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***Addressing Climate
Adaptation and Mitigation
at the Local and Regional
Level: Lessons for Norway***

Gard Lindseth

Report



Program for Research and
Documentation for a Sustainable Society
Centre for Development and
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Program for Research and Documentation
for a Sustainable Society (ProSus)
Centre for Development and the Environment
University of Oslo
P.O.Box 1116 Blindern
N-0317 Oslo, Norway
Tel: + 47 22 85 89 00
Fax: + 47 22 85 87 90
informasjon@prosus.uio.no
www.prosus.uio.no
Visiting address: Sognsveien 68, 4th floor

FOREWORD

The present report is addressed to one of three sub-themes of a cooperative project conducted by ProSus, CICERO and the Western Norway Research Institute on: "Climate Change in Norway: An Analysis of Economic and Social Impacts and Adaptations". The other sub-themes are: (1) a background paper and survey of the literature on the "Institutional dimensions of climate adaptations" (Lars Otto Næss, CICERO, 2003); and (2) an overview (in Norwegian) of "Institutional response to climate change: How four institutional systems can contribute to societal adaptations to climate change" (Carlo Aall and Kyrre Groven, Western Norway Regional Institute, 2003). ProSus has had scientific responsibility for the project, which has been organized as a separate "work package" of a larger CICERO project of the same name as above (see <http://www.cicero.uio.no/projects>). The project heads at CICERO have been Siri Eriksen and Karen O'Brien, and William M. Lafferty has been responsible at ProSus.

The goal of the present report has been to develop an empirically grounded perspective on work with climate-change adaptation at the level of the local community (or municipality) in Western societies. Given that most work done thus far on climate adaptation has been in developing countries, the goal of the project has been to document cases of local climate-change efforts that can provide insights into the factors affecting institutional adaptation at the local level. Relying on concepts and approaches from his ongoing doctoral project, Gard Lindseth has focused on two types of materials: (1) work to achieve mitigation of greenhouse gas emissions by the "Cities for Climate Protection" (CCP); and (2) work on local community adaptation to climate change at the sub-national level in North America. The results of these analyses are then brought together in concluding perspectives that point towards a communicative and discourse-related approach to climate-change adaptation in Norway.

Given the relatively sparse nature of adaptation studies at the local level in high-consumption societies, Lindseth's analysis makes a significant contribution to a formulation of the problematic within a multi-level context. He demonstrates the significant role that communicative processes play in defining and structuring institutional arenas for action; the key problem of defining and assessing risk at the local level; the difficult interdependency between science and democratic discourse; and the vital challenge of achieving effective policy integration across interactive domains and levels of governance. The report serves to complement the other contributions to the project by both establishing a much-needed and highly-relevant baseline for local community efforts in this area, and establishing an initial "frame" for how local community institutions can better understand and work with the dual challenges of short-term adaptation and long-term mitigation.

Oslo, April 2003

William M. Lafferty
Director

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1 INTRODUCTION

This report aims to identify the important challenges and the questions that must be taken into account when Norwegian municipalities are to address adaptation to climate change. Studies on climate change mitigation and adaptation at the sub-national level from other countries are drawn from in order to discuss challenges for Norway – a country where climate adaptation is yet to reach the political agenda.

Climate change adaptation is a relatively new concern for both science and politics. Until recently, the climate policy agenda has been mostly focused on mitigation and the prospects and possibilities we have for reducing our CO₂ emissions. However, it has become more and more evident that even if we could virtually stop emitting CO₂, there is a legacy of past emissions that will continue to affect the climate for decades to come. The days when any talk about climate adaptation was looked upon as a way of undermining the mitigation agenda is over. The IPCC (2001) has recognized the necessity of becoming better prepared for future changes in climate, and the panel's report *Climate Change 2001: Impacts, Adaptation and Vulnerability* is an acknowledgement that the adaptation agenda is becoming more and more important. The report, which forms part of the Third Assessment Report (TAR), focuses on the environmental, social, and economic consequences of climate change and potential adaptation responses.

The focus of most of the concern about climate impacts and adaptation has first and foremost been on developing countries, largely because they are recognised as both being the most vulnerable to climate impacts and having less capacity than the developed world to adapt. However, extensive national research programs on impact and adaptation in the developed world are also underway, for instance in Canada and the UK. Thus far, the examples of sub-national studies of climate impact and adaptation in the developed world are relatively few. We have identified North America, and Canada in particular, as the region where we find the most examples of climate adaptation studies at the sub-national level (within the developed world). This report therefore concentrates on the empirical studies undertaken in this region.

To have a broader background for discussing climate adaptation in Norway, this report will also take a look at experiences from climate mitigation at the local level, which provides numerous examples of municipalities willing to take on a responsibility for a global issue. There are of course differences when working with climate mitigation and climate adaptation – perhaps the most important is that the effect of adaptation measures is much harder to measure than reductions in greenhouse gases. Moreover, because mitigation of greenhouse gas emissions presents a fairly well-delineated dilemma of justice for the international community – that of allocating rights to emit greenhouse gases to the global atmosphere (Paavola & Adger 2002) – it is a more concrete concern for politics than adaptation, and has been favoured because it is much more compatible with the big politics agenda (Rayner 2002). There are, however, several similarities between mitigation and adaptation concerns, and I aim to show that we can learn from previous experiences with climate mitigation.

The line of reasoning that this report builds on is that both mitigation and adaptation measures rest on scientific information on global warming. This knowledge and information has to be translated into national and local action. The challenge for a community approach

in regard to both adaptation and mitigation is thus two-fold: *First* one has to create an understanding that this is an important task for a community. This challenge emphasizes translating knowledge and science, as well as “framing” the climate question, so that the issues are understandable for the inhabitants and actors in a community. The aim is to have stakeholders *acknowledge* that climate change is relevant to planning and decision making. The *second* challenge is that of actually *integrating* climate change considerations into policy. It is about determining what actions and measures that should be undertaken, and this entails handling risk and prioritizing between different policies. It is a challenge that emphasizes the power dimensions; the negotiations between the different stakeholders and the actors involved.

Although it is the Norwegian context and the challenges ahead that is the rationale for writing this report, Norway and specific aspects of the Norwegian context will not be given much attention. A more thorough overview of how institutions in Norway can prepare for adaptation, can be found in Aall & Groven (2003). Rather, this report is a report that discusses some of the core problems and prospects of addressing climate mitigation and adaptation in a community, be it in Norway or in other parts of the developed world. These challenges would equally apply to Norwegian municipalities as they would apply to municipalities (at least in the developed world) in general. The report looks at the knowledge-policy interface and it reflects on the ways in which scientific knowledge is used, portrayed and understood in the field of climate change. The frame of reference is thus not “what tools are available to attack these problems better”, but rather an examination of how the issue is framed in the first place. Since climate adaptation is a new policy field in Norway, examining and reflecting on how the climate issue has been framed, is assumed to be of great importance for how a future climate adaptation policy in Norway could look like. Based on the nature of the climate problem and on the challenges ahead, this report presents the following core thesis statement: It is important that climate mitigation and adaptation are looked upon together and that concrete projects for community adaptations in Norway are build on past experiences with climate mitigation and Local Agenda 21-work. This argument emphasizes that climate adaptation should be understood as a challenge for *sustainable development*, where the public plays an important role in the community deliberations. Thus, this report encompasses and circles around the broader issue of public participation and democratic steering for the environment.

The structure of this report is as follows: *Chapter 2* describes an international network that works with local climate policy: The Cities for Climate Protection (CCP). This chapter has aims to answer two questions: (1) How does the CCP make the climate question relevant for cities? ; and 2) How has the CCP perspective on climate change changed throughout the nineties and up to the present? The chapter describes the argumentation used by the CCP and looks at how the conditions within which the CCP operates might exemplify typical opportunities and constraints faced by other actors working with climate policy at the local level. *Chapter 3* concentrates on sub-national examples of climate impact and adaptation in North America. The aim of this chapter is to give a descriptive overview of how the research community and stakeholders come together to work with climate adaptation. Together, the two chapters – from the international context – are meant to inform decision makers and researchers in Norway on *what it could mean* to work with climate change in a local context. *Chapter 4* draws on these two previous chapters and discusses important challenges in the climate adaptation work. The chapter focuses on two main issues: the communication of climate change, and the attempt to achieve consensus on future climate adaptation

measures and actions. The report ends with a discussion (in section 4.2.4) on the important considerations for Norwegian municipalities and how work on climate adaptation may be enhanced.

2 CLIMATE MITIGATION: THE CASE OF THE CITIES FOR CLIMATE PROTECTION (CCP)

2.1 Introduction

This chapter discusses the challenges of addressing a global problem in a local context. It looks at how the CCP as a network has framed the climate issue and facilitated climate protection work for their member cities. The CCP campaign grew out of the International Council of Local Environmental Initiatives (ICLEI). ICLEI was launched in 1990 at the World Congress of Local Governments for a Sustainable Future. Its mission is to build and serve a worldwide movement of local governments to achieve tangible improvements in global environmental and sustainable development conditions through cumulative local actions. Today more than 400 local governments, representing nearly 300 million people worldwide, participate in the ICLEI.¹

To become a member of the CCP, the elected council or an appropriate bureaucratic authority must adopt a local government resolution. In most local governments, the draft resolution is prepared by staff and eventually approved by the full governing body of the local authority (ICLEI 2002d). Today CCP has 561 member cities all over the world, representing 8% of global greenhouse gas emissions. Throughout the nineties and up to the present, the CCP has facilitated in policymaking processes at the local level, worked for recognition of the local level of governance in international forums, and lobbied national governments.

The empirical material in this chapter comprises *strategic* documents from the CCP and ICLEI², where their position on climate change is laid out. The CCP is not looked upon as a unified actor, but a single voice and line of argumentation is identified and presented under the banner of CCP. As such it is possible to talk of the CCP as an actor that attempts to translate the climate question and “serve” cities with the arguments that should motivate them to prioritize climate protection. Two questions are addressed in this chapter (1) How does the CCP make the climate question relevant for cities? The chapter focuses on the year 1997 because during this year the CCP undertook an evaluation of both its own work and the status of climate policy in general. This leads us to the next question: (2) How has the CCP perspective on climate change changed throughout the nineties and up to the present?

2.2 Making a Global Issue Relevant for Cities

The challenge for CCP is to define the climate issue in a way that other actors can accept.

¹ There are also hundreds of additional local governments participating in specific ICLEI campaigns and projects. Full membership in ICLEI is offered to local governments and associations of local governments. Each local government member holds a position on the Council, which establishes and oversees the implementation of ICLEI's Strategic Plan and elects an international Executive Committee of local government representatives. ICLEI's world secretariat is in Toronto, Canada. Regional offices and secretariats are found in Berkeley, California (US office); Freiburg, Germany (European secretariat); Tokyo, Japan (Japan office); Melbourne, Australia (Australia/New Zealand office); Johannesburg, South Africa (African secretariat); and Rio de Janeiro, Brazil (Latin America secretariat). See www.iclei.org.

² The CCP has its own staff and its own campaign organisation, and it is possible to identify a “CCP voice” on climate change. However, the CCP grew out of ICLEI and is a campaign under ICLEI's organisation umbrella, and there will be no effort to distinguish between the two in the following discussion.

Over the course of the next few years (1993-1997), four declarations were made that summed up the strategic role municipalities should play with regards to climate protection. These declarations, put together by actors from 150–200 municipalities worldwide, represent CCP's standpoint on climate change (Waldmann 2003). The presentation in this section draws from these declarations (ICLEI 1993a; 1995a; 1995b; 1997a) as well as two documents from ICLEI's world Secretariat (ICLEI 1993b; 1993c) in order to look at how CCP has motivated and stimulated local action on climate change.

2.2.1 The chain of reasoning

The challenge for the CCP is simply to answer the question: Why is climate change an extraordinary challenge that needs increased attention and immediate action? All CCP/ICLEI documents represent a call for local action, and the four declarations (ICLEI 1993a;1995a; 1995b; 1997a) also explicitly show commitments from local governments that want to do more in the field of climate protection. Furthermore, they are also appeals aimed to raise the awareness of national authorities, international actors and other local governments not yet involved in climate work. The challenge is an enormous one for the CCP: namely, to create a worldwide movement at the local level that can contribute significantly to reducing the impacts of global warming.

What the CCP does in these documents is to establish a chain of reasoning to specify the motivation for local action on climate change. The chain starts with overall science, knowledge, risks and normative argumentation, and ends with the local benefits derived from working with climate mitigation. The argumentation presupposes the necessity of immediate action: it builds on the scientific evidence from the IPCC and follows up with the precautionary principle: the consequences of in-action will be so severe that we cannot wait. Moreover, the climate problem is not compared with other problems, thus the issues of prioritizing between pressing social issues is circumvented: the climate issue is portrayed as an extraordinary issue that simply overrides other issues. The goal of the CCP is to form an alliance of cities that believe in the seriousness of climate change, can lead by example, and become a force that has the power to change how more and more cities organize their societies.

2.2.2 Specified measures

In addition to establishing a chain of motivation, the CCP specifies what cities should and could do in their climate work. The challenge here is to find ideas, concepts or local hooks that more specifically can help the cities transform their knowledge into local action.

The CCP has given quite detailed prescriptions as to what should be the *content* of the cities' climate work. Through a number of documents and declarations, the CCP has suggested what measures cities should undertake and what sectors of policy to prioritize. The following sectors and strategies have been given special attention (see especially ICLEI 1993a; 1993c; 1995b):

- Efficiency and renewable energy measures in buildings
- Reducing energy demand through electric gas utilities and utility regulations
- Transportation, infrastructure and land-use planning
- Waste management
- Municipal procurement policies

- Advocacy at the state/provincial and national levels
- Citizens lifestyle
- Greening of the city

In another report on the CCP (Lindseth, forthcoming), the different strategies and initiatives are classified according to whether they are *hard* or *soft* or in a *middle* category.³ The report documents that there is an overweight of the recommendations in the middle range categories, with a particular emphasis on technology. Measures focusing on increased energy efficiency and promoting the use of alternative energy dominate the recommendations. In order to help alter the trend of global warming, CCP recommends first and foremost technological fixes, as well as a change of behaviour at the individual level. Harder strategies like the use of taxes are also recommended, although the emphasis is not particularly strong, nor given much space in the documents.

Climate protection is a task that will have to compete with other issues in a city, and harnessing the interest of actors requires decoupling the links to other issues that compete with climate change, such as unsustainable production or transportation. The CCP's recommended actions for cities may redefine how cities do politics, but the range of possible strategies and mechanisms that are adopted to bring about these changes need not entail a severe reorientation of local politics.

The question is whether these actions are able to reduce the cities' CO₂ emissions. The next section looks at the municipalities' action, and how the CCP reports on their member cities' performance. The issue here is not so much what the municipalities have done, but how the CCP views the results and what recommendations it makes.

2.3 Progress Report 1997

The year 1997 marked an important time within the climate change field with the meeting in Kyoto, Japan for the parties of the climate convention (COP). In July 1997 an interim report on the progress of the CCP campaign was submitted by the ICLEI to the Conference of the Parties and its Subsidiary Bodies. This report's purpose is to provide preliminary data and insights drawn from practical local government efforts to reduce greenhouse gas emissions (ICLEI 1997b). The report can thus be said to be an initial status and check on how the work was proceeding. The ICLEI also conducted an in-depth case studies of local government initiatives that appear to have been the most successful to date (ICLEI 1997c).

2.3.1 The Milestone Survey

As of 30 June 1997, the CCP had recruited 174 local government participants representing 100 million people worldwide. Urban CO₂ emissions occurring in these jurisdictions

³ Briefly, the different measures a municipality can adopt can be categorized as follows (Groven & Aall 2002:68-69): The hard category includes legal instruments, such as regulations; economic instruments, such as taxes and fees; and physical instruments, such as infrastructure for buildings or for constructing path or bike lanes. The middle category includes grants, planning, organisational and technological instruments. Planning could be overall plans for measures to reduce transportation or for using energy differently. Organisational instruments relate to routines in municipality operations such as procurement policies or environmental certification processes. Technological instruments relate to specific initiatives that are concerned with changes in the way we use energy sources. The soft category includes information and cooperation, such as providing citizens information about sustainable lifestyles and environmental behaviour and cooperative initiatives between different sectors in society.

accounted for about 5% of total global CO₂ emissions. A Milestone⁴ Survey was sent to all participants to ascertain which milestones they had completed. This phase was included in the interim report (ICLEI 1997b). The most important numbers and figures from the survey⁵ are as follows:

- 65 CCP participants had formally adopted a reduction target and timetable for its achievement;
- 31 CCP participants had completed all five milestones and were well on their way to implementing policies and measures to reduce CO₂ emissions.

Of the 178 cities in the campaign, 53 cities had by 1997 established reduction targets. Among those 53 cities, the results are as follows:

- 3 cities had committed to reducing their emissions by 30%,
- 5 cities had committed to reducing their emissions by 25%
- 42 cities had committed to the 20% reduction target
- 2 cities had committed to reduction targets of between 15% and 17%
- 2 cities had committed to stabilizing their emissions

In the report, the ICLEI lists the important insights gained from administering the milestone process (ICLEI 1997b). They state that most of the CCP participants appeared to be following through on their initial political commitments. Furthermore, participants set and adopted a target and timetable usually after careful deliberation involving a thorough analysis of local energy use and emissions, as well as quantification of the potential for energy use reductions locally. Many cities, as a first step, began to implement measures right away to build public support and to gain initial experience in energy efficiency retrofits before considering more comprehensive measures (ICLEI 1997b).

Initially then, the CCP campaign can be seen as a success: Cities that constitute more than 100 million people and represent 5% of total greenhouse gases had joined the campaign in the first four years. Furthermore, a large portion of the cities seem to be following through with their work, setting targets and timetables and following the milestone procedures. However, a closer look at some of the case studies gives us a more detailed view of what cities do and the problems they face in their climate protection work.

2.3.2 Reporting on the case-studies: The success stories

In December 1997, the ICLEI issued a report presenting case studies and examples of best practice from ten cities in the developed and developing nations⁶ (ICLEI 1997c). Focus was put on the cases in the developed world, and we present some of these results briefly below.

Since 1990, four cities – Copenhagen, Portland, Saarbrücken, and Toronto – have collectively invested upwards of \$30 million in energy advisory services and retrofits of

⁴ Once it has become a CCP participant, the local government should proceed to undertake and complete the five performance milestones. The milestones is a methodology that helps local governments to understand how municipal decisions affect energy use and how these decisions can be used to mitigate global climate change while improving community quality of life (ICLEI 2002d). The Milestones are as follows: 1. *Milestone*: Conduct an energy and emissions inventory and forecast; 2. *Milestone*: Establish an emission target; 3. *Milestone*: Develop and obtain approval for the Local Action Plan; 4. *Milestone*: Implement policies and measures, 5. *Milestone*: Monitor and verify results.

⁵ The initial survey achieved a 78% response rate from the campaign participants. (Responses continued to come in after this report (1997) was drafted.)

⁶ Some of these cases are also reported on in the Interim report, July 1997 (see ICLEI 1997b)

municipal buildings, facilities, and street lighting, which has achieved over 100,000 tonnes of CO₂ emissions reductions annually. The key to the success of these initiatives has been *partnerships* with state, provincial, and national governments, as well as with private financial institutions. Such partnerships have enabled the cities to raise significant capital for retrofits. Some of the other important initiatives or suggestions for future climate protection mentioned are as follows (ICLEI 1997c):

- Reductions in methane emissions due to initiatives to recycle, reuse, and reduce solid waste have made significant contributions to early equivalent CO₂ reductions.
- Local governments that own and operate their own utilities, such as Copenhagen and Saarbrücken, were able to reduce emissions significantly.
- Over the long-term the most effective initiatives to reduce transportation energy locally will be changes in local land use management that foster more compact communities, mixture of residential and commercial uses in the same neighbourhoods, and transit-oriented development

Another important lesson drawn from the performance are that local governments in developed nations that have made commitments to the 20% CO₂ emissions reduction target have been able to make significant progress since 1990 towards achievement of their targets. The cities of Copenhagen, Saarbrücken, and Toronto have reduced their emissions 7–22% since 1990.⁷ These cities were able to make significant progress because of strong local political commitment, fewer institutional barriers, imaginative programs, and municipal control over the electricity utility.

The CCP thus described the possibility of succeeding as possible – and they pointed to good results. Furthermore, in the Interim Report (ICLEI 1997b), the ICLEI stated that enrolling more local governments in climate work would be possible, and that reducing greenhouse emissions are good. The primary recommendation they gave for the COP is to negotiate aggressive targets and timetables for inclusion in the new legal instrument that would be finalized at Kyoto. Experience from the field suggested that the "Toronto target," a 20% reduction of CO₂ emissions from 1990 levels by 2005 or 2010, would be realistic and achievable at the local level. In sum, ICLEI's CCP offered good news for the COP and its subsidiary bodies. Because local governments are the level of government closest to the people, the growth of ICLEI's CCP campaign suggested that there was strong public support worldwide for climate protection policies and measures at the national and international levels (ICLEI 1997b).

2.4 A Shift in Focus

2.4.1 Local benefits of working with climate protection

It was argued above that prior to 1997 the *problematization* of climate change was established by CCP as a chain of reasoning starting with risks and knowledge and ending with local benefits. It was pointed out that the local benefits were not something that was argued with strong force. In the interim report (ICLEI 1997b), the CCP uses the empirical

⁷ Portland has reduced CO₂ emissions per capita, and it would have realized an actual emissions reduction of 3% had its electricity fuel mix not dramatically changed due to failure of a power plant.

data and asks why there is such a strong interest in climate change at the local level. The argumentation starts with the following:

Many local elected officials have informed themselves about climate change and have pondered the potential effects on their cities. Many coastal cities, like Copenhagen, for instance, are threatened by sea level rise [...] Many cities are covered by a thick blanket of polluted air. Local officials are beginning to understand the connection between temperature rises and air pollution. The formation of ground-level ozone, for instance, depends on the level of ambient temperature. In sum, the connection between local environmental threats and climate change is raising concerns among local governments.

The CCP here points to effects, and still claims that the awareness that they can be affected by climate change — to which they themselves have to a marginal degree contributed — will motivate cities to act. Moreover though, it is the intermingling of local pollution and the global threat that in sum motivates them to act. We thus see some of the same focus as mentioned in earlier CCP documents.

However, we can also identify a shift from earlier reports and declarations. Local benefits are given a more prominent place and argued with greater force in the Interim Report than previously. Local benefits are, according to the CCP, something that strengthens the initial interest for local government to work for climate change (ICLEI 1997b):

Once their level of concern has been raised, [local governments] quickly discover that initiatives to reduce greenhouse gases offer multiple benefits for the community, benefits that outweigh the financial costs. These include: -Reducing municipal budget costs and deficits; creating jobs; enhancing the competitiveness of local firms; improving air quality and public health; and enhancing the liveability of urban neighbourhoods

According to the CCP, the moral and ethical concern initiates action, but the benefits are necessary for keeping up the work. This issue is further stressed in the case report (ICLEI 1997c), where multiple benefits once again is mentioned.

In the case report (ICLEI 1997c), the CCP states that the climate issue has become interwoven with many other environmental and economic issues facing local residents, such as job creation, improving air quality, and enhancing the liveability of local neighbourhoods. One of the most important lessons from the case studies is thus that that protection of the climate really entails addressing many other local problems in a way that efficiency and thrift in the use of energy resources are significantly enhanced (ICLEI 1997c; 1997b).

The conclusion and recommendations that CCP give indicate a *broadening* of the scope of what climate change politics is all about. Linking climate change to local action and also emphasizing the local benefits shows that the climate issue has become a subject that can and should be used to motivate different kind of initiatives that is related to sustainable development and environmental protection.

2.4.2 Climate policy and realism

The interim report also indicates that working for climate protection is not an easy task. Studying how the CCP views the measures and instruments the municipalities have used in their climate work also reveals changes in the strategy. Drawing from the case report (1997c), the success stories focus on technological measures, stressing that those local governments that own and operate their own utilities, possess the single most important instrument needed. Through that mechanism, cities have succeeded in integrating district energy with end-use efficiency initiatives (ICLEI 1997c). Furthermore it is pointed out that *partnership* is the key to success. However, the CCP also stresses that more fundamental changes are needed — and that technology is not sufficient. Over the long term, the most

effective initiatives to reduce transportation energy locally require more overall planning and harder physical instruments in order to design communities that are more compact and that use less energy (ICLEI 1997c). Here, the CCP emphasizes that the challenge is not just related to technological fixes, but also requires a deeper form of change.

The CCP appears to have an ambivalent role in the climate change discourse. Although it strives to set ambitious goals, it operates in a context where certain *softer* measures like technology seem to be more favoured, and thus more feasible and realistic to apply.

2.4.3 Measuring climate policy in monetary terms

This ambivalence is also evident when it comes to the issue of costs and benefits, which is given a more thorough discussion in both the Interim Report (ICLEI 1997b) and in the Case Study Report (ICLEI 1997c), thus indicating that this is a problematic issue when working with climate policy. The CCP frames the climate issue in cost-benefit terminology, stressing that cities *gain* from prioritising climate change – environmentally, but also economically:

Indeed, money is not the problem. There is significant private capital available to finance energy efficiency retrofits, since they pay back handsomely, and municipal governments are generally low risk borrowers (ICLEI 1997c) [...] In the case of energy efficiency retrofit investments, the cities are not experiencing net costs, indeed, substantial energy costs savings being achieved are enabling the cities to reduce municipal operational costs and produce a healthier municipal ledger sheet (ICLEI 1997b).

However, the CCP also objects to the notion that everything be measured in monetary terms (ICLEI 1997c):

Otherwise, it is difficult to attribute costs to CO₂ reductions strategies, when the measures were designed to have multiple benefits. For instance, Copenhagen is investing about \$93 million to convert some of its power generation to natural gas from coal. One of the key reasons is to improve air quality, as well as reduce energy imports into the country. While greenhouse gas reductions are also a key reason, it is impossible to assign a weight to this reason. Many of the economic studies of the costs and benefits of greenhouse gas reducing measures are faulty, we conclude, because they do not adequately address this problem of weighting when multiple benefits are achieved by the measures. Indeed, many of these urban benefits are being overlooked by national governments - and industry - in their assessment of the economic pluses and minuses of reducing CO₂ emissions!

In its second recommendation to the Conference of the Parties (COP) under the United Nations Framework Convention on Climate Change (UNFCCC) (ICLEI 1997b), the CCP elaborates further on the problem that cost-benefit analyses are faulty when it comes to climate change. It recommends that the Subsidiary Body for Scientific and Technological Advice (SBSTA) encourage its members to pursue two directions of research with respect to cost-benefit economic studies of measures to reduce CO₂ emissions:

First these studies should encompass as many of the multiple benefits that local governments and residents are now enjoying if such benefits can be quantified [...]. Likewise they should include the potential costs of climate change impacts on the urban environment, such as higher morbidity rates from air pollution and higher mortality rates from urban heat waves. Second, such studies should be complemented with case studies of the non-quantifiable benefits that local residents are enjoying as the result of CO₂ reduction efforts. Such benefits include enhancements in urban liveability that foster, for instance, greater social harmony, more comfortable homes. More aesthetic street lighting and safer neighbourhoods.

2.4.4 Cities needing help

As shown previously in this chapter, the CCP portrays cities as being both part of the problem and part of the solution in the climate question. What do the reports say on the role

cities can play in the future on the climate issue? At the end of the Case Study Report, the CCP lists important lessons, elaborating on the difficulties cities face in their work. A concern for the CCP is that freer national and international energy markets are likely to confound local government efforts to reduce CO₂ emissions by (a) shifting electricity generation to coal as a primary energy supply, and by (b) reducing utility expenditures on demand-side measures, especially as investor-owned utilities cut costs in order to compete. This is already occurring in both Portland and Saarbrücken (ICLEI 1997c). Institutional, market, and political barriers are the key impediments to local government efforts to reduce CO₂ emissions in developed nation cities.

On the other side, in the Interim Report, the CCP sees a trend that will facilitate climate work. "A worldwide trend toward devolution of central authority to local government [...] will likely bolster the role of local government in protecting the climate" (ICLEI 1997b:6). The ICLEI still believes that local municipalities must and can play a role in climate protection – although in the run-up period to Kyoto in 1997, it emphasizes that municipalities need help from the international level and from national governments. Both in the Interim Report (ICLEI 1997b) and at the fourth Local Government Leader's Summit in Nagoya, Japan (ICLEI 1997a), it comes with recommendations to the parties to the climate convention. Based on experiences from the local level, the CCP suggests that a 20 % reduction of CO₂ emissions from 1990 levels by 2005 or 2010 is achievable at the local level. The recommendation to the COP is to stress the need to set aggressive targets, and the CCP states that a 20% target for Annex 1 countries is appropriate (ICLEI 1997a). With respect to the potential to carry out the reductions locally, it is emphasized that a 20% reduction target at the local level is possible only if "several key factors that are presently undermining CO₂ reduction efforts – such as the tendency of freer energy markets to favour the most carbon intensive fossil fuels – can be addressed by national energy taxes or regulatory solutions" (ICLEI 1997b).

Through the recommendations, the CCP emphasizes that cities are doing fine, but that they need help. Legally binding national commitments to reduce greenhouse gas emissions, if agreed-upon targets and timetables are ambitious, would significantly enhance and amplify local initiatives. On the other hand, weak national commitments risk undermining local government initiatives. Furthermore the CCP wants to emphasize that working for climate change is too important an issue for being looked at in narrow perspectives on cost and benefits.

It seems valid to argue that there has been a change in the CCP perspective, after the results from the Campaign show the difficulties cities meet, and after the international arena has become more important. The voice of CCP stressing the importance and seriousness of the climate issue – which was so strong in the beginning – is not replaced, but it is at least supplemented with a more conflict-based perspective. It is emphasized more and more that local governments need help in their work – and certain trends like the need to think about initiatives as costs and benefits and the liberalisation of the energy market are serious threats to local climate protection.

2.5 Some Recent Developments in the CCP

This section briefly indicates some of the more recent developments in the CCP campaign.⁸ No new reports or overviews of how all the member cities are doing in their work

⁸ A more thorough overview can be found in Lindseth (forthcoming).

have been issued, but national studies (for instance in the US and Australia) exist, and the CCP has also issued a number of case studies. This overview below will not focus on the results, but rather act as a short note on the more recent activities and issues that CCP has been focused on in the last years.

After the Kyoto meeting in 1997, the CCP has continued to give its input and recommendations to the parties in the UNFCCC. In these recommendations, the CCP continues to tell the parties how important the CCP work is, but it also gives perspectives on what should be done by the parties. The CCP has taken a stand on the use of the flexibility mechanisms, and states that national action needs to come first. Emissions trading must not undermine the importance of domestic action or weaken the commitments under the Kyoto Protocol (ICLEI 1998).

The focus on energy efficiency has been communicated both through various reports and conferences. One important conference was the European expert workshop – where ICLEI was co-organizer – called “Buy efficient – Public Procurement and energy efficiency” that was held in Strasbourg, France, September 2000. The report from the workshop discusses the available measures, the obstacles, the role of EU, nation states and municipalities, and addresses how to convince public bodies to purchase more energy-efficient products and technologies (ICLEI 2000a). In October 2000, ICLEI issued a report titled “Implications of the Deregulated Energy Market for Local and Regional Authorities”, following up on the previous concern for the difficulties this would have for climate protection. Under the subheading “Consequences for climate protection”, ICLEI claims that local authorities have many tools at their disposal to influence local energy use. However, it states, in most countries the ability of local governments to pursue these opportunities is constrained by national policies that favour large-scale, centralised energy solutions and that subsidise carbon-based fuels. The ICLEI concludes this section by saying that in the deregulated market, municipalities have less money available for climate protection measures. They will have to concentrate on those that are economically profitable (ICLEI 2000b). The ICLEI’s response to this is that local governments should continue to work with energy efficiency, renewable technologies and use economic measures such as taxes and fees to internalise the full cost of energy consumption.

Under the Johannesburg Summit, the problems municipalities face in working for sustainable development was stressed. Together with three UN agencies, the ICLEI hosted the Local Government Session at the summit. With more than 600 mayors and representatives from local authorities worldwide, the four-day session was the largest parallel event to the World Summit on Sustainable Development (ICLEI 2002a). At the summit, the “Local Government Declaration to the World Summit on Sustainable Development” was presented. According to the declaration, the local level has an important role to play in the future, since the national states cannot on their own centrally manage and control the complex, fast-moving cities of today and tomorrow. Only strong, decentralised local governments with sufficient power and ability are in position to do so. National governments thus have an important role to play in order to give them that possibility (ICLEI 2002b). The declaration views the effects of economic liberalisation and globalisation as posing a danger for this work. These effects are “felt most sharply at local level. [...] The negative impacts of globalisation are felt everywhere, but in particular in developing countries, and threaten to undermine the positive work of local authorities”. Furthermore in a press release issued just prior to the summit, ICLEI chairperson Kaarin Taipale stated (ICLEI 2002c):

Globalization and the strong influence of economic power centres without democratic accountability have not been counterbalanced by political leadership. If one were to redefine government as an effective agent for essential public objectives such as equity and sustainability, then it must be built on a solid local foundation, i.e. by strengthening local government.

The Johannesburg meeting confirms the previous role that the CCP and ICLEI have played as advocates for local government work for climate protection and sustainable development. They stress that local work for sustainable development is a success story, for instance exemplified with the fact that more than 6400 cities worldwide have instigated Local Agenda 21 processes (ICLEI 2002c).

In 2001, the CCP presented its goals for the period 2001–2006. The idea of working together with other levels of governance is reflected here (ICLEI 2001c). The need to strengthen regional and national campaigns is emphasized, as well as a desire to continue to represent the local government sector at international climate negotiations and other international forums. Furthermore, the CCP wants to strengthen its capacity to monitor and report on local government achievements, stressing the need to assist its members through focus on protocols and pilot projects and to further develop technical assistance.

Today, the CCP's web pages clearly show that the global character of the climate problem has been replaced with the emphasis on the *localness* of the problem. The "background" section on the CCP states (ICLEI 2002d):

ICLEI strives to provide cities participating in the CCP with substantial assistance in achieving their emissions reduction goals. Technical tools and information, training workshops, and overall assistance have been designed to link the global issue of climate change with air quality and other local issues such as energy costs, traffic congestion, waste management and community liveability. It is such links -- the overlap in the causes of air pollution and global warming pollution and the adverse impact rising local temperatures have on smog formation, for instance -- that *primarily motivate local leaders to participate* in a Campaign focused on climate protection. These links are especially important in developing countries where issues such as air quality, health, and economic development are pressing concerns. (Emphasis added.)

This statement stands in contrast to what was written up until 1997, where the risks were the way to argue for climate protection. A change was occurring in the Interim Report in June 1997. Here, the global risks and scientific knowledge-base were still recognised as the reason to act, but the benefits were seen as necessary for keeping up the work (ICLEI 1997b).

2.6 The Relevance of the CCP case for Climate Adaptation

The case of the CCP has provided insight into how cities and communities work with a global issue. The CCP perceives that efforts to protect the climate face barriers and structural hindrances, and this in turn forms an important background for discussing the possibilities of creating change within the climate discourse. In the introduction to this report, some similarities between climate-adaptation and climate-mitigation policymaking were pointed out. The first was necessity of creating an understanding that the climate issue is an important task for a community. This challenge emphasizes translating knowledge and science, and it emphasizes the "framing" of the climate question so that it is understandable and comprehensible for the inhabitants and actors in a community. The CCP case demonstrates that the CCP has communicated climate change by reference to a global threat. We have, however, seen that this notion that cities will be affected by climate change has been replaced by a focus on the "localness" of the problem: Reducing CO₂ emissions also means solving local problems, which can benefit the society. Building on this, what are the prospects

for climate impact and adaptation policymaking? How can information and knowledge about a global threat be translated and made relevant for a region or a community? What analytical tools are available for portraying how vulnerable a community is to climate impacts?

Furthermore, the *second* challenge we posed was that of actually starting to initiate action that addresses the problem. This is a matter of assessing risk and prioritizing between different policies. In this regard, what are brought to the fore through the CCP case are the difficulties faced in making the climate problem relevant in a world where many trends, such as liberalisation of energy markets and globalisation, hinder the work with climate protection. Will adaptation to climate change alter this? Or will adaptation also be a concern that “everybody agrees is important”, but something that we not yet (maybe because the threats are not perceived as that urgent at this stage) are ready to prioritize? Can adaptation processes create new possibilities for activating local interests and initiate local action? Chapter 4 discusses this in greater detail and compares climate change mitigation and climate change adaptation as strategies for change. First, however, the next chapter concentrates on climate adaptation and tries to shed some light on how sub-national regions have worked with this challenge.

3 CLIMATE ADAPTATION: EXPERIENCES FROM SUB-NATIONAL STUDIES IN NORTH AMERICA

3.1 Introduction

The by far most extensive overview of previous studies and existing knowledge on adapting to climate change is the IPCC's *Climate Change 2001: Impacts, Adaptation and Vulnerability*. This volume, which forms part of the Third Assessment Report (TAR), has been produced by Working Group II (WGII) of the IPCC and focuses on the environmental, social, and economic consequences of climate change and potential adaptation responses.

Since the Second Assessment Report (SAR) in 1996, research on climate impacts has grown considerably, and much has been learned in the past five years regarding the potential risk of damage associated with projected climate change (IPCC 2001). The value of adaptation measures to diminish the risk of damage from future climate change, and from present climate variability, was recognized in previous assessments and is confirmed and expanded upon in the new assessment. Although this report builds on previous assessments, including the SAR (IPCC 1996) and the IPCC's Special Report on Regional Impacts of Climate Change (IPCC, 1998), the TAR departs from them in important respects. In comparison to previous assessments, greater attention is given to climate change adaptation; multiple pressures on systems; links between climate change, sustainable development, and equity; and characterization of the state-of-the-science and confidence levels associated with key conclusions of the assessment (IPCC 2001).

The IPCC report is used here to set the stage for the more in-depth studies of climate adaptation, with a particular focus on the North American context. In the recent years, the North American nations have undertaken intensive region-specific assessments of impacts and vulnerability (Canada Country Study, U.S. National Assessment, regional case studies). Other arguments for looking at this region are that Canada and the US have comparable climate situations to Norway and do not differ much as to the level of welfare and institutional capacity. Furthermore, research results from North America (especially Canada) are easily accessible through numerous research institutions working with climate adaptation. The regional studies, however, cover much bigger geographical areas than Norwegian municipalities and with far greater populations. But if the scale and topography differs from the Norwegian context, there are other more general aspects on climate adaptation which are interesting to elaborate on: The studies give examples and insights of analytical tools for climate modelling and of stakeholder participation processes. With regards to transferring knowledge to the Norwegian context, this chapter compromises the characteristics of these projects and provides us with information on what it means to set climate adaptation on the research- as well as the political agenda.

The chapter starts with a general overview of the adaptation concept. The rest of this chapter focuses on planned and anticipatory adaptation, concentrating on studies of different scenario processes and how the public and various stakeholders have been allowed to participate in these projects.

3.2 Adaptation: The Concept

According to the IPCC, *adaptation* is adjustment in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. This term refers to changes in processes, practices, or structures to moderate or offset potential damages or to take advantage of opportunities associated with changes in climate. It involves adjustments to reduce the vulnerability of communities, regions, or activities to climatic change and variability (IPCC 2001). Most impact and adaptation studies to date have been based on climate change scenarios that provide a limited set of possible future climates—invariably specified as average annual conditions, such as temperature and moisture. Yet the climate change-related stimuli for which adaptations are undertaken (i.e., adaptation to what?) are not limited to changes in average annual conditions; they include variability and associated extremes (IPCC 2001).

Adaptation to rapid anthropogenic climate change may be a new challenge, but individuals, societies, and economies have adapted—in various ways and with various degrees of success—to changed and variable environmental conditions throughout history. Adaptations come in a huge variety of forms. Commonly used distinctions are purposefulness and timing. Autonomous or spontaneous adaptations are considered to be those that take place—invariably in reactive response (after initial impacts are manifest) to climatic stimuli—as a matter of course, without the directed intervention of a public agency. Planned adaptations can be either reactive or anticipatory (undertaken before impacts are apparent). In addition, adaptations can be short or long term, localized or widespread, and they can serve various functions and take numerous forms (IPCC 2001)⁹.

Planned adaptation is often interpreted as the result of a deliberate policy decision on the part of a public agency, based on an awareness that conditions are about to change or have changed and that action is required to minimize losses or benefit from opportunities (Pittock & Jones 2000). Autonomous adaptations are widely interpreted as initiatives by private actors rather than by governments, usually triggered by market or welfare changes induced by actual or anticipated climate change (Leary 1999). To what degree are societies likely to adapt autonomously to avoid climate change damages? Some studies show faith in market mechanisms and suggest considerable capacity of human systems to adapt autonomously (IPCC 2001). Other studies highlight the constraints on “optimal” autonomous adaptation, such as limited information and access to resources, adaptation costs, and residual damages; these studies emphasize the need for planned, especially anticipatory, adaptations undertaken or facilitated by public agencies (IPCC 2001).

3.3 Planned and Anticipatory Adaptation

Climate adaptation measures have been initiated for various reasons including; as a response to extreme events, gradual changes in socio-economic and/or the natural resources situation and planned scenario processes.

One example of an extreme event was in January 1998, when a severe winter storm struck; instead of snow, some areas accumulated more than 80 mm of freezing rain—double

⁹ It can be argued that the time-perspective is the essential aspect when discussing adaptation. In this regard “adaptation” differs from “coping”, since a common distinction is that coping is reactive and short-term, whereas adaptation is long term and can be either reactive or anticipatory.

the amount of precipitation experienced in any prior ice storm. The result was a catastrophe that produced the largest estimated insured loss in the history of Canada. The event served as a grim learning laboratory for the insurance and disaster recovery communities. It revealed the wide spectrum of insured and non-insured losses that can materialize from a single natural catastrophe (IPCC 2001). An example of a more gradual change is population growth coupled with water supplies that are limited, heavily utilized, and highly variable, as in the case in the Rocky Mountains-Southwest U.S. sub-region. One strategy that has been developed to cope with these issues is use of water banks (IPCC 2001). An example of adaptation as a response to a scenario process occurred in the Columbia River basin. Recent management and policy changes led to changes in system operations; fish habitat protection is now regarded as a high priority – on par with hydroelectricity production and flood control (Cohen et al. 2000). Estimates for three warming scenarios range from a small increase to a decrease of 16% by 2050, with an earlier annual peak, higher winter flows, and lower summer flows (IPCC 2001). Water resources managers and other stakeholders were interviewed in order to come up with suggestions as to how one could respond to the situation.

Since the focus of this report is to give background knowledge and pose important questions as to how Norwegian municipalities can adapt to future changes in climate, the focus in the rest of this chapter considers planned, mainly anticipatory adaptations, undertaken or directly influenced by governments or collectives as a public policy initiative. These adaptations represent conscious policy options or response strategies to concerns about climate change (IPCC 2001). Public adaptation initiatives may be direct or indirect, such as when they encourage or facilitate private actions (Leary, 1999). Planned adaptation by public agencies represents an alternative or complementary response strategy to mitigation (of net GHG emissions). Analyses of such planned adaptations are essentially normative exercises involving identification of possible policy strategies and evaluation of the relative merit of alternatives, as an aid to policy development (IPCC 2001). Research addressing future adaptations to climate change tends to be normative, suggesting anticipatory adaptive strategies to be implemented through public policy. Generally, such adaptation recommendations are based on forecasts of expected (though still largely unpredictable) climate change.

3.3.1 Scenario processes

Climate scenarios are concerned with understanding changes in natural and socio-economic systems that may be attributed to anthropogenically caused changes in the climate. Some scenario based studies focus primarily on limited aspects of physical impacts of climatic conditions on natural processes, whereas other studies also incorporate impacts on social and economic systems (Berkhout et al. 2002). There is currently a debate on the validity of climate scenarios. A central issue for dispute is whether they should be considered to be mere explanatory assessments of sensitivity or if they also can be used as predictions of the future. The standard response has been to search for more finely grained models, better data and the application of more powerful statistical techniques (Berkhout et al. 2002). No matter how (in) accurate they are, scenarios have been integrated in climate impact and adaptation studies at the sub-national level. The following section looks at some of these examples, particularly those from Canada. Canada's early response to climate adaptation can be linked back to the Changing Atmosphere Conference in Toronto in 1988, where

scientists warned the world's governments about the potential for a change in climate because of the increasing concentrations of carbon dioxide and other greenhouse gases. At the time, the Canadian government had just completed its first environmental action plan (Green Plan). At the Earth Summit in Rio de Janeiro in 1992, Canada signed the Framework Convention on Climate Change. It committed the country to stabilizing greenhouse gas emissions at 1990 levels by the year 2000. Canadian scientists were also eager to increase their knowledge about adapting to climate change. The Great Lakes, the St. Lawrence River Basin, and The Prairies were three areas in Canada selected by the scientific community for detailed study¹⁰ (Cohen et al 1997).

3.3.1.1 Two pioneering studies in Canada

In the Great Lakes–St. Lawrence region, scenario-based studies have been conducted over the past 15 years. They have indicated consistently that a warmer climate would lead to reductions in water supply and lake levels (IPCC 2001). A research project called the Great Lakes St. Lawrence Basin (GLSLB) project was initiated in 1992 to improve the understanding of the complex interactions between climate, environment and society so that regional adaptation strategies could be developed in response to potential climate change and variability (Mortsch & Mills 1996). Climate and hydrologic scenarios were developed for the GLSLB Project from the Canadian Climate Centre (CCC) General Circulation Model (GCM) and spatial analogues. Four climate transposition scenarios representing warm-dry, warm-wet, very warm and dry, and very warm and wet conditions were constructed from historical climate data from regions to the south and west of the Basin (Mortsch & Mills 1996).

The primary objectives of the GLSLB Project were (i) to identify and assess the physical, biological, social and economic impacts of climate change and variability; (ii) to identify and evaluate strategies for adapting to possible impacts; and (iii) to develop, test and apply methods that would integrate and link multiple disciplines as well as incorporate adaptation responses into climate impact assessments. The research focused on four climate-sensitive theme areas: land use and management, ecosystem health, water management and human health (Mortsch & Mills 1996).

The second case study of the regional impacts of climate change, which the Canadian research community focused on, was the Mackenzie Basin Impact Study (MBIS). The basin is a watershed that extends from the mid-latitudes to the subarctic in northwest Canada. The Mackenzie Basin was chosen for a case study in order to look at a high latitude or northern region which had sensitive ecosystems and a large number of aboriginal people who were still following the traditional ways or lifestyle. This area, which includes parts of the Yukon and Northwest Territories as well as northern British Columbia, Alberta and Saskatchewan, has experienced a warming trend of 1.5 °C this century. Scenarios of climate change, based on experimental results from General Circulation Models of the atmosphere, suggest that this region could warm up by 4 °C to 5 °C between the 30-year base-line period of 1951–1980 and the middle of the 21st century. The question was: How would an economy which was based on natural resources and a Northern culture cope with climate warming? How could they deal with the changes which were expected to be the most significant in the world? (Cohen et al 1997). The MBIS framework was developed in two distinct phases. The first was the pre-research phase, from 1989–1992. The second was the research and consultation

¹⁰ The Prairies region was a candidate for a research project, but research was not undertaken (Mortsch 2003).

phase, 1992–1997, in which researchers and stakeholders shared their views on both science and policy issues specific to the Mackenzie Region. Within this process, several types of integration exercises were used, including models, stakeholder consultation, and thematic discussions.

3.3.1.2 Regional assessment in the US

In the United States, 19 regional assessments were initiated in 1997 nationwide as part of U.S. National Assessment of the Potential Consequences of Climate Variability and Change, a study initiated by the U.S. Global Change Research Program. The regional assessments provided input to the National Assessment Synthesis report 2000 (Fisher et al 2000). One of these regional projects was the Mid-Atlantic Regional Assessment (MARA), which aimed to analyze and evaluate the potential consequences of climate variability and change for the Mid-Atlantic region's people and resources, in the context of other existing and anticipated pressures. The MARA project also – as the cases above – founded its research on climate models. To guide development of climate scenarios and provide comparability across the many regions of the National Assessment, output was provided from two state-of-the-art global climate models: the Hadley model, developed by the Hadley Centre for Climate Prediction and Research in Great Britain, and the CCC model, developed by the Canadian Centre for Climate Modelling and Analysis. Both models project climate change as model experiments in which atmospheric greenhouse gases are increased by 1 percent per year. Using two different General Circulation Models (GCM) give a range of possible climatic outcomes for the MAR. Output from the GCMs was used to construct 10-year climatic averages for two periods of time: 2025–2034 (or “2030”) and 2090–2099 (or “2095”) (MARA 2000). In the MAR project, the assessments of climate change impacts on each of the “key topics” used the Hadley and CCC scenarios to represent a range of possible changes in temperature and precipitation. The MAR project also used data provided by the National Assessment for population, employment, and income in the Mid-Atlantic region through the year 2050. As a preliminary step in the assessment process, a regional scoping workshop was held at Penn State in September 1997. The workshop brought together a broad spectrum of interested parties from academia, industry, government, and environmental organizations. Goals of the workshop were to (a) identify and discuss potential climate impacts in the context of other stresses on the region; (b) ascertain what is known now and what needs to be known in order to make informed decisions in response to opportunities and challenges posed by climate variability and change; and (c) determine early actions designed to address the potential impacts of climate change and climate variability. As part of the National Assessment, MARA analyzed and evaluated what is known about the potential consequences of climate variability and change for the Mid-Atlantic region, in the context of other existing and anticipated pressures (MARA 2000).

3.3.1.3 Two recent studies in the Georgia Basin

Among some of the more recent studies is the Georgia Basin study in Canada. The project seeks to provide a better scientific understanding of the vulnerabilities of human and ecological systems to climate change, and thus provide a sound scientific basis for decision-making on climate change adaptation (Yin 2001). The project developed an integrated assessment (IA) approach to identify the societal vulnerabilities to climate scenarios. The approach that was used integrated climate change impact assessment, vulnerability

identification, adaptation option evaluation, multi-criteria decision-making and multi-stakeholder participation (Yin 2001). The impact assessment is built on many years of research experience in integrated climate change impact and adaptation studies in the Mackenzie River Basin, and Great Lakes Basin in Canada. The climate scenarios applied in this study were selected in a manner that is consistent with the national sets of scenarios that are being produced by the Canadian Climate Impact Scenarios facility (see Barrow 2000). Scenarios were designed representing different climate change conditions. Vulnerabilities were identified from several different sources including the following: existing data from previous studies on climate change impacts, government documents, consultant reports, and scientific literature. In addition, additional expert consultation and computer modelling efforts were employed to fill some of the data gaps for key sectors that are sensitive to climate change (Yin 2001).

Another study, in the same region, started in 1998 and is due to finish by the end of 2003. The Georgia Basin Futures Project (GBFP) does not explicitly focus on climate impacts and adaptation, but it uses scenario tools to explore alternative development paths for the Georgia Basin. The project explores how in the next 40 years, citizens can learn to live within the limits of natural ecosystems, while improving human well-being in the Georgia Basin region on the west coast of British Columbia. The project aims to increase the level of understanding of how complex ecological, social and economic systems interact and to discover new ways of achieving a sustainable future for the region. A scenario model known as QUEST is used as a means of facilitating discussion with stakeholders on such paths. The model would be used as a game so that “players” could see the future consequences of current and near-future actions in this region. QUEST shows each person how their consumer and policy preferences affect the Basin’s future over the next forty years. The model uses the following four steps: (1) Invent a Future – by considering world views, values, goals and targets; (2) Choose policies in transportation, housing, lifestyle, land use, government, industry, etc.; (3) View consequences of their policy choices at the end of each decade; (4) View the overall 40-year scenario (GBFP 2003). Researchers will be working to bring the climate change issue into the QUEST model and the subsequent outreach activities with stakeholders, and in this way there is “a unique opportunity to assess the impacts of global climate change scenarios on regional development” (GBFP 2003).

3.3.2 Dialogue and participation in climate adaptation processes

Various projects have attempted to involve stakeholders and the public in a variety of ways – ranging from inviting stakeholders or professionals within certain sectors to comment on technical issues like water management, to inviting as many affected people as possible into the project and letting them discuss the region as a whole. In certain projects, stakeholders have participated throughout the project period; where in others they have only taken part in certain periods or in the discussions on some issues. Stakeholders have also contributed to writing reports and evaluated the drafts or plans.

3.3.2.1 Framing the issue: Asking some fundamental questions

In the Great Lakes–St. Lawrence Basin, adaptation research was incorporated into the project to begin addressing questions such as the following: What is adaptation? Why should society adapt? How does society adapt? How can adaptation responses be developed and

assessed? What are the barriers to implementing adaptation strategies? (Mortsch & Mills 1996). Workshops held in Quebec City and Montreal during 1993 established support, research interest and expertise for the study. Four climate-sensitive themes, developed by a steering committee, were supported: water management, ecosystem health, human health, and land use and management. The workshops also identified a number of study concepts for each theme area centred on contemporary and potential environmental and social issues. Together with the Great Lakes Environmental Research Laboratory, project staff worked on organizing and preparing for the final GLSLB Project Symposium in Toronto (Spring 1997). The final Symposium and report was designed to examine, debate, and document the impact and adaptation results of all studies which have been conducted to date. The symposium brought together researchers and stakeholders to discuss the potential impacts of and responses to climate variability and change. All working groups at the symposium identified the critical need for better communication of what is known and not known about climate change impacts and adaptive responses (Mortsch et al 1998). Furthermore, all working groups also expressed a concern about the limited participation of affected stakeholders in setting research agendas and in assessing the acceptability of certain impacts and adaptation. It was emphasized that participation is necessary to determine whether researchers and planners are asking the questions that matter to people, and whether adaptations (or costs) are acceptable to those who may be asked to bear them (Mortsch et al 1998).

3.3.2.2 Sector specific participation: Water management

Water management is an important concern for many of the impact and adaptation projects. The Columbia River Basin study is an example of more limited stakeholder participation, focusing on including the water resources managers and other stakeholders in the upstream portion of the Columbia, on the Canadian side. Their responses were focused on technical issues like discussing or commenting on possible impacts. They noted, for instance, that flood risk would not necessarily be reduced because upstream storage facilities may release a substantial amount of discharges for fish habitat protection or other reasons. Similarly, irrigation supply and hydroelectricity production would be reduced because of lower annual flow combined with fish protection requirements. In these circumstances, regional utilities might have to purchase electricity from fossil fuel sources, thereby affecting the region's ability to meet GHG emission targets (Cohen et al. 2000).

3.3.2.3 Broad participatory processes in the sub-arctic region

In the Mackenzie Basin study, a number of threats to the Mackenzie landscape and nature were identified. The six-year cooperative study represented one of the first attempts at an integrated regional assessment of climate change (Cohen et al 1997). Different groups were interviewed and brought into the process. Two exercises dealt with individual perceptions of aboriginal responses to future scenarios. The first asked for a listing of physical and biological impacts, as well as how aboriginal people would be affected if they continued to pursue a traditional aboriginal lifestyle or if they became more active in the formal wage economy. Results showed that perceptions of impact and vulnerability were influenced by visions of future lifestyles (Cohen et al. 1997). The second exercise used input-output modelling and a community survey to look at responses to a potential benefit of warming—an opportunity for expanded activity in the formal wage economy (because of the

longer summer) that would force people to relocate from their traditional community if they wanted the employment. Results showed a willingness to accept the opportunity, but there were concerns about social impacts on the community of relocation or creation of commuter workers who would be absent for extended periods (Loneragan & Kavanagh 1997 in Cohen et al. 1997).

One of the more interesting aspects of the study was that scientists from many disciplines and stakeholders from the region worked on it together. Not surprisingly there were problems. When the study began in 1990, it was difficult to get regional governments, aboriginal communities and private sector industries actively involved. But their interest and participation increased over the next few years (Cohen et al. 1997). The stakeholders included representatives from aboriginal organizations, colleges, institutes, industries and all levels of government. The stakeholders' replies to the "what should be done?" question ranged from reactive to proactive. This question was a hard one which defied simple answers, and which was further complicated because of its link to the challenge of sustaining the ecosystems and communities in this region, and elsewhere. All the discussions centred on five themes: interjurisdictional water management, sustainability of ecosystems, economic development, maintenance of infrastructure, and sustainability of aboriginal lifestyles (Cohen et al. 1997). Throughout the period of the project, stakeholders were asked to react to the various research results through thematic roundtable discussions. At the final workshop, there were six rounds of such table discussions. Stakeholders were asked whether or not the scenario of changes and effects which might occur if the climate changed would make a difference to their visions of the future, and if so, how should the region respond? A number of recommendations for future adaptation possibilities were given (Cohen et al. 1997).

3.3.2.4 Bringing stakeholders together in an Advisory Council

In the MARA project, broad-based stakeholder participation was encouraged at each stage of the assessment. An interdisciplinary Pennsylvania State University (Penn State) team led the first MAR assessment of climate change impact. The core team included 13 faculty members, 6 post-doctoral or associate researchers, 33 graduate assistants and 11 undergraduate interns. However, what is unique here is also the broad collaboration with stakeholders. The appendix of the report is a detailed description of how the work has been carried out and overview of all the participants. More than 40 stakeholders took the time to prepare comments on the overview draft (MARA 2000). A number of workshops were produced throughout the period. Workshop goals were to summarize scientific agreements as well as uncertainties and the role of the news media in communicating about climate change. The workshops also elicited stakeholder input about what types of potential impacts they could envision or were of concern (MARA 2000). A stakeholder Advisory Council was established to ensure that interactive communication would be a routine part of the MARA. The intent behind the Advisory Council was to form a group that was small enough to focus constructively on a set of important issues, yet large enough to represent the group likely to experience substantial impacts in the region. Attention focused on enlisting representation from two groups: 1) those most likely to be affected, and 2) those expressing particular interest in the process. In total, the group had 92 members distributed accordingly: 25 from citizens groups, 19 from business and industry, 22 from state and local government and commissions, 13 federal government researchers, and 13 academic researchers. The identification processes was informal and broad. Individuals and groups that had expressed

scepticism as well as those supporting actions to reduce GHG were identified. The stakeholders gave feedback on the preliminary drafts of the assessment report, offered advice and disseminated results to a wider audience (MARA 2000). The MARA project concludes that the stakeholders provided important input to the assessment. The assessment was thus revised several times and new issues were added. The stakeholders also told the research group that the analysis plan and the draft document reflected their concerns (MARA 2000).

3.3.2.5 Integrating climate adaptation and sustainable development

In the Georgia Basin study, the research effort included a series of workshops and internet-based surveys with participation by a broad range of public and private stakeholders. The stakeholders were invited in to relate impact information to decision-making and to select desirable measures among alternatives (Yin 2001). In the study, alternative options were evaluated by relating their various impacts to three broad sustainability goals. Stakeholders were asked to compare alternatives and determine their relative preferences or relative importance of each alternative. Stakeholders could therefore specify their individual importance in reducing climate change vulnerability in the Georgia Basin, and could then compare specific adaptation options according to their relative effectiveness at achieving each goal. The end result of this process is a prioritized ranking indicating the overall preference each of the adaptation options (Yin 2001).

3.3.2.6 Using technical tools to enhance learning and dialogue

The Georgia Basin Future study is scheduled to finish by the end of 2003 and results are only preliminary (Robinson 2001). The project has community involvement as one of its main goals. In combination with community partners, including government agencies, business, and NGOs, the project will use a number of research tools designed to be used in participatory settings, including the computer modelling/gaming software QUEST. In this way, expert knowledge will be combined with those public attitudes, beliefs, preferences and values in the creation of a new, third form of knowledge that represents the fusion of its two constituent parts (GBFP 2003). The project tries to create a two-way dialogue between the project and its users. These values and beliefs can then be incorporated into QUEST. In turn, users and actors will have the opportunity to learn more about the interactions between society, the economy and the environment, and gain an understanding of the trade-offs between these components (GBFP 2003).

3.3.3 Impact and adaptation processes: So what?

The examples above give an indication of the character of the work already being conducted within this field. The question that has to be asked, however, do these studies actually lead to any measurable changes? The impact and adaptation processes studies give few or no evidence of actual policy change resulting from these processes. One reason might be that these processes are still in their early stages, and that discussion is still focusing on what the range of possible adaptation measures are. Another interpretation might be that the absence of thorough policy changes reflects the opinion that climate adaptation still not is viewed as a task that requires immediate attention. Some of the studies are also explicit about the limitations of their study. For example, the point of the MARA

project was not to change policy, but to provide more information and to change opinions. The MARA findings suggest win-win actions that would have substantial benefits even if the climate stays the same, plus a bonus of making the region more resilient to climate change. Many of these win-win strategies will be cost-effective even in the absence of climate change but have not been high on society's agenda. Strategies suggested would reduce risks from several environmental stress factors – including climate change (MARA 2000). In the Georgia Basin Future project, the main goal of the policy analysis component is to refine the conceptual framework of the project and to undertake sector-specific analyses of sustainability strategies for the Georgia Basin to 2040. In the Mackenzie Basin, the discussion about what steps participants could take to adapt to climate change and to protect the ecosystem included the need to improve communications between scientists and stakeholders, a better understanding of the information requirements of the people who made decisions, and a greater appreciation of traditional knowledge.

Linda Mortsch at the Adaptation and Impacts Research Group (AIRG) at the Environment Canada states that working with climate adaptation has been a tremendous challenge for the research community in Canada, and that the first steps were to develop awareness of the impacts of climate change and establish that climate change was an important issue that deserved attention (Mortsch 2003). As the results from the different processes elaborated on in this chapter have shown, the challenge is still first and foremost to raise awareness among the general public so that they acknowledge the issue of climate change as important, and would want to think further about what should be done about it within their sphere of influence. Although there are few examples of climate change considerations being included in planning and decision making, Mortsch points to a number of effects that have come out of work with climate adaptation. In the Great Lakes–St. Lawrence project, the information has been transferred to other authorities such as the Grand River Conservation Authority (GRCA). The group who carried out the project has secured additional funding to further explore issues of adaptation. Another project in the Trent-Severn Watershed linked with a consortium of environmental groups for cleaning up the watershed through public presentations. Together they formed a climate change group which secured funding for public outreach (Mortsch 2003). Mortsch emphasizes that impact and adaptation processes seem to be most successful in the water resources field, but that health may soon be emerging as another area where a difference can be made. So far they have not made the case that climate change is important in this area (Mortsch 2003).

This chapter has gone some way in exemplifying the means and methods of how climate adaptation processes and projects can be organised and carried out. The case studies as a whole show that putting climate adaptation on the agenda in Norway most likely will require a conscious effort from both research community and decision makers over a long period of time. Thus – the final words from the Mackenzie Basin study, illustrating the challenges ahead, provide a fitting closing remark for this section (Cohen et al. 1997):

The effect of a change of climate on the Mackenzie Basin is more than the sum of changes to the trees, wheat, water and permafrost. Governments, communities, industries and people will respond to the combined effects of climate change on water and land resources. These responses will be tempered and shaded by the choices government officials, community residents and industry leaders make in response to other issues such as the demands of the global economy, traditional lifestyles and political realities. Computer-based models are one way to bring together or integrate many parts of the whole, but these models are limited in their abilities to describe how regions and people relate to climate change and other stresses. The experience of MBIS suggests that an integrated assessment requires a partnership of stakeholders and scientists, in which visions are shared and respected, and information is freely exchanged.

4 ADAPTING TO CLIMATE CHANGE IN NORWEGIAN MUNICIPALITIES: CONSIDERATIONS ON THE CHALLENGES AHEAD

This final chapter focuses on the two challenges put forward in the beginning of this report. *First*, how to create an understanding that the climate issue is an important task for a community; and *second*, how to integrate climate change considerations into policy. Section 4.1 addresses the first challenges by discussing the problems and prospects of communicating climate change, whereas section 4.2 discusses the second challenge. Here the focus is on the consensus-building process of deciding on what adaptation measures and initiatives that can be undertaken in a community. In this section, we start with discussing multilevel governance and the problems that CCP faced in their work for climate mitigation. This is important for showing that it is *not* just about reaching a consensus on what to do, but it is also a question of how ambitious cities can be, or “what level” of consensus it is actually possible to reach. The difficulties cities face in their work raises the question of what the appropriate scale for climate adaptation is. Towards the end of this section (4.2.4), we point to some important democratic challenges of working with climate adaptation.

The aim of this chapter is not to provide solid answers, but rather to pose some more fundamental questions that are relevant for the Norwegian context. The chapter does recommend that climate adaptation should be looked upon as embedded in a broader debate for sustainable development. Normative elements are also emphasized towards the end of this chapter, when I synthesize some of the lessons learned, and propose some ways to enhance the climate adaptation process.

4.1 The Communication of Climate Change

4.1.1 Climate change and risks

In this report the CCP has been used as an example of an actor that attempts to communicate risks of climate change in order to get cities to act. During the last decade, concern for the risks our societies face have been linked to the debate on modernity, primarily through the work of Anthony Giddens (1990) and Ulrich Beck (1992). In a climate change context, it has been discussed to what degree the concept of risk and communicating risks has an effect on peoples’ perception and on their motivation to act (see Thompson & Rayner 1998 for an overview of this debate). Research on risk emphasizes that it is a highly constructed concept, subject to narratives of the world and who we are (Thompson & Rayner 1998). The climate problem can be placed within this risk debate. Although it is broadly recognised that the IPCC is correct when it claims that we are in a process of global warming, there is a complex heterogeneity of the actual climate change discourse. There are a number of competing ideas about nature, about equity, about resilience and vulnerability (to mention but a few aspects) that constitute this discourse. The CCP as a network has placed itself within this risk debate, where especially threats to health are viewed as an important

reason for taking climate change seriously. The crucial link that the CCP does establish is the notion that a global risk should motivate local action. Some comments on this are necessary.

Several studies emphasize that lay people tend to confuse global warming with other environmental problems, such as ozone depletion (Thompson & Rayner 1998, MARA 2000, Andrey & Mortsch 2000). For many people, climate change is part of a wider problem concerning humankind's disturbed relationship with nature. In this sense, climate change and ozone depletion are the same thing; they are members of the category of environmental insults deriving from industrial society (Thompson & Rayner 1998). Research on the emergence of this new environmental paradigm has already been quite successful in relating environmental behaviour to underlying belief structures. Building on this, Thompson and Rayner (1998) trace the perceptions, of both the experts and the laity, to variations in forms of *social solidarity* (ways of binding ourselves to one another) and to the *collective representations* (shared way of knowing) that these forms of solidarity both generate and are in turn supported by. The point they make is that it does not make sense to separate expert/lay distinction on what risks really are from what the public erroneously believe them to be (Thompson & Rayner 1998).

The experience of the CCP shows that risks do not necessarily have to be presented in a way that is scientifically accurate, and that it is not necessarily sufficient and "correct" information on the problem that motivates people to act. In line with this, Bulkeley's (2000b) studies of public understanding of climate change in Newcastle, Australia, suggests that local knowledge, values and moral responsibilities are more important than scientific information when it comes to motivating action. What the CCP is trying to do is to make the risks relevant by saying that cities are the first to notice the effect of climate change, and therefore they should cut down their own emissions. This communication strategy could easily be countered by economic theory stressing incentives to act, since there is no clear link between a city's emissions and its perceived global warming or impacts of global change. The local problems, like air quality and health problems that people feel today, could also be linked to local problems, like too much traffic. However, the CCP frames and sees these problems as global ones; the traffic is first and foremost a problem for climate change, but reducing traffic will also solve a local problem. The narrative on climate change told by the CCP is one where scientific knowledge forms the background, but not one where knowledge claims and accurate scientific information is important to motivate action. It is rather a narrative that tries to construct a picture of how vulnerable we are as people living in the city.

4.1.2 Adaptation to "what"?

Adaptation to climate change, however, adds a dimension when it comes to relying on science in order to motivate action. If we talk about planned and anticipatory adaptation, then a precondition is that we know what we are to adapt to. Scientific research and climate scenarios thus become more important than when discussing mitigation (where we try to avoid climate change by choosing from a number of means that all have the effect of reducing CO₂ emissions). A not too bold hypothesis is that there is a better prospect for mobilizing stakeholder interests and concern if climate change impacts can be demonstrated "on the ground," in familiar locations, and upon landmarks and businesses, than if impacts only were linked to the global threats and not presented specifically to certain locations (as in the case of the CCP). Climate impact and adaptation thus can make the climate issue more tangible and "real" for stakeholders in a way that a global-scale impact would not do

(Shackley & Deanwood 2002). An important question when discussing adaptation is then, how much do we know about how climate will change in “our” region or municipality? Several issues seem problematic in this regard.

First, the climate change that we can expect in the future will depend upon how well we are able to reduce our CO₂ emissions. For instance, a potential technological breakthrough with regard to new form of renewable energy could dramatically reduce our CO₂ emissions. This in turn will have consequences for how severe the climate impacts will be. Moreover, the IPCC’s scenarios for the year 2100 range from 1.7 to 5.8 °C, indicating that the impacts could be anything from moderate to quite dramatic. *Second*, one thing is gradual changes; another thing is variability and extreme events. Downing et al. (2001) conclude that predictions of future climate hazards, at useful temporal and spatial scales, are insufficient for planning specific adaptation measures. For example, the uncertainty in climate change is likely to overwhelm algorithms to calculate the costs and benefits of measures such as larger water supply reservoirs or calculate protection from floods (Downing et al. 2001). *Third*, although considerable progress has been made in the modelling of climate change effects on first-order systems such as regional hydrology, less effort has gone into modelling, or even speculating on the subsequent effects on second-, third-, and fourth-order economic and social systems (e.g., agriculture, trade balance, and national economic development) that are affected by (changes in) water (Chalecki 2000). *Fourth*, with Norwegian municipalities in mind, there has been an increased demand for down-scaled models of climate change and rapid improvements in computer technology recently, but assessors have not been able to keep up with the growing demand for more useful, higher resolution models and data (Cash & Moser 2000). This does of course pose a problem for local managers and the community as a whole, which needs to act on the basis of these models. The models and explanations lack credibility for local and regional decision-makers. Furthermore, there is a dearth of relevant outputs that are useful to and useable by regional and local decision-makers (Cash & Moser 2000).

In Norway information on climate impact is first and foremost available through the RegClim project, which is a cooperative research projects with 6 Norwegian institutions taking part.¹¹ RegClim started up in 1997, and before that regional climate modelling in our area had been practically absent. Norwegian climate modelling is thus in its early childhood, with a vulnerable competence (RegClim 2003). We still have a long way to go before we can provide local decision makers in Norway with credible (or at least more relevant) information that they can use for planning. Drawing from the section above, communicating climate adaptation may not be any easier than communicating climate mitigation because, in the words of Mortsch; How do you communicate a complex issue that has no real sense of urgency, where there are many uncertainties in science, and for which there are no easy solutions? (Mortsch 1998). In the case of climate change, science may then not be able to supply the desired resolution of climate information in the near future. In the meantime, however, decision-makers must find the types of policies and management strategies for which scale-specific, adequate information already exists. In the studies I have looked at,

¹¹ Participating institutions are: The Norwegian Meteorological Institute, Institute of Marine Research, Institute of Marine Research, Geophysical Institute - The University of Bergen, Department of Geophysics - The University of Oslo and The Norwegian Institute of Air Research. There are two overall aims of RegClim. The first is to estimate probable changes in the regional climate in Northern Europe, bordering sea areas and major parts of the Arctic (“our region”), given a global climate change. The second is to quantify, as far as possible, uncertainties in these estimates, inter alia, by investigating the significance of regional scale climate forcings pertaining specifically to our region (RegClim 2003).

scenarios have been used, and – as faulty as they might be – they have still been instrumental in initiating action and pointing the actors in certain directions.

4.1.3 Science and democracy

The studies looked at in this report more or less use the same analytical tools. They draw from climate and hydrological scenarios from national climate assessments, like the Canadian Climate Centre (CCC) and General Circulation Models of the atmosphere. They are further applied to the specific region and different scenarios, such as warm-dry, warm-wet, very warm and dry, and very warm and wet conditions (see GLSLB-study). What the scenarios have in common is that they are used as an initial “screening” to direct the actions and the discussions on adaptation in to certain topics or subjects. Thus they provide important background information for discussing what to do next. The studies have also resulted in the development of interesting new tools, such as the QUEST model in the Georgia Basin Futures Project. Computers/gaming used in schools and for the public allows information about the climate to be presented in an understandable and interesting way. The problem of communicating, especially between experts and lay people, which for instance was raised in the Mackenzie Basin study, is a problem where technical tools such as computer visualising/gaming can prove to be helpful. There is still probably a great need for spreading more information on climate change. In the MARA project, people were asked about the likelihood of the potential changes in climate (MARA 2000). The results show that a minority is certain that the threat is real, an even smaller minority certain that the threat is bogus, and the largest group of sceptics looking for more certainty. The same survey states that only 9 per cent of those sampled consider themselves well-informed about climate change, and misinformation is widespread. Uncertainty combines with perceptions of large risks suggest that the public is likely to be receptive to climate change information, especially when the information is about possible impacts.

“Public understanding of science” is a field that raises some important democratic questions. The Georgia Basin Futures Project (GBFP) and the use of the QUEST model is a good illustrative case. Most of the researchers involved in the project are advocates of a sustainable future; they are representatives of many departments and three universities. Courteney Hall et al. (2001) ask who the GBFP is attempting to represent and whether it is possible to separate between the role of citizens and the role of the researcher/educator. Courtenay Hall et al. (2001) see a danger in the assumption that people have to be trained to find the correct path towards a sustainable future. The authors state that people are likely to be misrepresented when we assume that we understand people’s relationship to and philosophy about the environment. The problem that Courteney Hall et al. (2001) point to is an important one to consider when discussing climate impact and adaptation. It is one thing that the problems we face are serious, but a different issue is whether and to what degree people are allow to decide for themselves what to do about it. In separating out the role of scientific and technical expertise in the policy process, policy formulation becomes increasingly technocratic, with science given a major role and lay public are often labelled as ignorant, or incapable of handling the scientific complexities which guide decisions (Keeley & Scoones 1999). Climate adaptation processes thus are in danger of undermining public responsibility and a key aspect becomes how one can empower citizens. Bäckstrand (2002) is discussing this issue in her paper “Civic Science for Sustainability. Reframing the Role of Scientific Experts. Policy-makers and Citizens in Environmental Governance”. The concept

civic science is used interchangeably with participatory, civil, citizen, stakeholder and democratic science, which all are catch words that signify the ascendancy of a participatory paradigm in science policy. The notion of civic science prompts us to rethink the relationship between science, knowledge, democracy and environmentalism. Civic science is a highly contested term, and it is debatable whether there is any point in using the word “science” to refer to the knowledge actors use in these participatory processes, but in the wake of the legitimacy crisis of scientific expertise, civic science has been advanced as a solution to reverse the growing public distrust in science (Bäckstrand 2002). The version of civic science as democratization suggests that scientific norms, institutions and procedures need to be reformed in accordance with democratic principles. In the wake of this, we can turn to climate adaptation and start thinking about some of the most urgent questions that arise:

- What are the boundaries between scientific expert knowledge and lay knowledge? Is it defensible to privilege scientific knowledge over other knowledge forms?
- Should citizens be invited to discuss the climate models or the scientific foundation they build on?
- Should citizens participate in the scientific problem formulation or assessment; or should the citizenry be confined to deliberations about the *use* of the scientific knowledge on climate impacts?

It is especially important for Norway – where climate adaptation yet is to hit the political agenda – that such questions are posed and tried answered before one proceed with more concrete projects and plans.

A possible answer for many of these questions could be to establish *boundary organisations*. Cash & Moser (2000) discuss the interface of science and politics and the tensions that emerge when science is brought into the policy arena. The challenge is to maintain scientific credibility while assuring political saliency. They propose that boundary organisations, institutions that straddle and mediate the divide between science and policy, be established to help in this task (Cash & Moser 2000). In the boundary organisation model, rather than being passive recipients of information, decision-makers are involved in the creation and maintenance of the relationship with scientists, the science–policy boundary and technical output. Consequently, boundary organisations can function as important information brokers that “translate” scientific information.

A typical problem that these organisations would have to address is the notion that climate change does not become truly interesting to stakeholders until the impacts of recent droughts, flooding, fires, storms, intensive rainfall events and so on become evident (Shackley & Deanwood 2002, IPCC 2001). The belief in anthropogenic climate change becomes coupled for the stakeholders with the experience of short-term variations, even though the scientific case for such coupling is far from robust (IPCC 2001a in Shackley & Deanwood 2002). This poses a great ethical worry for researchers and activists working with climate change. There is a possibility that positive impacts of climate change may be disclosed or hidden in order to draw attention to the seriousness, threats and the risks of climate impacts. Consequently, how climate impact is defined and how definitions of dangers and risks are portrayed can not only change societal and individual perceptions, it can also have an impact on the way climate change is studied.

What comes to fore here is keeping in mind the social construction of the climate case. Climate change rests on scientific (but uncertain) facts, but facts should be recognised as

being embedded in broader moral discourses about who we are. The scientific evidence provides good strategic and explanatory *opportunities* for stakeholders and citizens, but the precise meaning is constructed within dominating perceptions of society and institutional values. This makes a strong argument for understanding more, not just what danger and risks are as an “objective” measure, but also understanding the *perceptions* of danger within the public and the different stakeholders. Yet again, there is a clear need for involving stakeholders in designing and undertaking research so that researchers and stakeholders can learn from each other, and so that researchers ask the questions that matter to people.

With this in mind, if the scientific evidence is accepted, and there is agreement about a number of more or less predictable impacts, the next question that arises is how to create a consensus on what adaptation measures to undertake. The next section elaborates further on the role of stakeholders and the “space” and range of available policies for climate adaptation.

4.2 Creating a Consensus on Future Action

4.2.1 Appropriate scale for climate adaptation

Defining the possibilities for climate adaptation at the local level has to start with considerations on multilevel governance. What the case of the CCP has showed is that cities need help from their national governments and from the international level of governance when doing climate protection work. The CCP have communicated to national governments and international fora that the trend with liberalisation of energy markets and the general globalisation is a threat to local government work. The CCP can be seen as part of a social construction of scale (see Marston 2000) through its attempts to argue for the need for local solutions. Rather than saying that due to these changing conditions, more emphasis on the global and national levels is important, the CCP is using the Kyoto agreement and the recent trends to direct new attention to the need for prioritising cities. They are constructing new opportunities for local climate policy.

If we turn to climate adaptation, the same issue is relevant to discuss. Is the local level of governance the appropriate level for climate adaptation? The debates on “who suffers what” often focuses on the differential effects of climate change on the nation states because the impacts of climate change are typically presented and projected at the global, continental or national levels (Paavola & Adger 2002). But, as the CCP argued throughout the nineties, it is at the local level that the effects of global warming will be felt first, and thus they are an important part of the solution on the climate issue. In recent years a literature has developed on forms of institutions with potential for cross-scale linkages, however much of this has yet to be connected to common pool resources, like how to handle climate change (Berkes 2002). Cash & Moser (2000) discusses challenges inherent in addressing multi-scale environmental problems. One of the most important challenges is to match the scales of the biophysical system and the management system. The problem arises when an environmental phenomenon is managed at an institutional scale whose authoritative reach does not correspond with the geographical scale or particular spatial dynamic of the environmental problem (Cash & Moser 2000). The challenge is to avoid policy pathologies which emerge because environmental and human systems “proceed at [their] own pace and in [their] own space, and that creates extraordinary conflicts when ecosystems, institutions,

and societies function on scales that are extremely mismatched” (Holling 1995 in Cash & Moser 2000).

In the case of the CCP, one could argue that the network is trying to negotiate with national and international levels of government to achieve a better match between problems and solution, arguing that cities are both part of the problem and the solution, but that national governments have thus far not realised the important role they play in climate protection. As for the question of climate adaptation in Norway, it seems valid to learn from these experiences and use time to find an appropriate division between what the different scales should do. The IPCC (2001: section 18.6.2) appreciates this point when they write that “Because the vulnerabilities of climate change occur at various scales, successful adaptation will depend on actions taken at a number of levels”. The IPCC follows through with a list that indicates the different measures that need to be undertaken at the different scales. Moreover, local and regional scale responses can rarely be divorced from other levels of decision making. As Paavola & Adger (2002) show, adaptation is a complex matter because considerations of adaptive responses, levels and timings must be looked at simultaneously. For instance, adaptation to reduced agricultural productivity may lead the international community to decide to foster proactive national adaptation strategies and policies and the development of new varieties of crop plants. National governments may expand the storage of grain, or change agricultural policies to alter the mix of cultivated crops. National governments can also decide to deal with some climate impacts as they are realised and ignore others, passing the responsibility on to local communities and individuals. Local governments may undertake small infrastructure changes for groundwater recharge, irrigation and flood protection. Individuals can in turn use diversification, investments and behavioural changes in a proactive manner while using migration as a reactive response (Paavola & Adger 2002).

This example shows that the levels and times of responses influence what alternatives exist and what their implications are for the adapting unit. It also shows that local level adaptation is important and essential, primarily because it is the local level that has contact with the people and can communicate these challenges. A severe problem is, then, that national governments do not necessarily forward their interests and concerns down to the local level, and when exposed to climate impacts, local communities may not have sufficient power to influence and choose adaptation measures. In Norway, the sustainability debate on Local Agenda (LA) 21 over the last years has to a large degree been an outcry from the municipalities that the national level does not do enough to facilitate community work. LA21 activities illustrate how municipalities have been pretty much left to themselves to sort out the difficulties and problems of sustainable development within the framework of LA21 processes. We see a paradoxical situation where the lack of policy co-ordination at the national level is being transferred downwards by prescribing stronger co-ordinating at the lower level (Naustdalslid 1994, Aall et al. 2001).

Due to the complexity of the matter climate adaptation must continue to be a multi-level dialogue and, and at least in the Norwegian context, a broader debate seems required about why municipalities should work with climate adaptation, what the constraints communities will face, and what the benefits of adaptation measures could be.

4.2.2 The CCP and the climate mitigation discourse

The above section emphasizes the need for the local level to play a role in the work for climate adaptation. If we take it one step further, the CCP case can provide an important backdrop for discussing the *possibilities of creating change* within the climate discourse. Section (2.4) demonstrated that the CCP had perceived a number of obstacles in their work for climate protection, and it shifted its focus more towards emphasizing the local benefits of climate protection, rather than the problem's global character (see also Bulkeley 2000a; 2000b, Betsill 2001, Slocum 2002a; 2002b). Bulkeley has especially focused on the Australian context, but she also elaborates on the CCP as a network and a global campaign. She points out that when the CCP works to secure support for the program, it stresses primarily the monetary benefits gained from emissions reductions (Bulkeley 2000a). Furthermore, she argues that the non-calculable and non-monetary benefits of the program tend to get sidelined in a discourse that stresses the need for quantification and concrete outcomes. Slocum (2002a; 2002b) has studied the CCP campaign in the U.S. She states that CCP frames climate protection as a win-win approach to economic development and environmental protection, which designate the citizen as a passive consumer.

However, even though the CCP has shifted its focus more toward local benefits and energy efficiency, it still presents other images of local climate policy. The stand the CCP takes on cost-benefit analysis has already been discussed, as well as its desire to create a notion that also other non-quantifiable aspects are important. Here, we see CCP as an actor trying to distance itself from a discourse on money-saving – a discourse that limits the options for local climate protection. For the CCP, it seems important to broaden the perspective of what is possible by also appealing to the non-quantifiable benefits. CCP is an illustrative case of the difficulties of making the climate problem relevant in a world where many trends hinder the work with climate protection. The search for objects that are familiar in a local context has become more important in the climate case (see Bulkeley 2000b). For instance, in Norway the most successful climate change campaign in the nineties was the mobilisation against the building of *gas-based power plants* (Hovden & Lindseth 2002). Betsill (2000, 2001) argues that the best thing US cities can do in their climate work is *not* to talk about climate change, but try to find local “hooks, such as air quality and growth, which they can link the climate issue to.” Slocum (2002a) emphasizes how the CCP is representing climate change through *energy efficiency*. These are all ways of making the climate issue more concrete.

The reason it is important to find local hooks or look for objectives that can symbolize the case is that the climate issue is becoming more and more technical. In broad terms, the climate change discourse has developed through certain stages. The scientific research on global warming identified climate change as a political problem that could be subject to regulatory policy. The discourse identified causes and effects, and translated them into responsibilities by quantifying them and referring them to geopolitical units (see Weingart et al. 2000). It is after the problem has been defined for a geopolitical unit that the question turns from a worry and a concern for all of humanity, to a problem that needs political legitimisation and poses a threat to our industrial societies and politics (Weingart et al. 2000). The CCP has to deal with this complex matter. Throughout the nineties it became evident that climate protection is not an easy task. Ambitious municipalities face structural constraints in their work for climate protection. Thus, what the CCP really sees as measures that would have an effect on climate change is linked to ways we live and organize our lives. The measures that

the CCP recommends do not seem to be easy to apply in today's societies: the CCP cannot report many municipalities that have, for instance, used overall planning or the tax system to change action. The success solutions that they can point to so far (ICLEI 1997c) are cooperation with different sectors of society in order to find solutions within the energy sector – solutions that stress technological fixes. This shows the tension between what is feasible and what is desirable or necessary. The CCP stresses that more structural changes are necessary, but are uncertain about how these changes should come about.

The frame for climate work can be seen as both narrowed and broadened at the same time. In the meaning narrowed down, one could argue that the conditions for local climate policy have been worse due to global trends that go in the wrong direction.¹² On the other side, climate change, as presented by the CCP, is more and more about other things than climate change. My suggestion is that the broader *perspective* on climate change is a response to the narrowing down on the *conditions* for climate protection. Since conditions are being harder, local level climate work has had to link climate change to other issues. A dominant trend is the search for win-win solutions. Clearly, there is the danger as Bulkeley (2000a) states that when one focuses on the ways in which demand for energy can be met more efficiently, deeper questions concerning the way in which demand for transport, development and energy could be addressed are neglected.

Would the situation be any different in Norway? Conditions such as the liberalisations of energy markets, a globalized and interconnected economy and the perception that economic growth is goal number one in society are conditions that equally would apply to Norway. A discourse perspective on the policy process will highlight that the options for changing policy are constrained. The aim here is not to discuss in detail all barriers that climate policy meets within a Norwegian context. Even though the above section show that *not* any form of climate policy is possible in a municipality, this report brings forward an argument that actors *do* have choices. Many would argue that the CCP perspective on climate policy show that the power of political interests – in state and society – and embedded patterns of knowledge are significant constrains on the future climate mitigation and adaptation policy locally. However, the CCP case has also shown that there are many ways to *frame* or present climate change in a community: Some ways emphasize win-win strategies, some activate moral concerns for future generations and others again link climate change to local environmental problems. Consequently, in relation to any particular policy issue, multiple and competing discourses coexist, associated with different located perspectives and different coalitions of people where, under particular circumstances, opportunities for argumentative interactions may open up (Keeley & Scoones 1999). Especially in the case of climate change, where uncertainty dominates debates about science and technology, previously powerful and intransigent interests may begin to recognise that public perception and values matter. This again could offer space for new actors and new voices to enter the policy arena (Keeley & Scoones 1999). Following this line, for many Norwegian municipalities climate change is a new policy field, and thus putting this subject on the political agenda could start with deeper reflections on why climate change is important. A debate starting from this perspective, do not point to what is economically feasible or possible, but offers a possibility for reflection on the different *roles* we have as inhabitants in a society. Such a perspective on community deliberations is embedded in a broader debate on the conditions for politics. Rein & Schön

¹² The association of European cities and municipalities that have entered into a partnership with indigenous rainforest peoples, the *Climate Alliance*, also state in their annual report for 2002 that climate protection policy locally currently is in a difficult position (Climate Alliance 2003).

(1993) argue for the creation of a policy discourse in which participants would reflect on the *frame of the conflicts* implicit in their controversies and explore the potentials for their resolution. Writers like Arendt (1959), Habermas (1984) and Bauman (1999) have written about the decline of politics as a parallel to the upspring of modern society. The economical sphere or economical factors removes important questions from the political arena, since the market makes all decisions economic ones. The solution is often an appeal to a *repolitisation* of society. Politics must be redefined, we must stop acting as consumers and start acting as citizens and we must put important questions about the goals of our society under the debate. Such a debate may not provide us with solid answers, but at least there is hope of asking some fundamental questions.

4.2.3 Democratic governance and climate adaptation

If we are to agree that the community level is important in climate adaptation, the following question arises: How do we organise processes where the public, politicians, NGOs, business and others come to understand that this is something that needs to be given high priority? To date, research on adaptation to climate change has focused mostly on empirical differences in adaptive responses, but the question of who decides which adaptive responses will be taken is not discussed to the similar extent (see Paavola & Adger 2002). A recent and thorough literature review on formal stakeholder processes in environmental policy concludes that they work best when designed to accomplish specific goals within specific contexts, e.g. deciding among remediation options at a Superfund site (see MARA 2000 for an overview). In contrast climate impact and adaptation requires attention to a complex issue with many uncertainties and with impacts that might not be evident for 30–100 years – long beyond the planning horizon of most individuals, businesses, and organisations. The literature has little to offer in addressing these new challenges we are faced with here. Through the adaptation studies cited earlier in this report, a number of suggested initiatives have come forward. Other recent examples from case-studies in Europe (Downing et al. 2001) suggest that we need to see a shift from addressing issues of “What if?” (i.e., if this scenario of climate change occurs, then what are the impacts?) to studies that evaluate the range of potential adaptive options. Interviews and three workshops with a wide range of stakeholders to explore their perceptions of climate change impacts and responses in two English regions point to the need to appreciate the added value of climate adaptation. Shackley & Deanwood’s (2002) findings suggest that while local and regional impacts are of considerable interest to regional stakeholders, their ability to respond through adapted policy and practice depends upon their existing frames of reference with respect to their understanding of the policy and decision-making systems, and the operation of current institutional processes and mechanisms. So far, these stakeholders do not see climate adaptation as an extraordinary task that requires new measures and new ideas. This adds to the information from the case studies we have studied here, where several of the regions actually do have a vast amount of knowledge on this field, but where it has not been decided what needs to be done or when action should be taken.

In this context, with limited knowledge about how stakeholder processes have worked to create change within the field of climate adaptation, it could be useful to take a closer look at Local Agenda (LA) 21. Information on how LA21 has worked could add to understanding what community climate adaptation could come to mean in Norwegian municipalities.

4.2.3.1 Experiences with LA21 in Norway

LA21 as a community challenge can be viewed as an interesting case when discussing climate adaptation. The idea of LA21 is to take a global perspective on the environmental problems and start planning with a long-term perspective. According to Chapter 28 in Agenda 21, local authorities should undertake a consultative process with their inhabitants in order to arrive at a consensus on an action plan or a 'Local Agenda 21' for the community (UN 1993). LA21 involves utilising the communication between actors in the local society in order to create change. LA21 thus needs a specific type of discussion situation to be able to achieve the *common good* rather than *private interests*. Some of the lessons learned from Norway's LA21 work might be helpful for its future work on adaptation to climate change. Experiences so far indicate that it is important to distinguish between the ambitions of the municipalities and what they actually do. When it comes to concrete results, the municipalities still have some way to go. In a national survey of LA21 efforts, Lafferty and Bjørnæs (2000) state that Norwegian municipalities have only to a limited degree laid down broad strategies for sustainable development in their work, developed or used indicators for sustainable development, or focused on "heavy" sustainable issues like consumption or traffic.

LA21 highlights the community challenges that must be faced when trying to address a global responsibility. Even though we haven't seen a broad change in the way we do environmental politics at the local level, Aall et al. (1999) state that the LA21 work in the municipalities differs from "traditional" municipal environmental policy, particularly when it comes to the policy process involving new policy partners. LA21 has in this way built up new capacity for handling environmental problems and created an understanding that environmental politics is something that involves the whole community. Norwegian municipalities, when taking on a greater responsibility for climate adaptation, thus have institutional capacity and actor networks available that they can build upon. Since climate adaptation is a new concern for Norwegian municipalities, the question of which *context* climate adaptation should be put into and what *linkages* to other issues that should be made is interesting.

4.2.3.2 Bridging climate adaptation and sustainable development

The challenge as to the actual democratic *process* should not differ a lot between climate adaptation and LA21-work; they are both about utilising community resources in order to create change. If we also think about the *content* or substance of the work, what linkages are there between climate adaptation and the broader sustainability issue? Should climate adaptation be looked upon as a different issue? The IPCC (2001) makes an important point out of the need to look at climate adaptation as part of a broader sustainability debate. Many sectors and regions that are vulnerable to climate change are also under pressure from forces such as population growth and resource depletion. According to the IPCC, climate adaptation and sustainability goals can be jointly advanced by changes in policies that lessen pressure on resources, improve management of environmental risks, and enhance adaptive capacity. Development decisions, activities, and programs play important roles in modifying the adaptive capacity of communities and regions, yet they tend not to take into account risks associated with climate variability and change. Inclusion of climatic risks in the design and implementation of development initiatives is necessary to reduce vulnerability and enhance sustainability (IPCC 2001).

If we are to be better prepared to adapt to climate change, we need to enhance institutional capacity (Lafferty et al. 2002). This capacity is both reactive (i.e., can act to repair damages) and proactive and precautionary (i.e., is better prepared for change as a result of conserving natural resources and enhancing the socio-economic structure). Climate justice is not just about the people that live here and now, but also the rights of future generations, and climate change impacts will exacerbate trends which are already threatening the stability and resilience of many key ecosystems (Paavola & Adger 2002). Climate mitigation seeks to limit the cause of damage to ecosystems; thus mitigation can also be seen as an important precautionary initiative for climate adaptation. The challenges for adaptation will be fewer and easier to handle if we are to reduce our CO₂ emissions. One could also assume that if mitigation is not taken into account, then climate adaptation measures could lead to more CO₂ emissions, which again would lead to more global warming and more vulnerability. For instance, in the Columbia River Basin study they noted that irrigation supply and hydroelectricity production would be reduced because of lower annual flow combined with fish protection requirements. In these circumstances, regional utilities might have to purchase electricity from fossil fuel sources, thereby affecting the region's ability to meet GHG emission targets (Cohen et al. 2000). Consequently, issue linkages need to be scrutinized in order to discuss whether we are actually adopting adaptation measures that in the short-term might lead to safer communities, but in the longer run increase global and local vulnerability.

The rest of this chapter builds on this idea of looking at climate adaptation as a community process embedded in a broader dialogue for sustainable development. Clearly, different regions and different municipalities will have different challenges, but what is proposed here is that taking on such a challenge entails paying attention to certain characteristics and principles that are common for all municipalities. Aall & Groven (2003) emphasize the following principles:

- The precautionary principle
- Governing risk
- Impact assessment
- Planning
- Participation
- From local structure to actor¹³

Building on these principles, which well summarises the content of the discussions thus far in this report, I propose that the challenge of climate adaptation is a broad community challenge of handling risk and planning under uncertainty. Such a situation invites us to think about *how* we can arrange a consultation process towards a sustainable development. The rest of this report will address this question, drawing from examples from LA21-work, and relating it to the Norwegian context.

4.2.4 Making climate adaptation matter through dialogue and deliberative democracy

4.2.4.1 Stakeholder participation for sustainable development

Community projects for sustainable development, like LA21, immediately point to a form of understanding of democracy which is put forward in Jürgen Habermas' theory of the

¹³ The development of a specific independent (from the national level) local role in the work with climate adaptation.

discourse democracy or the “deliberative” democracy (Lindseth 2001, Føllesdal 2000). By deliberation, Habermas means “rational discussions and mutual considerations (deliberation) between free and equal citizens” (Kalleberg 1999:36). As a way of giving a direction for the discussion, Habermas’s ideas are useful. Habermas (1996) tells us about the importance of arranging a free and open debate. When discussing climate change, there will be different interests coming to fore, but the challenge lays in being able to create solutions to our common good and thus handle the conflicts created by a value-pluralistic world. Habermas emphasizes that comprehensive communication is necessary in order to establish a common understanding and opinion (Eriksen & Weigård 1999). In regard to the objective of sustainable development, there is a basis for common forming of opinions and exchanges of political opinions through environmental issues because this concerns the common interests which may be in opposition to the self-interests. As the consideration for the community involves thinking sufficiently long-term for it to include the considerations for future generations, there is an obvious potential in activating an obligation towards environmental values (Dryzek 1997).

A democratic ideal is that all voices should be heard and that as many people as possible should be given the chance to take part in the work. However, for practical reasons, the number of participants in projects or co-operation groups must be kept at a manageable level. The MARA project (MARA 2000) found a solution to this by establishing a stakeholder Advisory Council. The intent behind the Advisory Council was to form a group that was small enough to focus constructively on a set of important issues, yet large enough to represent the group likely to experience substantial impacts in the region. The same type of forums or councils has been tried in LA21-work in Norway. The demand for governance and steering of the LA21-dialogue involves, according to Kommunenes Sentralforbund (KS) [The Norwegian Association of Local and Regional Authorities] (2000), a form of formalised co-operation. In their “recipe” for LA21, KS (2000) writes that it can only be successful if the authorities, trade and business, and voluntary organisations co-operate as equal partners. This may be achieved by establishing independent bodies or forums that function as advocates or frontrunners in the LA21-work. In Norway, such LA21 forums are developed only to a limited degree. Fredrikstad Miljøforum [Fredrikstad Environmental Forum] functions as one of the few ongoing examples of such a formalised co-operation recommended by the KS (Bjørnæs & Aall 1999, Lindseth 2000). The work in Fredrikstad Miljøforum shows that co-operating over environmental issues is problematic and may create conflicts. However, experience also shows that there is a significant potential in such co-operation bodies. By inviting different groups to join the work, the authorities are forced to take in different views and more nuances may become evident through the debate (Lindseth 2000).

When discussing climate adaptation in a municipality, many actors and sectors in society will have different agendas and interpretations of risk, and some will be winners and some losers. Some issues will affect many, whereas other issues will be more relevant for certain groups. The point here is not to determine what kind of decisions a municipality should make, the time period they should focus on, the sectors that should be prioritised, or whether adaptation responses should focus on the natural environment or the physical environment. The point is rather that agreement on how the community as a *whole* should prioritise this issue is necessary. The challenge is to make this a communicative process, rather than one where stakeholder participation becomes the object of a power struggle where different forms of expertise clash (Rugset 1998). The principal democratic element in this regard is that the participation should not only have a strategic or instrumental perspective. If the actors are to

free themselves from their self-interests, the focus will have to be on the themes and challenges where the dimensions of the common interests are brought into the dialogues. We have earlier in this report stressed the need to understand the *perceptions* of danger within the public and the different stakeholders so that researchers ask the questions that matter to people. Furthermore, boundary organisations, institutions that straddle and mediate the divide between science and policy, can be established to help in this task (Cash & Moser 2000). Boundary organisations also emphasize linking the work in the community deliberations to the broader political decision making bodies, which points us to the legal aspects of community deliberations.

4.2.4.2 The legal aspects of community deliberations

The question of how we channel the suggested adaptation measures coming out of from stakeholder deliberations is an important legal matter (see Habermas 1996). Eriksen (1999) points out that it is important to note that there are *legal* deliberations also at the municipal level. A legal discourse ensures that new programmes are investigated and evaluated alongside the existing legislation, and that there are limits drawn between different interests and fields (Habermas 1996).

The decisive factor is that the deliberation should try to clarify opinions, find out when there is consensus, but also conflict and how to work further with conflicts. Amdam & Amdam (2000) show, however, that in relation to the processes surrounding the various part-plans in the municipal planning in Norway, legal discourse is almost completely absent. When there is a lack of legal discourse, a necessary minimum of a confrontational process that may legitimise the planning documents and provide validity for the work cannot be established. The plan thus receives a dubious legal status and there is thus a possibility that actors may use it, abuse it, or ignore it according to their own interests (Amdam & Amdam 2000).

A significant challenge for the parties discussing climate adaptation is the question of the degree of obligations they choose to relate to the work. Voluntary agreements and self-regulation have been used in industry in Norway in regard to pollution control and are a kind of management tool in environmental politics (Jansen & Osland 1996). The climate adaptation process could focus on the establishment of more binding agreements between the strategic actors from trade and industry, organisations and municipalities. If the various actors agree to use private legal agreements etc., such agreements may appear as alternatives to command and control.

Better legal clarification also implies that planning documents arising from the climate adaptation process must be given a status in relation to other plans and in relation to legislation, regulations and other sources for what is right (cf. Amdam & Amdam 2000). Legally binding agreements thus do not only involve the formal legislation process, but also an operationalisation of political programmes in order for the politicians to clarify how to relate to various objectives in society on a practical level (see Eriksen 1999). In regard to climate adaptation, it may be argued that the success of the work depends on such legal considerations being carried out. If we view climate adaptation as a work for sustainable development, an example would be that action plans for sustainable development would have to be seen in relation to other plans, such as plans for business and trade development, health and culture. This may involve having the plans contain absolute limitations in the form of defining minimum standards for sustainable development that the other sectors cannot violate in their operation plans. Such a legal clarification will in practice involve a co-ordination

of the politics at a municipal level, having sustainable development as the basic condition. It will also make evident how the sustainable interests stand in relation to other interests.¹⁴

In this regard, it also seems relevant to emphasize the precautionary principle and actions of an irreversible nature. Several writers single out the greenhouse effect as an example of an environmental problem of such a nature. Høyer (1999) speaks out that it should be possible to concretise further in a legal form which forms of serious and irreversible environmental consequences the principle should include, and which procedures should be followed in order to reveal any scientific uncertainties for thus to ensure that the principle does not become watered down and is actually implemented in environmental politics.

Finally, it should be pointed out that we are here moving towards a limit in relation to the municipal apparatus' possibilities to control the social development towards a sustainable direction. There is a limit to what a municipality can and will do when there is no governmental politics on a national level characterised by sustainability.¹⁵ A clearer anchoring of sustainable development on a national level, with stricter legislation in regard to non-sustainable production and consumption will to a greater degree make it possible to change the direction on a municipal level. The work due to finish autumn 2003 with a national Agenda 21, an action plan for sustainable development in Norway, might be just the opportunity to lift climate adaptation considerations in to a broader sustainability debate.

4.3 Conclusion

Climate adaptation is a new challenge for Norwegian municipalities. This report has looked at sub-national experiences internationally with climate mitigation and climate adaptation in order to discuss some of the considerations that are important for the Norwegian context. The report gave a detailed overview of the CCP and their experience with climate mitigation work. It identified how the CCP has understood and framed the climate issue, and on that background it discussed the difficulties and problems of working with climate mitigation. Chapter 3 of this report gave a state-of-the-art overview of sub-national studies of climate adaptation processes in North America. A special focus was put on anticipatory and planned adaptation, and we took a closer look at some of the participatory processes.

This last chapter has focused on two questions: What are the challenges of communicating climate change?, and how do we go about trying to create a consensus on what to do next? When communicating climate change, risks and uncertainties are important categories. Climate adaptation rests on scientific knowledge, but we will never have complete information on what we are to adapt to. Handling and communicating risks thus becomes of great importance, requiring us to address such questions as whose perspective of reality counts, and who is to present the public with the images and pictures of how "our" community is likely to be affected by climate change. In this regard, an argument was presented for the democratization of science; scientific norms, institutions and procedures need to be reformed

¹⁴ Possibly clarify which aspects and themes within the framework of sustainable development should be prioritised.

¹⁵ An example from the country's first planning document entitled *Lokal Agenda 21 – Kommunedelplan miljø/ Lokal Agenda 21 i Sogndal kommune* may illustrate the point: "It is a dilemma to have to take consideration of the global climate in Sogndal when the central authorities move in the opposite direction. It must, however, be an objective to reduce the local car traffic in Sogndal" (Sogndal council 1996, p. 31 in Lafferty et al.1998:36).

in accordance with democratic principles. But, keeping in mind the technical character of climate impacts and adaptations, where especially climate models form an important information tool, it might be that the divide between scientific expert knowledge and lay knowledge is impossible to bridge. Discussing and clarifying this last matter, will in turn have important consequences for how and to what degree public participation should take place in climate impact and adaptation processes.

The final section of this chapter discussed the process of defining what adaptation measures to undertake. It discussed some of the problems of working with climate change at the local level of governance, and I had a brief comment on what the appropriate scale for climate adaptation work should be. This section concluded that climate adaptation, as a result of its technical and overarching character, must continue to be a multi-level dialogue. In the Norwegian case, it seems important to bring forward arguments and answers to questions such as *why* municipalities should work with climate adaptation. Other important focal points would be an evaluation of the constraints communities are likely to face, and what the benefits could be of starting to adapt to climate change.

The last part of this chapter opened the perspective somewhat and argued that climate mitigation and climate adaptation must be seen in relation to one another. Since climate mitigation attempts to address the cause of the problem by reducing harmful emissions, it can also be seen as an important initiative for climate adaptation; the challenges for adaptation will be fewer and easier to handle if we are able to reduce our CO₂ emissions. The rest of this last chapter built on the idea of looking at climate adaptation as a community process embedded in a broader dialogue for sustainable development. It used examples from LA21-work and related to the Norwegian context. Important aspects here are how one commits to the work and starts to actually adapt. This element points to the legal aspects of community deliberations. A legal discourse ensures that new programmes are investigated and evaluated alongside the existing legislation, and that there are limits drawn between different interests and fields. However, no matter what a municipality does, it is evident that community adaptation to climate change needs some sort of dialogue between the national and local level of governance. Today, climate adaptation has barely reached the research- and political agenda in Norway. Thus at this stage, the debate on how we should adapt in Norway and how we are to “frame” the adaptation issue is a debate only in its forming. In this regard, this report has presented a normative argument for making sure that climate adaptation builds on past experiences with climate mitigation and Local Agenda 21, emphasizing the need to understand climate adaptation as a challenge for sustainable development where the public plays an important role in the community deliberations.

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