

# **A Grand Objective lost in the Waste Bin?**

Local Agenda 21 and solid waste reduction  
in the Norwegian municipality of Trondheim.

Hilde Nøsen Opoku

Programme for Industrial Ecology  
REPORT NO: 3/1999

## **Reports and Communications from**

### **Norwegian University of Science and Technology (NTNU) Industrial Ecology Programme (IndEcol)**

*Report no.3/1999*  
*ISSN 1501-6153*  
*ISBN 82-7948-002-1*

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Industrial Ecology Programme (IndEcol)  
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Internet: [www.IndEcol.ntnu.no](http://www.IndEcol.ntnu.no)

Price: NOK 60,-  
Printed in 50 copies.



## PREFACE

This study examines the joint implementation of a Local Agenda 21 process and the new Waste management plan in the Norwegian municipality of Trondheim. Within the framework of Local Agenda 21 the local authorities were to act as catalysts in stimulating a comprehensive partnership between local businesses, civil society organizations, and the general populace, in order to reduce the waste production. As a prelude to the eventual introduction of the plan to the whole city, a pilot project involving selected residential areas was undertaken. Now, two years later, the experimental phase is completed. The program has not been n as successful as envisaged.

Based on participant observation, elite interviews, regression analysis of data from telephone surveys and local waste statistics, this study provides some of the answers to why the program could not achieve the desired results. The findings indicate that a pragmatic policy design, as a consequence of insufficient support from the political and administrative leadership in the municipality, resulted in rigid policy directives. Three factors were particularly important for the outcome. First, there was an insufficient choice of test group. Second, the mechanisms designed to facilitate the source reduction process did not evolve as desired. And finally, the rigid directives made the program vulnerable to competing policies. This notwithstanding, the results may provide valuable input for the design and implementation of future programs in the Trondheim municipality - and for others involved with Local Agenda 21 processes.

I am grateful to many people for their help and support during the preparation of this report: All members of the coordination committee for the project have patiently answered questions and shared their knowledge and opinions; Prof. Marion Pines and Prof. Arnold Packer at Institute for Policy Studies at Johns Hopkins University, in a crucial way, improved my knowledge about the dynamics at work when implementing new policies; Pål M. Martinussen at the department of Political Science at NTNU has given fruitful comments and inestimable - to use a term from his domain - help with the regression models; Ingvild Vaggen Malvik has been an incredible source of information; My supervisors, Prof. Helge Brattebø and Prof. Knut Erik Solem, at the Program for Industrial Ecology at NTNU have provided me with practical and informative guidance; Trine Fissum has shared valuable insight in the “political economy” of local assemblies; Paul Opoku-Mensah has corrected the language, as usual; And finally, warm thoughts to my parents who have taken more than their share of baby sitting during the writing process - though Sandra, you are my moral incentive for this kind of work!

Dragvoll, March 1999

Hilde Nøsen Opoku



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# 1 INTRODUCTION

The activities of local authorities are an important lever in helping society achieve sustainable development. This realization has been based, first, on the widely held premise that although the environmental threat might be global, ultimately, it is caused at the local level by industry, households and individuals. Second, there are some environmental problems whose effects are limited to the local level and can be most effectively dealt with at that level. And finally, that a permanent solution to environmental problems calls for drastic changes both in the attitudes and priorities of individuals and in the organization of society. These changes, it is argued, must begin at the local level.

This awareness has resulted in a gradual shift of responsibility for environmental protection from the central to the local level. In the Norwegian case, a gradual devolution of environmental protection matters from central to municipal authorities is taking place. This has led to an integration of environmental issues into the planning activities in an increasing number of municipalities.

On June 20<sup>th</sup> 1996 the city council in Trondheim passed two resolutions that were to merge in an attempt to meet both national and global developments for environmental policy making:<sup>1</sup> The new waste management plan, focusing on source and waste reduction, should be jointly implemented with a pilot project for Local Agenda 21 processes. By providing the public with adequate information on problems growing out of the fast generation of solid waste, and encouraging them to put forward initiatives to meet these challenges in their communities, waste reduction and new forms of public participation were expected.

Now, two years later the experimental phase has come to an end. Neither changes in the public participation patterns, nor waste reduction is evident. The source sorting component of the project, however, is regarded a success. Why these results? More specifically, why have the local government authorities not been successful catalysts in stimulating the envisaged partnership? What have been the challenges? Was it a poor policy design? Was there a lack of commitment by the implementers? Or, were their skills insufficient? Did the program get necessary support? And what was the affect of conflicting policies at the time? By analyzing the entire implementation process this paper aims at answering these questions.

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<sup>1</sup> The boundaries for the municipality of Trondheim are identical with those of Trondheim city, the third largest city in Norway with a population of 130 000 inhabitants. The terms 'city' and 'municipality' are therefore used alternately when particular arrangements excluding one of the two is not specified.



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The report is organized in two sections. The first begins with an outline of the central conceptual issues in the study. This part is divided in three sections; First, waste and the management of waste are described; Second, is a presentation of the logic and processes behind the concept Local Agenda 21. And finally, implementation theory is briefly presented as analytical framework for the study.

The first stage of the empirical section describes the implementation process as it evolves for the program - from the agenda setting phase and throughout the process until the end of the program. This is followed by, an impact analysis proceeds, supported by both qualitative and statistical findings. Finally, the report is pulled together in a discussion and a summary of the main findings.

## 2 THE CENTRAL CONCEPTUAL ISSUES

Waste and the management of waste, Local Agenda 21, and Implementation theory are the three core conceptual issues for the empirical analysis in this study. As limited space is available, each concept is given a brief introduction only - hoping that the proceeding discussions will complete the drawings.

### 2.1 Waste and the management of waste

The problems to which waste gives rise are both specific and relatively complex: Waste is not only a potential source of pollution - it also constitutes huge amounts of useful raw materials, which in turn gives rise to major problems in the industrial consuming countries. Current upward trends in waste generation must be halted and reversed in terms of both volumes and environmental hazard and damage. Thus the management of waste generated is perceived as a key task in the quest for sustainability (EEC:1993).

There are, however, altering views on such strategies: Most commonly used is a model arranging the management options in a hierarchy which in sum puts primary emphasis on source reduction, followed by promotion of recycling and reuse, and then optimization of final disposal methods for waste which is not reused. This "priority list" is among others used by the European Union and the U.S. Environmental Protection Agency (EEC, 1993, U.S. EPA, 1994).<sup>2</sup> Another view sees source reduction separate from the management option hierarchy (Ervin, 1991 in Lober, 1996). This distinction is based on the notion that the set of policies including incineration, land filling and recycling is based on management of waste, while the latter policy category – source reduction – is based on prevention (Lober, 1996).

The term source reduction is in itself complex, and often used interchangeably with waste reduction, waste minimization and pollution control. Source reduction is commonly distinguished from waste reduction and waste minimization in that activities such as recycling and composting are considered to be waste reduction and minimization activities, as they reduce the amount of waste that needs to be disposed of in landfills or incinerators, but do not reduce the amount of waste that is initially produced. Pollution prevention, on the other hand, refers to activities oriented towards

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<sup>2</sup> EEC used the word waste prevention rather than source reduction, but refer to it later as «solving the waste problems at source».

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prevention of damaging releases from waste into a variety of media such as air, water and land (Conn, 1988 in Lober, 1996).

Source reduction activities, as such, can be implied either in the production process or as policies aiming at changed public behavior. Techniques such as Life Cycle Assessments (LCA) and Design For Environment (DFE) help inform product producers in ways that may help in source reduction, while recycling programs and composting may be the public's contribution. Waste reduction, however, requires more profound changes in public behavior -- one that arrives at changed patterns of consumption -- at least in modern or post modern societies. A change that might reveal in a reflexive modernization (Beck, Giddens and Lash; 1997)? Source reduction within the system boundaries of this project depends on changed consumption patterns, primarily at the individual level.

The broad awareness of problems linked to waste generation made the issue a major theme at the UN Conference on Environment and Development held in Rio de Janeiro in 1992 (UNCED). As a result, Agenda 21, the action plan of the Rio Conference argues that *«A preventive waste management approach focused on changes in lifestyles and in production and consumption patterns offers the best chance for reversing current trends»* (Agenda 21, Chapter 4:31).

Fortunately, unlike most environmental problems -- such as loss of biodiversity and ozone depletion -- the public is able and willing to do something about the waste problem, (Lober, 1996). And the character of solid waste management is of such nature that the optimal level of environmental quality in one jurisdiction is unlikely to coincide with that in another (Baumol and Oates, 1988). Combining waste management and Local Agenda 21 processes is therefore a good blend, at least on paper.

In the Norwegian case, central government has been instrumental in providing the elements that should constitute environmentally sound waste management policy at all levels. This is contained in Parliamentary Report nr. 44 (1991-1992). Within the framework of the report, waste management at all levels should aim at:

1. Preventing waste and reducing the quantity of harmful material in the waste;
2. Encouraging reuse, material recycling and energy utilization.
3. Ensuring an environmentally justifiable final treatment of waste which is not reused.

To meet these objectives Parliament adopted in 1993 *Forurensningsloven* § 33a which transferred waste management policies to the municipalities. Agenda 21, however, went further challenging all relevant actors to actively promote sustainable development. In its chapter 28, the jurisdiction of local authorities can be understood to be where all the actors come together, to work out and implement new efforts. Chapter 28 in Agenda 21 is what we today referred to as Local Agenda 21 (appendix I).

## 2.2 Local Agenda 21, its logic and the processes behind

Globally a varying set of approaches towards the concept Local Agenda 21 is developing. Unlike for example Sweden, Norwegian municipalities are not legally required to implement Local Agenda 21 strategies. Here, a nationwide environmental protection reform known as «Environmental management in the Municipalities» (MIK), introduced to Norwegian municipalities in 1991, replaced the focus on LA 21 for quite some time.<sup>3</sup> Currently, however, the concept is gradually emerging as a distinct policy issue, and those developing beyond the argument of being just another name on established processes as claimed earlier.

Parliament report number 58 (1997-1998): *Environmental policy for Sustainable Development*, represents a shift from the two earlier reports in the aftermath of the 1987 epoch-making report from the World Commission for Environment and Development, in that it specifically emphasizes the important role of *municipalities* in environmental policies. It states, *inter alia*, that LA 21 will replace the MIK-reform as basis for the official environmental policy in Norwegian municipalities (p.29). This is in contrast to early comments by the former prime minister, and leader of WCED, Gro Harlem Brundtland who held that MIK gave Norway a lead internationally in developing LA 21 strategies (Nationen, 10.6.94 in Dahle, 1997). This claim ranked Norway first in an international survey conducted by ICLEI in 1997.<sup>4</sup> In the survey Norway was represented with 415 LA 21 cases, this was approximately the number of municipalities involved in the MIK-reform at the time.

Though Norway might have entered the field of LA 21 at a late stage, different emphasizes on the contents of the concept is given – resulting in a variety of approaches. The Norwegian board of municipalities (*Kommunenes*

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<sup>3</sup> Since the late 1980's there has been a gradual shift from central to decentralized environmental administration in Norway. This evolution is largely the result of the MIK-reform, which began as a pilot project funding some municipalities to strengthen their political and administrative organization in order to encourage a more active environmental politic. From 1991, the program has been extended, and is now implemented in most Norwegian municipalities (Naustdalslid, 1994: 13).

<sup>4</sup> The International Council for Local Environmental Initiatives (ICLEI) is an association of local governments working along the intentions imbedded in the concept Local Agenda 21. ICLEI was launched in 1990 as the international environmental agency for local governments under the sponsorship of the United Nations Environment Program, the International Union of Local Authorities (IULA), and the Center for Innovative Diplomacy. ICLEI maintains a formal association with IULA and has official consultative status with the United Nations.

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*Sentralforbund*) has, in accordance with the British strategy, adopted the partnership approach to LA 21. This places LA 21 in the tool-box of processes aimed at strengthening the local democracy (KS, 1996 and LGMB, 1994). Some critics are therefore skeptical to the extent this important provider of premises to Norwegian municipalities actually has, or is willing to, put the concept on their environmental agenda (Aall, 1998). With this argument Aall touches on a broad debate regarding the (emerging) role of Ecology as a new «ism» in the ideological landscape. Within this frame social and ethical dimensions are added to the traditional focus on pure ecological systems in the understanding and use of the term Ecology (Beck et. al. 1997, Klassekampen, 1996, Knutsen, 1995). Local Agenda 21 is supposed to include all three dimensions.

As it is presented in Agenda 21, however, the concept aims at encouraging populations and authorities at the local level throughout the world. The variety of development stages in the world therefore requires each region, country or municipality to identify and emphasize what is most urgent in their case. The corroding situation for local democracy in Norway might be a threat also for getting environmental questions on the political agenda. If so, strengthening the local democracy might be the ultimate way to introduce LA 21 in order to improve the conditions for nature and humans.

Moving from concept to actual policy, LA 21 should be regarded as a continuing process rather than a single event, document or activity. The process can involve a range of activities, tools and approaches from which a local authority and its partners can choose according to local priorities and circumstances (LGMB, 1994). In Scandinavia a guideline consisting of five elements for inclusion in Local Agenda 21 provides the path in the development of LA 21 policies. These will inform the analysis. They are:<sup>5</sup>

1. *Global responsibility*: Traditionally environmental planning has primarily focused on local activities and its local consequences. The LA 21 concept challenges counties and municipalities to take the aggregated impact of locally based activity into account and see environment and development in a global perspective.
2. *Long term perspective*: While local authorities traditionally have been working according to short term programs based on their election systems, LA 21 has no definite end station. Sustainable development is not a goal as such but a continuous process, a vision rather than election promises. Stipulating a policy for sustainable urban development calls, for example, for a revision of plan theory, planning methods and practice (Kleven, 1998:29).

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<sup>5</sup> Inspired by Danish authorities and the work done on LA 21 in Sweden the Norwegian foundation *Idèbanken* developed a guide for actors wanting to start a LA 21 in their community called «Fra Rio til Roa» (1996).

3. *Everything is related*: By long term thinking more permanent solutions can be found in contrast to our present situation where we have a tendency of just curing the symptoms.
4. *Knowledge*: To see these connections knowledge is crucial. Information on a city's strategy for waste management in order to rise the public awareness of materials circulation is for example regarded as an important pedagogical strategy (Halvorsen Thoren, 1998:63).
5. *Participation*: Studies shows that there is no general grassroots pressure on Norwegian politicians for a more sustainable city development. On the contrary, the demands for even higher material standards are still increasing (Hellevik, 1996 in Næss, 1998). Local Agenda 21, however, should be a process where all actors in society participate, both in developing and implementing the agenda.

Two huge paradoxes are however imbedded in the Local Agenda 21 concept. On one hand it introduces a rather radical new strategy to environmental policy making and implementation, both in its bottom up approach and in its strong element of cross sectoral cooperation. On the other hand the role of local authorities as initiators and the institutional framework the concept is to be implemented within is that of the old order. A successful implementation would in the long term necessarily yield institutional changes, but where do we start?

## 2.3 Implementation theory, the analytical framework

As a continuous process involving the above elements, Local Agenda 21 imbeds subobjectives to particular policy outcomes such as source reduction. This is when subobjectives are understood to be outcomes that must be achieved before and in order to realize further outcomes (Mohr, 1995). Two categories of subobjectives are particularly relevant: The *discovery subobjectives*, referring to the importance of the program personnel to learn something about the targeted part of the world before operating in it; And the behavior prerequisites which is crucial, whenever behavior of people appears as an objective on the outcome line. In the latter category a set of three subobjectives are challenging to both policy makers and implementers: The target individuals (a) must know what is to be done, (b) must be motivated or have the incentive to do it, and (c) must have the ability and other resources necessary to carry it out. These are respectively referred to as the *knowledge*, *motivation* and *resource* subobjectives (Mohr, 1995).

This awareness fits into a classical set of conditions for successful policy achievements, set forth by Sabatier and Mazmanian (1979), and which provides the framework for this analysis: First, the program should be based on a sound theory relating changes in target group behavior to the desired

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objectives; Second, the statute (or other basic policy decisions) contains unambiguous policy directives and structures the implementation process so as to maximize the likelihood that target groups will perform as desired; Third, the administrators implementing the legislation possess substantial managerial and political skills, and are committed to statutory goals; Fifth, the program is actively supported by organized constituency groups and key legislators throughout the implementation process; And last, the relative priority of statutory objectives is not undermined over time by conflicting public policies or by changes in relative socioeconomic conditions that limit the statute's purposes or political support (Ibid. 1979). In order to place the case in a broader perspective both the agenda setting phase and policy evaluation is included in what is referred to as, the policy implementation analysis. This rather broad focus -- from the pre decision phase to impact evaluation -- is based on the assumption that crucial conducts for the policy outputs can be identified throughout that process.

### 3 LOCAL COLLABORATION FOR A SUSTAINABLE DEVELOPMENT

Creating and implementing policy directives requires many appraisals and considerations, which in sum affect the outcome of the policy objectives set forth. In the following section an attempt to identifying those appraisals and considerations, which became crucial to the program, is made.

#### 3.1 From consciousness to implementation

In 1994 the term Local Agenda 21 was introduced for the first time in an official municipal document for Trondheim. The Environment plan for 1994-97 stated that ways of meeting governmental requirements for an active use of the Plan- and building-law as a tool to conduct environmental considerations at all levels, would be through *«holistic and long term planning which deal with environmental questions in a serious manner, a kind of 'Local Agenda 21' as recommended by the Rio-declaration»* (p.3).

Implementers in the Environmental Section of the Municipality admit to their limited knowledge regarding the concept at this time. The document shows signs of this limitation, as it is descriptive of the situation rather than prescriptive for the problems needed to be solved, and was therefore regarded unsuitable as a steering document.

The lack of a national policy for Local Agenda 21 was now developing into frustration in both the local public sector and within the NGO community. In 1995 a combined group of actors took the initiative to meet with the Ministry of Environment to discuss the issue. Among them was the first local bureaucrat introducing LA 21 into the official debate, Mr. Omre, who later became the LA 21 coordinator in Trondheim.<sup>6</sup> The Municipal Union (KS) had on for hand reacted positively to Omre's initiative, though no substantive follow-up was made (Dahle, 1997). The national Department of Environment, on the other hand, was not pleased with the critique concerning this issue. However, in a preparatory note to a follow up meeting in the department, Omre even took a step further and suggested to see LA 21 processes in extension of the MIK reform (TK, 1996b); And from now on references to the term Local Agenda 21 started gradually to increase in

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<sup>6</sup> In an article in the journal *Plan* (1995), Omre pledged for a an over all environmental policy document, indicating that Agenda 21 could be the appropriate steering document for Norwegian municipalities. During the same period, the magazine *MIK-nytt*, published by The board of Municipalities (KS), raised the same issue, calling for LA 21 processes in Norwegian municipalities.



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national documents and official speeches. Even the national parliament encouraged local authorities to endorse LA 21, and early 1996 a project called "sustainable local communities" was launched. A national resolution regarding implementation on Local Agenda 21 is, however, still absent.

After the assembly in the Department of Environment a conference on LA 21 was arranged for Environmental leaders in mid-Norway (*Trøndelag*) in order to learn more about the concept. The Environmental Section of the administration in Trondheim succeeded in developing a proposal for two pilot projects using the LA 21 strategy. To get their suggestion through at the city manager level, however, executive officer knew the proposal had to be "pragmatic". Neither the city manager nor head of the Environmental Section were initially enthusiastic about the concept. But by developing the two suggested projects in relation to already established programs the expenses would be at a minimum level, it was claimed. As a result the necessary support was given.

On June 22<sup>nd</sup> 1996, the city council passed a resolution supporting two LA 21 pilot projects. The first was a continuation of a "house renovation program" carried out in the urban district of Lademoen. The other was to support the implementation of the waste reduction component of the new waste management plan – which had passed in the city council the very same day.

Though pragmatic, the combination of LA 21 and waste treatment were based on a previous survey ranking waste on top of the list of areas the public held they were willing to contribute in order to improve the environment.<sup>7</sup> The combined program was, however, limited to yet another pilot project: The introduction of the source sorting program in a corner of the suburb at Strinda.

### 3.2 The Political procedure

Having passed the city manager, the proposal from the environmental section was sent on to the executive committee of the local council (*Formannskapet*). As part of a new organizational structure introduced in Trondheim in 1992 -- aimed at improving the elected representatives' chance to influence decision making process in general and the initiating phase in particular --, the executive committee passed the proposal on to the

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<sup>7</sup> 75% of the population mentioned waste as an area where they believed they could contribute to improve the environment. This was a telephone survey prepared by Omre in cooperation with a consulting firm, based on recommendations given in Agenda 21. The population was 780 individuals randomly chosen from six municipalities in the region (See Norfakta, 1995).

Committee for Environment and City development.<sup>8</sup> This committee consists of thirteen representatives from the city council, reflecting the party constellation in the council. In the election period the committee consisted of: six representatives from the Conservative Party, three from the Labor Party and one representative each from the Socialist Left Party, the Greens, the Liberal Party and the Progressive Party. In addition others could be called on to give particular information, or answer questions regarding a particular case. The Environmental section, and the City development section, are frequently present at committee meetings but do not have the right to vote.

Although the committee was given the opportunity to propose changes, the proposal passed as presented. Important for a more general understanding of the implementation policy on environmental issues -- and the long term prospects for LA 21 in the city at the time is -- however, the proceedings that revealed in the committee by this case: Despite a pragmatic policy proposal, the majority of the members still feared the costs of the program. While one of the representatives from the Labor Party had wanted to include the entire city in a LA 21 process, the Progressive Party -- along their voting tradition on environmental issues in the municipality -- claimed they were against Local Agenda 21 as such. In the end, two suggestions from the committee to the city council were, however, proposed regarding the case. First, aware of the opinion among the politicians regarding Local Agenda 21 and the general procedures in the policy making process, the representative from Labor suggested the addition of another district to the pilot project; Second, the representative from the Greens called for a proposal suggesting how the citizens could be involved in developing future visions for the city. Both notions were dismissed. In the fall of 1998, however, the new Chairman of the City Council did invite all inhabitants of Trondheim to participate in such manners as suggested by the Greens, though connections to Local Agenda 21 was not made.

The political procedure in this case follows -- in accordance to the informants -- a general pattern in the municipality. When a statutory requests certain action, only transfers to a minimum fulfillment of the request is approved. If there are no requirements, proposals hardly pass if they imply costs. In this context a city council vote for 600,000 NOK to the Local Agenda 21 program, not included in the proposal, was rather surprising. In the struggle for resources, the notion of governmental requirements is important in order to get priority for almost any issue. Local agenda 21 initiatives did at this stage not have this notion in Norway.

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<sup>8</sup> This reform is known as "The new Trondheim" (*Nye Trondheim*) and was launched in order to improve the steering mechanism and flexibility across administrative and political levels in the municipality by the turn of the decay ( Lie, et al., 1995).

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### 3.3 Policy directives

The "pragmatic" proposal boomeranged. Rigid directives were issued on the policy designers, who now were to implement them. One consequence of just adding the LA 21 project to the established plans at the Waste section was loss of choice regarding test group and affiliated members to the coordination committee:

«In the Waste management plan Local Agenda 21 – processes is mentioned as a project idea in the section on «possible initiatives» (...). Although it might seem appropriate to employ a ‘LA 21 – strategy’ to implement a city wide contribution to ‘waste reduction’, it is however natural to limit the initial phase of the LA 21 process to a more distinct geographical area including different types of buildings. - The Waste section is developing such a pilot project in the district of Strinda»

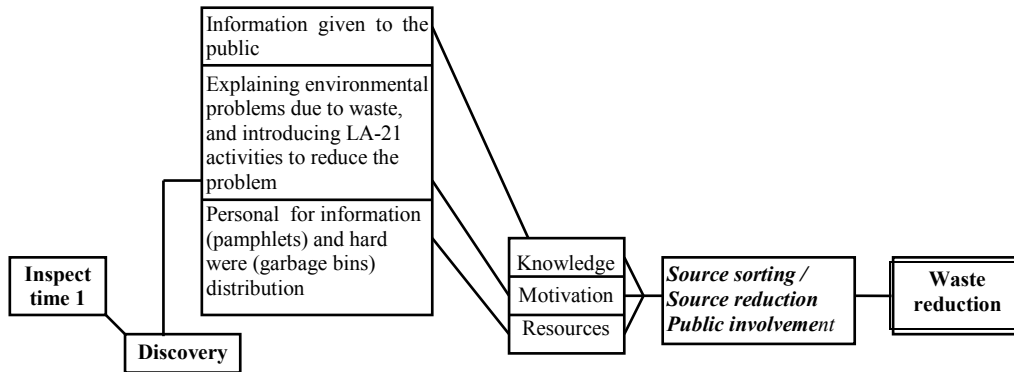
(From the city council resolution, June 20<sup>th</sup>, 1996).

The resolution further states that this effort should be conducted as a collaborative project between the Environmental section, the Waste section and Strinda volunteer exchange (*Strinda frivillighetssentral*). The main objective was to find methods for source reduction through a close cooperation between the Waste section and the subscribers. The Environmental section should participate and assist throughout this process, while the volunteer exchange was to prepare for an optimal collaboration between the municipality and the target group. Later the environmental Home Guard (*Miljøheimevernet*) and the Center for Environment and Development (CED) at the University of Trondheim were invited to participate in the «The contact group for LA 21» formally coordinated by the Environmental section.<sup>9</sup>

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<sup>9</sup> The model for this forum was introduced in Agenda 21, Chapter 28.

Figure 1: Policy directives given in order to meet main objective and subobjectives. (The model is adopted and adjusted from Mohr, 1995: 42).

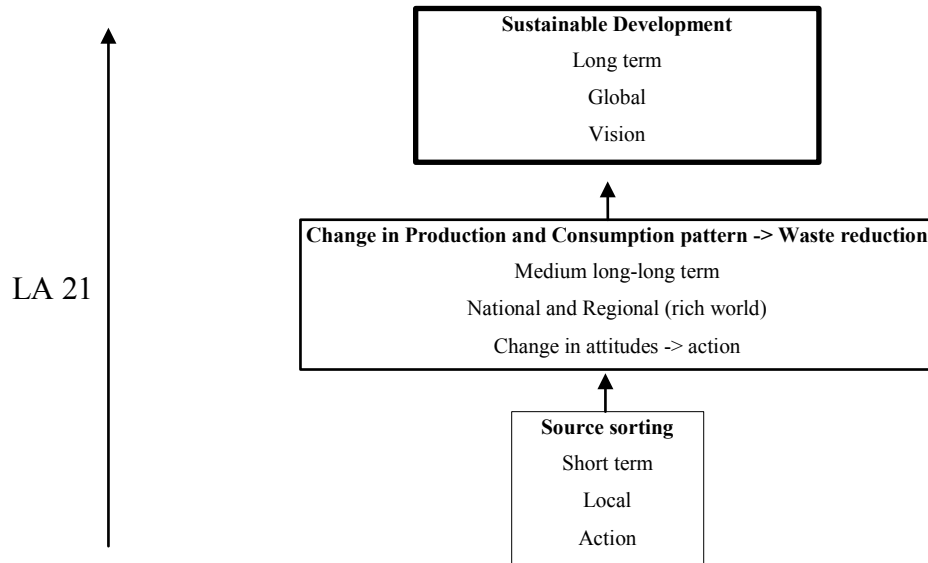


### 3.4 Theoretical understanding of policy objectives

The new waste management plan for Trondheim imposed a policy output – waste reduction -- which required change in public behavior at two levels in order to reduce the amount of waste generated: Source reduction and pollution control were to be met with-in the source sorting program. A model with four fractions for source sorting would meet the present potential for source reduction at the landfill and the incinerator, and improved methods for disposal of hazardous waste would increase the pollution control; The program, together with an extensive knowledge and motivation building effort, was assumed to lead to a new awareness among the public concerning their own consumption resulting in a new kind of public involvement regarding the issue. Combined, the two programs would lead to the main objective: waste reduction -- generally meaning a decrease in the total amount of waste generated in the households, industry and public administration. Indirectly this design provides a model with two intermediate variables (subobjectives); source sorting, and new forms of public involvement, and one dependent variable; waste reduction.

Based on the above understanding of the concepts a hierarchical model illuminating the different characters of the objectives on the outcome line for the program may be constructed:

Figure 2: A hierarchical model of Environmental challenges in Local Agenda 21 processes.



At its core is a decision-making process that began with a «grand objective», meaning a strive for the maintenance and improvement of life on Earth. This understanding is based on the modern interpretation and common consensus on the concept of Sustainable Development (SD). Within this grand objective, change in production and consumption patterns in order to limit the constraints on raw materials is identified as a crucial step towards SD. This awareness aids us to identify social activities that ought to be undertaken in order to realize this objective, like in our case waste reduction. When the Environmental section in the municipality of Trondheim designed their combined source sorting and public information program, they actually set forth practical actions on the ladder towards the grand objective. Each level in this model consists of final objectives as such, i.e. source sorting and source reduction, but is only subobjectives at different development stages when searching for sustainable development. Local Agenda 21, however, is a continuous process through out.

As we saw in the introduction, the program's objectives consisted of considerable different characters. This implies a complex implementation task as they require different strategies and time span: First, an acknowledgment of a global vision on sustainable development was needed in order to make a long term commitment to the task; Source reduction and change in consumption pattern, implying attitudinal changes which is also known to be a relatively slow processes; While waste reduction and pollution control --through source sorting-- is somehow in place when

technological facilities as garbage bins and information is given to the public.

After identifying the nature of the variables and the complexity of the policy design, the remaining question is, how well prepared was the municipality for this complex task, and to what extent were the impacts a result of their strategy?

### 3.5 Target group

The Strinda project must be regarded as a rather ad hoc solution to the desire to establish LA 21 in Trondheim. Only in one line in a section suggesting possible activities do the Waste management plan refer to LA 21 (§ E p.46). The Environmental section did however originally have a cooperation plan with the Waste section in mind, but this was in another district and concerning a characteristically different program. This plan was dismissed as the Waste sections all ready had a pilot project in transit concerning source sorting program at Strinda. This determined the target group for what became a combined project by the time it was presented for the city council. A particular collection route (R 16) in the district of Strinda had been chosen for the project. This was based on an initiative from the waste collectors on this route excited about the source sorting program. The target group, in other words, was rather randomly chosen.

*Table 1: An overview of subscribers on Route 16.*

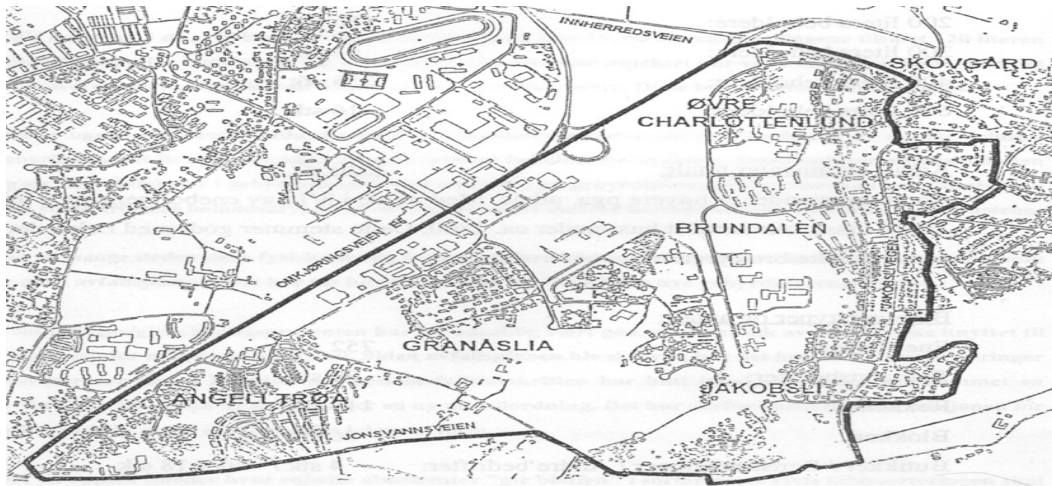
<b>Type of buildings and numbers:</b>			
<i>Detached houses (Private residences):</i>	720*	<i>Grocery stores:</i>	4
<i>Semi-detached houses:</i>	70	<i>Gas stations:</i>	-
<i>Undetached houses:</i>	110	<i>Other enterprises:</i>	18
<i>Apartment buildings:</i>	96	<i>Schools:</i>	3
		<i>Kinder gardens:</i>	4
		<i>Institutions:</i>	10
		<i>Farms:</i>	4
		<i>Other:</i>	4
<i>*The number of detached houses includes an increase in the number of residences by 1/3 do to bachelor flats for rent</i>			
<i>N</i>	1043		1015

Though the variation of subscribers along the route gave important experiences for the extension of the program, the settlement pattern along the route was not sufficient for a common attempt to increase public participation. As the map shows, this is not a closely knitted local

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community but rather three communities (Granåslia, Charlottenlund and Angeltrøa) related to separate schools and shopping areas. Their only connection in this case was that they happened to belong to the same waste collection route, which few -- if any -- of the subscribers were aware of.

*Map: The target group - subscribers within the area of waste collection route number 16.*



When questioned if the choice of target group could have been made differently, implementers tend to believe not – again based on necessary pragmatic due to limited priority for the project at the political and administrative top level.

### 3.6 Skills, commitment and roles of implementers in light of conflicting policies

Along national and international suggestions, a form of cross sectoral collaboration was established to implement the directives given for the Strinda project. The «Contact Group», as it was named, involved two representatives from an NGO, the administrator of the volunteer exchange, a researcher from the local university and two representatives from both the Waste and Environmental section of the administration. The mandate of this group, or 'Forum for Environment' as it is known elsewhere, was primarily to ensure that the three sub-objectives; knowledge, motivation and resources, were met. In this sense, the motley group of actors may be regarded as the implementers, or the implementing committee.

The participants possessed varying interests, skills and commitments to the task. As stated in the resolution; the municipality did not possess a

superior position in the forum, but contributed with practical arrangements and a secretary function conducted by the coordinator who now devoted 50% of his official time to Local Agenda 21.

### *3.6.1 Providers of knowledge and motivation*

Based on the nature of the organization and their broad knowledge and experiences on information delivery concerning environmental issues, the Environmental Home Guard (EHG)<sup>10</sup> was contracted by the Environmental section. As the NGO representative in the committee their obligation was to provide knowledge and motivation towards waste reduction. In doing so EHG arrange information seminars for housing cooperations and primary schools prior to the placement of the waste bin system for source sorting as it proceeded in the many neighborhoods at Strinda.

When giving speeches in the schools Local Agenda 21 was presented and described specifically. In the housing co-operations, however, requests for in depth explanations of the required content of each source fractions and practical solutions regarding placement of the tripled amount of waste bins took all the time available. Though there was not room to introduce LA 21 specifically in this context, any opportunity to put source sorting and source reduction in a broader context was taken. As time passed and the sorting program had been implemented, some of the co-ops have asked for more information and advice in order to further reduce their source production. A few have started to compost gardening waste, and one coop is entering an experiment for a common composting of food disposals from its households.

These are all initiatives minimizing the total amount of waste going to the landfill or the incinerator. When recognizing the developments within the co-ops, assuming it is based on information given at the seminars and increased consciousness as result of the source sorting program, EHG firmly believes seeds for changes also will evolve at the individual level.

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<sup>10</sup> The EHG has borrowed its name from the ordinary Home Guard – ‘Heimevernet’ in Norwegian ("National Guard" in American) - and is, to a certain extent based on the same principles. Each participant is expected to perform his or her task where they live, in their family, neighborhood or local community. Everyone takes responsibility for their immediate environment, and everyone is "armed". As consumers, club members and employees the idea is that we have the "weapons" needed to defend the environment against damage. Finally, by using the Home Guard concept, they wish to focus on the belief that we are today more seriously threatened by "invasion" and "conquest" from the ills of pollution and over-consumption, than by the threat of military attack (see <http://www.miljohv.no/English/>).



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### 3.6.2 *Supporting, guiding and coordinating volunteers*

As specified in the program directives, the role of Strinda volunteer exchange<sup>11</sup> was to coordinate, support and guide local initiatives according to the policy objectives.

These exchanges has been established in order to support people in their communities so that some official duties becomes redundant, though they are not supposed to replace official functions. When first introduced in the 1980's only work with a caring nature were conducted. This has now changed. A varying list of matters is now guiding their work. This development has placed Local Agenda 21 processes as a central theme on their agenda. This is so for the exchange at Strinda.

However, hardly any such initiatives enrolled for the waste reduction project, and the frustration in the organization caused by limiting their LA 21 involvement to waste only increased.

### 3.6.3 *Resource distributors in transition*

The Waste section's representatives played a dominant role in the committee's meetings. Their objectives, stipulated in the waste management plan, endorsed national requirements and were affiliated with a considerably amount of resources. A number of arrangements conducted off and for the committee were paid for from their budget, including development and distribution of information material. This probably helped the work in the sense of ability to get things done. On the contrary, it might have limited the focus of the process. Discussions regarding practical arrangements of the source sorting system became central on the meetings agenda, as this was the main obstacle for the section in the actual implementation of the plan. However, during the project period, two conflicting policies concerning the work and role of the Waste section in the committee distracted the continuity of both the project and the committee's sections.

After a history of monopoly on waste collection, the city council voted for an opening of tenders in early 1998. The positions of many workers were jeopardized as they now lost their contract in a major district. Though this was not at Strinda, it had already affected the whole organization in many ways over some time.

The Strinda project for example, was introduced unison to all waste collectors as the program successively was to be implemented in all the city districts. At these seminars, held in the fall of 1996, questions regarding the

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<sup>11</sup> As a concept Volunteer exchanges, in its Norwegian form, were initiated as a Think thank (idé dugnad), including several NGO's by minister Wenche Frogn Sællæg in the 1980's. This was based on the dissolution of social networks in society, and NGO's becoming more professional and less inclusive of ordinary people. In other words, the objective was to revitalize public engagement. Today more than 235 Volunteer exchanges have grown out of this initiatives.

possible effect of a competitive situation were already frequent. Those knowledge and experiences from the program were launched as precedence in a possible competitive situation, workers needed to find answers to "what if" rather than "why" and "how" do we reduce waste.

Praiseworthy in this situation, is that the Waste sections workers union has taken the initiative to develop a north-south link as recommended for LA 21. The plan is to send waste collecting engines discarded here to Keren, Trondheim's friendship town in Eritrea.

The latter conflicting policy was yet another reorganization of the administration, endorsed by the new city manager. In consequence the Waste Section was split in two fragments and dispersed. The Waste Section, as we knew it, was limited to operational work only. Work concerning public information was on the other hand transferred to a new division of the Environmental Section. Before the branch executive was appointed, two information workers were employed, one with responsibility for the Strinda project, the other for waste reduction. The latter formally became the new secretary for the committee, and the traditional Waste section met with only one representative.

At this point the task of the new employees was to some extent unclear, and at the last meeting of the committee, on June 18<sup>th</sup> 1998, the secretary expressed uncertainty on both mandate and role of the committee. Though a new meeting was scheduled the group has not met as such again. For unpublished reasons the secretary has withdrawn from his position. He has not been replaced, as there is still uncertainties concerning what the position should obtain.

### *3.6.4 Program Coordinators*

Though the administrative reorganization led to some duty changes, it was yet another conflicting issue which over shadowed the Local Agenda 21 effort for the appointed executive in the Environmental section.

In the second pilot project for LA 21 a long time conflict between inhabitants and the city council was blossoming as the deadline for a final solution was coming up. The conservation of an old group of houses was at stake, as a consequence of a city plan from 1947, which had earmarked the area for industrial activities. Now a car selling company next to the old working class houses wanted to expand. Not only did the conflict lead to an extremely tense situation. A wide and creative engagement involving a broad coalition of people engaged in various ways, along LA 21 intentions. And even more peculiar, the engagement took place in the appointed area for, of all, conservation and rehabilitation of old houses in the name of LA 21.

In a Local Agenda 21 setting the conflict and its outcome were deadly in two ways: First, how could the Environmental section encourage the population to participate in LA 21 processes at the same time as it could be

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argued that the municipality strikes down on those committing them selves to such processes? Second, how would it affect the public's confidence in the local politicians, and their willingness to participate in environmental problem solving, if yet another large grassroots movement was slashed? (The two largest movements in the city over the two past decades concerned environmental issues, in both cases the public were turned down.<sup>12</sup>)

Administrators in many sections gave underground support to the movement, but did not go public as they feared reactions from the political level. During the night before the very last vote on the case, the Christian People's Party surprisingly turned in favor of a last minute compromise between the new city manager and the car company. The houses are saved and the car company will be moving.

Though the final vote took place after the two Local Agenda 21 experiments more or less had come to an end, the results might be of ultimate importance for further attempts to encourage public participation for sustainable development.

A replacement of the section's manager has given new optimism regarding possible support for a further development of LA 21 strategies in the city. Though the former manager delegated responsibility to his executives to work on the concept, his emphasis was on developing and informing on the reasoning for the different source sorting fractions. LA 21, it is claimed, he never endorsed.

As at now, the section is evolving two possible scenarios regarding Local Agenda 21. One is to include the whole city under the umbrella "environment and consumption patterns", supporting initiatives as they emerge. The other is a possible collaboration among the Nordic and Baltic states introducing LA 21 in the primary school curricula. As at yet, Trondheims work on LA 21 so far, made the municipality rank as number 45 among 145 responding municipalities in a national survey concerned with the Local agenda 21 development (Mathiassen, 1998).

Still, however, the general knowledge and understanding concerning LA 21 is low in the administration in Trondheim. In fact, it is so low that the distribution of an information brochure for all citizens in the municipality, developed by the implementation committee, has been postponed until the administration can respond to upcoming public requests. This has not been done yet, and in the meantime, the brochures are still in storage.

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<sup>12</sup> The first case concerned public transportation where the city council favored busses rather than the more environmental friendly tram way. The latter case was an attempt to stop the national oil company Statoil from building a office complex in a popular resort area.

*3.6.5 A dialectic learning process*

When the Environmental section invited the Center for Environment and Development at the local university to participate in the Local Agenda 21 process, it was ultimately to provide knowledge and guidelines to the process. Bringing in the scientific milieu was in accordance with the request given in Agenda 21. Competence on the inquiry was, however, absent at the center at the time. As it was in both parties' interest to build such capacity, a research fellow at the center was welcome to the committee in some kind of a learning dialog. This collaboration is at this point evolving in a master thesis and a Ph.D., in Political science, on the issue.



## 4 ANALYSIS OF THE PROGRAM'S IMPACT

The central objective of the project was to reduce the total amount of waste being generated, or as the municipal's waste management plan for 1997-1999 stipulated it: "not exceed the total amount of waste generated in 1996". Introducing the LA 21 principals the pilot project at Strinda was designed to meet this objective though the objective is not met. The tendency is rather to the contrary.

While measurements from week 39-46 in 1997 shows a total amount of 192,740 kg, measures from the preceding periods show an increase - hence, a total amount of 239, 520kg for week 03-10 in 1998. According to the Waste section these numbers are in general higher than those *prior* to the introduction of the source sorting program.

Though the total amount of waste being generated at source still increases, the amount of waste going to the filling or incinerator has decreased. The source sorting and consequently the source reducing component of the program can therefore be regarded a success.

The Waste Section's own interpretation of the results is that *"introducing the source sorting program in itself does not affect the amount of waste being generated"* (TK, 1996:11). As mentioned above, source sorting and source reduction is a rather technical adjustment, while the waste reducing objectives goes further and require changes in individuals way of thinking and accordingly the way they act – hence the way they consume. This awareness seems to have disappeared in the Environmental Section's concluding remarks to the project. Building on the Waste sections conclusion, three statements has been used by the ES to as reasons for the results of the pilot project:<sup>13</sup>

First, *"Waste reduction does not come as a result of a political resolution only!"*. After observing the hard work and passion among the initiators of the program, this rather simplistic explanation to why waste reduction were not approved in the project is rather puzzling. Was not the idea of the whole program to establish subobjectives as knowledge, resources and motivation in *order to* reduce or at least stabilize the amount of waste generated? In other words, requirements beyond the resolution were given and must therefore be looked into in order to identify loop holes in the implementation process.

The next statement, *"Inhabitants were too busy sorting their waste"* – meaning the program was too complex – might pin point one obstacle. Though the observation is right within the given time frame of the program,

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<sup>13</sup> These results were, among other occasions, presented at «Seminar om kildesortering i Nord- og Sør-Trøndelag», Quality Airport Hotel Stjørdal - 2. Sept. 1998.

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the analysis of the conceptual framework showed that one can expect waste reduction in a medium-long time span. This was based on a general understanding that changed behavior as a result of changed attitudes normally needs time to evolve. The comments from the administration therefore give further evidence of incongruity between theory and design, and between engagement and conceptual consciousness.

The third concluding statement given by the Environmental Section is: *"Route 16 is not by its nature a neighborhood"*. Though rather limited, this is never the less a sufficient description of one of the problems met by the implementers. The potential for creating a local «movement», or at least increasing the local involvement in the issue at stake – as the intention was when introducing LA 21 – was hampered by the fact that Route 16 virtually consists of three neighborhoods. The nature of the settlement on the route tripled any effort of building a «local» engagement (see map p. 16).

However, a telephone survey conducted in the target group in September 1997, on behalf of the Environmental Section's new information branch for waste, had already brought forth an analysis which revealed more nuances to the program results than what the conclusion from the Environmental Section captured in late 1998. Though no sharp line can be drawn between the subobjectives, the following analysis of the results from the 1997 survey, will be presented in categories representing knowledge, motivation and resources. These were the three subobjectives identified as crucial steps in the process of meeting the intermediate objectives, source sorting/source reduction and public involvement, and the final objective, waste reduction (see figure 1 p. 13, and chapter 3.4).

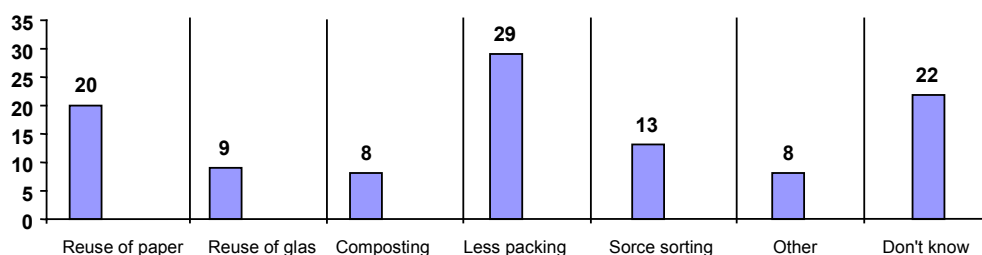
#### *4.1.1 Knowledge*

To identify and measure the variables representing the knowledge category, a selection from the questionnaire based on questions requiring information on: source sorting, source reduction, waste reduction, LA 21 and general environmental awareness, in order to give positive answers were made.

Though only 18 % of the respondents held that source sorting increases their consciousness towards waste and 13% held that source sorting is important in order to reduce the amount of waste, as many as 1/3 mentioned less packaging as ways of reducing waste (see figures below). While the source sorting system helps in reducing the amount of waste going to the landfill or incinerator, less packaging is waste reduction at source. As consumers the public may exercise pressure on the producers to change the packaging. Important here, however, is that there is an awareness of the components in the waste problem. Our assumption is that this kind of awareness might grow into a more conscious consumer, which in the long term might have a positive effect on the waste production.

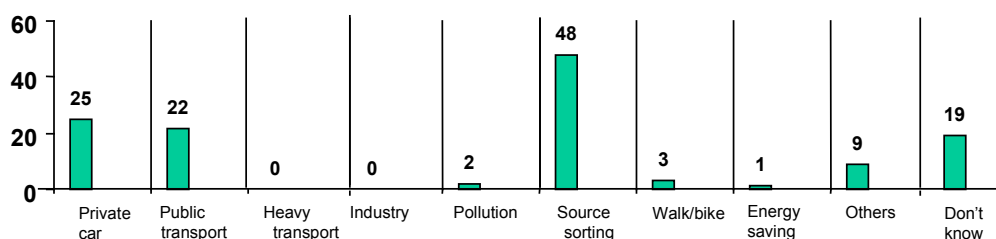
## Contents

*Figure 3: Response to the following question: In what ways would it be easiest for you to reduce the amount of waste at home?*



When asked to list areas in which the respondent held that she or he could help provide a better environment in their local community, 48% referred to source sorting. Though this is a very positive response, it is only an increase of 3% if we make a comparison with the 1995 survey conducted on the whole populace of Trondheim, before the program was introduced.<sup>14</sup>

*Figure 4: Response to following question: Within which area do you believe you can contribute to Improve the local environment?*



A logistic regression analysis where the «source sorting» response is the dependent variable, shows that among the socio-economic variables only gender has a significant impact on the response. The findings indicates that there is a higher tendency for women to regard source sorting as a way of contributing to a better environment than men do (Appendix II, table 1).

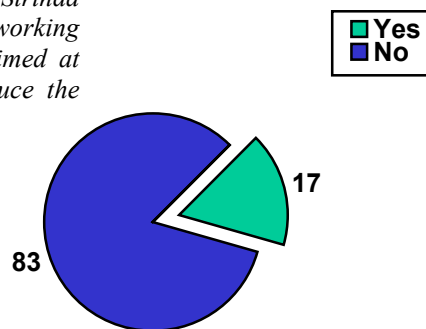
<sup>14</sup> Among the 6 alternatives listed as possible ways of improving the environment in the 1995 survey, "Waste treatment" were then the highest ranked alternative, making an equivalent to the «source sorting» figures in the 1997 survey (Norfakta, 1995).



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Information on the Local Agenda 21 aspect of the project was distributed in the mail to all subscribers on route 16. Despite this, only 17% responded positively when asked if they knew that Strinda district and the Volunteer exchange were involved in a Local Agenda 21 project aimed at making inhabitants reduce the waste generated in their district. When testing for the effect of socio-economic variables on the awareness of the LA 21 initiative, neither of these variables showed any significant effect (Appendix II, table 2).

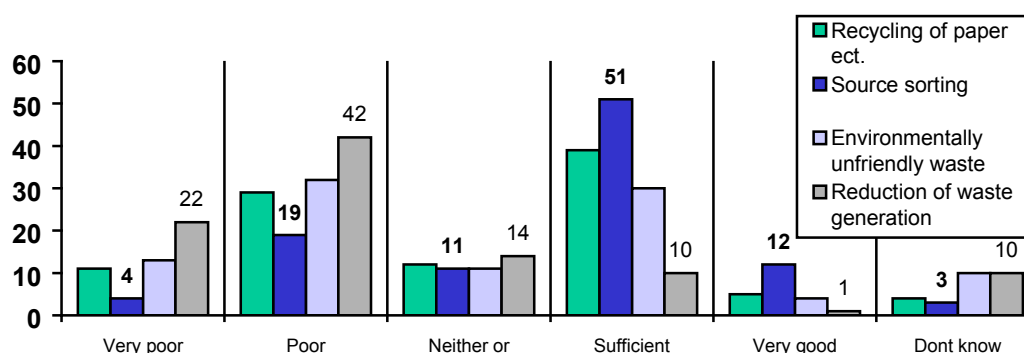
*Figure 5: Question: Are you aware that Strinda district, i.e. Strinda Volunteer exchange, is working on a project called "Local Agenda 21» aimed at making the inhabitants in the district reduce the total amount of garbage?*



A possible explanation to this disappointing result is that information brochures often are regarded as commercial material, and then thrown out when distributed without addressee through the mail. Also important is that when EHG introduced the source sorting program to the Co-ops, though in a context they thought of as Local Agenda 21, the term itself was not mentioned. And as the respondents in the survey were 18 years or older the target group at the school seminars, where LA 21 were introduced in more detail, were not included in the survey.

A more detailed question regarding the sufficiency of the information provided for recycling of paper, source sorting, environmentally unfriendly waste and the reduction of the waste production was also given. Here the respondents were most satisfied with information regarding source sorting (62%), and less satisfied with information about waste reduction (64%). Regarding the complexity of waste reduction compared to source sorting, and the fact that waste reduction was the main objective of the project more information on waste reduction is required. Again, however, this is an issue that needs to develop at the individual level. A follow up question after a longer time period would therefore be interesting. At this point, the fulfillment of the knowledge subobjective must be regarded insufficient.

Figure 6: Question: To what extent do you think Trondheim municipality has given information about.....in your district?



When looking into socio-economic characteristics of the respondents to the more general questions regarding knowledge about the environment, there are only a few significant findings. There are indications that men are more aware of technical installations such as the two return/recycling stations in town than women are; that people informed about these stations are generally older than those who are not; And that families with children have more knowledge about these stations than those without children (Appendix II, table 3).

Women on the other hand responded more frequently than men that use of private care and winter tires with studs (*piggdekk*) is the most environmentally unfriendly factors in the municipality. The higher education one possessed the higher likelihood of giving the same negative response concerning use of private care and tires with studs (appendix II, table 4). There was no significant socio-economic pattern among the respondents who held that the garbage problem had the most negative effect on the environment in the municipality (appendix II, Table 5). However, women, more frequently than men, held that source sorting is a way for them to help improve the local environment (Appendix II, table 6).

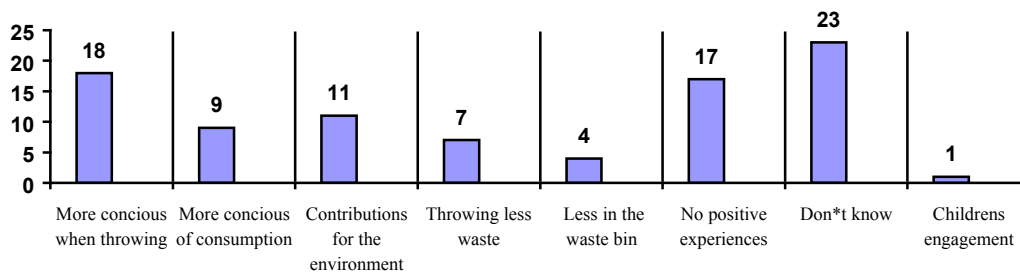
#### 4.1.2 Motivation

In the motivation category questions identifying attitudes/feelings and willingness towards source sorting, waste reduction or other environmental actions are looked into.

A positive feedback from the survey to the program implementers is that 50% of the respondents listed a positive experience from source sorting when asked to do so. Among the positive categories 18% responded that the program had contributed to a more conscious attitude towards what they throw away, which was the highest score among these categories. This, we believe, is a positive trend for the motivation to go a step further and actually

throw less or choose more environmental friendly items at the store. The interpretation of the second category in the diagram below, is that as for now 9% of the respondents along Route 16 do consume along these inquiries.

*Figure 7: So far, what are your positive experiences regarding source sorting?*



Also relevant for motivation is people's judgement of their own possibilities to improve the local environment. As noted above, source sorting got the highest rank before less use of private care and more use of public transport on this question. The high rank for source sorting is regarded positive for the motivation variable. The only socio-economic variable of significance on this question showed a positive correlation between high education and negative attitude towards use of private care, in other words no particular trend for those listing source sorting first (appendix II, table 7).

However, when asked to what degree people tend to believe source sorting will lead them to produce less waste, younger people tend to be more positive than older respondents. (appendix II, table 8). Households with children and people with higher education are generally more *positive* towards source sorting than others when that question is asked specifically (appendix II, table 9).

Only few months after the introduction of the program the EHG could report/confirm that residences in the co-ops along subscription route 16 have started to make even further connections to ways of reducing waste. Based on this development executives in the Environmental Section of the municipality were asked if they believed a more positive curve for waste reduction at Strinda will emerge given a longer time frame. On two occasions the rather surprising response was that they had not thought of that possibility.

Finally, when testing for the effect of what was regarded as knowledge variables on motivation no specific trends emerge. There is only a low

positive tendency that households with children have a general positive attitude towards source sorting compared to other categories (appendix II, table 10).

Though, not over whelming results from the motivation category either, there are positive tendencies for the further development of the program if supported sufficiently.

### *4.1.3 Resources*

The resource category was defined as soft and hard ware material available for the subscribers in order to meet the objectives of the program. These were defined as the pamphlets of information regarding LA 21 and the four waste bins required for the source sorting system. As such it is both required in order to provide knowledge and therefore motivation.

Formally the resource category should be regarded as a technical matter. However, the placement of the waste bins was postponed several time due to delays at production, and because of weather conditions. The timing between the distribution of information and placement of the waste bins may therefore not have been the ultimate.

Neither of the three subobjectives were met sufficiently according to the expectations, however, as the pilot project's unsuccessful experiences may be adjusted prior to an extension of the program.



## 5 IMPLICATIONS OF THE IMPLEMENTATION PROCESS

The study has shed light on two main obstacles for the rather disappointing results in the Strinda project. One is the lack of buy-in for the LA 21 part of the project at both the political and administrative top levels of the municipality. Though the waste reduction objective had the necessary juridical and administrative support at all levels, the general low emphasis on policies not required of municipalities by central government resulted in a "pragmatic" policy design -- in order for the politicians to get the necessary support for the combined project. This, in turn, led to insufficient conditions for evaluation from inspect time to the discovery phase (see model 1, p.13). Rather disappointing results from the implementation of the subobjectives, knowledge, motivation and resources, which were regarded as crucial in order to meet the final objective on the outcome line: waste reduction, may be a direct consequence.

As the time frame became rather short in order to meet the deadlines set for the introduction of the source sorting program, it seems to have affected the one-on-one information concerning Local Agenda 21 which was scheduled, and the waste minimizing aspect, negatively. Having to introduce Local Agenda 21 processes in limited areas, both in terms of issues and geography, important media coverage (information) might have been lost as well. The first obstacle also gave a random target group which were insufficient in order to evolve a common engagement for increased public participation.

By combining the introduction of Local Agenda 21 and the waste management plan, Trondheim municipality put themselves at the vortex of the multilevel character environmental problems occur within.

On one hand municipalities have to implement national requirements. On the other, their independent role as local representative bodies calls for additional initiatives to find solutions for local environmental problems not stipulated in the national policy. When applying the Local Agenda 21 strategy on the waste problem, the municipal set forth a local strategy to meet both local and national requirements within a global environment and development problem solving design.<sup>15</sup> In other words, municipalities receive impulses from above, give signals to national decision making (Naustdalslid, 1994), and at yet another aggregated level their work stimulates the evolution of global trends (Kaye and Solem, 1992). Within

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<sup>15</sup> In addition comes a growing number and characteristics of regional and interregional environmental policy strategies, such as «Interreg», between municipalities in central Norway and Sweden, and the environmental cooperation between Nordic countries and the Baltic states.

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this multilevel frame, different objectives require different time spans and skills for implementation. These elements set forth the complex system local authorities operate within concerning environmental issues.

Combined into one pilot project, in a period with conflicting public policies and reorganization of administration, the design and directives might have been too complex for both target group and implementers in order to meet the objectives. Policy decision should contain unambiguous policy directives and should structure the implementation process to maximize the likelihood for targeted groups to perform as desired. The design in question did not give room for the necessary innovation as the process proceeded, which is crucial to succeed with a dynamic concept as LA21 (Se Gan: 1998: 14-16). Uncertainties regarding the mandate among implementers, maybe as a result of insufficient knowledge and understanding of the concept and those of the actual task, were also evident.

And last, the construction of the coordination committee left out crucial actors for this particular project, such as representatives from the housing co-operatives and small businesses in the area affected by the program.

This notwithstanding the city's early engagement for LA 21, at least in the Norwegian context, though based on individual initiatives - must be credited. The process has started, and its prospect to mature lies in the continuation. As political support for LA 21 has increased in the municipality, a new city manager is in charge of the administration and a national policy is some how more evident, the possibilities for successful outcomes exist. To start the process towards a sustainable development within the administrative body would show a positive example to the public. A second step would be to develop appropriate arenas for dialog and further development of the local level in a sustainable direction.

Whatever happens, it is recommended to use the "Route 16" population as experimental group for one more survey. This might give indicators for a long term effect of the project.

## 6 SUMMARY AND CONCLUSION

This report has sought to give a descriptive and analytic presentation of the local effort to achieve waste minimization by applying Local Agenda 21 processes to the implementation of the Waste management plan in the Norwegian municipality of Trondheim. The project was to link LA 21 to a source sorting program in transit in a randomly selected area of the town. Local waste statistics and telephone surveys shows that neither waste reduction nor changed public participation has been obtained as expected by the plan within the program's two year time span. The report finds that insufficient support for the project from the political and administrative leadership in the municipality resulted in a pragmatic plan, which resulted in a rigid policy design. This in turn, made it difficult for the implementers to meet, sufficiently, crucial sub-objectives, such as knowledge, motivation and resources.

Although the program did not succeed within it's short time span, the findings shows evidence of a positive trend which may evolve in the population given a longer time span and sufficient program support.





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## APPENDIX

### Appendix I

#### **Chapter 28. In Agenda 21; Local authorities' initiatives in support of Agenda 21.**

##### **PROGRAMME AREA**

##### **BASIS FOR ACTION**

28.1. Because so many of the problems and solutions being addressed by Agenda 21 have their roots in local activities, the participation and cooperation of local authorities will be a determining factor in fulfilling its objectives. Local authorities construct, operate and maintain economic, social and environmental , oversee planning processes, establish local environmental policies and regulations, and assist in implementing national and subnational environmental policies. As the level of governance closest to the people, they play a vital role in educating, mobilizing and responding to the public to promote sustainable development.

##### **Objectives**

28.2. The following objectives are proposed for this program area:

- a) By 1996, most local authorities in each country should have undertaken a consultative process with their populations and achieved a consensus on «a local Agenda 21» for the community;
- b) By 1993, the international community should have initiated a consultative process aimed at increasing cooperation between local authorities;
- c) By 1994, representatives of associations of cities and other local authorities should have increased levels of cooperation and coordination with the goal of enhancing the exchange of information and experience among local authorities;
- d) All local authorities in each country should be encouraged to implement and monitor programmes which aim at ensuring that women and youth are represented in decision making, planning and implementation process.

##### **Activities**

28.3. Each local authority should enter into a dialogue with its citizens, local organizations and private enterprises and adopt a «local Agenda 21». Through consultation and consensus-building, local authorities would learn from citizens and from local, civic, community, business, and industrial organizations and acquire the information needed for formulating the best strategies. The process of consultation would increase household awareness of sustainable development issues. Local authority programmes, policies, laws and regulations to achieve Agenda 21 objectives would be assessed and modified, based on local programmes adopted. Strategies could also be used in supporting proposals for local, national, regional and international funding.

28.4. Partnerships should be fostered among relevant organs and organizations such as UNDP, the United Nations Center for Human Settlements (Habitat) and UNEP, the World Bank, regional banks, the international Union of Local

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Authorities, the World Associations of the Major Metropolises, Summit of Great Cities of the World, the United Towns organizations and other relevant partners, with a view to mobilizing increased international support for local authority programmes. An important goal would be to support, extend and improve existing institutions working in the field of local authority capacity-building and local environment management. For this purpose:

- a) Habitat and other relevant organs and organizations of the United Nations systems are called upon to strengthen services in collecting information on strategies of local authorities, in particular those that need international support;
  - b) Periodic consultations involving both international partners and developing countries could review strategies and consider how such international support could best be mobilized. Such a sectoral consultation would complement concurrent country-focused consultations, such as those taking place in consultative groups and round tables.
- 28.5. representatives of associations of local authorities are encouraged to establish processes to increase the exchange of information, experience and mutual technical assistance among local authorities.

### MEANS OF IMPLEMENTATIONS

#### *a) Financing and cost evaluation*

28.6 It is recommended that all parties reassess funding needs in this area. The Conference secretariat has estimated the average total annual cost (1993-2000) for strengthening international secretariat services for implementing the activities in this chapter to about \$ 1 million on grant or concessional terms. These are indicative and order-of-magnitude estimates only and have not been reviewed by Governments.

#### *b) Human resource development and capacity-building*

28.7. This programme should facilitate the capacity building and training activities already contained in other chapters of Agenda 21. » (UN, 1992: 233-234).

## Appendix II

### Coding of variables

#### Socio-economic variables regarded Independent variables

*Gender*: Dummy- variable where gender = 1, if mail = 1.

*Age*

*Children*: Dummy- variable where children =1, if having children in the household =1.

*Education*: High versus low education, high education is assigned the value 1.

*Income*: High versus low income, high is assigned the value 1.

*Estate*: Dummy- variable where estate = 1, if respondents is house owner =1.

*Car owner*: Dummy- variable where care owner is 1, if respondent owing a car =1.

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### Dependent Variables indicating knowledge and motivation:

*Aware of green number:* Dummy- variable where the value of 1 is assigned to respondents who new of the municipality's green number for answering to environmental questions.

*Aware of recycling plants:* Dummy- variable where the value of 1 is assigned to respondents who new of the installations.

*Aware of the LA 21 component of the Strinda project:* Dummy- variable where the value of 1 is assigned to respondents who new of the implementation of LA 21 at Strinda.

*Regarding use of private care and tires with stud as most damaging to the local environment:* Dummy- variable where the value of 1 is assigned to respondents who regarded the two factors as most negative to the local environment.

*Regarding garbage as having most damaging effect to the local environment:* Dummy- variable where the value of 1 is assigned to respondents who regarded the garbage as the most negative factor to the local environment.

*Less use of private car as ways of contributing to improved local environment:* Dummy- variable where the value of 1 is assigned to respondents who were willing to use their car less in order to improve the local environment.

*Source sorting as ways of contributing to improved local environment:* Dummy- variable where the value of 1 is assigned to respondents who regarded source sorting as the best way of improving the local environment.

*To what extent one think source sorting might contribute so that they throw less waste:* Dummy- variable where the value of 1 is assigned to respondents gave a positive answer.

### Results from the Logistic Regression analysis

*Table 1. Empirical results for the influence of socio-economic variables on the likelihood of regarding source sorting as an area one can contribute to improve the environmental conditions.*

<i>Independent variable</i>	<i>B</i>	<i>Sig</i>	<i>Exp(B)</i>
Gender	-,6917	<b>,0174</b>	,5007
Age	-,0026	,8015	,9974
Children	,4814	,1412	1,6183
Education	,1260	,5097	1,1343
Income	-,0731	,4095	,9295
Estate	,1713	,5493	1,1869
Car owner	-,3439	,4742	,7090



## Appendix

*Table 2. Empirical results for the influence of socio-economic variables on the likelihood of having knowledge about the Local Agenda 21 effort at Strinda..*

<i>Independent variable</i>	<i>B</i>	<i>Sig</i>	<i>Exp(B)</i>
Gender	,1820	,6273	1,1996
Age	,0148	,2931	1,0149
Children	,3992	,3488	1,4906
Education	,2119	,3891	1,2360
Income	,1087	,3292	1,1148
Estate	,0163	,9649	1,0164
Car owner	-,2665	,6849	,7661

*Table 3. Empirical results for the likelihood of being aware of the two recycling plants in Trondheim.*

<i>Independent variable</i>	<i>B</i>	<i>Sig</i>	<i>Exp(B)</i>
Gender	,7203	<b>,0876</b>	2,0551
Age	,0366	<b>,0122</b>	1,0372
Children	,9292	<b>,0403</b>	2,5325
Education	-,0696	,7945	,9327
Income	-,0101	,9331	,9899
Estate	,2987	,4581	1,3481
Car owner	-,0851	,8932	,9185

*Table 4. Empirical results for the influence of socio-economic variables on the attitude towards use of private car and winter tires with studs*

<i>Independent variable</i>	<i>B</i>	<i>Sig</i>	<i>Exp(B)</i>
Gender	-,5079	<b>,0848</b>	,6018
Age	,0033	,7462	1,0033
Children	,4813	,1416	1,6182
Education	,5447	<b>,0059</b>	1,7241
Income	-,0219	,8044	,9783
Estate	-,1229	,6704	,8844
Car owner	,0472	,9217	1,0483

*Table 5. Empirical results for the influence of socio-economic variables among respondents who held that the garbage problem has the most negative effect on the environment in the municipality.*

<i>Independent variable</i>	<i>B</i>	<i>Sig</i>	<i>Exp(B)</i>
Gender	-,0767	,8957	,9262
Age	-,0032	,8747	,9968
Children	,0622	,9234	1,0642
Education	-,2149	,5669	,8066
Income	-,0023	,9899	,9977
Estate	-,2995	,6030	,7412
Car owner	-,2213	,8061	,8015

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*Table 6. Empirical results for the influence of socio-economic variables on the likelihood of regarding source sorting as a way to help improve the local environment.*

<i>Independent variable</i>	<i>B</i>	<i>Sig</i>	<i>Exp(B)</i>
Gender	-,6917	<b>,0174</b>	,5007
Age	-,0026	,8015	,9974
Children	,4814	,1412	1,6183
Education	,1260	,5097	1,1343
Income	-,0731	,4095	,9295
Estate	,1713	,5493	1,1869
Car owner	-,3439	,4742	,7090

*Table 7. Empirical results for the influence of socio-economic variables on the likelihood of regarding use of private car as having a quite negative effect on the environment.*

<i>Independent variable</i>	<i>B</i>	<i>Sig</i>	<i>Exp(B)</i>
Gender	-,0566	,8600	,9449
Age	-,0005	,9665	,9995
Children	-,5052	,1583	,6034
Education	,5471	<b>,0116</b>	1,7283
Income	,1553	,1020	1,1681
Estate	-,3785	,2375	,6849
Car owner	,3124	,5949	1,3667

### Results from the Linnear Regression analysis

*Table 8. Empirical results for the influence of socio-economic variables on the respondents likelihood to believe source sorting will make them throw less waste.*

<i>Independent variable</i>	<i>B</i>	<i>Sig</i>
Gender	-,233	,131
Age	-1,180E-02	<b>,031</b>
Children	-3,881E-02	,821
Education	,159	,113
Income	-1,812E-02	,695
Estate	8,876E-02	,557
Car owner	-1,328E-02	,958

## Appendix

*Table 9. Empirical results for the influence of socio-economic variables on the likelihood for the respondents to be positive towards source sorting.*

<i>Independent variable</i>	<i>B</i>	<i>Sig</i>
Gender	-5,043E-02	,608
Age	-4,195E-04	,904
Children	,216	<b>,050</b>
Education	,129	<b>,045</b>
Income	1,221E-02	,679
Estate	-,105	,275
Car owner	-,111	,495

*Tabell 10. Empirical results for the influence of socio-economic and "knowledge" Variables on the motivation for source sorting.*

<i>Independent variable</i>	<i>B</i>	<i>Sig</i>
Gender	-1,666E-02	,870
Age	-8,809E-04	,805
Children	,188	<b>,097</b>
Education	,100	,132
Income	1,094E-02	,715
Estate	-9,313E-02	,342
Car owner	-,101	,536
Aware of green number	7,313E-02	,465
Aware of recycling plants	-3,867E-03	,978
Aware of LA 21	,134	,289
Negative to private care and use of tires with stud	,116	,248
Garbage a big problem	,132	,496
Use of private car negative	6,897E-02	,526
Source sorting to improve	,116	,241

Rapporter utgitt av  
Program for industriell økologi  
Norges teknisk-naturvitenskapelige universitet

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|------------------------|--|---|
| 1/1999<br><del>A</del> | Ingvild V. Malvik, Elin<br>Mathiassen, Terje Semb              | <i>Bærekraftig mobilitet – en visjon for<br/>framtiden?</i> |
| 2/1999                 | Jørund Buen, Karl C. Nes,<br>Vidar Furholt, Karine<br>Ulleberg | <i>Prosjektoppgave i Industriell økologi</i>                |