SUSTAINABLE URBAN AREAS

2

Introduction to sustainable urban renewal

CO_2 reduction and the use of performance agreements: experience from the Netherlands

Claudia Boon
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Foreword

This research project 'Introduction to Sustainable Urban Renewal' has been conducted as part of the Habiforum BSIK programme 'Innovative use of Space'. The project is also part of the Corpovenista programme which is funded by the Aedes federation of Dutch housing associations and eight housing associations. Furthermore the Foundation of Building Research (SBR) supported this project.

Before the 'Innovative use of Space' programme started on 1 January 2004, this research project was already underway, headed by Gerda Klunder, in collaboration with two housing associations, Woonbron Maasoevers in the Rotterdam area and Staedion in the The Hague area, and the Foundation of Building Research. In this report we present the research results for 2003.

We would like to thank Jon van Eenennaam (Woonbron Maasoevers), Fattah Kabbaj (Staedion), Hans Vingerling (SBR), Peter van Oppen (SBR), Gerda Klunder and Henk Visscher (OTB Research Institute for Housing, Urban and Mobility Studies) for their participation in the committee which commented on and supervised the findings of this first part of the ICES-KIS research programme.

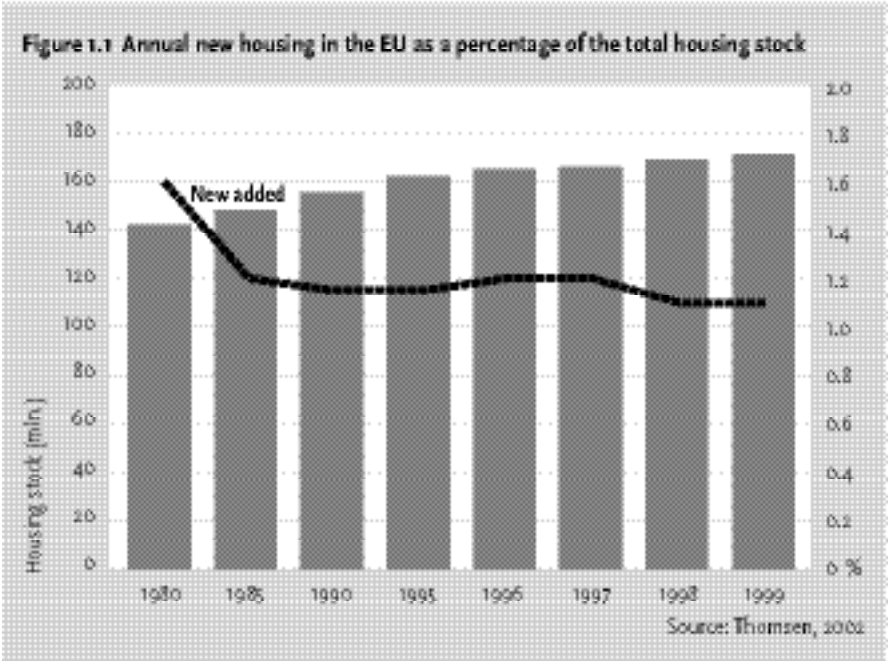
Claudia Boon and Minna Sunikka,
Delft, August 2004

1 Introduction

1.1 Why urban renewal as a focal point of sustainability?

As in other European countries, the renewal of post-war housing estates is a major policy issue in the Netherlands. The aim is to upgrade post-war neighbourhoods by means of demolition, the renovation of social rented housing and the construction of new owner-occupied dwellings. This process of renewal will pursue high targets and ambitions as it gets underway in the coming years. Not only will different parties have to work together in the complex area of renewal, they will also have to formulate policies and objectives for sustainability and development. Sustainability is a highly complex concept as it embraces a whole battery of interconnected social issues and uncertainties which are difficult to address. All in all, urban renewal will emerge as a major theme in the building sector in the years ahead. It will lead to major interventions in the housing stock and – at the same time – rigorously challenge the market players to make existing dwellings more environmentally-friendly and to develop sustainability in post-war housing. The existing housing stock is a key factor in attaining the greenhouse gas reduction targets in the Kyoto Protocol. The largest energy consumers are households and the tertiary sector (European Commission, 2001). In 2000 the CO_2 emissions from domestic energy consumption amounted to approximately 23 million tonnes in the Netherlands, representing 12% of all CO_2 emissions (CBS/RIVM, 1999; Crommentuijn & Verbeek, 1999). In the EU 1.9 million units of new housing are produced every year, amounting to 1% of the building stock (see Figure 1.1). Dwellings yet to be built will constitute 15% of the total housing stock in 2020 and 5-10% in the Kyoto period, 2008-2012 (NOVEM, 2002). This research project is intended as an introduction to sustainable urban renewal. By presenting two case studies it offers insight into the environmental policies of Dutch housing associations and municipalities. Focusing specifically on the role of performance agreements in realising sustainability ambitions, it also assesses the feasibility of CO_2 reductions and examines the costs and decision-making processes.

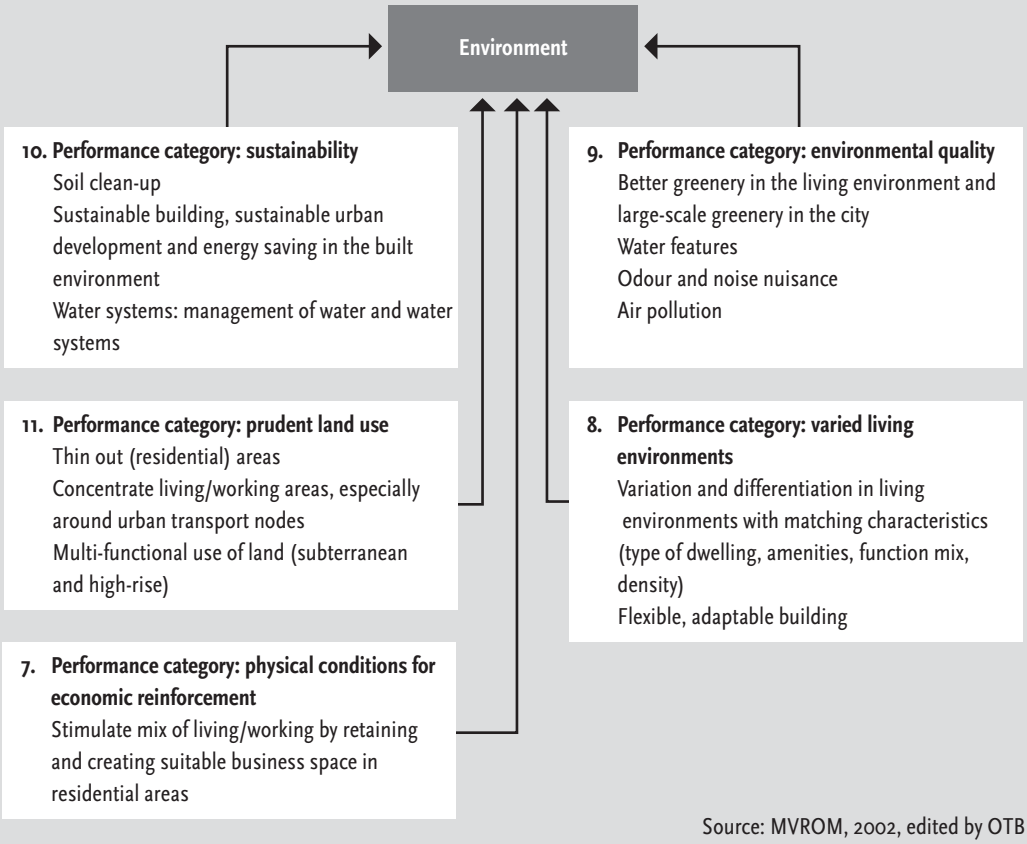
Ever since the Ministry of Spatial Planning, Housing & the Environment (MVROM) presented its first Action Plan for Sustainable Building (*Plan van Aanpak Duurzaam Bouwen*) in 1995, a lot of energy has been invested in the introduction and implementation of sustainability in everyday design, building and management. Though a fair amount of experience has been gathered in the practical application of sustainability procedures in new building and urban expansion, hardly any has been gained in the improvement and reorganisation of housing estates. This will change in the next few years, when large-scale investments under the Major Cities Policy (Grotestedenbeleid, GSB) and the Investment Budget for Urban Renewal (Investeringsbudget



Stedelijke Vernieuwing, ISV) open up key opportunities in the existing stock. The purpose of these investments is to create mixed living and working environments which will strengthen the cities and create more flexibility in the future. In 1997 the MVROM set goals for urban renewal in its Urban Renewal Policy Document (*Nota Stedelijke Verniewing*). The restructuring of post-war housing estates forms an integral part of its plans. The policy document presents the restructuring process as a package of socially and economically desirable interventions in the built environment. Some researchers claim that the social and technical problems of post-war housing are symptomatic of economic and political problems (Woolley, 1985). Current policies and policy instruments for sustainable building are, however, slowly turning away from new development projects and focusing more on utilising the environmental potential of the existing housing stock (Sunikka, 2001; 2003a; Beerepoot 2002). Despite the availability of up-to-date knowledge and instruments, government policy and practice appeared to have parted company, with the result that sustainable housing is slowly being modified. Several obstacles have been identified at policy and strategic level; notably, the perceived costs of implementing environmental management, the lack of market demand and poor delivery of benefits (Sunikka & Boon, 2002).

The terms ‘sustainable building’ and ‘sustainable urban renewal’ are pivotal in our research. Stemming from the more general notion of ‘sustainable development’, these two concepts first appeared in the Brundtland Report, *Our Common Future* (WCED, 1987). The ultimate aim is the realisation of “a life in dignity for the present generations without threatening the life in dignity of the future generations”. As this statement is open to wide interpretation, we first need to establish more narrow definitions. In 1993 the MVROM stated that the purpose of sustainable building is “to reduce the impact of construc-

Figure 1.2 Performance categories for sustainability in urban renewal



Source: MVROM, 2002, edited by OTB

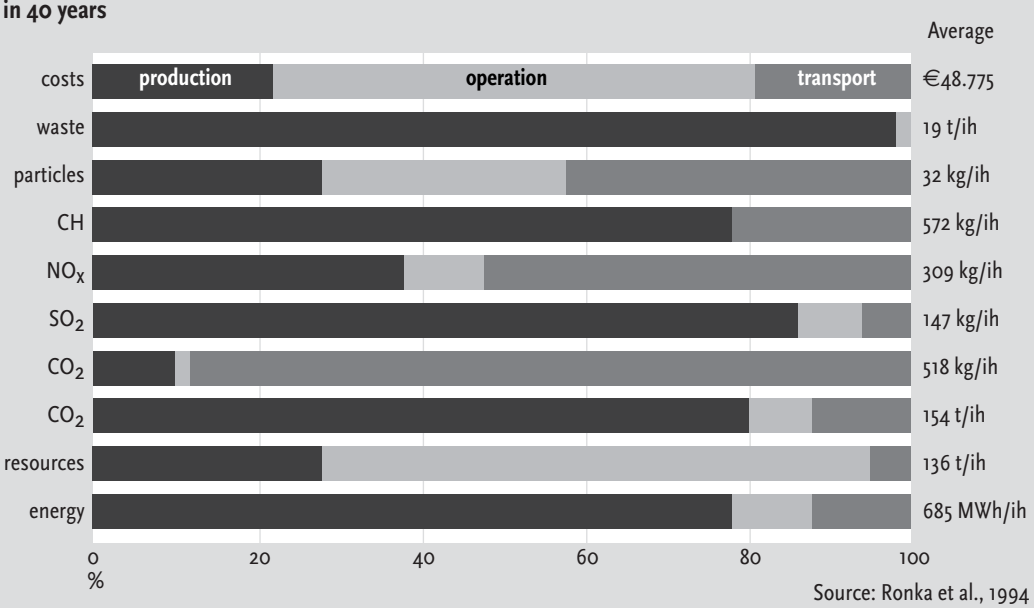
tion, buildings and built-up areas on health and the environment". As time progressed, the concept was expanded to include flexibility, the quality of urban planning, health and welfare, and social and economic interests, besides the 'environment' (Hendriks, 1999). The second concept, sustainable urban renewal, differs from mainstream urban renewal insofar as it accords priority to the environment. However, the literature provides very few definitions. Our research project endorses the definition formulated by Bus (2001): "Sustainable renewal is a district-based approach geared to solving existing problems, preventing new problems, improving the quality of the local environment and reducing supra-local environmental pollution." This implies that sustainable urban renewal is not a question of ecological sustainability alone, but also of social and economic interactions. The same implication is evident in the performance categories identified by the MVROM in its *Investment Budget for Urban Renewal* (MVROM, 2002). The 'sustainability' category concentrates solely on the physical environmental aspects of urban renewal, such as soil clean-up, energy saving and noise control. However, the ministry indicates that sustainability is also influenced by economic and socio-ecological factors, and that spearheads or priorities could therefore fall under several categories (see Figure 1.2). Our project addresses sustainable building and

sustainable urban renewal in a contemporary setting. Hence, both concepts are inextricably linked with themes such as flexibility, differentiation of the housing stock and housing quality. The performance categories in Figure 1.2 will therefore serve as our departure point. A performance agreement in sustainable urban renewal is understood as a written undertaking between a municipality, a housing association, and possibly some other parties, which sets out policy goals for sustainable building in the restructuring of post-war housing estates.

1.2 Aims and scope

There are four main strategies for tackling problematic housing estates: demolition, renovation, maintenance, and non-action. In the Netherlands, demolition followed by new construction has become a common policy in renewal projects (Thomsen, 2002; Tellinga, 2004), even though the renovation of post-war housing can cut energy costs and consumption, curtail a rise in the demand for new housing, and improve the indoor air quality. In the Netherlands, a reduction of 3.6 Mton of CO_2 emissions could be won from existing housing if an average of €2,300 was invested in each dwelling and if the energy tax was raised 2.5 times to shorten the payback time (ECN, 1998). Another study by Slot et al. (1998) estimates a potential CO_2 reduction of 13-44% (3.1 – 10.6 Mton) depending on the effectiveness of the measures, and claims that an average investment of €954 could already secure savings of 13%. Nonetheless, measures to reduce CO_2 emissions, such as insulation and solar energy, are often rejected in practice, and the environment still does not figure significantly in current restructuring projects. The research by Bus (2001) on sustainable urban renewal suggests that decisions on demolition-and-new-construction are not based on environmental considerations, but on economic projections of the housing market. In the two housing estates that featured as case studies in this research, very little attention was paid to waste prevention, energy saving or the use of new materials. The type, size, location and market position of a dwelling were more important than its environmental performance when decisions were taken on whether to remove it from the market (Bus, 2001). Waals et al. (2003) argue that the widely-held belief that this situation is cost-related is only partly true, as cheap options like double glazing are sometimes left out in renovation projects, whereas more expensive technology, like photovoltaic systems, is successfully applied. In this research we focus on renovation because – as already mentioned – renovation can reduce energy costs and consumption, curtail a rise in the demand for new housing and improve the indoor air quality without creating environmental problems associated with waste dispoal and the consumption of new resources.

Figure 1.3 Environmental impact of a housing area in terms of production, operation and transport in 40 years



Source: Ronka et al., 1994

Failure to replace the existing housing at an adequate pace is causing a shortage in supply. In most EU states, demolition accounts for 0.2% annually. But, even if all new building were designated for the replacement of demolished dwellings, it would still take over a century to replace the stock. New building projects can take a long time, being subject to production restrictions and demolition processes. Power & Mumford (2003), who studied low-demand neighbourhoods in the UK, found that though the demolition of unpopular apartment blocks can increase the popularity of the surrounding houses, it can also signal a general lack of confidence and make things even worse. An air of uncertainty about the future of a neighbourhood sends out 'zero value' signals and scares off potential new applicants. Before long, the same symptoms start to appear in other neighbourhoods nearby. Power & Mumford (2003) conclude that the low demand is more to do with the poverty and unemployment in such neighbourhoods than the quality of the housing. In 2000, the monthly rent for 90% of social housing in the Netherlands was less than €412. Affordable social housing is declining along with rent subsidies (Thomsen, 2002). Yet, in most renewal projects, the housing for high- and middle-income households is disproportionately high compared with the housing for lower-income households. In Figure 1.3, Ronka et al. (1994) present the environmental impact of a housing estate in terms of production, operation and transport over a period of 40 years. Renovation can make a deep impact on operation and transport. The use of existing structures for production reduces the need for new materials and saves energy.

The pragmatic line which the government has adopted towards sustainable building since the 1990s has not led to broad-scale application by local authorities, developers, designers, advisors or builders (Houben, 2002). The

question that needs to be answered is whether the covenants between the government and the business community have created a situation in which sustainable building can continue under its own steam. Though these covenants have helped with the conceptualisation and formulation of ambitions for sustainable building, they have not resulted in very much action so far. The same reservations can be expressed about special instruments, such as Optimising Energy Infrastructure (*Optimalisering Energie Infrastructuur, OEI*), Energy Performance on Site (*Energie Prestatie op Locatie, EPL*) and Sustainability Profile for a Location (*Duurzaamheidsprofiel voor een Locatie, DPL*). In June 2002, a question was raised in the Permanent Parliamentary Committee of the MVROM as to how the ministry intended to fulfil its brief to embed sustainability across the whole spectrum of the building sector, when there were no means of verification. Similar questions were asked regarding the objectives for sustainable urban development. Performance agreements can serve as a gauge for sustainable building and help to anchor it in everyday practice, but there is still nowhere near enough experience on this front.

1.3 Central questions of the study

As explained above, scarcely any experience has been gained of performance agreements in sustainable urban renewal. This is the first time that a project has explored whether and how performance agreements can assist the realisation of the policy goals for sustainable building and the action plans for a district or neighbourhood. Figure 1.4 shows the relationship between municipal and housing association policy, the planning process for reorganising post-war estates, and performance agreements. The feedback from performance agreements indicates that performance agreements can result in policy revisions or extensions.

In physical terms, not enough is known about the potential in the existing housing stock for reducing CO_2 emissions and the related costs. Moreover, as mentioned earlier, decisions on demolition-and-new-construction are not based on environmental considerations, but on economic visions of the housing market. Our research was therefore conducted from two angles: the physical angle, i.e. the potential for CO_2 reduction and the related costs; and the process angle, i.e. the policy, the planning process and the role and potential of performance agreements. The first aim of the project is to enable municipalities and clients to translate sustainability ambitions and objectives into performance agreements when compiling a programme of requirements for a neighbourhood renewal plan. The second aim is to give urban renewal parties deeper insight into the potential of the existing stock for reducing CO_2 emissions and the related costs

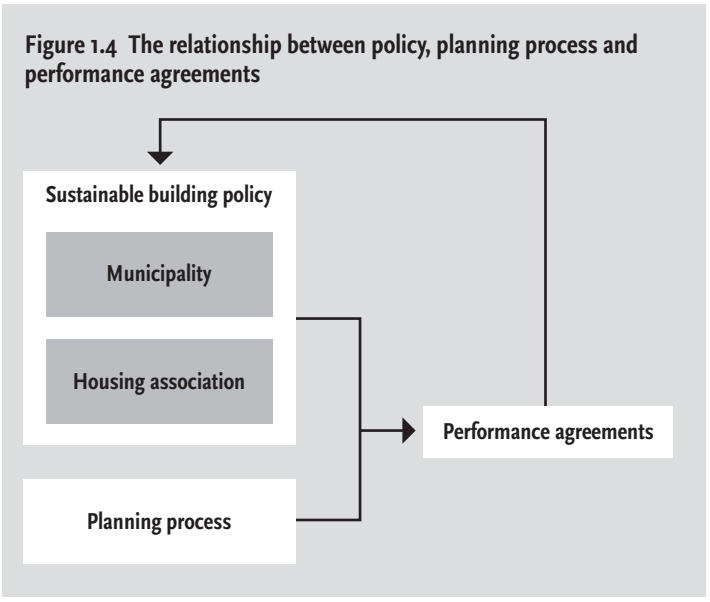


Figure 1.4 The relationship between policy, planning process and performance agreements

All of this raises a number of questions: What kind of CO_2 reduction is feasible in the sustainable renewal of post-war housing estates? What role can performance agreements play in the implementation of sustainable building when restructuring plans are being compiled for post-war housing estates? How can the results of this study help to clear up the ambiguity in the concept of sustainable development?

The questions that need to be answered from the physical angle:

- Which European, national, regional and municipal environmental policy developments are relevant for social housing associations in the near future?
- How can renovation contribute to energy efficiency as an alternative to demolition-and-new-construction in the renewal of post-war housing estates? What expenditure is required and what receipts are anticipated?
- Which policy developments make investments in energy efficiency more attractive in the near future?
- What kind of policy instruments are required to support energy efficiency in urban renewal?

The questions that need to be answered from the process angle:

- What ambitions and objectives do municipalities and housing associations formulate in their policy for sustainable building?
- How is the planning process organized?
- What parties play a role in the planning process and what influence do they have?
- Have performance agreements already been reached for sustainable building?
- What experience has been gained of performance agreements in general and in sustainable building in particular?
- Under what circumstances would performance agreements for sustainable building be a fitting instrument?
- How can performance agreements operate?
  - What kind of performance agreements can contribute to sustainable building in urban renewal?
  - What place can be assigned to performance agreements in the planning process?
  - How can the implementation of performance agreements be tracked and monitored during the planning process?

1.4 The approach and components of the research

This research recognizes the environmental aspects of sustainable urban renewal in terms of both quality and quantity. As the question of quality becomes more complex at neighbourhood level, case studies may provide the best avenue of research. The case study is a common tool whenever 'which' 'who', 'what', 'where', 'why' and 'how' questions need to be answered (Yin, 1993). The case studies will shed light on the complexity of urban renewal (including the current bottlenecks and arguments) and help us identify the environmental problems of post-war housing estates. The case studies in this project were selected according to three key criteria:

- They had to involve a post-war residential housing estate as most of the restructuring will be carried out in such neighbourhoods.
- They had to involve ambitions and objectives for sustainable building.
- The planning had to be sufficiently developed for us to explore the scope and limitations of performance agreements.

All three criteria were met by the case studies provided by the housing associations: Morgenstond Midden in The Hague and Oedevlietsepark in Hoogvliet, Rotterdam. Both were built in the 1950s and the housing associations, Woonbron Maasoevers and Staedion, and the Municipalities of The Hague and Rotterdam are busy with sustainable building. Social housing predominates in both case studies. Morgenstond Midden is located in a typical early post-war housing estate, close to the city centre in a pleasant neighbourhood. It is a relatively high-demand neighbourhood which displays many characteristics of post-war housing. Conversely, the second case study, Oedevlietsepark, is located in a low-demand area on the outskirts of the city. It resembles a late post-war neighbourhood but has more space and the surroundings are monotonous. A restructuring brief and plan had been formulated for both locations. The case studies were examined from the physical and the process angle. The Netherlands was chosen because it has emerged as an international leader in environmental issues since the mid-1980s. It also has a tradition of effective planning and consensus politics. At present the Dutch are displaying creativity in their approach to environmental policy, also at municipal and regional level (Cohen, 2000).
The research was split into four phases:

Phase A: Policy analysis based on information from the case studies
Our aim in this phase was to answer research question 1 (physical angle) and questions 5-7 (process angle). We studied documents and conducted preliminary interviews with the municipalities and housing associations (see Appendix A) in order to get an idea of their policy on sustainable building, flexibility,

differentiation, and housing quality. Environmental policies and policy instruments (taxation and regulations) were examined at European, national, regional and municipal level. We also ascertained if any performance agreements already existed between the parties.

Phase B: Feasibility studies about the reduction of CO_2 emissions in post-war housing, based on the case studies

Research questions 2-4 were examined in feasibility studies on energy efficiency. We focused on buildings when assessing improvements to energy performance. We also studied the cost implications of the proposed energy-saving measures, together with payback times and relevant policy developments in the near future. Functional lifespan also constitutes an important factor in renovation and demolition decisions, because it is usually shorter than the more often studied technical lifespan. The reason behind renovation is more often functional outmoding than technical problems: thus, a space or a component might not meet present-day requirements, while the technical lifespan is nowhere near exhausted. In this research, the extension of functional lifespan relates to home improvements, such as new kitchens or bathrooms, so that the dwelling reflects present-day functional requirements. The extension of functional lifespan in the two case studies was based on the existing plans for the dwellings, the residents' survey and the programme of requirements compiled the housing association.

Phase C: Analysis of the planning process and experience of performance agreements

The second phase addressed questions 8-10 (process angle), concentrating particularly on the scope and limitations of performance agreements in the planning process. We interviewed key players (see Appendix A) about the planning process: we asked them to describe their experience of performance agreements in general and to suggest how performance agreements could help realize sustainability ambitions and objectives in renewal projects. This helped us to pinpoint the moments when performance agreements could play a role and to identify the ambitions and objectives that could feature in them.

Phase D: The creation of a model representing the role of performance agreements for sustainable building in renewal projects

This phase sought to answer research question 11 (process angle). The results of the survey were converted into a model representing the process of reaching performance agreements. Examples were also included on the basis of an additional literature search. The model needs to be tested and further developed and fine-tuned in a later stage.

This report is split into three parts. The introduction is followed by Part 1, which briefly explains the theoretical aspects of sustainable urban renewal. Chapter 2 begins with the presentation of the field of study which is further explored in Chapter 3. European, national, regional and municipal policy developments are examined together with the environmental policy of the housing associations in Chapter 4. Chapter 5 presents the case study of Oedevlietsepark in Hoogvliet from the physical angle and then from the process angle. Morgenstond Midden in The Hague is discussed in Chapter 6. Chapter 7 describes a model for fleshing out performance agreements. Finally, conclusions are drawn in Chapter 8.

Part I
Context

In this part of the report we set out our theoretical framework and explain the concept of sustainability in order to place our research in the context of sustainable development. We intend to examine, amongst others, the potential role of performance agreements in relation to sustainable building in urban renewal planning processes. First, however, we need to understand the theories and developments surrounding decision-making processes, planning processes and performance agreements. This will clarify the context of the decision-making and planning and uncover opportunities for performance agreements on sustainable building in urban renewal. In addition, by treating the decision-making process as a policy network we will be able to find ways of analysing the two case studies. A discussion of the modern challenges facing the social housing sector will shed light on the role of social housing in sustainable urban renewal, as these also figure in the background in the case studies. As the aim of this research is also to deliver policy recommendations, we shall explain our approach to policy instruments. This part further introduces the principles for the feasibility studies (see Part 2), along with more general references to the reduction of CO_2 emissions in the domestic sector, the extension of the functional lifespan of housing and some international examples. It is not our intention to provide an exhaustive account of the above-mentioned developments and theories; only those which are relevant to this study are addressed.

2 Strategies for sustainable urban renewal

2.1 Introduction

In this chapter we describe the theoretical framework and practical considerations that form the starting point for our analysis of energy efficiency in housing and the decision-making and planning processes in the case studies plus the development of a model for performance agreements. Section 2.2 looks at sustainable urban renewal: it describes the concept of sustainable development, the decision-making process, the planning process and the role of the social housing sector. Section 2.3 discusses policy instruments for sustainability and energy efficiency and touches on the history of performance agreements. Section 2.4 presents concepts and international examples for feasibility studies on energy efficiency. Section 2.5 focuses on the extension of the functional lifespan.

2.2 Sustainability and the renewal of post-war housing

2.2.1 Concepts of sustainability

Reliable estimates of the earth's resources have lead to the conclusion that the consumption of energy and materials in industralized countries needs to be reduced to 5% of its present level within the next 50 years. This alarming figure has met with a whole array of reactions, ranging from total disbelief to diffidence (Tjallingii, 1996). Over the past three decades the focus of the environmental debate has shifted from 'survival' to 'responsibility and stewardship' (Cole, 2004). Lately, there has also been a lot of discussion about the extent of environmental problems (Lomborg, 2001). A widely-held position is that, until environmental instability starts triggering natural disasters, ecological issues will be politically eclipsed by economic, social and military priorities (Ingersoll, 1991). Mounting geo-political tensions associated with global terrorism and the responses to it seem to confirm this notion (Cole, 2004). Sustainable development continues to be a subject of debate, defined ambiguously – as in the Brundtland report (WCED, 1987) – at one end of the spectrum and treated purely as a technical concept at the other (Beckerman, 1994). Perman *et al.* (2003) have distinguished six main concepts of sustainability. Three of these are basically economic in nature and two originate with ecologists. The main difference between the economic and ecological approach to sustainable development is that the ecologists tend to support 'strong sustainability' and favour some variant of 'keep the natural capital intact' whereas the economists, the 'weak sustainabilists', tend to favour 'keep the total capital intact'. Ecologists are usually less optimistic than economists about the possibilities of substituting man-made for natural capital.

They are also more inclined to urge a cautious approach to policy objectives, and less inclined to rely on price incentives as policy instruments (Perman *et al.*, 2003). The sixth concept 'sustainable building as consensus-building and institutional development' is really a group of concepts in which sustainability is seen essentially as a problem of governance in the broadest sense. Our research is based on the institutional concept of sustainability. Sustainability problems are even more difficult to address in an urban context, where the relationship between people, the social environment and accommodation is deeply complex (Brandon, 1999).

As the institutional approach to sustainable development includes aspects of the economic approach, the theory of ecological modernisation also makes a suitable theoretical framework. Moreover, the theory of ecological modernisation endorses a policy of legislation and incentives to encourage sustainable development. The essence is to emancipate ecology from culture, politics and economics. The proponents of ecological modernisation argue that industrial society embarked on a new era in the 1980s. They suggest that we have now entered the third industrial revolution: a radical restructuring of basic production processes along ecological lines. As a political programme, ecological modernisation says that environmental problems should be solved by harmonising ecology and economy through 'superindustrialisation', and not 'deindustrialisation' (Spaargaren & Van Vliet, 2000). The ecological modernisation theory builds on the synthesis between environmental and economic benefits and argues that certain types of policy intervention can result in economic and environmental benefits at one and the same time. Innovative and strict environmental regulation by the government and incentives for environmental improvement are seen as a way of driving industry towards environmental innovation. This process calls for the invention and diffusion of new technologies and production techniques which will promote environmental and economic benefits.

Some studies, however, doubt the optimism of ecological modernisation, claiming that the theory is economically oriented, narrowly focused and indifferent to social equality (Mol *et al.*, 2000). For example, the modernisation of a recycling system delivers only marginal ecological gains (Pellow *et al.*, 2000). Furthermore, the policy ambitions are determined by short-term feasibility. Pellow *et al.* (2000) argue that the theory of ecological modernisation aims at 'win-win', but results in 'zero sum'. The application of this theory is limited in housing, because the construction sector is low-technology, heterogenous and long-term. From the environmental perspective, it is not production-focused but operation-focused. Furthermore, the research shows that there is not yet a real market demand for sustainable building (SBR, 2001; Sunikka & Boon, 2002). We have taken these limitations into account in our research. We also recognize that any kind of environmental modernisation or

efforts to achieve real sustainable development entail fundamental changes in mindset. Even in the best situations, the focus is now on incremental innovations and gradual technological improvement. This applies likewise to our own project. However, we also consider the standpoint that sustainable development requires radical innovations, discontinuous change and the introduction of new technologies from the process perspective as well.

2.2.2 The decision-making process

Decision-making processes are usually complex in urban renewal. There are several theories for this (Klijn, 2003): one theory is that the dramatic changes in society over the past decades have led to new decision-making procedures. For example, in a modern 'network' society many organisations have attained high levels of specialisation in various subjects and products. As a result, key decisions on sustainable urban renewal need to be taken at all sorts of places and initiative-takers need to partake in all sorts of discussions. Another theory is sought in the trend towards individualisation, which has added to the complexity. The private citizen is more assertive than ever; he demands quality and wants a say in what happens in his neighbourhood. In recent years some organisations have been experimenting with different input formats to improve the quality of the decision-making, but these have only made things more complicated. So, there is no easy way of identifying spatial or other qualities for sustainable urban renewal (Klijn, 2003). To get an idea of this process, which includes different interpretations of quality and is subject to societal dynamics, we shall approach decision-making as a policy network. Numerous studies have been conducted along similar lines (see e.g. Castells (2000); Klijn (1996); Teisman (1998), De Bruijn *et al.* (2000)). Decision-making on sustainable urban renewal fits in clearly with the definitions of policy network provided by these studies. Klijn (1996) describes policy networks as more or less stable patterns of social relationships between players, which form around policy problems and/or clusters of resources which are created, maintained and changed by game-playing. He identifies three main characteristics:

- Mutual dependence between players.

There is no chief player in a policy network (like the government in the past). The participants each have their own agenda and interests, but these are intertwined with the agendas and interests of the other participants. The players are bound to each other because they need each other's resources to bring a policy process to a satisfactory conclusion (Klijn, 1996).

- Differences in perception.

Each player in a policy network has his own perception of reality, which is heavily dependent on his background. So, the players see the situation in different ways and have different ideas of the goals that need to be achieved

and the policy problems in (Frissen, 1997).
- Durability in the relational patterns.

If there is no durability in the relationships between the players, there is no network, there is only an incidental string of interactions between independent parties. Rules and values emerge which then influence future interactions (Klijn, 1996).

These three characteristics are present in the process of sustainable urban renewal. The decision-making process for sustainable urban renewal in the two case studies was therefore examined from this perspective. The same applies to the characteristics of sustainable urban renewal which are discussed in detail below.

Mutual dependence between players

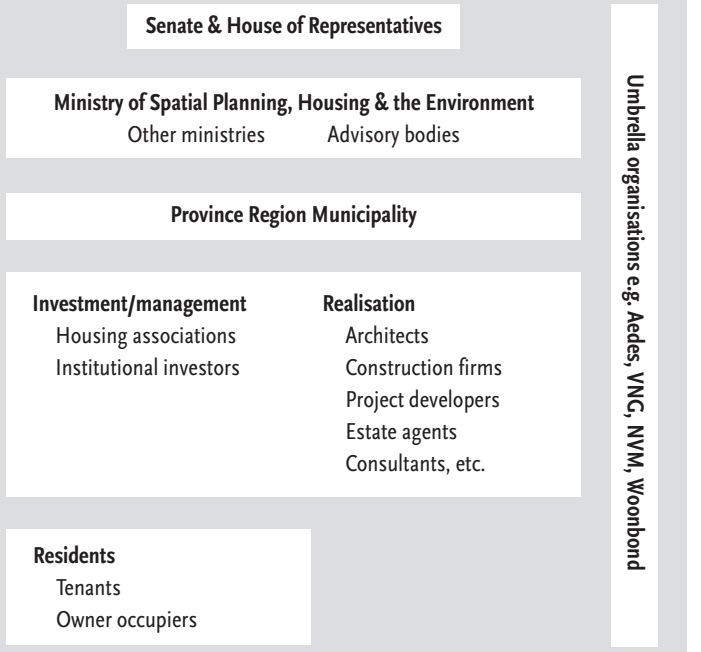
Various players bear responsibility in the process of sustainable urban renewal, including the government, the housing associations and the residents (see Figure 2.1). Parties from the public and the private sector are involved at different levels. Though these parties each have their own agenda, they are dependent on one another when it comes to giving actual substance to the process. This complicates things somewhat. Kräwinkel (1997) provides an overview of the main players in the public housing sector, though it should be said that one cannot, strictly speaking, refer specifically to the players, as different markets and segments may involve different parties (see Figure 2.1).

The municipality and the housing association are leading players in the process of sustainable urban renewal. They are primarily responsible for building and developing a designated area. However, their roles have changed dramatically since public housing was decentralized in the early 1980s and housing associations were privatized in the 1990s. The municipalities adopted a more facilitative role while the housing associations became independent and took on more responsibility. The two sides are now on an equal footing and are more dependent on each other. We shall now discuss the new role and position of municipalities and housing associations and the implications for performance agreements (see Figure 2.1).

The municipality

The role of the municipality has been transformed by decentralisation, more empowered housing associations and the abolition of object subsidies. The municipality is no longer the supervisory body which makes sure that housing is secured and improved for low-income groups in particular. On the contrary, as an equal party in the urban renewal process, the municipality now has to negotiate and coordinate. This new position calls for a new approach, new types of intervention and new steering instruments (Ouwehand, 2000). In this new scenario cooperation with housing associations has become more

Figure 2.1 The principal players in the public housingsector in the Netherlands



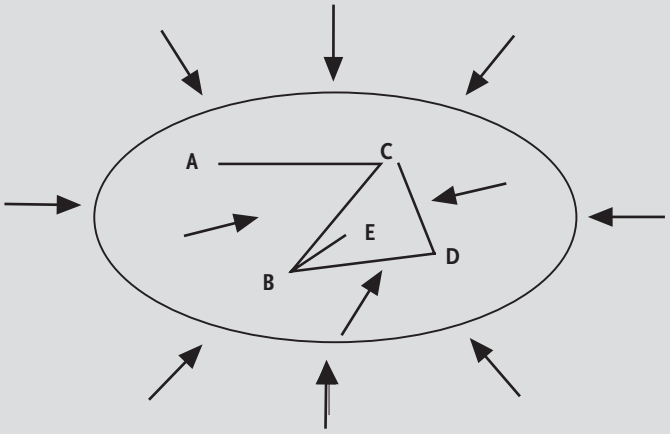
Source: Kräwinkel (1997), edited by OTB

important – cooperation in which both parties are responsible for fleshing out and implementing the urban renewal brief.

The housing association

A fundamental change has also occurred in the position of the housing association. It is now more of a private enterprise and has ceased to be dependent on the government (Ouwehand, 2000). The housing association is no longer an extension of the municipality and is free to formulate its own policy. Originally, housing associations were responsible for the social rented sector, but now they operate more in the markets for medium- and high-priced housing. The greatest challenge facing the housing associations in the next ten years is urban renewal. In the past the municipalities were responsible for the restructuring programme; nowadays more and more housing associations are assuming the role of overall developer. Agreements are reached whereby the housing association accepts responsibility and bears the financial risks for both the land development and the construction. This division of roles in which execution is placed in the hands of one agency helps to speed up the realisation of renewal programmes. As the municipality and the housing association clearly need each other to give shape and content to the process of sustainable urban development, they appear to be mutually dependent. Kräwinkel (1997) contests this, maintaining that the government still occupies a special position in a policy network and is therefore not on a truly equal footing with the other players. Kräwinkel claims that this special position is reflected in the central position of government in public housing and cites government involvement via regulations as an example. This involvement is frequently linked to formal powers which determine the progress of the decision-making. A classic example is the need for a municipal permit for demolition work. There is no way that a housing association can circumvent the municipality when it comes to demolition projects. Kräwinkel says that her own vision is succinctly expressed by Hufen & Ringeling (1990, foreword): "Anyone who likes can still see the government as the spider in the middle of the web but with two differences: the single spi-

Figure 2.2 Relationship patterns, contributory factors and network lines within a policy network



Source: Kräwinkel, 1997, edited by OTB

der has become a whole colony and they are no longer in the middle".

Differences in perception
Increased pluriformity and assertiveness in the network community mean that there is no longer one single vision of good results for urban renewal (assuming this was ever the case). Different parties in the renewal process have different ideas about the quality and the desired results. These ideas are not always easy to change, because they are strongly intertwined with the identity of the player (Klijn, 2003). In addition, the players in the urban renewal process have their own agenda and perception of reality. The end product, e.g. a performance agreement, materializes through negotiations in which each independent player tries to exert the strongest possible influence (Frissen, 1997).

Durability in the relational patterns of the players
If the process involves action which triggers reciprocal effects and the development of rules and values, the relational pattern of the players can be described as durable. Kräwinkel points out that policy networks are subject to external interaction and influences besides the internal manipulations and perceptions of the various parties. In other words, external factors can also affect the players' relationships. The actual nature of these factors differs according to the network. Figure 2.2 shows possible relational patterns, contributory factors and network lines within a policy network. A key question in the network approach is: how does collective action evolve? (Klijn *et al.*, 2000). The parties have to work together to achieve the desired result. After all, policy and policy processes emerge at the confrontation between independence and the diversity of goals and interests. This point exists in every policy field – including sustainable urban renewal – despite all attempts to regulate interactions by means of mutual agreements and organisational formats.

2.2.3 The planning process

It is beginning to look as if the planning process is outdated. More and more people are complaining that the 'blueprints' from the traditional planning processes in the built environment are no longer adequate (Klijn, 2003; Deuten & De Kam, 2003). Plan-based thinking in the form of, say district

Table 2.1 Two perspectives on the plan as a spatial instrument

	The plan as an integrated ideal	The facilitative plan
Contents	Detailed and ideal	Rough concepts
Quality	Quality can be determined in advance Optimisation of specific values	Quality crystallises out during the process (juggling with multiple criteria)
Plan vision	Plan is the end product/ definitive document	Plan visualises potential developments (a decision-making tool) and - more importantly - sets ground rules for interaction
Knowledge and the use of knowledge	Plan supported by an extensive collection of knowledge (as stock)	Plan offers a provisional 'state of the art' and pointers for further searches and studies
Orchestration/steering	Implemented through organisational and judicial interventions	Ongoing adaptation and optimisation via process steering

Source: Klijn, 2003

plans, zoning plans, action plans for sub-areas and structural plans, is based on the principle that a plan is an integrated, concrete document which defines the developments for the longer term. It seems, however, that quality is determined much earlier in the decision-making process (Klijn, 2003). Plans may therefore be viewed from two perspectives: on the one hand, as a blueprint that defines the quality for the area and, on the other, as a general idea with scope for further interaction, ground rules between the parties and general starting points which can be developed further. The characteristics of these two perspectives are listed in Table 2.1.

The discussion on planning and the content of a planning process is not new. The plan, as part of this process, has been a topic of debate on many occasions. Since the opportunities for a performance agreement are influenced by the way in which the urban renewal parties organize a planning process (see also Chapter 8) this part of the report will discuss the various perspectives on planning and planning processes. Planning is subject to many interpretations. It is an instrument for pursuing policy and it precedes the actual realisation of policy. All the descriptions in the literature indicate that planning is about drawing up and following plans with a view to systematic and effective operations. There are essentially two interpretations based on social democratic or liberal ideology (Van den Heuvel, 1998). The social democrats assign a key role to the government. They see planning primarily as a steering instrument, a means of exerting a direct influence on the development of society. The liberals, on the other hand, advocate autonomy in societal processes and take a more pragmatic and businesslike view of planning as a form of systematic preparation for previously defined intentions. Government intervention should be kept to an absolute minimum for fear of upsetting market forces. Voogd (1995) agrees that planning functions and tasks are subject to

all shades of interpretation and refers to the ideas of the spatial planner Faludi. Depending on the approach of the author and the concrete object of the planning, positions are adopted which can often be related to three visions identified by Faludi (1982): a management-oriented vision, an object-oriented vision and a decision-oriented vision. A management-oriented vision implies that all the relevant decision-making on the processes is recognizable and controllable. An object-oriented vision revolves around the acquisition of insight so that steps can be taken. Faludi says that the transition from insight to action is not the central issue here because attention remains focused on the actual project. A decision-oriented vision is diametrically opposite. Here it is not the concrete object but the required choices that are central. This vision implies that, during the planning, careful attention is paid to identifying the right moments for making, analysing and evaluating choices. In the 1970s and 1980s the decision-oriented approach commanded a lot of attention. Fried & Jessop (1969) introduced the strategic choice approach in which the planning process is structured in a way that clearly indicates where and when certain decisions must be taken while making allowances for uncertainties and unforeseen developments. In this context the planning process is seen as a continuous cyclical process that fits in with everyday reality (Voogd, 1995).

Dynamics is another important topic in the debate on planning and planning processes. Social dynamics move fast in a prosperous, densely populated and urbanized country like the Netherlands. Castells (2000) maintains that these dynamics are tied in with the transition from an industrial to a network society. The accompanying economic, technological, socio-cultural and international changes have inevitably influenced the shape of the spatial policy. The Netherlands Institute for Spatial Research (2004) says that the influence of the Dutch government is waning because private citizens are becoming more assertive and want ‘a voice’. It also states that the expansion and integration of the EU is progressively encroaching on spatial policy and rendering it inadequate. According to the Institute, a gap has opened between the content of plans and actual developments because governments are frequently ignorant of the exact state of affairs and because society is no longer as malleable as it used to be. Hence, in recent years a debate has been rising in academic circles (e.g. Teisman 1998 and Spit 2003) and various advisory bodies (e.g. the Netherlands Scientific Council for Government Policy (1998), the Inter-Province Consultative Platform (2001) and the Social and Economic Council of the Netherlands (2002)) to do something about development urban planning in addition to the current designation urban planning. The Netherlands Institute of Spatial Research defines development urban planning as “an area-oriented policy practice that anticipates societal trends, inter-connects the various spatial needs, relies on active input from the stakeholders and pays attention to

actual implementation". Urban renewal processes in the Netherlands are often strongly characterized by plan formation consisting of district plans, zoning plans, action plans for sub-areas and the structural plan (Klijn, 2003). This changeover from 'admission planning' – i.e. zoning plans which state what is to be permitted in a specific area and what is not – to 'development planning' in which the government steers the spatial lay-out of an area – usually in dialogue with the relevant parties – might therefore be the crucial factor in determining the role and influence of a performance agreement in the planning process for urban renewal. We shall return to this in depth in chapter 8.

2.2.4 The role of social housing

Sustainability in urban renewal also depends on the ownership structures. This research focuses on housing as the largest sector in the building stock (Sunikka, 2003), and on the stock managed by the housing associations. In the Netherlands rented housing is dominated by providers of social housing. In 2002 the housing associations (private non-profit institutions) owned around 2.4 million homes: 36% were low-rent, 58% were affordable and 6% were high-rent (Ball, 2004). In the housing associations environmental management occupies a key position in the sustainable renewal of post-war housing estates and the struggle against social and spatial segregation. In this study, social housing is defined as housing that is not provided for profit and which is often let at below-market rents and allocated to lower-income groups. The way in which social housing is produced and the social landlords themselves are regulated by the state (Power, 1993). There is a growing international consensus that the role of social housing needs to be enhanced in order to house poorer groups in western cities and avoid bitter urban conflict. Power (1993) argues that state-sponsored housing is indispensable in modern urban society, because of the growing economic complexities, greater shifts in the population and increased instability. As housing is seen as a social right in Europe, the state has intervened on a broad basis. But if governments support housing for poor urban households, they will become embroiled in a constant struggle to renew and upgrade social and physical conditions which perpetually lag behind the rising standards of the majority. In Europe, a combination of fear, self-interest and democratic traditions is creating constant pressure and leading to attempts to re-integrate, upgrade and harmonize conditions. Governments are investing huge amounts of energy in social housing in an effort to integrate the diverse communities, reduce urban conflict amid growing polarisation, avoid slum conditions and make use of dwindling resources of land, buildings and young people. According to Power (1993), social housing plays a pivotal role in addressing the pressures of immigration, segregation and marginalisation.

Social housing across Europe has undergone change and is adapting to its new role in the market, where it is expected to make a profit while assuming responsibility for housing low-income, single, and elderly households at the same time. The Dutch government's withdrawal from direct involvement in the provision of social housing began with the publication of the 1989 white paper 'Housing in the 1990s'. This document strengthened the administrative independence of housing associations by giving them more freedom to set rents (although overall rent increases are still regulated) and to change their housing portfolios. In addition to supplying lower-income groups with housing, the housing associations can now build more expensive owner-occupied dwellings. Public urban renewal subsidies will offer them incentives not only to upgrade the existing stock but also to demolish and build new dwellings for home owners, even though recent government announcements have stressed that social housing institutions should focus on their role as providers of affordable rented homes (Ball, 2004). The social housing sector continues to face new challenges at project level. Power (1993) states that, while issues of race and diversity are becoming more urgent, cities are constantly attracting new waves of immigrants who move into the vacated areas and share them with the elderly, the drop-outs and the under-achievers. Some inhabitants accept changes, such as immigrants with different lifestyles, whereas others leave. Generally, those who stay put either belong to the older generation or have been left behind, creating polarized and unstable neighbourhood over many decades (see Table 2.2.)

The demand for housing is becoming more differentiated as a result of multi-ethnicity and need. In an attempt to avoid social segregation, a controversial policy of 'gentrification' has been introduced in urban renewal programmes in the Netherlands. This policy has led to measures designed to increase the supply of more expensive owner-occupied housing at attractive locations which are currently dominated by social housing. These measures include demolition, upgrading and selling off rented dwellings (Ball, 2004). But 'undesirables' do not just disappear; instead, they move to other neighbourhoods, creating a 'waterbed' effect. Ouwehand (2002) suggests that they should be encouraged to become involved in the restructuring process and lists some success factors for sustainable urban renewal: an accurate and recognizable analysis of the one-sideness of the neighbourhood with resident participation, a wide range of social amenities, collective activities, the stimulation of different groups, individual approaches to different groups, a long-term social agenda and added value from the combination of physical and social activities. Resident participation in urban renewal is crucial, also in terms of sustainability. It is the resident (or the owner) who consumes the energy and decides whether he wants any home improvements. Technical construction projects should therefore be combined with information on, for example,

Table 2.2 The changing role of social housing, according to Power (1997)

Continuing role of existing social housing	Changing role of social housing	New forms of social housing	Overarching role of government in social housing areas
Core role of providing affordable homes to meet need. Large irreplaceable stock. Most stock good quality. Housing lasts +60 years so stock will stay in use. Standards inside dwellings high. Low-income households need cheap housing. Even difficult estates can work with care.	Majority better housed. Ageing stock, distinct from more recent housing. Growing gap in conditions unless upgraded. More out-of-work households. More polarisation. More special needs. More difficult management task. Slow and more specialized additions to stock. High demand from single, mobile, young, in-work and student households.	Smaller scale developments. More mixed developments. More community-based initiatives. More private orientation. Experiments in new forms. More self-help. More flexible tenures. Social role more clearly recognised. Tenant control and involvement. Links to work and training now essential.	Responsibility for law and order. Democratic representation. Protecting the public good. Protecting vulnerable groups. Providing for casualties and emergencies. Guaranteeing citizen rights/responsibilities. Integrating diverse communities. Preventing/overcoming injustice/discrimination. Creating conditions for greater prosperity. Allowing/encouraging community involvement. Reinvestment/regeneration/rescue of estates.

Source: Power, 1997

individual measurement systems, new installations, and the impact of individual behaviour on energy consumption. Even though most people say that they support environmental causes, they still engage in environmentally destructive behaviour (Cole, 2004). Bazerman *et al.* (1997) suggest that knowledge about the physical state of the environment alone will not solve this discrepancy between words and action. Kromwijk & Scherpenisse (2003) conclude that housing associations and housing in general are on the verge of a radical change and that the new problems cannot be solved within the current framework and mindset. According to Power (1993), forms of ownership and management styles are not enough to overcome the social problems facing state-sponsored landlords. New approaches are needed.

2.3 Policy instruments

2.3.1 Direct regulation, economic and communicative instruments

There are various ways in which governments can improve sustainability in urban renewal. Bell *et al.* (1996) categorize the political options for improving energy efficiency under subsidies, regulations, measures to increase energy

prices, information campaigns to improve market forces, and the removal of barriers (by e.g. establishing new institutions or allocating new powers to existing ones). Policy analyses produce non-normative information which is made available to the client or a broader group of decision-makers. The successes and failures of policy analyses may be differently perceived depending on the perspective of the players. In this research we apply the 'as is' approach, which is based on the description and explanation of a current policy (Twaalfhoven, 1999). Policy instruments consist of a myriad of techniques which a government may employ to implement its policy objectives (Howlett & Ramesh, 1993). Environmental policy instruments may be structured in different ways. The most common typology is based on three concepts: direct regulation, economic instruments and communicative instruments (Kemp, 2000; Murakami *et al*., 2002). Direct regulation includes policy instruments which use legislation to enforce environmentally-friendly behaviour. Economic instruments make environmentally-friendly behaviour more economically attractive and attempt to correct imperfections in the market for the environment as a public good. The purpose of communicative instruments is to persuade people to act in an environmentally-friendly manner by providing information on the environment or by reshaping opinions and attitudes (Jordan *et al*., 2000; Ekelenkamp *et al*., 2000). The choice of policy instruments is guided by tradition. Relatively little is known about the politics behind the policy instruments or the relationships between some instruments and political regimes (Howlett & Ramesh, 1993; Jordan *et al*., 2000).

The problems associated with direct regulation include high administrative costs, possible tolerance of non-compliance by local governments, failure to address corporate responsibility for environmental issues and economic efficiency, and the disproportionate allocation of tasks across different target groups. Innovation is thin on the ground since there are no incentives for performing above the official requirements. Direct regulation can operate via individual standards, such as minimum insulation levels for building components, or via general standards, such as the overall energy performance (Beerepoot & Sunikka, 2004). One alternative to command-and-control policy instruments is the decentralized incentive system. In economics, environmental problems are regarded as externalities. The internalisation of measurable externalities can be promoted by economic instruments. External effects can be controlled and corrected via taxes and subsidies (Pigou, 1932) or the introduction of property rights (Coase, 1960). Europe is dominated by the Pigouvian tradition which is based on the idea that externalities are created by the difference between private and social marginal costs. In negative externality the social marginal cost exceeds the private marginal cost, so the private marginal cost needs to be corrected by imposing a tax (Boman *et al*., 1999). Taxation enables the external costs of environmental damage to be internalized and

provides a mechanism for introducing price differentials to encourage more sustainable patterns of production and consumption. The OECD countries have accepted the polluter-pays principle (PPP) and have agreed to conduct their pollution-control policies so that the property rights lie with the victims. In positive externality, the required measure is a subsidy (Boman *et al.*, 1999). A subsidy transfers purchasing power from society to the industrialist or individual provided it is spent on investment (Bowers, 1997). A subsidy might conceivably be described as a negative tax. Sunikka concludes in an inventory of economic instruments in sustainable housing policies in Europe (2003b) that none of the fiscal instruments are self-policing, so they need to be enforced by legal means. To the best of our knowledge there is, however, no research on the anticipated effects of energy certification for buildings either as a voluntary instrument or in combination with regulations, subsidies or taxes.

The impact of a theory or policy might be measured by level of innovation that it stimulates (as in the theory of ecological modernisation). Environmental innovation can be seen as a potential reduction of environmental pollution if applied in the proper setting. The value of the innovation depends on the temporal and spatial context. An innovation may be technological or it may take the form of, say, procedures or financial constructions that drive the production-consumption cycle. Moreover, environmental innovations can reach domestic consumers through all sorts of channels. The periodic introduction of radical or discontinuous change is a prerequisite for successful incremental innovation. The theory of ecological modernisation in domestic consumption is more than just an offshoot of the theory of ecological modernisation in industry (Spaargaren & Van Vliet, 2000). In practice, the actual consequences of a policy depend on developments outside the government's control, such as trends in the global and national economy. The implementation of the policy may also be affected by unforeseen developments (Hulsbergen & Van der Schaaf, 2002) while many improvements may be the result of general trends rather than a policy programme (Alterman, 1991). In the case studies we compare the formulated policies with the implemented policies, but we do not perform a deep-impact analysis. In Chapter 4 we examine the policies that are relevant to the case studies. In Chapter 8 we discuss the policy implications of the case studies. Performance agreements have been selected as one policy instrument which would enable sustainability to add to environmental gains in the process of urban renewal.

2.3.2 Performance agreements

Performance agreements have become increasingly important since public housing was decentralized in the 1980s and housing associations were privatized in the 1990s. The State Secretary at that time, Heerma, introduced a new

element into public housing policy whereby the government assumed a more facilitative role and market players were given more responsibility. Local authorities and housing associations found themselves on an equal footing and now had to work together. Performance agreements force the main parties in the public housing sector to accept responsibility and adhere to a set policy. What this means for the municipalities and housing associations is that they need to pursue shared goals and not just their own policy objectives. In this new scenario, performance agreements (a.k.a. covenants, accords etc. (Van Buuren *et al*. 1997)) can help to shape and regulate the new relationships in the sector. The public housing performance agreements that were previously reached by municipalities and housing associations tended to be about specific issues (Van der Zon, 1996), *viz*: the number of realizable dwellings, the size of the core stock, the division of the living space, and status holders. Only incidentally were performance agreements reached on more topical issues, such as flexible construction, homes for marginalized groups, sustainable building, and investment in the everyday environment. This all changed in 1994, when 's-Hertogenbosch city district developed a covenant and basic package for sustainable building in association with the Steering Group for Experimental Public Housing (*Stuurgroep Experimenten Volkshuisvesting, SEV*) and the Netherlands Agency for Energy and the Environment (Novem). This covenant was signed by municipalities, housing associations, the Dutch Federation of Entrepreneurs in Construction (*Nederlands Verbond van Ondernemers in de Bouwnijverheid, NVOB*) and diverse building companies. As the first 'real' covenant for sustainable building (a.k.a. *dubo convenant*) it served as an example for many other regions and municipalities. In 1999 around 75% of Dutch municipalities were party to a local or regional dubo covenant (Dutch Institute for Public Opinion and Market Research, 1999). At national level a dubo covenant was signed in the social rented sector at the start of 1998 when the Aedes federation of housing associations, the Dutch Union of Tenants (*Nederlandse Woonbond*), the Netherlands Waterworks Association (*Vereniging van Waterbedrijven in Nederland, VEWIN*), EnergieNed, Novem and the Ministries of Spatial Planning, Housing & the Environment (MVROM) and Economic Affairs entered a collective undertaking for a period of four years. This undertaking was not succeeded by another when it expired. Instead, sustainable building was accorded a place in the National Housing Accord (*Nationaal Akkoord Wonen*), which former State Secretary Remkes concluded with the municipalities, provinces, landlords, consumer organisations and the building sector in 2001.

The Netherlands has gained experience in performance instruments as well as performance agreements. Performance instruments can be used to quantify and evaluate agreements. The main performance agreements in the Netherlands are discussed briefly below.

Sustainability Profile for a Location (Duurzaamheidsprofiel voor een Locatie, DPL)

The DPL is being developed as a means of determining sustainability levels for neighbourhoods and comparing the design options. The DPL approaches sustainability as an all-encompassing concept in which quality of life and the environment play important roles. It will support the decision-making for the development of existing districts and new sites in an open planning process. In the conceptualisation phase it offers guidelines for setting performance levels for the environment and quality of life. In the evaluation phase these performance levels are analysed and monitored to ascertain whether they fit in with the objectives.

Eco-Quantum and Greencalc

While framing a policy for sustainable construction, the government is also developing methods for quantifying environmental pollution (Klunder, 1999). The so-called 'environmental standard' is defined as "key figure(s) for a raw material, a production process, a product, or a waste substance which express the (potential) environmental impact of production, consumption and waste processing, the aim being to provide a simple means of weighing environmental questions in the decision-making process"(MVROM, 1989). The environmental Life Cycle Analysis (LCA) serves as the basis (Klunder, 1999). Eco-Quantum and Greencalc are both important calculation models for working out the environmental impact of a building Eco-Quantum can help an architect optimize a design as the calculations are based on the characteristics of the building. The client can also use Eco-Quantum to compare designs and explore alternatives together with the architect. Finally, the municipality can use it for formulating, realising and evaluating policy. Eco-Quantum is specifically intended for new building projects.

Like Eco-Quantum, Greencalc can present a picture of the environmental impact caused by the construction and use of buildings. It expresses the impact in environmental costs. Greencalc is made up of four modules: materials, energy, water and mobility. These modules include several scenarios which differ according to the desired level of sustainability in the building (Klunder, 1999). Greencalc was originally designed for utility building projects but is also used in new housing, renovation and decision-making between demolition and renovation.

Energy Performance Advice (EPA)

In 1999, in association with Novem, the Dutch Ministries of Spatial Planning, Housing & the Environment (MVROM) and Economic Affairs developed a policy instrument called Energy Performance Advice (EPA) for existing buildings. An EPA consists of overall energy-saving recommendations to reduce the energy consumption of an existing dwelling. The aim of the EPA system is to

provide insight into the current energy quality of individual dwellings on the basis of an Energy Index (EI). This way, comparisons can be drawn with the energy quality of other dwellings of the same type. The EPA provides an indication of the future energy quality of the dwelling once the recommendations have been implemented. The EPA is a voluntary instrument which can be requested by any owner-occupier. It is attractive because it can prove financially beneficial to owner-occupiers. Owner-occupiers need to carry out an EPA before they can become eligible for a grant from the Energy Premium Fund.

On-Site Energy Performance (Energie Prestatie op Locatie, EPL)
The EPL was instituted by the government with a view to saving fossil fuel. Municipalities can use it when shaping their energy policy for new and existing sites. As a norm for CO_2 reduction the EPL is similar to the EPN but instead of single buildings, it covers an entire development site including the energy supply system. An EPL can be calculated for a neighbourhood in its present state. It can also be used during renovation preparations and support decision-making on building measures (Groot & Klimbie, 2002). An EPL is expressed on a scale of 1 – 10: the higher the EPL, the lower the fuel consumption. Hence, an EPL of 10 represents an ideal situation in which no more fossil fuel is used. To give an idea of the value of the norm: the EPL is 6.0 for the construction of a natural gas or electricity grid on a new site where the homes have an EPC of 1.0 and are fitted with a central heating boiler.

As explained earlier, the success of a performance agreement for sustainable building depends on certain factors, such as the way in which the urban renewal decision-making and planning process is organized. These factors and the factors which have been addressed in this section are summarized below:

- The type of agreement – The type of agreement between the parties – verbal or written, public-private or statutory – can influence the extent to which it is respected and the willingness of the parties to sign.
- The content of the agreement – The content of the agreement influences the willingness to sign. The parties may back out if the commitments are too heavy or too comprehensive.
- The position of the parties – The position of the parties can determine whether they want to enter the agreement; parties with the most clout are in the strongest positions when establishing the agreement.
- The clarity of the agreement – The clarity of the agreement can affect its legality. If the commitments are clearly formulated, the agreement can be legally binding. Sometimes the commitments are so obscure that legality means very little (Koeman, 2001).
- The decision-making process and consultation with the parties – Decision-

making in urban renewal is usually complex (Klijn, 2003). The required expertise and resources are spread over many organisations. In order to benefit from specialized knowledge various organisations need to be involved in the process. In this research project the decision-making process is approached as a policy network.

- The execution stage – Evaluations can be performed in the execution stage to establish how far agreed ambitions can be implemented and agreed levels of performance are fulfilled.
- External factors – External uncontrollable factors can also influence the success of a performance agreement. These include societal trends, such as the changeover from an industrial to a network society.

This section explained the analytical framework for the part of the research that addresses performance agreements and planning processes in urban renewal. This framework will be used to analyse performance agreements as an instrument on the one hand and the process of urban renewal in the case studies of Morgenstond Midden and Oedevlietsepark on the other.

2.4 CO_2 reduction in the domestic sector

2.4.1 Principles of the feasibility study

There is a school of thought which maintains that anthropogenic interference in the carbon cycle is the most serious of all the sustainability issues facing the world in general and the industralized countries in particular (Bell *et al*., 1996). The Rio de Janeiro Conference on Environment and Development resulted in Agenda 21 and the Framework Convention on Climate Change, which states that greenhouse gases must be stabilized at a level that prevents dangerous anthropogenic interference in the climate (UN, 1993). That said, the acceptable level of greenhouse gases is still open. In the UK, for example, the government has set a target of a 60% reduction in CO_2 emissions by 2050 (Mitchell, 2004). Most efforts to stabilize the emissions seem insufficient. The process of transferring technology from the research and development community to the realm of practical implementation is very slow (Bell *et al*., 1996). Energy for heating living space is the largest end-use category in the domestic sector. The main factors influencing these requirements are thermal insulation, passive solar design, air-tightness and ventilation control, and heating-system efficiency and control. Given that energy conservation in buildings is a public issue, the housing sector will probably be expected to play a part in reducing CO_2 emissions. Clients and professional advisors often see the investment costs as more important than the estimated receipts (revenue savings) unless the payback time is very short, i.e. less than five years (Bell *et*

al., 1996). Measures to improve the energy performance of dwellings can be classified as moderate, advanced or radical, compared with current practices (Norgård, 1979). Our research focuses on the moderate measures, defined as the incremental improvement of present practice based on relatively short payback times and considerable field experience (Norgård, 1979). Thanks to better insulation and more efficient heating installations the energy requirements of new housing which is built according to present-day building regulations are, on average, 50% lower than those of the existing stock. According to the energy strategy in Westelijke Tuinsteden (Amsterdam), it is possible in the renewal process to realize a 50% reduction in energy consumption, compared with the business-as-usual scenario. About half of this reduction (25%) can be achieved through low-cost measures at building level; the other half (25%) requires large-scale measures for residual heat and renewable energy, feasibility studies at district level, coordinated action, and investments with moderate or long payback times (Ligthart *et al*., 2003). In this study we shall focus on dwelling-related energy consumption; in other words, energy consumption which is influenced by the technical state of the houses. This covers natural-gas consumption and some electricity consumption, but excludes the energy used by domestic appliances.

We shall examine four renovation options in the case studies. The Energy Performance Advice (EPA) instrument will be used to conduct energy evaluations on the basis of technical sources, construction plans and installations, and other information provided by the owner. Site inspection will be geared to verification and modification of this data. The reference level presents the current situation: standard maintenance with no special environmental measures. The evaluation is based on observations on-site and the construction plans. It must, however, be borne in mind that energy evaluations always include a deviation; for example, a misevaluation of 2 cm in insulation can lead to a 20% deviation in the results. Users are in a key position for determining a building's energy consumption. In this research, however, we shall focus on solutions from the investor's point of view, in this case the housing association. As the dwellings are due for demolition and not renovation, the energy potential cannot be validated in practice. In this research, we base the renovation solutions on the National Packages for Sustainable Building, a collection of standards which are widely recognized in the Netherlands (SBR, 1998b):

- Space heating accounts for the largest share of energy consumption in housing estates. Most of the thermal losses result from the building envelope, which is usually uninsulated in post-war housing stock. The simplest way to improve the thermal performance of a building is to install extra insulation in the outside walls, the roof and the floor. This is referred to as renovation Solution 1 in the case studies.

- Windows are the weakest link in a building's energy performance. The thermal performance of current windows is much higher than the single- or double-glazing installed in the post-war housing stock. If, in addition to extra insulation, all the windows were replaced by new energy-efficient HY^{++} windows (U-value 1.6), considerable energy savings could be realized in post-war housing with large window surfaces. This improvement of the whole thermal envelope is referred to as renovation Solution 2 in the case studies.
- There are other energy-efficient measures that can be taken besides extra insulation and the installation of new windows. An HY107 (high-yield) boiler can be installed for heating space and a WP boiler with water-saving regulators can be fitted for heating tapwater. Ventilation can be adjusted to suit requirements and the joints in the construction can be sealed. This is renovation Solution 3 in the case studies. It should be noted that new insulation requires extra attention to a healthy indoor climate and usually calls for an upgrade of the ventilation system. The elimination of cold bridges is also an important feature in improving the energy performance of existing dwellings.
- In addition to extra insulation and the new windows and new installation measures described above, solar boilers for hot water can be installed on the roof. This is Solution 4 in the case studies.

Standard renovation is used as the second reference level in order to determine the extra costs of energy-efficiency measures compared with renovations that would have been done anyway. Standard renovation implies a 'zero option', where no extra environmental measures are implemented and, for example, windows are replaced with components with similar levels of energy efficiency. No extra insulation is used. The local gas provision is replaced with an Improved Yield (IY) boiler.

Economically speaking, a firm or household will invest in energy conservation up to the point where the financial benefits no longer outweigh the costs (Velthuijsen, 1997). In this research we assess the commercial viability of a project by applying the Net Present Value (NPV) test. The NPV of a project is the present value of its Net Cash Flow. As a rule, a project gets the go-ahead only if the NPV is > 0 (Perman *et al.*, 2003). The expenditure and receipts relating to energy-efficient measures will therefore be examined over 25 years. The costs are based on an inflation rate of 2.9% and an interest rate of 6.5%. The investment level is set low as it was assumed that similar renovation measures were carried out in more than 50 dwellings. VAT is excluded in all the cost calculations. As state energy subsidies were abolished in the Netherlands in 2003, they will not be included in our calculations of the investment costs. We shall apply a gas rate of €0.367 and an electricity rate of €0.128,

both including the REB energy tax. It is extremely rare for the most desirable option to be feasible in terms of time and money (Van der Voordt & Van Wegen, 2002). Scenario techniques can be used to provide an idea of the spatial implications of future developments. The first step is to find the right variables for a critical scenario and to identify the driving forces. One could begin by analysing past developments or by brainstorming about what might happen and not just about what will happen. Although forecasting is fraught with risks, it need not prevent speculation about factors that could shape environmental attitudes and about investments in sustainability. We shall use some energy price scenarios as a background against which the conclusions from the case studies can be tested. The feasibility studies are presented in Chapters 5 and 6.

2.4.2 International reference

In Finland, low-energy construction is employed in buildings with the combined aim of reducing the energy consumption to half the current level, cutting down water and electricity consumption, improving the indoor climate and upgrading the general image. These energy savings are achieved with heat recovery (60% efficiency), new windows and an envelope which is insulated in excess of the building regulations. Low-energy renovation uses ordinary and tested renovation solutions which do not bring huge extra costs for buildings which would be renovated anyway (Hekkanen *et al.*, 1999). Two levels are presented: a 25% reduction in energy consumption, or a more ambitious 50%. New technology can easily deliver 25% savings on the current level of energy consumption and hence annual savings of 4,100 GWh. Based on the current average price of district heating (€33.6/MWh), these 25% savings work out at annual savings of €100 million. These levels are expected to increase further in the future as a result of environmental factors and rising energy prices. An average energy price of €84/MWh – which is more than likely in the near future – would lead to a 25% reduction (so-called F3 level) and annual savings of €300 million, if new – already easily available technology – were implemented (Hekkanen *et al.*, 1999). We looked at low-energy renovation in one case in particular, KOY Kaari-Salpa, which is situated in Oulainen in Finland. KOY Kaari-Salpa is a housing project built in 1972. It is owned by the City of Oulainen and is a typical example of a suburban low-cost apartment block from the 1960s and 1970s. This project was chosen as an example of best practices in energy-efficient renovation because of the halved energy consumption achieved by the renovation and the positive resident feedback from extensive monitoring. Prior to the renovation the building was in very poor shape and had high levels of energy, water and electricity consumption. There was erosion in concrete elements, the indoor climate was poor due to an over-dense envelope (air flow n_{50}=1.8 l/h) and the dwellings fell far short

Table 2.3 Life-Cycle cost comparison for different outside-wall renovation options in KOY Kaari-Salpa

ECONOMIC STUDY (TOTAL LIFE-CYCLE COSTS)				Interest: 0
Project:	**KOY Kaari-Salpa**			
	m²	**U-value (original)**	**Heating need figure**	**Energy price**
	1,000	**0.36**	**5,270**	**0.5**
Economic time: 60	**OPTION 1**	**OPTION 2**	**OPTION 3**	**OPTION 4**
Living surface: 2,000	No actions / renewal of parts of facade in 10 years	Fixing joints, plaster-filling + welding + boarding + extra insulation in 20 years	Bolting + boarding + mineral wool 70 mm	Bolting + plaster + mineral wool 50 mm
Life-cycle target	10	30	60	6-
Inv. costs/€/1,000 m²	0	42	118	109
Inv. costs/€/1,000 m²	202			
Time of renewal	10	20		
Maintenance	Welding	Fixing	Renewing the board	Painting
Maintenance costs/€/1,000 m²	17	42	59	25
Maintenance action 1	3	2	5	3
Maintenance action 2	7	3		
Maintenance action 3		3		
Maintenance action 2/€/1,000 m²		118		
Maintenance action 1		5		
INVESTMENT	202	42	118	109
MAINT. COSTS	34	244	59	50
TOTAL	**235**	**286**	**177**	**160**
TOTAL, €	**235,000**	**286,000**	**177,000**	**160,000**
ENERGY SAVINGS				
U-value, original	.36	0.36	0.36	0.36
U-value, new	0.25	0.27	0.24	0.27
Impact in years	50	30	60	60
Savings, kWh/m²	-13.9	-11.4	-15.2	-11.4
Savings, €	**58,494**	**28,715**	**76,575**	**57,431**

Source: Hekkanen *et al.*, 1999

of present-day standards. The low-energy renovation began with a survey of the state of the building in 1995. The renovation work was completed during six months in 1996. Extra insulation was installed on the outside walls and new surface material (board) was added. Before any options were applied, various alternatives for extra insulation were assessed and an economic comparison of total life-cycle costs was drawn up. In addition to investment costs, the comparison took account of the use of different options, future

maintenance needs, future trends in energy prices and value factors (see Table 2.3).

The results showed that what at first appeared to be the least expensive option was actually the most expensive if the whole life-cycle costs were compared. The extra costs arising from new insulation as part of the low-energy renovation of the walls and roof, compared with work that would have been part of a standard renovation anyway, amounted to €45.4 per living m^2, €8.4 per living m^2 for walls and €1.68 per living m^2 for the roof. In addition to extra insulation, new triple glazing was to be installed. Plans to use the new 'super glazing' had to be abandoned, but tests in one dwelling revealed that super glazing increases the indoor temperature at the front of the window from 1.1 to 1.5 degrees, thus improving comfort and saving energy provided the installation is performed carefully and there are no air currents between the window frame and the wall. The costs are 25% higher than for normal windows. Selective glazing can cut the U value for double glazing from 3.0 to 1.8 and for triple glazing from 2.0 to 1.5 (Lappalainen, 1983). Experience of 'super glazing' when tested in one apartment proved promising. In Kaari-Salpa, new dwelling-specific ventilation was realized in the renovation and, according to the monitoring reports, it improved the quality of the indoor air. Ventilation accounted for the greatest share of the costs in the low-energy renovation. The total amounted to €38.68 per living m^2. The costs for dwelling-specific ventilation were €5.05 per living m^2. The monitoring showed that the energy-saving targets were reached – and even partly surpassed – by the renovation in Kaari-Salpa. Low-energy renovation resulted in a 45% reduction in heating energy, a 50% reduction in water consumption and a 20% reduction in energy consumption, compared with the previous situation. The energy consumption halved. The annual heating energy requirement was 125 kWh/htm^2 while the electricity and water requirement worked out respectively at 52 kWh/htm^2 and 92 l per person per day. These changes appear to be permanent (Hekkanen *et al*., 1999). Consequently, the owner, the city of Oulainen makes annual savings of 200 MWh – or €6,896 (see Table 2.4).

The users of a building are in a key position to reduce energy consumption. Their behaviour can be influenced by, for example, individual measurement systems and education. In Oulainen, individual measurement is thought to have had a deep impact on reducing energy consumption. According to a resident survey in 1997, 80% of the residents who had never thought about their water and electricity consumption began to watch it more closely when individual measurement was introduced. Only a few respondents suspected that dwelling-specific measurement would not change their consumption habits (Hekkanen *et al*., 1999). In the end, the extra costs of the low-energy renovation amounted to 10-20% at the time of investment. These were mainly attrib-

Table 2.4 Energy consumption in KOY Kaari-Salpa before and after the renovation (in 1997 and 1998); the building has 1,830 m² of living space.

	Heating (kWh/living m²)	Electricity (kWh/living m²)	Water (m³, year)	Water (l/per person, day)
Average before renovation	227	71	6,031	233
Average after renovation				
In 1997	124	55	2,401	103
In 1998	127	52	2,156	92

Source: Hekkanen *et al.*, 1999

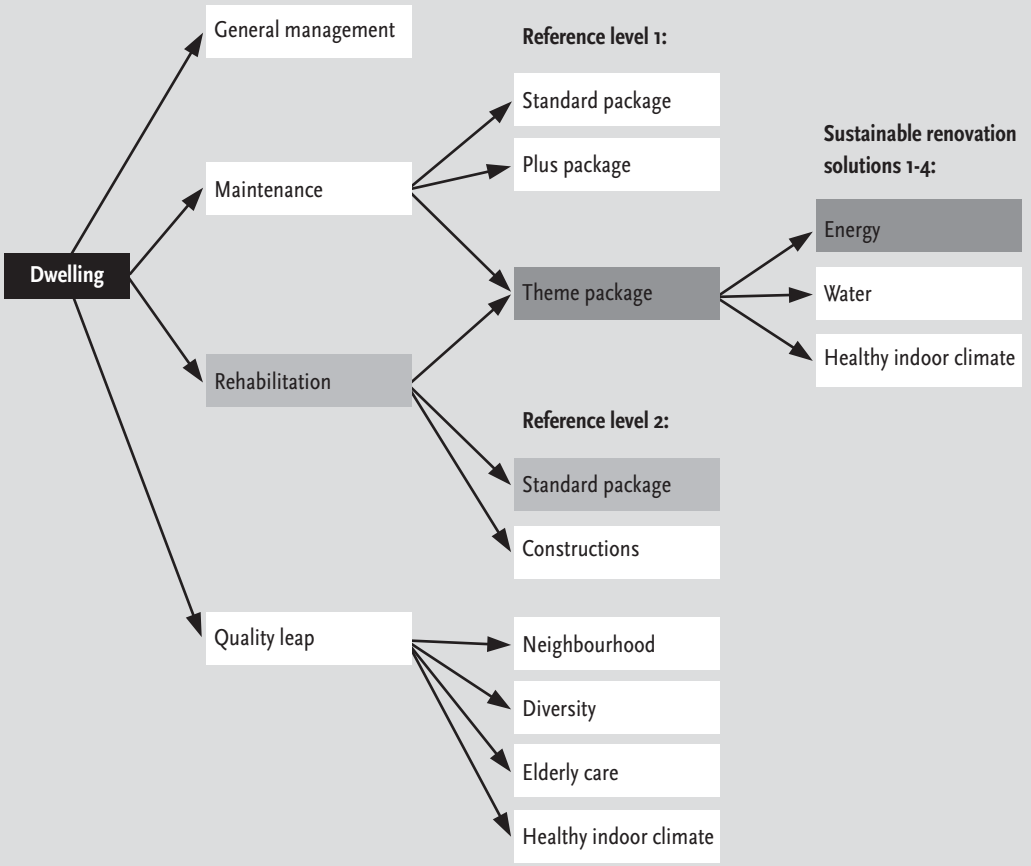
utable to the new ventilation system. The total project costs were around €840,940. The impact on rents resulted in €1.5 per living m² per month. The monthly rent was raised from €3.9 to €5.4 per living m². Total energy-efficiency improvements stood at €60.55 per living m², accounting for 15% of the total renovation costs. Despite the fact that the housing is owned by the City of Oulainen and primarily intended for low-income households, the tenants did not find the rent increase excessive. The residents and the owner both regarded the renovation as economically compatible and worth the investment (Hekkanen *et al.*, 1999). The first resident survey was carried out in Kaari-Salpa in 1996, a few months after the completion of the renovation. Nineteen of the 29 dwellings participated. The survey concluded that the residents take a positive view of the renovation and see the rise in rent as moderate, given the benefits. The upgrading of outmoded bathrooms and kitchens to new building standards was seen as very significant and relatively successful. High scores were accorded to the new ventilation and indoor climate: draughts and cold were rare, but there was occasional over-heating on the south and west side. Smaller windows were considered appropriate in terms of size and sound insulation. Most of the residents found the new balconies very useful, although the transparent material was criticized. The second survey, which was carried out in 1998, revealed that the residents were still satisfied with the renovation improvements. An evaluation showed that the measures had been successful and no damage had been suffered. The building stock and climate conditions in Finland are, of course, different from those in the Netherlands, but this reference case still provides background information for the feasibility studies in energy efficiency (see Chapters 5 and 6).

2.5 Extension of the functional life-cycle

2.5.1 Principles of the feasibility study

When buildings reach the end of their functional-economic life-cycle, their technical life-cycle usually still has a long way to go (Verhoef, 2002). Energy conservation in housing is feasible only if the life-cycle of the dwelling can be reasonably continued. In this research, the concepts relating to the extension

Figure 2.3 Different operation concepts at tactical policy level



Source: SBR/SEV/NOVEM, 2003, edited by OTB

of the functional life-cycle are based on the examples of strategic housing management in Duwon, the tool for sustainable housing management (SBR/SEV/NOVEM, 2004). The studied concepts are illustrated in Figure 2.3.

- The reference level for the sustainable renovation solutions is standard maintenance, which involves no special environmental measures. The maintenance focuses on materials, not energy saving.
- The first renovation solution and the second reference level for sustainable renovation is standard renovation without extra environmental measures. This is also referred to as the 'zero option'.
- The energy-efficient renovation solutions are based on the renovation with the energy theme package (see Section 2.4.1). The life-cycle target for the intervention is 25 years for constructions and 15 years for installations.

In this research, we see the extension of the functional life-cycle as a way of exploring how existing dwellings can meet present-day requirements. One of

the main reasons for demolition is that the need for space is greater today than it was forty or fifty years ago. Hence, newly built apartments in the Netherlands are among the most spacious in the EU (Ball, 2004). This trend towards space consumption can continue in the future, so the renovated apartments need to be flexible enough to cater for future needs. But as it is difficult to define these needs for an unknown user, one solution is to reserve enough space for different uses and furnishing. Sufficient floor height and flexible frames are also important with regard to future adaptability. It should be remembered that different technical life-cycles suit different components, such as surface, frames and installations. The surface materials, as visible components, have a naturally shorter lifespan and need to be easy to change. Extra insulation and soundproofing can also extend the life-cycle of a building. Extra insulation on the outside of the envelope has the potential to improve the aesthetic appearance of a dwelling. In a report on CO_2 reduction in urban renewal projects in the Netherlands, Van der Waals *et al*. (2003) conclude that, in the successful planning processes, options were implemented for reasons other than the perceived economic benefits. It was more important to improve the physical quality of the housing and the level of comfort by fitting insulation and double-glazing. Comfort can be a more effective driver than costs or environmental benefits. Solutions for reducing CO_2 emissions are unlikely to be adopted in urban renewal projects unless people feel they have more to gain than economic and technical benefits; this applies particularly to comfort and quality (Van der Waals *et al*., 2003). Improvements to the quality of the housing can make energy efficiency more attractive to housing associations and tenants. Most of the construction and installation measures, such as new glazing and insulation, improve the indoor climate and are invisible. Glazed balconies, however, improve the usability and comfort of the dwelling in a concrete way. New facade material and the use of solar panels can also enhance the appearance of the housing and give it an image of quality. Glazed balconies can serve as thermal buffer zones, while increasing the comfort and improving the architectural standard of the existing housing. In the next 10 years, the population in the case study areas is expected to grow, while the size of the households will continue to decrease. The number of elderly residents will rise. Elevators, balconies and access systems increase the comfort and usability of a dwelling and will enable an ageing population to live longer at home. The majority of households will consist of one or two persons, 'traditional' families will become less common. In this research, we propose an alternative concept for renovation. We shall apply an 'ex-ante' approach, in which the project has not yet been implemented and the actual effects cannot be measured (Lans & Van der Voordt, 2002). The target groups that we propose for transformations in the case studies are the elderly (20% of the dwellings), small households (40% of the dwellings) and families comprising more than four persons (40% of the dwellings).

Table 2.5 The impact of an elevator and the number of storeys on the price of the apartment in relation to location and time of construction

	Elevator				No elevator			
Storeys	4	3	2	1	4	3	2	1
All information	1.07	1.06	1.05	1.02	1.03	1.01	1.02	1.00
Helsinki Area	1.05	1.04	1.04	1.00	1.02	1.01	1.02	1.00
Cities outside the capital area	1.11	1.10	1.09	1.06	1.03	1.01	1.02	1.00
Built in 1950s	1.09	1.06	1.06	1.03	1.02	1.02	1.02	1.00
Built in 1960s	1.04	1.02	1.02	1.00	1.02	1.00	1.01	1.00
Built in 1970s	1.04	1.05	1.06	1.04	1.00	1.00	1.02	1.00
Built in 1980s	1.09	1.07	1.03	1.03	1.03	1.01	1.00	1.00
Built in 1990s	1.13	1.10	1.09	1.00	1.04	0.95	0.96	1.00

Source: Ronka *et al.*, 1997

2.5.2 International reference

The crucial importance of accessibility in housing renewal is underscored by the fact that in 2030, about 20% of the European population will be over 65 years old. Housing this population, preferably in their own homes, will form a major challenge for all governments. Accessibility means dimensions and services designed for wheelchair users and the elderly, but it can also mean better living environments for other users. Accessibility has an impact on the size of corridors, entrances, bathrooms, kitchens, balconies and outside space (Rakennustietosäätiö, 1998). Dwellings in the existing stock are often small and do not meet accessibility requirements. Meantime, residents in post-war housing estates are ageing and prefer to continue their housing career at home in their own familiar environment. The costs of installing an elevator vary between €58,866 – 92,503. In Finland, state subsidies cover 40% of the costs and most cities add 10%, so that the owner has to pay only half the real price. The impact of an elevator on property prices and rents was worked out by means of statistical analysis. An economic analysis showed that the price of homes in buildings with elevators is around 2-4% higher than in comparable buildings without elevators. The difference in price varies according to the height, age and location of the building from a few percent to 10% (see Table 2.5). A figure of 1.00 means that an elevator does not have impact on the price of a dwelling. Consequently, a figure of 1.05 means that a new factor raises the price of a dwelling by 5% compared with the previous situation, provided all other factors are constant. The research shows that rents also tend to be higher in buildings with an elevator than in buildings without one (Ronka *et al.*, 1997) (see Table 2.6).

Lodenius (1994) maintains that, in a renewal process, the general strengths of suburban post-war housing estates (e.g. green space, low building density, social networks, ecological potential and recycling) should be reinforced. If the demolition is selective, the infrastructure can be reorganized. For exam-

Table 2.6 The impact of an elevator on rents in relation to location

	Elevator	No elevator
All information	1.04	1.00
Helsinki Metropolitan Area	1.04	1.00
Cities outside the capital area	1.07	1.00

Source: Ronka *et al.*, 1997

Table 2.7 Benefits and functions of urban forests

Architectural benefits	Defining open space, framing and screening views, landscaping buildings.
Aesthetic benefits	Variation in the landscape created by the mixed colours, textures, forms and densities of vegetation. Tree growth, seasonal dynamics and more experience of nature.
Climatological and engineering benefits	Cooling, wind control, rainwater retention, impacts on urban climate through temperature and humidity control. Lower air pollution, sound control, less glare and reflection, erosion control.
Social benefits	Recreation opportunities, improved home and work environments, effects on physical and mental health, cultural and historical values of green areas.
Ecological benefits	Value of urban biotopes for flora and fauna, conservation of biodiversity, nutrient cycles etc.
Economic values	Value of market-priced benefits (timber, berries, mushrooms etc.), higher property values.

Source: Tyrväinen, 1999, adapted from Robinette 1972, Kellomäki and Loikkanen 1982, Miller 1997

ple, old, often wide-dimensioned roads in post-war areas can be used for complementary construction. In post-war housing estates the architectural quality of complementary construction needs to be emphasized; otherwise new construction will not upgrade the image of the area and may even have an adverse effect. It is not always necessary to build new housing in a low-demand housing area. Post-war housing estates often suffer from unintegrated functions and a lack of services. Combining other functions with housing can increase the demand (market value) for the existing housing. The conservation of green areas can also add to the value. Preserving the natural environment gets more and more difficult as the density and efficiency of the housing estate increases. In sustainable neighbourhoods, the green space is not reduced in renewal projects; on the contrary, connections to surrounding natural areas are preserved. Furthermore, some of the green areas can be maintained more naturally (and economically). Urban forests and green areas can help to extend the life-cycle of a housing estate (see Table 2.7).

The impact of green areas and water on the price of housing in urban environments has been studied in a research project by Tyrväinen (1999). Two economic valuation methods: hedonic pricing (examining the external benefits and costs associated with housing) and contingent valuation were applied in two different urban environments in Finland: 1,020 observations were record-

ed in Joensuu and 662 in Salo. The main aim of the project was to find out whether the benefits of urban forests are reflected in property prices. The results show that urban forests are clearly an environmental amenity and that people pay for benefits like these through the prices of apartments. In Joensuu, swathes of forest in a housing neighbourhood and proximity to a watercourse and recreation area increased apartment prices. In Salo, where urban forests are scarcer, the effect on property values was even clearer. Although preferences may vary from household to household, Salo residents were willing to pay, on average, 5% more for a forest view. Proximity to wooded parks was also found to have a significantly positive effect on house prices (Tyrväinen, 1999). The contingent valuation questionnaires were sent to 500 randomly chosen residents in Joensuu and Salo. In the survey the residents were for their opinions on urban forests and to express their willingness to pay for the use of wooded recreation areas and small-forested parks. The results showed that, in both towns, urban forests were seen as a source of positive rather than negative externalities. In both towns more than two thirds of the respondents were willing to pay for the use of recreation areas. A good location and active management raised the average willingness to pay (WTP). What's more, on average, half of the people were willing to pay to stop the forested parks from being redesignated for alternative use. In Joensuu the average WTP for preventing the conversion of urban forests varied from €21.2 – 34.65 per household per year, and in Salo from €12.45 – 28.4 per household per year (Tyrväinen, 1999).

This information on the extension of the functional life-cycle on the basis of accessibility and green space in urban renewal was used as a background for the case studies in Chapters 5 and 6. That said, it should be noted that these studies focus on energy efficiency and see the extension of the functional life-cycle mainly as a precondition for renovation.

Part II
The case studies

This part of the research is devoted to the two case studies. We shall approach them from a process and a physical angle in order to piece together an overall impression of the feasibility of sustainable urban renewal. The introduction to the field of study is followed by a policy analysis that identifies the environmental policies at various levels which are relevant to the case studies and indicates whether they have any real impact on the renewal process in the urban districts. We then present the case studies themselves. We begin by addressing the feasibility of energy-efficient improvements in housing. This will provide an idea of the practical environmental potential of post-war housing renewal in terms of energy-saving and the barriers that prevent realisation, i.e. costs. We then discuss the sustainability ambitions in the policy and the planning process, concentrating specifically on the potential role of performance agreements. We look at the development of the plan, trace the emergence of sustainability ambitions and ascertain which performance agreements – if any – were reached during the planning process. We report the performance-agreement experience of the main players and discuss the opportunities and risks envisaged by the municipality and the housing association. This part of the report ends with the first step towards converting the ambitions for sustainable building into performance agreements in urban renewal planning processes. We shall describe the scope and limitations of performance agreements for sustainable building on the basis of a literature search and the two case studies.

3 Field of study

3.1 Introduction

This chapter provides an introduction to the two case studies, Oedevlietsepark in Hoogvliet Rotterdam and Morgenstond Midden in The Hague South-West (*Den Haag Zuidwest*). Oedevlietsepark forms part of the Maasranden area in Hoogvliet, which is currently in the throes of a radical restructuring programme. The area around Koolvisweg and Baarsweg is being redeveloped to form a new Oedevlietsepark. The Morgenstond district forms The Hague S.W. together with Bouwlust, Moerwijk and Vredelust. The Hague S.W. is currently undergoing a radical transformation which should break the downward spiral towards degeneration and an ever weaker position in the housing market (Municipality of The Hague, 2002a). This chapter describes the restructuring brief and the aims for Oedevlietsepark (Section 3.2) and Morgenstond Midden (Section 3.3).

3.2 Oedevlietsepark, Rotterdam

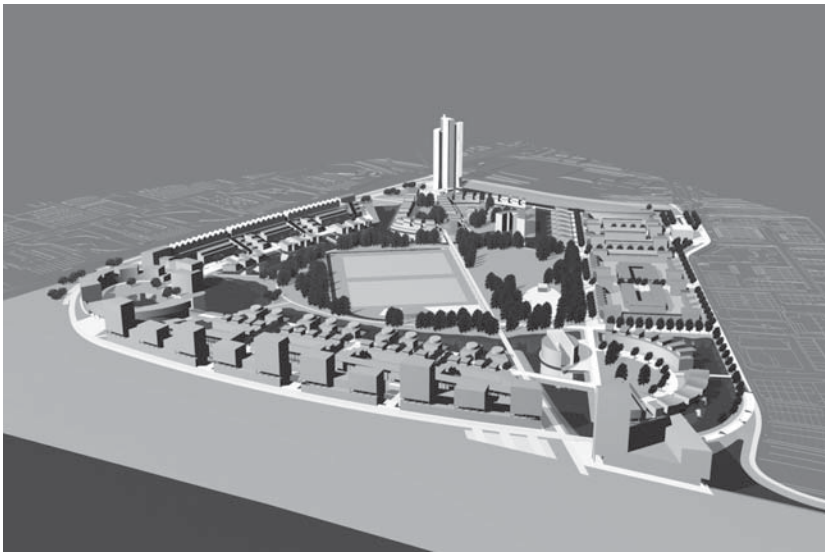
The early 1990s saw the start of a major restructuring programme in Hoogvliet, which eventually involved the demolition of five thousand homes and the sale of another two thousand between 1999 and 2010. Built in the 1950s, Hoogvliet is a typical example of an early post-war housing estate. It has a spacious lay-out with plenty of greenery. The housing lacks variation and is made up mostly of terraced family homes and flats. Hoogvliet is bounded on the north by industry and the A15 and on the south-west by the Ruigeplaatbos and the Oude Maas (see Figure 3.1 for a map of the area).

In the 1950s and 1960s Hoogvliet provided housing mainly for people who were employed by businesses from the nearby dockland and industry terrain of Shell Pernis. This all changed in the mid-1970s when residents started leaving the area in search of better things and Hoogvliet was used for housing large swathes of the immigrant influx. As a result, the average occupation level has fallen sharply over the years. As the supply outweighs the demand, there is a surplus of rented homes and flats. This is the reason behind the sweeping renovations at Hoogvliet. Oedevlietsepark, the subject of the second case study, is situated in the south of Hoogvliet, specifically in the Meeuwenplaat neighbourhood, which consists of around 3,000 dwellings built in 1959-1960. In South Hoogvliet, social rental dwellings, mainly in the lowest rent categories, account for about 76% of the housing stock. Oedevlietsepark is favourably situated near the centre of Hoogvliet and the Oude Maas. It consists of similar five-storey apartment blocks next to Koolvisweg and Baarsweg, built around 1959. These two main streets have conferred a second, unofficial name on Oedevlietsepark; it is also called the 'KoBa'. The existing

Figuur 3.1 Oedevlietsepark

urban structure is open and spacious; cars are parked in the streets. There is a considerable amount of green space, though park maintenance has been poor in recent years. Apart from a church and sport facilities there are no services in the area. Oedevlietsepark does not have cultural value as such, but the planning is typical of its time. The buildings have a reinforced concrete structure and brick facades with large strip windows. There are only a few apartments on the first floor, which consists mainly of storage space with a closed facade and dark entrances. Closed staircases serve two apartments on each floor, there are no elevators. Woonbron Maasoevers housing association manages nearly half of the 12,000 dwellings in Hoogvliet and is also the owner of the housing stock in Oedevlietsepark. Oedevlietsepark is the first area in Meeuwenplaat to meet the criteria for urban renewal. The need for large-scale renewal in Hoogvliet is mainly due to the problem of low demand. At the moment, Hoogvliet is the least popular part of the Municipality of Rotterdam: only 4% of housing applicants name Hoogvliet as a priority, though 7% of Rotterdam's population live in the area. The negative image of Hoogvliet is partly associated with the older, northern part that was built to accommodate industrial workers. The more suburban South Hoogvliet, where Oedevlietsepark is located, has a better image. The residents are, on average,

Figure 3.2 The new plan for Oedevlietsepark



Source: Kuiper Compagnons, Rotterdam

wealthier, better employed, longer-term and more satisfied with their surroundings than their northern counterparts. The Meeuwenplaat residents are, however, the most dissatisfied group in the area and most often complain that their neighbourhood is going downhill. There is a large demand throughout Hoogvliet for owner-occupied single-family housing with more space and a garden. The current housing supply does not meet the actual demand; it is functionally outdated and has a poor energy performance. With 29% (330 hectares) of its surface dedicated to green space, Hoogvliet is the greenest area in the Municipality of Rotterdam, but this green potential is not being experienced in Oedevlietsepark at the moment. The existing housing stock faces away from the green areas and the Oude Maas, so no-one benefits from the view. Like the housing, the green space is monotonous and falls short of present-day requirements. Apart from the sport fields, the park between the highway and Koolvisweg is hardly used and poorly maintained. According to the housing surveys, the lack of functional green space, such as children's playgrounds, is seen as a problem by the residents of South Hoogvliet.

The renewal process aims to improve Hoogvliet's position in the housing market by increasing the quality, comfort and future value of the dwellings. Image improvement is one of the main objectives. Before any demolition or renovation work began, the housing stock was evaluated on the basis of the square metres of living space in the dwellings, accessibility, outdoor space and other criteria. Approximately 4,500 dwellings failed to meet these criteria and were earmarked for demolition. They will be replaced by new, more expensive dwellings with a lifespan target of 80 years. In 1999-2020, a total of 5,000 dwellings, representing 33% of the total building stock, will be demolished in Hoogvliet. In the renewal process, the composition of residents will

Complex Koolvisweg in Oedevlietsepark in Hoogvliet

also be changed, though many have already moved to surrounding areas like Vlaardingen. In partnership with the Municipality of Rotterdam and the Borough of Hoogvliet, the housing association of Woonbron Maasoevers has developed a plan for Oedevlietspark (see Figure 3.2). One of the aims in the redevelopment brief for Oedevlietsepark is to upgrade Hoogvliet and give it a new image. The spatial structure of the area will be redesigned to guarantee high quality. In Oedevlietsepark, the existing urban structure will undergo a radical transformation. All existing housing will be demolished. The plans for new housing have already been drawn up and developed by Kuiper Compagnons. Large-scale renovation is not considered an option. The main reason for demolition is the clear imbalance between the current monotonous housing supply and the demand. Most of the housing is no longer let and the rest will be vacated in 2004. Key themes in the new plans are greenery, water and greater differentiation in the housing supply. Demolition will be followed by the construction of around 1,100 dwellings; 240 in apartment blocks and 686 with a connection to the ground. In the new plans, there will be around 250 middle-priced and 300 expensive single-family dwellings, as well as 310 multi-family dwellings with low rents (less than €400 a month). Thirty percent of the dwellings will fall into the social rental category. New housing will be built around a new park. The new dwellings will have a large living room, three bedrooms, a kitchen, a bathroom, a balcony and variable amount of storage space. Most will have a private garden and be 3 storeys high. There will be a few apartment buildings with 5–9 storeys and elevators. New roads will encircle the housing area instead of crossing it, while parking will be mostly integrated and cars kept off the streets. The 27-storey tower block, Het Oosterbaken, at the corner of the Groene Kruisweg and Aveling will be a landmark as an entrance to the area. The new plan is based on the total rearrangement of the environment. Public space will diminish while gardens, parking etc. will become more private. Sustainable building measures – sustainable energy and water management – form part of the renewal of Oedevlietsepark, but they have not been given any priority. A sustainable demolition project has been set up for recycling materials and building components in Hoogvliet, but it is not yet clear whether sustainable demolition will be applied in Oedevlietsepark. The photographs show the complex in Koolvisweg which has been selected for the feasibility study in Chapter 5.

A view in a street of Morgenstond Midden in The Hague

3.3 Morgenstond Midden, The Hague

The Hague SouthWest is characterized by a clearly defined block lay-out and open green space. Most of the urban renewal in Morgenstond is being carried out in Morgenstond Midden. Like the other districts in the Hague S.W., Morgenstond was built between 1945 and 1959 according to a design by the Dutch urban planner, Dudok. Morgenstond Midden is centrally situated in The Hague S.W. between the main thoroughfares of Hengelolaan, Loevesteinlaan, Melis Stokelaan and Dedemsvaartweg. It is split into two part by the Leyweg shopping mall. Most of the housing consists of three- or four-storey stairway and walkway flats. The average living area is small, generally between 45 and 60 m^2 (Municipality of The Hague, 2002). At present, the buildings are arranged either in squares or rows. The squares have an enclosed courtyard;

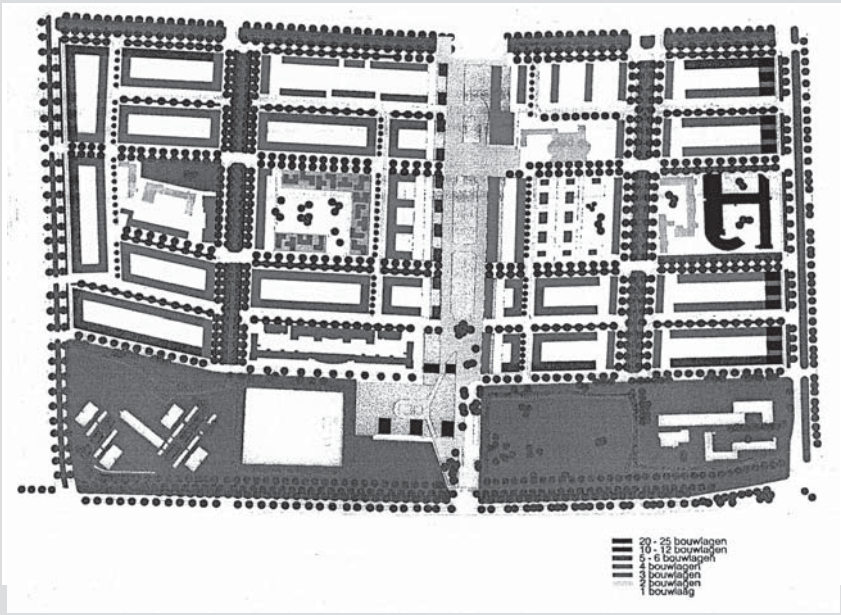
Figure 3.3 Overview plan Morgenstond Midden

Source: Municipality of The Hague, 2002a

the rows have an open garden. A plan of Morgenstond is shown in Figure 3.3. The photograph shows a street view of this district.

The Municipality of The Hague is working on the renewal project with two housing associations, Haag Wonen and Staedion, on the basis of area visions and neighbourhood plans. An area vision forms the basis for a neighbourhood plan, which includes the introduction of concrete improvements within the next ten years. Neighbourhood plans and area visions determine the ambition levels for each neighbourhood in The Hague SW. Housing associations have decided which housing complexes will be renovated or demolished (the so-called 'renewal' complexes) and in which will be left until 2010 (the 'guarantee' complexes). Most of these improvements involve the dwellings, the lay-out of streets and squares, parking, amenities (e.g. shops and restaurants), facilities for the elderly and the youth, comfort and safety. One important ambition in the renewal brief up to 2010 is the conversion of Morgenstond Midden into a compact, garden suburb. The programme for Morgenstond Midden consists of the demolition of 2,350 rented dwellings and 37 commercial premises; the new construction of 1,650 dwellings split into social rented dwellings (30%) and owner-occupier dwellings (70%) and into dwellings on storeys (60%) and dwellings with a ground connection (40%); and the construction of (partial) underground parking facilities with 1,242 places. In the new Morgenstond Midden most buildings will have 3–5 floors and the average dwelling surface will be 120m^2 (Municipality of The Hague, 2002b). The housing associations have decided which housing complexes will be renovated, which will be demolished, and which will be left until 2010. A SWOT analysis, accepted in 2003, lists the following objectives for Morgenstond (Municipality of The Hague, 2002a):

Figure 3.4 The renewal plan in Morgenstond Midden



Source: Municipality of The Hague, 2002d

- To improve the residents' chances of a housing career in the neighbourhood and to offer more housing for high- and middle-income groups.
- To use the potential of the spatial structure, to create more differentiation between living environments, to improve commercial prospects for businesses and other facilities near the main streets, to improve accessibility, to create good parking facilities and green space.
- To improve the quality of life in the neighbourhood by tackling concrete problems and to promote social cohesion between the residents.
- To strengthen the economic structure of Morgenstond by making the shopping mall in Leyweg more attractive and to enable the development of offices, restaurants and recreation facilities near the shopping centre.

Figure 3.4 shows the renewal plan for Morgenstond Midden, based on the existing hierarchy of streets, canals and smaller roads. On the whole, Morgenstond is regarded as an attractive residential district mainly because of the lavish greenery and spacious lay-out. But people are still leaving, because Morgenstond offers no opportunities for moving up the housing ladder. This high turnover is one of the main factors which prompted the municipality and the housing associations to intervene: "The housing in Morgenstond is too one-sided. The district needs new types of dwelling, such as larger family homes, also in the private sector. This will strengthen the economic support base and, at the same time, enable residents to move to larger homes without leaving the neighbourhood" (Municipality of The Hague, 2002b). The case study complex at Hengelolaan, which is the subject of the feasibility study in Chapter 6 is presented.

4 Policy analysis

4.1 Introduction

In this chapter we address the European, national and regional environmental policy challenges that are relevant to the two case studies, Oedevlietsepark in Hoogvliet and Morgenstond Midden in The Hague. We also analyse the environmental policy of the Municipalities of Rotterdam and The Hague and the housing associations Woonbron Maasoevers and Staedion. First, policy developments at the European level are presented in Section 4.2. National policies for sustainable housing are examined in Section 4.3. Section 4.4 focuses on the regional policy of the province of Zuid-Holland. Section 4.5 adresses the extent to which sustainability is incorporated in the policies of the Municipalities of Rotterdam and The Hague. The theme of Section 4.6 is the same as 4.5, but in relation to the policies of the housing associations Woonbron Maasoevers and Staedion.

4.2 European policies

High levels of urbanisation in Europe have introduced an urban dimension in many of the European Union's environmental policies. In fact, the urban environment has apparently become so important that it is discussed as an independent subject in the 6th Environmental Action Programme (EC, 2002). One of the key actions outlined in this Programme is the Thematic Strategy on the Urban Environment (EC, 2004). This document names four priority themes which exert a significant influence on the urban environment: sustainable urban transport, sustainable urban management, sustainable urban construction and sustainable urban design. Sustainable urban construction covers a broad spectrum of sustainability themes, but the EU intends to focus on the existing housing stock. This focus will become stronger as the EU continues to expand, since the candidate countries will bring along a huge stock of post-war housing. In its energy policy the EU accords priority to energy saving and increasing renewable energy sources (EC, 2001) as it prepares to implement the Kyoto Protocol across the community. Under the Kyoto Protocol the EU must reduce its greenhouse gas emissions by 8% between 2008 and 2012 compared with the level in 1990. The allocated targets vary between the member states: the Netherlands has a reduction target of 6%. The impact of the implementation of the Kyoto Protocol has been the subject of various research projects. According to a recent report by the Boston Consulting Group, the direct minimum costs of implementing the Kyoto targets in the power industry alone would run to some €20 billion a year, which is equal to 0.2% of the EU GDP, or about €50 per person (Jansen *et al.*, 2003). A major part of the costs, €8 billion a year, would be defrayed by investment in new plants to replace those that have to be prematurely shut down. There will be big

winners and losers among the stakeholders. Even if the governments were to make electricity plants responsible for 25-50% of the CO_2 reductions, other sectors would still be expected to contribute, including households. But this still does not solve the problem of how the annual net cost to Europe of at least €20 billion is to be shared. To attain the Kyoto targets for reducing greenhouse gases European governments would have charge power stations a lot more for producing CO_2. Such measures, which are intended to encourage the industry to replace dirty generating plants with cleaner ones, would automatically drive up electricity prices. To engineer a reduction in emissions the report suggests a minimum levy of €25 per ton of CO_2 in the form of a carbon tax accompanied by continuous subsidies for cleaner technologies. With Kyoto, a levy of €25 – 35 per ton of CO_2 would increase wholesale electricity prices by €8 – 13 per MWh (up to 30% more for average use and 25% more for peak use). With a €25-per-ton carbon tax commercial and domestic consumers of energy would have to pay over €27 billion a year; this is equal to a rise of 8-12% in the price of electricity and 2-3% in the price of gas. So, energy consumers lose out while governments win by reaping the tax revenues. The implementation of the Kyoto Protocol would also increase the demand for new energy capacity, with gas-fired capacity being the most economic. The report predicts that Europe will require 80 GW of new capacity before 2012. The share of capacity based on renewable energy will increase significantly from the current 195 GW. High costs, limited expansion opportunities and dependence on technological breakthroughs in renewable energy sources, like hydropower and biomass, will increase the role of wind power. Wholesale gas and electricity prices will rise and each country could find itself in a boom-and-bust cycle (Jansen *et al.*, 2003). It is therefore to be expected that energy prices will be driven up over the long term. The reasons are an increase in the marginal cost of delivered power (up to 35% without Kyoto and up to 65% with Kyoto) and an increase in the marginal cost of delivered gas (up to 25% without Kyoto and up to 40% with Kyoto).

All of this will make the energy market will more dynamic and prone to fluctuation in the future. If the share of renewable energy sources increases, as intended, the environmental impact of the energy consumed by buildings could decrease, but the economic importance of energy choices will increase. As a result, energy management in buildings will become more of a strategic question. Though the building sector, where energy consumption is fairly regular, is less important than, for example, the power generating industry, it will still have to contribute to the energy-saving targets and the costs arising from the Kyoto Protocol. The question remains as to how the different stakeholders can prepare themselves for the challenges of the new energy market. Electricity and gas users might decide to build a sustainable and competitive long-term supply of energy. Large electricity consumers might opt to buy

electricity and gas over the long term at a price below their future long-run marginal costs. They could also review supply contracts to assess their value in the future and hedge risks (Jansen *et al*., 2003). In the residential sector, however, the idea is that higher prices will stimulate efforts to improve energy efficiency because they have a better pay-off. Large developers need to understand how cyclical processes and long-term rising prices will affect their costs and the requirements of their customers (the tenants), how to benefit from these trends and how to hedge the risks. Most importantly, the energy developments will shorten the payback time of energy investments in both new and existing stock. This is a key factor in new building projects and renovation. Energy efficiency and cleaner energy production can be seen mainly as a task for the power generating industry, because it is difficult at present to realize energy savings from the residential sector, where the energy consumption is regular on a major scale. Energy efficiency will probably become more important in 2010 and thereafter, but in this decade, the efforts to cut greenhouse gas emissions will have to address the question of how to replace current energy sources with cleaner, or renewable equivalents. It is conceivable that, in the near future, solar energy will be as common in buildings as double-glazing is now. However, despite all the money that governments and multinationals invest in technology, the problems of high costs (even though the costs of providing solar energy, amongst others, have fallen by over 50% in the past 10 years), limited sources, and the unreliability of sustainable energy sources to meet the needs, have not be solved. The housing sector will therefore have to save energy and recognize the impact that higher energy prices will have on housing and tenants. Sustainable energy sources can reduce the environmental impact of energy consumption in the future; at present the price of energy is making energy management an important strategic question in housing management. Energy prices and taxation shorten the payback times of energy investments. The importance of reducing of CO_2 emissions in the building sector is also recognized by the European Union. Accordingly, in early 2003, the European Parliament approved Directive 2002/91/EC on the Energy Performance of Buildings (EC, 2003). One of the four key themes in this Directive is the introduction of energy certificates for the current building stock. The Directive states that, starting from January 2006, an energy performance certificate, which is no more than 10 years old, must be shown to prospective purchasers or tenants when a building is sold or let. In addition to detailing the current energy-efficiency level of the building, the certificate must include recommendations for cost-effective improvements in energy performance. The Directive requires that energy certificates be issued for existing building stock, but it leaves each member state free to decide whether certain minimum energy criteria should be applied and whether to combine the energy certificate with economic policy instruments or to use it only for informative purposes. In Denmark, for

example, a mandatory energy certification scheme for all existing buildings has been in effect since 1997 under the Act on Energy and Water Conservation in Buildings. The Danish energy certificate for small buildings, which is almost identical to the pending EC energy certificate, consists of a standardized energy rating and includes information on energy and water consumption and CO_2 emissions compared with a reference building of a similar type. An energy plan is also required with recommendations for further energy and water savings and estimates of the investment costs, annual savings and anticipated economic lifespans of the proposed measures. When a building is sold, a specially trained energy consultant is appointed to carry out an energy certification procedure. The evaluation costs are paid by the seller and range between €300-500 for a single-family home depending on the size, age and type of building (Vekemans, 2003). The calculations are based on accurate information about the building, including, for example, heating installations, and electrical and water-consuming appliances. Even though energy certification is mandatory in Denmark, a survey conducted in 2001 revealed that only 50-60% of buildings are covered by the scheme and that there are significant regional differences (COWI consult, 2001). Moreover, no sanctions are in place. According to the survey, the certification scheme is fairly well accepted, but many building owners are unaware of the requirements, which tend to get buried under all the other paperwork when a building is sold (Laustsen, 2001). Home-owners have a very poor knowledge of the scheme. This is because of the lack of promotion rather than the quality of the information (COWI consult, 2001). Ideally, the buyer should get the information on the energy performance before the purchase, but as competition between potential buyers makes this difficult to realize, certification is mandatory (Beerepoot & Sunikka, 2004). Energy certification for household appliances has been successful in Europe and pushed up the sales of energy-efficient products. For housing associations, the energy certificate means that energy efficiency will become more of an issue when property is purchased or rented. Also, as the owner of the property, the housing associations will have to pay the costs of the energy evaluation.

Liberalisation of the energy market, which will open the door for competition in the production, transmission and distribution of energy, is an important development in EU energy policy in general, but it will also make a deep environmental impact. Energy producers and distributors will be privatized and, from 2004, consumers will be free to choose their gas and electricity supplier. A free market will change the role of energy companies and curtail the government's power to influence their decisions. Provinces and municipalities will no longer be able use energy providers as agents for their policies. There are fears that a more competitive energy market will lead to lower energy prices, leaving fewer resources and interest for companies to invest in renew-

able energy and research and development (Correljé *et al.*, 2000). Some researchers believe, however, that a free market, which promises an opportunity to oust monopolies, could provide openings for renewable energy and green energy by making end-users more quality- and price-conscious (Collier, 1998). The EU 6th Environment Action Programme stresses the need to internalize the external costs to the environment (EC, 2002). It includes the promotion of fiscal measures such as environment-related taxes and incentives, the possible use of tradable emissions permits and emissions trading, and an inventory and review of subsidies that undermine the sustainable use of energy with a view to phasing them out. All EU countries use environmental taxes to support environmental objectives and to implement the polluter-pays principle (PPP) (Sunikka, 2003b). The implementation of the polluter-pays principle would involve passing on all energy-related costs identified in this study to home-owners and occupants. A report by the Federal Environment Agency in Germany estimates the costs of domestic energy (heat, hot water, electricity) at €7.7 billion per year, or roughly €2.6 per square metre of the total housing stock per year. The value of absolute damage came to approximately €21 billion or €7 per square metre of the total housing stock per year (Lintz, 2000). But despite the fact that pollution taxes are being increasingly emphasized as an effective instrument of environmental policy, the EU policymakers are not empowered to levy them as tax questions are subject to unanimity rule.

Waste management is partly governed by the rules of market economy, but it is also influenced by EU and national regulations. Waste flows are expected to rise in this decade. Waste generation in OECD countries in Europe is reported to have increased by nearly 10% between 1990 and 1995 while GDP growth stood at approximately 6.5% in constant prices (EEA, 1998). By 2020 household waste is likely to grow by around 20% for the EU as a whole. Landfill is generally expected to decrease while recycling and incineration with energy recovery will increase (EEA, 1999). Waste from construction and demolition accounts for 25% of the total waste generation in the EU. This is, therefore, a key sector for realising reductions. Waste generation and waste consist of quantitative waste (the amount of waste generated) and qualitative waste (the degree of hazard). Demolition waste also includes hazardous waste, such as asbestos, which needs special processing. The recycling potential of the demolished materials is limited. In most cases the quality is inferior to virgin materials because of contamination or the recycling components. Strictly speaking, recycling cannot be classified as waste minimisation. Waste minimisation is aided by the direct re-use of a product or component. To complicate things further, the transport of waste also has a deep environmental impact. The European Environment Agency EEA (1999) has warned that the challenge posed by mounting waste cannot be sustainably solved by waste

management and recycling alone. Waste needs to be integrated in strategies of sustainable development and treated as part of the total flow of material through society. The EU waste policy is guided by the Community Waste Management Strategy (1989), which aims at an integrated waste management policy and has set a hierarchy of principles (the prevention of waste generation, the re-use and recycling of waste materials, energy recovery, and the final disposal of waste) (EC, 1989). The 1996 review of the Community Strategy places material recovery above energy recovery (EC, 1996). The legal response to the strategy is defined in the Waste Framework Directive and the Directive on Hazardous Waste (EC, 1991). The projected trends suggest that the present policies, despite some measure of success, will not suffice to stabilize the increase in waste or meet the policy objectives. Waste management and recycling must be supported by measures to reduce waste generation, which take account of the total life-cycle of products and services and influence the construction sector at the same time. Developments in the price of construction and demolition waste are one factor that can influence renewal strategies. However, data on future trends in waste generation and management is pretty thin (EEA, 1999; Blaauw, 2001). Though the adoption of environmental innovation can also be influenced by long-term external factors, such as deregulation of the energy market, growing environmental awareness in the building sector, and trends in the housing market, the impact of these factors cannot be comprehensively assessed (Van der Waals *et al*., 2003).

An overview of the key policy developments at EU level shows that the most important environmental policy developments as far as housing associations are concerned are as follows:

- The EC energy certificate and the ensuing costs.
- The costs of implementing the Kyoto Protocol, reflected in higher energy prices and a more dynamic energy market.
- The EU policy on waste.

4.3 National policies

The Netherlands is required to realize a 6% reduction in greenhouse gas emissions by 2010, compared with the level in 1990. The Dutch government's policy on the environment gives priority to energy saving in the built environment and has defined its national energy and climate policy is defined in several policy plans. The most important of these is the Sustainable Energy Action Programme (*Actieprogramma Duurzaam Energie in opmars* MVROM, 1997b), which sets a 10% target for sustainable energy by 2020. The Memorandum on the Implementation of Climate Policy (*Uitvoeringsnota Klimaatbeleid*) allows the government to choose between CO_2 reduction targets in either national or international developments, but no provincial reduction targets

are set (MVROM, 1999a). The Energy Report (*Energierapport*), published every five years, contains an overview of the main energy developments (MVROM, 1999b). Two Action Plans have been published for sustainable building in the Netherlands (MVROM, 1995; 1997c). The current policy for 2000-2004 places the emphasis on urban development, consumers and energy (MVROM, 1999c). The policy objectives are set in four domains: harmonisation, implementation, consolidation and preparation. In addition to issuing building regulations, the government has introduced measures to stimulate the implementation of its strategy. Though sustainable building has tended to focus mainly on new projects, more attention is now being paid to the environmental potential of the existing housing stock. The National Packages for Sustainable Building and Management, a collection of general sustainability measures and recommendations, have been available for housing projects since 1995 and are well-known in the building sector (SBR, 1998a; 1998b). In 1998, 61% of the building permits included some measures from the National Packages; this figure was expected to rise to 80% in 2000 (MVROM, 1999d). Be that as it may, the average reduction in the environmental burden that can be achieved by these measures is still somewhat modest (Blaauw & Klunder, 1999). The Action Plans for Sustainable Building do not set specific targets for the social housing sector – which covers 2.3 million homes and accounts for 75% of the total rented stock. Social housing associations have been searching independently for ways to promote sustainability. Aedes, the umbrella organisation for social housing associations, signed an environmental agreement with the government on behalf of its members in 1998, and has devised strategies to translate the objectives into an environmental policy at housing association level. According to Sunikka & Boon (2002) and Weissmann (2000), costs coupled with a lack of knowledge, appropriate instruments and information have been largely responsible for preventing sustainability from becoming firmly established as common practice in the social housing sector.

The building regulations specify R values, an insulation measurement, for parts of the construction shell. Up to now, hardly any energy standards or other regulations have been applied in existing buildings. Their scope is, in any case, limited. Renovations need to comply with the new requirements in the Dutch Building Act, but there are no stipulations for replacement action. A study by Van der Waals *et al*. (2003) on urban renewal projects in the Netherlands found that in seven renovation projects in which elements of housing were insulated, the minimum R value was used in four cases, a higher value was used in one and exemption was granted in two, making even lower R values possible. It is to be expected that environmental building regulations will be tightened in the near future. Plans to sharpen the EPC from 1.0 to 0.8 and eventually to 0.6 are currently being prepared by the Platform for Building Regulation (*Overlegplatform Bouwregelgeving*, 2003). The Ministry of

Spatial Planning, Housing & the Environment (MVROM), which studied the implications of the new EPC, concluded that an EPC of 0.8 is feasible in practice and does not introduce any new risks compared with the current level of regulation. Payback from these energy investments cannot be realized with current energy and construction prices, whereas payback can be realized with an EPC of 0.9 (MVROM, 2003). New environmental measures for materials are also being discussed (*Overlegplatform Bouwregelgeving*, 2003). The building regulations are still applied to new construction projects. Now that more attention is being paid to the potential role of current housing in energy-saving, it is likely that progress will continue – albeit slow – in the formulation of regulations for the existing stock. Setting minimum environmental requirements for the existing stock could be fraught with problems as the monitoring systems and cost implications are bound to place a strain on low-income households. Besides regulation, a tax on housing-related environmental damage could serve as an effective policy instrument for realising more sustainability in future. The Regulatory Energy Tax (REB), which the Dutch government introduced for households in 2001, increased energy bills by a third. Even so, research has shown that only half the population is aware of the REB and only 2% take it into account in their electricity consumption (Van der Waals, 2001). The Energy Tax can still, however, contribute to energy savings by shortening the payback time of investments. At the other end of the spectrum, market players often want subsidies to actually implement sustainable building (Sunikka & Boon, 2002). But environmental subsidies are unlikely to increase in the future for several reasons: they have to be financed by general taxes, they do not comply with the polluter-pays policy, and various studies have shown that they have only a limited impact on consumer behaviour (Beerepoot & Sunikka, 2004). The Dutch government decided to cut energy subsidies for buildings in 2003 due to budgetary considerations and the free-rider effect. Communicative instruments play a key role in national sustainable building policy. The National Covenant for Sustainable Building (1997) states that the social rented sector should realize a 15% reduction in CO_2 emissions in 1996-2001. But this agreement counts for very little in practice, given that individual housing associations are not accountable for their part in it and sanctions are non-existent (Sunikka & Boon, 2002; Van der Waals *et al*., 2003).

The urban renewal programme was introduced in the Netherlands in 1997 and the objectives were presented in the Housing Policy Paper (*Nota Wonen)* in 1999 (MVROM, 1997a; 1999e). Although the level of ambition has since been modified, the objectives remain high; they encourage demolition and the combination of existing housing, together resulting in a loss of 200,000 dwellings. Other objectives concern the upgrading of 761,000 homes (instead of 681,000), the construction of 285,000 new homes (instead of 200,000) and the sale of 538,000 homes (instead of 238,000). Urban renewal is fleshed out in

the Urban Renewal Investment Budget (*Investeringsbudget Stedelijke Vernieuwing, ISV*), which is part of the Major Cities Policy (*Grotestedenbeleid, GSB*). The aim is to improve the quality of the urban living and working environment by introducing physical changes. In the Fifth Spatial Planning Memorandum (*Vijfde Nota Ruimtelijke Ordening 'Ruimte maken, ruimte delen'*) the government earmarks the areas where most of the urbanisation will take place in the Netherlands in the next 20 years in a population that could reach 18 million. These areas will accommodate over two thirds of new dwellings and more than three quarters of new jobs. The Dutch government has designated seven great national landscapes, and six national and eleven regional urban networks. The municipalities in these urban networks need to reach agreement on efficient land use (MVROM, 2001). The Urban Renewal Act (*Wet stedelijke vernieuwing,* MVROM, 2000a) is geared to the overall management of urban renewal and states that the minister responsible for the municipal investment budget can enforce municipal policy. The Dutch policy on urban renewal does not address the environment, even though renewal projects make a deep environmental impact. For example, current renewal policy supports demolition and new construction, even though demolition is highly unsustainable in environmental terms as it involves new construction and waste. It remains to be seen whether, with increasing hands-on experience, future policies continue to support demolition or encourage renovation. Furthermore, despite their importance, neither recycling nor the management of demolition and construction waste is addressed in renewal policies. The Dutch government has introduced special landfill and general waste taxes which are levied over and above the processing costs. The national policy supports the objective of a compact city and more construction in sparsely built areas. This objective recurs in the renewal of post-war housing estates, but it often contradicts another national policy goal, *viz.* the preservation of green and recreational space. The problem of a compact city versus the preservation of green space has not yet been adequately addressed in national policies.

On the basis of a policy analysis the main national policy developments as far as housing associations are concerned are as follows:

- Developments in the building regulations, such as sharpening the EPC from 1.0 to 0.8 and eventually to 0.6 (although application in the existing stock and control remain problematic).
- Developments in the Regulatory Energy Tax (REB) on energy consumption.
- Possible increases in the charges for construction and demolition waste.
- Recent cuts in energy subsidies.
- As often referred to in sustainable building agreements and environmental policies, the National Packages define to a large extent the conceptualisation and ambitions of sustainable building in practice.

4.4 Regional policies

In this chapter we focus on the regional policy of the Province of Zuid-Holland, as this is where both case studies are located.

The province of Zuid-Holland has developed an environmental and water policy plan for 2000-2004 (*Beleidsplan Milieu en Water*) (Provincie Zuid-Holland, 2001a). The key themes are quality and increasing densities in cities. The plan also advocates improving the quality of life in urban areas so that people will be discouraged from moving to newly developed housing projects in smaller municipalities. The province implements its policy objectives by identifying special qualities in each region which can be further exploited. It also communicates with all the relevant organisations about agreements on these regional qualities. The municipalities then flesh out the ideas with support from the province in terms of expertise, a knowledge network and funding. Since the province of Zuid-Holland accounts for a quarter of the national energy consumption, it plays a key role in realising the energy objectives. It has published an Energy and Climate Policy Paper for 2000-2010 (*Nota Energie- en Klimaatbeleid*) (Provincie Zuid-Holland, 2000), which was preceded by an energy policy for 1995-1999. Lessons from the earlier policy prompted suggestions that energy saving should be integrated and implemented in other policy fields, such as spatial planning, by making more effective use of legal measures. They also led to the realisation that concrete projects were needed to stimulate wind energy potential and preparations were needed for new, more dynamic energy markets after deregulation. In line with national policy, the energy policy in the Province of Zuid-Holland for 2000-2010 is three-pronged: the aim is to reduce the energy demand by encouraging end-user energy savings, to make greater use of sustainable energy sources and to improve efficiency in the consumption of still needed fossil energy (Provincie Zuid-Holland, 2000). Energy-saving measures are also implemented in the residential sector and the recovery and reuse of waste heat is being considered. The main focus is the renovation of existing stock using Energy Performance Advice (*Energie Prestatie Advies, EPA*) and Energy Performance per Location (*Energie Prestatie op Locatie, EPL)*. Demolition projects and new construction projects must take improvements to energy efficiency into consideration (Provincie Zuid-Holland, 2001b). Further savings are expected from the transfer to alternative energy sources: the share of renewable energy sources will increase to 10% in 2020. In the housing sector this means, for example, that the later implementation of more economic solar energy should be possible. The Province of Zuid-Holland intends to have a wind turbine generating capacity of 250 MW by 2010. In 1991, it signed an agreement on wind energy placement problems (*Bestuursovereenkomst Plaatsingsproblematiek Windenergie BPW*), whereby it pledged to reserve space for 150 MW for wind turbines by

2000. This space has already been reserved in the regional plan (*Streekplan*). The combustion of biomass and waste materials for electricity generation and the use of solar energy will also be promoted, but the costs of renewable energy sources are still a problem. The energy and climate policy of the province will be monitored. It is, however, difficult to set overall province-specific targets for CO_2 reductions (in Mton CO_2) because CO_2 emissions are impossible to place. The monitoring will be implemented mainly at project level and the CO_2 effect of the selected projects will be calculated at the same level.

The relationship between provincial government in the Netherlands and other players in society has acquired a distinct horizontal character in recent years. The province has assumed a more communicative role: it must set a good example and is no longer primarily a subsidy provider. Municipalities are seen as partners in spatial planning amongst others. Since the 1990s, energy targets have been translated into municipal energy-saving procedures (*Gemeentelijke Energiebesparings Aanpak GEA*) which are applied to housing, sustainable energy (specifically solar energy) and energy-saving in municipal buildings. The province plans to cooperate with larger municipalities and to activate smaller municipalities in knowledge dissemination and model projects. It also intends to make better use of current subsidies and funding options for energy saving and sustainable energy sources. The Province of Zuid-Holland has published a guidebook based on its environmental and water policy, entitled 'Hand Luggage for Sustainability and Environmental Quality in Urban Areas' (*Handbagage voor duurzaamheid en omgevingskwaliteit in het grootstedelijk gebied*) (Provincie Zuid-Holland, 2001c). The guidebook aims to make sustainability targets more concrete and feasible at regional level and recognizes the environmental, spatial and processing aspects of sustainability. The conservation of greenery and water structure is considered vital. The environmental themes are water, transport, energy, nature and landscape, soil and residual materials, the living environment, land-use and life-cycle targets. Four levels of ambition are defined for each theme. The first level is the basic minimum environmental quality that must be achieved; the second consists of complementary measures which have little spatial relevance but should be applied whenever possible; the third includes more profound location-specific environmental measures, which have less value for spatial quality but are important to sustainability (e.g. energy infrastructure); the fourth focuses on the environmental opportunities which are important to the identity of the location, such as greenery and water structures in new housing areas. The measures are entered in a matrix with the themes and ambition levels as the axes.

The Province of Zuid-Holland also explains its urban renewal objectives in a document entitled 'Urban Transformation in the Neighbourhood: the role of

the province in the revitalisation of post-war housing estates' (*Stedelijke transformatie in de wijk. De rol van de provincie bij de revitalisering van naoorlogse wijken*) (Provincie Zuid-Holland, 2001d). Greenery and water are seen as positive impulses in urban living environments. Post-war housing estates with potential in their parks and canals can offer opportunities for urban living in a park-like environment that is safe, clean and spacious. The province can raise the level of ambition of the municipality, the residents and the housing associations in the transformation of neighbourhoods. The urban renewal policy does not, however, mention environmental objectives.

On the basis of a policy analysis, the main regional policy developments as far as housing associations are concerned are as follows:

- The Energy and Climate Policy Paper for 2000-2010 includes energy-saving measures (but no sanctions) for the residential sector as well.
- Energy ambitions will be reviewed in the ISV applications.
- Solar energy will be promoted in buildings to increase the share of renewable energy sources.

4.5 Municipal policies

This chapter focuses on the themes of sustainable building and housing quality in the policy of the Municipalities of Rotterdam and The Hague.

4.5.1 Sustainable housing in Rotterdam

The environmental objectives for Rotterdam are defined in Rotterdam Environmental Policy Plan 2 (*Rotterdams Milieubeleidsplan 2*) and the Rotterdam Energy Plan (*Rotterdams Energieplan*) (Municipality of Rotterdam, 1995; 2000b). In the energy policy, the CO_2 reduction targets are related to the national objectives. In the building sector, the EPC (*Energieprestatiecoëfficient*) is set at 20% below the level in the building regulations, but this is not legally enforceable. Implementation of the muncipality's sustainability objectives is stimulated by the use of different policy instruments, such as voluntary agreements and tools like 'Environment in Place' (*Milieu op z'n plek*). The 'Environment in Place' document was developed by the Municipality of Rotterdam in 1997 as an instrument for area-based environmental policy. It is a more detailed version of Rotterdam Environmental Policy Plan 2, which confirms the desirability of integrating the environment in spatial planning. 'Environment in Place' can be used for drawing up new spatial plans and policy or for evaluating the environmental aspects of current policy. In practice, it is used only by the Environmental Department and not by the other municipal departments for which it was developed. One of the spearheads of the hous-

ing quality policy (*Rotterdamse Woningkwaliteit*) of the Municipality of Rotterdam is sustainability (Gemeente Rotterdam, 2002). It is applied to large-scale housing projects which are built on municipal land. The aim of this document is to narrow down and simplify the rules for batch building in Rotterdam and to introduce order into the many quality packages, such as House Choice (*Woonkeur*) and the National Package for Sustainable Building (*Nationaal Pakket Duurzaam Bouwen*), which lack overall consistency and coherence (Municipality of Rotterdam, 2003). Housing Quality in Rotterdam came into being in association with the market and takes the form of an agreement between the Municipality of Rotterdam and the developer. It sets a minimum standard of quality (a.k.a. Basic Quality) and can be extended by the addition of thematic Plus Packages. The Basic Quality is not optional. It consists of four housing categories and nine technical regulations, two of which – the sole use of renewable wood (FSC or Stichting Keurhout label) and coated zinc, copper and lead – fall under the category of sustainable building. It is possible to deviate from the Basic Quality provided substantial reasons are offered. The five Plus Packages are organized thematically, each with its own set of measures. For example, the measures for the 'Sustainable & Healthy' theme relate to energy, water and materials and envisage, amongst others, an EPC of 10% below the norm set by the Building Act (*Bouwbesluit*), and better water management by installing separate hot water pipes (d=12 mm) to the kitchen tap. The developers are free to decide whether or not to adopt the measures in the Plus Packages or to go a step farther and add some of their own. Housing Quality in Rotterdam reflects the discussion on the widening concept of sustainable building, where the focus is transferred from technical environmental measures towards quality issues that increase comfort, usability and the market position of housing (Municipality of Rotterdam, 2002). The Rotterdam Municipal Building Regulations explain the application procedure for municipal building permits and the rules for the separation of construction and demolition waste.

The urban renewal policy for Rotterdam is set out in the Housing Vision for Rotterdam (*Woonvisie Wonen in Rotterdam*) (Municipality of Rotterdam, 2003). This policy paper was drafted to clarify Rotterdam's housing policy for the next fifteen years. It also sets out a concrete approach for the next four years. The Housing Vision provides a general framework and is further specified in agreements between the Municipality of Rotterdam, housing associations and other parties who are working on the concept of living in the city. The Housing Vision also articulates the ambition to make Rotterdam an attractive residential city for everyone. This means that more homes and higher-quality homes need to be created to attract occupants from medium- and high-income groups. Meantime, special attention needs to be paid to marginalized groups such as the elderly and large families, as well as addicts and the

homeless. The Housing Vision does not include sustainable building as a theme, but it does devote a lot of attention to improving the quality of the housing stock. Accordingly, the stipulations in Housing Quality in Rotterdam are applied to secure a minimum standard of building. The municipality also wants to improve quality by introducing more variation in the types of dwelling. This will be achieved by renovation, demolition and new building. Voluntary agreements between municipalities and local players in the housing sector have become an important policy instrument in the Netherlands to promote sustainable building, also at municipal level (Boon, 2003a). In the Rotterdam region, an agreement on sustainable construction, renovation and management (*Convenant Duurzaam ontwikkelen, bouwen en beheren*) has been drawn up with several parties in the construction market (Regio Rotterdam, 2000). These parties have agreed to work together to reduce environmental pollution in the development, building and management of housing, from the spatial planning phase to occupation. The partners have pledged to include environmental factors in the spatial planning for new building and the renovation and management of existing buildings. The measures are derived from the checklists in National Packages for Sustainable Building (SBR, 1998a; 1998b), which include standard measures and recommendations for materials, water use, the indoor climate, waste management and energy saving. The Rotterdam Sustainable Building Covenant draws a distinction between fixed and variable, case-specific measures. The fixed measures are, in principle, obligatory in new construction. Renovations and housing that meet the covenant requirements are awarded a sustainable construction certificate; 70% of the new housing projects in Rotterdam already have this status. The Sustainable Building Covenant also includes points of spatial planning. These covenants are, however, essentially flawed because they are non-obligatory. Though they can promote sustainability, they are unlikely to bring about behavioural change on a larger scale. In a research project on urban renewal in the Netherlands Van der Waals *et al*. (2003) conclude that municipalities and housing associations often ignore the covenants in the building process and suggest that this is due in most cases to the absence of a monitoring mechanism, the lack of quantified objectives for CO_2 reductions, the wide scope of the issues addressed and the weak legal basis (e.g no use is made of covenants when building permits are being assessed). The true value of a covenant lies in the willingness of the different parties to sign up for sustainability. The covenant, as an instrument, is starting to pay off in the Dutch urban planning process because it places sustainability on the policy and political agenda and helps to promote sustainable building. Nonetheless, other instruments like regulations and financial incentives are still needed (Boon, 2003b).

The policy objectives for the green areas in Hoogvliet are defined in the municipal policy documents ‘Green in Hoogvliet’ (1998) and the Water Plan

(2000-2005). In the Hoogvliet Development Vision (*Ontwikkelingsvisie Hoogvliet,* 2000) the green areas are classified as landscape (nature, the Green Ring), intermediate (park landscape, green radials), urban nature (the living environment), neighbourhood parks (focus on use) and berm nature (damage zone) (Municipality of Rotterdam, 2000c). The importance and potential of the green areas is recognized in all new renewal plans. Ecological and recreational developments focus on the Green Ring that surrounds Hoogvliet on three sides and along the Oude Maas. The Green Ring, which is 12 kilometres long and has a surface of nearly 120 hectares, plays a central role in the master plan for the Oude Maas river banks (published in 2002). The World Wildlife Fund is participating in a biodiversity project in Ruigeplaatbos.

4.5.2 Sustainable housing in The Hague

The sustainability policy for The Hague is set out in various documents; the most important ones will be discussed in this chapter. In addition to a compact city, the environmental policy of The Hague for 2001-2006 (*Milieubeleidsplan Den Haag, Contouren voor een duurzame stad*, Municipality of The Hague, 2001), emphasizes a good living climate comprising three main elements: environmental quality, sustainability of buildings and facilities, and favourable socio-economic perspectives. The policy calls for responsible use of urban land which will conserve nature and landscape, contribute to energy saving and restrict mobility. It recognizes that the concept of a compact city (which promotes maximum profit from space and the concentration of functions) can come into conflict with environmental objectives. On the one hand environmental regulations on noise and dust can complicate compact construction and lead to lengthy procedures while, on the other, compact construction sometimes takes place at the expense of urban green areas. Such contradictory requirements can easily lead to dilemmas. The 'City and Environment' project (*Stad en Milieu*) seeks to address conflicts between environmental and spatial planning objectives. The problems – which may be of a legal mature or related to materials or management – are tackled in three phases: first, the municipality gets involved in the environmental planning as early as possible, second, the existing regulatory framework is exploited to the full; and if neither of these phases is successful, the municipality can renew the current norms.

One of the key objectives of the environmental policy is to make The Hague a CO_2-neutral city. CO_2 emissions have increased from 1,900 Ktons in 1990 to 3,000 Ktons in 1999, households and transport being responsible for approximately 70%. The most important objective in the energy policy of The Hague (1993) is to realize a 17% reduction (300 Ktons) in CO_2 emissions from households and companies by 2000, compared with the level in 1990. However, in

1996, it was already clear that, despite specific measures, no reduction had been achieved in absolute CO_2 emissions. An updated energy plan in 1996 introduced some new energy-saving options involving solar energy, sustainable construction and environmental licences. The policy objective of CO_2-neutrality is addressed by three main strategies: energy saving (including an energy campaign for households, the stimulation of small-scale interventions in dwellings, special projects like *Prijs je rijk met energie* and *Stooklijnproject*, and initiatives targeted at companies), the use of sustainable energy sources ('The Hague solar-powered city', special projects like *Zonnekwadrant*' in large office complexes and the use of photovoltaic cells in municipal buildings) and, as a secondary strategy, joint implementation (CO_2 emission rights). The Municipality of The Hague is also a signatory to the Climate Treaty for local governments. A product of solidarity with the Amazon region, the Climate Treaty calls for a 50% per capita reduction in CO_2 by 2010. It does not, however, include any mandatory measures and is really more of a communicative instrument. Given the current lack of attention for area-specific environmental quality, The Hague wants to move towards a more area-orientated environmental policy. An environmental atlas is being developed which recognizes various environmental qualities.

The Municipality of The Hague sees urban renewal as one of four main domains where environmental policy can have a management function, where a more area-orientated policy can prove useful and where environmental policy objectives can be realized. The Urban Renewal Programme (*Meerjarenprogramma Stedelijke Vernieuwing, MPSV*), which forms part of the Major Cities Policy (*Grote Steden Beleid, GSB*), is geared to improving the living and working climate, the economy, accessibility and mobility. The environmental policy can offer a framework at both programme and project level to implement sustainability objectives in urban renewal (Municipality of The Hague, 2001). The Municipality of The Hague uses social instruments (communicative tools) and fiscal instruments (taxes and subsidies) to implement its environmental policy. Regulations are thought to be most effective, but in many cases are actually the least efficient means of attaining the objective. Regulations are applied mostly in cases where behaviour is totally undesirable (e.g. threats to health and safety). Social instruments include education, the dissemination of information, and agreements aimed at dialogue and cooperation. Fiscal instruments include an energy tax, national prices for construction waste, subsidies for solar boilers etc., and emission rights. Tax benefits in return for environmentally-friendly investments in buildings or a land-price policy can also boost the development of sustainability planning.

Environmental policies for the housing sector are also recorded in the Regulations for Sustainable Building (*Verordening Duurzaam Bouwen*), the policy paper

Table 4.1 Sustainable building themes for each phase in Environmentally-Aware Building

Planning design	Architectural design	Raw & waste materials
Landscape	Energy-saving	Raw materials
Water	Choice of materials	Demolition waste
Traffic	Household waste	Building waste
Nature	Water-saving	
Energy	Quality of the indoor environment	
Waste		
Land use		

on environmentally-aware building (*Nota Milieubewust Bouwen*) and a memorandum entitled Strength of The Hague (*Nota Kracht van Den Haag*) (Municipality of The Hague, 1996; 1998a; 1999). The Regulations for Sustainable Building were compiled in 1996 by the Municipality of The Hague on the basis of a list of core measures for materials. These regulations set explicit minimum requirements for sustainable building in new housing projects. The municipality issued the policy paper on environmentally-aware building to promote sustainable building practices via covenants. This paper lists the sustainability principles that must be applied throughout the project – from design to execution. These principles relate to the phases of urban planning, architectural design, and raw and waste materials. Table 4.1 shows the themes for each phase. The pursuit of sustainability is seen as an obligation, possibly with different ambitions depending on the location and situation. There is a list of standard principles and a list of optional principles. Any party who deviates from the standard principles must explain how he then intends to achieve the sustainability target. For example, one of the standard principles for Landscape is that new development locations must blend in with the original features of the landscape or the land allocation. An optional principle for Energy is the achievement of maximum compactness, regularity and shelter in building projects.

Strength of The Hague (*nota Kracht van Den Haag)* was drawn up within the parameters of the Major Cities Policy. It constitutes the guideline for the renovation of housing estates in The Hague and sets a level of ambition for The Hague SW. This involves, amongst others, an urgently needed transformation process which will introduce new types of housing, higher quality housing, and more varied housing in order to reflect different lifestyles and tastes. The paper mentions sustainable building and expatiates in four separate sections: Environment and Building, Garden Suburb, Water, and Environment & Sustainability. The first section, Environment and Building, explicitly addresses a policy instrument known as 'Strategy for Spatial Planning and the Environment' (*Ruimtelijke Ordening en Milieu Beleids Ontwerp Strategie, ROMbo*). The ROMbo method ensures that the environment is included in urban renewal planning processes from the very start. ROMbo is linked to the National Package for Sustainable Urban Development (*Nationaal Pakket Duurzame Stedenbouw*) (SEV/Novem, 1999) and the Hague Checklist for Spatial Planning and

the Environment (*Haagse Checklist Ruimtelijke Ordening en Milieu*). It rests on three planks: energy expansion, overall chain management, and quality promotion. Energy expansion is equated with energy-efficient building and consists of a dual policy for restricting fossil fuel on the one hand and generating renewable energy on the other. The ultimate goal is to realize energy-neutral building in which fuel levels are kept to a minimum and offset by renewable energy. Overall Chain Management is translated as ecological construction in the 'Strength of The Hague' paper and relates to the closure of water and material cycles in spatial and administrative units. Quality Promotion stimulates bio-building, which covers comfort, safety and health in spatial planning and everyday working and living. The ultimate aim of bio-building is: comfortable, safe and healthy living in the private and professional sphere and more scope to influence personal life choices without jeopardising the life of future generations. Special attention is paid to energy expansion. The Hague is working on a new energy vision which will cover a period of 20-25 years and address themes like living/households, business/employment, traffic/transport and involve a study on the realisation of grass roofs in the urban environment, model projects in energy-neutral wooden-frame construction and industrial, flexible and detachable construction. The Garden Suburb section reflects the greenery theme. Thanks to improvements in the financial situation of The Hague, more money for investment in greenery is set aside in the 'Strength of The Hague' paper. Large existing districts need upgrading so that they can continue to be attractive in the future. This can be assisted by making better use of links with the revitalisation programme. The Municipality of The Hague accords priority to the theme of green and safe, the replanting of 100,000 trees, historical greenery and parks of the future, city of green contours, and nature areas in and around the city for leisure and recreation. Water is no longer recognized as the bearer of the urban structure. The Hague wants to 'restore' water in the city and has compiled The Hague Water Plan (*Waterplan The Hague 1998-2002*, Municipality of The Hague, 1998b) for this purpose. The Water Plan will improve the constituents of the water system and concentrate on water quality, ecological value, wildlife-friendly banks, sewage, water management, ground-water, material and energy consumption, and leisure. Top priority goes to bio-diversity. The plan has a threefold ambition: 'ornamental water', 'pleasing water' and 'living water'. The intention is to realize at least the first of these by 2003. The last section, Environment & Sustainability, describes current initiatives of the Major Cities Policy which are being bolstered and continued on the basis of four spearheads: more sustainability in the living and working environment, more sustainability in the physical environment, stimulation of sustainability-oriented behaviour, promotion of a sustainable urban economy.

The Housing Vision for The Hague, 2020 a.k.a. Urban Living (*Stedelijk Wonen*), sets out the urban framework for living in The Hague in the years ahead and

addresses the challenge facing the municipality, i.e. to continue to house all the municipal target groups and enhance the quality of life in the city. The document attaches major importance to policy implementation on an area basis, whereby the city is split into different living environments. It also elaborates on two key principles from the Housing Policy Plan (*Beleidsplan Wonen*) (Municipality of The Hague, 1998c) and the 'Strength of The Hague' paper: first, stronger ties must be established between the city and middle- and high-income groups by offering a more varied range of housing; second, enough quality homes must be available for low-income groups. Sustainable Building does not appear as such in the Housing Vision. The subjects that feature in the document are housing stock and other real estate; lay-out and management of public space and greenery; quality of life and safety; social cohesion in neighbourhoods; the range and image of amenities; employment; accessibility; and parking. These need to be worked out for each district. Interestingly, considerable attention is paid to increasing the density of urban areas in The Hague by more building in the city, a higher rate of replacement for demolished buildings, the stimulation of mixed functions, function-stacking or multiple use, and site re-designation. Other options include building on infrastructure, underground building and 'topping up'.

4.6 Environmental policies of the housing associations

In this section we analyse the environmental policy of the two housing associations, Woonbron Maasoevers and Staedion.

4.6.1 Environmental policy of Woonbron Maasoevers

Woonbron Maasoevers sets out its policy in its strategic stock plan for Hoogvliet (*Hoogvliet aan zet*) (Woonbron Maasoevers, 1999) and explains its vision for sustainable building in its Year Plan for 2003 (Woonbron Maasoevers, 2003), which is updated annually. Woonbron Maasoevers compiled its strategic stock plan for Hoogvliet in 1999, describing it as 'policy in the making' because further refinement was required. The strategic stock plan mainly concerns the housing owned by Woonbron Maasoevers in Hoogvliet. It does not explicitly adopt sustainable building as a theme, but it does refer to it several times. In the SWOT analysis for Hoogvliet, Shell Pernis emerges as a potential source of residual heat for the district. The programme for new building states that dwellings should be sustainable, adaptable and socially safe. The housing association says that there are already enough guidelines for this and quotes as examples the National Package for Sustainable Building, the Senior Citizen seal of approval (*Seniorenlabel*, currently included in

Housing Choice) and the police seal of approval, Living Safely (*Veilig Wonen*). The Year Plan for 2003 clearly explains the standpoint of Woonbron Maasoevers' in a section devoted entirely to sustainability. The housing association maintains that a positive contribution to the environment is part and parcel of its social responsibility and presents the following starting points:

- Compliance with the Covenant for Sustainable Development, Building and Management (Sustainable Building Partnership, Regio Rotterdam).
- Close monitoring of developments in environmental conservation and application where possible.
- A reasonable balance between company interests and the general interest.
- No environmental measures at the expense of quality and sustainability.
- Health as a special area of attention for the indoor climate.

Woonbron Maasoevers has built up and implemented a sustainable demolition policy for which Oedevlietsepark is serving as a pilot project. If it turns out that a market exists for the products of sustainable demolition, the housing association is willing to assist in setting up a regional collection and distribution point in Hoogvliet or the surroundings. The Sustainable Building policy plan will be drawn up and implemented in 2003. It will be based on the Regional Covenant for Sustainable Development, Building and Management (Regio Rotterdam, 2000) and the National Covenant for Sustainable Building (MVROM, *et al*. 1998). The maxim for new building is to apply in full – if technically feasible – the measures in the National Package for Sustainable Building in the Housing Sector (*Nationaal Pakket Duurzaam Bouwen Woningbouw*) (SBR, 1998a). The following principles also apply:

- All sustainable building measures should be applied if no extra costs are involved and the quality of the end product is not undermined.
- Extra investment of at least €1,361 for sustainable building components in each home, as agreed in the Regional Covenant for Sustainable Development, Building and Management.
- The design, surroundings and use of materials should be geared to a sustainable environment; new norms should be anticipated at an early stage.
- Sustainable building as a standard part of the reporting system for new building.

The quality requirements for existing housing stock will be established on the basis of Sustainable Housing Management (*Duurzaam woningbeheer, DUWON*) (Novem/ SEV, 1997). The DUWON checklist will be used to ascertain the sustainability level. The results and the quality requirements will together form the departure point for the maintenance of dwellings designated 'for further development'. The police label, Living Safely, is also part of the maintenance. In compliance with the regional covenant only approved wood will be used. The company will contribute to water management by implementing

small-scale measures and interventions costing up to €150 per dwelling. Woonbron Maasoevers developed and implemented its demolition policy in 2002. Sustainable demolition is currently being tested in pilot projects in Hoogvliet. If it turns out that there is a reasonable market for the products of sustainable demolition, Woonbron Maasoevers will help to develop a regional collection and distribution point in Hoogvliet and the surroundings. The housing association is also looking at energy efficiency. An energy study was carried out in Hoogvliet in 2000 but it focused on energy-efficient improvements and the subsequent investment costs in new rather than existing buildings. The housing association has also been getting to grips with its new role as a provider of housing for targeted market groups. Kromwijk & Scherpenisse (2003) have discovered a mismatch between policy measures and actual market developments, which is resulting in a situation where policy targets are not realized. Hence, stagnation has emerged in new construction, the sale of social rented housing and the demolition and renewal of housing, the housing shortage is getting worse, mobility is slowing down, the residents are exposed to risks and the housing market is becoming out of reach of low- and middle-income groups. Kromwijk & Scherpenisse (2003) advocate a more differentiated housing supply and the abolition of regulations and policies that prevent the real housing demand from being met. They argue that policy in the Netherlands is geared to spatial planning, housing production and money rather than people and list some fundamentals for new construction projects. For example, they say that housing should be more directed at residents so that the focus shifts from spatial planning and buildings to people. Second, the regulated allocation of housing should be replaced by a more facilitative approach which allows people a choice in where they live. This will help people to develop an attachment to the neighbourhood. Third, a transfer is needed from one-sided housing to pre-profiled housing environments for lifestyles, and from dwellings to living environments: 'difference makes quality' and 'quality makes a difference'. The elderly are quoted as an example, as lifestyles and needs vary significantly in this target group. Lifestyles should also result in different management strategies. Residents should not be prohibited from investing in home improvements but encouraged. Housing associations should be more socially-aware and cooperate with the residents. Housing management should focus more on the market and the client. In dynamic 'ownership-neutral housing management' dwellings should not be for rent or for sale – but for 'living in'.

4.6.2 Environmental policy of Staedion

The most relevant policy document on sustainability at Staedion Housing Association is the 'Environmental Policy Plan' (Staedion, 2002). The aim of Staedion's environmental policy is to raise the environmental performance of

the company to a socially responsible level and keep it there. The policy is an offshoot of the National Covenant for Sustainable Building (*Nationaal Convenant Duurzaam Bouwen*) and the National Housing Accord, 2001-2005 (*Nationaal Akkoord Wonen*), and reflects the legalities of the Environment Act (*Wet Milieubeheer*), the Soil Protection Act (*Wet Bodembescherming*) and the Noise Abatement Act (*Wet Geluidhinder*). It addresses three themes: sustainability, quality of life, and health, which are subdivided into nine spearheads: sustainable building and renovation, lower energy consumption and CO_2 emissions, sustainable maintenance, less noise nuisance, sustainable water management, tenant participation in housing management, a healthy indoor environment, soil clean-up, and internal environmental conservation. The developments and action areas for each spearhead are briefly described. The aims are also formulated and quantified. For example, the aim for 'sustainable maintenance' is to apply sustainable materials and regulations on the basis of a pre-defined package. The aim for 'sustainable water management' is to replace all lead piping. The deadline for realising these aims is 1 January 2007. Staedion has also set out its ambitions in a technical plan for rented and owner-occupied homes. This has since been converted into two programmes of requirements: one for new buildings and one for existing buildings. Sustainable building does not feature in the programme for new buildings, though measures for sustainable building do figure in the plan that must be drawn up before a building project can commence. The programme does not specify any standards for these measures. Conversely, sustainable building constitutes a clear theme in the programme for existing buildings. This is based on three levels of maintenance with an ambition for each level. Each ambition gives rise to a specific strategy. The level of ambition depends on the state and age of the dwelling. Cases in point are solar panels, heat exchangers, small-scale co-generation connection, low temperature systems and home renovation in which the dismantling of re-usable elements plays a role.

5 Oedevlietsepark, Rotterdam

5.1 Introduction

This chapter addresses the first case study: Oedevlietsepark in Hoogvliet, Rotterdam. It adopts a broad angle, approaching sustainability from the perspective of energy-saving potential and the extension of functional life-cycle. It also recognizes the importance of sustainability as a theme in the planning process. We shall discuss several renovation solutions, energy-saving potential and the subsequent costs, sustainability ambitions in the planning process, and experience of performance agreements in the planning process. Section 5.2 concentrates on the improvement of energy efficiency and the costs. In Section 5.3 we discuss the extension of the functional life-cycle in the context of the case study. Section 5.4 deals with the planning process for Oedevlietsepark and Section 5.5 describes the input from the sustainability ambitions of the different players in the planning process. Section 5.6 describes the experience of performance agreements and Section 5.7 concludes with a section on performance agreements for sustainable building.

5.2 Energy-efficient renovation

We chose a building on Koolvisweg, which is typical of the buildings in Oedevlietsepark, as a case study in our examination of energy-efficient renovation solutions that can reduce CO_2 emissions. The field of study is presented in Chapter 3. An energy evaluation was conducted using the Energy Performance Advice programme (*Energie Prestatie Advies, EPA*). The calculations were subject to the following assumptions and constraints:

- The cavity walls have a structure of double-brick or a combination of brick and reinforced concrete. Extra insulation and boards have been installed in some parts of the facade in earlier renovations in order to prevent cold bridges and heat losses. There is no cavity insulation and neither the roof nor the floors are insulated. The ground floor is unheated space which is used for storage. The main facade faces south-east.
- Double glazing was installed in an earlier renovation.
- The energy demand is dominated by the use of natural gas for heating the living space. Natural gas is also used for hot water and cooking while electricity is used for other energy services. The buildings have natural ventilation. It is assumed that all the dwellings are heated with local gas systems and that tap water is heated by an the instantaneous boiler in the kitchen.
- The estimated annual average indoor temperature is 15 degrees.
- A three-bedroom apartment is presumed to accommodate four residents and a two-bedroom apartment three.

The calculations for the investment costs and payback time are based on the

Table 5.1 EPA evaluation of the different investment options for one apartment block in Oedevlietsepark

Options	Reference Existing situation	Solution 1 Insulation	Solution 2 Solution 1 + windows	Solution 3 Solution 2 + installations	Solution 4 Solution 3 + solar boiler
Energy index	1.13	0.86	0.78	0.74	0.66
Space heating (m^3 gas)	28,000	13,145	9,332	9,370	9,370
Tap water heating (m^3 gas)	15,087	15,260	15,260	0	0
Total gas consumption (m^3)	43,887	28,405	24,592	9,370	9,370
Gas savings (m^3)	-	15,482	19,295	34,517	34,517
Tap water heating (kWh)	0	0	0	61,184	41,608
Ancillary energy (kWh)	7,929	7,929	7,929	11,091	12,591
Lighting (kWh)	9,181	9,181	9,181	9,181	9,181
Total electricity consumption (kWh)	17,111	17,111	17,111	81,456	63,380
Electricity savings (kWh)	-	0	0	-64,345	-46,270
Expenditure (excl. subsidies and VAT) (€)	-	108,179	168,235	322,404	368,046
Extra expenditure (excl. subsidies and VAT) (€)	-	85,263	119,654	258,519	304,161
Gas costs (excl. VAT) (€)	16,107	10,425	9,025	3,439	3,439
Electricity costs (excl. VAT) (€)	2,194	2,194	2,194	10,443	8,125
Annual receipts in total energy costs (€)	-	5,682	7,082	4,419	6,737
Payback time (years)	-	30	45	-	-
Payback time extra investments (years)	-	21	25	-	-
CO_2 emissions reduction (kg)	-	31,641	40,327	39,562	48,177
MJ Gas for EPL calculations	1,721,614	1,096,444	924,809	390,498	390,498
MJ Electricity for EPL calculations	157,945	157,945	157,945	611,444	470,943
Change in the reference energy index (%)	-	24%	31%	35%	42%

following assumptions:

- The estimated investment for the renovation is low as it is assumed that similar renovations are carried out in more than 50 dwellings (the selected building type in Oedevlietsepark has 26 dwellings, meaning that at least two apartment blocks are renovated at the same time).
- All the costs are exclusive VAT.
- As government energy subsidies were abolished in 2003, the investment costs are calculated without subsidies.
- The gas price is €0.367, including REB tax.
- The electricity price is €0.1282, including REB tax.
- The life-cycle expectancy before the next intervention is 25 years. This is the period used when considering payback times. The life-cycle expectancy for installations is 15 years.
- Life-cycle costs are understood as total energy costs over 25 years. Maintenance costs are not incorporated in a total life-cycle cost analysis.
- The payback time is calculated on the basis of the Net Present Value of the amount saved and takes account of inflation (2.9%) and interest rates (6%).
- It is possible to discount the investment prices further if the measures are combined, e.g. extra insulation in combination with new windows. This does not, however, figure in these calculations.

Table 5.2 Key figures for an average dwelling in Oedevlietsepark

Options	Reference	Solution 1	Solution 2	Solution 3	Solution 4
	Existing situation	Insulation	Solution 1 + windows	Solution 2 + installations	Solution 3 + solar boiler
Total gas consumption (m^3)	1,688	1,093	946	360	360
Gas savings (m^3)	-	595	742	1,328	1,328
Total electricity consumption (kWh)	658	658	658	3,133	2,438
Electricity savings (kWh)	-	0	0	-2,475	-1,780
Expenditure (excl. subsidies and VAT)	-	4,161	6,471	12,400	14,156
Gas costs (excl. VAT)	620	401	347	132	132
Electricity costs (excl. VAT)	84	84	84	402	313
Annual receipts in total energy costs	-	219	272	170	259

Table 5.1 presents the results of the EPA evaluation based on these assumptions and constraints. The reference case presents the current situation. In Solution 1 previous extra insulation and board facade (where it exists) is removed and extra insulation is placed in the outside facade, in the roof and on the floor. Renovation Solution 2 goes farther and replaces all the existing windows with new High Yield^{++} windows. Solution 3 goes farther still and includes more energy- efficient installation measures. An HY107 boiler is installed for heating living space and a WP boiler for heating tap water as well as water-saving equipment. The ventilation can be adjusted to demand and the joints and construction are sealed. Solution 4 also includes the installation of a solar boiler. Table 5.2 shows the energy consumption, the savings and the costs for an average dwelling in Oedevlietsepark.

As shown in Table 5.1 and 5.2, most of the energy is used for heating living areas. In Solution 2 (insulation and HY++ windows), gas consumption can be cut by 44%, resulting in savings of €7,082 in the total annual energy costs. This represents annual savings of €272 per average dwelling. Solution 2 also makes it possible to improve the energy index of the case study by 31% and achieve a reduction of 40,327 kg in CO_2 emissions. New energy-efficient installations, such as an HY107 boiler, an electric WP boiler and a solar boiler can reduce gas consumption by a dramatic 79% compared with the current level, despite a slight increase in electricity consumption (Solution 3). This can deliver gas savings of 34,517 m^3 and annual reductions of €6,737 in energy bills, working out at €259 per average dwelling. The energy index can be improved by 42% and 48,177 kg in CO_2 reductions. The investment costs for Solution 2 are €168,235 in total and €6,471 per average dwelling. The investment costs for Solution 4 are €368,046 in total and €14,156 per average dwelling. The abolition of government energy subsidies in the Netherlands in 2003 has made solar boilers very expensive for ordinary consumers. This is also the reason why some energy providers have stopped supplying them. The investment costs for Solution 3, with new installations but without a solar boiler, are €322,404 in total and €12,400 per average dwelling. The results show a difference of 48% between the investment costs of Solution 2

Table 5.3 Annual energy costs, life-cycle energy costs after 25 years (NPV) and the CO_2 reduction delivered by the different renovation solutions

	Standard Standard renovation	Solution 1 Insulation	Solution 2 Solution 1 + windows	Solution 3 Solution 2 + installations	Solution 4 Solution 3 + solar boiler
Annual energy costs (€)	18,141	12,619	11,219	13,882	11,564
Annual receipts in energy costs compared to standard renovation (€)	-	5,522	6,922	4,259	6,577
NPV of cumulative LCC in energy after 25 yrs (€)	315,448	219,428	195,270	241,620	201,082
Receipts in cumulative LCC in energy compared to standard renovation after 25 years (€)	-	96,020	120,178	73,828	114,366
CO_2 reduction (kg)	12,156	31,641	40,327	39,562	48,177
CO_2 reduction compared to standard renovation (kg)	-	19,485	28,171	27,406	36,021

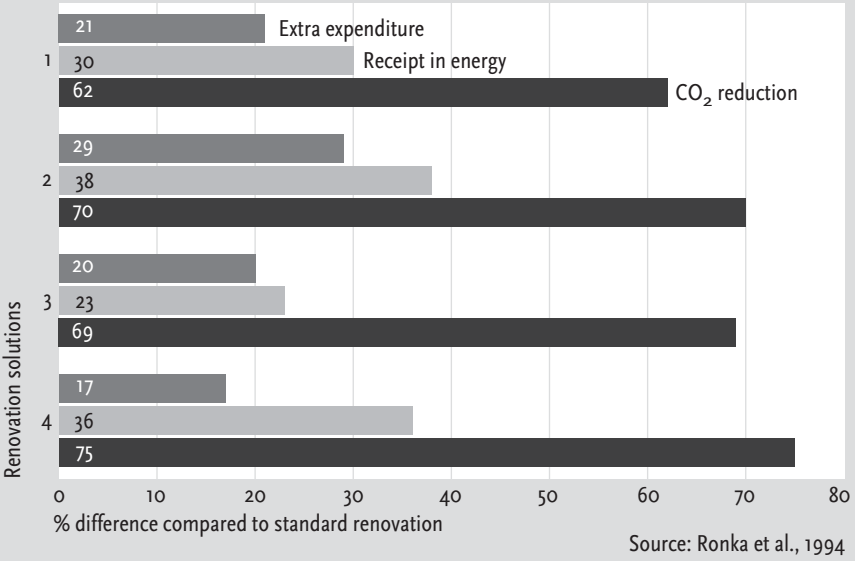
Table 5.4 Extra investment costs, receipts in life-cycle energy costs and the CO_2 reduction delivered by the different renovation solutions compared to standard renovation (%)

	Standard Standard renovation	Solution 1 Insulation	Solution 2 Solution 1 + windows	Solution 3 Solution 2 + installations	Solution 4 Solution 3 + solar boiler
Expenditure (%)	0	21	29	*)20	*)17
Receipts in LCC compared to standard renovation (%)	-	30	38	23	36
CO_2 reduction compared to standard renovation (%)	-	62	70	69	75

** Since the life cycle of installations is 15 years, the investment needs to be made twice during the 25-year life cycle of the dwelling. The second investment (i.e. after 15 years) takes account of an inflation rate of 2.9%*

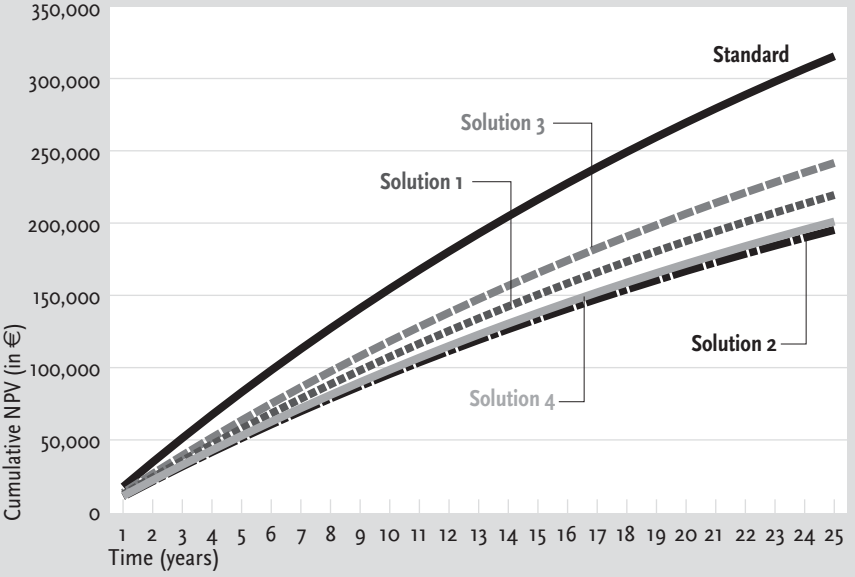
(thermal envelope) and Solution 3 (energy-efficient installations). This is attributable to the installations. The savings in energy costs, however, increase less sharply by 19%, and the CO_2 reduction increases by only 2%. So, the energy savings achieved with thermal insulation are more cost-effective than with installations. When we discussed these results with the housing associations, they proposed a standard renovation as the actual reference level, a 'zero option' consisting only of necessary jobs with no extra environmental measures. Table 5.3 compares the energy savings and CO_2 reductions achieved by the different renovation solutions with the standard renovation. It also shows the life-cycle costs in energy for the different renovation solutions on the basis of the Net Present Value (NPV) compared with a standard renovation over a period of 25 years. The Net Present Value takes account of an inflation rate of 2.9% and an interest rate of 6%.

Figure 5.1 Extra investment costs, receipts in life-cycle energy costs and the CO_2 reduction delivered by the different renovation solutions compared to standard renovation (in %)



Source: Ronka et al., 1994

Figure 5.2 Comparison of energy LCC of the different investment options over a 25-year period (NPV)



The comparison between standard and energy-efficient renovations shows that Solution 2 can save 38% more in total energy costs and reduce CO_2 by 70% more than a standard renovation. Solution 4 would result in an extra reduction of 36,021 kg (75%) in CO_2 emissions compared with the 'zero

Table 5.5 NPV of the different investment options after 25 years

	Solution 1 Insulation	Solution 2 Solution 1 + windows	Solution 3 Solution 2 + installations	Solution 4 Solution 3 + solar boiler
Expenditure (€)	108,179	168,235	*)817,433	*)933,156
Cumulative receipts in energy costs after 25 years NPV (€)	98,802	123,146	76,840	117,147
NPV after 25 years (€)	-9,377	-45,089	-740,593	-816,009

** Since the life cycle of installations is 15 years, the investment needs to be made twice during the 25-year life cycle of the dwelling. The second investment (i.e. after 15 years) takes account of an inflation rate of 2.9%.*

Table 5.6 NPV of the different investment options for the extra expenditure compared to standard renovation after 25 years

	Solution 1 Insulation	Solution 2 Solution 1 + windows	Solution 3 Solution 2 + installations	Solution 4 Solution 3 + solar boiler
Extra expenditure compared to standard renovation (€)	85,263	119,654	*)655,457	*)771,180
Cumulative receipts in energy costs after 25 years NPV (€)	98,802	123,146	76,840	117,147
NPV after 25 years (€)	13,539	3,492	-578,617	-654,033

** Since the life cycle of installations is 15 years, the investment needs to be made twice during the 25-year life cycle of the dwelling. The second investment takes account of an inflation rate of 2.9%.*

option'. The relation between the required extra investment receipts in cumulative LCC in energy and the expected CO_2 reduction compared with standard renovation is presented in percentages in Table 5.4 and Figure 5.1.

In Figure 5.2 the lines present the cumulative life-cycle costs in energy of the different renovation options over a 25-year period. The difference between the lines represents the receipts, savings in energy costs. A standard renovation has the highest life-cycle costs while Solution 2 seems to be the most cost-effective.

If an investment has a non-negative Net Present Value (NPV) then it should be chosen. Otherwise, it should be discarded. Cumulative savings from the different solutions are compared and related to the investments in Table 5.5. Table 5.6 presents the Net Present Value test, in which the cumulative savings in energy costs are compared with a standard renovation that would have been carried out anyway.

With the standard renovation as a reference level, the payback time is 21 years for Solution 1 and 24 years for Solution 2. The long payback times and the negative NPV of installations make energy investment financially unattractive to

Table 5.7 NPV of the different investment options in the case of A) the current trend in energy price, B) the expected 30% increase in energy price in 2012 compared with 2003 (without Kyoto), and C) the 60% increase in 2012 compared with 2003 (with Kyoto), based on the extra expenditure compared to standard renovation

	Standard	Solution 1	Solution 2	Solution 3	Solution 4
	Standard renovation	Insulation	Solution 1 + windows	Solution 2 + installations	Solution 3 + solar boiler
Extra expenditure compared to standard renovation (€)	0	85,263	119,654	*)655,457	*)771,180
Annual receipts in energy costs (€)	160	5,682	7,082	4,419	6,737
A. Current energy price					
Cumulative receipts in energy costs after 25 years NPV (€)	2,782	98,802	123,146	76,840	117,147
NPV after 25 years (€)	-	13,539	3,492	-578,617	-654,033
B. +30% increase in 2012 (without Kyoto)					
Cumulative receipts in energy costs after 25 years NPV (€)	3,951	140,321	174,895	109,130	166,375
NPV after 25 years (€)	-	55,058	55,241	-546,327	-604,805
C. +60% increase in 2012 (with Kyoto)					
Cumulative receipts in energy costs after 25 years NPV (€)	5,790	205,600	256,258	159,899	243,774
NPV after 25 years (€)	-	120,337	136,604	-495,558	-527,406

** Since the life cycle of installations is 15 years, the investment needs to be made twice during the 25-year life cycle of the dwelling. The second investment takes account of an inflation rate of 2.9%.*

developers, but this could change in the near future depending on policy developments such as energy pricing. Gas and electricity prices rose annually in the Netherlands in 1999-2003. During this period, the gas price for an average household rose from 29 to 40 Eurocents per m^3 including VAT. This works out at an average annual increase of 14%. Prior to this, the average annual increase in the price of gas was 11% (NOVEM, 2004). Returning to the policy analysis in Chapter 4, if CO_2 were taxed at €25 per ton, an average increase of 30% could be expected in the price of energy. A more moderate scenario assumes an 8-12% increase in the price of electricity and a 3% increase in the price of gas. The price trend is further influenced by the Kyoto Protocol and the deregulation of energy markets. Table 5.7 shows the payback times and Net Present Values (NPVs) of the cumulative savings derived from the renovation solutions over a 25-year period in the different price scenarios. In addition to the anticipated increase in energy prices, we used two scenarios in this study in order to place the different investment options in a policy context:

- The first scenario is based on the assumption that, by 2012, energy prices will have gradually increased by 30%, compared with the level in 2003. In this scenario the Kyoto Protocol has not been will not be implemented.
- The second scenario is based on the assumption that the Kyoto Protocol will be implemented and cause a dramatic increase in energy prices. This would mean a gradual increase of 60% by 2012, compared with the level in 2003.

Figure 5.3 The cumulative savings in energy costs (NPV) delivered by renovation solution 2 in the case of A) the current price trend and B) the 30% increase in 2012 compared to 2003, over a 25-year period

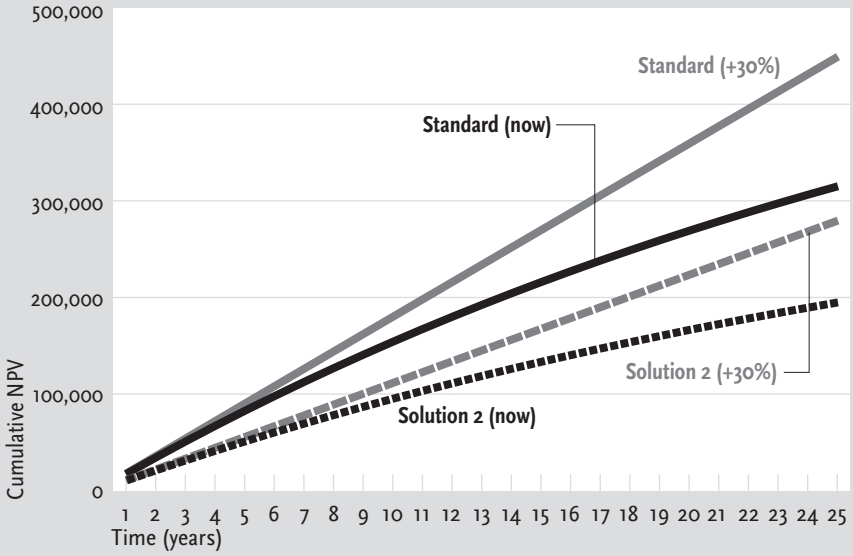


Figure 5.4 NPV over a 25-year period for the different investment options that can pay back in 25 years

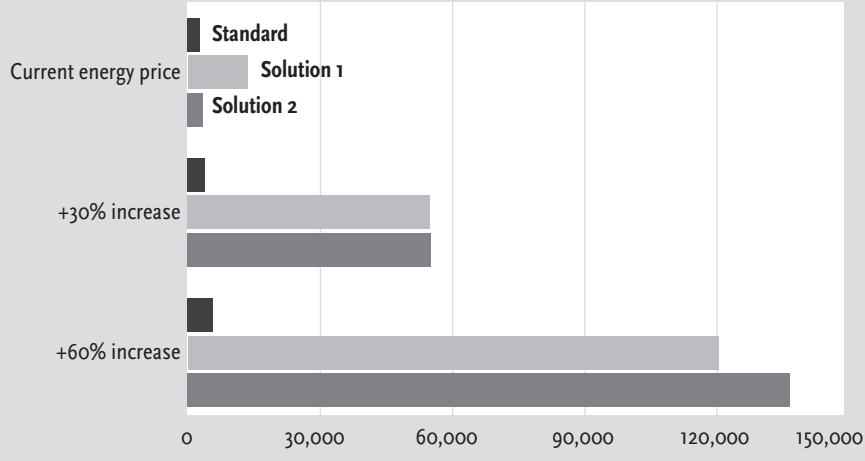


Table 5.7 shows that if energy prices increase gradually by 30% by 2012, Solution 1 (insulation) can be paid back in 16 years and Solution 2 (insulation and new windows) in 18 years. If the prices were to increase by 60% by 2012 – which is likely to happen if the Kyoto Protocol is implemented – the payback time would be shortened to 13 years for Solution 1 and 14 years for Solution 2. Solutions 3 (plus new installations) and 4 (plus a solar boiler) would still not be paid back. Even so, the price of energy is still a key motivator in energy

Table 5.8 Comparison of the energy savings and NPV delivered by renovation solution 2 after 25 years in relation to investment that is made now, after 10 years and after 20 years

	Investment now	Investment after 10 years	Investment after 20 years
Expenditure (€)	168,235	223,912	298,012
Annual receipts in energy costs (€)	7,082	8,498	9,915
Cumulative receipts after 25 years NPV (€)	123,146	107,707	61,626
NPV after 25 years (€)	-45,089	-116,205	-236,386

saving. Figure 5.3 presents the cumulative energy savings as the NPV resulting from energy-saving measures over 25 years at the current energy price with a 2.9% inflation rate and the 30% increase by 2012, compared with the level in 2003. It shows that cumulative savings increase more with energy-efficient renovation solutions than with standard renovation, where they remain marginal regardless of the increase in the energy price. This is confirmed by Figure 5.4, which shows the cumulative savings in energy costs resulting from different renovation solutions after 25 years in different price scenarios. Solutions 3 and 4 are not shown in the figure because their NPV is negative and cannot be paid back in any energy price scenario.

It was assumed that no action apart from maintenance would be taken at present and that such renovation measures would be carried out in 10 or even 20 years. This is a hypothetical assumption, but it was made for the sake of a general impression. Probably, the standards will be higher in 10 years, so the annual energy savings will be greater than at present. The standards for thermal regulations are, for example, expected to increase by 20% (Beerepoot, 2002; Sunikka; 2001). Expenditure will also increase by the 2.9% rate of inflation. Despite the higher standards, no additional increase in energy investments has been inferred because the general expectation is that, in 10 years, the average products will be more energy-efficient than they are at the moment. The most effective renovation option, Solution 2 (insulation and new windows), is taken as a case study. The different options relating to investment now or in 10 or in 20 years time are compared in Table 5.8. This study compares cumulative energy savings (NPV) over a 25-year period. A comparison between investments which are made now or in 10 years indicates that the savings in energy costs are not all that different after 25 years. However, the investment costs can also be expected to rise by a 2.9% rate of inflation in 10 years, making the NPV of the savings achieved after 25 years much less for investment in 10 years time than for investment now. This suggests that it would not be profitable to postpone energy investments.

5.3 Extension of the functional life-cycle

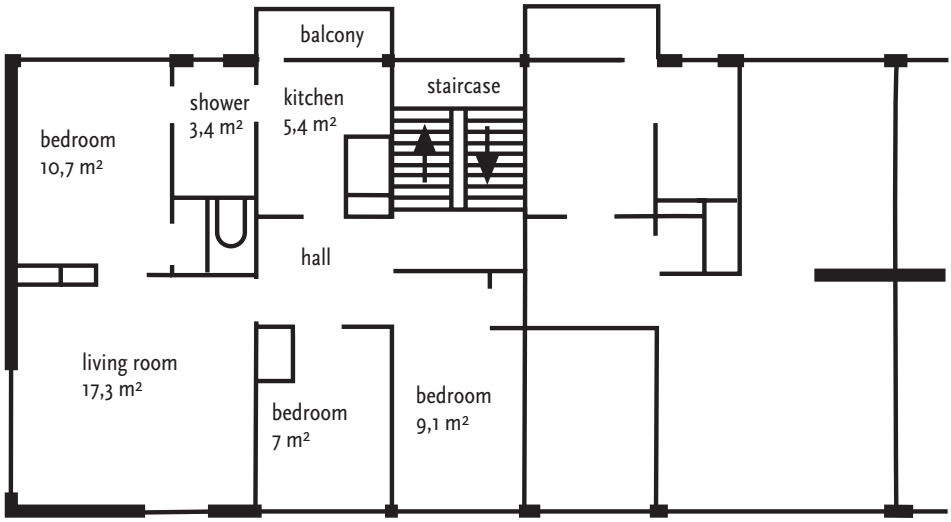
Demolition decisions in Oedevlietsepark are based on the inability of the current dwellings to meet present-day living requirements for comfort, function-

ality (especially in bathrooms and kitchens), aesthetics and space. According to the housing market analysis for Hoogvliet (OTB, 1997), the condition of the dwellings is the main reason why the residents are dissatisfied with their environment. The residents of South Hoogvliet, where Oedevlietsepark is located, are dissatisfied primarily with the absence of elevators, the lack of comfort in their own dwelling, the poor technical quality of the buildings and lack of maintenance. The rent for most dwellings is somewhere between €180-270 a month. The monthly rent for a quarter of the dwellings is over €360. The selling price of a dwelling is usually less than €68,000. If even some of the present mix of residents is to be preserved and new housing is to be made available for Hoogvliet residents, the new supply needs to include housing for small households and low-income groups. The existing dwellings measure +60 m^2 and consist of a living room (17 m^2), two or three bedrooms (7-10 m^2), a kitchen (5 m^2), a bathroom (3.4 m^2), a separate toilet and a small balcony (2 m^2). The indoor height is 2.53 metres (see Figure 5.13). Renovation is needed to extend the functional life-cycle of the current dwellings and bring them up to the standards of new building. According to the programme of requirements submitted by the housing association, the dwellings in Oedevlietspark can be upgraded to meet the following basic requirements:

- The dwellings should have a minimum width of 7.4 metres, a minimum of 90 m^2 of usable surface (140 m^2 for dwellings on the ground floor) and 70 m^2 of living surface. This means that two apartments need to be combined into one and new dwellings must be built on the ground floor.
- A maximum six apartments on one floor and no outside walkways.
- The outside space must measure at least 12 m^2 and be 2.7 metres deep. This requires the building of new balconies.
- An EPC of 0.8. This is discussed in Section 4.2.3.
- 60% of rainwater is recycled.
- Space for separate waste collection.
- Dwellings must be adaptable to different lay-outs and flexible for different functions.
- Storage space in the apartment.
- A parking norm of 1.4 (1.0) under buildings (parking facilities can be built next to the renovated housing).

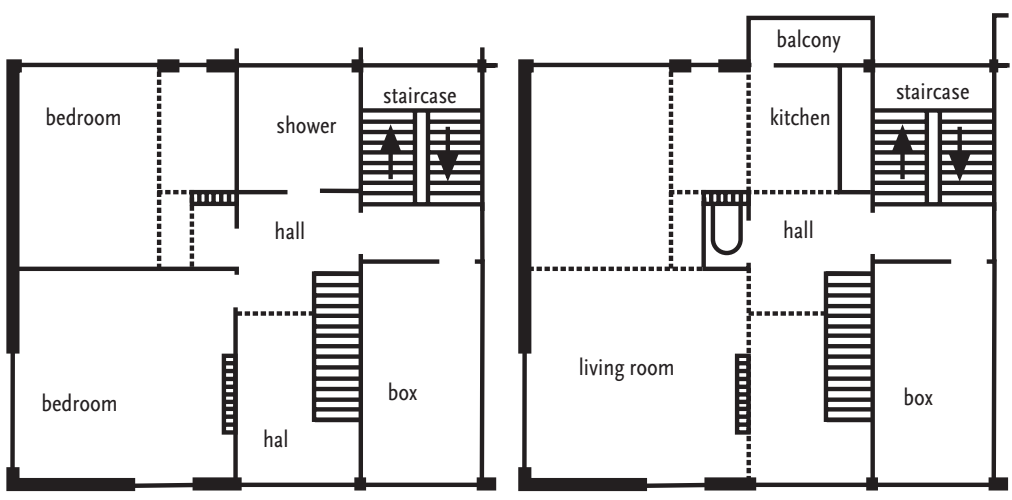
As explained in Chapter 2, in this research the target groups for the proposed renovations are the elderly (20% of the dwellings), small households (40% of the dwellings) and families consisting of more than four persons (40% of the dwellings). It is the policy of the housing association not to build special senior citizen dwellings; all housing should, in principle, be suitable for all age groups. One large group in Hoogvliet is single-parent families. Over one third of the 6,000 families in Hoogvliet, (2,243) have one parent, mostly young single mothers with an Antillian or Surinamese background. This target

Figure 5.5 Plan of the dominating dwelling type in Oedevlietsepark



Source: Woonbron Maasoevers; drawing not in scale

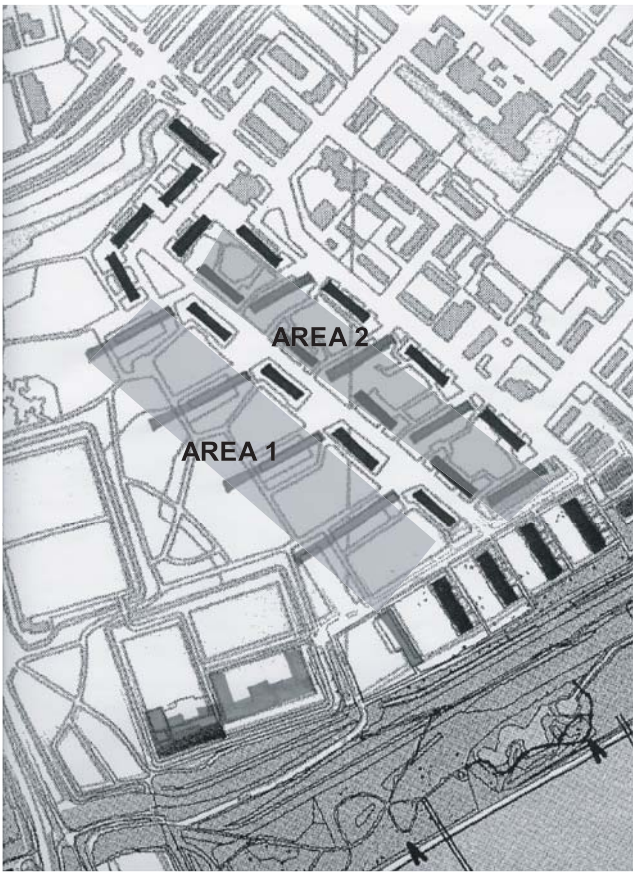
Figure 5.6 Vertical connection of two existing dwellings into one two-storey apartment



Source: M. Sunikka; drawing not in scale

group needs affordable housing, public space such as playgrounds and green areas near the dwelling, safety, and accessibility. Some of their needs are similar to those of elderly households. Sixty percent of the apartments should be suitable for small households, such as single-parent families and the elderly.

Figure 5.7 In order to avoid construction in the green buffer zone and the Green Ring, new housing in Oedevlietsepark is located in the park (Area 1) and built in the place of demolished gallery housing (Area 2)



Source: M. Sunikka

The aim is to convert the three-bedroom apartments into two-bedroom apartments and the two-bedroom apartments into one-bedroom apartments. The plan has been adapted to make space for larger kitchens and bathrooms. Furthermore, 40% of the dwellings should be designated for families. To meet the qualitative and quantitative living requirements of this target group, two dwellings must be combined into one, elevators must be installed, the current planning must be changed and more outdoor space must be added to the apartments. The proposal is to build new dwellings on the ground floor where the storage basements are currently located. Possibilities exist for combining two apartments on the ground floor and the first floor into one spacious dwelling connected by a staircase. The third, fourth and fifth floors would accommodate the smaller 60 m^2 dwellings, accessible for the elderly. An elevator can also be built at the location of one bedroom which is separated from the dwelling and the remaining space can serve as storage for one dwelling. There are several possibilities for converting two apartments into one. Figure 5.6 shows one idea for a vertical conversion (as in Figure 5.5).

The pressure to demolish buildings is also caused by the need for more variation in the housing market. At present, demand and supply are out of balance in terms of size, type and price. In Oedevlietsepark, new and larger housing is needed, but this can be fitted into the existing urban structure without necessitating a radical rearrangement of the environment and the total replacement of the housing stock. WIMBY (Welcome In My BackYard), an organisation which is active in the renewal of Hoogvliet, has proposed an

alternative strategy for Oedevlietsepark in which the existing green character would serve as a basis for new development (WIMBY, 2003). Parts of this strategy feature in the proposal for the building of new housing in Oedevlietsepark. The green zone next to the motorway would be preserved because green plays an important role as a buffer zone. Also, the green area next to the Oude Maas, which also belongs to the Green Ring, would be left unbuilt and naturally conserved. New single-family housing would be built in the little-used park between the sports fields and the existing housing at Koolvisweg. This area has the lowest green potential and can therefore be used to accommodate the demand for new housing (based on plans submitted by WIMBY). This is Area 1 of new construction in Figure 5.15. The walkway flats between Koolvisweg and Baarsweg have the most difficulties in meeting present-day demands. Outside walkways are not wanted, and the apartment blocks are so high that they overshadow the courtyards. The best option is therefore to demolish the four walkway apartment blocks and replace them with a new building. This is Area 2 of the new construction in Figure 5.7.

5.4 The planning process

To get an idea of the renewal process in Morgenstond Midden from a process angle we shall now focus on the planning process and policy instruments in the area. When a decision was taken in the 1990s to demolish housing in Hoogvliet, a location had to be found where the housing association could start building replacement homes. Oedevlietsepark was earmarked for this purpose. Oedevlietsepark is one of the Maasranden projects that feature in the Maasranden Structural Sketch (Municipality of Rotterdam, 1999). The Structural Sketch sets the framework for the diverse urban renewal and concentration projects which will be addressed in the coming years. But, as the Municipality of Rotterdam never came up with an urban development plan for Oedevlietsepark, Woonbron Maasoevers decided to take the first step. In an effort to kick-start a complete redevelopment of this strategically situated area it commissioned Kuiper Compagnons to produce a development sketch in 1997. The plan met with an enthusiastic reception in Hoogvliet. It showed the new Hoogvliet, in which the Oosterbaken and the Hofeiland gave the district a totally new perspective – towards the main road and the Maas. Kuiper Compagnons developed the plan further in close collaboration with Woonbron Maasoevers, the Municipal Office of Urban Development and Housing, OBR developers and the Borough of Hoogvliet. The plan is only a skeleton, so it does not specify the future intentions for the area and, as the estimated realisation time is ten years, it is also flexible. The plan was based on a house-building programme and a number of preconditions. The idea was to drive in the first pile two years later. This did not happen, either then or in

2001 – so the residents drove it in themselves as a symbolic gesture. One reason for the delay was that the Land Development Agreement failed to get off the ground. Woonbron Maasoevers wanted to link the land development with the three planks of the Major Cities Policy, so that the social plank could be bolstered by the physical and economic planks. The alderman at the Municipality of Rotterdam at that time refused to go along with this. He wanted to use the subsidies for the social plank, as they were specifically created for this reason. The conflicting views of the municipality and the housing association on the nature of the social plank held up the Land Development Agreement, as the two sides were independent enough to stand their ground. The municipality owned the land and Woonbron Maasoevers owned the building rights. The Borough of Hoogvliet participated from the start in the talks with Kuiper Compagnons and was enthusiastic about the development plan. Eventually, the borough adopted it as the urban development plan for Oedevlietsepark. However, there was still no vision for the urban structure of Hoogvliet as a whole. The Municipal Office of Urban Development and Housing then reflected on the 'logic' of Hoogvliet together with Woonbron Maasoevers and Vestia housing associations, OBR, the Borough of Hoogvliet and Wimby (International Building Exhibition Rotterdam-Hoogvliet). This resulted in an urban development vision for the whole of Hoogvliet, which was recorded in a document entitled 'Logic of Hoogvliet'. Wimby was the initiator of the vision and played a strong role its realisation. Spatial cohesion at a high level of abstraction is particularly salient in Logic of Hoogvliet. Meantime, the municipality drew up a policy paper entitled 'Development Vision for Hoogvliet', which incorporated the three basic spatial principles for the ring around Hoogvliet: ecology, water and leisure. The ecological ring had to encroach at various locations in Hoogvliet, including Oedevlietsepark. The greenery in Oedevlietsepark would therefore be ecologically reorganized and connected to the outer ring by special routes. Water would also be introduced and used for new types of housing (e.g. along the water). The water would be purified by helophyte filters. Eventually, the municipality and the housing associations would convert all the plans into an urban development programme of requirements which covered the guidelines for EU directives, hotel and catering, spatial preconditions, the building programme, technical preconditions (e.g. the Living Safely standard and Housing Quality in Rotterdam), energy, and sustainable building.

To concretize the restructuring, the Hoogvliet Restructuring Bureau, consisting of a steering group and a project group, was set up at the end of the 1990s. The steering group comprised the Spatial Planning Portfolio Holder from the Borough of Hoogvliet, the Office of Urban Development and Housing, the Department of Public Works, the OBR and the directors of Woonbron Maasoevers and Vestia. The steering group supervised the project group,

which was responsible for implementing the steering group decisions. The project group was made up of people from the Municipality of Rotterdam and the Borough of Hoogvliet and policy workers from the housing associations. The Environment Department was involved in the project team from the start but it was not part of the steering group. It could offer advice, but had no input in the decision-making process for Oedevlietsepark. The Borough of Hoogvliet played its own part in the decision-making; it was responsible for approving the main spatial plans for Hoogvliet and for granting building permits. The programme of requirements for Oedevlietsepark was compiled by the pre-plan team under the project management of the Municipal Office of Urban Development and Housing. This team also consisted of delegates from OBR, the Environment Department, the Municipal Engineering Office, the Borough of Hoogvliet and Woonbron Maasoevers. The programme of requirements for Oedevlietsepark is an important policy document, because it is used by the municipality to ratify the plans. It includes standard and optional requirements for sustainable building. The standard requirements relate chiefly to materials and the Energy Performance Norms (EPN); the options relate to, e.g. separate use of water in the district. Woonbron Maasoevers uses this list as a basis for negotiations with architects and developers. When the plans for Oedevlietsepark are carried out, the programme of requirements falls under the responsibility of a planning team, made up of the same organisations as the pre-plan team, but with OBR as the project manager. The Borough of Hoogvliet is responsible for ratifying the building plan on the basis of the programme of requirements.

At the start of the restructuring project a declaration of intent was signed entitled 'Hoogvliet: A Mind of its Own' (*Hoogvliet: Eigenzinnige Stad*). This declaration constitutes an important basis for the restructuring in Hoogvliet. It is a framework document in which the various partners explain what they want to do in Hoogvliet in the next fifteen years. It includes the policy papers and visions that were already in existence and serves as a basis for further policy documents and visions. The declaration of intent was signed by Woonbron Maasoevers, the Borough of Hoogvliet, the Municipality of Rotterdam, and the residents and contractors. The fact that the residents and the contractors also signed the document was seen as a landmark event. Good social cohesion in the district is an important part of the declaration. This will be monitored every two years by a liveability audit which will also serve as the gauge for the interventions in Hoogvliet. It will show, amongst others, whether the physical aspects of the restructuring are having the desired effect on social cohesion. Woonbron Maasoevers expects the work in Hoogvliet to continue along the same lines despite the change in the market. In 2004, many homes will be demolished and a lot of medium-cost housing will be built in the next five years.

Several performance agreements exist for Hoogvliet, but not at the level of the restructuring brief or specifically for sustainable building. Production agreements were signed at city level by the Municipality of Rotterdam, Woonbron Maasoevers and the Borough of Hoogvliet, followed by partnership and area agreements by the Municipality of Rotterdam and Woonbron Maasoevers.

5.5 Input from sustainability ambitions

We conducted interviews with key persons from the Municipality of Rotterdam, the Borough of Hoogvliet and Woonbron Maasoevers in order to get a better idea of the sustainability ambitions of the parties involved in the renewal of Oedevlietsepark. Woonbron Maasoevers has a clear, ambitious vision for Hoogvliet with 'decisiveness', 'adventure' and 'trust' as the keywords. They want to link this vision to the right districts and build homes in surroundings which will still be popular in a hundred years. The starting point for the restructuring programme was good housing in good surroundings. Woonbron Maasoevers commissioned Kuiper Compagnons to produce the development sketch, as it wanted to contribute to the ideas at structural level. The sketch is not just a proposal, but a statement which asks the planners and decision-makers to consider, discuss and support the realisation of urban quality at various levels. Sustainable building does not appear as a theme in the sketch, though plenty of attention is paid to integrating greenery with buildings. The new spatial structure of Oedevlietsepark will have to include a strong orientation towards living among greenery on a large-scale. The watchwords here are 'exchange' and 'integration', reflecting the notion that greenery can contribute more to the quality of the living environment. Woonbron Maasoevers has high ambitions for the quality of the housing and for sustainable building:

- A flexible layout.
- Flexibility in the function of the living, working and office space.
- An Energy Performance Coefficient (EPC) of 0.8.
- The disconnection of at least 60 m^2 of rain water.

The regional covenant for sustainable building must also be observed. Apartment blocks need to have enough space either inside or underground for the collection of four types of waste. The development sketch does not further elaborate on the ambitions. Despite recent market developments and advice from third parties to reduce the scale, Woonbron Maasoevers still wants to build spacious and flexible homes with a surface area of at least 100 m^2. The housing association is also a driving force in the Residual Industrial Heat and Sustainable Demolition projects. The idea of using residual industrial heat

has been around since the 1970s. Woonbron Maasoevers is actively involved in the project. Indeed, without Woonbron Maasoevers it is unlikely that the project would be so far advanced. The housing association places the responsibility for the living environment with the municipality and stresses that improved housing needs to be accompanied by an improved living environment.

The Municipal Office of Urban Development and Housing sees the restructuring proposal as an opportunity to realize several aims. The municipality believes that there is scope for more variation in the urban planning of the district. The homes and the greenery are too uniform and the public gardens in Hoogvliet no longer serve their purpose. The Office exerts its influence mainly through the programme of requirements for urban development. This programme could clash with general ambitions, possibly as a result of market changes that occur during the planning process. A step-by-step approach is therefore essential as this will furnish more insight into the ambitions and possibilities in each phase of the planning process. The environmental and energy requirements in the programme did not come from the Office of Urban Development and Housing. Ambitions such as an EPC of 0.8 came from the housing association. The municipality has added no extra requirements as these would be difficult to enforce. In addition, the municipality no longer provides financial support for any other sustainability ambitions. The stimuli come from the transfer of knowledge and the facilitation of policy on sustainable building.

The Environment Department of the Municipality of Rotterdam has high environmental ambitions for Hoogvliet, specifically with regard to noise, odour and external safety. The challenge is to retain quality of life in Hoogvliet despite heavy environmental pressure and the huge restructuring brief. For example, the Environment Department wants to thin down the housing near the Shell terrain and the motorways and concentrate it more in the centre and to the south. This objective is underscored in the detailed version of the Development Vision for Hoogvliet. Hoogvliet also offers excellent opportunities for greenery, water and energy. The profuse greenery in the district can be better utilized. Also, a lot more can be done with water, given the large swathes of space. Finally, there is energy-saving potential, especially in the form of residual industrial heat. The department has communicated its urban development ambitions through two environmental discussion papers. The first of these (2000) served as a building block for the Development Vision for Hoogvliet (Municipality of Rotterdam, 2000a). The second (2001) is a more detailed version of the first and concentrates particularly on noise nuisance and air and environmental pollution in the district. In Oedevlietsepark this means noise nuisance in particular. A project for silent asphalt has been set

up in Maasranden. Silent asphalt shifts the noise contour and allows more homes to be built within the statutory minimum. For example, the replacement of paving stones by silent asphalt on Baarsweg makes a huge difference to the noise level. It also frees up space so that building operations can go ahead closer to the road. The other spearheads in the first paper do not recur directly in the second but are fleshed out in separate reports on water, energy and greenery. The Environment Department advises on sustainable building in the Oedevlietsepark planning process. It keeps abreast of the restructuring activities by participating in the project group of the Hoogvliet Restructuring Bureau. It is also the discussion partner for the Province of Zuid-Holland, which checks the plans against the environmental legislation. The Environment Department takes the initiative for sustainable building in the planning process, just as it took the initiative in the Hoogvliet Energy Report. However, it is the Department of Urban Development and Housing which incorporates the sustainability ambitions in the programme of requirements. This department takes the first steps towards formulating a section on sustainability and the Environment Department acts as assessor. The sustainability section must, at the very least, include the basic package for Rotterdam Housing Quality and express an intention to develop the plus packages. The OBR has not formulated a vision of quality or expressed sustainability ambitions. This is the job of the Urban Development Office. The OBR is responsible for assessing the financial viability of the plans. Like the housing association, the Municipality of Rotterdam benefits from sustainability, but extra quality costs money – and funding is not always available.

The Borough of Hoogvliet wants to upgrade the district for all time. It sees Hoogvliet as a garden suburb on the River Maas. Hoogvliet's location works against it when it comes to a new identity, but a makeover of Oedevlietsepark has an excellent chance of success. The borough feels that attention should be paid to the surroundings as well as the housing. The homes need to be the right size, adaptable and have a life expectancy of more than fifty years. The surroundings need to be less uniform. At the moment they are green and spacious, but there is only one type of living environment. Different types of housing need to be built in different types of living environment. The borough is transposing the needs into the programme of requirements. This has prompted a lot of discussion, as the housing associations have their own agendas.

5.6 Experience of performance agreements

Though there is no experience of performance agreements for sustainable building in Hoogvliet, key persons were invited to express their opinions on performance agreements in general. These are reported here.

The parties involved in the restructuring of Hoogvliet apply a broad interpretation to performance agreements. The interviewees said that plans like the Maasranden Structural Sketch could also be called a performance agreement. Though such plans are not formalized, they still address the future lay-out of Hoogvliet and the financial parameters. Formal agreements have, however, been reached at city level about the production of housing. These go farther than declarations of intent and took four years to materialize. Woonbron Maasoevers sees these production agreements as a breakthrough – a sign that they are on the right track. But there is no mention of the environment. The time is not ripe for that, because the financial implications are still unclear. Explicit agreements have also been reached on re-housing, with performance commitments for both the municipality and the housing association. No firm commitments are recorded in the Maasranden partnership. Agreements like these should be flexible enough to capitalize on future trends in, say, the housing demand. The current decline in the housing demand is making the OBR question the high new building ambitions of the borough and the housing association. Be that as it may, agreements cannot just be swept aside. Strong justification is needed for deviations. What's more, a good understanding needs to be maintained between the municipality and the housing association. Finally, two covenants are in effect: the Industrial Heat Covenant (*Industriële Warmte*) between the Municipality of Rotterdam, Vestia and Nuon; and Our Green Covenant (*Ons Groen*) between Woonbron Maasoevers and Stichting De Bomenridders. Thanks to the second covenant, the Municipality of Rotterdam is slowly realising that the greenery in the district needs to be cherished. Now that the plans for Oedevlietsepark are concretized and demolition and building are underway, random clearance is no longer in the picture. The municipality is assuming a replanting obligation, even though it did not sign the covenant. So, it is important to keep the covenant on the agenda at all times.

The interviews led to various recommendations for realising sustainability ambitions in the planning process. First, the parties need to have enough clout. A party with clout is in a strong position and can set an agenda. This is why Maasoevers merged with Woonbron. The parties should be aware of their own position and the positions of other organisations within the planning process so that they can find a good balance. In the past it was the municipality who called the shots. Things have changed since then and the housing association and the municipality are now on an equal footing. Second, ambitions need to be formulated in full at the very start. The general ambition for Hoogvliet is to extend its lifespan. The next step is to transpose this to the housing and living environment. Admittedly, lists and seals of approval do often stay on the table during the planning process, but the challenge is to go a step farther. Municipalities record their ambitions in structural sketches

and programmes of requirements. These ambitions become binding when the parties commit to them. Third, the sustainability ambitions can be tracked and monitored during the planning process by assessing the building plans against the programme of requirements and by ongoing dialogue between the parties.

5.7 Performance agreements for sustainable building

The Municipality of Rotterdam, the Borough of Hoogvliet and Woonbron Maasoevers agree that performance agreements can play a role in the realisation of sustainability ambitions. Some interviewees even suggested that performance agreements were necessary and offered various arguments in support. After all, a performance agreement places the responsibility with the initiative-takers and forces the parties to sit around the table at the right time. Also, the parties feel a need to finalize matters so that they can be realized. It is important that the municipality and the housing association come together because they are dependent on each other for developing the area. A comprehensive programme of land development needs to be collectively drawn up. Some parties are quick to regard sustainability as 'something extra'. Woonbron Maasoevers sees openings for e.g. sustainable demolition precisely because the scale of the restructuring is so great. So, ambitions are not just there to be treasured; they can be realized as well. Performance agreements can be reached on various aspects of sustainable building. However, it is the situation that determines which ones. Woonbron Maasoevers would like to see a 'package deal' where the pros and cons cancel each other out. The added value lies in breaking even between investment and development. At present, people still tend to think in sectoral terms. The Borough of Hoogvliet says that performance agreements can extend beyond housing and encompass greenery, water and other issues. The structural sketches are an excellent example of this because they set good quality standards, which can then be adopted in the partnership agreements. Sometimes ambitions may be dropped because they are vague or outdated. The borough has always taken a broad view of performance agreements, but warns that this can also be a danger.

The Environment Department of the Municipality of Rotterdam attaches great importance to the place of performance agreements in the planning process, saying that they can be reached at different phases, e.g. when the Vision is formulated. The environmental opportunities and obstacles can be thrashed out in this phase and then become the subject of performance agreements. The parties could, for instance, agree to commission an analysis

of opportunities and risks. So, a choice is already made. Performance agreements can also be reached on the municipal policy in this phase. For example, the municipality can promise the housing association that it will endorse an EPC of 0.8. New agreements can be reached in the second phase (urban development) when the results of the studies are known. Suppose residual heat turns out to be feasible, the parties to the performance agreement can then decide on who is responsible for what in the project. The type of agreement can differ for each study. In the last phase (management/realisation) firm and concrete agreements can be reached at building level.

The OBR said that agreements on the financial aspects, such as partnership and production agreements, would be a good place for recording sustainability ambitions. This is because the financial aspects can affect the ambitions. The appendices to the Maasranden partnership agreements refer to ambitions that were put forward at an earlier stage in the project. The ambitions return at each level – also at the level of urban development. The agreements should become binding through the programme of requirements for urban development. The OBR would like to see the current performance agreements include a framework of quality requirements for the outdoor space. Such a framework would fit well into partnership agreements like Maasranden. At present Maasranden is too one-sided. It makes no mention of the quality of the outdoor space. As there are no parameters there is no possibility of assessment. The OBR sees a role here for the Office of Urban Development and Housing. Woonbron Maasoevers says that the municipality sets its sights too low. The OBR admits that it is not easy to formulate an extra level of ambition for the outdoor space. Certain places have been earmarked where it should be possible to realize higher ambitions, but further specification is needed. Finally, agreements need to be reached about the land development.

The parties to a performance agreement should be those who commission the restructuring programme; normally, the housing association and the municipality. The Environment Department also stressed the importance of the water board. Commercial players with market interests should not be involved. It is a lot harder to reach agreements with private parties as they have had nothing to do with the ambitions set by the project group. In any case, they usually find the legal norms adequate. In the start phase of the restructuring the residents and the contractors also signed the declaration of intent *Hoogvliet: Eigenzinnige Stad*. Both Woonbron Maasoevers and the Borough of Hoogvliet saw this as a positive move which bolstered the restructuring plans.

6 Morgenstond Midden, The Hague

6.1 Introduction

This chapter concentrates on the Morgenstond Midden case study. In this part of the report we intend to explore renovation solutions for Morgenstond Midden and the costs, the extension of the functional life-cycle of the buildings, the role played by sustainability in the planning process for Morgenstond Midden and the relative involvement of performance agreements. Section 6.2 deals with the renovation solutions and the costs. In Section 6.3, we discuss the functional life-cycle of the buildings. Section 6.4 looks at the development of the plan and the planning process. Section 6.5 assesses the emergence of sustainability ambitions and ascertains which performance agreements – if any – were reached during the planning process. Section 6.6 reports on the experiences of the main parties regarding performance agreements and discusses the opportunities and risks envisaged by the municipality and the housing association. Section 6.7 describes the experience of performance agreements for sustainable building.

6.2 Energy-efficient renovation

The research focuses on the Hengelolaan complex which was built in 1954. This complex includes two buildings: Complex 01 and Complex 02. Complex 01 is a four-storey apartment block with 56 dwellings and Complex 01 is a three-storey block with 36 dwellings. Both have unheated, partly sunk basements which are used for storage. There are interior staircases and two apartments on each floor. These complexes have been selected as a case study because it is here that the plans are furthest developed. The field of study is presented in Chapter 3. The energy evaluation was conducted with the EPA tool (*Energie Prestatie Advies*). The calculations were subject to the following assumptions and constraints:

- The buildings are free-standing with exposed facades.
- The structure is based on the reinforced concrete load bearing, the so-called Tramonta system. The cavity walls have a structure of concrete, air space and bricks with no insulation. The roof is uninsulated and slightly sloping with concrete and wooden constructions. The floor is uninsulated and made of reinforced concrete.
- Double glazing was installed in an earlier renovation.
- The energy demand is dominated by the use of natural gas for heating space. The calculations are based on local gas systems. Natural gas is also used for hot water (an instantaneous boiler in the kitchen) and cooking, electricity is used for other energy services. The buildings have natural ventilation.
- The estimated annual average indoor temperature is 15 degrees.

Table 6.1 EPA evaluation of the different investment options for complex 01 in Morgenstond Midden

Options	Reference Existing situation	Standard Standard renovations	Solution 1 Insulation	Solution 2 Solution 1 + windows	Solution 3 Solution 2 + installations
Energy index	1.28	1.24	0.99	0.81	0.74
Space heating (m^3 gas)	91,966	91,585	49,286	29,286	25,101
Tap water heating (m^3 gas)	27,982	27,976	29,561	29,597	0
Total gas consumption (m^3)	119,949	119,572	78,847	58,883	25,101
Gas savings (m^3)	-	377	41,101	61,065	94,847
Tap water heating (kWh)	0	0	0	0	111,328
Ancillary energy (kWh)	17,079	19,732	17,079	17,079	22,519
Lighting (kWh)	18,112	18,404	18,112	18,112	18,112
Total electricity consumption (kWh)	35,190	37,844	35,190	35,190	151,959
Electricity savings (kWh)	-	-2,654	0	0	-116,768
Expenditure (excl. subsidies and VAT) (€)	-	-	255,430	358,952	*)686,636
Extra expenditure (excl. subsidies and VAT) (€)	-	63,056	140,850	194,403	*)560,076
Gas costs (excl. VAT) (€)	44,021	43,884	28,937	21,610	9,212
Electricity costs (excl. VAT) (€)	4,511	4,862	4,511	4,511	19,481
Annual receipts in total energy costs (€)	-	214	15,264	22,591	20,019
CO_2 emissions reduction (kg)	-	12,217	84,488	124,064	130,655
MJ Gas for EPL calculations	4,589,062	4,318,136	2,919,719	2,137,760	950,676
MJ Electricity for EPL calculations	324,835	349,348	324,835	324,835	1,197,168
Improvement in energy index (%)	-	3%	23%	37%	42%

* *This is a one-time investment, but since the life cycle of installations is 15 years, it needs to be made twice during the 25-year life cycle of the dwelling.*

- A three-bedroom apartment is presumed to accommodate four residents, a two-bedroom apartment three, and one-bedroom apartment two.

The calculations for the investment costs and payback times are based on the following assumptions:

- The estimated investment for the renovation is low as it is assumed that similar renovations are carried out in more than 50 dwellings (the complex consists of a total of 92 dwellings).
- All the costs are exclusive VAT.
- As government energy subsidies were abolished in 2003, the investment costs are calculated without subsidies.
- The gas price is €0.367 and the electricity price is 0.1282, both including REB tax.
- The life expectancy before the next intervention is 25 years for the constructions and 15 years for the installations. These are the times used in the consideration of payback times.
- Life-cycle costs are understood as total energy costs over 25 years. Maintenance costs are not incorporated in a total life-cycle cost analysis.
- The payback time is calculated on the basis of the Net Present Value and

Table 6.2 EPA evaluation of the different investment options for complex 02 in Morgenstond Midden

Options	Reference	Standard	Solution 1	Solution 2	Solution 3
	Existing situation	Standard renovations	Insulation	Solution 1 + windows	Solution 2 + installations
Energy index	1.28	1.24	0.96	0.78	0.68
Space heating (m^3 gas)	78,690	76,785	43,711	26,821	20,047
Tap water heating (m^3 gas)	21,110	21,102	22,193	22,193	0
Total gas consumption (m^3)	99,800	97,901	65,904	49,014	20,047
Gas savings (m^3)	-	1,899	33,895	50,786	79,752
Tap water heating (kWh)	0	0	0	0	85,212
Ancillary energy (kWh)	10,979	13,013	10,979	10,979	16,255
Lighting (kWh)	13,804	14,099	13,804	13,804	13,804
Total electricity consumption (kWh)	24,783	26,805	24,783	24,783	115,270
Electricity savings (kWh)	-	-2,022	0	0	-90,488
Expenditure (excl. subsidies and VAT) (€)	-	-	210,834	292,196	*)503,180
Extra expenditure (excl. subsidies and VAT) (€)	-	40,536	79,067	125,659	*)415,490
Gas costs (excl. VAT) (€)	36,626	35,933	24,187	17,988	7,357
Electricity costs (excl. VAT) (€)	3,177	3439	3,177	3,177	14,778
Annual receipts in total energy costs (€)	-	431	12,439	18,638	17,668
CO_2 emissions reduction (kg)	-	10,270	70,965	103,307	112,707
MJ Gas for EPL calculations	3,755,147	3,529,505	2,352,987	1,713,965	752,388
MJ Electricity for EPL calculations	228,765	247,462	228,765	228,765	879,543
Improvement in the energy index (%)	-	3%	25%	39%	47%

** This is one-time investment, but since the life cycle of installations is 15 years, it needs to be made twice during the 25-year life cycle of the dwelling.*

takes account of inflation (2.9%) and interest rates (6%).
- In the EPA evaluation, it is possible discount the investment costs further if the measures are combined, e.g. extra insulation is combined with new windows. This does not, however, figure in these calculations.
- In contrast with Oedevlietsepark (see Chapter 5), the installation of solar boilers was not examined due to the high investment costs.

Tables 6.1 and 6.2 present the results of the EPA evaluation based on the assumptions and constraints listed above. As a starting point, separate calculations were made for Complex 01 and Complex 02. The reference case is the current situation. Standard renovation is based on renovation measures that would be taken anyway, without extra investments in energy efficiency. In Solution 1 extra insulation is installed in the outside facade, in the roof and on the floor. Solution 2 goes farther and replaces all the windows with HY^{++} windows. Solution 3 goes farther still and includes the installation of an HY107 boiler for heating space and a WP boiler for heating tap water as well as water-saving equipment. The ventilation is adjustable and the joints and construction are sealed. The results of the evaluation for average dwellings in Complex 01 and Complex 02 are shown in Tables 6.3 and 6.4.

Table 6.3 Key figures for an average dwelling in complex 01 in Morgenstond Midden

Options	Reference	Standard	Solution 1	Solution 2	Solution 3
	Existing situation	Standard renovations	Insulation	Solution 1 + windows	Solution 2 + installations
Total gas consumption (m^3)	2,142	2,135	1,408	1,051	448
Gas savings (m^3)	-	7	734	1,090	1,694
Total electricity consumption (kWh)	628	676	628	628	2,714
Electricity savings (kWh)	-	-47	0	0	-2,085
Expenditure (excl. subsidies and VAT) (€)	-	-	4,561	6,410	12,261
Gas costs (excl. VAT)	786	784	517	386	165
Electricity costs (excl. VAT)	81	87	81	81	348
Annual receipts in total energy costs (€)	-		273	403	357

Table 6.4 Key figures for an average dwelling in complex 02 in Morgenstond Midden

Options	Reference	Standard	Solution 1	Solution 2	Solution 3
	Existing situation	Standard renovations	Insulation	Solution 1 + windows	Solution 2 + installations
Total gas consumption (m^3)	2,772	2,719	1,831	1,361	557
Gas savings (m^3)	-	53	942	1,411	2,215
Total electricity consumption (kWh)	688	745	688	688	3,202
Electricity savings (kWh)	-	-57	0	0	-2,514
Expenditure (excl. subsidies and VAT)	-	-	5,857	8,117	13,977
Gas costs (excl. VAT) (€)	1,017	998	672	500	204
Electricity costs (excl. VAT) (€)	88	96	88	88	411
Annual receipts in total energy costs (€)	-	19	346	518	491

The evaluation shows that most of the energy is used for heating space. Solution 2 (insulation and HY^{++} windows) delivers annual savings of 61,065 m^3 in gas consumption in Complex 01, and 50,786 m^3 in Complex 02. If the original situation without later renovations is taken as the starting point, Solution 2 can reduce the total gas use by 51%. This delivers annual savings of €22,591 in total energy costs in Complex 01, and €18,638 in Complex 02. This works out at annual savings of €403 in energy costs per average dwelling in Complex 01 and €518 in Complex 02. Solution 2 can improve the energy index by 37% in Complex 01 and by 39% in Complex 02, resulting in a total CO_2 reduction of 227,371 kg in both complexes. New energy-efficient installations, such as HY107 boilers and electric WP boilers (Solution 3), can reduce the current gas consumption by 79% in Complex 01 and 80% in Complex 02, despite a slight increase in electricity consumption. This can deliver in total savings of 174,599 m^3 in gas consumption in both complexes. An annual €20,019 cut in energy bills can be achieved in Complex 01 and €17,668 in Complex 02. This means annual energy cost savings of €357 and €491 per average dwelling

Table 6.5 Annual energy costs, life-cycle energy costs after 25 years (NPV) and the CO_2 reduction delivered by the different renovation solutions for both complexes

	Standard Standard renovations	Solution 1 Insulation	Solution 2 Solution 1 + windows	Solution 3 Solution 2 + installations
Expenditure (€)	-	466,264	651,148	1,189,816
Extra expenditure (€)	-	219,917	320,062	975,566
Annual energy costs (€)	88,118	60,812	47,286	50,828
Annual receipts in energy costs compared to standard renovation (€)	-	27,306	40,832	37,290
NPV of cumulative LCC in energy after 25 yrs (€)	1,532,254	1,057,439	823,027	884,677
Receipts in cumulative LCC in energy after 25 years compared to standard renovation (€)	-	474,815	709,227	647,577
CO_2 reduction (kg)	22,487	155,453	227,371	243,362
CO_2 reduction compared to standard renovation (kg)	-	132,966	204,884	220,875

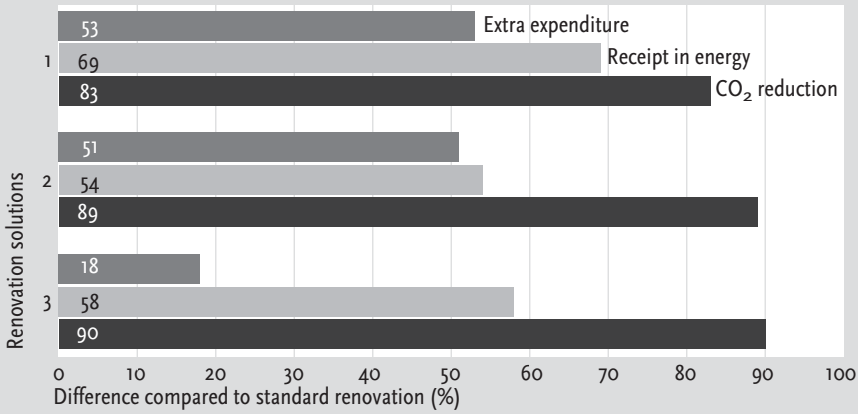
respectively. The energy index can be improved by 42% in Complex 01 and by 47% in Complex 02, enabling a total reduction of 243,362 kg in CO_2 emissions in both complexes. The investment costs for Solution 2 are €358,952 for Complex 01 (€6,410 per average dwelling) and €292,196 for Complex 02 (€8,117 per average dwelling). For Solution 3, the investment costs are €686,636 for Complex 01 (€12,261 per average dwelling) and €503,180 for Complex 02 (€13,977 per average dwelling). The extra investment reflects the difference with standard renovation. Extra expenditure is specified for windows and installations. Compared with a standard renovation the extra investment costs for Solution 2 are €194,403 in Complex 01 and €125,659 in Complex 02. For Solution 3 with new installations, the extra investment costs are €560,076 in Complex 01 and €415,490 in Complex 02. The installations push up the investment costs for Solution 2 (insulation of the thermal envelope) and Solution 3 (thermal envelope and energy-efficient installations) by 42-48% (65-70% in the case of extra expenditure), while the CO_2 emissions decrease only by 5-8%. It seems therefore that, at the moment, thermal insulation is more cost-effective than installations in CO_2 reduction. When the housing associations learned the results of the energy evaluation, they proposed using standard renovation as a second reference level, a 'zero option' where only necessary renovation jobs are carried out without extra environmental measures. In Figure 6.1 the energy savings and CO_2 reductions from the different renovation solutions are compared with a standard renovation. Table 6.5 also shows the life-cycle costs in energy for the different renovation solutions compared with standard renovation over 25 years, as NPV. The Net Present Value takes account of an inflation rate of 2.9% and an interest rate of 6%. Complexes 01 and 02 are considered as a whole.

Table 6.6 and Figure 6.1 compare (in percentages) the expenditure, receipts and CO_2 reductions in the different renovation solutions with a standard renovation (zero option). The savings from Solution 2 (extra insulation and new

Table 6.6 Extra investment costs, receipts in life-cycle energy costs and the CO_2 reduction delivered by the different renovation solutions compared to standard renovation (%)

	Solution 1 Insulation	Solution 2 Solution 1 + windows	Solution 3 Solution 2 + installations
Extra expenditure compared to standard renovation (%)	53	51	18
Receipts in LCC compared to standard renovation (%)	69	54	58
CO_2 reduction compared to standard renovation (%)	83	89	90

Figure 6.1 Extra investment costs, receipts in life-cycle energy costs and the CO_2 reduction delivered by the different renovation solutions compared to standard renovation (in %)



windows) are 54% higher than for a standard renovation and the extra investment costs are 51% higher. If Solution 2 were implemented in Complexes 01 and 02, it would reduce CO_2 by 227,371 kg – or 89% more than standard renovation. Solution 3 would deliver 90% more CO_2 reduction compared with the 'zero option' and the investment costs would be 18% higher.

Over a 25-year period Solution 2 (insulation and new windows) can save an extra €709,227 in extra costs compared with the zero option. This is illustrated in Figure 6.8. The lines show the cumulative LCC in energy which is delivered by the different renovation solutions over 25 years, as NPV. The difference between the lines represents potential receipts in energy costs. Figure 6.2 indicates that a standard renovation (zero option) has the highest life-cycle costs while Solution 2 appears to be the most cost-effective.

Generally speaking, if an investment has a non-negative Net Present Value (NPV) it should be selected. Otherwise, it should be discarded. Table 6.7 compares the cumulative savings from the different renovation solutions over a 25-year period with the required investments. A comparison between the

Figure 6.2 Comparison of LCC in energy for the different investment solutions over a 25-year period (NPV) for complexes 01 and 02

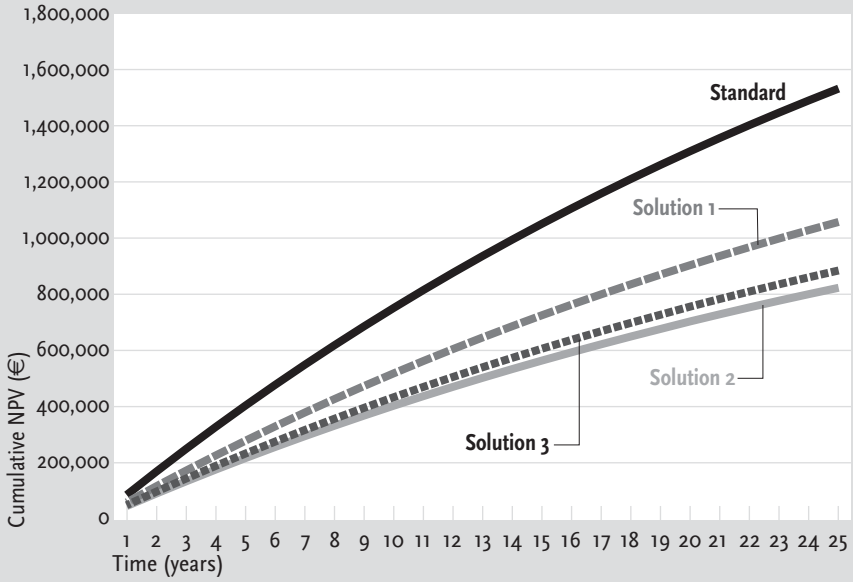


Table 6.7 NPV for the different investment options for complexes 01 and 02 after 25 years

	Solution 1 Insulation	Solution 2 Solution 1 + windows	Solution 3 Solution 2 + installations
Expenditure (€)	466,264	651,148	*)3,016,698
Cumulative receipts in energy costs after 25 years NPV (€)	481,718	716,917	655,326
NPV after 25 years (€)	15,454	65,769	-2,361,372

** Since the life cycle of installations is 15 years, the investment needs to be made twice over a 25-year period. The second investment after 15 years takes account of an inflation rate of 2.9%.*

savings in energy costs and the actual expenditure required in Complexes 01 and 02 indicates that Solution 1 (extra insulation) can be paid back in 24 years and Solution 2 (extra insulation and windows) in 22 years. The NPV of Solution 3 (new installations) remains negative over the 25-year period. Table 6.8 presents the Net Present Value test in which the cumulative savings in energy costs are compared with the extra expenditure (standard renovation) that would be made anyway.

If the standard renovation and extra investment costs are taken as a reference, then Solution 1 can be paid back in 10 years and Solution 2 in 9 years. Solution 3 can still not be paid back. The negative NPV of installations makes

Table 6.8 NPV for the different investment options for extra expenditure compared to standard renovation for complexes 01 and 02 after 25 years

	Solution 1 Insulation	Solution 2 Solution 1 + windows	Solution 3 Solution 2 + installations
Extra expenditure compared to standard renovation (€)	219,917	320,062	*)2,473,481
Cumulative receipts in energy costs after 25 years NPV (€)	481,718	716,917	655,326
NPV after 25 years (€)	261,801	396,855	-1,818,155

** Since the life cycle of installations is 15 years, the investment needs to be made twice over a 25-year period. The second investment takes account of an inflation rate of 2.9%.*

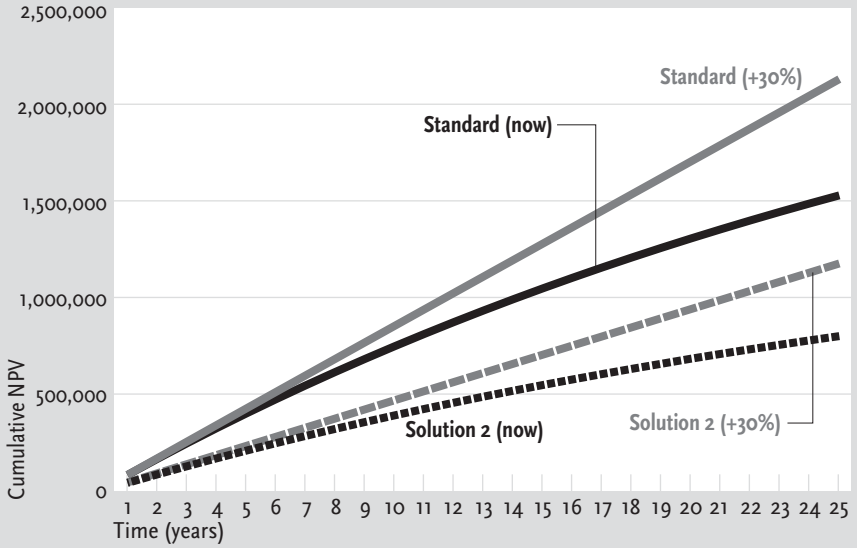
Table 6.9 NPV of the different investment options in the case of A) the current energy price trend, B) the expected 30% increase in energy price in 2012 compared to 2003 (without Kyoto), and C) the 60% increase in 2012 compared to 2003 (with Kyoto), based on the extra expenditure compared to standard renovation for complexes 01 and 02

	Standard Standard renovations	Solution 1 Insulation	Solution 2 Solution 1 + windows	Solution 3 Solution 2 + installations
Extra expenditure compared to standard renovation (€)	0	219,917	320,062	*)2,473,481
Annual receipts in energy costs (€)	645	27,703	41,229	37,687
A. Current energy price				
Cumulative receipts in energy costs after 25 years NPV (€)	11,216	481,718	716,917	655,326
NPV after 25 years (€)	-	261,801	396,855	-1,818,155
B. +30% increase in 2012 (without Kyoto)				
Cumulative receipts in energy costs after 25 years NPV (€)	15,929	684,145	1,018,179	930,707
NPV after 25 years (€)	-	464,228	698,117	-1,542,774
C. +60% increase in 2012 (with Kyoto)				
Cumulative receipts in energy costs over 25 years NPV (€)	23,339	1,002,416	1,491,846	1,363,681
NPV over 25 years (€)	-	782,499	1,171,784	-1,109,800

** Since the life cycle of installations is 15 years, the investment needs to be made twice over a 25-year period. The second investment takes account of an inflation rate of 2.9%.*

Solution 3 unattractive to developers; the other solutions also have relatively long payback times. This scenario could change, however, in the near future. In the Netherlands, gas and electricity prices increased annually in 1999-2003. In this period the gas costs of average households increased from 29 to 40 Eurocents per m^3, including VAT, which is equal to an average annual increase of 14%. Electricity costs rose by 11% (NOVEM, 2004). Hence a further increase in energy prices may be on the cards. It is virtually impossible to accurately predict future energy prices or policy developments, but we can

Figure 6.3 The cumulative savings in energy costs (NPV) delivered by renovation solution 2, based on the current price trend and on the 30% increase in 2012 compared to 2003 for complexes 01 and 02 over a 25-year period



venture some suggestions. A policy overview was conducted in an attempt to determine relevant developments for housing associations in the near future. We shall now examine its impact on decision-making in energy-efficient renovation.

With the report of Jansen *et al*. (2003) as background information (see Chapter 4), Table 6.9 shows the payback times of the above renovation solutions in three different price scenarios. The first scenario is based on the current energy price with an inflation rate of 2.9%. The second is based on the assumption that, by 2012, energy prices will be 30% higher than the level in 2003. The Kyoto Protocol is not implemented in this scenario. The third scenario is based on the assumption that the Kyoto Protocol will actually be implemented and result in a dramatic increase in energy prices, i.e. 60% higher in 2012 than in 2003. The energy prices are expected to increase gradually instead of in steps.

The results show that, if energy prices increase gradually by 30% by 2012 compared with the current level, Solutions 1 (insulation) and 2 (insulation and new windows) can be paid back in 8 years. If energy prices have increased by 60% in 2012 (i.e. if the Kyoto Protocol is implemented) the payback time will be shortened to 7 years. Solution 3 (installations) could still not be paid back. Nevertheless, energy prices are an important motivating factor in saving energy. This is illustrated in Figure 7.12, which compares the cumulative energy savings (NPV) generated by energy-saving measures over 25 years in the first and second scenarios with the current level. Figure 6.3 shows that cumulative savings increase more with the Solution 2 than with a standard renovation. This is further illustrated in Figure 6.4, which shows the

Figure 6.4 NPV over a 25-year period for the different investment options that can pay back in 25 years for complexes 01 and 02

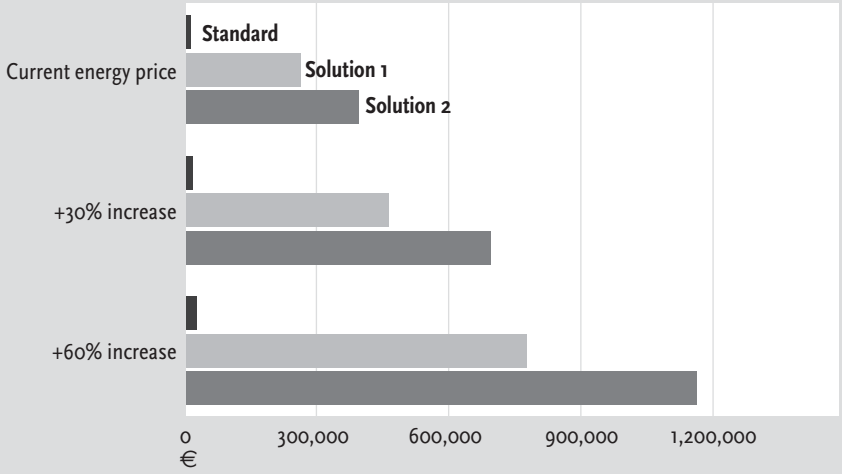


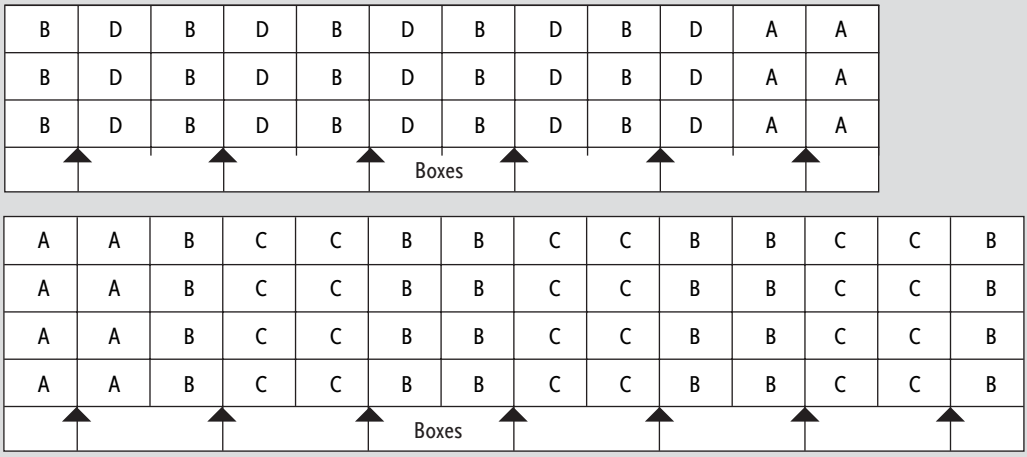
Table 6.10 Comparison of the energy savings and NPV after 25 years, delivered by renovation solution 2 for complexes 01 and 02 in the case of investment that is made now, after 10 years and after 20 years

	Investment now	Investment after 10 years	Investment after 20 years
Expenditure (€)	651,148	866,629	1,153,419
Annual receipts in energy costs (€)	41,229	49,475	55,721
Cumulative receipts after 25 years NPV (€)	716,917	638,678	358,764
NPV after 25 years (€)	15,454	-227,951	-794,655

NPV from the different renovation solutions after 25 years –which can be paid back in this time – in the different price scenarios.

It was assumed that no action apart from maintenance is being taken at present, and that renovation measures similar to those which are discussed here will be carried out in 10 or even 20 years. This is a hypothetical study, but it was conducted with a view to providing a general impression. Presumably, in 10 years time the standards will be higher, and hence annual energy savings will be greater than at present. The increase in standards for e.g. thermal regulations is expected to exceed 20% (Sunikka; 2001; Beerepoot, 2002). Also, expenditure is expected to increase by an inflation rate of 2.9%. Despite higher standards, an additional increase in energy investments has not been calculated because in another 10 years average products will probably be more energy-efficient than they are at present. The most effective renovation option, Solution 2 (insulation and new windows) is taken as a case study. The different investment options, i.e. now, in 10 years, and in 20 years are com-

Figure 6.5 The existing situation regarding housing types in complexes 01 and 02



Source: Klunder, 2004

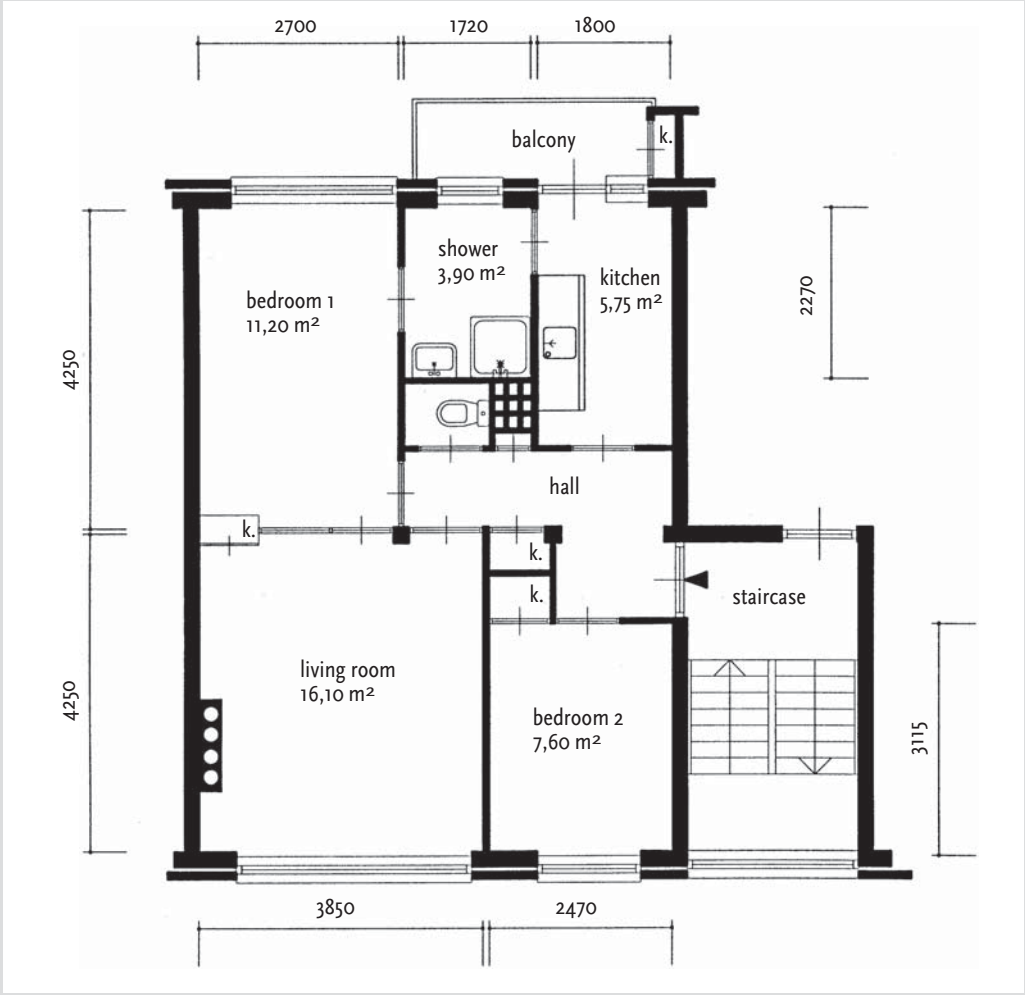
pared in Table 6.10. The study compares cumulative energy savings (NPV) over 25 years. A comparison between investment in Solution 2 now and in 10 years time shows that the savings in energy costs are not all that far apart (11%) after 25 years. However, the investment costs can also be expected to rise by a 2.9% inflation rate in 10 years, making the Net Present Value of the savings achieved in 25 years much less for investment in 10 years than for investment now. It is, therefore, not profitable to postpone energy investments.

6.3 Extension of the functional life-cycle

This research project focuses on the Hengelolaan complex, which is managed by Staedion housing association and consists of 254 dwellings in eight buildings. There are 28 types of dwelling in the complex including two-, three-, four- and five-room homes. Complex 01 comprises a four-storey building on Hengelolaan with 24 three-room apartments (dwelling type B), 24 two-room apartments (dwelling type C) and 8 five-room apartments (dwelling type A), plus a three-storey building on Dieverstraat with 15 three-room apartments (dwelling type B), 15 four-room apartments (dwelling type D) and 6 five-room apartments (dwelling type A). The used surface area of the dwellings varies between 44 and 80 m^2. The current situation is presented in Figure 6.5. The most common type of apartment in these complexes is the three-room dwelling presented in Figure 6.6.

The renewal programme for the Hengelolaan case study and its surroundings is based on the demolition of the two apartment blocks in Hoogeveenlaan and the construction of new dwellings as well as the further exploitation of the six apartment blocks right of Hoogeveenlaan. New construction projects will include housing with walkways and with interior staircases. This research focuses on renovation as an alternative strategy to the demolition

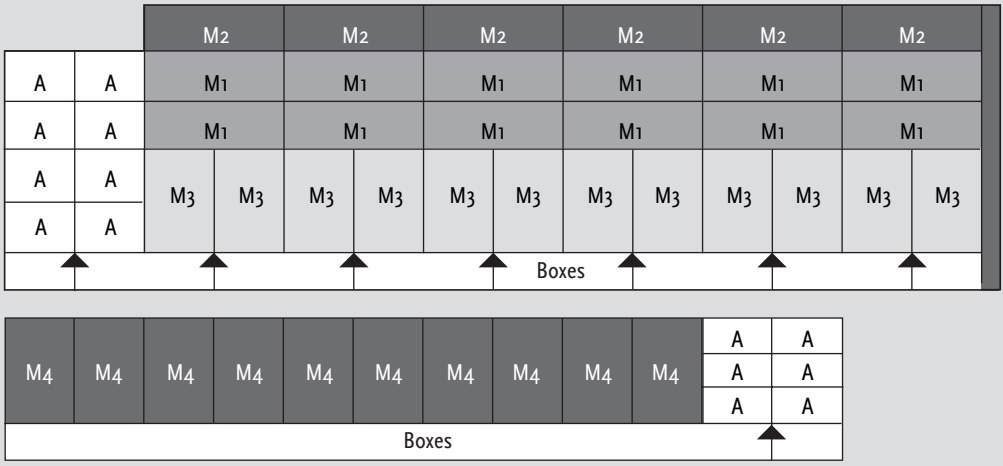
Figure 6.6 Plan of the dominating three-room apartment in Hengelolaan, Morgenstond Midden



Source: Staedion; drawing not in scale

and new construction that has been planned for the neighbourhood. The target groups for the proposed transformations are the elderly (20% of the dwellings), small households (40% of the dwellings) and families consisting of more than four persons (40% of the dwellings), as stated in Chapter 2. In addition to ordinary apartments with entrances and staircases, the existing apartments can be converted into maisonettes that can attract middle- and high-income residents as envisaged in the policy documents. It is also possible to make vertical conversions between apartments. In the three-storey Complex 02, two- and three-room apartments can be combined into three-story dwellings. Four three- and four-room dwellings can be transformed into maisonettes. This results in a number of variants: the vertical or horizontal conversion of three two-room apartments into a large apartment with three storeys; the vertical conversion of three three-room apartments into a large

Figure 6.7 New housing differentiation schema of the complexes 01 and 02



Source: Klunder, 2004

apartment with three storeys; the vertical or horizontal conversion of two three-room apartments into an apartment or a maisonette; the vertical conversion of two four-room apartments into an apartment or a maisonette; or the renovation of a five-room dwelling (Klunder, 2004). This programme can result in various apartment lay-outs. One option is presented in Figure 6.7. The light blue boxes represent the horizontally connected apartments (dwelling type M1); the dark blue boxes are new dwellings with elevator access that can be built on the top of the building (dwelling type M2) and the yellow boxes are maisonettes for starters (dwelling type M3). The dwellings with three storeys are shown in yellow (dwelling type M4) (Klunder, 2004).

6.4 The planning process

In order to get an idea of the renewal in Morgenstond Midden from a process angle, we shall now focus on the planning process and policy instruments in the area. In March 2003, the Municipality of The Hague signed a performance agreement with Haag Wonen, Staedion and Vestia housing associations at city level (Municipality of The Hague *et al*. 2003). This agreement sets out the responsibilities of the municipality and the housing associations in the urban restructuring brief for The Hague during 2003-2010. It also builds on the current restructuring brief, which gives priority to diverse types of housing without shirking the responsibility to accommodate special groups. The performance agreement also elaborates on the municipal housing policy, in which the main objectives are 'vitality', 'integration' and 'sustainability'. Agreements have been reached on cost-sharing and the replacement rate of new dwellings in the designated areas, and objectives have been formulated for housing the special groups. The municipality and the housing associations hope that the performance agreement will speed up the pace of urban renewal in The Hague, so that enough attractive homes can be built for all income

groups. The housing associations assume the role of overall area developer when entering the performance agreement and hence bear the financial risks of developing the building and the land. The municipality is responsible for the fundamental urban planning and programme and for funding supra-district amenities and infrastructure. Sustainable building is not actually a theme in the agreement; one of the strategies is to upgrade districts by introducing a more differentiated housing stock. The Municipality of The Hague and the housing associations have agreed on the levels and responsibilities for The Hague S.W. as an area designated for restructuring. The municipality initiates and is responsible for the agreements at Levels 1 and 2; the housing associations are responsible for the agreements at Levels 3 and 4. Cooperation takes place at all levels:

- Level 1: The Hague SW as a city district, for which a structural vision has been drawn up by the Municipality of The Hague and a strategic stock policy and communication strategy have been formulated collectively by the housing associations.
- Level 2: The districts of Moerwijk, Morgenstond, Bouwlust and Vredelust for which area visions have been developed.
- Level 3: Area developments for which concrete plans have been made on the basis of financial, urban planning and programmatic principles.
- Level 4: Projects, including (architectural) drawings.

Staedion, Vestia and Haagwonen have developed a strategic stock policy for the whole of The Hague SW. The Municipality of The Hague has formulated the structural vision (Municipality of The Hague, 2004). In the stock policy the housing associations state which complexes will undergo radical renovation by 2010 (requiring relocation of the residents) and which complexes will be left alone. These are known as renewal and guarantee complexes respectively. The Structural Vision for The Hague S.W. is an overall spatial and functional vision which splits the area into several housing environments and describes the future developments and changes in these areas in relation to the present situation. It also sets out the brief for certain policy domains in the future, *viz*: traffic, green and water structure, wildlife and the environment, sport and leisure, amenities, the economy, and cultural-historical values. Important sustainable building themes are optimal retention or reinforcement of the green and water structure and public transport. Other aspects are water recovery, sustainability, water quality, connective ecological zones and air pollution. On the question of sustainability, it states that the restructuring of The Hague SW offers opportunities for a qualitative and sustainable city. The spearheads in the environmental policy plan will be further developed in this context.

Visions have also been drawn up at district level, including the Morgenstond Area Vision (*Gebiedsvisie Morgenstond*) (Municipality of The Hague, 2002). This

should enhance cohesion between the many current and completed projects. It will also lead to a new approach, which will be area-based with inter-project connections instead of project-based with separate agreements each time between the municipality and the housing associations. The area vision sets out the desired level of ambition for the whole area; the various interventions need to fit into this framework in terms of substance and investment. The area vision for Morgenstond was developed by the Municipality of The Hague and the housing associations and approved by the Municipal Council in February 2003. The main lines and departure points for the transformation of Morgenstond are recorded in an area vision programme which will be implemented by 2010. This programme covers, amongst others:

- the replacement, renovation and sale of dwellings
- improvements to public areas
- the retention and reinforcement of the amenity support base
- high replacement rate for buildings
- reinforcement of green areas
- improvements to the user value of green facilities
- the realisation of an ecological network.

The programme further points out that research is needed with a view to the current and desired amenities, optimal coordination of facilities, the multifunctional use of space and the lay-out of sport and leisure terrains in Morgenstond. Sustainability does not appear as a theme in the document. The largest interventions are intended for Morgenstond Midden. The restructuring activities for this district are further specified in an Urban Plan (Municipality of The Hague, 2002b) which was approved at the same time as the Area Vision. The Urban Plan defines the programmatic, financial and spatial framework for the redevelopment of Morgenstond Midden and will form the basis of future architectural and urban building plans. It was compiled by the Urban Development Office of the Municipality of The Hague and Haag Wonen and Staedion housing associations. The urban planning and programmatic principals concern spatial structure, buildings, traffic & parking, the housebuilding programme, the living environment, population patterns, the replacement rate and the volume of building. Agreements have been reached for each theme. For example, for traffic and parking, the parties have agreed to uphold the concept of the compact garden suburb and the quality of public areas. To meet the municipal requirement of 1.5 parking places per dwelling, 0.75 parking places (approx. 1,250 places) will be created in specially built parking facilities. The themes of adaptable building, noise nuisance, and sustainable and environmentally-aware construction are addressed but not elaborated in the area development. Building plans will be compiled on the basis of the urban plan and will have to meet the legal and municipal requirements for sustainable building.

A steering group and a control committee have been appointed to implement and oversee the restructuring of The Hague S.W. The steering group is authorized to take decisions and consists of the directors of Staedion, Vestia and Haag Wonen, the Hague Development (Haags Ontwikkelingsbedrijf, HOB) and Policy Departments of the Urban Development Office, the City Planner, and the Alderman for Spatial Planning, Urban Development & Housing. The control committee directs the working processes and consists of a representative from HOB and the Policy Department of the Urban Development Office as well as the development manager of each of the three housing associations and a secretary. The steering group decides on e.g. strategic stock policy, the Structural Vision for The Hague S.W., the area visions, the area developments, the working methods, the communication strategy, relocation, the projects, the new building programme, the investment programme, the schedule and the partnership agreements for the area visions. Eventually, the sum total is approved by the City Council. The implementation of the vision for Morgenstond Midden is concretized in a partnership agreement between the Municipality of The Hague on the one hand and Staedion and Haag Wonen on the other. The alliance between the municipality, the housing associations, welfare organisations and local residents was given the go-ahead in 2001 when the Municipality of The Hague published the first Neighbourhood Improvement Newsletter for Morgenstond. This alliance covers the material, financial, organisational and technical planning aspects of the restructuring of Morgenstond Midden. The agreement will be rounded off at the start of 2004. The concept of sustainable building is addressed in the partnership between the Municipality of The Hague and Staedion and Haag Wonen. The partnership agreement for Morgenstond Midden endorses the requirements for adaptable and sustainable building. Staedion had already endorsed them in its standard technical plan.

6.5 Input from sustainability ambitions

We compiled an inventory of the sustainability ambitions of the Municipality of The Hague and Staedion housing association by holding interviews with key persons (see Appendix A).

Staedion was involved in all phases of the Morgenstond Midden planning process and put forward its policy on several occasions. It did not formulate any additional sustainability ambitions. Staedion's general vision of Morgenstond Midden is sustainable renewal in the broadest sense; in other words, social and economic renewal as well as physical renewal. Staedion also wants to renew some of the one-sided stock in its housing portfolio with a view to improving the district and precluding future selling and leasing risks. Last but not least, it wants to achieve its reduction targets for CO_2 emissions.

The Department of Constructional Physics and Ecology at the Urban Development Office of the Municipality of The Hague is responsible for integrating sustainable building in planning processes. It does so by applying the ROMbo method. This method was also used for Morgenstond Midden, but it led to only one meeting between the municipality and the associations. No other meetings have been held to date because the housing associations were put off by the high ambitions of the municipality, not least by an Energy Performance Coefficient (EPC) of 0.5. As the municipality does not have any real means of exerting pressure or realising the targets itself, Staedion does not expect sustainable building to reappear on the Morgenstond Midden agenda. Nor does it anticipate new agreements on sustainable building. So, the process has not delivered many benefits for Morgenstond Midden. Neither has it led to agreements between the parties nor to higher ambitions for sustainable building. All the same, the department sees opportunities for sustainability in Morgenstond Midden by, for instance, linking environmental ambitions to area typology in the area vision.

The Department of Spatial Planning & Monument Conservation at the Urban Development Office is responsible for drawing up the urban planning programme for Morgenstond Midden. The urban planners at the Municipality of The Hague see sustainability as a broad concept that stretches beyond ecology and the environment. Spatial and social factors are also crucially important. Hence, they stress the need for a clear spatial structure with enough flexibility to accommodate different agendas and functions in the course of time. If the area is to continue to function as an attractive living environment for diverse target groups, then a support base needs to be maintained for amenities and public transport. These aspects are emphasized in the Structural Vision for The Hague S.W. and the development plan for Morgenstond Midden. The Structural Vision for The Hague S.W. devotes particular attention to the social aspects. The urban planners freely admit that environmental factors do not figure prominently in the visions. For example, they set no ambitions for energy. They do, however, address improvements to the water system, asphalt limitation, mobility, sustainable demolition and flexible building. A new identity which meets the requirements of the modern housing consumer is a key principle in the Morgenstond Midden development plan. Neither sustainable building nor sustainability features as a separate item. The urban planners say that the sustainability ambitions are already integrated in the plan for Morgenstond Midden, but are not specifically labelled as such: examples include the retention of a support base for amenities (shops, schools, public transport etc.) the high replacement rate of new homes, maintenance of the existing road structure and the underground infrastructure, upgraded public space (due partly to the construction of parking facilities), the re-use of existing materials in the public space, the creation of public green areas and tree equilibrium.

6.6 Experience of performance agreements

As explained in the previous section, no specific performance agreements relating to sustainable building have as yet been implemented in Morgenstond Midden. This prompted us to ask key persons to describe their experience of performance agreements in general and assess the suitability of performance agreements as an instrument for promoting sustainable building.

The Municipality of The Hague has experience of performance agreements on energy in new extension areas. Though these documents are not actually referred to as performance agreements, they are effectively the same thing. For example, the municipality and the project developers have agreed on an EPC of 0.85 for the extension area of Wateringse Veld (owned by the municipality) and an EPC of 0.5 for the sub-district of Bouwlust. This target – including sanctions for non-performance – is incorporated in the agreement for the realisation of the Bouwlust project. The Municipality of The Hague has gained further experience in performance agreements in the Ypenburg district. Random checks are carried out at the building sites to ensure that the EPC is observed. The interviewees had a favourable opinion of performance agreements, provided they are clearly formulated and supported by sanctions. No performance agreements are signed for current building assignments. Instead, the municipality issues a proposal with an invitation for tenders, which incorporates the policy paper on Environmentally-Aware Building and the Sustainable Building Regulations. Interested parties can respond and the municipality decides who gets the job. The Department of Constructional Physics and Ecology at the Urban Development Office of the Municipality of The Hague is responsible for organising the performance agreements at the VINEX locations. This department takes a positive view of performance agreements, but adds that as there is no guarantee of success and given that so much depends on the parties concerned, regulations may be preferable – provided they are simple.

Performance agreements on sustainable building play hardly any role – if any – in the planning for Morgenstond Midden. The municipality and the housing association say that performance agreements could be useful in the realisation of sustainability ambitions, but only if the parties really have something to offer each other or if the consumer sees sustainability as important. Both see the formulation of sustainability ambitions as a joint responsibility and say that in The Hague SW – and therefore in Morgenstond Midden as well – there were excellent opportunities for including sustainability as a theme in the performance agreements reached by the municipality and the housing associations on restructuring in The Hague. This never happened, despite exhaustive discussions. The agreement set ambitions for solar energy, green

space, water, and underground waste and was jointly drawn up by the Urban Development Office and Staedion. One reason for the omission is that the restructuring programme had already been running for several years. Around this time the Strength of The Hague policy paper appeared, describing the situation in The Hague. The situation has changed since then, especially in relation to the housing market. This has made the parties wary and limited the scope for negotiation. A second reason is that the ambitions were too high. There was not much left of them by the time the negotiations had run their course and attention turned to other issues. Lastly, the time and political climate surrounding the performance agreements for the restructuring of The Hague also played a role; the environment was low on the priority list.

6.7 Performance agreements for sustainable building

Though the ROMbo method proved unsuccessful in Morgenstond Midden, the Municipality of The Hague and Staedion still see it as a suitable tool for reaching performance agreements on sustainable building. Performance agreements are based on a shared purpose and starting point. If there is no shared purpose then the agreement is doomed from the start. The Department of Constructional Physics and Ecology at the Urban Development Office points out that agreement is reached by a process; it is not the technical realisation of targets. The process can be helped along by creating a support base for sustainability agreements between the parties. Performance agreements can play a role in this, provided the process is not too rigid.

The scale of performance agreements is also important. Performance agreements made at city level should already incorporate sustainability ambitions. The ambitions can then be transposed to a smaller scale. The performance agreements can be confirmed in a partnership contract or a binding undertaking which can be measured and verified. No sustainability ambitions were included in the restructuring brief for The Hague S.W. This had a discouraging effect on the parties. The fact that sustainability was not included as a separate theme in these performance agreements influenced all the municipal departments and the willingness of the parties to engage in discussions on sustainability for Morgenstond Midden. Staedion said that it is important for a performance agreement to represent a win-win situation for all parties. This helps to create a support base within each organisation so that the building process can run smoothly. The relationship between the municipality and housing associations has changed in recent years because housing associations have become independent and no longer receive municipal subsidies. As they are now on an equal footing, housing associations and the municipality need to have something to offer each other in a performance

agreement. If one party has nothing to offer, it can hardly expect to receive anything from the other party.

The interviewees had several ideas about the actual content of a performance agreement. Staedion said that a well organized ROMbo could result in a performance agreement. Each municipality or housing association should first reflect on the ambitions, how they can be realized, and what they themselves can offer. Agreements must be clear-cut. They are often made by politicians or the government, but they must also be respected by the executives. A support base within the organisation is essential. Only then can external parties become involved. Eventually, a worthwhile and feasible performance needs to materialize. The Department of Constructional Physics and Ecology at the Urban Development Office says that the problem does not lie in reaching an agreement but rather in fulfilling it and formulating potential sanctions. Parties fail to deliver on agreements because they are not held accountable. The negotiations need to be opened in a financial context so that the right conditions can emerge. If, for example, sustainability is going to cost an extra EUR 5,000 per dwelling, then the parties may decide to split the costs down the middle. They need to find common ground. The officials who are responsible for the sustainability ambitions need to be more assertive and pro-active towards the local authorities. Sustainability should be high on the agenda from the start so that it can latch on to existing procedures. The parties also need to stay alert and be prepared to tackle each other. They can decide among themselves to deviate from the agreement if, say, a particular party cannot deliver. The Municipality of The Hague said that it is important in this respect for the parties to give timely warning if the objectives are unlikely to be achieved and to offer a clear explanation. This will open up scope for negotiation and for reviewing the agreements. This kind of scope is important because of the strong financial interdependence of the parties in the restructuring processes. It is not easy to find the right sanctions because diverse interests are at stake and sanctions can also undermine the interests of the other parties. It is best to appoint one party to report on and monitor the process. This party can then record the dates of the discussions with regard to the progress. This does not detract from the responsibility of the individual parties for the success or failure of the agreement. Both the municipality and the housing association said that no commercial players should be involved in performance agreements for sustainable building, as they negotiate too much from a business perspective. A network manager from, say, an energy company, can be involved, but not a producer. Architects do not play a role either in reaching performance agreements. It is important to limit the number of parties and topics. A performance agreement has to be manageable and realistic.

7 Designing performance agreements for sustainable building

7.1 Introduction

In this part of the report we take the first step towards converting the ambitions for sustainable building – including the energy ambitions – into performance agreements in the urban renewal planning process. The scope and limitations of performance agreements for sustainable building will be discussed on the basis of a literature search and the two case studies. Section 7.2 discusses the types of performance agreements which promote sustainable building in urban renewal. Section 7.3 places them in the context of the planning process. Section 7.4 discusses how performance agreements can be tracked and monitored after implementation. Finally, Section 7.5 presents the conclusions.

7.2 Performance agreements in sustainable urban renewal

Sustainable urban renewal involves various parties. The literature presents the process of sustainable urban renewal as a policy network (Klijn, 1996). A policy network can be said to exist when the players are mutually dependent and there is no higher authority. The players each have their own vision of reality and are engaged in an ongoing relationship. Several players, such as government authorities, housing associations and residents, bear responsibility in the process of sustainable urban renewal. The positions of the municipalities and housing associations have changed dramatically in recent years. The housing associations have become independent and the municipality no longer acts as overseer and subsidy-provider. In other words, the municipalities and the housing associations are now on an equal footing. However, they are still dependent on each other when it comes to giving shape and content to the process of sustainable urban renewal – a process in which performance agreements are becoming ever more important. Privatisation has not only changed the role of housing associations, it has created a new situation where the parties still need to determine their positions and responsibilities. Essentially, performance agreements stem from a need on the part of the municipalities and the housing associations to legitimize their new positions. A classic case is the performance agreement that the Municipality of The Hague entered into with the housing associations. This agreement states that the housing associations are responsible for the overall development of areas and hence implies that land development is no longer separate from building development. This kind of role allocation has never before appeared in urban renewal in the Netherlands. The agreement was preceded by lengthy negotiations about all sorts of issues, particularly the extra ground rent revenue that flowed into the municipal coffers from the re-allocation and sale of housing

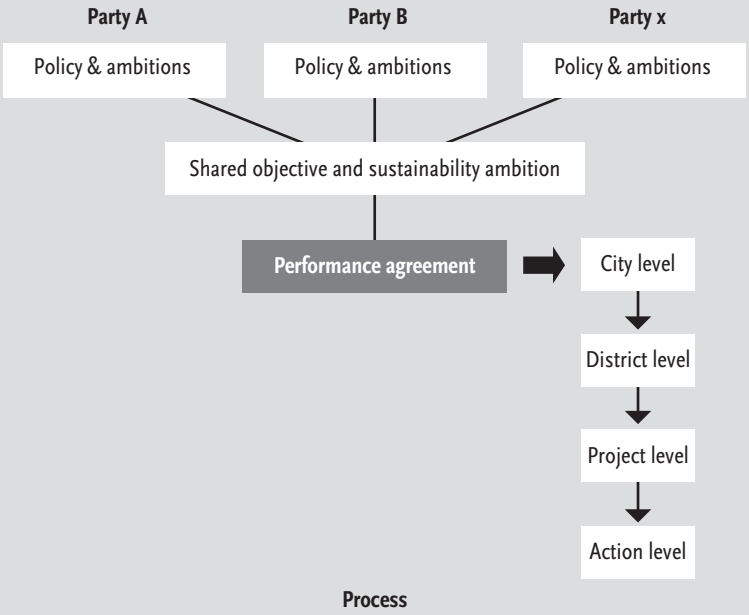
Box 7.1 Preconditions for performance agreements in sustainable urban development

- The parties must have a shared purpose when entering a performance agreement.
- A performance agreement should constitute a win-win situation for the parties concerned.
- The parties must make resources available besides formulating ambitions.
- The parties should create a support base within their own organisation before entering a performance agreement.
- A performance agreement should have value, it should no be too vague and it should lead to execution. Parties can be put off if the ambitions are too high.
- A performance agreement should relate to a performance and its financial implications.
- A performance agreement should not be too rigid; it should be able to capitalize on new trends in the urban development process.

association homes (Laverman, 2003). Trends and changes in public housing influence the way in which performance agreements on sustainability are defined and hence determine their prospects of success. The case studies suggested that various preconditions needed to be in place (Box 7.1).

First of all, the case studies showed that municipalities and housing associations are in favour of cooperation – also for the realisation of sustainability ambitions. All the interviewees saw performance agreements as an opportunity to realize ambitions and declared their willingness to be a party to them. However, the case studies also showed that willingness alone does not suffice when it comes to drafting performance agreements and making them work. The added value of a performance agreement therefore lies in the fact that the parties give concrete expression to a shared purpose. Hence, a performance agreement goes farther than just agreeing on goals and ambitions. Quantification, evaluation and sanctions are indispensable. It is a lot easier to make retrospective evaluations if there is a clear understanding on who does what and when. To prevent irritation and misunderstandings, the parties need to be clear about the visions and ambitions they want to present. Before performances can be formulated the parties need to decide on the subject of the agreement. This forces them internally and externally to state their ambitions as an organisation and to say which ambitions they want included in the performance agreement (Van Daalen, Ouwehand, 2000). It also emerged from the case studies that performance agreements are reached at various levels: at city, district, project and even at action level. These agreements offer opportunities for sustainability ambitions. Agreements that address finance (e.g. performance agreements at city level and partnership agreements at district level) are particularly suited as they can cover the budgetary aspects of the ambitions. But, as illustrated by the Morgenstond Midden case study, sustainability ambitions can die a death when performance agreements are being thrashed out at city level. When this happened at Morgenstond Midden,

Figure 7.1 Ideal model for designing performance agreements



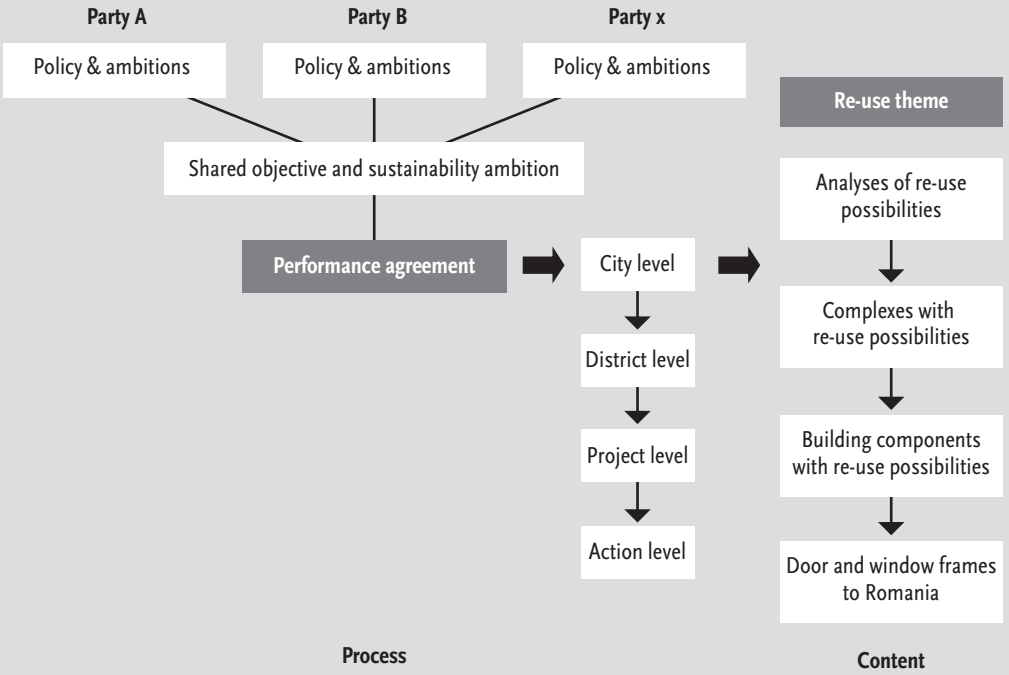
it seriously undermined the motivation of the Municipality of The Hague and Staedion housing association to reach a performance agreement on a lesser scale, e.g. at district level. Performance agreements on urban renewal can offer clear openings for sustainability ambitions, but they can just as easily slam the door on them. This is partly because these agreements deal with multiple subjects and because they involve new roles in which the parties are yet to gain experience. The parties should take account of such tugs-of-war when formulating sustainability ambitions in performance agreements at city level.

The process is sketched above in an ideal model (Figure 7.1), which shows how parties can reach a performance agreement and the various levels. In an ideal model performance agreements are concluded at all levels; they start at city level and gradually become more concretized until they reach action level. The process can also take place the other way around if this is better suited to the shared purpose. The case studies revealed that performance agreements between municipalities and housing associations are especially desirable. This is not reflected in the ideal model, where performance agreements are open to several parties.

7.3 Performance agreements in the planning process

The plan in both case studies is integrated. In Morgenstond Midden and Oedevlietsepark the municipality and the housing association work with

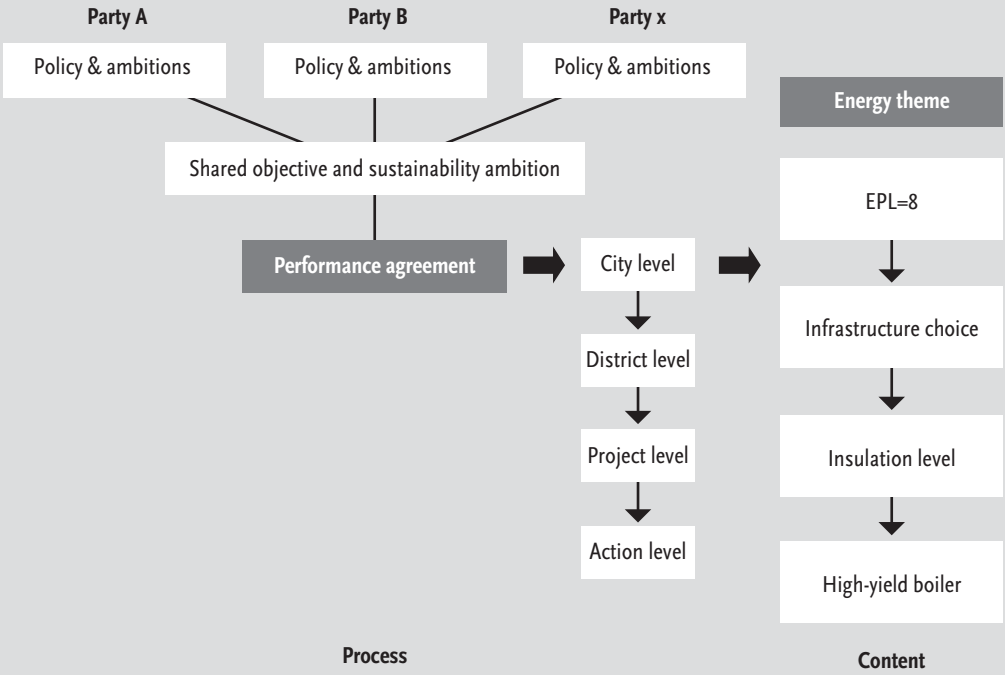
Figure 7.2 Example 1, the realisation of performance agreements within the ideal model



structural plans, zoning plans, district visions and plans of action for urban development. The planning process is split into an initiation, definition, design, implementation and management phase. In the initiation phase the ambitions are analysed and the opportunities for the area are identified. In the definition phase the programme of requirements is drawn up and a preliminary feasibility study is usually performed. In the design phase the programme of requirements is used as a basis for drafting a design with feedback on the costs. In the implementation phase the plan becomes definitive and is carried out. Finally, in the management phase the owner of the property and the owner of the public space become responsible for the respective maintenance.

In planning processes like those in the case studies, the performance agreement can play a special role in each phase, when deals are struck on the achievement of goals. A performance agreement therefore supplements the existing plans and policy and offers a way of converting ambitions into achievements and responsibilities. In both case studies analyses of the policies of the municipalities and housing associations revealed that the sustainable building themes of flexibility, differentiation and housing quality were part of the official policy. However, analyses of the planning revealed that these themes do not always re-emerge directly when the plan is being worked out and implemented. Performance agreements might improve this situation if, for example, they were included in each phase of the process. This vision is highly similar to that of the Municipal Environment Depart-

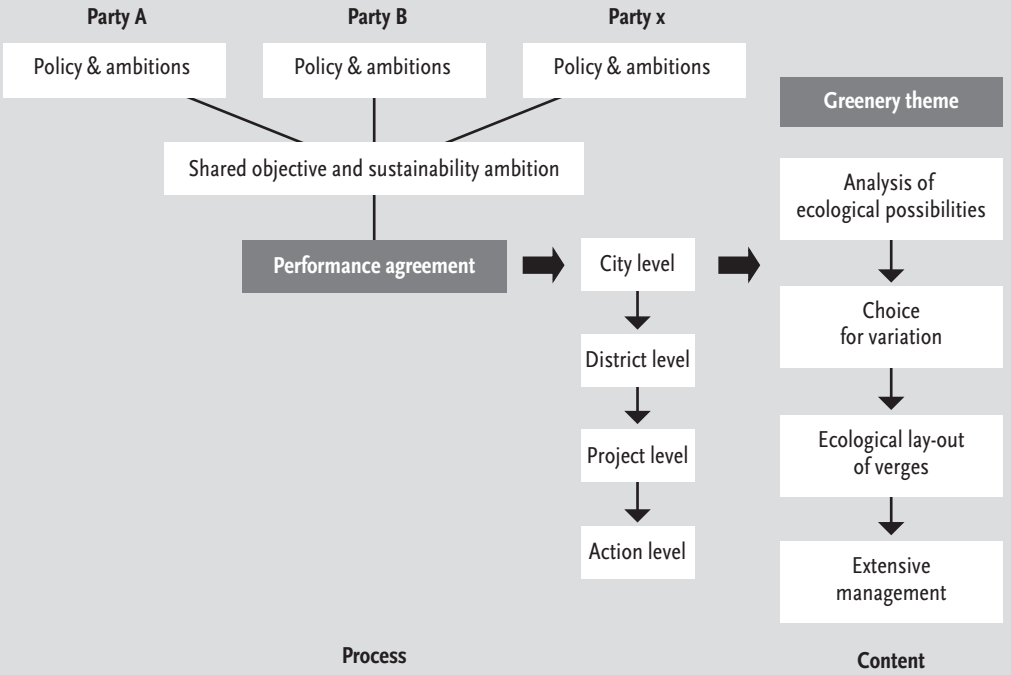
Figure 7.3 Example 2, the realisation of performance agreements within the ideal model



ment in the Oedevlietsepark case study, which is based on the principle that performance agreements should be reached in the various phases of the planning process so that environmental opportunities and risks can be identified each time. A performance agreement in the initiation phase can lead to an analysis of opportunities and risks. This way, choices can be made at an early stage. In the initiation phase performance agreements can also be reached on municipal policy; for instance, the municipality could promise the housing association that it will endorse an EPC of 0.8. The agreement can be further specified and refined in each subsequent phase. Each time, the nature and quantification of the performance can be clarified and decisions can be taken on sanctions. The parties can reach a performance agreement for each sustainability theme in the urban renewal or can agree on several themes at the same time and then develop them individually. At all events, there must be a shared ambition and scope for negotiation; for, the parties cannot coerce each other into adopting sustainability ambitions. Otherwise, performance agreements can play no role in the realisation of sustainability ambitions in the planning for sustainable urban renewal. Examples are provided below on how performance agreements can be defined for the themes of re-use, energy and the quality of outdoor space. The next study will look more deeply into ways of concretising performance agreements.

In Figure 7.2 the ideal model for a performance agreement is further refined by the inclusion of an example on re-use. In Oedevlietsepark there is a re-use project in which building components from demolished housing are sent to

Figure 7.4 Example 3, the realisation of performance within the ideal model

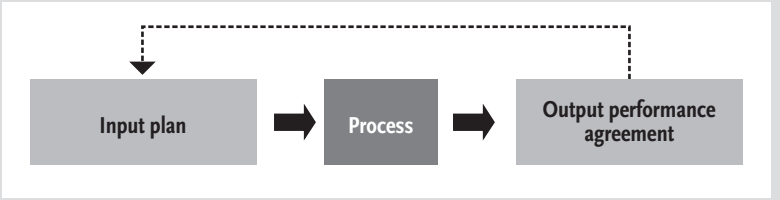


Eastern Europe where they are used again. Figure 7.3 shows a performance agreement in which the parties decide at city level to commission an analysis of re-use possibilities in the urban environment. The financial parameters are also determined. At district level the parties agree on the area and decide on the complexes that are eligible for participation in the re-use scheme. Later, at project level, they decide which building components in the complexes are suitable for re-use. Finally, at action level they agree that the door and window frames can be sent to Romania.

Figure 7.3 offers another example of a performance agreement; this time the theme is energy. At city level the municipality and the housing association agree on an EPL target of 8 in the urban renewal project. The potential for energy infrastructure is explored for each area and the most suitable candidate is chosen. At project level, agreements are reached on insulation levels and at action level joint decisions are taken on the type of boiler (e.g. high-yield).

The third and last example shows how the quality of the outdoor space can be incorporated in a performance agreement. Among the various themes that can be identified when determining the quality of outdoor space and reaching agreements are the lay-out of the streets, greenery, parking facilities and water. Figure 7.4 shows the development of a performance agreement for greenery. The parties agree at city level that they want to develop the urban greenery in a way that will make the most of its (ecological) potential. The

Figure 7.5 Input-output chart



Source: Frissen, 1997

Box 7.2 Preconditions for performance agreements in the planning process

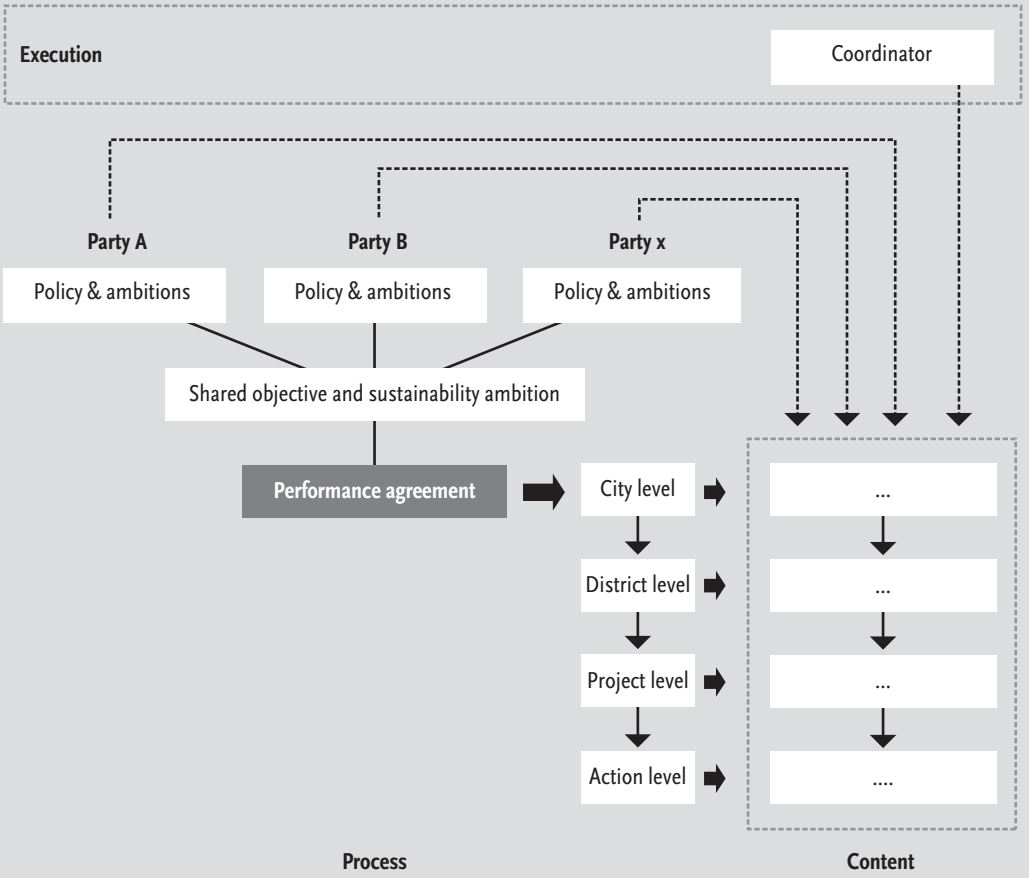
- The discussion for performance agreements should be opened within the financial parameters.
- A performance agreement should not be tight shut, but should allow scope for negotiation.
- The parties in the planning process should have enough clout to set agendas.
- Ambitions should be formulated in full at the start of the planning process and stay high on the agenda so that they can latch on to the existing procedures.

performance consists of commissioning a study to explore the possibilities within fixed budgetary limits. The findings of the study can prompt the parties to opt at district level for more variation in the greenery. Then, at project level, the verges are ecologically laid out and at action level a decision is taken for extensive verge management.

When a plan is facilitative (see also Chapter 2) – i.e. it is seen as a tool for visualising discussions and generating information – the performance agreement plays an even greater role. It then becomes an instrument for establishing goals, for setting the ground rules between the parties, and for taking decisions in the event of conflict. The plan serves primarily as input for the discussions on the content and quality of the area and the performance agreement regulates the future interaction between the parties. The performance agreement plays a key role in determining the objectives for an area and the way in which they are fleshed out by the parties. If processes are involved, then the administrators often use an input-output chart. An example is provided in Figure 7.5, where the plan is the input and the performance agreement is the output.

As the case studies showed, it makes no difference whether a plan is an integrated ideal or a facilitative tool, performance agreements will not succeed unless certain preconditions are met (Box 7.2).

Figure 7.6 Implementation and execution of performance agreements within the ideal model



7.4 Implementation and execution of performance agreements

In recent years criticism has been mounting about the content of performance agreements between municipalities and housing associations. This is because many performance agreements are full of good intentions that rarely come to anything (Conijn, Van Grinsven, 2003). Cooperation should be concretized and should not stop short at good intentions (Van Daalen, Ouwehand, 2000). The case studies revealed a consistent pattern of advice for the implementation of performance agreements. This advice applies to performance agreements in general, and not specifically to sustainable building, as the interviewees had very little experience in this domain. The preconditions for the implementation and execution of performance agreements are summed up in Box 7.3.

Figure 7.6 shows how a performance agreement can be implemented and executed within the ideal model. The parties are individually responsible for

Box 7.3 Preconditions for the implementation and execition of performance agreements

- If the agreements are not fulfilled the parties must keep talking and tackle each other.
- When the performance agreement is drawn up the parties should already have considered sanctions for non-fulfilment.
- The parties must give timely warning and explanations if the performances cannot be achieved.
- Although all the parties are responsible for the process, one party must be appointed to report on the performances and monitor the process.
- The process for drafting and implementing a performance agreement should be well-organized and orderly.
- A performance agreement is not a guarantee. The right people need to be involved in the agreement (not just politicians or administrative officials but both) as execution is heavily dependent on the people who make the agreement.

the process, which determines who is responsible for what. Obviously, the parties need to communicate well in order to cooperate well. The communication can be organized in a consultative format. Information can be exchanged at the meetings and the progress of the agreements and concrete matters can be discussed (Van Daalen *et. al,* 2000). A coordinator or an external party can be appointed to oversee and monitor the process.

Part III
Conclusions

This research had two main goals. First, we examined the energy saving and CO_2 reduction potential of post-war housing stock from a physical angle in two case studies. We also addressed the costs of the relevant policy developments as these are often named as the main barrier to sustainability. Second, from the process angle, we attempted to determine the potential role of performance agreements in the implementation of sustainable building in the planning processes for the renewal of post-war housing estates. Morgenstond Midden in The Hague and Oedevlietsepark in Hoogvliet, Rotterdam, served as case studies. This part of the report presents the conclusions.

8 Conclusions

8.1 Introduction

In this chapter we draw our conclusions on the basis of the experience recorded in the case studies, the policy analyses and the theoretical considerations. Section 8.2 summarizes the conclusions from the physical angle with the aid of the policy analyses and the findings of the feasibility study. Section 8.3 focuses on performance agreements and ends with the more general research question on the role of urban renewal in sustainable development.

8.2 CO_2 reduction

This research project presented two case studies, one in Oedevlietsepark (Hoogvliet) and one in Morgenstond Midden (The Hague). From the physical angle we attempted to determine the practical contribution that the renovation of post-war housing can make to sustainability in urban districts. We focused on energy efficiency and CO_2 reduction and the financial feasibility of exploiting this potential. We analysed the relevant policies in the case study areas, performed energy evaluations with EPA and put the renovation solutions to the NPV test. This section addresses the four research questions that were posed in Section 1.3:

1. Which European, national, regional and municipal environmental policy developments are relevant for social housing associations in the near future?

The policy analyses at European, national and regional policy levels show that the development which is most likely to have an impact on energy-efficient renovation in the near future is an increase in energy price due to regulatory measures, government action, the implementation of the Kyoto Protocol, a more dynamic energy market, pressure to satisfy electricity needs with zero-emission technology, and taxes. At the same time, cuts have been made in national energy subsidies, emphasising cost-efficient energy-saving measures and payback times. One key policy instrument that will influence the reduction of CO_2 emissions in the domestic sector is the EC Energy Performance Directive (EPD), due to be introduced in 2006. The EPD will make energy certificates compulsory whenever dwellings are sold or rented. The aim at national level is to derive 10% of the energy requirement from sustainable sources by 2020; hence, renewable energy will be promoted in buildings at all policy levels. At regional and municipal level solar energy is already being strongly – but voluntarily – promoted in buildings. Discussions have taken place on lowering the EPC from 1.0 to 0.8 and eventually to 0.6., though this proposal still needs to be examined in relation to the existing stock. No action has been taken so far because of resistance from the construction

industry, but signs are appearing at municipal level; for example, an EPC of 20% below the regulatory requirement is prescribed for new construction projects in Rotterdam.

In Oedevlietsepark, the first case study, the Municipality of Rotterdam, the Borough of Hoogvliet and Woonbron Maasoevers Housing Association all included ambitions for sustainable building in their policy. The municipal policy is set out in various documents, *viz*: the Rotterdam Housing Vision, Housing Quality in Rotterdam, the Second Covenant for Sustainable Development, Building and Management in the Rotterdam Region 2000+ and Environment in Place. Housing Quality in Rotterdam is the most recent policy paper on sustainable building, subsuming sustainable building and flexibility under the general heading of 'housing quality'. Woonbron Maasoevers has drawn up a strategic plan for Hoogvliet (*Hoogvliet aan zet*) which identifies several openings for sustainable building, such as a residual heat project. Woonbron Maasoevers sets requirements for new building in particular: it needs to be 'sustainable', 'adaptable' and 'socially safe'. In its Year Plan for 2003 the housing association states that a positive contribution to the environment is part of its social remit. It sees a long life expectancy as an important aspect of sustainable building. The quality of housing covers the themes of sustainable building, flexibility and differentiation and is the common denominator for the policy of the municipality and the housing association.

In the second case study, Morgenstond Midden, the policy of the Municipality of The Hague and of Staedion housing association incorporates several ambitions for sustainable building. The most relevant municipal policy papers are the Strength of The Hague, the Housing Vision for The Hague, 2020, the Sustainable Building Regulations, the policy paper on Environmentally-Aware Building and the Environmental Policy Plan for The Hague, 2001-2006. The sustainability ambitions in the housing policy are set mainly at urban development level where the themes include water, green space, mobility and improved quality. Urban renewal is seen as an opportunity for implementing the spearheads of climate policy, sustainable water management, pollution control in public areas, noise control and quality of the indoor environment. Sustainable building in the narrowest sense takes place at the level of individual buildings; no attention is paid to the existing stock at this level. The ROMbo method plays an important role in the formulation of sustainability ambitions in The Hague. Staedion has formulated its environmental policy in an environmental policy plan, which has been converted into programmes of requirements for new and existing buildings. The policy is based on the themes of sustainability, quality of life and health, which are then subdivided into nine sub-themes including sustainable building & renovation, energy, and sustainable water management. Sustainable building is integrated in the

programme of requirements for existing buildings. Particular attention is paid to the use of materials, water and energy. There is no concrete interpretation of sustainable building in the programme of requirements for new building. It is mentioned as a general condition in the introduction but is not explained further. The themes of sustainable building, flexibility, differentiation and housing quality all appear in the policy of both the Municipality of The Hague and Staedion. When it comes to sustainable building, a strong emphasis is placed on the use of materials, water and energy.

2. How can renovation contribute to energy efficiency as an alternative to demolition and new construction policy in the renewal of post-war housing estates? What is the required expenditure and the expected receipts?
The energy evaluations carried out in the case studies of Oedevlietsepark and Morgenstond Midden illustrate once again that the renovation of late post-war housing stock offers potential for reducing CO_2 emissions. Extra insulation and the installation of energy-efficient HY^{++} windows can reduce gas consumption by 44% in Oedevlietsepark, and by 54% in Morgenstond Midden. In an average dwelling, this would mean annual savings of €272 in total energy costs in Oedevlietsepark, and €403 (Complex 01) and €518 (Complex 02) in Morgenstond Midden. If energy-efficient installations and a solar boiler are added over and above the insulation of the thermal envelope and the installation of new windows, the gas consumption can be cut by 79-80%. This would mean a reduction of 48,177 kg in CO_2 emissions in Oedevlietsepark and total reduction of 243,362 kg in Morgenstond Midden (both complexes). The feasibility of energy-efficient renovation is, however, dependent on the costs. In Oedevlietsepark, extra insulation and new windows require an investment of €6,500 per average dwelling and €14,200 if new installations and a solar boiler are added. In Morgenstond Midden, extra insulation and new windows require an investment of €6,410 per average dwelling for Complex 01 and €8,117 for Complex 02. If new installations and a solar boiler are added, this mounts to €12,261 (Complex 01) and €13,977 (Complex 02). The absence of subsidies makes payback times long for normal consumers, despite improvements to living comfort and the indoor climate. The results show that these installations push up investment costs by 48% while the savings in energy costs increase only by 19%, and the CO_2 emissions drop by a mere 2-8%. Yet, compared with a standard renovation (the 'zero option') thermal insulation and new windows can reduce CO_2 emissions by 70% in Oedevlietsepark and by 89% in Morgenstond Midden with 29% and 51% in extra investment costs respectively.

3. Which policy developments will make investments in energy efficiency more attractive in the near future?
The findings from the two case studies show that higher energy prices are an important factor in shortening the payback times of energy-efficiency invest-

ments. However, if the prices were 60% higher in 2012 compared with the level in 2003 (as anticipated if the Kyoto Protocol is implemented), Solutions 3 and 4, which include more effective installations and a solar boiler, will still not be paid back in the 25 years, which housing associations consider a reasonable lifespan before the next intervention. As it is difficult to set a value to the environment and thereby correct the discrepancy between environmental and financial gains, sustainable renovation needs to be made more attractive in the policies. Long payback times also underline the need to encourage innovations that can change the energy-saving scenario. Installations and energy-efficient windows, for example, are becoming vitally important as a result of, amongst others, the tighter building regulations and standards of recent decades. Innovation support is a challenge which requires changes to current government policies.

4. What kind of policy instruments are required to support energy efficiency in urban renewal?

Though the operational benefits of energy-efficient renovation are crystal-clear, housing associations still opt to demolish housing and build new dwellings – also in these case studies. Demolition is chosen usually because the existing housing supply does not meet current requirements: it is functionally outdated and has a poor energy performance. This study responded to the issue of poor energy performance by demonstrating that CO_2 emissions can be reduced by renovating the existing housing. Such inconsistencies raise the possibility that other factors may be influencing decisions on energy-efficient renovation at strategic level. The housing associations often quote costs as the greatest barrier to sustainable housing management (SBR, 2001; Sunikka & Boon, 2002). If the NPV of energy improvements is negative despite the CO_2 potential, then the question is whether anyone will be willing to make an investment which is greater than the receipts. The reduction in CO_2 emissions will not be a sufficient incentive if the market is the sole allocative instrument. As a public good, the environment cannot derive value from the supply and demand mechanism. The gap in the market must therefore be redressed by policies. This can be realized by refining and combining existing environmental policy instruments, by introducing sustainability into existing policy instruments, and by developing new kinds of policy instruments.

As concluded in the policy analysis, the Energy Performance Directive (EPD) will make energy-saving in buildings mandatory and, at the same time, add to the data on energy consumption. The implementation of the Directive is open to each member state, but as a key policy instrument to promote CO_2 reductions in buildings, it will inevitably affect social housing providers, who will have to issue dwellings with energy certificates and possibly carry out boiler inspections. Experience from Denmark indicates that energy certification for buildings should be combined with sanctions. It is also plausible that,

without fiscal support, the recommended energy improvements will never be realized, especially in social housing where residents are unlikely to invest in someone else's property (in some cases this is even prohibited). The EPD can also be supported by taxes. Experience from the Netherlands indicates that energy taxes need back-up from public information campaigns in order to be effective. Finally, the question still remains as to how the energy tax can be increased without hitting low-income households, especially those in the social housing sector, who have less financial scope for investment in energy-saving measures.

If existing or pending policy instruments are not enough to achieve sustainable urban renewal, new fiscal instruments can be introduced to encourage energy-efficient renovation. Preferential credit conditions can be granted for sustainable renovation. Special funds for sustainable building are already being set up in Germany and the UK. Fiscal benefits can be granted for sustainable renovation, or tax credits, or a lower VAT rate for energy-efficient construction materials (as in the UK). Preliminary talks on trading CO_2 certificates have already been held in Germany and the UK. Developers can be assigned added-density allocations for sustainable buildings (Drouet, 2003). Some housing associations have suggested that energy investments could be compensated in the price of land. Energy consumption could also be taken into account in when recommendations are submitted on permitted levels of rent (a system that exists in the Netherlands).

At the end of the day, it is the resident (or owner) who uses the energy and decides whether to invest in the dwelling. The case studies highlighted the investment-profit dilemma, which has been around for a long time and can seriously impede sustainable building unless it is addressed in policies. Alternative strategies can be adopted to overcome this problem. For example, if solar panels were installed, the energy provider could manage them. In this option, the energy provider manages and maintains the installation and receives the generated power, paying 20% to the home owner at consumer rates. If the occupier invests in solar panels and is responsible for the maintenance, he/she receives the generated power and a small payment, provided electricity is supplied to the grid and the installation remains for 10 years. If the housing association owns the solar panels, the tenant receives the generated power, and the use of the solar panels is included in the rent. Different ownership models for using solar energy have been tested in the 1MW PV project in Nieuwland, Amersfoort (Bouwmeester & Van IJken, 1999). Things get more complicated if extra insulation is involved. The tenants will most likely have to pay for this through higher rents, which could then push up the price of affordable housing and place it beyond the reach of the people it is originally intended for. At all events, the responsibility for investment could be spread over several players. Although many people seemingly espouse pro-environmental causes, they still engage in environmentally destructive

behaviour (Cole, 2004). This 'attitude-behaviour' enigma is also tied in with the question of Willingness To Pay (WTP), which still needs to be properly researched as the WTP of residents can differ from the official estimates. It might also be interesting to link WTP to hard information such as household income. The fact that CO_2 reduction is an abstract concept with no respect for national borders could make its acceptance more complex and limit the WTP. At project level, technical construction measures should be combined with information on, say, individual measurement systems and educative material about the new installations and the impact of individual behaviour on energy consumption.

8.3 Performance agreements

From the process angle, this research project attempted to determine the potential role of performance agreements for sustainable building in the planning processes for the renewal of post-war housing estates. Morgenstond Midden in The Hague and Oedevlietsepark in Hoogvliet, Rotterdam, served as case studies. We analysed the policy, the planning process and the performance agreements in which the key players were the Municipality of The Hague and Staedion housing association in Morgenstond Midden and the Municipality of Rotterdam, the Borough of Hoogvliet and Woonbron Maasoevers housing association in Hoogvliet. The aim was to find windows of opportunity for the further development of performance agreements. This section addresses the seven research questions that were posed in Section 1.3, and concludes with the general question of the role of urban renewal in sustainable development.

5. What ambitions and objectives do municipalities and housing associations formulate in their policy for sustainable building?
In both case studies the themes of sustainable building, flexibility, differentiation and housing quality feature in the policy of the municipality and the housing association. The housing policy incorporates many sustainability ambitions and objectives – also for greenery and water – on an urban development scale. The environmental policy often pertains to a lower scale, e.g. buildings. One striking feature of the policy is that it relates mainly to new building. In The Hague the more traditional themes of materials, energy and water play a major role in the further development of sustainable building. Here the ROMbo method is applied to integrate sustainable building in the planning process for urban renewal. In Rotterdam, on the other hand, where the municipal policy focuses on the quality of housing, sustainable building is incorporated in 'Housing Quality in Rotterdam'. The municipality and the market players jointly decided to make the use of wood from sustainable

forests and coated zinc, copper and lead key requirements in sustainable building. These requirements also figure in Basic Housing Quality in Rotterdam. Woonbron Maasoevers housing association has integrated its environmental policy in a Year Plan. Staedion housing association has also drawn up an environmental plan and has incorporated the statutory and municipal requirements for sustainable building in its standard technical policy.

6. How is the planning process organized?
The approach in both Morgenstond Midden and Oedevlietsepark is area-based. In The Hague this has signalled a radical change as, in the past few years, various projects have been carried out in The Hague SW without any kind of vision of the overall area. Interestingly, the approach entails the inclusion of sustainable building at building plan level. There is no clear-cut ambition in the area vision. In Hoogvliet a central role is played by the programme of requirements for urban development, which was compiled on the basis of the structural sketch, the development vision and the urban renewal vision. The programme of requirements sets out measures for sustainable building in the form of wishes and demands for, amongst others, the use of materials and the EPN. All the building plans are tested against the programme of requirements.

7. What parties play a role in the planning process and what is their influence?
The municipality and the housing association take the lead in both case studies. It is they who draw up the plans and reach agreements. Strictly speaking, one should not refer to *the* Municipality and *the* housing association as the restructuring process involves many departments. Contractors, energy providers and suchlike are seen as executive parties who have no influence on the ambitions and objectives. The new roles of the municipalities and housing associations are clearly expressed, but in different ways. In The Hague, Staedion acts as the overall area developer and is responsible for both the land and the building. Staedion has no specific ambitions for Morgenstond Midden, and is sticking to its 'standard' policy. In Rotterdam Woonbron Maasoevers is assuming a great deal of initiative but is adhering to the traditional role allocation in which the municipality is responsible for the outdoor space. Staedion is tenaciously pursuing projects for sustainable demolition and industrial heat. The Municipalities of The Hague and Rotterdam particularly want to see improvements to the general quality of the districts. This will be achieved by, for example, creating more variation in the housing supply by improvements to the greenery and water structure. In addition, the Municipality of The Hague wants to formulate collective ambitions for Morgenstond Midden by applying the ROMbo method, but it does not have enough influence to be sure of success.

8. Have performance agreements already been reached for sustainable building?

There is no experience of performance agreements for sustainable building on the basis of the definition applied in this research. A performance agreement in sustainable urban renewal is defined as a written undertaking between a municipality, a housing association and any other parties which sets out performance requirements for the realisation of the approved sustainable building policy in the renewal of post-war housing estates. The concepts of performance agreement and sustainable building appear to be subject to different interpretations. Sometimes, it looks as if all agreements are called 'performance' agreements. A very broad interpretation is applied in Rotterdam in particular, where structural sketches are also referred to as performance agreements. The concept of sustainable building is developed mainly at building level and is increasingly subsuming themes such as flexibility, differentiation and housing quality. The scale is therefore being constantly expanded, but the relationship between these concepts is not always clear. Housing Quality in Rotterdam seems to reconcile various interpretations.

9. What experience has been gained of performance agreements in general and in relation to sustainable building in particular?

The experience of performance agreements in the case studies relates mainly to public housing. These are broad agreements with scope for adjustment, but they do not yet include sustainability ambitions. Opportunities did arise for the incorporation of performance agreements on sustainable building in The Hague Performance Agreements 2003-2010, but there was no shared ambition and objective. In The Hague, performance agreements are already in place for new building at VINEX locations. The municipality has positive experience of these agreements. The greatest challenge is to maintain them. A balance therefore needs to be struck between delivering on promises and preserving a good relationship.

10. Under what circumstances would performance agreements for sustainable building be a suitable instrument?

Performance agreements for sustainable building are generally regarded as a suitable instrument for the realisation of sustainability ambitions. Some people even feel that they are necessary. From the interviews we distilled the conditions that need to be in place for the successful implementation and execution of performance agreements for sustainable building. These can be split into preconditions for performance agreements in sustainable urban renewal, preconditions for performance agreements in the planning process and preconditions for the implementation of performance agreements.

Preconditions for performance agreements in sustainable urban development:

- The parties must have a shared purpose when entering a performance agreement.
- A performance agreement should constitute a win-win situation for the parties concerned.
- The parties must make resources available besides formulating ambitions;
- The parties should create a support base within their own organisation before entering a performance agreement.
- A performance agreement should have value, it should not be vague and it should lead to execution. Parties can be put off if the ambitions are too high.
- A performance agreement should relate to a performance and its financial implications.
- A performance agreement should not be too rigid; it should be able to capitalize on trends in the urban renewal process.

Preconditions for performance agreements in the planning process:

- The discussions for a performance agreement should be opened within the financial parameters.
- A performance agreement should not be tight shut but should allow scope for negotiation.
- The parties in the planning process should have enough clout to set agendas.
- Ambitions should be formulated in full at the start of the planning process and stay high on the agenda so that they can latch on to existing procedures.

Preconditions for the implementation of performance agreements:

- If a performance agreement is not fulfilled the parties must keep talking and call each other to account.
- When a performance agreement is drawn up the parties should already have considered sanctions for non-fulfilment.
- The parties must give timely warning and explanations if the performances cannot be achieved.
- Although all the parties are responsible for the process, one party should be appointed to report on the performances and monitor the general process.
- The process for drafting and implementing a performance agreement should be well-organized and orderly.
- A performance agreement is not a guarantee. The right people need to be involved (not just politicians or administrative officials but both) as execution is heavily dependent on the people who make the agreement.

11. How can performance agreements operate?

- **What kind of performance agreements can contribute to sustainable building in urban renewal?**
- **What place can be assigned to performance agreements in the planning process?**
- **How can the implementation of performance agreements be tracked and monitored during the planning process?**

The research revealed that the Municipalities of The Hague and Rotterdam and the housing associations of Staedion and Woonbron Maasoevers see opportunities for formulating and implementing sustainability ambitions through performance agreements. They have already acquired experience of performance agreements in public housing, though these still do not include sustainable building. Even so, the case studies showed that it is precisely these performance agreements that offer scope for sustainable building as they relate to the restructuring briefs, the roles and responsibilities of the municipality and the housing association, and the financial potential. As such, they form a promising foundation for establishing sustainability ambitions. The results of the case studies and the additional literature search have delivered a model on the concretisation of performance agreements for sustainable building.

12. How can the results of this study contribute to the ambiguous concept of sustainable development?

The research shows that, in terms of energy saving and CO_2 reduction, urban renewal can make a significant contribution to sustainable development. This research was based on the institutional concept of sustainability, which sees sustainability as essentially a problem of governance in the broadest sense. A lot of attention was devoted to policies, also because feasibility studies indicate that, at this stage, CO_2 reduction is not financially 'worth it' and redress therefore needs to be made in policies. Though sustainability features in the policy agendas, the level of ambition seems to decline as it moves from higher policy scales towards concrete action. There is no sign of these agendas when market and environmental benefits are being weighed against each other at project level. Our research aimed to identify the practical problems of implementing sustainable development and to spotlight the gap between policy and practice. Performance agreements present one structured way of tackling the complexity of sustainable development. This research takes a first step towards the further development of performance agreements for sustainable building. It revealed that there is very little experience of performance agreements in this domain. On the other hand, the performance agreement, as an instrument, is not an unknown phenomenon in public housing sectors. The parties realize that cooperation is absolutely crucial in order to realize ambitions in the complex domain of urban renewal, where

municipalities and housing associations are becoming ever more dependent on each other for the implementation of the restructuring brief. This also emerged from the case studies where performance agreements were reached at various levels to ensure that restructuring was efficiently steered. As it happened, these performance agreements also provided openings for the realisation of sustainability ambitions; first, because they defined renewal objectives in which sustainability would play a role; and second, because they set the financial parameters for the renewal. One crucial factor is a shared purpose and ambition. As many sustainability ambitions are still dependent on budgetary scope, the financial implications need to be clearly understood if the ambitions are to remain on the agenda. The concretisation of a performance agreement in a planning process is closely connected with the planning process itself. If this process consists of different phases in which the structural sketch and the plan of action play important roles, the performance agreement can serve as a supplementary instrument and make a valuable contribution towards converting the sustainability policy of municipalities and housing associations into realizable objectives. If the planning process is open and innovative and the results are still to emerge, then a performance agreement is an excellent instrument for realising sustainability ambitions. An open process provides scope for performance agreements which can give shape and direction. A performance agreement is a first move towards formulating shared ambitions within a restructuring project. The next move – implementing the ambitions – appears to be more difficult. To ensure good cooperation one party can be appointed to monitor the general process and report on the achievements. However, it should be stressed that the agreement process can be successful only if the municipalities and housing associations have the same ambition. This research project consists of a preliminary survey of the scope and limitations of performance agreements in sustainable building, flexibility, differentiation and housing quality. Follow-up research is needed to further develop the findings.

This study focused on the Netherlands, because we wanted to place sustainable urban renewal in a practical and specific context. Great caution is required when generalising the findings of a case study, all the more so in urban renewal, where location, market demand and demolition pressure differ in each case and where the decision-making involves emotional as well as practical issues. Differences have already emerged between the two case studies in this project: Morgenstond Midden has a favourable suburban location close to the centre of The Hague whereas Hoogvliet is located far from the centre of Rotterdam, next to an industrial landscape. There is considerable potential for comfortable housing in Morgenstond Midden if the dwellings are combined, whereas Oedevlietsepark can be improved with selective demolition. As post-war housing was characterized by standardisa-

tion and neighbourhoods with identical types of housing (Thijssen, 1990), some physical comparisons can be drawn nationally and internationally between cases with a similar housing typology, provided the scope is limited to technical improvements or costs. There are huge national differences process-wise, but as many European countries are facing similar developments such as the deregulation of the energy markets and housing market trends, reasonable benefits can be gained from experience of different kinds of policy instruments.

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Appendix 1 List of interviewees

Morgenstond Midden case study

Interviews phase A:
J. de Hoog, Urban Development Office, Municipality of The Hague
P. de Reus, project manager, Morgenstond Midden, Staedion

Interviews phase C:
J. Tokkie, Urban Development Office, Municipality of The Hague
F. Weijzen, Urban Development Office, Municipality of The Hague
E. Hasker, Urban Development Office, Municipality of The Hague
H. Bakker, Urban Development Office, Municipality of The Hague
F. Kabbaj, real estate consultant, Staedion

Oedevlietsepark case study

Interviews phase A:
K. Hogervorst, Office of Urban Development & Housing, Municipality of Rotterdam
R. Solinger, project manager, Oedevlietsepark, Woonbron Maasoevers

Interviews phase C:
R. van der Wal, Office of Urban Development & Housing, Municipality of Rotterdam
J. de Bok, Office of Urban Development & Housing, Municipality of Rotterdam
B. Jonker, OBR, Municipality of Rotterdam
E. Feenstra, Policy Department, Borough of Hoogvliet
M. van Dongen, Public Works & the Environment, Municipality of Rotterdam
J. van Eenennaam, Project Director for Reorganizations, Woonbron Maas-oevers

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As in other European countries, the renewal of post-war housing estates is a major policy issue in the Netherlands. The aim is to upgrade neighbourhoods by means of demolition, renovation of social rented housing and construction of new owner-occupied dwellings. The existing housing stock is a key factor in attaining the greenhouse gas reduction targets in the Kyoto Protocol.
This process of renewal will pursue high targets and ambitions as it gets underway in the coming years. It will lead to major interventions in the housing stock and – at the same time – rigorously challenge the market players to make existing dwellings more environmentally-friendly and to develop sustainability in post-war housing.
By presenting two case studies this book offers insight into the environmental policies of Dutch housing associations and municipalities. Focusing specifically on the role of performance agreements in realising sustainability ambitions, it also assesses the feasibility of CO_2 reductions and examines the costs and decision-making processes.

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