labelling is best considered a form of third-party surveillance. To some extent, it reflects the changing relations between citizen-consumers and producers, as it widens the range of subjects on which producers have to give account to citizen-consumers (and not only state authorities). But, as legal scholars and marketing economists have been keen to point out, citizen-consumers have a limited capacity to process the information about the various environmental impacts of a product. "They cannot prioritise these impacts and rank the product according to an aggregate index of environmental quality. Consequently, it is argued in current debates on labelling issues, specialised environmental labelling institutions have to undertake this task." (Nadaï, 2001, 22) Environmental labels aim to increase the environmental performance of the whole production-consumption chain by stimulating the production of, and demand for, environmental friendly alternatives. Its success is dependent on changes in both individual consumption choices and the production of labelled products. From a surveillance/counter-surveillance perspective, one can say that with labelling companies voluntary open up their internal production processes, not directly for citizen-consumers but for a third party that translates collected information into the form of a specific label.

There are some drawbacks to labelling as a consumer oriented form of monitoring. Various authors have pointed out that labels are of limited value as a means to empower citizen-consumers in processes of environmental reform. Labelling places the individual citizen-consumers at the end of the production-consumption chain. They are hardly involved in processes of standard setting, criteria development, or the judgement of products. As Hadfield and Thomson (1998) argue, consumer-concerns are hardly ever completely in line with the scientific concerns that are at the basis of labelling. Especially when consumer concerns are more inclusive than experts' concerns, "identifying a consumer protection problem solely by reference to scientific assessments of risk ignores both the reality of how citizen-consumers manage uncertainty and the reality that scientific assessments are themselves subject to substantial uncertainty and are reached only through an exercise of judgement" (Hadfield and Thomson, 1998, 206). Second, labelling only visualises substance flows and environmental performance of producers to a very limited extent. A major gap exists between the detailed scientific criteria and environmental analysis of the Life Cycle Analysis (LCA) of a product and the often one-dimensional assessment that the label reveals to citizen-consumers. Thirdly, labelling gives citizen-consumers only a limited action perspective: buy the labelled product or do not buy it. Changes can only occur in an indirect way

and, on the medium term, through market mechanisms. Finally, monitoring via labelling is limited to those products under the labelling scheme, which is so far a rather restricted affair in most countries. To conclude, monitoring through labelling seems to be of limited value to citizen-consumers who strive to become participants in the ecological modernisation of production and consumption.

Telemetering Helmond

Obragas, a utility company in the Netherlands, carried out a telemetering experiment in Helmond, a medium sized city in the Netherlands, in 1997 and 1998. Twenty-nine households, living in new-built, energy-efficient houses, participated on a voluntary basis. A special device was installed in the houses that collected data from the conventional electricity-, water- and gas-meters and sent the information, by a two-way TV-cable, to the computer network of Obragas. Citizen-consumers received a weekly personal update of the consumption of water, gas and electricity on Teletext. Actual consumption levels, aspired savings and achievements were compared and visualised by means of smiling, neutral or sad-looking faces. The aim of the experiment was to examine the possible contribution of regular feedback to citizen-consumers on lowering their consumption of energy and water. This application of monitoring led to a considerable decrease in household consumption levels; water consumption was reduced by 18%, gas consumption by 23% and electricity consumption by 15%. According to an evaluation by Völlink and Meertens (1999), feedback on consumption levels was appreciated. Participants were mainly interested in comparing current consumption levels with their aspired levels. Much to the disappointment of the participants, the experiment ended after three months, as it appeared too expensive and technically vulnerable. For utilities, these projects are best considered as experiments in service-provision, as well as an experiment with new methods for metering and charging citizen-consumers. Providing these information services and extensive monitoring might bind consumer to that particular utility company. The Telemetering project should thus be interpreted as an example of new monitoring-schemes which serve to strengthen the interaction between providers and citizen-consumers, something judged as valuable by providers in times of a liberalising European energy market.

In terms of our ideal-types of monitoring, the Telemetering project is best considered an adapted form of producer-oriented monitoring. The project attempted to test a new form of monitoring, and of providing feedback, but remained heavily steered by the producers' choices. It was not directly related to the changing relations between producers and citizen-consumers. Conse-

quently, the whole production-side of the chain was left out of the monitoring scheme and citizen-consumers could merely attempt to reduce domestic consumption levels; the ways in which energy and water were produced and the kind of sources the utility company drew upon in producing water and energy were not included in the monitoring scheme. Through the metering-system, citizen-consumers were subjected to permanent monitoring of consumption by utilities. As the evaluation showed, this was apparently not considered a drawback (Völlink and Meertens, 1999).

At roughly the same time, Obragas also experimented with the introduction of pre-payment systems for natural gas consumption, one of the first Dutch utilities to do so. Citizen-consumers could buy pre-paid cards at supermarkets and with these cards consume a corresponding amount of natural gas. This experiment was well evaluated as citizen-consumers felt they had more insight in their own consumption levels, but, like other experimental projects with metering and paying systems, these projects are initiated in no small part because they offer benefits to the provider as well. Just as the Telemetering project is not only an experiment with information provision, but also an experiment with new ways of monitoring/reading the energy-meters and charging consumers, pre-paid systems offer benefits to the providers of energy. While these new systems might benefit citizen-consumers (through the provision of information), at the same time they restructure the relation between citizen-consumers and providers. As Graham and Marvin argue, "smart metering technologies enable premium citizen-consumers have increasing levels of choice while prepayment metering technologies based on smart cards allow utilities to dump expensive, marginal and poor customers" (Graham and Marvin, 1996, 40). What these projects point out is that while new forms of monitoring can be beneficial to one group of citizen-consumers, they can also be a drawback for another. This requires careful evaluation of monitoring schemes when it comes to their effect on the relations between producers and citizen-consumers.

Eco-teams

In the early 1990s David Gershon founded Global Action Plan for the Earth (now named The Empowerment Institute), the NGO that has developed and still supports the Eco-team program. At the core of this program is the belief that citizen-consumers are willing to change behaviour but have insufficient knowledge about the environmental impacts of their own consumption and the environmental benefits of alternative practices. By self-monitoring (for example water and electricity use and waste production) and comparing one's consumption level with that of a peer-group and by exchanging saving-tips,

citizen-consumers become more aware of their own environmental impact and the available options to lower this. Participants are provided with a guide-book, which discusses several environmental subjects and contains saving-tips. The key element of the Eco-team program are the group-meetings providing people with the information, support and incentives to change their domestic consumption practices. The Eco-team program was introduced in the United States and has spread to almost all countries in Western Europe and other countries such as Slovenia, Russia, Japan and South Korea.[4] Evaluations show that, shortly after participation, Eco-team participants in the Netherlands reduced waste production with an average of 27.6%, gas consumption with 23.1%, electricity consumption with 6.8%, and water consumption with 4.9% on average. Six to nine months after the program had finished, consumption levels had, surprisingly, decreased even more (Staats and Harland, 1995, Harland, 2001). Furthermore, Eco-team participants argue that the products for sale in local shops changed following questions and pressure from these participants. As the Eco-team program proved to be a successful method for changing individual lifestyles, several local and national governments have invested in the promotion of the program (among others) by paying for so called regional centres.

Self-monitoring implies that people regularly have to read their water- and electricity-meter, weigh their garbage, maintain a logbook on transportation-kilometres, or even register the origin of food products bought. Although it is argued that existing meters only provide knowledge in technical units and thus do not match the 'logics' of social practices and citizen-consumers, Eco-teams prove that information collected in terms of kWhs, cubic metres, kilometres and kilograms can be made meaningful for consumer experiences. Both the group meetings, that enable comparison with other people of flesh and blood, and the provision of tips on self-monitoring enable participants to understand and interpret social practices in terms of an expert discourse.

Eco-teams can be considered as one of the most complex consumer-oriented monitoring schemes, with an advanced form of self-monitoring. Monitoring is employed as an instrument for consumers to gain insight in their own consumption practices, enabling improvements. The most likely outcomes of participation are changes in individual consumption choices, only indirectly affecting the producer side of the chain. The issue of surveillance is apparently not a drawback, as people voluntary reveal their consumption to other participants (but not to institutions and producers).

A first step to increase the influence of citizen-consumers on producers is made in the 'second generation' Eco-teams where the emphasis is no longer on consumption only, but rather, citizen-consumers become part of sub-

political arrangements and can fulfil their role as 'citizen' next to their role as end-user of utility resources. Effectively, this means that citizen-consumers gain insight in and seek influence over processes on the 'other side of the meter'. They are asked to step up to utilities, companies and governments with questions and comments. This confronts producers with consumer concerns. The information and knowledge that participants have gathered strengthens their position vis-à-vis producers and this enables new consumer-provider relations. The most developed example can be found in the United States where Global Action Plan has developed the 'Livable Neighborhood Program'. Participants do not only discuss their individual consumption patterns, but also develop actions to improve the neighbourhood. Development of the program should results in "an effective neighbourhood mobilisation and action tool to assist local government in delivering services and improving the overall liveability of the community" (www.globalactionplan.org). This development could mean that the Eco-teams are less focussed on self-monitoring but increasingly seek to empower (groups of) citizens through citizen-consumer involvement.

www.scorecard.org

In 1998, the US based non-governmental organisation Environmental Defense Fund developed the website Scorecard to provide citizens with information on local pollution levels, polluters and possibilities to take action. The site is freely accessible and enables people to search by postal code or category of environmental pollutants. Entering your postal code will give you an overview of the different pollution-levels in that locality and the companies responsible for these pollutants. The data are collected with the help of existing scientific and governmental data-sets (to which companies have to report their emissions). Recently, a section on environmental justice has been added to the site. It is now possible to locate the differentials in environmental pressures place by place throughout the United States.[5] Both in Canada and the United Kingdom comparable websites have been developed.[6] Similar initiatives are being developed in, among other countries, Singapore, Australia (Howes, 2001a) and the Netherlands.[7] Scorecard is basically an intermediate that collects and translates the information available in order to make it easy available and understandable for citizen-consumers. Without the translation of information into easily comprehensible numbers and figures (for example a toxicity index), it would be hard for citizens to learn about, and understand, local pollution levels and local polluters. The goal of Scorecard is not the provision of scientifically justified or exact pollution data. The main goal is rather to present data in such a way that it echoes the interpretation-framework of lay-

actors, stimulates people to take an interest in local environmental quality and provides a platform for discussion.

Besides merely providing information, Scorecard also enables citizens to take action. This can consist of sending a fax or email to a local company or local authorities or joining a local environmental organisation. In the United States - as in many European countries - it also became possible, by decision of the Supreme Court, for private citizens or citizen groups to call upon federal environmental laws in suits designated to stop companies from transgressing federal pollution laws (Jones, 2000). This implies that environmental organisations can effectively start lawsuits against polluting companies. The information on Scorecard has in some cases triggered these kind of processes. Furthermore, the introduction of Scorecard has had an effect of the shareholders value of some of the most polluting companies (Hamilton, 1995).

Initiatives like Scorecard are examples of how new technologies can enable countervailing monitoring. In these cases, producers become increasingly transparent to citizen-consumers, shareholders and the like. This development does not result from a changing relation between producers and citizen-consumers. Rather, it is based on new ways in which governments and environmental organisations seek to use information technologies. The purpose of these initiatives is twofold. On the one hand, they seek to inform local communities, on the other, they attempt to put producers under pressure to reduce emissions. It is a form of counter-surveillance as companies become the subjects of scrutiny.

Scorecard, and a number of more or less similar initiatives, shows us another possible development with respect to consumer-oriented monitoring. Originally, the emission-data were not disclosed, but with Scorecard, the Internet becomes the public extension of monitoring-schemes. The question is how citizen-consumers and producers will react on these kinds of initiatives. A next possible step could be to involve citizen-consumers in data-collection in units and dimensions that are closely related to their daily practices and experiences, without losing control of validity. Equally, one can imagine that legal debates on the validity of presented information will arise. Furthermore, these disclosure systems proved vulnerable to increased safety measures; information on the location of chemical plants was taken of the web after the September 11 attacks.

Comparing the four projects

After describing the four cases in detail, we now turn back to our research issue. The question was if consumer oriented monitoring can be helpful in (democratically) changing consumption- and production chains into more envi-

ronmentally sound directions. We wondered if citizen-consumers can indeed be influential in realising environmental reform and how this fits within the changing relations between producers and citizen-consumers. Table 4.1 gives an overview of the case-studies in relation to the questions that we formulated.

The described monitoring projects give us a first glance at the 'new discourse on monitoring' which emerges and shows the increasing diversity in this field. The common denominator seems to be that citizen-consumers are no longer left outside, or excluded from, environmental monitoring.

	Labelling	Telemetering	Ecoteams	Scorecard
Type of monitoring project (cf figure 1)	Third party control (either state or private)	Producer oriented monitoring	Self-monitoring, moving towards counter-surveillance	Counter-surveillance
What is the role of the citizen-consumers?	Passive role in development but crucial for successful implementation	'traditional' consumer role with a focus on reduction of consumption but no influence over producers	The consumer as an agent of change, at first only focussed on individual consumption, now also sub-political involvement	Citizen-consumers act as concerned citizens and shareholders, who 'watch' over companies
Reflect changes in relation producer – consumer?	No	Not really, perhaps as an example of service provision	2nd generation Ecoteams as sub-political arrangement	Example of increased responsibility of consumer(-groups)
(Risk of) surveillance	None	Exists, but participants do not consider this a drawback	Voluntary disclosure of consumption, but not to institutions and companies	Consumer-surveillance over producer
Effect on environmental performance of household	Through a shift in purchasing patterns	Reduction in direct energy consumption	Change (qualitative and quantitative) in consumption patterns	None
Effect on environmental performance of producers	Stimulus for environmental friendly products	No influence	Influence on producers through 'ecological choices'	Stimulate reduction of pollution by producers

Table 4.1; Comparison of four environmental monitoring projects

5. Conclusions

This chapter shows that an alternative discourse on environmental monitoring, moving away from the deterministic top-down view on monitoring and surveillance, is emerging. Following a theoretical classification of environmental monitoring projects, some real-life experiments were introduced to illustrate that this countervailing discourse is valid. It shows us that citizen-consumers, and consumer or environmental organisations, are searching for new ways to get involved in environmental monitoring and use monitoring in processes of ecological reform.

The categorisation, and brief study of four projects, serves to set the stage for further research into the dynamics and applicability of consumer-oriented environmental monitoring. New monitoring schemes do not only affect the environmental performance of the different actors involved, but also affect the role of citizen-consumers, in particular in relation to other actors in the chain. This can enhance producer power and surveillance, but can also lead to the development of consumer-oriented and countervailing monitoring schemes.

In our cases, environmental considerations, citizen-consumers' roles and the relations between citizen-consumers and producers intermingle. Applying monitoring has an effect on all of these dimensions and in any future analysis and evaluation of environmental monitoring, these dimensions should be taken carefully into account. A common problem in the four cases is the way in which information is provided and presented to citizen-consumers. Although there is probably no single unified solution to the question of how monitoring data can best be presented to citizen-consumers, future research could provide a better understanding of citizen-consumers' wishes and demands with respect to information. We believe that an approach to understanding information that is based on social practices, and takes into account the differences between different lifestyle groups, can be beneficial. Finally, although we used case-studies from different countries, our selection of cases came from a restricted geographical area. The question to what extent (countervailing) monitoring schemes are applicable in a similar manner in different political, societal and political contexts needs further investigation.

CHAPTER 5

MONITORING DOMESTIC ENERGY FLOWS

1. Introduction

Domestic houses are penetrated by various environmental flows which connect domestic processes of water use, waste production and energy consumption with the utility companies who handle these flows outside the private sphere of households. In order to charge citizen-consumers and households for their usage of these flows, different metering and monitoring devices and strategies have been installed in the past. The common denominator among these monitoring practices was the fact that they were organized from a producer rationality, aiming to provide producers and providers of flows and services with information that allowed them to perform their conventional tasks.

Over the last decade, due to processes of liberalisation, globalisation and individualisation, the position of citizen-consumers in the infrastructures for energy, water and waste production- and consumption has undergone major changes (van Vliet, 2002). As a consequence of liberalisation, the relationship between environmental flow consumers and suppliers changes, including the division of responsibilities between the various stakeholders involved (Guy et al., 2001). The traditional 'captive consumer' (one product, one prize, one provider, and no choice) has ceased to exist. Citizen-consumers can – and are made to - choose between different (green) products and service providers. Companies explore different niches – including 'green' ones – and look for ways to attract and bind citizen-consumers. The contemporary utility company no longer only serves public interests, as it used to do in times of state-

ownership. It needs to satisfy its shareholders, advertise itself, diversify its products, constantly develop new markets, and – following the ENRON-case and the 2003 blackouts in (among others) New York and Italy – maintain the trust of its customers and shareholders. While governments become less directly involved in environmental flow provisioning, they are not withering away from the scene. Their style of regulation moves from direct regulation to a set of new regulatory and policy strategies and instruments which fit better in the new arrangements around environmental flow provisioning, such as labelling and disclosure policies (Mol et al., 2000, Gunningham and Sinclair, 2002, Jordan et al., 2003c).

The changes on the production and consumption–side of domestic environmental flows are reflected in the character and functions of the energy meters and monitoring. Traditionally, the energy meter was the line of demarcation between the 'world' before the meter, where large public companies guarded safe and continuous supply, and the private space behind the meter, where citizen-consumers used electricity and water, and produced waste, in performing their daily domestic routines. The energy meter was first of all a monitoring device for energy companies to charge individual – and sometimes small groups of – citizen-consumers. However, the monitoring of domestic flows of energy, water and waste has become much more advanced and complex and now fulfils multiple goals. The meter is no longer solely there to be used by providers for billing individual consumers; it is considered a device that can enhance citizen-consumers understanding of energy, water and waste consumption and production practices too. Several research projects on 'smart metering' give proof of the fact that meters can serve as a starting-point for thinking about energy conservation and for strengthening the position of the citizen-consumer in the energy chain (Graham and Marvin, 1996, Marvin et al., 1999, van Vliet, 2002, Roberts and Baker, 2003, Völlink, 2004).

If we look beyond the meter, we also witness a variety of developments which enable citizen-consumers to collect more information on the privatized providers and their products. As providers offer new products, such as green electricity, new flows of information (to secure citizen-consumers' trust in these products) emerge. Furthermore, providers are increasingly obliged to publish information on their generation portfolio, enabling citizen-consumers to make better informed decisions. These developments mean that an increasing number of (new) instruments and approaches, meant to change both citizen-consumer and provider practices, are based on the collection and dissemination of information. Compared to the old situation of utility monopolies, owned by state agencies, and 'captive consumers' who had no choice but to accept the products, the current energy, water and waste market is filled with flows of information between providers and citizen-consumers.

Researching domestic flows and informational governance arrangements

In the aforementioned DOMUS research project (see chapter 3), it was concluded that in the utility sectors, access to environmentally relevant information for citizen-consumers or end-users was far from being organised in an efficient and sufficient way (Chappells et al., 2000, van Vliet, 2000). Monitoring schemes turned out to be designed and implemented first and foremost from the perspective of providers, serving the general interests of suppliers. In line with the plea of Marvin and others for a user-led pathway of monitoring development (Marvin et al., 1999), it was argued in chapter 4 that consumer-oriented forms of monitoring are feasible and desirable. Monitoring can increase the transparency of the chain involved in domestic energy production and consumption, thereby enhancing the understanding end-users might have of the expert systems implied in the provisioning of domestic energy. This enhanced reflexivity can be considered as crucial for the active commitment and involvement of end-users in policies aimed at the greening of energy production and consumption.

In this chapter, I illustrate and reflect upon newly emerging energy monitoring and metering schemes and technologies, which challenge the traditional, provider-oriented formats. Rather than focussing on the technical specificities and feasibility of such monitoring schemes, the focus is on the identification of citizen-consumers; their demands, concerns and (potential new) roles in relation to energy monitoring arrangements. The following issues are addressed in this chapter. First, the notion of 'consumer oriented' monitoring will be elaborated by sketching, and categorizing, the diversity of new domestic monitoring and metering arrangements. It will be argued that there is a horizontal and vertical dimension to consumer-oriented monitoring, each with its own key concerns and questions. After that, I describe the outcomes of the Energy House research project, as a 'unique case', in which these issues and concerns were discussed with citizen-consumers. Finally, I conclude on the future perspective for consumer-oriented forms of monitoring.

2. Energy monitoring explored I

If one quickly scans the numerous developments in the field of energy monitoring, the following observations can be made. First of all, we see that 'traditional' forms of energy metering remain in place and that they are increasingly digitalized. Both providers and civil society organisations provide citizen-consumers with the instruments to keep an eye on their energy consumption

levels over time. Secondly, the developments in the field of ICT have enabled new forms of monitoring, particularly in relation to smart home technologies, which provide citizen-consumers with new means to monitor and control their energy consumption levels. The introduction of green electricity and the compulsory disclosure of generation portfolio's illustrate that monitoring is no longer restricted to individual consumption patterns but can also come to cover the performance of providers. These developments not only mean that the role of citizen-consumers (and the impact of their individual decisions) changes, but it also affects the role of NGO's in the governance of the energy chain; traditional forms of lobbying are supplemented with new, market-oriented, strategies to exert influence.

If we assess these observations from a consumer-perspective, two different strategies through which the provision of information can lead to environmental reform can be identified. First, various monitoring projects seek to provide citizen-consumers with information on their personal consumption levels, and means to reduce those levels. The second strategy consists of those projects in which information about the performance of providers, or the quality of the product, is made available to citizen-consumers. Based on Shove's (2003) distinction between the horizontal and vertical structuring of consumption practices, we can typify the two different strategies as two different dimensions of consumer-oriented monitoring. Through *horizontal empowerment*, consumer-oriented monitoring can enable citizen-consumers to make informed lifestyles choices regarding the consumption of energy. By *vertical empowerment*, consumer-oriented monitoring aims to strengthen the role of citizen-consumers in energy production and consumption chains.

In the upcoming section, both forms will be explored in more detail, drawing upon some relevant examples from the field of energy-monitoring. Energy consumption is selected as an example of domestic flows for the following reasons. First of all, the energy sector has a long history of experimenting with environmental innovations seeking to reduce consumption levels (from the 1970s onwards). Secondly, in most countries, the energy sector faced liberalisation earlier then the other utility sectors. Finally, there is considerable (yet, many would argue, insufficient) pressure to reduce CO_2 emissions because of global warming. Together this means that the energy-sector has more knowledge of, and experiments more often with, innovative forms of monitoring. Although the examples are primarily from the Netherlands, earlier research has illustrated that comparable developments are taking place in other (predominantly OECD) countries (see Chappells et al., 2000).

Horizontal empowerment: increasing awareness and improving internal co-ordination

As was noted before, traditional forms of monitoring, drawing upon the energy bill and/or metering, continue to be seen as important means to provide information to citizen-consumers. They are considered to contribute to the horizontal empowerment of citizen-consumers.

Over time, the energy bill is increasingly used as a means to convey information about energy consumption levels, and the environmental impact. As Wilhite et al. (1995, 1999) and others (Koolen and Oostdijk, 2004), have argued, the bill connects producers and citizen-consumers, and when the bill also features information on past performances, or when the bill is accompanied by information about average consumption-levels of similar households, this can be a useful starting point for increasing awareness among citizen-consumers about (first and foremost) the financial and environmental consequences of energy consumption. [1] From the 1980s onwards, a range of metering projects has been established that sought to inform and educate the citizen-consumer by reading the energy-meter. A number of these metering projects were, and still are, initiated by energy providers. The Thrifty Heating Campaign is a clear-cut, and thoroughly researched, example of this type of monitoring.[2] Participating households need to read their meters regularly, write down their meter-scores, and compare their consumption levels with a temperature-corrected average. Whereas projects like these originally used local newspapers to publish information, they nowadays use websites, with the advantage that additional information and saving-tips are easily provided. [3] Comparable metering projects are also developed by civil society organisations.[4] In some projects, civil society organisations have put more effort in developing a consumer-oriented approach to (energy) metering; in for example 'Eco-teams', participants join a group of 8 to 10 households and work through an approximately six month's saving-program that is based on metering.[5]

The developments in information and communication technologies have been an impetus to develop new smart metering technologies, using for example TV-cable, the Internet or smart-cards. Some of these experiments made use of newly developed formats for providing information to citizen-consumers (for example Telemetering, discussed in Loois and Drabbe, 1991). In other cases, citizen-consumers are given the possibility to borrow a smart meter that allows them to monitor the energy consumption of specific apparatus.[6] Developments in the field of electronics have also facilitated the rise of 'domotica' or smart home technologies. Based on advanced electronic networks, these systems not only enable households to access external networks (television, safety) more easily, they also enable enhanced 'control'

over the households, for example in relation to energy consumption (heating and lighting) and indoor climate (ventilation).[7]

A drawback of most of the existing (energy) metering systems that work towards the horizontal empowerment of citizen-consumers is that information is usually given from a provider perspective; domestic citizen-consumers receive information only on their total energy consumption, and are informed in rather technical terms such as kWh and m^3 (van Vliet, 2000). Feedback on domestic consumption is reduced to 'quantifying the substance flows that passes through the meter'. It does not provide information on how the total energy and water consumption is constituted (for example in relation to specific social practices, or the rooms within the house). Since it is only quantitative in nature; information on for example the 'quality' of the energy provided is not included. Finally, these monitoring schemes are based on the existing relation between the citizen-consumer and (one) provider, disabling comparison between different providers.

As Goldblatt (2002) formulates it: contemporary monitoring schemes are 'energy-revealing', providing citizen-consumers with technical information of their energy consumption, instead of 'socially revealing', in which case citizen-consumers would come to know more about ways to alter (energy aspects of) their lifestyles and households, and about how to make environmentally informed choices. According to Shove, Lutzenhiser and others (1998), this is symptomatic of energy policies in general: energy consumers are approached through the lens of energy providers. Provider-led monitoring schemes do not 'fit' the lifestyles and domestic routines of householders since they are not formatted for the purpose of self-monitoring and self-improvement in any sophisticated way. Most of the times, they just deliver information on the net consumption in kJ or kWh's. Likewise, information-strategies on energy consumption fail to take into account most of the times the different potentials of particular (lifestyle-) groups of domestic consumers to work on energy conservation (Brandon and Lewis, 1999).

Conventional monitoring schemes thus often fail to provide citizen-consumers with the relevant information to link lifestyle choices and actual domestic practices with energy consumption and conservation, or to enable citizen-consumers to make informed choices between different products and suppliers. With respect to monitoring schemes for horizontal empowerment we can conclude that the existing formats are in need of revision and alteration to be labelled 'consumer-oriented'.

Vertical empowerment: enhancing consumer power in the energy-chain

Consumer-oriented monitoring can also enhance consumer empowerment over producers and providers if monitoring practices are more vertically oriented, i.e. focus on the chain of provision and consumption. Most of the vertical monitoring practices are provider-oriented, since they empower providers through the provision of information about households' consumption levels. If monitoring can serve consumer-interests instead of producer-interests, it could strengthen the position of citizen-consumers vis-à-vis producers in the energy system, rather than the other way around. Monitoring can then contribute to counter-surveillance by citizen-consumers; the producer and distributors becoming the major loci of monitoring and control.

This specific form of chain-inversion in monitoring can take different forms. Monitoring strengthens the position of citizen-consumers, for example when (electronic) communities are established which collectively seek to address energy issues. The case of Energy Watch in the United Kingdom might serve as an example here.[8] Monitoring can also empower citizen-consumers by, for example, enabling individual citizen-consumers to make an informed choice between different providers and the services and commodities they offer. Finally, monitoring of producers can take the form of compulsory public disclosure, comparable to toxic releases disclosure (see Graham, 2002, and chapter 7). This would make producers more susceptible to consumer pressure (and pressure from shareholders, the media, et cetera).

A well-known example is this respect is the introduction of green electricity. The introduction of green electricity requires a different kind of energy monitoring. Due to the nature of electricity a great deal of monitoring is required. Since almost all electricity that is produced in a sustainable way is mixed with conventionally produced 'grey' electricity during the phase of distribution and use, providers have to find ways to make visible and guarantee to households that the electricity they use is really 'green'. In the European Union, a system of green certificates was developed to secure that the amount of green electricity sold matches production.[9] Although this system of certificates is not accessible for citizen-consumers, two more consumer-oriented 'spin-offs' are worth mentioning. First of all, the World Wildlife Fund performs independent audits of green electricity producers (a fact to which energy providers frequently refer) to guarantee citizen-consumers that their electricity is really produced according to the guidelines. Secondly, various independent websites have been established which seek to help the citizen-consumer by making the energy market more transparent.[10] Various regulations which force providers to disclose information on the corporate generation portfolio, for example in the United States, work in the same way, albeit

that these schemes are based on government legislation (Markard and Holt, 2003).

Traditionally, NGOs are active participants in the debate on energy, particularly in relation to nuclear energy and global warming, and they have frequently sought to mobilize citizen-consumers. Organisations such as WISE and NIRS critically follow development in the energy-sector, particularly when it comes to nuclear power.[11] However, these organisations appear reluctant to address 'consumers'. Another category of NGOs have been active in the development of alternative energy-sources and in stimulating households to take energy-saving measures. Organisations such as the Dutch 'De Kleine Aarde' and the UK-based Centre for Alternative Technology have experimented with and showed energy-saving technologies to the general public, but their scope remains restricted to individual household consumption.[12] With the liberalisation of the energy market, new means to take action have been opened up. Not only is it easier for citizen-consumers to join forces in consumer cooperatives who together own for example windmills, NGO's are also increasingly able to use publicly available information on producers to generate market-pressure.[13] This is done through for example websites which provide citizen-consumers with information about corporate generation portfolio's.

Monitoring can thus become a tool to provide citizen-consumers with detailed and specific information on relevant activities and actors operating 'before the meter'. Citizen-consumers are 'empowered' through monitoring as they come to know more about the performance of the other actors involved in the production, provision and dissemination of green alternatives. They learn about providers competing with green products who try to use their good environmental performance as a selling point. They can check whether and to what extent energy providers do live up to the environmental legislation and the environmental targets for energy providers as set by non-governmental organisations. In this way, monitoring contributes to the vertical empowerment of citizen-consumers.

Wrapping up

In table 5.1, both dimensions of consumer-empowerment are displayed. It was argued that horizontal empowerment and vertical empowerment aim to achieve different goals, and therefore not only have different loci of action but also demand different kinds of action. Furthermore, it is also shown that the questions and concerns that are of relevance for each of the two strategies differ.

	Horizontal empowerment	**Vertical empowerment**
Focus	• (segments of the) Lifestyle • Households time-space organisation	Improved performance of providers
Locus	Private consumption 'after' the meter	Performance of producers 'before' the meter
Modus Operandi	• Self-regulation and feedback • Implementation of measures as offered by providers	Chain actors responding to enhanced consumer powers and counter-surveillance
Concern	• Functionality of monitoring • Format of monitoring	○ Distribution of responsibility ○ Trust in various chain actors

Table 5.1: horizontal and vertical empowerment of citizen-consumers

When it comes to horizontal empowerment, the question is which requirements citizen-consumers have regarding monitoring schemes. To analyse the desired format and function of energy monitoring, the following issues need to be addressed. First of all, one must understand what role citizen-consumers assign to monitoring; how do they use it, how often, et cetera. Secondly, there is the question about the ideal format for monitoring; to what extent are existing monitoring schemes comprehensible and accessible, and how could that be improved according to citizen-consumers. Should such schemes encompass relevant parameters that generate information to be used to organise changes in specific segments of the lifestyles and/or changes in the time-space organisations of households?

The viability of monitoring schemes that contribute to the vertical empowerment of citizen-consumers is considered to be dependent on a number of different aspects. The exertion of countervailing power can only function if citizen-consumers take responsibility for the greening of production-consumption chains, rather then delegate responsibility to governments or corporations. Secondly, the eventual 'design' of countervailing monitoring arrangements is dependent on the issue of trust. Whether citizen-consumers trust corporations, institutions of the nation-state, or non-governmental organisations not only determines the 'partnerships' they are likely to develop,

but are also of influence on the eventual kind of actions citizen-consumers are likely to take.

The question posed here is to what extent these two strategies for empowerment are viable means to further strengthen the position of citizen-consumers in the organisation of production-consumption chains. To answer this question, from a citizen-consumer perspective, these two strategies, each with its own specific set of concerns, were discussed with citizen-consumers as part of the Energy House project.

3. Energy monitoring explored II: The Energy House

Methodology

The Energy House was a joint project in which the van Hall Institute (Leeuwarden, the Netherlands), the Dutch energy-company NUON and Wageningen University participated (for more information, see Slingerland et al., 2003). [14] In the Energy House, a digital platform was established to facilitate a discussion on various energy-related issues and on the various 'avenues' for energy monitoring, particularly in relation to energy conservation. On various occasions, the moderators brought up issues related to energy monitoring.[15] This platform can be seen as a digital focus-group; the interactive approach enabled the researchers to discuss issues of energy conservation, the division of conservation responsibilities, energy-chain transparency, and consumer-oriented monitoring formats with a group of citizen-consumers in an intensive way. To supplement the information gathered from the digital focus group, the participants were interviewed twice, once just after the start and once when the experiment neared completion. These were structured interviews, the majority of which were conducted by telephone.

A total of 39 participants were interviewed and actively participated in the online discussions (in the period from June 2002 to March 2003). Participants were generally speaking middle-aged homeowners and the majority was male. They were recruited through email-lists provided by the energy company and advertisements in magazines covering environmental issues. As a consequence, most of the participants showed relatively high levels of environmental concern. Similarly, a disproportionate number of participants already used green electricity. A relatively large part had some experience with monitoring domestic energy consumption, through for example 'Ecoteams' or the Thrifty Heating campaign, and displayed high levels of knowledge when it came to energy conservation.

In this thesis, the Energy House project is considered a 'unique' case, the findings of which are not representative for any larger population. The participants represent a well-informed and interested minority but this is not considered problematic since the aim of a 'unique' case-study is to study particular phenomena *in extremis*. Given the nature of the case, we cannot assume that the findings are representative. The 'exaggerated' findings of such case-study are however considered illustrative for contemporary trends and attitudes towards issues of monitoring and citizen-consumer empowerment.

The aim of this 'unique' case was to discuss four issues related to monitoring and countervailing power with a selected group of citizen-consumers: (i) the function of monitoring, (ii) the format of monitoring, (iii) the distribution of responsibility, and (iv) trust in the various chain actors.

The function of monitoring

As already emphasized in chapter 1, environmental monitoring makes the invisible visible (Shove, 1997). A first question to pose is when and why citizen-consumers are interested in making domestic energy flows visible. The discussions within the Energy House illustrated that there is no single ideal-type of consumer-oriented monitoring; households engage in monitoring for different reasons and have different needs and interests.

The participants generally considered it important that energy consumption was made visible in order to increase awareness among citizen-consumers, and monitoring was seen as the necessary tool to get better insight into energy consumption levels and possible saving-options. Monitoring is considered useful on specific occasions (for example after moving to a new house) or in relation to particular consumption choices. The latter can comprise for example the purchase of a new washing-machine, or the decision to make certain improvements in and around the house. In such instances, monitoring can be helpful in calculating the economic feasibility and environmental benefits of particular choices.

What the findings also illustrate is that monitoring generally takes place because of specific reasons, and the reason for monitoring determines the format of monitoring and the kind of information that participants wish to receive. When thinking about buying new household equipment (e.g. a washing machine) the participants prefer information and a kind of monitoring that quickly provides them with detailed and 'technical' information. If households are however at a point where they are evaluating their total energy consumption, after moving to a new house or being confronted with an unexpected high energy bill, they prefer more extensive monitoring schemes.

The format of monitoring

In elaborating upon this latter point, several formats for monitoring were discussed with the participants. Notwithstanding the recognised usefulness of, and familiarity with, existing formats for monitoring, the participants in the Energy House project acknowledged that monitoring in its current form is far from ideal.

In attempting to get a better insight into the preferable form for information provision, the participants were asked, as a stepping-stone for discussions on the desired format, to discuss different formats for monitoring and their applicability in the horizontal restructuring of social practices. The three formats discussed were based on (i) resource flows, comparable to most of the existing monitoring schemes, (ii) domestic social practices (for example information about the total energy use of washing, cooking or lighting the house) and (iii) rooms or spaces within the house (for example energy used in the kitchen, the garage or in the rooms of the children). The majority of the participants underscored the need for a monitoring format which provides more applicable information. Linking energy use to social practices was the preferred alternative, with a room-based format scoring second best.

In discussing this desire for alternative monitoring formats, contemporary monitoring formats were criticized for two reasons. First of all, the frequency with which these monitoring schemes provide information was considered too low. Some participants argued that a higher frequency of feedback could further enhance understanding and awareness of energy consumption, with indicated optimal frequencies ranging from monthly to even daily levels. Somewhat comparable, others argued that 'maybe we should take the telephone bill as an example, where each call is registered separately'. A second weakness of current monitoring practices lies in the impossibility to compare products (for example natural gas and electricity) and practices (for example domestic energy consumption and flying). This shortcoming could be overcome by using different indicators; since 'the kWh doesn't say anything; you have to be creative, make it tangible and make the pollution visible'. For example 'everything should be visualised in calories, to be able to add all the different energy sources'. An interest was expressed in meters that could measure the performance of a single piece of equipment, and some argued that more information should be provided when one buys equipment or products: 'I would like to have more information about the products that I buy. Things like the distance that a product travels, and the energy used for the production of the product'.

What these comments have in common is that they point towards the wish for a better and more informative form of monitoring, particularly in relation to the horizontal dimension. Current monitoring systems are not informative enough since the information is (too) technical and cannot be easily applied in daily life. Improvements can be made in the frequency with which information is provided, the level of detail (covering specific practices rather than total energy consumption) and the indicators used.

Distribution of responsibility

Earlier it was described how the changing role of the citizen-consumers in energy production-consumption chains could enable new forms of vertically empowering monitoring, based on the increasing power of citizen-consumers. It was also argued that the viability of such forms of monitoring and consumer-empowerment depend on the responsibility that various actors have, or think they have, for improving the environmental performance of the energy production-consumption chain (whether that concerns energy conservation or the greening of production).

While almost all respondents agreed that monitoring can be a useful instrument to provide citizen-consumers with insight into their own consumption levels, opinions differed when it came to the question if, and how, monitoring-schemes should (also) be used to disclose information on the modes of production and provision. Respondents agreed with the need for vertical monitoring schemes, especially when it came to claims about green electricity; 'they will have to be transparent about green electricity; an open calculation is needed'. However, there was no consensus when it came to the question which actor should hold corporations responsible. Although some argued that individual citizen-consumers could play this role, others argued that the average citizen-consumer would not be knowledgeable enough to 'monitor' the energy company or stated that 'you shouldn't overload citizen-consumers with information'. Subsequently, they plead for an independent authority to check energy companies, favoured the establishment of citizen-consumer forums at the energy company, or attributed a greater role to governments or civil society groups.

Trust in the various chain actors

The question of responsibility can also not be seen apart from the question which actor is trusted by the citizen-consumer to (help them) work on energy conservation. At this point, the attitude towards the energy company is somewhat paradoxical. It was recognised that citizen-consumers should be

able to monitor providers, with discussions focussing on the character of green electricity, (sport) sponsoring by energy companies, and the relation between the stimulation of energy conservation and privatisation of the sector.[16] Yet at the same time, participants showed little opinion about the concrete form and content of such countervailing monitoring schemes. The greater majority of the participants expressed trust in the energy company and the information provided; energy companies were seen as reliable partners in realising energy conservation, and thus are 'logical' partners in working on horizontal empowerment. While acting as skilful, well-informed and committed 'consumers', the ambitions of the participants as 'citizens' – for example demanding a say in the overall policies of the utility companies – were much less articulated.

4. A broader perspective on energy monitoring

The findings of the Energy House project point us towards a number of issues related to the possibilities and impossibilities of a consumer-oriented form of energy monitoring. In this section, we reflect on these findings, keeping the aforementioned examples of energy monitoring in mind.

The examples illustrates that both energy companies and NGO's consider self-monitoring through metering a useful tool to provide citizen-consumers insight into their domestic energy consumption levels, and thereby useful for bringing about energy conservation. However, it is also argued that there is much room to improve contemporary monitoring arrangements which are currently characterised by their continuous flow of technical information. If we look at the motives for monitoring, we see that there is an interest in monitoring on particular points in time. Citizen-consumers are not necessarily interested in monitoring as a continuous process. The findings of the Energy House project suggest that the interest in monitoring is dependent on the particular domestic situation. If things are 'business-as-usual', monitoring might be of little relevance, but if the energy-bill proves to be much higher than expected, or if one has just moved to another house, energy consumption, conversation and monitoring are of greater concern.

As the participants in the Energy House project state, monitoring is desirable in specific situations (and thus not in others), and this offers possibilities to develop monitoring schemes that are context-specific, that are offered when one, for example, buys a new house, washing machine, et cetera. The implication is that citizen-consumers might not be interested in the continuous metering of energy consumption levels, but decide to meter and monitor in

response to particular developments which affect their (concern about) energy consumption levels. When comparing this to the current developments in energy-monitoring, it is striking that the majority of the monitoring schemes are based on the idea that citizen-consumers are inherently motivated to monitor their energy consumption continuously.

Secondly, the findings from the Energy House project suggest that there is ample room to improve the quality of information provision, for example by making use of better parameters. Current parameters could be replaced or supplemented by parameters that are better suitable to relate energy consumption and particular social practices to their environmental or financial consequences and/or that make comparison of products and practices possible. Looking outside the boundaries of the Energy House project, one might expect that such formats could be even more appealing to citizen-consumers with less interest and knowledge of environmental issues. At the same time, the ongoing developments in monitoring and metering show little progress in this direction. Monitoring continues to be a rather technical affair, even though developments in smart home technologies can, as projects like Telemetering Helmond (see chapter 4) illustrate, offer new means to visualize (trends in) energy consumption levels, for example through Teletext or Internet.

If we look beyond self-monitoring and metering, addressing the possibilities for the vertical empowerment of citizen-consumers, we witness a number of developments. For example, the introduction of green electricity has, certainly in the Netherlands, led to significant changes in the production of electricity.[17] Furthermore, the liberalisation of the market has forced energy companies to rethink their corporate image and strategy (where some have chosen for a 'green image'). When it comes to monitoring, the aforementioned examples of energy monitoring illustrate that the emphasis is primarily on providing the citizen-consumer with information about personal consumption levels, sometimes as a strategy to attract new, or satisfy existing, customers. In the energy production-consumption chain, issues of consumer empowerment and energy conservation are of little interest; there appears to be a status quo in which neither citizen-consumers, nor non-governmental organisations, nor governments, nor companies demand or develop initiatives which challenge the existing distribution of responsibilities within the energy chain.

The findings of the unique case The Energy House might illustrate why citizen-consumers show little interest in developing countervailing power. A significant number of citizen-consumers considers energy conservation as an important issue – and the increasing costs of energy will most likely increase the size of this group– but there is no clear 'mode of countervailing action'

available. Although global warming and energy conservation are considered important issues, by all concerned actors, there is no clearly articulated role for citizen-consumers in the chain, nor are there initiatives to develop citizen-consumer power. Citizen-consumers trust energy companies and consider them primarily responsible for an efficient and clean energy production-consumption chain. They acknowledge that they have their own responsibility as well, but only in the light of individual consumption level; given their trust in energy companies they do not consider themselves as agents of change in relation to the system of provision for energy. This is where NGO's can come to play an important role; the findings of the Energy House illustrate that a number of citizen-consumers (and one would expect this number to be much higher outside the boundaries of this particular project) believes that individuals are not able or willing to monitoring companies extensively and, consequently, that this could be a task for NGO's.

5. Conclusions: monitoring consumption and/or production?

In this thesis I argue that the emergence of consumer-oriented environmental monitoring schemes means that citizen-consumers come to play a more important role in the organisation of production-consumption chains. This development is fuelled by the developments in ICT and the changing regulatory role of the nation-states. In the energy sector, these developments are clearly at stake. Because of the ongoing processes of privatisation and liberalisation in the energy sector in Europe, one might expect consumer-oriented monitoring schemes to gain strategic significance in the near future. The development of green electricity schemes is just one, instructive, example in this respect. As there are more producers and products, targeting different groups of people under diversifying circumstances and conditions, more diversified flows of energy will come together with more and new information flows.

From the environmental literature we know that monitoring schemes are important for environmental change, since they 'visualize' the product or substance flows and their related impacts on the environment. With respect to domestic energy use, it is a well-established fact that citizen-consumers can (and indeed do) use monitoring schemes to reduce their energy consumption. The term '*horizontal*' structuration of domestic energy saving practices was coined to discuss the use of monitoring as a tool to review consumption practices and (segments of the) lifestyle under the influence of incoming information. The various monitoring projects discussed support the hypothesis that the monitoring schemes as presently provided to, and used by, energy con-

sumers do indeed target primarily, and almost exclusively, this horizontal structuration of domestic practices. Typically, energy producers provide citizen-consumers with environmentally relevant suggestions for energy conservation 'beyond the meter'. The *'vertical'* dimension of domestic energy monitoring is developed only in one direction: providers monitoring the energy use (and thus in a way the behaviour) of citizen-consumers, whereas monitoring schemes to exert consumer-control over providers are almost non-existent.

The Energy House project, designed as a qualitative research project in order to learn more about the opinions of end-users with respect to energy monitoring, brought two main findings to the fore. First, it was recognised by the participants that most monitoring schemes can be improved considerably when judged from the perspective of the citizen-consumer. If made more end-user friendly (visible, accessible, and readable) and developed from an explicit citizen-consumer perspective, their use in horizontal processes of self-monitoring and change would be further enhanced. Second, when asked for the need to be involved in vertical (chain-related) processes of energy monitoring and saving, most participants of the Energy House project express only modest interest and eagerness. Householders showed remarkable trust in the (sustainable) energy policies of their providers and were slow in committing themselves to actions stretching beyond their private sphere. If citizen-consumers are to be aware of their 'political' role in shaping energy production and consumption chains, the range of functions assigned to monitoring (in particular in the vertical dimension) should be increased.

What does this tell us about the (future of) consumer-oriented monitoring? For a start, it can be argued that the developments in the field of monitoring need to be paralleled by an understanding of the conditions and formats in which consumer-oriented forms of monitoring are useable, feasible, and desired. If citizen-consumers trust the various actors in the chain or only attribute limited responsibility to solve environmental problems to themselves, different arrangements, in which NGO's and/or governments come to play a role, might be required to tap efficiently on the power of citizen-consumers. More explicit efforts from the side of environmental NGO's, governments and (privatised) utility companies themselves seem to be a prerequisite if environmental information flows are to be brought to life, thereby establishing a political commitment of energy consumers to be engaged in the environmental reform of energy production and consumption.

CHAPTER 6

FUEL EFFICIENCY LABELLING IN EUROPE

1. Introduction

Historically, environmental policies have emphasized the need to reform production and therefore industrial and agricultural producers and other large point-source polluters were considered to be the principal targets for environmental policies and strategies. Recently, particularly in developed countries, consumption is increasingly framed as an essential domain to bring about processes of ecological restructuring, turning citizen-consumers into principal agents of change. Through what has become known as political consumerism, citizen-consumers can voice their concerns and can, by choosing between producers, products and services, exert power on institutional or market practices (Micheletti, 2003). Labels and product information are visible and essential elements to enable, facilitate and stimulate political consumerism. In recent years such labels and product information have gained solid ground in the field of the environment and are widely recognized as one of the new policy instruments that states apply in their efforts to green production and consumption processes (Jordan et al., 2003b). Next to government organized and sanctioned labels and product information schemes, there is a wide variety of labels and information systems on products that are partly or completely privately organized, either by (organisations of) producers or by non-governmental consumer and environmental organisations.

The initial, and still dominant, orientation in environmental governance on producers and production is reflected in many social theories on the environ-

ment. Also ecological modernisation theory, arguably one of the more prominent theories on environmental reform in the last two decades (argued by for example Buttel, 2003), focused originally on the role of producers and production in analyzing and solving environmental problems. It was only in the mid 1990s that ecological modernisation perspectives started to pay attention to, and reflect and theorizes upon, consumption and the changing role of citizen-consumers in environmental reform (Spaargaren, 1997, Spaargaren, 2003, Mol and Spaargaren, 2004). Empirical research on consumption issues, inspired by ecological modernisation theory, is by now slowly developing.

This chapter aims to contribute to this development by drawing upon one particular case-study. The empirical focus in this chapter is on the European Union's labelling directive which forces car-manufacturers and -sellers to provide information on the fuel efficiency of new vehicles (Directive 1999/94/EC). Through the labelling directive, producers are required to provide information to potential buyers of new cars. As such this regulation can be seen as an example of a new form of governance that seeks to enrol the citizen-consumer in the environmental reform of production and consumption chains. As was discussed in the intermezzo on the research methodology, each case-study 'represents' a wider range of developments and, in this case, I discuss fuel efficiency labelling as 'representative' of a larger diversity of labels. Through an in-depth analysis of this particular case, I aim to shed further light on the relevant theoretical notions and ideas of political consumerism and ecological modernisation, as identified in chapters 2 and 3, and the influence of new flows of environmental information.

2. Environmental labelling in context

Information, citizen-consumers and labelling

In chapter 3, it was argued that we witness the increased proliferation of modernized environmental governance arrangements in which information comes to play an important role. As greater importance is attached and given to the role of individual and institutional non-state actors in environmental reform, information, transparency, openness and accountability are increasingly becoming crucial elements in governance strategies (Roome and Park, 2000, Reisch, 2001). Legal regulation is complemented by informational regulation (cf. Konar and Cohen, 1997, cf. Kleindorfer and Orts, 1998) and different non-state actors apply different information based practices and strategies for pushing environmental reform. For example, information is provided to *citizens* through pollution inventories and registers (see chapter 7), to streamline

communication between government and public but also to enable and facilitate public pressure on polluting companies. In the financial realm, disclosure, (sustainability) reporting and indexes such as the Dow Jones Sustainability Index inform *investors and insurance companies* about the environmental performance of clients. The most relevant development in the light of this chapter is the provision of information to, and subsequent use by, *consumers* as a means to influence the environmental performance of actors in the production and consumption chains. Conventional policy instruments – following simple attitude-behaviour models – sought to influence consumers by creating environmental awareness, bringing about a change in attitude, and resulting in behavioural change. Currently, consumers are more and more seen as strategic and powerful players in the organisation of production-consumption chains and environmental governance innovations aim to tap on that consumption power (hence I use the notion citizen-consumers from now on). We see governments and NGO's increasingly trying to mobilize consumers, through for example labelling, boycotts and buycotts, to influence companies and production through consumption (Micheletti, 2003).

In such consumer-oriented environmental governance strategies and arrangements, (environmental) labels play a major role. Labels come in different forms. They can be developed by government institutions, private actors or combinations or hybrids of them. Labels can take the form of positive seals of approval, negative ones or comparative markers (Banerjee and Solomon, 2003, Grankvist et al., 2004). Nowadays, sustainability labels entail issues ranging from labour rights to forest management, covering a range of commodities from timber and fish to toilet cleaner and automobiles. As labelling makes more information available to citizen-consumers at the crucial places where the consumption end meets the production end of the chain, they are believed to come to play a greater role in co-governing the environmental performance through their consumption choices. In addition, labels do what producers have been doing for a long time: using logo's to influence markets. Labels have the ability to interfere with the conventional corporate logo's and branding strategies of companies and producers, touching upon what some considered as the most crucial part of producers capital: reputational capital. In that sense, theoretically labels do not just work through the citizen-consumers, but also through the producer.

The influence of globalisation and political modernisation

The emergence of labelling as a strategy for environmental governance is frequently discussed in relation to larger societal processes such as globalisation and the development of new policy-instruments. As reported widely through-

out the environmental social sciences, the 1990s marked a major transformation in how states, citizens, and companies approached issues of environmental damage and protection. Notions as diverse as environmental governance, sub politics, political and ecological modernisation, network societies, and many others all refer to the insight that the role and position of the state and state authorities in – among others – environmental regulation is changing dramatically.

Among the most influential developments affecting the role of the nation-state are without doubt the processes of globalisation and internationalisation. Although many scholars have correctly claimed that it is an exaggeration to argue that the nation-state becomes powerless (cf. Eckersly, 2004), it is clear that the nature of governmental regulation is changing (Held et al., 1999). As people, products and companies are increasingly mobile and deterritorialised it becomes increasingly hard for nation-states to set and enforce regulation. "Nation-states struggle to deal with the 'space of flows', with the deterritorialised and decentred mobilities of the global network society, because global (environmental) problems are no longer soluble at the level of individual states enforcing national regulations alone." (Oosterveer, 2004, 2) As Urry (2000) argues, this forces the nation-state to turn into a gamekeeper state, rather than a gardener state. Gone are the days in which the state could set strict standards: "they will increasingly act as legal, economic and social regulators, or gamekeepers, of activities and mobilities that are predominantly provided by, or generated through, the private, voluntary or third sectors" (Urry, 2000, 200).

From the late 1980s onwards the environmental social sciences developed a slightly different analysis of the changing role of the environmental state, relatively independent from the globalisation literature. Following the pioneering work of Martin Jänicke (1986) the failures of Western nation-states in dealing with the environmental crisis were initially blamed on the lack of preventive approaches and a too strong state dependency on capital (see chapter 2). Jänicke's original argument was that the ecological crisis asked for a strong, preventive state, which could regain its legitimacy by successfully intervening in economic processes. From the early 1990s Jänicke and others turned their attention and research agenda to processes of political modernisation. The notion of political modernisation builds upon the idea of preventive approaches but extends the analysis to include the changing roles and responsibilities of state authorities vis-à-vis non-state actors, new concepts of governance, new policy instruments and new regulatory arrangements in-between state, market and civil society (van Tatenhove et al., 2000).

The central idea of political modernisation theory is that the nation-state is increasingly unable to effectively implement strict command-and-control regulation, requiring the nation-state to modernize its strategies, approaches, instruments and arrangements. Globalisation arguments are one, but certainly not the only, reason for the necessity for political innovation and modernisation. In the field of environmental regulation, "national policies are not only believed to be replaced by transnational policies but the division of responsibilities between industrial actors, consumers, civil society and (semi) governmental actors is also believed to shift" (Smink et al., 2003). Moreover, in the 1990s we witness in the OECD countries the replacement of command-and-control policies and legislation by so-called new environmental policy instruments, because these are believed to achieve greater effectiveness and considered to be more democratic. [1]

3. Fuel efficiency labelling as a subject of study

This chapter discusses the historical developments in regulating automobiles and relates the emergence of fuel efficiency labelling to the changing role of the nation-state in governing (the environmental consequences of) automobility. The environmental problems caused by automobility are multi-faced, ranging from health effects to congestion and from urban air quality to CO_2 emissions. Although most OECD countries have a considerable amount of regulation that tries to mitigate these environmental and health problems one way or another, effective regulating automobility proves to be extremely difficult. In an attempt to further boost the combat against environmental and health problems of automobility in the EU, the European Commission endorsed legislation (1999/94/EC) that stated that from 2001 onwards all new cars sold in the European Union must have an energy-label, providing potential buyers with information about the fuel-efficiency of the car. This regulation has become a cornerstone of the European policy on energy conservation and automobility and will be taken as a case-study.

To analyse the changing distribution of governance responsibilities, power and influence between national, international and non-state actors, the chapter focuses on the actual development and implementation of the car label in the European Union, and the Netherlands in particular. Special attention will be paid to the representation of citizen-consumer interests in these processes.

This research is based on literature review and a series of semi-structured, in depth interviews with key informants. During 2004, interviews were con-

ducted with branch organisations, policy makers (both in the Netherlands and at the European Commission) and civil society groups (see the 'list of interviews' for details). Although the main focus of this chapter is on the Netherlands, I will (and need to) touch on international and European developments. The Dutch case is ideal for two reasons. First, the Dutch fuel efficiency labelling scheme is widely believed to approach the ideal car label model (Energieverwertungsagentur, 1999). Next to that, the label (introduced in January 2001) was accompanied by a subsidy program in 2002 through which fuel efficient cars were made financially more attractive. This makes it possible to compare different ways to target the citizen-consumers (solely through information, or combined with a financial incentives).

4. A brief history of fuel efficiency regulation

Regulation up till the 1970s

The first environmental regulations dealing with automobiles were established in the state of California which, in the mid 1960s, adopted emissions standards for automobiles. At that time, several other US states considered similar measures and the car industry, up till then heavily opposed to emissions standards, lobbied for federal emissions standards (Andrews, 1999). The Motor Vehicle Air Pollution Control Act was enacted by congress in 1965 and the first federal standards for carbon monoxide and hydrocarbons emissions were imposed for 1968 model year vehicles (Vogel, 1997). Initiated by President Nixon, the 1970 Clean Air Act Amendments required the car industry to further reduce the emissions on carbon monoxide and hydrocarbons (90% within 5 years) and nitrogen oxides (90% within 6 years).

In Europe, it was recognized that attempts to govern car manufacturers should take place at the EU level. In 1970 the first European directive on automobiles was approved (Directive 70/220/EEC). In this directive, it was stated that new cars to be sold on the European market needed approval of the EU. This approval was only given if the car fulfilled certain standards concerning safety but also concerning the emissions of carbon monoxide and hydrocarbons. Fuel efficiency and CO_2 emissions were not an issue at that time, neither in the United States nor in Europe.

Regulation following the oil crises of the early 1970s

The first regulation which tackled the issue of fuel efficiency was developed in the US after the oil crises in the early 1970s. In an attempt to reduce fuel de-

mand from automobiles, the US Congress established the Corporate Average Fuel Economy (CAFE) program. It required automobile manufacturers (domestic and foreign) to increase the average fuel economy of motor vehicles sold in the US. The aim was to double fuel efficiency in the period 1975-1985 leading to CAFE standards of 27.5 miles per gallon (mpg) for new cars and 20.7 mpg for new light trucks and sport utility vehicles (SUVs). From the outset, the CAFE standards had a double agenda; "CAFE standards sought not only to conserve fuel but to do so in a way that protected the market share of domestic automakers" (Vogel, 1997, 100). Alternative instruments, such as an auto efficiency tax, would benefit the Japanese car industry, which specialized in small and fuel efficient vehicles. Furthermore, CAFE explicitly sought to protect domestic jobs, by making a difference between cars manufactured in the US and abroad. This way, the US car manufacturers could not improve their corporate average by importing fuel efficient cars from abroad; both the inefficient and fuel efficient cars had to be produced within the US if they were to be averaged. A wide range of literature discusses the effectiveness, or ineffectiveness, of the CAFE standards (Kirby, 1995, Dowlatabadi et al., 1996, Greene, 1998, Bernstein, 2003). On the whole the average fuel economy of US cars has improved; automobiles sold in 1990 had an average fuel economy of 28 mpg, twice the efficiency of vehicles produced during the 1974 model year (Vogel, 1997).

The Energy Policy and Conservation Act, which led to the establishment of the CAFE standards, also created the basis for a federal fuel economy information program. The first fuel economy label was introduced in the mid 1970s and contained information about the estimated miles per gallon (mpg). In the period 1975-1985, the label was evaluated and revised on various occasions and in 1986 it was redesigned to contain information about the average fuel use both in the city and on the highway, about the estimated annual fuel costs and information about the range of fuel economy of comparable vehicles. The main purpose of the label was to provide independent certified fuel economy information; it "was not designed to persuade consumers of the fuel economy issue" (Wahnschafft and Huh, 2001, 549).

In Europe, the oil crisis also triggered various policy initiatives, ranging from a prohibition to drive for one or more days to a search for alternative fuels. These measures were developed at the level of the member state rather than by the EU. For example, the Netherlands stimulated the use of natural gas in automobiles to reduce oil imports. Governments also tried to stimulate selective car-use and more efficient driving styles and in the Netherlands the maximum speeds were set at 80 km/hr (for regional roads) and 100 km/hr (for highways).

Regulation in the 1990s

In the US, the debate in the 1990s focused on the question whether or not CAFE standards should be tightened. The background was that, after what was achieved in the 1970s and 1980s, the average fuel economy of cars sold in the US did no longer improve. The rising popularity of light trucks and SUVs led to a decrease in average fuel economy.[2] At that point, there was no consensus on the pros and cons of strengthening CAFE standards (Dowlatabadi et al., 1996, Bezdek and Wendling, 2005). The tightening of the CAFE standards was complicated by a GATT ruling that these standards restrict international trade. In 1993, the European Union called for convening a GATT dispute settlement panel. Their complaint was that three US policy measures, of which CAFE attracted most attention, protected US based car manufacturers. In 1994, the panel ruled that part of CAFE violated GATT rules (Vogel, 1997). Discussion focused particularly on the distinction between domestic and foreign produced cars. The GATT ruled that "the EU was correct in suggesting that the American policy objective of promoting fuel efficiency could be achieved in ways that were less restrictive of trade" (Vogel, 1997, 108). The GATT ruling did not mean that CAFE had to be abolished as a whole; it particularly condemned the differentiation between cars produced inside and outside the US. Although the US government did not change the CAFE regulations after the GATT ruling, the ruling has been used as an argument against the strengthening of the standards.

Whereas the issue of fuel efficiency regulation came to a stand still in the US in the mid 1990s, environmental considerations led the EU to develop new regulation. Global warming became a key issue in European policies, and it was recognised that automobility significantly contributed to this problem. However, this issue was not tackled by the existing regulatory framework and agreements (the so-called 1992 Auto Oil I Programme). When developing the Auto-Oil Programme II, the EU focused on further strengthening the limits of noxious and toxic emissions such as NH_3, NO_X, VOC and particulates. Although the second Auto-Oil Programme foresaw in the evaluation of the effect of various measures (such as fiscal instruments, using alternative fuels, et cetera) on CO_2 emissions, it did not contain a strategy to reduce the overall CO_2 emission caused by automobility.

In 1996, the European Commission, approved regulation which, independently from the existing Auto Oil Programme, sought to reduce the CO_2 emissions by automobiles and increase fuel efficiency (Com(1995) 689 def). The regulation was based on three pillars, each with a different strategy. A 'provider oriented' voluntary agreement on increasing fuel efficiency was to be established with the European car manufacturers united in the *Association des Constructeurs Européens d' Automobiles* (ACEA). This should result in the

'supply' of fuel-efficient cars. Secondly, it was agreed that, through a labelling scheme, citizen-consumers should be provided information on the fuel efficiency of cars, thereby increasing their power in the market. Finally, the door was opened for possible future fiscal reforms to stimulate increases in fuel efficiency, granting nation-states the possibilities to influence its citizen-consumers through fiscal measures.

The voluntary agreement between the European Commission and the ACEA was drafted in 1998. The industry's commitment was to achieve a new car fleet with an average CO_2 target of 140 gCO_2/km by 2008, and an intermediate goal of 165-170 gCO_2/km in 2003 (ACEA, 2002). Furthermore, the industry committed itself to provide cars with a fuel economy of 120 gCO_2/km no later than 2000. In a later stage, the Japanese and South-Korean car-manufacturers joined this voluntary agreement, pledging to reach the same targets.[3] Some argue that the agreement is little ambitious and will make a very small contribution to CO_2 reductions (Volpi and Singer, 2000) but others argue it is the most cost-effective way to achieve improvements in fuel economy (Plotkin, 2001). Involved policy makers stated that the fact that an agreement could be reached on such a sensitive subject was a tremendous success in itself (interview Zuidgeest).

5. Regulating fuel efficiency in the European Union

In this context of international debates on the validity of strict fuel economy standards, and given the strong political influence of the car manufacturers, the choice for a regulatory strategy based on labelling and the voluntary agreement was not more then logical. Strict regulation was considered politically unfeasible (interview Clausing; interview Zuidgeest). The car industry was a major economic force, with significant power on national governments; citizen-consumers would not like to be forced to buy smaller fuel-efficient cars; and strict regulation could be seen as trade-restrictive with possible WTO inconsistency as a result. Under these conditions, introducing compulsory labelling was considered the policy measure which 'hurted the least' (interview Zuidgeest). Imposing strict EU norms for fuel efficiency would meet opposition from various nation-states, since it could harm their economy (interview Zierock). The decision to develop the labelling directive was also fuelled by the unsatisfactory negotiations with the ACEA concerning the voluntary agreement. The European Commission wanted the ACEA to commit itself to the more ambitious goal of a new car fleet average of 120 gCO_2/km, which they refused. If the ACEA had committed itself to the 120 gCO_2/km

goal, there probably would not have been an EU labelling scheme (interview Zierock). However, starting January 18, 2001, all new cars for display were required to have a label that at least contained information about the fuel economy and CO_2 emissions in gCO_2/km.

The EU saw labelling explicitly as a strategy to influence consumer-choice, as a demand-driven instrument that would work well in conjunction with the supply-driven voluntary agreements (interview Zierock). Although the EU reached agreement on the implementation of a label, it did not agree on the definite format of the label (as was the case with for example Directive 92/75/EEC on the labelling of domestic appliances). The economically and politically powerful car industry did not have much interest in convincing citizen-consumers to buy smaller, less profitable cars, nor had the member-states in which these manufacturers were located. Consequently, the EU implemented the directive on the basis of minimum harmonization, delegating more responsibility and freedom on implementation to the member-states. Thus member states were granted the authority to demand more elaborate labels on which more information than strictly necessary, and possibly in different formats, is provided.

The minimum requirements as formulated in the directive require (i) that new passenger cars that are displayed are accompanied with a label, (ii) that a poster with information about the fuel economy of the different versions and vehicles of the concerned brand is available in showrooms, and (iii) that a guide with an overview of the fuel economy of all vehicles for sale in the concerned country is available. Furthermore, (iv), all advertisements should contain information about car fuel economy. On all these occasions, this information should be given in a prescribed format; information should at least contain the official fuel consumption and the official specific emissions of CO_2.[4]

Most member-states have been notoriously slow in implementing the directive. In January 2001, only four member states had implemented the directive: Denmark, Sweden, Finland and the Netherlands. Throughout 2001, most countries implemented the directive. In March 2002, the EC started juridical cases against the five countries that failed implementation of the directive: France, Germany, the United Kingdom, Italy and Spain. All five countries have a domestic car industry. After years of legal struggles with the European Commission, Germany was the last member state to introduce the label in 2004.

6. Taking labelling one step further: the Dutch label

In 1996, when the first plans for introducing a fuel economy label were already made, the Dutch Ministry of Environment sought contact with different interest groups. This ranged from interest groups representing the automobile sector (the RAI association, BOVAG) and the Dutch Automobile Association (ANWB) to consumer organisations (Consumentenbond) and environmental NGOs (Stichting Natuur en Milieu). The Dutch Ministry for Environment wanted to provide more information than strictly necessary, including a comparison between different cars, which would enable citizen-consumers to make a better informed choice. Furthermore, the parameter 'gCO_2/km' was not considered to be very useful for the average citizen-consumer (interview Zuidgeest). The idea was brought up to develop a label that, analogous to the European label on domestic appliances, classifies cars based on their relative performance (see Figure 1). It was argued that citizen-consumers, when considering purchasing a new car, have already decided on the size of the car. Fuel efficiency labels would never convince a potential BMW-buyer to switch to a Fiat Panda. Consequently, illustrating relative differences in environmental performance between comparable cars was believed to be more useful than absolute figures. Furthermore, a label based on absolute indicators would blur the differences between cars of similar size: small cars would always do well, bigger cars never. The Ministry's preference was also based on research undertaken at that time. A reduction of automobility CO_2 emissions of about 5% could be expected through information provision and a label comparable to the one used for domestic appliances proved preferable (Energieverwertungsagentur, 1999).

Industry representatives opposed the label, arguing that the process of selling and buying a car was (and should continue to be) an 'emotional experience' in which 'rational' arguments should not, and will not, play a role (interview Zijlstra). Because the labelling directive was mandatory imposed by the EU, the car industry could not challenge the label as such but only try to influence the way it was implemented nationally (interviews Pereboom, Zijlstra). Consequently, they vigorously opposed plans to take labelling further than strictly required and argued that differences in national labelling schemes would lead to a chaotic situation, would confront industry with extra costs and would only confuse citizen-consumers.

This resulted in a fierce political struggle. The Minister of Environment personally favoured the label and found the main consumer organisation (Consumentenbond), environmental organisations, as well as the Dutch Automobile Association (ANWB) on his side. In the end, the matter was settled in the

Second Chamber, which supported the minister. Industry representatives quickly changed tactics, acknowledging that a label could benefit (at least some) manufacturers. The subsequent discussion focused on the best methodology to categorize different car classes and to calculate the relative performance. The result was a formula based on length and width of the car, and its relative and absolute fuel efficiency.[5] The 'average' car received a D-label and other cars would be compared to this standard. Each year, the average is recalculated and car fuel efficiency categories are thus moving targets.

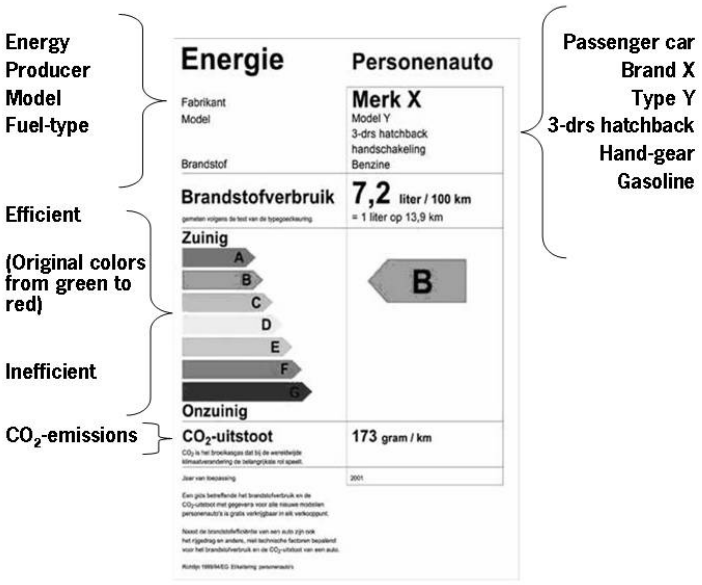

Figure 6.1: The Dutch fuel efficiency label

In January 2001, in line with the EU's time-line, the label was introduced (see figure 6.1). Since then, publicity surrounding the label has mainly been generated by the government and ANWB. Environmental NGOs have not been active in making the general public familiar with the label, as they claimed that others are in a better position to do this (interview Fransen) or

that they "want to approach people as citizens, not as consumers" (interview Ten Kate). Consumer-research showed that, if asked, citizen-consumers thought of the label as understandable and useful. Generally, they were familiar with the label and argued that the categorisation based on vehicle size was most useful when they considered buying a car. During visits to car dealers, researchers noticed that car salesman hardly mentioned the label nor explained the label clearly (Stienstra and Jansen, 2001). A special division of the Dutch Treasury was given the task to control whether car sellers rightfully applied the correct label. Between 90% and 98% of the companies did so (Belastingdienst/FIOD-ECD, 2001). The predicted chaos and confusion did not occur.

The hostile attitude towards labelling among industry changed when the government decided to introduce a subsidy for A and B labelled cars in 2002. Consumers who bought A or B labelled cars received 1000 respectively 500 Euro from the tax authorities. The industry supported this decision, considering that it was not unlikely that consumers would spend this rebate on car luxuries (interview Zijlstra). The subsidies only lasted one year, as the newly elected conservative government decided to end this financial provision. In an unlikely collaboration, industry representatives, consumer organisations and environmental organisations jointly lobbied to maintain these subsidies, without result (interview Clausing).

7. The effects of fuel efficiency labelling in the Netherlands

The introduction of fuel efficiency labelling in the Netherlands was accompanied by a compulsory annual evaluation by the Dutch government, to be submitted to the European Commission. Research before the introduction of the car label concluded that citizen-consumers were rather indifferent towards environmental issues when purchasing a car (Muconsult, 2000). This view still dominates among policy-makers and industry representatives alike: environmental considerations are believed to play a very minor role in decisions on car buying. Type, price, colour, image et cetera are all more important (interview Zuidgeest, Zijlstra, Clausing, Pereboom). Only a small niche exists for notable environmental friendly cars (such as the Toyota Prius) and it is not believed that these citizen-consumers are in need of a label to fulfil their information needs (interview Pereboom).

But what can we say about the real effects of labelling. Did the label have a positive environmental effect by increasing the share of fuel-efficient cars in

total car sales? Although one should be careful not to attribute the observed change in the sales numbers solely to the introduction of fuel efficiency labels, the changes are illustrative for the market development (see Table 6.1). The market share of A labelled cars shows a heavy fluctuation because of the subsidy program, but the market-share of B-labelled cars increased significantly whereas the share of D en E labelled cars continuously decreased. The positive environmental effects are even larger since the categories are 'moving targets'.

	A Green	B	C	D Yellow	E	F	G Red
2000	0.5	6.5	41.1	33.0	12.4	3.7	2.5
2001	0.3	9.5	45.7	27.7	11.4	3.2	2.2
2002	3.2	16.1	40.0	26.3	8.7	3.6	2.0
1st quarter 2003	0.8	14.2	44.9	24.9	8.6	4.1	2.5

Table 6.1: Relative market share labelled cars in 2000, 2001 and 2002 in percentages (derived from Ministerie van VROM, 2003)

How can we explain the discrepancy between the common idea of low citizen-consumer interest in environmental information and the observed increase in market-share of fuel-efficient cars? The findings of this case-study illustrate that labelling set in motion a number of mechanisms. The argument behind labelling is that the provision of information can influence consumer-choice, and thus for example make a citizen-consumer buy a B-labelled vehicle, rather than a C-labelled one. At the same time, it is frequently argued that environmental considerations play a minor role in the purchase of a new vehicle. The findings of this case-study point at three additional effects of labelling:

1. A 'spotlight effect': the introduction of the label has put a spotlight on the issue of fuel efficiency (interview Clausing). It is evidence of the fact that policy-makers at different levels care about the issue, and are willing to develop regulations to reduce fuel efficiency. As such, the label can be a first step towards the development of further regulations, for example by linking the tax on new cars to their fuel efficiency (interview Zuidgeest).[6]
2. A provisioning effect: the fuel efficiency label has led to change in the kinds of cars available, and the way they are promoted. Car manufacturers brought fuel efficient models on the Dutch market, which were not for sale beforehand (interviews Zijlstra, Pereboom). The subsidy

led car manufacturers to advertise for the most fuel-efficient cars, and up to this day, some manufactures use fuel efficiency as a unique selling-point.[7]

3. A 'spin off' effect: although the label is primarily designed to convey information about the environmental performance of the car, it indirectly also covers the marginal cost of driving. In situations where the environmental effects are related to the economic effects, environmental labels do not necessarily appeal only to citizen-consumers environmental motives. Given the strong increase in fuel prices in 2004 and 2005, this financial motive might become even more important in the future.

The future of the Dutch fuel efficiency labelling scheme

After the subsidies were abolished, the general public did not hear much of the Dutch labelling scheme. Policy-makers have discussed some minor difficulties and some of the (unnecessary) burdens for car sellers, most notable the compulsory poster and the fuel guide. Amendments to the European directive crossed out the poster. Future suggestions from the Dutch ministry are to withdraw the European obligations to produce the fuel guide and the obligation to provide fuel efficiency information on each advertisement. It is not believed that citizen-consumers actually look at this information, let alone take it into consideration when buying a car.

In the European context, an upcoming round of negotiations aims to harmonize the label. The car industry continues to stress that the international diversity of regulations and formats is a burden to them. Furthermore, they plea for harmonisation as it is strange that some cars are labelled 'green' in one country, but 'yellow' in another. What this harmonisation should entail is not clear. Some prioritize harmonisation independent of the final form (interview Pereboom). Others plea for harmonization at the minimum standards, disabling individual nation-states to take further measures (interview Zijlstra). The Dutch Ministry wants to maintain the current Dutch labelling scheme (preferable as a European standard). Their categorisation and labels are believed to be clear to the citizen-consumers and offer the possibility to be related to future financial measures (interview Zijlstra).

End of 2005, the Dutch government working on new regulation which would make the levies on purchasing a new car dependent on the fuel efficiency label. A labelled cars would then become cheaper, while G labelled cars would become more expensive. In response, the car industry has, supported by some political parties, argued that the calculation method should be

revised, stressing the absurdities of the current method (an 6 cylinder Audi A8 has the same label as a 1.2l Fiat Panda).[8]

8. Conclusions

The case-study on fuel efficiency labelling in the European Union is illustrative of the general societal developments as described in the second section of this chapter. It has also proven to be an interesting example to study how political consumerism 'works' in practice. What it has illustrated is that labelling works through a variety of mechanisms and the influence of labelling on producers is not only the result of the actual changes in consumer choice; the actual power of the citizen-consumer is much bigger than one would expect on the basis of their expressed concern for fuel efficient cars. Labelling not only influences real-life citizen-consumers in their decision but it also gently directs producers' attention to the concerned issue, with the 'threat' of changing citizen-consumer behaviour on the background. The collection and provision of environmental information can also be instrumental in focusing corporate attention to a specific issue, thereby exerting influence prior to the citizen-consumer choices by directing corporations to develop and market different products.

The question is what this particular case tells us in the light of the theoretical notions of political modernisation, exemplified by the development of new policy arrangements, the changing role of the nation-state under such arrangements, and the emergence of political consumerism.

Nation-states are no longer in the position where they can develop and implement strict command-and-control regulations. Not only are such forms of regulation increasingly considered as inefficient, the case of fuel efficiency labelling also illustrates how the international policy arena – with the GATT/WTO as most visible example – plays a role in restricting the range of policy-measures available to the state. Under such conditions, new forms of regulation are required. Command-and-control regulation is replaced by new approaches, policy instruments and governance arrangements. These new arrangements require the (nation-) state to change tactics. Rather then setting strict standards, governments come to play a role in developing networks, forging coalitions and in defining the 'rules of the game', also when it comes to the provision of environmental information or the development of environmental labels. Of particular interest here are those attempts where governments attempt to enrol citizen-consumers into governance arrangements

by forcing corporations to provide environmental information. The consequence of this process is that citizen-consumers are provided with more and more environmental information, increasing the possibilities to take environmental arguments into consideration. As public concerns are – sometimes as part of an explicit strategy of the government – incorporated into consumption choices, consumerism turns into political consumerism.

Next to that, the case of fuel efficiency labelling in Europe shows that to analyse the impact of labelling, we must look beyond individual consumption choices, even beyond the aggregate of these choices. The development of consumer-oriented monitoring schemes, in this case culminating in the fuel efficiency label, comes together with numerous processes which together pressurize producers to take environmental considerations into account. Political consumerism therefore should not be considered as a particular act, but as a set of interrelated processes which can together come to stimulate the ecological modernisation of production and consumption

.

CHAPTER 7

INFORMING OR EMPOWERING?
DISCLOSURE IN THE UNITED STATES AND THE NETHERLANDS[†]

1. Introduction

Environment and information

The popularity of buzzwords such as transparency, accountability and disclosure in environmental discourses and policies makes it clear: environmental information is important. International agreements such as the Rio declaration (Art. 10) and the Aarhus Treaty state that public availability of information is a prerequisite for democratic environmental governance.[1] Sustainability reporting (in relation to corporate social responsibility) is fashionable, both in official regulations as part of corporate, market-driven strategies.[2] Of course, environmental information has always been around. What is new is that the information is no longer solely used by experts as a tool in decision-making but that information becomes part of a regulatory strategy. Disclosure seeks to make civil society actors more knowledgeable about pollution in their local environment, enabling them to increase the pressure on polluters to lower pollution levels. To disseminate information, governments and non-governmental organisations have developed, or are developing, databases that disclose information to the general public.

[†] This chapter is published as: van den Burg (2004), Informing or empowering? Disclosure in the United States and the Netherlands, *Local Environment*, **9**, 367-381

As an environmental policy instrument, disclosure is part of the third wave of environmental policy instruments, following traditional legal remedies and market-based approaches (Karkkainen, 2001, Graham, 2002, Gunningham and Sinclair, 2002). It builds upon existing freedom of information acts, but goes one step further; disclosure comprises the dissemination of actual emission data via the Internet3. It serves different purposes: disclosure promises environmental improvements and strengthened environmental democracy, by raising awareness (among businessmen and communities) and facilitating local dialogue rather then through strict rule setting and enforcement. Disclosure originated in the US with the establishment of the Toxics Release Inventory (TRI) in 1987. In 1998, the NGO Environmental Defense Fund launched Scorecard as a counterpart to the TRI to make the information better accessible. The Aarhus Treaty, drafted by the United Nations Economic Commission for Europe (UNECE), explicitly argues that nation-states should develop digitally accessible databases (the Pollutant Release and Transfer Registers).

This chapter analyses the emergence and construction of disclosure in both the US and the Netherlands. It seeks to answer the following question: can disclosure empower civil society actors in environmental struggles and debates? The comparison between the US and the Netherlands enables me to describe how different governments use disclosure differently. The central argument will be that Dutch policy-makers wrongfully think that disclosure only works because of the US' legal system. In conjunction with a different political culture, this conception leads policy-makers to use disclosure as a way to *inform* civil society on the general environmental quality, rather than *empower* civil society vis-à-vis polluting companies. This limits civil society's possibilities to use environmental information in environmental action.

2. Regulatory innovation; the emergence of disclosure

The origins of disclosure lie in the changing relations between different societal actors (such as governments, companies and citizen-consumers) in environmental reforms. Partly under the influence of ideological streams of thought and partly influenced by the changing 'rules of the game', nation-states have attempted to cut back on command-and-control regulation, and develop alternative forms of regulation. "Deregulation is based essentially on the alleged inefficiency and to a lesser extent also the illegitimacy of a high degree of state intervention and comes down to a partial retreat of the state." (Liefferink et al., 2000, 14) Deregulation and regulatory innovation can be understood in relation to following three interrelated developments: global-

isation, the changing nature of surveillance and the decreasing legitimacy of the state in relation to environmental policy making.

Globalisation and environmental regulation

The role of the nation-state in environmental policy-making and enforcement changes as a result of globalisation (see for example Held et al., 1999, Mol, 2003). As argued by Held et al, globalisation in itself does not mean that nation-states become powerless: "there are many good reasons for doubting the theoretical and empirical basis of claims that nation-states are being eclipsed by contemporary patterns of globalisation" (Held et al., 1999, 14). What is happening is that nation-states are reconstituting their role, they are "undergoing a profound transformation as their powers, roles and functions are rearticulated, reconstituted and re-embedded at the intersection of globalizing and regionalizing networks and systems" (Held et al., 1999, 440). Elaborating on this reconfiguration, Urry (2000) refers to Bauman's metaphors of 'gardening' and 'gamekeeping' states to make the point that modern nation-states can no longer be omnipresent and develop a law or guideline for every single issue (gardening) but have to limit themselves to setting the rules of the game (gamekeepers).

Following the reconstitution of the power and role of nation-states, the roles of citizens (as civil society) and consumers (as market agents) are subject to change. Both become increasingly important in setting the environmental agenda, in determining what is acceptable, and in solving environmental problems in conjunction with producers. Consumer labels illustrate the delegation of responsibility to the market; disclosure is an example of the larger responsibility of civil society for pressurizing (or surveilling) producers. Rather than setting and enforcing strict rules, the state turns into a facilitator who, among others, provides citizens with information and the means to exert power.

The changing nature of surveillance

The development of new information- and communication technologies is not only closely linked with the processes of globalisation (Castells, 1996), it has also changed the capacity, speed and geographical range of information gathering, processing and dissemination. This has in turn affected the nature of surveillance. As Foucault showed, information is not a neutral entity. Surveillance and monitoring generate information that is used to exert influence and power over others (Foucault, 1977). Surveillance exerts power because actors self-discipline themselves and behave in line with the standards that they believe are expected from them. But surveillance also affects social (power) rela-

tions and grants some actors with the means to influence others. The dominant analysis of surveillance, following Foucault, states that surveillance benefits large powerful actors by giving them greater control over individuals and that it is part of a pyramid-like structure of control (see e.g. Whitaker, 1999). This instrumental, technocratic view on the role of information implies that (environmental) information is employed by the powerful actors to steer, influence and discipline citizens and consumers. However, as is increasingly pointed out, the nature of surveillance in contemporary societies has changed (Mathiesen, 1997, Lyon, 1998, Haggerty and Ericson, 2000, Lyon, 2001). Surveillance has transformed into "something much more like a plant that sends out shoots here and there, growing rhizomatically" (Lyon, 2002, 162). The possibilities for surveillance are no longer restricted to the powerful actors; NGO's, grassroots organisations and citizens have more and more possibilities to gather, interpret and disseminate information. Nowadays, no actor stands outside the 'surveillant assemblage' (Haggerty and Ericson, 2000).

The environmental field is no exception. Elsewhere, I have argued that environmental monitoring can indeed be used by citizen-consumers to push for environmental reform (chapter 4). Access to environmental information is no longer restricted to scientists, state agents and companies; new arrangements around monitoring and surveillance are established between producers, citizen-consumers, environmental organisations and governments, with different forms and levels of participation in processes of environmental change. The result is a situation where nobody is excluded from surveillance and civil society actively demands (access to) information from the government and companies, stating that they have a 'right-to-know'.

Decreased legitimacy of the state

The 'right-to-know' argument is voiced most strongly in situations where governments are less trusted and are faced with decreasing legitimacy. This is particularly noticable in relation to accidents, for example the disaster at Bhopal, India, the explosion of a fireworks factory in Enschede, the Netherlands in 2000, or the SARS-outbreak in 2003. These disasters all resulted in demands for more information and transparency, not only because that could trigger companies to reduce the risks but also because citizens wanted to know what risks they are subjected to (Fortun, 2001, Anonymous, 2003).

But accidents are only the most visual failures of the conventional, expert informed, styles of governance. As argued by Beck (1992), the traditional ways of dealing with risks and environmental problems are doomed to fail because of the nature of contemporary risks. Natural sciences have been able to deal with many external risks (such as diseases, contamination, et cetera) but

fail to deal with those risks that are produced by science in the first place. As many contemporary risks are the result of science and technology, science and technology themselves become subject to discussion. Subsequently, "in their concern with risks, the natural sciences have involuntarily and invisibly *disempowered themselves somewhat, forced themselves toward democracy*" (Beck, 1992, p. 58). Science and technology, and consequently the expert-informed style of policy-making, become subject to public scrutiny or, in Beck's words, to reflexivity. This development further contributed to the emergence of regulatory mechanisms based on the provision of information. By providing information about pollution and polluters, governments avoid potential legitimacy crises, as they then derive legitimacy from the fact that they provide information, rather than from the fact that they have avoided (or limited) pollution or accidents. Increased reflexivity also creates new feedback loops, confronting companies with the environmental consequences of their practices and providing civil society with information on companies' practices.

3. Disclosure as a part of environmental democracy

Notwithstanding these general origins of disclosure, the actual development and implementation of disclosure practices proves to differ strongly among nation-states. By taking the US and the Netherlands as examples, this chapter aims to analyse and evaluate disclosure practices in environmental policy in two fields: its promises of environmental reform and its contribution to civil society involvement and democratisation.

To analyse the impact of disclosure on the environment, one needs to ask a couple of questions. First, one needs to question if disclosure has contributed to a reduction of the total environmental impact. Secondly, the question is what has triggered these environmental benefits (if any). In theory, disclosure can work through a variety of mechanisms, for example providing state agencies with better information, stimulating companies to reduce their emissions, empowering civil society, or by informing shareholders about the environmental record of companies. In this chapter, special attention goes out to the question of democratisation as some authors herald disclosure as an example of 'environmental democracy in action' (Lynn and Kartez, 1994).

For many academic authors and idealists, democracy and environmental reform should be considered as two sides of one coin. Although this is an assumption that can be questioned (see for example Kabiri, 2004), the concept of 'environmental democracy' has gained solid ground (Dryzek, 1996, Mason,

1999, Dryzek et al., 2002). As shown by Dryzek et al. (2002), Western democracies take a different stance when it comes to the inclusion of interest groups and social movements. The US is characterized as a pluralist, passively inclusive state in which social groups and movements can easily access administrative forces and policy-makers. In this context, provision of information is a strategy to support different lobby-groups. In the Netherlands however, policy-making is characterized as corporatism. First of all, unorganized citizens simply are not considered very important. Organized interest groups (both environmental and business organisations) have easy access to policy-makers (through was has become known as the 'Poldermodel'). At the same time the state is careful not to damage its good relations with different actors. Thus, they are careful not to trigger unguided, and unpredictable, environmental debates and controversies.

How does this relate to disclosure? Disclosure is often depicted as an instrument that enhances democratisation. Information is brought into the public space in an effort to educate the public, and increase societal pressure on producers in order to reduce their environmental impact. Disclosure promises to deliver information to citizen which they could otherwise not collect, thereby solving the Coarse theorem (Tietenberg and Wheeler, 1998, Fung and O'Rourke, 2000). By bridging the information gap between corporations and governments on the one hand, and citizen on the other, disclosure attempts to enable individual citizens to take action. In most cases, governments decide on the way in which information is collected, processed and published, and defines the possibilities that citizens have to take action. The extent to which this process is geared towards the needs of citizens can be considered a parameter for democratisation and reflects how governments think about the role of citizens and the importance they attach to citizen empowerment.

4. Environmental disclosure in the USA: the TRI and Scorecard

The origins of disclosure in the United States

Disclosure policies came into existence in the US when, in 1986, the Emergency Planning and Community Right to Know Act (EPCRA) urged the Environmental Protection Agency (EPA) to develop the Toxic Release Inventory (TRI). The EPCRA was a direct response to the disaster at the Union Carbide facility in Bhopal, India and a series of comparable near-accidents in the US (Abrams and Ward, 1990, Fortun, 2001), although the issue of transparency had been around longer, particular in relation to worker safety and the Love

Canal incident. The Toxics Release Inventory requires industries to provide information on the on-site usage and emissions of toxic chemicals. Industrial facilities with 10 or more employees that manufacture or process toxic substances in quantities above a certain threshold are obliged to report yearly to the EPA, which makes the information publicly available through its website.

The institutional embedding of the TRI is somewhat peculiar. It is only loosely embedded, with no direct relation to the traditional command-and-control instruments. Companies report to the federal Environmental Protection Agency (US-EPA) office, which however has relatively little power over the reporting companies. Most permits are granted by the state agencies and only very large facilities fall under direct responsibility of the US-EPA. Even at the state level, different units within the environmental departments are responsible for TRI and permitting. In principle this could mean that it goes unnoticed if companies report higher emissions than their permit allows them (interview Wither).[4] The EPA has the possibility to enforce reporting (although the willingness to enforce varies over time) but there are only limited possibilities to validate the reported data. In principle, they can compare the provided data with the earlier reported data and 'standard' emission data for certain types of industry. Although this does not happen very often, the possibility is believed to be an impetus for companies to provide the correct data (interview Senthil).

Environmental Defense Fund added a new dimension to the disclosure of environmental information when they launched the website Scorecard in 1998.[5] Scorecard was developed to make the TRI-information more accessible but also to link the quantitative information on emissions to specific health consequences (interview Pease). Scorecard integrates various public databases, among which the TRI, with the existing knowledge on the health-effects of certain toxics. The presented information is thus not only quantitative but also qualitative. Furthermore, Scorecard also ranks the polluting facilities to put a spotlight on the biggest polluter. Scorecard is more citizen-oriented, or as Fortun (2004, 64) states, "Scorecard is built around a conception of the user as a citizen, and around a conception of democracy that requires ongoing participation by citizens, even in matters that are extremely complex, scientifically and politically".

Use and effect of the Toxics Release Inventory and Scorecard

At the time of establishment, both the EPA and companies were rather sceptical, being afraid that the TRI would be another costly bureacratic burden (interview Senthil). Nowadays, the TRI is an established instrument and even industry representatives argue that it has helped to put a spotlight on pollution

(interview Gunnulfsen). The success of the TRI in the US, considered a 'surprise' by the EPA (Karkkainen, 2001), manifests itself in different ways. One of the firmest conclusions that can be drawn is that the total level of reported toxic emissions has steadily decreased since the TRI was established (Roe, 2002). Despite the difficulties in comparing different years (as reporting requirements change every now and then) and doubt about the quality of the data (with virtually no data checks) this conclusion seems to hold (Konar and Cohen, 1997, Natan and Miller, 1998, Karkkainen, 2001). Furthermore, the TRI has "produced positive consequences for democratic norms, collaborative decision making, and corporate efficiency, as well as environmental quality" (Lynn and Kartez, 1994). Cohen (2000) argues that the TRI have resulted in significant reductions of environmental pollution but also empowered local communities and other stakeholders and increased cooperation between the EPA and the regulated industries.

The TRI data are occasionally used by the EPA to prioritize environmental action programs and develop other policies (interviews Gunnulfsen, Senthil) but the real pressure on companies comes from other sources. There is some empirical evidence that the TRI generates internal pressure within companies to reduce toxic emissions following new insight into (the inefficiency of) their production processes (Gottlieb et al., 1995). In other countries, this arguments seems to hold (Howes, 2001a, Gunningham and Sinclair, 2002).

Just by looking at the TRI data, one is tempted to conclude that the TRI is not primarily designed for individual citizens.[6] The information is very technical and requires a basic understanding of toxics. Even Scorecard, which attempts to make the information more accessible, can be rather confusing. Nevertheless, both databases are frequently contacted when people look for information on local pollution levels, with up to 40.000 unique visitors a month for Scorecard (interviews Balbus, Pease). This is evidence that the databases fulfill a certain need for information. Environmental NGO's have also used the information from the TRI to develop toxic use reduction programs, for example the Silicon Valley Toxics Coalition[7]. Other actors have used the data from the TRI for more (surprising) purposes. There are examples of teachers who ask students to use the TRI data in writing reports on environmental problems and polluters (interview Pease). Journalists have used the information to write informed articles on polluters and local issues and companies that actually sell environmental technologies use the databases to identify for potential customers (interview Pease). Even health professionals increasingly make use of Scorecard (interview Balbus).

Explaining the success of disclosure

Both from the literature and from the conducted interviews, the conclusion is that disclosure works through a variety of mechanisms. First of all, the information might provide the reporting company with new information on their own environmental performance, which could lead to an improvement of the companies performance (Howes, 2001a). Second, disclosure of environmental information might be interesting to shareholders (Lynn and Kartez, 1994). Reported high pollution levels might mean that the company works ineffectively, or that the company risk high clean-up costs in the future. This could result in lower stock value (Hamilton, 1995). Third, the disclosure of environmental information might provide environmental organisations and communities with the means to target high pollution levels (Lynn and Kartez, 1994). This can either mean that they file lawsuits but it can also mean that they negotiate with local governments and producers. Fourth, transparency on pollution levels can allow for benchmarking between different companies. Not only can companies compare their pollution levels with other similar companies but their might also be a 'reputation effect' where companies do not want to be the worst performer (Stephan, 2000).

According to Bill Pease and David Roe, both involved in the development of Scorecard, the success of disclosure as a regulatory strategy is best explained by the process of anticipation. The effect of direct citizen action and lawsuits is easily overstated: "those are all very peripheral, I would say. It (Scorecard, SvdB) operated much more on the level of stigmatization of corporate reputation" (interview Pease). Meant as a rough indication, David Roe argues that for one case of direct activism over high levels of toxic emissions, hundred cases have become unnecessary because companies reduced emissions in anticipation (interview Roe). The strength of disclosure is that it allows different actors to identify the worst polluters rapidly, and consequently focus their actions (Lynn and Kartez, 1994). The influence of disclosure is not primarily felt through lawsuits and direct action. The achieved reductions are largely the result of companies who seek to reduce toxic use because they want to be one step ahead of conflicts with environmental organisations or citizens, a decrease in shareholder value, a bad reputation, unfavorable news-coverage, et cetera.

The future of disclosure

The right-to-know can be granted to citizens, but it can also be taken away. This became particularly clear after September 11. Right after the attacks, sensitive information about risk profiles and risk management plans was taken off the EPA website. These were not part of the TRI, which has not been

threatened yet, although there is a continuous debate about the extent to which potentially dangerous information should be available.[8] The two opposing positions in the debate are on the one side those who state that companies should seek to reduce the actual risks, rather then reduce the information that is available on the risks. On the other side, it is argued that the TRI is a danger to homeland security and should be taken offline. The outcome is undecided (see e.g. Cohen, 2002).

5. Present Perfect: Dutch experiences with disclosure

Origins of disclosure in the Netherlands

In June 1998, the Dutch governments signed the Aarhus Treaty, as drafted by the UNECE. It stated that nation-states should make environmental information accessible to the general public through electronically accessible databases. National governments will be responsible for the Pollutant Release and Transfer Registers (PRTR) which will contain information about the state of the environment. The project Emission Registration is the Dutch equivalent of the PRTR. [9] It seeks to make environmental information publicly accessible, which, technically, isn't a big challenge for the Dutch government. It is a continuation of the existing monitoring and modelling schemes that exist for a long time and serve to inform policy-makers on problems and the effect of measures taken. In contrast to the TRI, this database will also contain information (although partially modelled) on diffuse sources (such as traffic, households and small-scale enterprises.

Unfortunately, it took a large accident to put disclosure onto the public agenda. When in 2000, a fireworks factory exploded in the city Enschede, Dutch policy-makers, journalists and civil society actors all argued that the public had a right to know about the risks they were subjected to. Several provinces developed websites that visualized various risks.[10] So far, the websites have not triggered a public debate on the risks and their main effect has been an improvement of the communication between different emergency services (interview Godthelp).

Dutch companies have not been very enthusiastic about disclosure. The September 11 attacks provided them with further arguments against disclosure, stating that the wrong actors could use the information for the wrong purposes (interview Doornbos). Furthermore, companies argue that that most companies already have regular contact with their neighboring communities and/or disclose information voluntarily (for example through annual sustain-

ability reports). In most cases, affected citizens can already gather the most relevant information and the additional value of nation-wide disclosure is questioned.

Disclosure and the useability for citizens

The Dutch Emission Registration system will be publicly accessible but the usability for citizens has no priority (interview van der Plas). [11] The primary purpose is to measure the progress made by, and effectiveness of, environmental policy. According to the developers, the Dutch law on the 'openbaarheid van bestuur' (guaranteeing that citizens have access to government documents) is not comparable with the US' right-to-know legislation. Policy makers argue that, because the Dutch Ministry of Environment has its own inspection network and the means to enforce environmental legislation, there is no need to leave this up to citizen-organisations (interview van der Plas). The argument is that, because there is a different 'culture' in the Netherlands, the translation of the TRI to the Dutch context will not work (interview Pulles).

As a consequence, the format chosen for disclosure of environmental information leaves very little possibilities for citizens to take action, nor does it put much pressure on the polluters. Originally, incorporation of the data on individual companies was only foreseen in the long run. However, the European Directive on Integrated Pollution Prevention and Control (IPPC) forced the Dutch government to change plans. Part of the IPPC is the development of a European Pollutant and Emission Register (EPER) which contains information about large European polluters.[12] The Dutch government decided to include information from companies that are already forced to produce an annual sustainability report into the Emission Registration. This comes down to approximately 250 companies in the Netherlands. Formally the Dutch government doesn't comply with the European rules yet (there are more companies that fall under the IPPC), but retrieving detailed information on the rest of the companies will take a lot of work.

Apart from these (approximate) 250 companies, the Emission Registration will contain information on the general environmental quality within each square of a grid. The model is built on a grid of 500m*500m but the information will be presented to the public on a grid of 5km*5km (interview van der Plas). This makes it quite hard, if not impossible, for citizens to know how much an individual source (be it a facility or traffic) has contributed. Also, it doesn't enable the comparison and ranking of different companies. This all severely limits the actions of civil society and the working mechanisms of disclosure.

If we want to assess the possible contribution of this Emission Registration to environmental reform, it is clear that most benefit must come from 'better' policy-making. The chances that environmental organisations or citizens will find anything enabling them to put pressure on polluters are marginal. Information will only be available on those companies that already produce a publicly available annual sustainability report. Furthermore, there is little chance that the reporting requirements will provide new insight to the companies, the explicit aim of policy-makers it to adjust the reporting process to existing reporting procedures to avoid any extra work for companies.

6. Comparing and concluding: the USA and the Netherlands

A comparison of disclosure schemes

The experiences in the US show that disclosure can be an environmental policy instrument that contributes to processes of environmental reform. Following the introduction of Right-to-Know legislation, companies have reduced toxic emissions, either voluntarily or under pressure from societal groups. This reduction has largely been achieved by the fact that companies anticipate on future action. As information flowed to the public space, where a range of actors such as citizen-groups, NGO's, individual citizens, journalists, teachers and shareholders could easily get the information, companies felt increased pressure to reduce their toxic emissions.

	TRI	**Scorecard**	**Emission Registration**
Method of data-gathering	Self-reporting	Self-reporting[B]	Models and estimates
Information is about:	• Point sources • toxic releases	• point sources • toxic releases (among others)[B]	• point sources and diffuse sources • Total emissions, environmental quality[A]
Information concerns:	Individual facilities	Individual facilities and total emissions	Total emissions
Nature of information	Quantitative	Quantitative and Qualitative (human health effects)	Quantitative
Comparison of different companies	No	Yes	No

Table 7.1: Information provided in the different disclosure schemes
[A]: The data on a selected number of large companies will be included
[B]: The basic information about companies' toxic use and emissions comes from the TRI

If we compare disclosure schemes in the Netherlands and the US (see tables 7.1 and 7.2) a number of differences become clear. In the Netherlands, the disclosure schemes are based on good, scientifically sound, modelling and they are primarily constructed for use in policy-making and –evaluation. With relatively strong environmental departments, and hence permitting and enforcement, the Dutch government is less inclined to leave anything up to civil society actors. In a true administrative rationalist tradition, the emphasis lays on better procedures, better modelling and better policy-making, rather than on disclosure, right-to-know or citizen participation and empowerment.

One could argue that disclosure only works in certain political cultures in which NGOs are able, and willing, to take companies to court. Again, it should be stressed that this is a facet of disclosure (Howes, 2001b), but the TRI does not work solely because NGO's and citizens can take companies to court. Disclosure also leads to self-reflexivity and internal benchmarking; it informs journalists and shareholders and stigmatizes companies in the public opinion. Thus, there is no reason to assume *a priori* that disclosure cannot work in another political culture in which civil lawsuits are less prominent.

	TRI	Score-card	Emission Registration
Positive environmental changes ascribed to the instrument?	+	+	N/A
Is the information used for 'better' policy making?	+/-	-	+
Are businesses provided with new insight?	+	-[B]	-
Is the disclosed information easily accessible and understandable for citizens?	+/-	+	-
Can the information be used on the market, most notably by shareholders?	+	+	-
Support given to citizens to act upon the information collected?	-	+	-
Does it provide NGO's with new ways to exert influence?	+	+	-

Table 7.2: Overview and ranking of different disclosure schemes

Conclusion

Disclosure of environmental information has emerged as a 'new' environmental policy instrument in response to what are commonly seen as global trends. This chapter shows that the real-life manifestations of these global trends vary greatly, dependent on the political culture and the role that is ascribed to civil society in realizing environmental change.

In the US, with a government that is less willing to implement and enforce strong regulation, citizens and citizen organisations are given much more importance. In the pluralist style of policy-making, the state is less hesitating to shift the locus of decision-making from the government (and its inner-circle) to the public space. As citizens and civil society can become better informed and organize countervailing powers, new mechanisms to exert influence (from writing a letter to a company to developing Scorecard) become possible. But it is not so much a process of deliberation, consultation, participation and discussion, of the traditional ways to enhance democracy. The main instrument to exert power is by generating publicity and pressure through a diversity of mechanisms.

In the more corporatist, Dutch style of policy-making, which seeks to accommodate different interests while avoiding conflicts, disclosure loses much of its charm. Because the government is reluctant to provide information

about individual facilities, the information that is provided is, although of a high quality (it covers several sources, including diffuse ones), little specific. This leaves civil society, journalists, shareholders et cetera with little opportunities for countervailing action. The emphasis lies on informing rather then empowering; disclosure is more focused on requirements of policy-makers than on those of civil society.

There are good reasons to consider disclosure a promising instrument. In the previous chapters I have shown that disclosure can indeed contribute to a process of empowerment and environmental reform. I have also argued that Dutch policy-makers are mistaken in thinking that disclosure *only* works with a US-like legal system. It would be a pity if disclosure were used in the Netherlands only for technocratic, instrumental policy-making, rather then enhancing societal reflexivity and participation. But if the information is provided in such a way that civil groups cannot make use of it, the (untested) hypothesis that disclosure cannot work in the Netherlands solely because the legal system is different, will become a self-fulfilling prophecy.

Part IV: Conclusions

CHAPTER 8

CONCLUSIONS: GOVERNANCE THROUGH INFORMATION

1. The emergence of consumer-oriented monitoring

Nowadays, environmental information is more readily available than ever before. Not only do the advances in information and communication technologies open up new ways for disseminating information, the changes in the relation between producers and consumers and the deployment of new environmental policy instruments also explain why more and more environmental information is publicly accessible. The consequence of this development is that environmental concerns and solutions are no longer discussed solely at the level of public institutions, corporations and non-governmental organisations. As citizen-consumers can find environmental information more easily, whether via Internet, the energy meter or various kinds of labels, new means to take environment-related actions are opened up. Citizen-consumers are turned into 'agents of change'.

As Internet enables you to retrieve information about air quality in the Netherlands, about pollution caused by local factories, or about the environmental risks that you are subjected to, you can file better-informed complaints, participate in local planning procedures, et cetera. A trip to the supermarket to buy ones daily groceries turns into a true environmental decision-making process; a range of environmental labels allow you to identify ecological, organic, and/or socially responsible produced products. Similarly, the decision to purchase for example a washing machine can nowadays be made while taking environment related considerations, such as energy- and water consumption, into account. And if that doesn't suffice, you can, for ex-

ample, meter your domestic flows in order to participate in energy-saving campaigns.

In theoretical terms, I argued that this increased availability of environmental information for ordinary citizen-consumers means that the nature of environmental monitoring shifts. Where environmental monitoring was traditionally used to provide scientists and policy-makers with the information required for decision-making, environmental monitoring is nowadays increasingly consumer-oriented; it is increasingly used to involve citizen-consumers in environmental governance.

The aim of this study is to analyse how exactly this changing nature of environmental monitoring affects the role of citizen-consumers in these environmental governance arrangements. Drawing upon the framework of ecological modernisation theory, issues related to monitoring, governance, and the changing role of citizen-consumers are discussed.

Three types of consumer-oriented monitoring

The first step to tackle this wide range of consumer-oriented monitoring schemes was to review various examples of consumer-oriented monitoring and identify 'categories' of environmental monitoring. Taking the position of citizen-consumers vis-à-vis the producers as a starting point, three categories of consumer-oriented environmental monitoring were identified.

Under the heading 'monitoring domestic flows' we find those monitoring schemes that are used in a context characterised by the continuous delivery of infrastructure-based commodities such as energy and water. Through the development of smart meters, 'domotica', and Internet-based metering schemes, households are provided with the means and incentives to reduce domestic consumption and/or take the quality of products and providers into account. A second distinct type of consumer-oriented monitoring was named 'monitoring the chain'. In the absence of a 'continuous' relationship between producer and citizen-consumers – as in the previous type –, information about the environmental quality of products and/or environmental performance of producers finds its way to citizen-consumers through for example labelling or webcams which enable citizen-consumers to take a look at the production process. The final type of consumer-oriented monitoring is discussed under the heading of 'monitoring the public environment'. Various monitoring schemes, making use of the Internet, provide citizen-consumers with information about the environment at large, pollution levels of particular facilities and/or environmental risks.

What we learnt from this brief review of some existing monitoring schemes (chapter 4) was not only that these three categories represented very different format for organising consumer-oriented monitoring, each being

embedded in their own particular context. The review also illustrated that the issues at stake and relevant research questions, given the emphasis of this thesis, were quite comparable. As such, the key concepts as defined in chapter 3 provide meaningful guidelines to discuss the merits and drawbacks of various forms of consumer-oriented monitoring. Subsequently, I elaborated upon each category by means of a case-study.

In this concluding chapter, I do not repeat the conclusions that were drawn at the case-level but consider each of these cases as an 'ideal-type'. I thus not only discuss the Energy House, the car-label, Toxics Release Inventory, et cetera, but consider them to be illustrative for the developments at large. The outline is as follows. First, I discuss the three categories of consumer-oriented monitoring through a cross case analysis, based on the key concepts (section 2). On the basis of that analysis, I move on towards a discussion on the consequences for ecological modernisation theory – seen in the light of the shift from *EcoMod 2* to *EcoMod 3* – in section 3.

2. A cross-case analysis of the four key concepts

Key concept 1: The appraisal of surveillance

The first key concept defined in chapter 3 was the appraisal of surveillance in the context of environmental monitoring. The advancements in information and communication technologies have fuelled discussions on the benefits and drawbacks of more monitoring and surveillance. On the apocalyptic side, various authors have discussed the dangers of hyper-surveillance or 'total' surveillance (Whitaker, 1999). On the other hand, it is argued that these same technological advances allow for new ways of exerting power bottom-up, through the development of counter-surveillance (Castells, 2001). The question we are confronted with here – in the context of environmental monitoring– is if it makes sense to talk about the positive effects of surveillance or if those attempts to link monitoring and surveillance with environmental reform inevitably lead us into an eco-Panopticon (cf. Foucault, 1977).

From a theoretical perspective, it was argued that surveillance should not *a priori* be seen as a top-down, repressive instrument. Surveillance heightens reflexivity but, as argued by Giddens (1984, 1985), the use and function of surveillance is not determined on forehand. How increased reflexivity comes to affect (the relations between) various actors is a question in its own, the answer to which depends on the relative influence of the involved actors, and the resources available to them. The developments in ICT provide new resources for surveillance as new means of 'watching' and communicating are

enabled. According to Mathiesen (1997), the emergence of the mass-media already provided citizens with the means to 'watch' powerful elites (and as such enabled a form of counter-surveillance) and the emergence of the Internet – facilitating rapid and largely uncontrollable communication across time and space – further spurs this development. In theoretical terms, surveillance is nowadays increasingly seen as a rhizomatic, or multi-directional, process where top-down forms of 'watching' are supplemented with various forms of 'counter-surveillance' (Mathiesen, 1997, Haggerty and Ericson, 2000). While this acknowledgement creates the conceptual space to think about forms of counter-surveillance; a second question is if such forms exist in the field of environmental issues.

The variety of monitoring and surveillance schemes which was described and discussed in this thesis is evidence of the fact that the functionality assigned to monitoring is subject to change. Although traditional forms of environmental monitoring continue to exist, monitoring is increasingly developed for citizen-consumers. In the field of utility monitoring, energy- and water meters continue to be used as a means to endow providers with information on domestic consumption levels, whilst at the same time there are continuing efforts to increase the functionality of these meters for domestic consumers themselves. Projects such as Eco-teams and Telemetering – however distinct in terms of their institutional design – aim to provide the citizen-consumers with the knowledge to reduce their domestic consumption levels.[1] In the field of smart-metering and 'domotica' there are numerous developments with an environmentally relevant dimension; the combination of information and intelligent technologies seeks to unite enhanced comfort with the efficient use of resources.

Next to that, monitoring is also increasingly used to provide citizen-consumers with information about the conducts of governments and corporations. As such, counter-surveillance has become a established counterpart to surveillance. The numerous examples of disclosure built upon existing environmental monitoring schemes. Existing 'infrastructures for environmental monitoring', consisting of networks of measuring centres, of satellites collecting environmental data, or of legal agreements which require companies to report on their environmental performance, are opened up for citizen-consumers. The rise of the Internet plays a pivotal role here, enabling the quick dissemination of information to a large audience. It is nowadays no longer surprising that institutions such as the Royal Netherlands Meteorological Institute decide to make their information of ozone concentrations publicly accessible; it is illustrative of a trend which started with the development of the US Toxics Release Inventory, compasses examples such as the European Pollutant Emission Register and was institutionalised in the adoption of the

UNECE's Aarhus Treaty.[2] The developments in the field of disclosure are however not limited to the 'opening up' of existing monitoring schemes; numerous NGO's have played an important role in taking disclosure one step further, making publicly available information better interpretable and more usable for citizen-consumers. Long standing examples – whose success has led to similar initiatives in other countries – are for example Friend of the Earth UK's Factory Watch or Environmental Defense Fund's Scorecard. Both provide detailed information on the emissions of particular companies and the health effects of these emissions, as well as a ranking of polluting companies.

In the domain of chain-monitoring, the development of counter-surveillance does not solely encompass the opening up of existing databases, making them more accessible to citizen-consumers. In a significant number of production-consumption chains, information on products and production methods is nowadays gathered and disseminated with the explicit aim to inform citizen-consumers. Whether that happens on the initiative of governments, as is the case with the European Directive on the labelling of electric appliances or cars, or the result of private initiatives, such as the FSC of MSC label, the result is that new flows of information are developed, specifically targeted at citizen-consumers.

By discussing this broad range of examples of counter-surveillance, I aim to illustrate that environmental monitoring and environmental information flows are nowadays no longer solely used by nation-states and corporations; they increasingly find their way to citizen-consumers. What is more, their existence is no formality; they are real in exerting influence on producers. As the case-studies on disclosure and fuel efficiency labelling illustrate, the provision of information not only enables citizen-consumers to take action (whether that consists of 'civil' actions or a change in consumption choices), but sets in motion a variety of processes through which environmental issues are brought onto the agenda.

The cases that are drawn upon in this thesis show that citizen-consumers can gather information on the environmental performance of companies and governments, or the environmental quality of products and public space; the broadening of the range of functions of environmental monitoring leads to new forms of counter-surveillance. The metaphor of the eco-Panopticon is thus unsuitable to describe the developments in environmental monitoring. The plethora of contemporary countersurveiling monitoring schemes illustrates that there are various dimensions to surveillance. A different view on (environmental) surveillance is necessary to replace traditional views; what should be analysed is not only how the powerful 'few' watch over the 'many',

but also how various forms of counter-surveillance come to play a part in contemporary environmental governance.

Key concept 2: The issue of access

The debate between neo-Marxists and ecological modernisation scholars pointed at the relevance of the distributional aspects of environmental pollution (see chapter 2). Neo-Marxism was credited for bringing in this issue which was not sufficiently dealt with in early formulations of ecological modernisation theory. In the context of environmental monitoring and informational governance arrangements, the analysis of this distributional dimension encompasses the distribution of access to monitoring, information, and governance arrangements.

The most obvious way to tackle this issue would be to analyse the unequal access of various groups and classes to information itself (classically discussed under the heading of 'the Digital Divide'). Although this is certainly one dimension of access, the work of Hague and Loader (1999) has illustrated that the notion of access needs to be discussed in a broader sense. Access is about more than just the accessibility of information; it is also about the comprehensibility of the provided information, the possibilities to (co-) construct information flows, and the means available to put such flows of information to use in meaningful social networks and political arrangements. Questioning the issue of access thus requires us to look beyond merely the figures on computer ownership, Internet-connections, et cetera. The numerous examples of consumer-oriented monitoring and the detailed case-studies provide insight into these various 'dimensions' of access.

A first remarkable thing to note is that in each of the three case-studies participants, policy-makers, NGO's, or others involved hardly considered the distributional aspects of monitoring to be an issue of great concern. A possible explanation for this might lie in the following two aspects. First of all, the means through which information is communicated (the energy meter, a label, the Internet) are in themselves widely available. The meters required for the monitoring of domestic flows are generally available as part of the infrastructure of provision. Labels are, by definition, available in shops and showrooms when one stands in front of a product, and in both the Netherlands and the United States, Internet access is widely distributed by now.[3] (One can expect that this issue is of greater concern in a number of other countries, with lower Internet access, where disclosure is also used as a policy-instrument.) A second reason why access in a 'narrow' sense receives little attention might lie in the fact that the accessibility in itself says little about the use and impact of environmental information flows. As the examples of informational govern-

ance arrangements illustrate, the eventual impact of making information publicly available is also determined by the roles that governments and various intermediaries play in putting the information to use.

When it comes to the issue of access, the emphasis lies much more on the question if the information is understandable for ordinary citizen-consumers and, if not, how that could be improved. In all the studied forms of monitoring this is a recurrent concern; can citizen-consumers understand information on (the environmental impact of) energy consumption or on emissions of companies, and can they make sense of the variety of labels? If we look at the provided information solely, there is significant variation in terms of the complexity of the information provided; some websites provide citizen-consumers with 'raw' scientific data on pollution levels, others translate this data into health effects, enable the comparison of different areas, or rank the top 10 of most polluting companies. Similarly, some labels convey detailed information about the characteristics of the product whereas others, so-called 'seals of approval', require the consumer to 'trust' the labelling agency. This thesis is not concerned with answering the question what kind of information citizen-consumer can and cannot understand; my argument is that the ways in which companies, governments and NGO's deal with these concerns in practice is illustrative of their 'view' on the possibilities and limitations of consumer-oriented monitoring and counter-surveillance. Compare for example the Toxics Release Inventory, where citizens are provided with information on the specific emissions of individual companies, with the Dutch 'Emissieregistratie' where information about the quality of the environment in general is provided. Whereas the former actively seeks to increase pressure on polluters by making information publicly available, the latter informs the public without empowering them. In a similar sense, information about energy consumption can be given in technical parameters (kWh, m^3) or linked to specific social practices. Such decisions, revealing underlying assumptions about what citizen-consumers can and cannot understand and do, are of crucial importance for the eventual functioning of information flows in environmental governance.

This issue of comprehensibility brings another aspect of access to the fore; namely the important role that non-state actors can play in (co-)constructing meaningful and influential information flows. This can take two different forms. Non-state actors can co-construct information flows by reinterpreting, reformulating, or adding to existing information flows. The examples of Scorecard and 'recht-om-te-weten' are illustrative; NGO's use existing information sources to compile their own information flows, which can be more comprehensible, more confronting, or offer more functions to compare and rank information than comparable websites developed by the state. Next to

that, non-state actors have more and more means, facilitated by ICT, to construct independent information flows. Thus, whereas information flows where traditionally developed by the institutions of the nation-state, we now witness, as the result of private and civil society initiatives, the emergence of various non-state based information flows which are more specifically developed for citizen-consumers.[4] In the field of labelling, a number of well-known examples, such as the Forest Stewardship Council and Marine Stewardship Council, illustrate that the capacity to develop labels is no longer restricted to the nation-state.

As argued by Hague and Loader (1999), the discussion on access cannot be seen apart from the question if and how citizen-consumers can put the acquired information to use; if meaningful networks to use the information are absent, access is an empty concept. In each of the three case-studies, this relationship between the provision of information and the means to take action works out in a different way. In the field of domestic flow monitoring, a distinction was made between horizontal and vertical empowerment, representing different forms of putting the information to use. Whereas horizontal empowerment, through smart metering, was identified as a valuable pathway to involve citizen-consumers in the ecological restructuring of domestic consumption practices, the possibilities for vertical empowerment were less clearly articulated because, among others, citizen-consumers generally did not consider themselves to be agents of change. When it comes to labelling, the main mechanism to take action is fairly easy to identify; one can buy the labelled product, or not. For citizen-consumers, the ability to take action is thus dependent on the availability of labelled products, the additional efforts that have to be made to acquire the product, and/or the possibilities to (collectively) arrange the provision of such products. Finally, the study of disclosure shows us that the means to take action are not only dependent on the information provided, but are also dependent on deliberate choices of NGO's and governments. Where some chose to provide technical data in a non-comparable format, others use a more confronting approach, for example though a ranking of polluting corporations, or go as far as including contact details or offering the possibilities to send an automatically generated fax to the concerned company.

Looking back on the case-studies, the following can be concluded about the issue of access. When it comes to informational governance arrangements, access is not only dependent on the means to retrieve information but is also dependent on the means to put information to use. Access is contextual; it is dependent on the provisioning of (environmental friendly) alternatives (in the

case of labels, et cetera) within the production-consumption chains, or on the functioning of 'infrastructures' to exert power and influence (means for participation, et cetera).

One can thus not assume that citizen-consumers are empowered and given a voice in the organisation of production and consumption chains solely by increasing the amount of information available. The degree to which citizen-consumers can access environmental information, and act consequently, should not be discussed by reference to general numeric data on computer ownership and Internet connections, it is as much dependent on the decisions made by various involved actors, and on their view what kind of information citizen-consumers want to have, need to have and can understand. In this 'social shaping' of access, both state- and non-state actors (can) play a pivotal role.

Key concept 3: The re-invention of the nation-state

The debate on the social shaping of access, and the role of state- and non-state actors in this process, brings us to the third point of concern. Following discussions on the impact of globalisation on (national) policy-making processes and the emergence of new environmental policy instruments and sub-politics, the role of the nation-state was identified as one of the key points of concern in thinking over the transformation of ecological modernisation theory. In the debate on the role of the nation-state, typical, juxtaposed, positions are taking in by those who argue that the nation-state no longer holds agency (Urry, 2003) and those who argue that the nation-state will not wither away (Jänicke, 2002, 2006). The concept of governance can bridge this juxtaposition, acknowledging the roles played by various social actors in developing regulatory arrangements, and making them work. In this thesis, the notion of informational governance arrangements was coined to describe the new forms of regulation which revolve around the collection and dissemination of environmental information. The question is how the changing role of the nation-state relates to the emergence of these arrangements.

With the variety of information governance arrangements in mind, bold claims about the retreat of the nation-state cannot be supported. When it comes to the role of the nation-state in processes of informational governance one encounters a continuum of different arrangements in each of which both state- and non-state actors play different roles. Some arrangements are clearly developed and implemented by the nation-state (Emissieregistratie, TRI, fuel efficiency labels), others are primarily developed by non-state actors (such as the FSC label, Energy Watch), and there are various 'hybrid' initiatives where private actors built upon the information provided by the state to develop

countervailing monitoring schemes (recht-om-te-weten, scorecard). Although the nation-state does thus not wither away, it is also not longer sensible to think of the nation-state as the main initiator of informational governance arrangements. The roles played by public, private and civil society actors come to dependent on the context and the initiatives (not) taken by the other actors.

Those examples where the nation-state develops informational governance arrangements can be seen in the light of the emergent audit society (Power, 1997), or the change from gardener- to gamekeeper-states (Urry, 2000). The choice for regulation through information can be based on varying underlying motives. In some situations, nation-states can choose to develop informational governance arrangements rather than deploying inefficient or inappropriate traditional policy-instruments. The example of fuel efficiency labelling is exemplary for a situation in which it is not possible, because of the pressure from car manufacturers and international regulations, to fall back on command-and-control regulation solely. A similar rationale underlies for example the development of a labelling regime for genetically modified organisms; when conventional regulations are (too) difficult to implement, 'soft' regulations like labelling can be an alternative. In various cases of disclosure, the relation between the 'old' policy instruments and the newly developed informational governance arrangements is however more complex. In these cases, informational regulation does not replace existing regulations; public disclosure is added to the regulatory toolkit. As illustrated by various risk mapping projects, public disclosure can be a means for nation-states to deal with uncertainty and decreasing legitimacy. When conventional regulations prove inadequate and the role of the nation-state (and its regulations) becomes a subject of debate – a development which occurred after accidents such as Bhopal, Love Canal and Enschede – disclosing information on risks is a means for the nation-state to regain legitimacy and trust.

The development of countervailing monitoring leads to a second, clearly identifiable kind of informational governance arrangement. Private actors (both corporations and civil society groups) take regulation one step further, bypass the governments, and seek to develop alternative regulations. Various labelling schemes are illustrative here, for example the Forest Stewardship Council, an international association of members with a corporate and civil society background, issues the FSC label. In relation to the monitoring of domestic flows, nation-states have generally played a marginal role. In the past, the responsibilities for metering (and for the subsequent energy conservation) were delegated to the semi-public utilities. Although there is increasingly discussion over the ways in which the nation-state can stimulate energy conservation, this research not only illustrates that the contemporary developments in this field come from corporate and civil society groups, but also that citizen-

consumers by now consider these actors, rather than the nation-state, to be responsible for, and trustworthy partners in, bringing about energy conservation.

In between these two extremes of state-organized and countervailing monitoring we find a broad range of hybrid informational governance arrangements. In these hybrids, the roles and responsibilities of nation-states and private and civil society actors intermingle. Illustrative are labels that are initially developed by civil society groups and/or private actors and subsequently 'adopted' by national governments, but also those cases where civil society groups appropriate the information disclosed by nation-states to construct their own websites and/or to support their own campaigns.

The variety of new informational governance arrangements thus challenges the primacy of the nation-state on the one hand, while providing the nation-state itself with new tools and regulations on the other. Regulation through information provides the nation-state with new policy instruments to tackle complex and disputed environmental problems and with the means to legitimate their conduct and decisions. The various kinds of informational governance arrangements also pose new challenges for the nation-state. Nation-states are for example faced with the question if informational governance arrangements such as labelling hinder free trade (Appleton, 1999), if these arrangements are sufficiently powerful, and if they should be supplemented with other policies. At the same time, an increasingly voiced concern is the possible relation between terrorism and the disclosure of sensitive information; forcing the nation-state to rethink what information should be publicly available, whether that is through public or civil society websites. This debate occurred immediately after 9/11 and even though the actual changes to for example the Toxics Release Inventory has been rather small so far, the issue of homeland security now figures heavily in debates on the future of disclosure, both in and outside the United States (Cohen, 2002, Baker et al., 2004).[5]

In this context, the heading of the re-invention of the nation-state refers to two different developments. First, it refers to the nation-states' ability to use informational governance arrangements as a policy-instrument and thereby achieve its formulated goals. Secondly, it refers to the fact that some of these emergent arrangements (willingly or unwillingly) challenge the nation-state to think over issues of responsibility and transparency, and find a balance between the provision of information and issues of homeland security.

Key concept 4: The citizen-consumers as agent of change

Citizen-consumers, and their (changing) role in bringing about processes of environmental reform, are at the heart of this thesis. The observation that environmental monitoring is increasingly geared towards citizen-consumers, involving them in informational governance arrangements, leads to numerous questions concerning the functioning, possibilities, and limitations of such arrangements. Critics of this consumerist-turn have argued that the focus on consumers draws away attention from what really matters; namely the role of institutions and infrastructures. Others however have argued, drawing upon the notion of political consumerism, that a focus on citizen-consumers opens up new ways for bringing about environmental reform, not only at the level of individuals but also at the level of corporations and the infrastructures of consumption. In the analysis of informational governance arrangements, I focused on the role of the citizen-consumers, and their potential to act as agent of change. Should they be considered captive and powerless, rendering a consumer-oriented approach useless, or does the emergence of regulation through information open up new ways for the involvement and empowerment of citizen-consumers?

In chapter 4, it was argued that the 'post-Fordist' turn led to the recognition that citizen-consumers play a crucial role in structuring production-consumption chains; general trends of diversification and individualization not only increase consumer-choice, they also mean that consumer-choices are increasingly important in the organisation of chains. While it was acknowledged that a consumer-oriented approach runs the danger of 'blaming the consumer', or lead to the development of isolated, individualized strategies for sustainable production and consumption, it was also argued that these are not inevitable consequences of a consumer-oriented approach to environmental issues. In other words, there is no overarching and deterministic force which transposes responsibility from corporations and governments to individual citizen-consumers. Consumer-oriented monitoring can be organized at all level and all major spots in the production-consumption chain, and can thus empower and affect all actors within this chain. The analysed cases of consumer-oriented monitoring not only have in common that they bring in the consumer in environmental governance arrangements but also that they are (to various extents) countervailing; they can empower citizen-consumers vis-à-vis producers and governments, enabling them to influence the infrastructures of consumption and production. Given this development, the equation of consumer-oriented monitoring with the transposition of responsibility and the 'blaming' of consumers does not do full justice to the range of developments that are taking place.

The case-studies provided more insight into the development and functioning of countervailing citizen-consumer power as the mechanisms through which citizen-consumers come to exert influence in informational governance arrangements were identified. One way to analyse the extent to which consumer-oriented monitoring is real in its consequences, and empowers citizen-consumers, would be to count the number of citizens that actively monitor domestic flows, that purchase their car on the basis of its fuel efficiency, or that go online and search for information about pollution and polluters. The findings of such an exercise might be disappointing for some, or even considered evidence that the emphasis on citizen-consumers is a spoof. The cases illustrate that not many citizen-consumers are interested in monitoring their energy consumption, let alone in discussing systems of provision with utilities, that fuel efficiency is just one among many factors that determine the choice for a particular car, and that websites like Scorecard or recht-om-te-weten generally do not lead to massive public protests. At the same time, policy-makers, NGO's and academics show considerable interest in such monitoring schemes, also because they are generally associated with bringing about environmental reform through the strengthening of the role of citizen-consumers in environmental governance. To explain this paradox, it needs to be acknowledged that citizen-consumers exert influence through a variety of tangible and less tangible mechanisms which are based on various 'identities' of citizen-consumers. Drawing upon Schot and de la Bruheze (2003), I differentiate between 'real', 'represented', and 'imagined' citizen-consumers.

The 'real' citizen-consumers are the ones that are found within the household, in shops and showrooms, and on the Internet. As they change their consumption choices, for example change to green electricity or buy FSC labeled timber, or take civil action, like sending a fax to a polluting company, they exert influence on the infrastructures of production and consumption. This however is only part of the picture; these 'real' citizen-consumers choices are at the basis of citizen-consumer driven environmental reform, but the magnitude of their influence cannot be explained by sole reference to their 'real' actions. The establishment of informational governance arrangements like disclosure or labelling is often based on the argument, held by governments and/or civil society groups, that citizen-consumers have an interest in, or right to, particular kinds of information. Even before 'real' citizen-consumers can possible play a role, other actors can seek to represent them because that provides them with an argument or legitimacy to promote and/or take certain actions.

'Represented' citizen-consumers thereby enable NGO's or governments to promote or take certain measures because 'the citizen-consumers want to know' or 'have a right to know'. The cases show that these process of repre-

sentation are not undisputed, often there is no consensus about the concerns, demands (and rights) of citizen-consumers; some argue that citizen-consumers are knowledgeable, concerned and interested whereas others argue that they have no interest in information and cannot understand labels, websites, et cetera.

In the case of disclosure, the enhancement of the public availability of information, because citizens have a right-to-know, also enables other actors, such as journalists, companies and NGO's, to retrieve information and pressurize polluters. Effectively, they draw upon information that was primarily disclosed because citizen-consumers had a 'right to know'. What is more, the case also illustrates that arguably the greatest impact of disclosure is achieved because companies act in anticipation to the demands and actions of 'imaginary' citizen-consumers. For example, they seek to avoid legal actions or a damaged reputation by reducing toxic emissions before there actually are complaints, lawsuits, et cetera. Comparable, the case of labelling shows us that the introduction of a fuel efficiency label not only means that consumers make different choices; it also means that producers make different choices, for example about the cars offered for sale, which affect the provisioning of environmental friendly alternatives.

Overall, I argue that the scope and impact of consumer-oriented monitoring schemes does justify the claim that the role and responsibilities of citizen-consumers in environmental governance is changing. The increased availability of information enables new ways of exerting countervailing power. To understand this change fully, one cannot focus solely on the actual behaviour of citizen-consumers. Citizen-consumers exert influence through their various identities; they exert influence through consumption choices, but are also represented in the development of governance arrangements, and are imagined in the minds of business leaders, politicians et cetera. To understand the impact of citizen-consumers, we need a broad view and cannot restrict ourselves to analyzing the actual practice of buying a car, looking for information on the Internet, et cetera. To understand the impact of citizen-consumers, we not only have to look at his/her actual behaviour, but also at the ways in which he/she is thought of in board rooms, conference halls, parliaments, et cetera.

3. On ecological modernisation and environmental flows

In chapter 2, it was argued that the challenge to contemporary ecological modernisation theorists is to adapt and reformulate their theoretical founda-

tions to the 21st century changes. Propelled by the processes of globalisation, the sociology of flows has emerged as a distinctively sociological lens to analyse societal developments, both in and outside the environmental realm. The argument made was that the juxtaposition of the sociology of flows and (existing formulations of) ecological modernisation theory will be beneficial for formulating a new version of ecological modernisation theory based on the sociology of environmental flows and this emerging version of ecological modernisation theory was labelled *EcoMod 3*. The difficulties that one encounters in formulating a sociology of environmental flows, as well as the expected advantages and disadvantages, have been addressed on various occasions (Mol and Spaargaren, 2005, Spaargaren et al., 2006). Building upon these efforts, this thesis seeks to contribute to the debate on the transformation of ecological modernisation theory through the analysis of one particular flow: environmental information flows.

As was observed in the chapters 1 to 3, the changing nature of environmental monitoring leads to the emergence of new information flows which affect the roles played by the various state- and non-state actors, including citizen-consumers, in bringing about environmental reform. The question tackled in this thesis is not only how flows of environmental information come to challenge and change environmental governance, in particular concerning the role of citizen-consumers, but also what we can learn from this in formulating *EcoMod 3*. To answer this question, three theoretical points of concern were identified: (1) access and the social embedding of information flows, (2) government and governance, and (3) the role of the citizen-consumer. In this concluding section, I return to these three points of concern and propose and elaborate upon four theoretical 'guidelines' to contribute to the (debate on the) development of *EcoMod 3*.

(i) To analyse the impact of environmental monitoring and surveillance under conditions of reflexive modernisation, the instrumental and top-down view on surveillance must be replaced by the notion of 'networked' surveillance.

(ii) Since informational governance arrangements come in different configurations in which the roles played by state- and non-state actors varies, the analysis of flows of information needs to take the activities of all societal actors into account. There is thus no reason to privilege the nation-state in the analysis.

(iii) To understand the role that citizen-consumers (can) play in the development and functioning of informational governance arrange-

ments, one is required to study access to information in relation to the provisioning of opportunities to act.

(iv) To assess the influence of citizen-consumers in informational governance arrangements, the various identities of the citizen-consumers must be taken into account.

The findings of this research illustrate that the nature of environmental monitoring changes under conditions of reflexive modernisation. Monitoring and (the provision of) information come to play new roles; they are increasingly considered as means to enhance individual and societal environmental reflexivity. As environmental information flows are targeted at citizen-consumers, they become part and parcel of the informational governance arrangements which enable these citizen-consumers to exert influence on producers, providers and governments. Pushed by the developments in information and communication technologies, (environmental) surveillance thus changes shape. The use of surveillance as an instrument to exert power is no longer restricted to the institutions of the nation-state; surveillance is also open to non-state actors who draw upon various sources of information, and means to gather information, in order to develop countervailing power.

Within *EcoMod 3*, the focus should thus not be on the deterministic, top-down views on surveillance but on a conceptualization which recognizes the distinctively 'networked' character of surveillance. For three reasons, I propose to use the notion of 'networked' surveillance to describe the changed nature of environmental monitoring and surveillance. First of all, it acknowledges and emphasizes the pivotal role played by the developments in the field of ICT on the establishment of new information flows and new forms of surveillance. Secondly, it emphasizes that there are various directions of surveillance; that we cannot think in terms of top-down and bottom-up surveillance but should consider surveillance as multi-directional. Nevertheless, and this constitutes the third reason, the notion of networks still enables one to differentiate between powerful and powerless actors; between those who do and those who don't have the means to affect the network. Contrary to what is suggested by the notion of 'rhizomatic' surveillance, it stresses that surveillance is not uncontrollable, nor is it 'neutral'.

With this, I touch upon a second issue of concern in formulating guidelines for *EcoMod 3*. The case-studies illustrate that the translation of networked surveillance into real-life informational governance arrangements is not only a process in which state- and non-state actors (can) come to play various roles but also that these roles are not fixed. Given the various configurations for infor-

mational governance arrangements, it is not determined beforehand which actor instigates the development of these governance arrangements, who determines format and functionality of the provided information, and who comes to represent the interests of the citizen-consumer.

As Buttel et al. (2006) argue, one of the main 'controversies' in formulating the sociology of environmental flows lies in the usage of the notion of governance. One strand of theorists open up the notion of governance to include the numerous activities employed by state- and non-state actors, and thereby de-privileges the nation-state. Other theorists are more restrictive and use the notion of governance primarily to discuss the (changing) role of the nation-state and its institutions. This study of information governance arrangements supports the former view; there is no a priori reason to consider the nation-state as the main unit of analysis. Through ICT and new governance arrangements, various societal actors are provided with new means to exert influence. Although this does not pre-empt the involvement of the nation-state in developing informational governance arrangements, and making them work, it leads to the conclusion that an in-depth analysis of particular case of informational governance arrangements is required to reveal the involvement and relative influence of the various concerned actors.

The last two guidelines for the development of *EcoMod 3* are concerned with the role of citizen-consumers. The cases of regulation through information are evidence of the changing role of citizen-consumers; private consumption choices are increasingly 'politicised' and individual citizen-consumers are given a role in watching corporations and holding them accountable. The changing role of citizen-consumers in environmental governance cannot be understood by drawing upon the 'traditional' approaches to consumer-research and citizen-participation since these tend to analyse the role of citizen-consumers 'out of context'. To analyse the role of citizen-consumers 'in context', the following two aspects must be taken into account.

First of all, studies on consumption and environmental reform require an approach which not only focus on the personal characteristics of citizen-consumers, such as attitude or access to information, but also take the possibilities and impossibilities to make a difference into account. As the work on systems of provision and the study of social practices has illustrated, individual choices cannot be understood without looking at the infrastructures available (and directing) citizen-consumers (Shove, 2003, Spaargaren, 2003). The increased availability of environmental information does not empower citizen-consumers to make a difference if the information is incomprehensible or if there are no actual means to use the information; access to information is

meaningless if there is no provisioning of alternative products, alternative metering schemes, et cetera.

Secondly, for properly understanding of the role that citizen-consumers (can) play in bringing about environmental reform it needs to be acknowledged that they have various identities. Whereas 'traditional' consumer-research focussed on the study of the actual choices made by citizen-consumer, often in relation to personal attitudes and lifestyles, a more contextual approach should acknowledge that citizen-consumers exert influence through other, less tangible, mechanisms as well. As was illustrated, citizen-consumers also exert influence as other actors seek to represent their interest, if only to add legitimacy to certain proposed changes and policy-measures, or if governments and companies respond to (future) demands, fears and actions of imaginary citizen-consumers.

If these two aspects are not taken into account, an incorrect picture about the possibilities and impossibilities of consumer-oriented environmental governance is due to arise. Where a focus on the individual characteristics of citizen-consumers might lead one to exaggerate the empowerment of citizen-consumers, a strict focus on the 'real' actions of citizen-consumers downplays their influence. To understand the role that citizen-consumers play in bringing about environmental reform, one should avoid reducing them to individual autonomous beings, but analyse the linkages access and provisioning, and between the 'real', 'represented' and 'imagined' citizen-consumers instead.

REFERENCES

Abrams, R. and D. H. Ward (1990), Prospects for safer communities: Emergency response, community right to know, and prevention of chemical accidents. *Harvard Environmental Law Review* **14,** 135-188.

ACEA (2002), ACEA's CO_2 commitment: A 35 million tonnes CO_2 Kyoto contribution to date. http://www.acea.be/ACEA/brochure_co2.pdf [22-11-2005]

Achterhuis, H. (1988), *Het rijk van de schaarste*, Ambo, Baarn.

Ajzen, I. (1991), The theory of planned behavior. *Organizational Behavior and Human Decision Processes* **50,** 179-211.

Aldridge, A. (1994), The construction of rational consumption in Which? magazine: The more blobs the better? *Sociology* **28,** 899-912.

Andrews, R. N. L. (1999), *Managing the environment, managing ourselves. A history of American environmental policy,* Yale University Press, New Haven.

Anheier, H., M. Glasius and M. Kaldor (Eds.) (2001), *Global civil society 2001,* Oxford University Press, Oxford.

Anonymous (2003), The right to know; Chinese are demanding more information. *Newsweek*, October 25th, pp. 60.

Appadurai, A. (1996), *Modernity at large. Cultural dimensions of globalization,* University of Minnesota Press, Minneapolis.

Appleton, A. E. (1999), Environmental labelling schemes: WTO law and developing countries implications In: *Trade, environment and the millenium,* Sampson, G. P. and W. B. Chambers (Eds.), pp. 195-221, United Nations University Press, Tokyo.

Bach, J. and D. Stark (2004), Link, search, interact: The co-evolution of NGOs and interactive technology. *Theory Culture Society* **21,** 101-117.

Baker, J. C., B. E. Lachman, D. R. Frelinger, K. M. O'Connell, A. C. Hou, M. S. Tseng, D. Orletsky and C. Yost (2004), *Mapping the risks: Assessing the home-*

land security implications of publicly available geospatial information, Rand Corporation, Santa Monica.

Banerjee, A. and B. D. Solomon (2003), Eco-labelling for energy efficiency and sustainability: A meta-evaluation of US programs. *Energy Policy* **31,** 109-123.

Baudrillard, J. (1998), *The consumer society. Myths and structures,* Sage, London.

Bauman, Z. (1987), *Legislators and interpreters,* Polity Press, Cambridge.

Beck, U. (1992), *Risk society. Towards a new modernity,* Sage Publications, London.

Beck, U. (1994), The reinvention of politics: Towards a theory of reflexive modernization In: *Reflexive modernization; politics, tradition and aesthetics in the modern social order,* Beck, U., A. Giddens and S. Lash (Eds.), pp. 1-55, Polity Press, Cambridge

Beck, U., A. Giddens and S. Lash (Eds.) (1994), *Reflexive modernization; politics, tradition and aesthetics in the modern social order,* Polity Press, Cambridge.

Belastingdienst/FIOD-ECD (2001), Besluit etikettering energiegebruik personenauto's. Activiteitenoverzicht 2001. Belastingdienst/FIOD-ECD, Haarlem

Bernstein, D. (2003), An assessment of corporate average fuel economy (CAFE). *Journal of Environmental Policy and Planning* **5,** 81-94.

Bezdek, R. H. and R. M. Wendling (2005), Potential long-term impacts of changes in US vehicle fuel efficiency standards. *Energy Policy* **33,** 407-419.

Bloor, M., J. Frankland, M. Thomas and K. Robson (2001), *Focus groups in social research,* Sage Publications, Thousand Oaks.

Blowers, A. (1997), Environmental policy: Ecological modernisation and the risk society. *Urban Studies* **34,** 845-871.

Blühdorn, I. (2000), Ecological modernisation and post-ecologist politics In: *Environment and global modernity,* Spaargaren, G., A. P. J. Mol and F. H. Buttel (Eds.), Sage, London

Bogard, W. (1996), *The simulation of surveillance,* Cambridge University Press, Cambridge.

Brandon, G. and A. Lewis (1999), Reducing household energy consumption: A qualitative and quantitative study. *Journal of Environmental Psychology* **19,** 75-85.

Brown, J. S. and P. Duguid (2000), *The social life of information,* Harvard Business School Press, Boston.

Bullard, R. D. (2000), *Dumping in dixie. Race class and environmental quality (third edition),* Westview Press, Boulder.

Burg, S. van den (2004), Informing or empowering? Disclosure in the United States and the Netherlands. *Local Environment* **9,** 367-381.

Buttel, F.H. (2000), Ecological modernization as a social theory. Geoforum **31,** 57-65

Buttel, F. H. (2000b), Classical theory and contemporary environmental sociology: Some reflections on the antecedents and prospects for reflexive modernisations theories in the study of environment and society In: *Environment and*

global modernity, Spaargaren, G., A. P. J. Mol and F. H. Buttel (Eds.), Sage, London

Buttel, F. H. (2003), Environmental sociology and the explanation of environmental reform. *Organization & Environment* **16,** 306-344.

Buttel, F. H., G. Spaargaren and A. P. J. Mol (2006), Epilogue: Environmental flows and twenty-first-century environmental social sciences In: *Governing environmental flows: Global challenges to social theory,* Spaargaren, G., A. P. J. Mol and F. H. Buttel (Eds.), pp. 351-370, The MIT Press, Cambridge

Camara, A. S. (2002), *Environmental systems: A multidimensional approach,* Oxford University Press, Oxford.

Carson, R. (1962), *Silent spring,* Houghton Mifflin, Boston.

Castells, M. (1996), *The rise of the network society: The information age; economy, society and culture (volume 1),* Blackwell Publishers, Cambridge.

Castells, M. (1997), *The power of identity: The information age; economy, society and culture (volume 2),* Blackwell Publishers, Cambridge.

Castells, M. (1998), *End of millenium: The information age; economy, society and culture (volume 3),* Blackwell Publishers, Cambridge.

Castells, M. (2001), *The Internet galaxy. Reflections on the internet, business and society,* Oxford University Press, New York.

Cerin, P. and P. Dobers (2001), What does the performance of the Dow Jones sustainability group index tell us? *Eco-Management and Auditing* **8,** 123-133.

Chappells, H., M. Klintman, A.-L. Linden, E. Shove, G. Spaargaren and B. van Vliet (2000), *Domestic consumption, utility services and the environment: Final DOMUS report,* Wageningen University, Wageningen.

Cohen, M. A. (2000), Information as a policy instrument in protecting the environment: What have we learned? www.environmentaldefense.org/wip/cohen.html [03-06-2003]

Cohen, M. A. (2002), Transparency after 9/11: Balancing the 'right-to-know' with the need for security. *Corporate Environmental Strategy* **9,** 368-374.

Cohen, M. J. (1997), Risk society and ecological modernisation: Alternative visions for post-industrial nations. *Futures* **29,** 105-119.

Commoner, B. (1976), *Machteloze energie,* Ambo, Baarn.

Cramer, J. (2000), Responsiveness of industry to eco-efficiency improvements in the product chain: The case of Akzo Nobel. *Business Strategy and the Environment* **9,** 36-48.

Cramer, J. (2002), From financial to sustainable profit. *Corporate Social Responsibility and Environmental Management* **9,** 99-106.

Cramer, J. and A. Loeber (2004), Governance through learning: Making corporate social responsibility in Dutch industry effective from a sustainable development perspective. *Journal of Environmental Policy and Planning* **6,** 271-287.

Dandeker, C. (1990), *Surveillance, power and modernity; bureaucracy and discipline from 1700 to the present day,* Polity Press, Cambridge.

Dey, I. (2004), Grounded theory In: *Qualitative research practice,* Seale, C., G. Gobo, J. F. Gubrium and D. Silverman (Eds.), pp. 80-93, Sage Publications, Thousand Oaks

Dieu, T. T. M. (2003), *Greening food processing industry in Vietnam: Putting industrial ecology to work,* Wageningen University, Wageningen (PhD-thesis).

Dobson, A. (1990), *Green political thought. An introduction,* Unwin Hyman, London.

Dowlatabadi, H., L. B. Lave and A. G. Russel (1996), A free lunch at higher CAFE? *Energy Policy* **24,** 253-264.

Dryzek, J. S. (1987), *Rational ecology. Environment and political economy,* Basil Blackwell Inc., Oxford.

Dryzek, J. S. (1990), *Discursive democracy: Politics, policy and political science,* Cambridge University Press, Cambridge.

Dryzek, J. S. (1996), Strategies of environmental democratization In: *Democracy and the environment; problems and prospects,* Lafferty, W. M. and J. Meadowcroft (Eds.), pp. 108-122, Edward Elgar, Cheltenham

Dryzek, J. S. (1997), *Politics of the earth: Environmental discourses,* Oxford University Press, Oxford

Dryzek, J. S., C. Hunold, D. Schlosberg, D. Downes and H.-K. Hernes (2002), Environmental transformation of the state: The USA, Norway, Germany and the UK. *Political Studies* **50,** 659-682.

Dunlap, R. E. and W. R. Catton (1979), Environmental sociology. *Annual Review of Sociology* **5,** 243-273.

Eckersly, R. (2004), *The green state. Rethinking democracy and sovereignty,* MIT Press, Cambridge.

Elzen, B., F. W. Geels and K. Green (Eds.) (2004), *System innovation and the transition to sustainability: Theory, evidence and policy,* Edward Elgar, Cheltenham.

Energieverwertungsagentur (1999), Labelling and its impact on fuel efficiency and CO_2-reduction: Study for the Directorate General for Energy (DGXVII) of the commission of the European communities. Energieverwertungsagentur, Vienna

Eshuis, J. and C. v. Woerkum (2003), Trust and monitoring in governance processes: Lessons from landscape management by farmers in a Dutch municipality. *Journal of Environmental Policy and Planning* **5,** 379-396.

Fine, B. and E. Leopold (1993), *The world of consumption,* Routledge, London.

Flyvbjerg, B. (2004), Five misunderstandings about case-study research In: *Qualitative research practice,* Seale, C., G. Gobo, J. F. Gubrium and D. Silverman (Eds.), pp. 420-434, Sage Publications, Thousand Oaks

Fortun, K. (2001), *Advocacy after Bhopal: Environmentalism, disaster, new global orders,* University of Chicago Press, Chicago.

Fortun, K. (2004), Environmental information systems as appropriate technology. *Design Issues* **20,** 54-65.

Foucault, M. (1977), *Discipline and punish. The birth of the prison,* Penguin, London.

Friedman, M. (1996), A positive approach to organized consumer action: The "buycott" as an alternative to the boycott. *Journal of Consumer Policy* **19,** 439-451.

Frijns, J., P. T. Phung and A. P. J. Mol (2000), Ecological modernisation theory and industrialising economies. *Environmental Politics* **9,** 257-293.

Fung, A. and D. O'Rourke (2000), Reinventing environmental regulation from the grassroots up: Explaining and expanding the success of the toxics release inventory. *Environmental Management* **25,** 115-127.

Gabriel, Y. and T. Lang (1995), *The unmanageable consumer; contemporary consumption and its fragmentations,* Sage Publications, London.

Garrett, D. E. (1987), The effectiveness of marketing policy boycotts: Environmental opposition to marketing. *Journal of Marketing* **51,** 46-57.

Gasteyer, S. and C. B. Flora (2000), Measuring ppm with tennis shoes: Science and locally meaningful indicators of environmental quality. *Society &Natural Resources* **13,** 589-597.

Geels, F. W. (2004), Understanding system innovations: A critical literature review and a conceptual synthesis In: *System innovation and the transition to sustainability: Theory, evidence and policy,* Elzen, B., F. W. Geels and K. Green (Eds.), pp. 19-47, Edward Elgar, Cheltenham.

Geels, F. W. (2005), Processes and patterns in transitions and system innovations: Refining the co-evolutionary multi-level perspective. *Technological Forecasting and Social Change* **72,** 681.

Giddens, A. (1984), *The constitution of society,* Polity Press, Cambridge.

Giddens, A. (1985), *The nation-state and violence,* Polity Press, Cambridge.

Giddens, A. (1990), *The consequences of modernity,* Polity Press, Cambridge.

Giddens, A. (1991), *Modernity and self-identity: Self and society in the late modern age,* Polity Press, Cambridge.

Giddens, A. (1994), Living in a post-traditional society In: *Reflexive modernization; politics, tradition and aesthetics in the modern social order,* Beck, U., A. Giddens and S. Lash (Eds.), pp. 56-109, Polity Press, Cambridge.

Glaser, B. and A. Strauss (1967), *Discovery of grounded theory,* Aldine, Chicago.

Glasius, M., M. Kaldor and H. Anheier (2002), *Global civil society 2002*, Oxford University Press, Oxford.

Goldblatt, D. (2002), Personal vs. socio-technical change: Informing and involving householders for sustainable energy consumption. Swiss Federal Institute of Technology, Zurich (PhD-thesis).

Gottlieb, R., M. Smith, J. Roque and P. Yates (1995), New approach to toxics: Production design, right to know and definition debates In: *Reducting toxics: A*

new approach to policy and industrial decision making, Gottlieb, R. (Ed.), pp. 124-165, Island Press, Washington DC.

Graham, M. (2002), *Democracy by disclosure: The rise of technopopulism,* The Brookings Institution, Washington, D.C..

Graham, S. and S. Marvin (1996), *Telecommunications and the city: Electronic spaces, urban places,* Routledge, London.

Graham, S. and S. Marvin (2001), *Splintering urbanism. Networked infrastructures, technological mobilities and the urban condition,* Routledge, London.

Grankvist, G., U. Dahlstrand and A. Biel (2004), The impact of environmental labelling on consumer preference: Negative vs. positive labels. *Journal of Consumer Policy* **27,** 213-230.

Greene, D. L. (1998), Why CAFE worked. *Energy Policy* **26,** 595-613.

Gunningham, N. and D. Sinclair (2002), *Leaders &laggards, next generation environmental regulation,* Greenleaf Publishing, Sheffield.

Guy, S. and S. Marvin (1996), Transforming urban infrastructure provision - the emerging logic of demand side management. *Policy Studies* **17,** 137-147.

Guy, S. and S. Marvin (2001), Local energy planning and electricity networks: Disconnections and reconnections In: *Urban infrastructure in transition: Networks, buildings, plans,* Guy, S., S. Marvin and T. Moss (Eds.), Earthscan, London.

Guy, S., S. Marvin and T. Moss (2001), *Urban infrastructure in transition: Networks, buildings, plans,* Earthscan, London.

Hadfield, G. K. and D. Thomson (1998), An information-based approach to labeling biotechnology consumer products. *Journal of Consumer Policy* **21,** 551-578.

Haggerty, K. D. and R. V. Ericson (2000), The surveillant assemblage. *British Journal of Sociology* **51,** 605-622.

Hague, B. N. and B. D. Loader (1999), Digital democracy: An introduction In: *Digital democracy: Discourse and decision making in the information age,* Hague, B. N. and B. D. Loader (Eds.), Routledge, London.

Hajer, M. A. (1995), *The politics of environmental discourse; ecological modernization and the policy process,* Oxford University Press, Oxford.

Hajer, M. A. (1996), Ecological modernisation as cultural politics In: *Risk, environment &modernity,* Lash, S., B. Szerszynski and B. Wynne (Eds.), pp. 246-269, Sage, London.

Hamel, J., S. Dufour and D. Fortin (1993), *Case study methods,* Sage, Newbury Park.

Hamilton, J. T. (1995), Pollution as news: Media and stock market reactions to the toxics release inventory data. *Journal of Environmental Economics and Management* **28,** 98-113.

Hannigan, J. A. (1995), *Environmental sociology: A social constructionist perspective,* Routledge, London.

Harland, P. (2001), *Pro-environmental behavior,* Universiteit Leiden, Leiden (PhD thesis).

Held, D., A. G. McGrew, D. Goldblatt and J. Perraton (1999), *Global transformations; politics, economics and culture,* Polity Press, Cambridge.

Hertz, N. (2001), *The silent takover; global capitalism and the death of democracy,* William Heinemann, London.

Hisschemöller, M., R. Hoppe, P. Groenewegen and C. J. H. Midden (2000), Knowledge use and political choice in Dutch environmental policy: A problem structuring perspective on real-life experiments with extended peer reviews In: *Knowledge, power and participation in environmental policy analysis,* Hisschemöller, M., R. Hoppe, W. N. Dunn and J. Ravetz (Eds.), pp, 1-28, Transaction Publishers, New Brunswick.

Hobson, K. (2003), Thinking habits into action: The role of knowledge and process in questioning household consumption practices. *Local Environment* **8,** 95-112.

Howes, M. (2001a), Digital disclosures: Environmental governance and the internet. Paper presented at the ISA RC24 Conference "*New natures, new cultures, new technologies*", Fitzwilliam College, Cambridge, United Kingdom, 5-7 July 2001

Howes, M. (2001b), What's your poison? The Australian national pollutant inventory v. the US toxics release inventory. *Australian Journal of Political Science* **36,** 529-552.

Huber, J. (1982), *Die verlorene Unschuld der Ökologie. Neue Technologien und superindustrielle entwicklung,* Fisher Verlag, Frankfurt am Main.

Huber, J. (1985), *Die Regenbogengesellschaft. Ökologie und Sozialpolitik,* Fisher Verlag, Frankfurt am Main.

Huber, J. (1991), Ecologische modernisering: Weg van schaarste, soberheid en bureaucratie? In: *Technologie en milieubeheer. Tussen sanering en ecologische modernisering,* Mol, A. P. J., G. Spaargaren and A. Klapwijk (Eds.), pp. 167-183, SDU, Den Haag

Huber, J. (2004), *New technologies and environmental innovation,* Edward Elgar, Cheltenham.

IUCN, UNEP and WWF (1980), *World conservation strategy: Living resource conservation for sustainable development,* International Union for Conservation of Nature and Natural Resources, Gland.

Jänicke, M. (1986), *Staatsversagen. DieOohnmacht der Politik in der Industriegesellschaft,* Piper, München.

Jänicke, M. (2002), No withering away of the nation state: Ten theses on environmental policy In: *Proceedings of the 2001 Berlin conference on the human dimensions of global environmental change "global environmental change and the nation state",* Biermann, F., R. Brohm and K. Dingwerth (Eds.), pp. 134-138, Potsdam Institute for Climate Impact Research, Potsdam

Jänicke, M. (2006), The environmental state and environmental flows; the need to reinvent the nation-state In: *Governing environmental flows: Global challenges to*

social theory, Spaargaren, G., A. P. J. Mol and F. H. Buttel (Eds.), pp. 83-106, The MIT Press, Cambridge

Jones, R. (2000), In pursuit of polluters. Trigger-happy ecologists or citizen prosecutors? *ABCNews.com* New York (last accessed 21-1-2000).

Jordan, A., R. Wurzel, A. R. Zito and L. Brückner (2003a), European governance and the transfer of 'new' environmental policy instruments (NEPIs) in the European Union. *Public Adminstration* **81,** 555-574.

Jordan, A., R. K. W. Wurzel and A. R. Zito (2003b), 'New' environmental policy instruments: An evolution of a revolution in environmental policy? *Environmental Politics* **12,** 201-224.

Jordan, A. J., R. Wurzel, A. Zito and L. Brückner (2003c), Consumer responsibility-taking and eco-labelling schemes in Europe In: *The politics behind products: Using the market as a site for ethics and action,* Micheletti, M., A. Follesdal and D. Stolle (Eds.), pp. 161-180, Transaction Publishers, Somerset NJ

Kabiri, N. (2004), Liberalising environmental governance and the hazards of democratisation. *Local Environment* **9,** 383-397.

Karkkainen, B. C. (2001), Information as environmental regulation: TRI and performance benchmarking, precursors to a new paradigm? *Georgetown Law Journal* **89,** 259-370.

Kirby, E. G. (1995), An evaluation of the effectiveness of US CAFE policy. *Energy Policy* **23,** 107-109.

Klein, N. (2000), *No logo: No space no choice no jobs,* Picador, New York.

Kleindorfer, P. R. and E. W. Orts (1998), Informational regulation of environmental risks. *Risk Analysis* **18,** 155-170.

Knoepfel, I. (2001), Dow Jones sustainability group index: A global benchmark for corporate sustainability. *Corporate Environmental Strategy* **8,** 6-15.

Kolln, K. and A. Prakash (2002), EMS-based environmental regimes as club goods: Examining variations in firm-level adoption of ISO 14001 and EMAS in UK, US and Germany. *Policy Sciences* **35,** 43.

Konar, S. and M. A. Cohen (1997), Information as regulation: The effect of community right to know laws on toxic emissions. *Journal of Environmental Economics and Management* **32,** 109-124.

Koolen, I. and A. Oostdijk (2004), *Energiebesparing door gedragsverandering? Meta-evaluatie ENTER projecten,* SWOKA, Leiden.

Koppen, C. S. A. van and J. L. F. Hagelaar (1998), Milieuzorg als strategische keuze: Van bedrijfsspecifieke situatie naar milieuzorgsystematiek. *Bedrijfskunde* **70,** 45-51.

Kreuger, R. A. and M. A. Casey (2000), *Focus groups, a practical guide for applied research [3rd edition],* Sage Publications, Thousand Oaks.

Krut, R. and H. Gleckman (1998), *ISO 140001: A missed opportunity for sustainable global industrial development,* Earthscan, London.

Kumar, K. (1995), *From post-industrial to post-modern society: New theories of the contemporary world,* Blackwell, Oxfor.d

Lash, S. and J. Urry (1987), *The end of organized capitalism,* Polity Press, Cambridge

Laxer, G. and S. Halperin (Eds.) (2003), *Global civil society and its limits,* Palgrave Macmillan, Basingstoke.

Leeuwis, C. (1993), *Of computers, myths and modelling: The social construction of diversity, knowledge, information and communication technologies in Dutch horticulture and agricultural extension,* Agricultural University Wageningen, Wageningen.

Lei, Z. (2002), *Ecologizing industrialization in Chinese small towns,* Wageningen University (PhD thesis), Wageningen.

Leroy, P. and J. van Tatenhove (2000), Political modernization theory and environmental politics In: *Environment and global modernity,* Spaargaren, G., A. P. J. Mol and F. H. Buttel (Eds.), Sage Publications, London.

Liefferink, D., M. S. Andersen and M. Enevoldsen (2000), Interpreting joint environmental policy-making: Between deregulation and political modernisation In: *The voluntary approach to environmental policy-making in Europe,* Mol, A. P. J., V. Lauber and D. Liefferink (Eds.), pp. 10-31, Oxford University Press, Oxford

Liu, Y. (2005), *Phosphorus flows in China,* Wageningen University, Wageningen (PhD-thesis).

Loois, G. and R. Drabbe (1991), Energiebesparing in huishoudens door monitoring: Eindrapport. IBM, NOVEM, Map, Tilburg.

Lynn, F. M. and J. D. Kartez (1994), Environmental democracy in action: The toxics release inventory. *Environmental Management* **18,** 511-521.

Lyon, D. (1993), An electronic panopticon? A sociological critique of surveillance theory. *The Sociological Review* **41,** 653-678.

Lyon, D. (1994), *The electronic eye: The rise of surveillance society,* University of Minnesota Press, Minneapolis.

Lyon, D. (1998), The world wide web of surveillance; the Internet and off-world power-flows. *Information, Communication and Society* **1,** 91-105.

Lyon, D. (2001), *Surveillance society: Monitoring everyday life,* Open University Press, Buckingham.

Maguire, D. J. and P. A. Longley (2005), The emergence of geoportals and their role in spatial data infrastructures. *Computers, Environment and Urban Systems* **29,** 3-14.

Maniates, M. (2002), Individualization: Plant a tree, buy a bike, save the world? In: *Confronting consumption,* Princen, T., M. Maniates and K. Conca (Eds.), pp. 43-66, MIT Press, Cambridge

Markard, J. and E. Holt (2003), Disclosure of electricity products - lessons from consumer research as guidance for energy policy. *Energy Policy* **31,** 1459-1474.

Marvin, S., H. Chappells and S. Guy (1999), Pathways of smart metering development: Shaping environmental innovation. *Computers, Environment and Urban Systems* **23,** 109-126.

Mason, J. (1996), *Qualitative researching,* Sage Publications, London.

Mason, M. (1999), *Environmental democracy,* Earthscan, London.

Mathiesen, T. (1997), The viewer society. Michel Foucault's 'panopticon' revisited. *Theoretical Criminology* **1,** 215-234.

Meadows, D. H., D. L. Meadows and J. Randers (1972), *The limits to growth: A report for the Club of Rome's project on the predicament of mankind,* [s.n.], New York.

Micheletti, M. (2003), *Political virtue and shopping: Individuals, consumerism and collective action,* Palgrave Macmillan, New York.

Mierlo, J. v. (2001), *Verspeelde energie: Vitesse en NUON, verslag van een explosieve relatie,* Uitgeverij SUN, Nijmegen.

Ministerie van VROM (2003), *Evaluatie van het energielabel voor personenauto's over het jaar 2001.* Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer, Den Haag

Mol, A. P. J. (1995), *The refinement of production. Ecological modernisation theory and the chemical industry,* Jan van Arkel/International Books, Utrecht.

Mol, A. P. J. (2000), The environmental movement in an era of ecological modernisation. *Geoforum* **31,** 45-56.

Mol, A. P. J. (2001), *Globalization and environmental reform. The ecological modernization of the global economy,* MIT Press, Cambridge.

Mol, A. P. J. (2004), Environment in the information age. The transformative powers of environmental information. Paper presented at *Technology, risks and uncertainty: challenges for a democratization of science*, Florianopolis, Brazil, 16-17 April 2004

Mol, A. P. J., V. Lauber and D. Liefferink (2000), *The voluntary approach to environmental policy-making in Europe,* Oxford University Press, Oxford.

Mol, A. P. J. and G. Spaargaren (2000), Ecological modernisation theory in debate: A review. *Environmental Politics* **9,** 17-49.

Mol, A. P. J. and G. Spaargaren (2004), Ecological modernisation and consumption: A reply. *Society & Natural Resources* **17,** 261-265.

Mol, A. P. J. and G. Spaargaren (2005), From additions and withdrawals to environmental flows. Reframing debates in the environmental social sciences. *Organization & Environment* **18,** 91-107.

Mol, A. P. J. and G. Spaargaren (2006), Towards a sociology of environmental flows: A new agenda for twenty-first century environmental sociology In: *Governing environmental flows: Global challenges to social theory,* Spaargaren, G., A. P. J. Mol and F. H. Buttel (Eds.), The MIT Press, Cambridge

Motaal, D. A. (1999), The agreement on technical barriers to trade, the committee on trade and environment, and eco-labelling In: *Trade, environment and the*

millenium, Sampson, G. P. and W. B. Chambers (Eds.), pp. 223-238, United Nations University Press, Tokyo

Muconsult (2000), *Effectiviteit van differentiatie van BPM en alternatieve maatregelen ter stimulering van de verkoop van auto's met relatief lage CO_2-uitstoot*. Muconsult B.V., Amersfoort

Nadaï, A. (2001), Consumer 'sovereignity' and policy issues in the development of product ecolabels. *European Environment* **11,** 14-26.

Natan, T. E. and C. G. Miller (1998), Are toxics release inventory reductions real? *Environmental Science and Technology* **32,** 368-374.

O'Rourke, D. (2005), Market movements; nongovernmental organization strategies to influence global production and consumption. *Journal of Industrial Ecology* **9,** 115-128.

Oosterveer, P. (2004), Global regulation of food and consumer involvement: Labelling of sustainable fisheries using the marine stewardship council (MSC). Paper presented at *International Seminar on Political Consumerism*, Oslo, 26-29 August 2004

Oosterveer, P. (2005), *Global food governance,* Wageningen University, Wageningen (PhD-thesis).

Otnes, P. (1988), *The sociology of consumption. An anthology,* Solum Torlag, Oslo.

Patton, M. Q. (1980), *Qualitative evaluation methods,* Sage Publications, Beverly Hills.

Phuong, P. T. (2002), *Ecological modernisation of industrial estates in Vietnam,* Wageningen University, Wageningen (PhD-thesis).

Pickerill, J. (2003), *Cyberprotest: Environmental activism online,* Manchester University Press, Manchester.

Plotkin, S. E. (2001), European and Japanese fuel economy initiatives: What they are, their prospects for success, their usefulness as a guide for US action. *Energy Policy* **29,** 1073-1084.

Power, M. (1997), *The audit society. Rituals of verification,* Oxford University Press, Oxford.

Princen, T., M. Maniates and K. Conca (Eds.) (2002), *Confronting consumption,* MIT Press, Cambridge, MA.

Rapley, T. (2004), Interviews In: *Qualitative research practice,* Seale, C., G. Gobo, J. F. Gubrium and D. Silverman (Eds.), Sage Publications, Thousand Oaks.

Reisch, L. A. (2001), The Internet and sustainable consumption: Perspectives on a Janus face. *Journal of Consumer Policy* **24,** 251-286.

Rifkin, J. (2000), *The age of access. How the shift from ownership to access is transforming modern life,* Penguin Books, London.

Rinkevicius, L. (2000), The ideology of ecological modernization in 'double-risk' societies: A case study of Lithuanian environmental policy In: *Environment and global modernity,* Spaargaren, G., A. P. J. Mol and F. H. Buttel (Eds.), pp. 17-40,

Roberts, S. and W. Baker (2003), Towards effective energy information: Improving consumer feedback on energy consumption. Centre for Sustainable Energy, Bristol

Roe, D. (2002), Toxic chemical control policy: Three unabsorbed facts. *Environmental Law Reporter* **32**.

Roome, N. and J. Park (2000), Introduction: Global sustainability and information economy: Old challenges, new perspectives. *Greener Management International*.

Rotmans, J. (2003), *Transitiemanagement: Sleutel naar een duurzame samenleving,* van Gorcum, Assen.

Sassen, S. (2000), *Cities in a world economy [second edition],* Sage Publications, London.

Schnaiberg, A. (1980), *The environment: From surplus to scarcity,* Oxford University Press, Oxford.

Schot, J. and A. A. de la Bruheze (2003), The mediated design of products, consumption, and consumers in the twentieth century In: *How users matter: The co-construction of users and technologies,* Oudshoorn, N. and T. Pinch (Eds.), The MIT Press, Cambridge MA

Schumacher, E. F. (1973), *Small is beautiful: A study of economics as if people mattered,* Blond Briggs, London.

Seyfang, G. (2005), Shopping for sustainability: Can sustainable consumption promote ecological citizenship? *Environmental Politics* **14,** 290-306.

Sheller, M. and J. Urry (2003), Mobile transformations of 'public' and 'private' life. *Theory, Culture and Society* **20,** 107-125.

Shove, E. (1997), Revealing the invisible: Sociology, energy and the environment In: *The international handbook of environmental sociology,* Redclift, M. and G. Woodgate (Eds.), pp. 261-273, Edward Elgar, Cheltenham

Shove, E. (2003), *Comfort, cleanliness and convenience,* Berg Publishers, Oxford.

Shove, E., L. Lutzenhiser, S. Guy, B. Hackett and H. Wilhite (1998), Energy and social systems In: *Human choice and climate change,* Rayner, S. and E. L. Malone (Eds.), pp. vol. 2; 291-327, Battelle, Columbus, Ohio

Simons, G. (1987), *Eco-computer. The impact of global intelligence,* John Wiley & Sons, Chichester.

Skogstad, G. (2005), Contested political authority, risk society and the transatlantic divide in genetic engineering regulation In: *Reconstituting political authority: Complex sovereignty and the foundations of global governance,* Grande, E. and L. W. Pauly (Eds.), pp. 238-260, University of Toronto Press, Toronto

Slater, D. (1997), *Consumer culture and modernity,* Polity Press, Cambridge.

Slingerland, S., S. Bottema, S. van den Burg, A. d. Daas, X. Klijnsma, R. Oei, H. Schönbeck, G. Spaargaren and A. Veenstra (2003), Het energiehuis: Energiebesparing via Internet passend bij leefstijlen van huishoudens. Wageningen University, Wageningen

Smink, C. K., C. S. A. v. Koppen and G. Spaargaren (2003), Ecological modernisation theory and the changing dynamics of the European automotive industry: The case of Dutch end-of-life vehicle policies. *Int. J. Environment and Sustainable Development* **2,** 284-304.

Smith, T., D. A. Sonnenfeld and D. N. Pellow (Eds.) (2006), *Challenging the chip: Labor rights and environmental justice in the global electronics industry,* Temple University Press, Philadelphia.

Sonnenfeld, D. A. and A. P. J. Mol (2002), Globalization and the transformation of environmental governance: An introduction. *American Behavioral Scientist* **45,** 1318-1339.

Spaargaren, G. (1997), *The ecological modernisation of production and consumption: Essays in environmental sociology,* Wageningen University, Wageningen (PhD thesis).

Spaargaren, G. (2000a), Ecological modernization theory and domestic consumption. *Journal of Environmental Policy and Planning* **2,** 323-335.

Spaargaren, G. (2000b), Ecological modernization theory and the changing discourse on environment and modernity In: *Environment and global modernity,* G.Spaargaren, A. P. J. Mol and F. H. Buttel (Eds.), pp. 41-73, Sage, London

Spaargaren, G. (2003), Sustainable consumption: A theoretical and environmental policy perspective. *Society & Natural Resources* **16,** 687-701.

Spaargaren, G., T. Beckers, S. Martens, B. Bargeman and T. van Es (2002), *Gedragspraktijken in transitie: De gedragspraktijkenbenadering getoetst in twee gevallen; duurzaam wonen en duurzame toeristische mobiliteit,* Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer, Den Haag.

Spaargaren, G. and S. Martens (2004), Globalisation and the role of citizen-consumers in environmental politics. In: *Handbook of globalisation and environmental policy*, Wijen, F., K. Zoeteman and J. Pieters (Eds.), Edward Elgar, Cheltenham

Spaargaren, G. and S. Martens (2005), Consumption domains in transition. The social practices approach as a tool for analyzing sustainability in everyday life. In: *Wetenschap met beleid, beleid met wetenschap. Swome/GaMON marktdag 2005,* Burg, S. van den, G. Spaargaren and H. Waaijers (Eds.), Wageningen Universiteit, Wageningen

Spaargaren, G. and A. P. J. Mol (1992), Sociology, environment and modernity: Ecological modernization as a theory of social change. *Society & Natural Resources* **5,** 323-344.

Spaargaren, G., A. P. J. Mol and F. H. Buttel (2006), *Governing environmental flows: Global challenges to social theory,* The MIT Press, Cambridge.

Spaargaren, G. and B. van Vliet (2000), Lifestyles, consumption and the environment; the ecological modernisation of domestic consumption. *Environmental Politics* **9,** 50-76.

Staats, H. J. and P. Harland (1995), The Ecoteam program in the Netherlands. Study 4: A longitudinal study of the effects on environmental behavior and its psychological backgrounds. Centre for energy and environmental research, Faculty of social and behavioral sciences, Leiden University, Leiden

Steg, L. (1999), *Verspilde energie? Wat doen en laten Nederlanders voor het milieu,* Sociaal en Cultureel Planbureau, Den Haag.

Stephan, M. (2000), Information disclosure programs: A theoretical analysis. In *Annual Meeting of the Midwest Political Science Association* Chicago, Illinois, April 27-30, 2000.

Stienstra, J. and A. Jansen (2001), *Evaluatie energie-etiket*. Bureau Ferro, Amsterdam

Strauss, A. and J. Corbin (1998), *Basics of qualitative research: Techniques and procedures for developing grounded theory,* Sage Publications, Thousand Oaks.

Szasz, A. (1994), *Ecopopulism: Toxic waste and the movement for environmental justice,* University of Minnesota Press, Minneapolis.

Tait, M. G. (2005), Implementing geoportals: Applications of distributed GIS. *Computers, Environment and Urban Systems* **29,** 33-47.

Tatenhove, J. van, B. Arts and P. Leroy (2000), *Political modernisation and the environment. The renewal of environmental policy arrangements,* Kluwer Academic Publishers, Dordrecht.

Tietenberg, T. and D. Wheeler (1998), Empowering the community: Information strategies for pollution control. *Paper delivered at the Environmental Economics Conference* Arlie House, Virginia, October 1998.

Toke, D. (2002), Ecological modernisation and GM food. *Environmental Politics* **11,** 145-163.

Ullrich, O. and A. Nigten (1984), *Wedstrijd zonder winnaars: In het slop van het industriele systeem,* De Uitbuyt, Wageningen.

Urry, J. (2000), *Sociology beyond societies; mobilities for the twenty first century,* Routledge, London.

Urry, J. (2003), *Global complexity,* Polity Press, Cambridge.

Veld, R. op het (2005), NUON grootste verliezer vrije energiemarkt. In *Het Financieele Dagblad*, October 25th, pp. 1.

Verschuren, P. and H. Doorewaard (1999), *Designing a research project,* Lemma, Utrecht.

Vliet, B. van (2000), Monitoring and power In: *Domestic consumption, utility services and the environment; final DOMUS report,* Chappells, H., M. Klintman, A. L. Linden, E. Shove, G. Spaargaren and B. van Vliet (Eds.), Wageningen University, Wageningen.

Vliet, B. van (2002), *Greening the grid. The ecological modernisation of network-bound systems,* Wageningen University, Wageningen (PhD thesis).

Vliet, B. van (2004), Shifting scales of infrastructure provision In: *Sustainable consumption: The implications of changing infrastructures of provision,* Southerton, D., H. Chappells and B. van Vliet (Eds.), pp. 67-80, Edward Elgar, Cheltenham

Vogel, D. (1997), Trouble for us and trouble for them: Social regulations as trade barriers In: *Comparative disadvantages? Social regulations and the global economy,* Nivola, P. S. (Ed.), pp. 98-145, The Brookings Institution, Washington DC

Völlink, T. (2004), *Go for less; the effect of feedback and goal setting on household energy and water consumption,* NUTRIM, Maastricht (PhD thesis).

Völlink, T. and R. Meertens (1999), *De effectiviteit van electronische feedback over het energie- en watergebruik door middel van teletekst bij huishoudens,* Maastricht University & NOVEM, Maastricht.

Volpi, G. and S. Singer (2000), *Will voluntary agreements at EU deliver on environmental objectives? Lessons from the agreement with the automotive industry,* WWF Discussion Paper, Brussels.

Wahnschafft, R. and K. Huh (2001), Effective implementation of fuel-economy labelling for passenger cars: Experiences from the USA, Sweden and Republic of Korea. Paper presented at *ECEEE Summer Study*, Paris,

Weale, A. (1992), *The new politics of pollution,* Manchester University Press, Manchester.

Webster, F. (2002), *Theories of the information society, 2nd edition,* Routledge, London.

Whitaker, R. (1999), *The end of privacy: How total surveillance is becoming a reality,* New Press, New York.

Wilhelm, A. G. (1999), Virtual sounding boards: How deliberative is online political discussion In: *Digital democracy: Discourse and decision making in the information age,* Hague, B. N. and B. D. Loader (Eds.), pp. 154-178,

Wilhite, H., A. Høivik and J.-G. Olsen (1999), Advances in the use of consumption feedback information in energy billing: The experiences of a Norwegian energy utility. *1999 ECEEE Summer Study in Buildings* ECEEE, Paris.

Wilhite, H. and R. Ling (1995), Measured energy savings from a more informative energy bill. *Energy and Buildings* **22,** 145-155.

Woerkum, C. van (2002), Interactive policy-making and communication In: *Marketing for sustainability,* Bartels, G. and W. Nelissen (Eds.), pp. 31-38, IOS Press, Amsterdam

WTO (2004), *Trade and environment at the WTO: Background document,* World Trade Organisation, Geneva.

Yin, R. K. (1993), *Applications of case study research,* Sage Publications, Beverly Hills.

Yin, R. K. (1994), *Case study research. Design and methods,* Sage Publications, London.

Yin, R. K. (1998), The abridged version of case-study research. Design and method In: *Handbook of applied social research methods,* Bickman, L. and D. J. Rog (Eds.), pp. 229-259, Sage Publications, Beverly Hills.

LIST OF INTERVIEWS

Chapter 6:

Louis Zuidgeest, *Ministry of Public Housing, Spatial Planning and the Environment*, Den Haag, 10-03-2004

Wybe Zijlstra, *BOVAG*, Bunnik, 17-03-2004

Kees Peereboom, *RAI Vereniging*, Amsterdam, 20-04-2004

Eugène Moerkerk, *RAI Vereniging*, Amsterdam, 20-04-2004

Pieter Clausing, *ANWB (Dutch Automobile Association),* Den Haag, 08-04-2004

Karl-Heinz Zierock, *European Commission*, Brussels, 10-06-2004

Albert ten Kate, *Friends of the Earth Netherlands*, (telephone), 02-09-2004

Jan Fransen, *Stichting Natuur en Milieu*, (telephone), 30-9-2004

Chapter 7:

Jan van der Plas, *Ministry of Public Housing, Spatial Planning and the Environment*, 14-8-2002, The Hague, the Netherlands

Tinus Pulles, *TNO-MEP*, 13-1-2003, Apeldoorn, the Netherlands

Hanneke Godthelp, *Province Friesland*, 07-3-2003, Leeuwarden, The Netherlands

Dick Doornbos, *Lyondell*, 26-3-2003, Rotterdam, the Netherlands

Susanne Wither, 23-4-2003, *New York State Department of Environmental Conservation*, Albany NY, USA

John Balbus, 24-4-2003, *Environmental Defense Fund*, Washington DC, USA

Jeff Gunnulfsen, 25-4-2003, *Synthetic Organic Chemical Manufacturers Association*, Washington DC, USA

Velu Senthil, 25-4-2003, *Environmental Protection Agency*, Washington DC, USA

Bill Pease, 28-4-2003, *Getactive Software*, Berkeley CA, USA

David Roe, 28-4-2003, *LCHR*, Oakland CA, USA

NOTES

Notes for chapter 1

[1] In this context, it is interesting to note that the capabilities to 'sense' the environment are often reduced to 'seeing' and there is thus an emphasis on visualizing the environment. Some have argued that the domination of 'vision' is unjust, and that one should also examine to what extent the environment is, or can be made to be, appropriated through other senses such as touch, smell and hearing (see for example http://www.vivacity2020.org [7-11-2005])
[2] See http://envisat.esa.int [7-11-2005]
[3] Throughout this thesis I will use the term citizen-consumers to those situations where no obvious distinction can be made between the citizen-role and the consumer-role, as well as in those cases where both roles are concerned. If it is very obvious that I discuss the citizen-role, I use the term citizen, likewise with the term consumer.
[4] In many cases, the provision of information does not necessarily take place through advanced information technologies at all, think of the photo-copies of shoplifters that are stuck to the window, or environmental labels.
[5] See http://www.eea.eu.int/main_html [5-1-2006]
[6] See http://www.m-w.com/dictionary/monitoring [5-1-2006]

Notes for chapter 2

[1] The most well-known example of early environmental concern was the controversy which followed after the publication of 'Silent spring' in 1962 (Carson, 1962).
[2] "Superindustrialisation can take a hard or gentle pathway. This is not to be found in any techno-horoscope. In the end, it is, and remains, a matter of political discussions."
[3] But I want to stress at this point that this thesis is not about overly optimistic visions on the paper-less office, cyber travel et cetera, nor am I ignorant of the negative social and environmental consequences of the ICT industry (see for example Smith et al., 2006).
[4] As argued by Spaargaren (2000) one should acknowledge that each interpretation of ecological modernisation contains, in varying quantities, elements of ecological modernisation as a socio-political program and as a theory of social change.
[5] The deployment of EMT as a socio-political program was given a major impetus after the publication of the Brundtland report in 1986, and the 1992 World Summit in Rio de Janeiro. Both fuelled the popularity of the concept 'sustainable development' which shows some close parallels to the notion of ecological modernisation.

[6] The work on the social practices approach as a way to study consumption can be seen as an example of this methodological 'guideline' at work (Spaargaren et al., 2002, Spaargaren, 2003, Spaargaren and Martens, 2005). This line of research draws upon the work of Otnes (1988) who, from the perspective of structuration theory, discussed the relation between everyday practices and collective socio-material systems.
[7] Although the original German version was already published in 1986, the translation and subsequent publication in English tremendously increased the impact of Beck's work.
[8] Concerning food consumption, one could for example argue that if you have the financial means to buy biologically produced meat, you can avoid some of the risks associated with meat consumption. The same goes for organic vegetable consumption. Some of the negative consequences of global warming can for example be countered by moving to other regions.
[9] While acknowledging that there is no common definition of the concept globalisation and that there is an ongoing debate whether or not globalisation is something new, one can safely state that the notion of globalisation has become firmly embedded in both societal debates on the environment, as well as in contemporary social theory.
[10] In, for example, the protests surrounding the WTO-meeting in Seattle, 1999 environmental arguments played an important role.
[11] This is not to say that there is no resistance – with subsequent ideological discussions on the role of science and technology – to the deployment of new technologies such as genetic engineering. Even an existing technology such as nuclear power is continues to be heavily debated.
[12] A well-known example is for example the Mexican Tuna case in which the Mexican government challenged the US regulations which sought to protect dolphins (WTO, 2004).
[13] It must be said that there is also ample critique on the notion of a global civil society, see for example Laxer and Halperin (2003).

Notes for chapter 3

[1] Note that one of the controversies concerning the sociology of flows, discussed in the previous chapter, was that it tends to define virtually everything as a flow. Because I focus on information flows, which are a rather undisputed kind of flow, I will not dig deeper into this debate.
[2] In this chapter I use the notions of monitoring and surveillance as almost interchangeable. One could argue that it makes sense to distinguish between the two, where monitoring refers to the process of gathering information and surveillance refers to the process where information is used (particularly when it comes to influence other actors). However, I do not use this distinction for a variety of reasons. First of all, it creates a somewhat clumsy differentiation between the gathering of

information (monitoring) and the practice of putting information to use (surveillance). Secondly, various theoretical schools have used the notions of monitoring and surveillance in contradictory ways. For example, what scholars of energy monitoring define as 'monitoring' would be labelled 'surveillance' by Giddens.

[3] Using the search terms 'environmental monitoring', Google comes up with 60+ million hits. The first academic journal to appear in the search result is – not surprisingly – the Journal of Environmental Monitoring.

[4] So-called smart meters can serve various functions, such as saving energy, switching the light on/off automatically, etc. You can find a wide variety of products and manufacturers on the Internet. The developments in the field of 'domotica' – where various electronic functions are to be integrated - are particularly interesting (see for example http://www.smart-homes.nl). Unfortunately, many demonstration projects continue to focus on the more experimental applications, like self-ordering fridges, whereas the current real-life developments lie for example in the development of safer houses for elderly people.

[5] Giddens appears to use the notion of surveillance to refer to the more organised, formal processes of information gathering.

[6] In Chapter 4 I will use these two dimensions of reflexivity to distinguish between various environmental monitoring schemes.

[7] I will use the notions "informational governance arrangements" and "regulation through information" interchangeably.

[8] It is tempting to argue that the developments in the field of information- and communication technologies have also contributed to the emergence of informational forms of regulation. When looking at the sheer amount of environmental information that can be collected and processed, for example through major projects such as the European Space Agency's Envisat[8], the (at that time futuristic) visions of the 1980s look pale (see for example Huber, 1982, Simons, 1987). The rapid development of the Internet has further fuelled the enthousiasm about the possibilities to provide tailored information to specific target-groups. Yet I would argue that the developments concerning ICT are the background to which new forms of regulation are developed, not a cause in itself.

[9] For an elaboration on the relation between trust and monitoring, see Eshuis and van Woerkum (2003)

[10] This was a 2005 campaign by the Dutch environmental organisation "Stichting Natuur en Milieu", see http:/www.benjijgifvrij.nl [14-12-2005].

[11] The Dutch label 'Milieukeur' is exemplary here. It is issued by a formally independent organisation, but the label is officially recognised and supported by the government. This means that for example labelled greenhouses are subject to favourable financial regulations and that (local) governments are stimulated to use the labelled products.

[12] In this respect it is illustrating that the Dutch consumer organisation 'Consumentenbond' has decided that it will never name a product the "best buy" it the producer is not willing to disclosure information on their corporate sustainability performance.

[13] The environmental justice movement, particularly large and influential in the United States has made significant progress in putting the issue of uneven distribution over (either economic or racial) classes on the environmental agenda (see for example Szasz, 1994, Bullard, 2000, Fortun, 2001). It is however interesting to note that, to the best of my knowledge, there is less attention for the uneven distribution of the means to participate in environmental activism, policy making et cetera.
[14] As argued by Rifkin (2000), the notion of access will come to be an important organizing principle in the relation between companies, governments and citizen-consumers.
[15] The five aspects of access are defined as (1) access to ICT, (2) access to information, (3) access to community networks, (4) access to decision makers and (5) access to a basic source of income. Since I use these notions in a different context (in which for example the difference between citizen-consumers, community or civil society networks and decision-makers is blurred), I have not used these exact phrases.
[16] An interesting note in this respect is that in the Dutch context, the upcoming retirement of an educated and still healthy and active generation – a generation which is also increasingly familiar with the possibilities offered by contemporary ICTs – is believed to lead to an upsurge of information-seeking citizens (personal communication Nijhoff).
[17] Immediately after 9/11, US Environmental Protection Agency's (EPA) officials decided to restrict access to sensitive information; it removed the Risk Management Plans from the EPA website, the most controversial section being the Offsite Consequence Analysis. In the aftermath of 9/11, a discussion evolved about the merits and dangers of providing potentially sensitive information to the general public. On the one hand, environmental interest groups and advocates of disclosure, such as OMB Watch – stressed that the availability of information should not be comprised solely because terrorist might use the information. Attempts to build a coherent legal framework that would make chemical industries less vulnerable for terrorist attacks – such as the proposed Corzine Bill – were dismissed as being 'stalinesque' and a 'jihad against chemical companies'. The only two laws that were actually implemented to improve the safety of chemical facilities – the Public Health Security ad Bioterrorism Preparedness and Response Act and the Maritime Transportation Security Act – cover only a fraction of the US' hazardous chemical facilities.

Various researchers studied the potential usability of the disclosed information for terrorists' purposes. In a research sponsored by the National Defense Research Institute, Baker et al (2004) applied a supply-demand approach to information. In assessing whether or not terrorist could acquire the information required, it was concluded that their 'flexibility' was to their advantage, adding that they have various means of acquiring information for their 'missions' including direct observation. On the supply-side, the information currently available through federal websites was not considered crucial since the information was often spread across various agencies or because the information was simply not relevant for terrorists. Less than 1% of the 629 federal databases were believed to contain sensitive information, and the accessibility of these databases was often already limited. Furthermore, closing the federal databases would

have a limited effect since much of the information was already mirrored on other – privately run – websites. Others argued that the truly relevant information, for both concerned citizens and terrorists, is the very detailed information about local facilities. So although the availability of general information, such as aggregate chemical usage, is not at risk, one could consider limiting the availability of detailed information to for example local community leaders or carefully screened individuals (see Cohen, 2002).

The direct consequences of 9/11 for disclosure schemes such as the Toxics Release Inventory appear to be limited. After a brief period of heated debate not much has changed. In July 2005, updated information about the Risk Management Plans was suddenly released again, after OMB Watch filed a complaint in court.

Notes for the intermezzo

[1] The choice to contribute to the debate on ecological modernisation theory still leaves open a number of methodological possibilities, as recent quantitative researchers have illustrated (see for example Phuong, 2002, Liu, 2005). The decision to focus on the changing functionality of environmental monitoring and the subsequent emergence of informational governance arrangements renders such a quantitative approach problematic.

[2] Ideally one would seek to ensure that triangulation of methods is possible. This principle entails the verification of evidence or information by checking it against three different sources Next to the triangulation of methods, methodologists also speak about the triangulation of methods and triangulation of researchers (Verschuren and Doorewaard, 1999).

[3] Yin identifies an additional mode of analysis, entitled program logic models, which combines these two modes into one analytical strategy.

[4] The researchers for example asked questions about monitoring, or presented an article from an external expert and asked participants to reflect on it.

[5] Although those labelling schemes which provide information about the production-phase of a product (Max Havelaar coffee, eco-labels, etc) are perhaps more wide-known and more discussed, there are also labels which are evidence of the fact that the company has a strategy for dealing with waste (such as the German Grüne Punkt label).

[6] The toxics release inventory can be found at http://www.epa.gov/tri/ [23-11-2005]. Factory Watch is by now no longer in operation but can still be found at http://www.foe.co.uk/campaigns/safer_chemicals/resource/factory_watch/ [23-11-2005]. Other sites provide information on the health effects of pollution on http://www.rechtomteweten.nl [23-11-2005] or information on ozone concentrations in the troposphere on http://www.knmi.nl/omi/publ-nl/nieuws/index.html [23-11-2005].

Notes for chapter 4

[1] When the largest Dutch retailer Albert Heijn introduced a customer loyalty card, many consumer organisations argued that this violated privacy interests and nation-wide 'card-sweeping' projects were set up. Nowadays, it is also possible to get a card without giving away personal information.
[2] For an elaborated discussion on the notion of social practices, its foundation in structuration theory, and relevance for environmental issues, see Spaargaren and van Vliet (2000), Spaargaren (2000).
[3] This was discovered during an exercise that was organised as part of an international winter workshop which involved researchers whose focus was on issues of sustainable consumption and everyday life. The participants were asked to bring with them recent energy and water bills. Bills from different countries were examined in some detail by groups of mixed nationality. 'Reading bills' turned out to be very difficult, even by well-trained academic researchers.
[4] See for more information www.empowermentinstitute.net [12-12-2005]
[5] http://www.scorecard.org [12-12-2005]
[6] http://www.pollutionwatch.org [12-12-2005], http://www.foe.co.uk/campaigns/industry_and_pollution/factorywatch [12-12-2005]
[7] http://www.rechtomteweten.nl [12-12-2005]

Notes for chapter 5

[1] As said before, one should not be too optimistic about this, in an academic workshop in Wageningen, November 2000, researchers that are working on these subjects were asked to bring their energy bill and explain it to each other. This proved to be very difficult, even for well-informed energy experts.
[2] At its peak, 31% of the Dutch households participated in the campaign (1987-1988), although the evaluations showed that households tend to participate for two or three subsequent seasons and then quit (Loois and Drabbe, 1991).
[3] See for example http://www.essent.nl [6-12-2005]; http://www.eneco.nl [6-12-2005]; http://www.nuonenergiebesparen.nl [6-12-2005]
[4] See for example http://www.energiebesparendoeikzo.nl [6-12-2005]; http://www.energieopmaat.nl [6-12-2005]
[5] Although the program was considered to be quite successful in the Netherlands, it now no longer exists. It is still in existence in for example the United States; see for more information http://www.empowermentinstitute.net/files/SLP.html [6-12-2005]. The effect of participation in Ecoteams on the consumption levels was studied and reported by Staats and Harland (Staats and Harland, 1995) and Harland (2001). See also Hobson (2003).

[6] This is joint campaign of Milieucentraal (an independent organisation which provides advice to citizen-consumers) and NUON (one of the major energy providers in the Netherlands. See http://www.consument-en-energie.nl/ [6-12-2005]
[7] See for example http://www.smart-homes.nl [6-12-20005]; http://www.domotica.nl [6-12-2005]
[8] http://www.energywatch.org.uk [6-12-2005]
[9] http://www.certiq.nl/ [6-12-2005]
[10] See http://www.energieprijzen.nl [6-12-2005], http://www.gaslicht.com [6-12-2005]
[11] See http://www.antenna.nl/wise [6-12-2005]
[12] See http://www.dekleineaarde.nl [6-12-2005]; http://www.cat.org.uk [6-12-2005]
[13] See for example http://www.kennemerwind.nl [6-12-2005]; http://www.yourenergy.nl [6-12-2005] for information about renewable energy co-operatives.
[14] The final report of the Energy House project (in Dutch) is available at http://www.sls.wau.nl/enp/research/projects/theme4.htm [8-12-2005]
[15] The researchers for example asked questions about monitoring, or presented an article from an external expert and asked participants to reflect on it.
[16] The issue of sponsoring was particularly sensitive because the participating energy company was involved in a scandal. In the period 1991-2001 the energy company NUON, at that time still a public company formally owned by the local and regional governments, was involved in the sponsoring of the Dutch football club Vitesse. Up to 1998, NUON only sponsored Vitesse, but when Vitesse ran into financial problems, due to mismanagement and the construction of a new stadium, various misty financial arrangements where made through which NUON came to participate in the management of the club and actually came to own some of the players (most notably Nikos Machlas). As the financial situation continued to worsen, NUON was increasingly criticized for spending (public) money on a football club. NUON had, in 2001, no choice but to accept its losses and cut through all ties with Vitesse. In total, the energy company spent 150 million Dutch guilders (68 million euro) on Vitesse. See van Mierlo (2001)
[17] In December 2004, 40% of the Dutch households bought green electricity. In July 2005, the market for grey electricity was also liberalized but there are no data available yet on the impact on green electricity's market-share. For more information, see http://www.energieprijzen.nl [8-12-2005]

Notes for chapter 6

[1] Examples of these new environmental policy instruments are voluntary agreements and covenants, levies and taxes, and labelling (Mol et al., 2000, Jordan et al., 2003b).
[2] Since light trucks and SUV's are categorised differently, they are subject to different fuel efficiency standards which explains why car manufacturers did not run into problems with the CAFE standards.

[3] The South-Korean manufacturers have an additional year to reach the targets.
[4] 'Official' here means the information as calculated by the European approval authority.
[5] It is interesting to note that none of the interviewees could tell me what the formula actually is, nor is it given on, for example, the website of the Ministry.
[6] See http://www.eu-milieubeleid.nl/ch14s08.html [22-11-2005]
[7] For example the campaign for the new Daihatsu Cuore, the text on the website explicitly refers to the A-label granted to this car: http://www.daihatsu.nl/home/index.php?option=content&task=view&id=9&Itemid=26 [22-11-2005]
[8] For more information, and absurdities, see Apeldoornse Courant (2005), "Energielabel nieuwe auto's roept verzet op", December 9. It is also noteworthy that from July 1 2006 onwards, the purchase tax on new vehicles will become partly dependent on the fuel efficiency. This fiscal measure makes use of the labelling scheme.

Notes for chapter 7

[1] For the Aarhus convention, see http://www.unece.org/env/pp/ [14-12-2005]. A coalition of countries, international organisations and civil society groups has emerged to stimulate transparency in different international contexts (http://www.pp10.org) [14-12-2005].
[2] See for example http://www.globalreporting.org [14-12-2005].
[3] There is another difference between information in permits and the information disclosed in the schemes discussed. Permits generally contain information about the maximum allowable emission over a short period of time (for example 24h). Disclosure schemes in the US generally contain information about the real (although self-reported) emission over the period of a year.
[4] For details on the interviews, see the "list of interviews" section
[5] http://www.scorecard.org [14-12-2005]
[6] See www.epa.gov/tri [14-12-2005]
[7] See http://www.svtc.org [14-12-2005]
[8] For an overview of this debate, see http://www.mapcruzin.com/chemical_catastrophe [17-1-2006]
[9] http://www.emissieregistratie.nl [14-12-2005]
[10] By now, the various provincial maps have merged into one national risk map, http://www.risicokaart.nl [14-12-2005]
[11] It was supposed to be publicly accessible in 2002 but because of technical problems this was delayed.
[12] http://www.eper.cec.eu.int [14-12-2005]

Notes for chapter 8

[1] The liberation of the market created sepsis about the willingness of providers to stimulate energy conservation. In this light, it is promising that the heightened energy prices seem to have triggered awareness among providers that help with energy conservation could potentially be a selling-point (op het Veld, 2005).
[2] http://www.knmi.nl/omi/publ-nl/nieuws/index.html [27-10-2005]
[3] In November 2004, 65% of the Dutch households had access to the Internet at home. Of these households, 49% had a fast Internet connection (cable or otherwise). For more data, see http://statline.cbs.nl/StatWeb/table.asp?PA=70655ned&D1=11,12,14,15,17-52,72-147&D2=0&D3=(l-11)-l&DM=SLNL&LA=nl&TT=2 [13-11-2005]. In the United States in 2003, 54.7% of the households had Internet access. See http://www.census.gov/prod/2005pubs/p23-208.pdf [13-11-2005]
[4] Recent examples from the Netherlands are for example NGO campaigns on toxics in cosmetics, or in fruit.
[5] In the Netherlands, the government asked provincial authorities to remove certain sensitive information from their online risk-maps. While the provinces at first refused to do so, arguing that it was their duty to provide citizens with information as accurate as possible, they were eventually forced to do so. See http://www.nu.nl/news/589572/52/Kabinet_dwingt_provincies_tot_aanpassing_risicokaart.html [02-12-2005]