



3E:
Delft Climate Plan
2003 - 2012

3E:
Delft Climate Plan
2003-2012

Effective, Efficient Energy Use

Acknowledgements

Published by Municipality of Delft, September 2003, District and City Affairs Cluster, Sustainability Sector, Environmental department, Barbarasteeg 2, Postbus 340, 2600 AH Delft **Information** Margreet de Wit, telephone +31 15 2602219, e-mail: mdewit@delft.nl **Layout** Klats publiciteit **Photography** Municipality of Delft (p. 12), Bureau Ecofys (p. 16), Stef breukel (p. 19, 30) and Fred Nijs (p. 28).

Table of Contents

Foreword	5
Summary	7
Decision Points	9
1 Climate policy translated from Kyoto to Delft	
1.1 Climate change: a global issue	12
1.2 Climate policy in Europe and the Netherlands	13
1.2.1 European energy policy	13
1.2.2 National elaboration of the Kyoto Convention	13
1.3 Delft policy frameworks and ambitions	14
1.3.1 Delft energy master plan	14
1.3.2 Policy frameworks of the Municipality of Delft	14
1.3.3 Ambitions of municipal climate policy	15
2 3E: Effective, efficient energy use	
2.1 Starting-points	16
2.2 Status and scope	17
2.3 Activities selection criteria	17
2.3.1 Feasibility	17
2.3.2 Ways of exerting influence	17
2.3.3 Local and regional	18
3 Implementing programme	
3.1 Introduction	19
3.2 Activities	19
3.3 Objective	22
3.4 Short description of activities	23
4 Organisation	
4.1 Allocation of tasks	28
4.2 Knowledge management	28
4.3 Generating awareness, involvement and change of conduct	29
4.4 Monitoring	29
5 Finance	
5.1 Costs	30
5.2 Coverage	30
5.2.1 Municipality of Delft's own funds	30
5.2.2 National co-financing funds	31
5.2.3 European funds	31
Literature	32
Abbreviations and terms	33
Appendices	35

Foreword

Delft puts energy into tackling climate

Recent dry summers and occasionally wet feet have forced us to start facing up to facts: the climate is changing, bringing inevitable consequences. The chief cause is the ever-increasing use of energy generated from fossil fuels such as coal, oil and gas. With the Climate Plan before it, Delft is taking on its responsibility in tackling these climatic problems. Having defined 20 realistic, viable projects, the city is demonstrating the possibility of a considerable cutback in local CO₂ emissions, specifically 33,500 tons compared to 1999. This is no simple target: the fact is, we wish to be and remain at the forefront of national progress and to be innovative where we possibly can. It was not mere coincidence that we were one of the first Dutch municipalities to build a sustainable residential area complete with numerous energy-saving processes and an emphasis placed on the use of sustainable energy. From as far afield as Taiwan, visitors come to see how we have achieved this. Another project, "100 Delft-blue roofs", has been imitated in many municipalities and, in the field of wind energy, Delft is making bold strides.

Admittedly we are a little ambitious, but without ambition we cannot possibly stem the rising tide of CO₂ emissions. As it happens, our ambitions are embedded in a firm sense of reality: no vague, grandiose schemes, but rather concrete activities coupled to feasible targets. The name of the plan "3E: Delft Climate Plan: Effective, Efficient Energy Use" confirms this. For this reason it contains no entirely novel initiatives, but focuses rather on projects already planned or even ones that are currently underway, showing how a contribution can be made to achieving climatic targets. These vary from large-scale undertakings, such as the possible use of residual heat from DSM and the construction of windmills along the edge of Technopolis, to more modest ideas like equipping parking meters, pumping-stations and suchlike with solar panels. Using sustainable energy and saving energy are both possible. The time has come to put these words into practice. To do so, we will all have to pull together in the years ahead. With a good dose of positive energy from everyone, we can win through.

Rik Grashoff
mayor deputy on sustainability, Delft

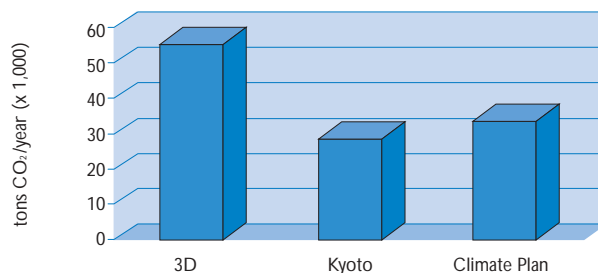


Summary

The 1997 Kyoto Convention defines a worldwide approach of the climate problem. The Netherlands has ratified this convention, committing itself to reducing greenhouse gas emission by 6% compared to 1990 over the period between 2008-2012. To attain this objective, the Netherlands Government, the Interprovinciaal Overleg (Interprovincial Consultations; IPO) and the Vereniging Nederlandse Gemeenten (Association of Netherlands Municipalities; VNG) signed a Climate Agreement on February 18, 2002 concerning a so-called BANS (Bestuursakkoord Nieuwe Stijl; New-Style Administrative Agreement) climate.

The '3E: Klimaatplan Delft; (Delft Climate Plan)' is the Delft interpretation of the Kyoto Convention, and is furthermore in line with the objectives of '3D: Duurzaamheidsplan Delft 2000-2003; (2002-2003 Delft Sustainability Plan)'. 3E stands for: effective, efficient energy consumption. In its Climate Plan, Delft sets itself an ambitious target: being and remaining a front runner in the Netherlands and applying innovation wherever possible. Delft links its ambitions to a full measure of realism, which implies: no wild, vague plans, but concrete activities, relating to attainable objectives. The principal objective is an annual reduction of 33,500 tons of CO₂ emissions, compared to 1999. This level of reduction should be realised not later than by 2012 (the final year of the plan period). On the basis of the Climate Scan performed by Novem, the largest environmental gain appears to come from (re-)construction processes and the use of sustainable energy.

Annual CO₂ reduction by 2012

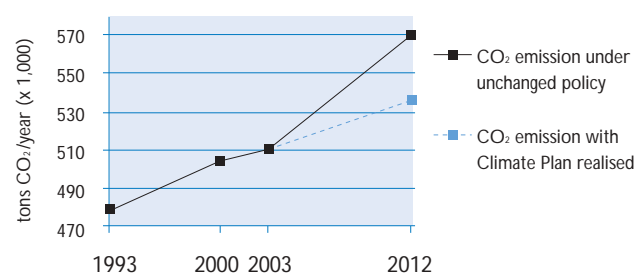


The objectives of 3D: a comparison between the local interpretation of the Kyoto Convention and the Climate Plan.
Explanation: 3D: energy objectives from the Sustainability Plan have been translated into annual CO₂-reductions.
Kyoto: reductions to be realised by Delft on the basis of its emissions in 1990 in relation with national objectives.
Climate Plan: annual CO₂-reductions relating to the projects named in the Climate Plan.

The figure above shows that the objective of the Climate Plan more than answers the local interpretation of the objectives of the Kyoto Convention. The 3D objectives have appeared too ambitious. The gap between the objective of the Climate Plan on the one hand and the objective of the Kyoto Convention on the other hand is justified, as it is not unlikely that the realisation of several projects within the Climate Plan will not run according to schedule.

The figure below shows the situation that will arise when we account for the increase in energy consumption due to new urban developments (Sporzone (railway zone), TU Zuid (Technopolis Innovation Park) and Harnaschpolder). These will result in an increase in overall urban energy consumption and the corresponding CO₂ emission. Although the Climate Plan will effect a change in this trend, it will not result in CO₂ reduction.

Altering trends in CO₂ emissions as a result of the Climate Plan



Calculations are based on ratios adopted by the Energieonderzoekcentrum Nederland (ECN; Netherlands Energy Research Centre) and the Rijksinstituut voor Milieuvraagstukken (RIVM; National Institute for Environmental Issues).

The Climate Plan is an integral plan, affecting many areas within municipal organisation. The plan is directional, giving concrete indications concerning the policies and activities that could contribute to actual reduction of CO₂ emissions. To this end, the municipality of Delft has adopted three strategies from the *trias energetica*:

1. reducing demand by way of energy saving among end users;
2. applying sustainable sources;
3. (continued) optimisation in the application of fossil sources towards energy efficiency and reliability.

The Climate Plan is a dynamic plan as well, with alterations possible during its plan period as a result of conditions such as:

- insight concerning the feasibility of current actions developing alongside these actions being carried out;
- new political and/or policy frameworks (at European, national or local levels);
- state of affairs of technological development;
- support among, and participation by those involved;
- economic developments.

The implementation time of the 3E: Delft Climate Plan is 2003-2012.

The Climate Plan offers opportunities for advancing Delft as "Kennisstad; (City of Knowledge)". Various projects demand innovative solutions. Searching for these possibilities presupposes a major role being reserved for several Delft institutions and business undertakings. See paragraph 3.4 'a short description of activities' and appendix IV, in which the chances of success of various projects for Delft as City of Knowledge are weighed.

The Climate Plan provides for an investment of roughly € 59 million, ± € 56 million of these reserved for physical measures and € 3 million for research and personnel costs, distributed over various parties. Half of the contribution for physical measures will however be spent on staff. Over the full length of the plan period this will result in roughly 375 man-years for implementation and 30 man-years for research and development.

The actual realisation of a reduction in CO₂ emission is put first and foremost in the Climate Plan. As a result, feasibility and possibilities of influence put in by the municipality play a decisive role when assessing possible 3E-activities. The above has been translated into the following criteria:

- support among target groups (social, executive and official);
- costs (effectiveness);
- technology (Are techniques in conformity with the market and/or available?);
- alignment with natural moments (especially relevant in construction processes, necessitating timely anticipation during planning);
- projects and/or activities can be influenced:
 - via the systems of legislation and regulation;
 - by way of dialogue (exchange, negotiate, convince);
 - by way of information and/or awakening;
 - using financial means (the municipality is pursuing a multiplier effect, meaning a situation in which a municipal financial effort manages to generate a substantial sum of money from out of its environment).
- project and/or activities being directed to the household of the municipal organisation (setting 'the proper example' can persuade other parties to follow suit).

In consultation with parties involved and on the basis of the above criteria, the municipality has formulated several programmes, projects and tools to be adopted over the next ten years in order to realise Delft Climate Policy.

Reducing CO₂ emissions demands concrete, often physical measures. All this costs money. The Climate Plan focuses on taking measures within projects that have already been planned or even started. It is by teaming up with these existing (often re-development) projects that additional expenses involved in these measures will remain at the lowest possible level; much lower, anyway, than in the case of a choice for stand-alone 'climate projects' which would require drastic operations in the city.

Decision Points

1 General

It is proposed:

1. To determine "3E: the Delft Climate Plan 2003-2012", including its relating project/programme matrix (appendix I in the Plan text), the proposed ambition levels per (sub) theme over the entire plan period (figure 1.2 Plan text), its elaboration in the Municipal Climate Policy Menu (Gemeentelijke Menukaart Klimaatbeleid) (see appendix II Plan text) and the allocation formula for additional costs of the climate plan (appendix III Plan text).
2. To agree to adapting the conditions for the deployment of the Energy-Saving Measures' Reserve, to enable covering of personnel input on behalf of the direct implementation of the Climate Plan.
3. To agree to the subdivision of the implementing period into 3 phases: Phase I from 2003 to 2006 incl.; Phase II from 2007 to 2010 incl. and Phase III from 2011 to 2012 incl.
4. To agree to as of now adopting for preparation all projects and programmes within phase I.

2 Financial coverage

2.1 General

Reducing CO₂ emissions demands concrete, often physical measures. These measures cost money. The Climate Plan concentrates on taking measures in projects that have already been planned or even started. It is by way of teaming up with these existing (mostly redevelopment) projects that additional costs will remain as low as possible. They will be far lower anyway than in the case of independent 'climate projects' which would demand drastic operations in the city.

Therefore, the climate plan frequently matches opportunities created by plans initiated by others. This implies that project planning will link up with project plans prepared by the project managers. Programmes are concurrent with the Climate Plan from its start onwards and during the entire period. However, their elaboration, too, depends on initiatives of third parties concerning construction or renovation plans. Consequently, it is often external factors that determine the effort and financial coverage required for the various phases.

Phase I starts from existing project plans, existing arrangements with other specialist teams and with the project managers on the employment market and project budgets. Regarding phases II and III no arrangements have been laid down yet. In addition, funds for phase I are known to be available from the BANS subsidy.

With regard to the additional investments involved in energy-saving measures, no more than a rough estimate can be given at present. With regard to larger projects with a greater economic or social impact, separate proposals will be submitted to the council. To be able to handle the great manifold of projects within the scope of this climate plan in a decisive manner, it is proposed to authorise the mayor and mayor deputies to determine separate project contributions amounting to a maximum of € 100,000 per project, and within the available means of the MTF (Environmental Technology Fund Reserve) and REM (Energy-Saving Measures Reserve) and the policy framework of this climate plan.

Starting from the chosen ambition levels a rough estimate has been prepared of the required municipal investment on the basis of ratios. Over the entire plan period up to and including 2012, municipal investments will be required, in a total amount of roughly € 11,557,725. This is about 20% of the total amount of additional investments. The municipal investment has a major leveraging effect, generating funds among third parties (the multiplier effect), resulting in the remaining 80% being supplied by other parties and subsidy-granting bodies. In addition, an amount must be reserved for personnel provisions included in the plan. The most obvious financing sources of municipal investment are the REM and the MTF. At present however, these reserves are not sufficient (see table A in this chapter).

2.2 Phase I

Personnel capacity

The total personnel input for phase I amounts to 19,496 hours. A part of the required personnel input is covered from existing budgets, namely:

- from the existing formation of the Environmental department: 1 fte (formation task unit) per year over a 4-year period (4*1,312 hours = 5,248 hours);
- from the existing formation of remaining specialist teams (total 1,083 hours, 0.83 fte over a 4-year period);
- from project budgets (1,170 hours as yet (0.9 fte) for 2003, the remaining hours have not been laid down yet).

Total coverage 7,501 hours, with 11,995 hours remaining.

The following is proposed:

5. Separate project proposals will be submitted to the Council for projects and programmes at estimates exceeding € 100,000, or which in themselves have a major spatial, economic or social impact. For the remainder of phase 1, the mayor and mayor deputies must be authorised to determine in detail separate project contributions covered by the REM and MTF within the scope of the funds granted by the Council. Out of these separate project contributions within phase 1 covered by REM and MTF, the proposals will be submitted for perusal by the Sustainability commission. Implementation will be checked annually by the Council on the basis of the sustainability monitor, reporting on project progress as well as on environmental effects.
6. With regard to phase I, the financing of the required personnel input not covered by existing budgets, to be provided for in the manner outlined below (11,995 hours for phase I)
 - a. by way of applying for a BANS-subsidy for 2003 up to and including 2006 (€ 233,516.- or roughly 0.6 fte/year in the case of Delft);
 - b. by way of BANS co-financing: € 233,516.- (roughly 0.6 fte/year) covered by the REM. Co-financing on the part of the Municipality is a condition of acquiring the BANS-subsidy;
 - c. by way of a contribution of € 432,593.- (roughly 1.1 fte/year) from the REM, to cover the remaining expenses.

Additional investment for physical measures

The total additional investment for phase I amounts to € 5,474,290.00. This is only in part covered by the REM (maximum cover € 1,982,256.67 after deduction by BANS climate co-financing and extra coverage for personnel costs).

It is proposed:

7. To agree to allocating to the Climate Plan 50% of the Environmental Technology Fund budget up to and including 2006 (total amount € 529,780.-).
8. Including the covering funds that are presently unavailable to phase I, being an amount of € 2,926,284.- in future decision-making on the allocation of funds released by the sale of TZH and the second tranche of EZH, or if required, in future budgets for 2004 and onwards.

Continuation of the Delft Energy Agency (DEA)

9. To agree to the relaunch of the Delft Energy Agency for a period of three years. The total foundation costs over this period are € 150,000.- and will be covered by the Environmental Technology Fund (MTF).

2.3 Phase II

Phase II is covered by the regular hours of the municipal Environmental department, as well as of other specialist teams, in so far as these have been promised by now. The total amount of uncovered personnel input and uncovered additional investment in physical measures amounts to roughly € 4.7 million for phase II, see table A.

It is proposed:

10. To arrive at a definitive decision on the financial framework for phase II by the end of 2005. Phase II is presently estimated to amount up to € 4.7 million, still uncovered. The decision must furthermore involve an evaluation and measurement of effects of Phase I.

All above recommendations were adopted by the Delft municipal council on April 24, 2003.

Table A

3E Climate Plan Financial Overview					
Available budget	Starting balance 1-1-03	Phase I 2003- 2006	Phase II 2007- 2010	Phase III 2011- 2012	TOTAL
I. MTF (part of climate plan)					
Starting balance (50% of € 424,360.00 (= MTF-fund by Dec. 31, 2002 + 3% price adjustment))	212,180.00				212,180.00
Addition over 2003-2006 incl. (50% of € 158,800.00 euro/year)		317,600.00	memorandum item	memorandum item	317,600.00
II. REM					
REM status by Dec. 31, 2002 + 3% price adjustment	1,831,534.67				1,831,534.67
Addition 2003-2006 incl. (€ 204,200.00 per year)		816,800.00	memorandum item	memorandum item	816,800.00
III. Bans Subsidy					
BANS subsidy 2003-2006		233,516.00			233,516.00
IV. Available Formation					
Present formation of municipal Environmental department		393,600.00	393,600.00	96,800.00	984,000.00
Remaining 2003 personnel budget through labour market 1,170 hrs	87,750.00	memorandum item	memorandum item	memorandum item	87,750.00
Present formation other municipal specialist teams		81,225.00	65,400.00	32,700.00	179,325.00
TOTAAL AVAILABLE	2,131,464.67	1,842,741.00	459,000.00	229,500.00	4,662,705.67
Costs of Climate Plan					
V. Personnel costs					
Total personnel costs		1,462,200.00	616,200.00	300,600.00	2,379,000.00
VI. Municipal Additional Investments					
Municipal share in Additional Investment for the Delft Ambition		5,474,290.00	4,555,623.33	1,527,811.67	11,557,725.00
TOTAL COSTS		6,936,490.00	5,171,823.33	1,828,411.67	13,936,725.00
STILL REQUIRED		2,962,284.33	4,712,823.33	1,598,911.67	9,274,019.33

memorandum item: possible financial advantage realised by specific agreements made in the labour market!

Calculation basis: € 75.- / hour

For further financial substantiation concerning the distribution of the implementing period into 3 phases, see Appendix VI

1 Climate policy translated from Kyoto to Delft



1.1 Climate change: a global issue

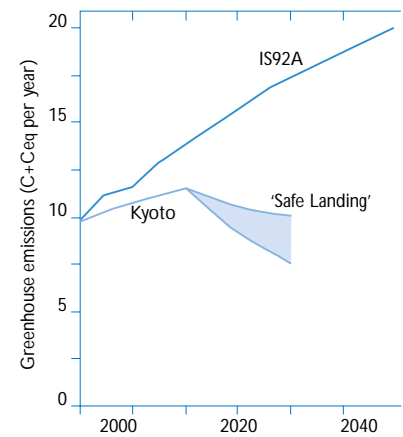
In Kyoto in 1997, dozens of countries conferred with each other on the (global) climate problem, resulting in the so-called Kyoto Convention. The outcome of this Convention can be summarised as follows:

- By 2010 all industrialised countries together must reduce their total CO₂ emissions to a level at least 5% below the 1990 level;
- Unlike the 1992 Rio de Janeiro Climate Agreement, the Kyoto Convention is compulsory in character;
- Developing countries will not be imposed emission restrictions until 2010 (according to the 1995 Berlin mandate).

Scenarios have by now been developed for the prediction of climate changes during the period from 2010 onwards. These studies show that the reduction of CO₂ emissions will have to be vigorously continued after 2010 as well. In this connection hopes are on new energy-generating technologies to become operational, present sustainable energy-generating technology to be developed further and energy-efficient aspects of processes to be improved. Finally, this will result in a global CO₂ economy which has ceased to affect the climate. This is also called the *safe landing* of the climate (see figure 1.1). The Kyoto Convention is considered to be the initiation of a drastic change in energy economy, ultimately resulting in this *safe landing*.

Figure 1.1 *Safe landing of the (global) climate and the contributions of the Kyoto Convention to realise this.*

The blue line denotes expected greenhouse emissions when emission restrictions are not agreed on (IS92A scenario). The light blue line continuing to 2010 depicts emissions when the Kyoto Convention targets are realised. To enable a safe landing of the climate by 2100, greenhouse emissions will have to stay within the green area over the period between 2010-2030 (Source: Safe Landing Analyse, R. Leemans, RIVM (Dutch National Institute of Public Health and Environmental Protection)).



1.2 Climate policy in Europe and the Netherlands

So far, not all 55 countries that prepared the Kyoto Convention in 1997 have ratified the convention, with the United States of America still assuming an attitude of waiting. However, all European countries have ratified by now, resulting in an elaboration on national level. In addition, an energy policy has been formulated on a European Union level as well.

1.2.1 European energy policy

The energy policy of the European Commission aims towards energy saving and generating sustainable energy [1] [2]. These two focus points were chosen on three grounds especially:

- In case of unchanged energy use, Europe will come to depend on energy imports for 70% of its energy needs by 2030. This is undesirable. Moreover, its dependence on import will only increase with new countries joining the European Union. Energy saving therefore is a logical way of decreasing import dependence, as is generating sustainable energy within Europe.
- Global warming and air pollution are undesirable. Energy saving and generating sustainable energy result in a decrease in greenhouse emissions and other undesirable gases.
- Hardware- and research investments in the area of energy efficiency and sustainable energy can turn Europe into a market leader in this area.

1.2.2 National elaboration of the Kyoto Convention

With the ratification of the Kyoto Convention, the Netherlands have committed themselves to the following purpose:

Greenhouse emissions in the Netherlands decrease by 6% compared to 1990, between 2008-2012 [3].

This is the Dutch contribution to the EU-commitment agreed under the Kyoto Convention. While implementing national climate policy, municipalities and provinces are major parties. A major part of the plans, after all, have to be translated into tangible projects at local levels. The 1999 'BANS-Klimaat', the climate aspect of the Bestuursakkoord Nieuwe Stijl (New-Style Administrative Agreement) contains arrangements on the elaboration of national climate policy. BANS-Klimaat provides for the conclusion of a climate agreement by the Dutch government, the interprovincial consultations (IPO) and the Association of Netherlands Municipalities (VNG). Its purpose is intensifying of climate policy by at least 40% of the municipalities and provinces within no more than two years following the Climate agreement taking effect. This Climate agreement was signed by the Government, IPO and VNG on February 18, 2002.

The BANS-Klimaat objective imposes a considerable duty on local authorities, also because various other themes (such as safety, enforcement, quality of living environments and integration) demand priority at local level. For this reason, BANS-Klimaat provides for a large support package, including a subsidy scheme.

1.3 Delft policy frameworks and ambitions

1.3.1 Delft energy master plan

In September 2000, DEA, the Delft Energy Agency, was founded. DEA has two objectives:

1. Delivering a contribution to a more rational energy use in Delft and Schipluiden.
2. Realising the generation of sustainable energy in Delft and Schipluiden.

At a local level, DEA plays a catalyzing, initialising and stimulating role in energy projects. By taking this role, DEA matches the parties required for actual realisation of projects. DEA has a general board in which the main users of energy in Delft and Schipluiden are represented. These are housing corporations (the foundations of Stichting DelftWonen, Stichting DUWO, Vidomes), Eneco Energie energy company, the Delft University of Technology, Haaglanden Chamber of Commerce, De Woonkoepel tenants' interest group, the Association for Wind Energy and the municipalities of Schipluiden and Delft. In 2001, the board of the Delft Energy Agency laid down the Delft Energy master plan [4]. This plan gives a clear overview of the ambitions and activities of the DEA general board members. The Energy master plan indicates the natural moments which will occur in Delft over the next five years, as well as the ways in which (the partners of) the Delft Energy Agency will respond to these moments.

1.3.2 Policy frameworks of the Municipality of Delft

Delft has a long tradition regarding environmental protection in all its aspects. It was by way of its '3D: Duurzaamheidsplan Delft 2000-2003' [5] (2000-2003 Delft Sustainability Plan) that Delft progressed from an environmental policy towards a sustainability policy. This step involved a broadening from 'environment' in its more narrow sense to sustainability in a broad sense. 3D contains a vision on sustainable urban development, connecting ecological, economic and social aspects of sustainability. One of the 3D focus themes is energy. The 3D-policy on energy can be considered as the continuation of the 1996-2000 Energiebeleidsplan (Energy Policy plan) [6]. 3D identifies two long-term energy objectives (2010-2020):

1. By 2020, the households' average energy use for spatial heating is 60% compared to 1999.
2. The percentage sustainably generated electricity of the total amount of electricity used is 15%.

The objectives of 3D have been elaborated in various projects. The main project aimed to realise the energy objectives of 3D was the 'Small Kyoto in Delft' project. This included, among other things, a climate scan (see below). 'Small Kyoto in Delft' eventually resulted in a municipal Climate plan being drawn up. The two 3D energy objectives also form part of the Delft Development Programme (DOP) [7], which in turn forms an integral framework for (spatial) developments in the city. In addition, the 2002-2006 municipal executive programme [8] explicitly refers to the climate problem, confirming the objectives laid down earlier and announcing the introduction of a municipal Climate plan.

The municipal ecology and tree policy also contributes to the realisation of climate objectives. Trees and plants convert CO₂ into oxygen and filter fine dust from the air, solving part of the Delft air quality problem. The Municipality is working towards a strong ecological structure by way of the Delft Ecological Structure policy document [9].

In 1995, the municipal council of Delft laid down the strategy document "Delft as City of Knowledge, Work is the Centre". This choice for Delft as City of Knowledge is largely based on the opportunities the theme offers for cooperation with parties in the city and economic expansion. The Delft as City of Knowledge strategy still is the red line running through municipal policy.

1.3.3 Ambitions of municipal climate policy

The Netherlands Organisation for Energy and the Environment, Novem, developed an instrument enabling the municipalities to map the current state of affairs, the opportunities, and the threats of their climate policies: the climate scan. In January 2002, Novem performed a climate scan for the Municipality of Delft [10]. This scan provides insight in the way in which the Municipality of Delft can intensify its climate policy, and in ambition levels that can be achieved per theme. Three levels of ambition can be distinguished: an active, an anticipating and an innovative level. The separate themes are:

- climate in policy;
- municipal buildings and installations;
- housing (new and existing);
- companies, institutes and sites;
- the agricultural sector;
- transport and traffic;
- sustainable energy;
- international.

The climate scan indicates that Delft could well be, or for that matter, remain a forerunner in the Netherlands with regard to many themes. Some themes even allow the possibility of an innovative approach. The scan furthermore shows that the major profit for Delft is found in **(re)construction processes** and in promoting **sustainable energy**. These observations match the 3D objectives very well. Figure 1.2 records the Delft ambition, based on the results of the scan per individual (sub) theme (elaboration of this ambition can be found in the municipal Menu, Climate policy, appendix II).

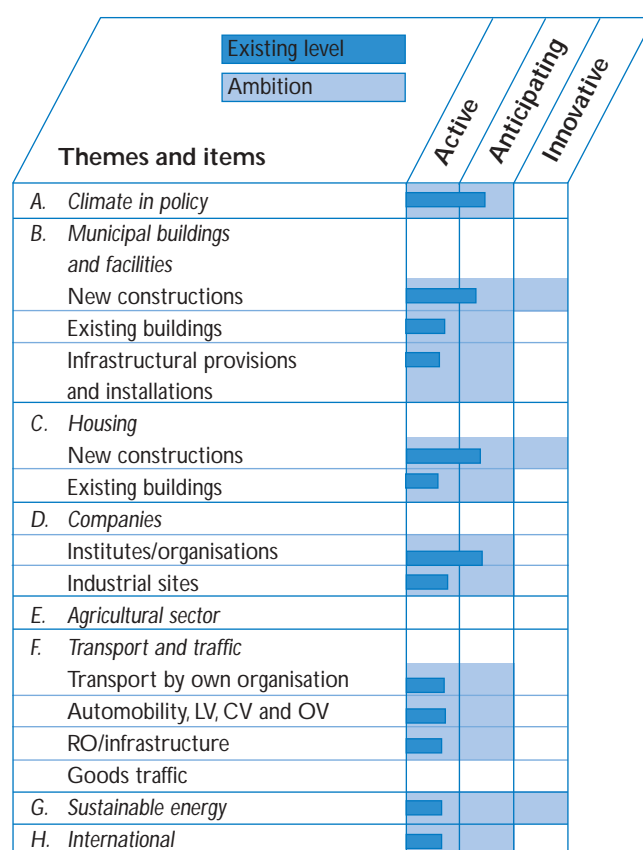


Figure 1.2 Ambitions of municipal climate policy

2 3E: Effective, efficient energy use



2.1 Starting-points

The Delft Climate plan bears the title of: '3E: effective, efficient energy use'. 3E translates the intentions of the Kyoto Convention to the Delft municipal level in a concrete and practicable way. Starting-points are the 3D energy objectives and the ambitions laid down in the Energy master plan of the Delft Energy Agency. It is an integral plan, penetrating many places within the municipal organisation.

The Municipality of Delft intends to reduce the use of fossil fuels, and with them the CO₂ emissions. For this reason the Municipality starts from each of the three strategies from the *trias energetica* (see figure 2.1), namely:

1. reducing demand by way of energy saving among end-users;
2. applying sustainable resources;
3. (continued) optimisation in the application of fossil sources regarding its energy efficiency and reliability.

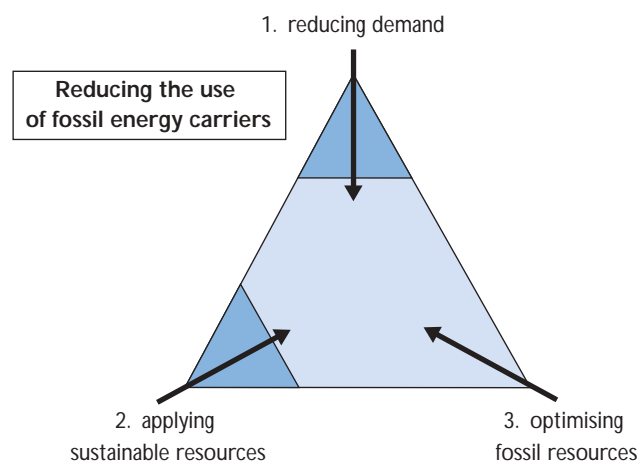


Figure 2.1 *Trias energetica*

This is translated into the following:

- intensifying the present energy and/or climate policy;
- implementing and/or intensifying activities already in progress;
- filling out 'blanks', i.e. using opportunities neglected so far;
- embedding climate policy within the entire municipal organisation.

The Climate plan offers opportunities of promoting Delft as City of Knowledge. Various projects demand innovative solutions. Searching for these solutions presupposes an important role being reserved for various Delft institutions and companies.

Reducing CO₂ emissions demands concrete, often physical measures. These measures cost money. The Climate Plan concentrates on taking measures in projects that have already been planned or even started. It is by way of teaming up with these existing (mostly redevelopment) projects that additional costs will remain as low as possible. They will be far lower anyway than in the case of independent 'climate projects' which would demand drastic operations in the city.

2.2 Status and scope

The Delft Climate plan has a scope of ten years (2003-2012). The plan has a directive nature. It indicates policies and activities which could contribute to achieve the climate objectives, also in other municipal areas of operation, such as '(re)construction', 'activity' and 'mobility'. The Climate plan is dynamic; it could be changed over the plan period due to influences such as:

- growing insight resulting from new developments, concerning the feasibility of actions initiated;
- new political and/or policy frameworks (on a European¹, national or local level);
- state of affairs of technological developments;
- commitment of and participation by those involved;
- economic developments.

2.3 Activities selection criteria

2.3.1 Feasibility

Actual realisation of a reduction of CO₂ emissions is predominant in the Climate plan. For this reason, feasibility plays a decisive part in assessing possible 3E activities. Feasibility is determined on the basis of the following criteria:

- the commitment of target groups (social, administrative and official);
- costs (effectiveness);
- technology (in conformity with the market and/or available techniques);
- matching natural moments (especially relevant during construction processes requiring a timely response to plans being formed).

2.3.2 Ways of exerting influence

The Climate plan is primarily a government plan. This implies that its realisation depends on the (im)possibilities the Municipality has to influence processes, social actors, inhabitants' behaviour and developments in society. The Municipality of Delft starts from projects and activities that can be influenced. This has been translated into the following selection criteria:

- the project and/or activity allows influencing by way of:
 - the system of regulation and legislation;
 - dialogue (exchange, negotiate, convince);
 - providing information and/or creating awareness
 - financial means (in this case the Municipality strives to achieve a *multiplier* effect, i.e. a situation in which a municipal financial effort generates substantial grants or subsidies from other donor organisations²).
- the project and/or activity focuses on the 'household' of the municipal organisation (practise what you preach can persuade other parties to follow).

2.3.3 Local and regional

Although the urban area of the Municipality of Delft offers plenty of opportunity to realise a reduction in CO₂ emissions, it also has its limitations. To be able to generate energy from wind for instance, locations remote from dwelling or industry areas are far more suitable. For instance a line-up of wind turbines along major infrastructures and/or a few turbines in cluster locations in specific places. Delft can achieve its objectives by contributing to the realisation of such facilities within the region. In the future, an international trade in CO₂ emission rights due to the Kyoto Convention can develop. The purpose of this trade is to offer areas where further emission reductions are very costly an opportunity to contribute to emission reduction by acquiring emission rights. This way other projects elsewhere in the world can be realised, resulting in a more efficient reduction of CO₂ emissions. Although in the long term planned objectives can be realised, at present it is far from being common practice. In realising its objectives, the Municipality of Delft starts from the following strategies (in order of preference):

1. initiating and realising projects and activities at local level, within existing frameworks;
2. jump into possible opportunities;
3. start up or participate in regional cooperation (evenly sharing joys and burdens)
4. start up or participate in international cooperation (also see chapter 5)

Only the first two strategies will be likely to apply during the plan period.

¹ In the Netherlands, environmental legislation and regulation still start from the ALARA-principle (*as low as reasonably achievable*). On a European level however, the so-called BAT-principle (*best available techniques*) is currently being worked on. Possible (long-term) application of the BAT-principle can increase the enforceability of energy measures within certain layouts to a considerable degree.

² 'Surroundings' must be interpreted here as the remaining areas of policy within Delft, market parties and (subsidy) possibilities offered by the province, the State or the European Union.

3 Implementation programme



3.1 Introduction

The Delft Climate Plan was prepared by the municipal Environmental department, supported by CEA consultants from Rotterdam and De Straat environmental consultants in Delft. To start with, ambitions were defined on the basis of the results of the climate scan and the applicable (Delft) policy frameworks (see paragraph 1.3.3). These ambitions resulted in a great number of projects and activities. These were submitted to the Delft official organisation during a workshop before being laid down in a project document. The project documents were discussed with the prospective official 'owners' of the projects and/or activities. Based on the outcomes of these discussions, the documents were elaborated and concretised in more detail. The projects and activities thus formulated were:

- checked against the criteria of paragraph 2.3;
- translated into CO₂ reduction potentials, costs and investments, on the basis of ratios, data obtained from experience and acquired knowledge (see appendix IV).

Paragraph 3.2 gives an overview of the various activities that will contribute to CO₂ reduction in Delft. Paragraph 3.3 presents the overall scope of the reduction during the plan period, setting it against the objectives of 3D and the Kyoto Convention.

3.2 Activities

Paragraph 1.3.3 specified the Delft ambitions for each of the climate scan themes. These ambitions have been translated into programmes, projects and/or instruments per theme. In the end, programmes and projects will contribute to a reduction of CO₂ emissions. Instruments will not contribute to this reduction, but will have a more facilitating role. An overview:

Theme Municipal buildings and facilities				
Nr.	Type	Title	Project manager	CO ₂ reduction tons/year
1	Programme	New municipal buildings	City district affairs and Projects	300
1a	Project	New municipal city office	Management of municipal real estate	1,625
2	Programme	Tackling energy use of existing municipal buildings/facilities	Management of municipal real estate	750
2a	Pilot project	Renovation of two existing buildings	Management of municipal real estate	20
2b	Project	Public installations: pumping-stations	City management department	Memorandum item
2c	Project	Public installations: traffic installations and lighting	Mobility	Memorandum item
7	Programme	Municipal internal environment care	Environment	Memorandum item
7c	Project	Energy management of municipal buildings and facilities and purchase of green energy	Housing, Service and Means	1,400

Theme Housing and Utilities				
Nr.	Type	Title	Project manager	CO ₂ reduction tons/year
3	Programme	New housing projects	City district affairs and projects	1,500
3	Programme	New utility projects	City district affairs and projects	900
3a	Project	Railway zone	Programmes and projects	5,000
3b	Project	Zuidpoort	City district affairs and projects	667
4	Programme	Existing housing and utilities building projects	City district affairs and projects	1,404
4a	Project	Poptahof	City district affairs and projects	2,950
4b	Instrument	Agreement on existing housing	Building control and monuments	Included under 4c
4c	Project	Existing city saves energy	Delft Energy Agency	1,736

Theme the Business Community				
------------------------------	--	--	--	--

Nr.	Type	Title	Project manager	CO ₂ reduction tons/year
5	Programme	Extended scope and duty of care of the business community	Environmental care	450
6	Programme	Sustainable industrial sites	Real estate	880
6a	Project	Towards sustainable Technopolis plan development	Programmes and projects	3,000
6b	Project	Re-structuring Schie banks energy performance	Real estate	3,000

Theme Traffic and Transport				
-----------------------------	--	--	--	--

Nr.	Type	Title	Project manager	CO ₂ reduction tons/year
7	Programme	Municipal environmental management	Environment	Memorandum item
7a	Project	Municipality of Delft's internal transport plan	Personnel and organisation	75
7b	Pilot project	Fleet of vehicles	City management	Memorandum item
8	Project	Laying down LV/OV/CV improvement as agreed performance within LVVP (LTTP)	Mobility	75

Theme Sustainable energy				
--------------------------	--	--	--	--

Nr.	Type	Title	Project manager	CO ₂ reduction tons/year
9	Programme	Realising sustainable energy in dwelling areas	Environment	2,075, included in other projects
9a	Project	Windturbines	Delft Energy Agency	10,134
9b	Project	Application of residual heat of DSM	Environment	16,800, included in other projects
9c	Pilot project	100 Delft-Blue Roofs	City of Knowledge	148

Theme International				
Nr.	Type	Title	Project manager	CO ₂ reduction tons/year
10	Instrument	International presentations	Environment	Does not apply
10a	Instrument	Continuation of Delft Energy Agency	Environment	Does not apply
10b	Instrument	Applying for European subsidies	Environment	Does not apply

Theme Climate in policy				
Nr.	Type	Title	Project manager	CO ₂ reduction tons/year
11	Instrument	Monitoring	Environment	Does not apply
12	Programme	General project management	Environment	Does not apply

TOTAAL CO₂ reduction **33,538 tons per year**

3.3 Objective

As indicated above, potential CO₂ reduction has been determined with regard to all activities described. This potential reduction denotes the difference between CO₂ emissions in the case of the project being realised or not. Potential reductions of all formulated activities and projects together indicate a feasible CO₂ reduction of over 33,500 tons annually. This is the Climate plan's fixed objective. If projects and/or activities are cancelled during the plan period for whatever reason, new activities will have to be formulated to achieve the goal nonetheless.

Figure 3.1 offsets the objective of the Climate plan against the objectives of 3D (converted to 2012) and the Kyoto Convention respectively (as calculated for Delft by 2012).

Annual CO₂ reduction by 2012

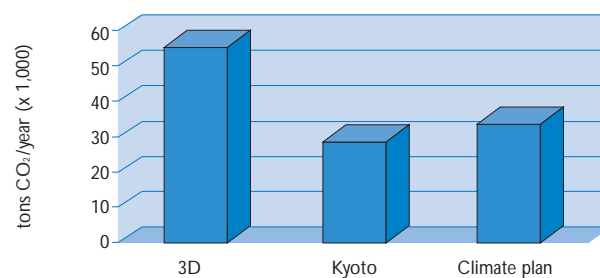


Figure 3.1 A comparison between the 3D objectives, the local translation of the Kyoto Convention and the Climate plan. Note: 3D: energy objectives of the Sustainability plan have been translated to annual CO₂ reductions. Kyoto: reduction to be attained by Delft on the basis of its emissions by 1990 and on the basis of national objectives. Climate plan: annual CO₂ reduction related to the projects named in the Climate plan.

Figure 3.1 shows that the objective of the Climate plan more than meets the local translation of the objectives of the Kyoto Convention. The objectives of 3D have turned out to be too ambitious. The gap between the objectives of the Climate plan on the one hand and the objective of the Kyoto Convention on the other is justified, since it is not unlikely that the implementation of a number of projects of the Climate plan will not be running according to plan.

The figure below depicts the situation that arises when growing energy use due to new urban developments (Railway zone, TU South and Harnaschpolder) is accounted for. This will result in an increase in overall urban energy use and consequently in CO₂ emissions. Although the Climate plan will effect an alteration of this trend, it will not lead to CO₂ reduction.

Trend alterations in CO₂ emissions as a result of the Climate plan

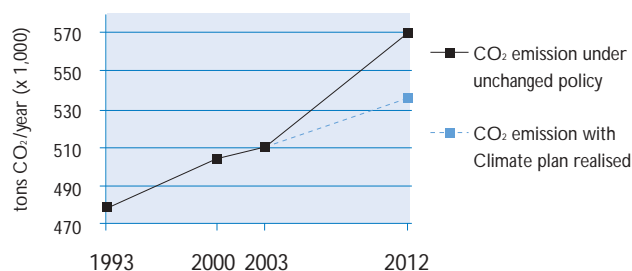


Figure 3.2 Calculations are based on the ratios adopted by ECN (Netherlands Energy Research Centre) and RIVM (National Institute for Environmental Issues).

3.4 Short description of activities

The project/programme matrix (appendix I) and the project documents (appendix V) give an extensive overview of all programmes, projects and instruments. This paragraph describes the content of the various programmes, projects and instruments in a few lines.

Programme 1: New municipal buildings

Over the next few years, various new buildings will be developed by the Municipality of Delft. Some of these are intended for municipal services such as the fire station and public garden accommodation. In addition, the Municipality develops buildings for other functions, such as health centres, schools, community centres and sports centres. The ambition behind constructing new municipal buildings is to realise an Energy Efficiency Coefficient (EPC) 12% more stringent than the legally enforced one and to achieve at least 40% coverage of energy demand through the use of sustainable resources.

Project 1a: New municipal city office

Delft is a Municipality characterised by ambitious sustainability objectives. This creates opportunities, especially when building a new city office to present this ambition to the world outside. Sustainability objectives can be achieved among other things by applying fundamentally innovating environmental measures. The ambition for a new city office is an innovative and illustrative project, showing how sustainability objectives can be realised. Hopefully, Delft will inspire others on a national and international outreach.

Programme 2: Tackling energy use of existing municipal buildings

The Municipality of Delft manages and redevelops various buildings, both for its own use and for use by others (health centres, library, schools, community centres and sports centres). The Municipality uses various methods to reduce energy use in its municipal buildings (see below).

Pilot project 2a: Renovating existing buildings

In the early nineteen-nineties, the Municipality of Delft initiated energy saving in existing municipal buildings by performing energy scans and applying energy-saving measures among other things. It is expected that by means of technical innovations in all existing municipal buildings (such as applying energy-saving measures in monuments) and responding to "natural" moments of intervention (renovation, planned maintenance) energy use can be reduced. This can be done by generating/using

sustainable energy, taking sustainable construction measures and including energy saving in environmental management systems. The Municipality starts with two pilot projects. In each of these projects the best energetical choice will be studied per individual measure.

Project 2b: Public installations: pumping-stations

The Municipality of Delft manages a large number of pumping-stations that keep the city and its surrounding area dry. Most of these pumping-stations already have energy-efficient motors. The only possibility of still contributing to the climate objectives is to provide the installations with equipment generating sustainable energy, such as solar panels and small wind turbines. At the moment the energy potential is still unclear. Moreover, there is no experience in generating sustainable energy on buildings like these. Carefully performing an inventory and a pilot project will therefore be a major part of this project. The final goal is to see to it that all pumps and installations with replacement periods exceeding five years are energy-efficient and equipped with sustainable energy options.

Project 2c: Public installations; traffic installations and lighting

The Municipality is in charge of the energy management of public lighting and traffic installations. Although much has been achieved in the area of saving energy, Delft nonetheless sees possibilities of saving energy in public installations. This can be done for example by developing new technology for traffic installations in conjunction with a manufacturer and by applying intelligent lighting. The purpose is to improve the energy efficiency of public installations by introducing various measures. In addition, extra measures could be taken in cases where the cost recovery period is shorter than ten years.

Programme 3: New housing projects

Roughly 4,000 new housing units will be built in Delft during the plan period. With regard to new housing projects, Delft strives towards an Energy Performance Coefficient (EPC) 20% more stringent than legally enforced. The municipal Environmental department supports municipal project managers in this matter. The input heavily depends on the size of the construction plan and the project ambitions. The above could result in a separate project being formulated.

Programme 3: New utility building projects (excl. municipal buildings, TNO, Harnaspolder, Railway zone, Zuidpoort and TU-South (Technopolis))

112,500 m² of gross floor surface will be realised in utility constructions in Delft during the plan period (excluding industrial sites, Railway zone, Zuidpoort and Technopolis). In this respect Delft strives towards an Energy Performance Coefficient (EPC) 10% more stringent than legally enforced. The municipal project managers are supported by the municipal Environmental department. The input heavily depends on the size of the construction plan and the project ambitions. The above could result in a separate project being formulated, and innovative techniques being applied when there are opportunities to do so.

Project 3a: Railway zone

The Railway zone will witness the realisation of roughly 300,000 m² of gross floor surface, both during and after construction of the railway tunnel. At the moment, an allocation has been provided of 250,000 m² for housing and 50,000 m² for offices, roughly 24,000 m² of which for municipal organisation and related public functions. The municipal ambition is an 'Energy Performance on Location' (EPL) of at least 8, presupposing residual heat being delivered by DSM. Applying this residual heat demands an innovative energy infrastructure. The conditions and consequences at building level must be defined in the Policy Document of Conditions and Starting-Points and the underlying Urban Development Master Plan.

Project 3b: Zuidpoort

The ambition for the complex of housing units, shops and a cinema in the Zuidpoort area is an Energy Performance Coefficient (EPC) 30% more stringent than enforced legally. Roughly half of this will be realised by way of constructional energy-saving measures. The other half will be contributed by energy installations, especially an energy system with cold and heat storage and a collective heat pump. The application of this highly innovative technology (the energy system) combined with housing units and a utility serves as a national example project. Individual ambitions are to be drawn up for the redevelopment of the Hoogoven building and possible other sub-plans in Zuidpoort.

Programme 4: Existing housing and utility construction projects

Over 3,700 housing units will be renovated during the plan period. In this respect, Delft strives towards 20% savings on current energy use. During the plan period a great number of utility constructions will be renovated until a level requiring a building permit. The ambition set by Delft is a 10% more stringent EPC. A part of this will remain outside major projects such as the re-structuring of the Schie river banks, and will be placed under this programme. The municipal project managers are supported by the municipal Environmental department. The input heavily depends on the size of the construction plan and the project ambitions. The above could result in a separate project being formulated.

Project 4a: Poptahof

As a part of the overall restructuring of the Poptahof neighbourhood, the development of an optimal energy infrastructure is what the Municipality of Delft wants to achieve. The first step included drawing up an energy vision. The Poptahof draft master plan's objective is to achieve an Energy Performance on Location (EPL) of 6 by 2015. To reach this goal, elements such as heat delivery by DSM and far-reaching energy saving and/or lowering of the EPC-value are considered. A high ambition level in a certain district demands innovative solutions and the application of new energy techniques.

Instrument 4b: Voluntary agreement on existing housing

The existing housing stock is responsible for a major part of energy use in Delft. Roughly 70% of the houses is owned by three housing corporations. Although these corporations have different ambitions, they are in favour of a structured approach towards energy saving. A voluntary agreement between the Municipality and housing corporations provides for arrangements on process, performance and measure levels. One of the themes of the agreement is energy. The objective is to have at least 40% of the existing housing stock provided with an EPA by 2012 (which is over 15,000 houses and housing units), with 50% of these having applied for subsidy for measures.

Project 4c: Existing city saves energy

In each house built before 1998, one or more energy-saving, or sustainable energy measures are to be taken. In some cases these measures are related to a replacement moment (HE-boiler, solar boiler), sometimes they can be instantly applied (cavity wall, roof or floor insulation). To acquaint home owners with these energy measures and to persuade them to take these measures, the Energy Performance Advice (EPA) is a good instrument. Objective is to perform an EPA for 6% of the existing houses, with one or more of the measures having been applied to 100% of these houses (2005).

Programme 5: Expanded scope and duty of care for the business community

To promote energy saving and the application and generation of sustainable energy among companies, the Municipality as competent authority can appeal to the Environmental Management Act. By applying the expanded scope for granting environmental permits and enforcing environmental measures, the Municipality intensifies its focus on energy within many companies each year. The objectives are to have energy prescriptions included in permits issued to all companies that are obliged to apply for permits, by 2005 at the latest. 10% of the companies under the Environmental Management Act will have performed an energy-efficiency and sustainable energy scan (EE and DE scan) by 2005, with 50% of these having taken measures by then.

Programme 6: Sustainable industrial sites (such as Harnaspolder and TNO Zuidpolder)

Within Delft, two industrial sites are being developed outside the spearhead projects Technopolis Business Campus and Schie banks: Harnaspolder (in conjunction with the Municipality of Den Haag and the Municipality of Schipluiden) and the TNO Zuidpolder re-development project. Objectives: For industrial sites an energy vision is drawn up, which includes an ambition corresponding with an Energy Performance on Location (EPL) of 7. This implies for instance the exchange of heat among companies (process and spatial heating). This application will demand highly innovative technology. Starting-point is to cover 5% of the energy demand by sustainable sources.

Project 6a: Towards sustainable planning development for Technopolis

On the grounds south of the Delft University of Technology-district a knowledge-intensive industrial site will be realised over the next fifteen years. Its estimated size is 600,000 m² gross floor surface of business units. The project is carried out by the Municipality of Delft in conjunction with the Delft University of Technology and a private developer. Although the municipal ambition is high (Energy Performance on Location of 7.5), it has not yet been formulated in evaluation criteria. The knowledge-intensive character of this site requires the application of high-grade energy technology (an experimental "station"), to be developed by the companies established in Technopolis.

Project 6b: Schie river banks restructuring energy performance

Over the next few years the Municipality of Delft will be involved in the sustainable restructuring of the Schie river banks industrial site. Its purpose is to revitalise this industrial site and to increase its sustainability. Cooperation between the companies established here will offer opportunities to achieve the high ambitions set with regard to the environment. As to energy, aspects are involved such as:

- better alignment between energy production and energy demand;
- using possibilities of exchanging energy flows among companies.

Although the municipal ambition is high (Energy Performance on Location = 7.5), this has not yet been formulated in evaluation criteria. A high ambition however demands a creative application of new energy techniques. The parties involved will lay down the preconditions in a Master Plan by way of first step.

Programme 7: Municipal environmental management

The Climate aspect will be placed under the municipal environmental management by way of the following elements:

- Energy is to be a testing criterion during municipal purchasing and contracting-out. This can be achieved either directly, on the basis of the energy performance of the product or the service, or by studying the energy content of a product or the energy policy adopted by the supplying organisation.
- The purchase of means of transport will be subject to a pilot project, to be performed by the Municipality within the Climate plan (see project 7b). Its results will eventually form part of a purchasing policy.
- The Municipality is realising its own transport policy: commuter traffic, official trips and transport between the various locations (project 7a).
- Energy management (see project 7c)

Project 7a: The Municipality of Delft's own transport plan

The activities undertaken by the Municipality of Delft and its employees involve a great amount of moves. The Municipality has a direct influence on the choice of means of transport during official trips and an indirect influence on the choice of means of transport for commuter traffic. By drawing up a municipal transport plan the Municipality will contribute to reducing CO₂ emissions and to the health of its employees. At the same time, the Municipality wants to set an example to the business world and is saving costs on transport by car. Drawing up a transport plan is obliged by law for companies employing over 100 staff (expanded scope of the Environmental Management Act). The objective is to achieve a 25-50% reduction in potential car ratio, with regard to official trips and commuter traffic alike (2005).

Pilot project 7b: Fleet of vehicles

Various specialist teams of the Municipality of Delft use vehicles. The use varies from private cars and vans to specialist large vehicles at departments such as City Management. The Technical Service team manages the fleet and sees to procuring new vehicles. Exchange programmes match the programmes of the specialist teams involved. By way of annual programmes the entire fleet can become energy-efficient in the end. The savings potential however is still unclear at present.

For this reason, the careful preparation of an inventory is required first and foremost.

Project 7c: Energy management of municipal buildings and facilities and purchase of green energy

The Municipality can save on municipal energy use by systematic control of the energy flows (energy management). In addition to financial gain, energy management will also deliver a substantial contribution to reducing environmental impacts. Energy management moreover enables the Municipality to set an example by using energy in its own buildings and facilities as efficiently as possible.

The objective is to have a centrally functioning energy management system by which the Municipality will obtain a continuous picture of energy use in all municipal buildings and facilities. Every three months a full energy registration will be conducted, as well as an analysis of this registration and feedback to governors and users of buildings.

Project 8: Laying down improvements in LV/OV/CV as performance agreements within Lokaal Verkeer- en Vervoerplan (Local Traffic and Transport Plan; LVVP)

Motorised traffic is a major source of CO₂ emissions. A well-aimed traffic policy could restrict these emissions. This implies using bicycles and public transport and forcing back the use of individual motorised transport. In public and collective transport, the Municipality can promote the use of energy-efficient bus engines and green electricity for trams through Haaglanden (the contracting party), resulting in decreased emissions per vehicle.

This will result in a new Local Traffic and Transport Plan in which the Municipality indicates more concrete implications of its mobility policy. The objectives are a shift from the modal-split in favour of cycling and public and collective transport, a lower CO₂ emission per new public transport vehicle in Haaglanden and Delft resuming its position as one of the three best cycling cities in the Netherlands.

Programme 9: Realising sustainable energy in urban areas

Step 2 within the Trias Energetica involves the application of sustainable energy. Sustainable energy will be given a place in various other projects. If it turns out necessary, research on new innovative techniques will be conducted. In addition there is the possibility of taking actions specifically aimed at sustainable energy. The objectives are: 3% of overall energy demand to be covered by locally generated sustainable energy by 2003 growing to 15% of overall energy demand to be covered by locally generated sustainable energy over the period from 2010-2020.

Project 9a: Wind turbines

Within its municipal boundaries, Delft intends to generate as much sustainable energy as possible. To determine the possibilities of using wind energy in Delft, a Wind Energy Quick Scan was conducted as part of the Sustainable Energy scan (DE-scan). The amount of wind in the Delft area is relatively good, especially around the fringes of the urban areas and in outer areas. The potential for wind energy generated within the Municipality of Delft is 48%. The objective is to realise an installed capacity of wind turbines of ± 10 MW. Realising these wind turbines will contribute to the image of Delft as City of Knowledge and to the progress of wind technology. During the feasibility study the height of the wind turbine will be looked at in more detail, with regard to its performance for instance.

Project 9b: Applying residual heat of DSM

After an initial inventory, it appears that ca. 200 TJ of residual heat at high temperature levels and ca. 100 to 200 TJ of residual heat at low temperature levels (ca. 30-35°C) could be released from DSM. This residual heat can be used to heat houses and offices, and can be transported by way of a heat grid to areas such as the Railway zone and the Poptahof neighbourhood. Exploiting residual heat will not be efficient until various locations have been connected to the system. In the Voorhof/ Poptahof and Buitenhof districts, forms of district and block heating are already in use.

A residual heat project of this order of magnitude is unique for the Netherlands! Further feasibility studies are being conducted at present. Based on the contacts with DSM a decrease of its cooling need is not to be expected.

Project 9c: 100 Delft-blue roofs (2nd tranche)

The umbrella project named 100 Delft-blue roofs demonstrates the possibilities of applying PV-cells in existing buildings and within varying sub-projects. By these projects Delft clearly presents itself as experimental "station" for PV, thus contributing to speedier introduction of PV in existing urban areas in the Netherlands.

Depending on the selection of projects for the second tranche the necessity of innovative energy techniques will be studied.

4 Organisation



4.1 Allocation of tasks

The Climate plan is an implementing plan by its nature. Implementation of this plan should result in the reduction of CO₂ emissions of ca. 33,500 tons during the plan period (by 2012 at the latest). During the plan period, the municipal Environmental department monitors and coordinates implementation progress. To a major extent, the implementation itself will be a matter dealt with by the other specialist teams within the municipal organisation.

During the plan period, the municipal Environmental department will be playing varying roles:

- ambassador (attend, inform, communicate);
- knowledge broker (making relevant knowledge available);
- supervisor (monitoring and administrative reports);
- project leader (owner of a few projects);
- manager (Energy fund manager).

During the implementation phase, the exact role played by the municipal Environmental department as coordinator will be determined in more detail and elaborated in consultation with the project owners. Table 4.1 illustrates the possible role of the municipal Environmental department in a building project.

4.2 Knowledge management

Knowledge is a crucial factor in the implementation of the Climate plan. Three forms of knowledge can be discerned:

1. Political knowledge: knowledge about administrative wishes, ambitions and decisions;
2. Knowledge concerning content: knowledge about the (im)possibilities of techniques, standards to be observed, relevant partners, etc.;
3. Procedural knowledge: knowledge about whom to apply to within the municipal organisation.

Apart from the municipal Environmental department, the Delft Energy Agency also plays a part in contributing knowledge (especially knowledge concerning content).

The Climate plan moreover offers opportunities of promoting Delft as City of Knowledge. Various projects require innovative solutions. When searching for these solutions, a major role has been reserved for several Delft institutions and companies.

The Climate plan provides for an investment of roughly € 59 million, ± € 56 million of which to be found in physical measures, and € 3 million in research and personnel costs, allocated to various parties. Half of the contribution for physical measures will however be spent on labour. Over the entire plan period, this will result in roughly 375 man-years' work in the labour area and 30 man-years' work in the knowledge sector.

Tabel 4.1 Process control during building projects

Phase	Desired role	Activities	Material required
Initiating phase	Attend	<ul style="list-style-type: none"> • Rough check of the initiative • Dialogue with initiator • Referring to relevant examples, parties, etc. 	<ul style="list-style-type: none"> • Checklist • Knowledge bank with example from practice, subsidies, parties, etc.
Definition phase	Facilitating process course	<ul style="list-style-type: none"> • Organising time/funds to introduce climate in plan formation • Organising knowledge exchange 	<ul style="list-style-type: none"> • Knowledge bank with experts etc. • Funds
Design phase	Consultation on call	<ul style="list-style-type: none"> • (Organising) Technical advice on climate • Theme gatherings 	<ul style="list-style-type: none"> • Knowledge bank with examples, experts etc. • Funds
Implementing phase	Monitoring	<ul style="list-style-type: none"> • Communication on measures performed and their effects 	<ul style="list-style-type: none"> • Monitoring system

4.3 Generating awareness, involvement and change of conduct

Apart from the application of energy-saving techniques and sustainable energy sources, another important element is the energy-saving conduct of the Delft business community and citizens. Like the Municipality, they have their own responsibility with regard to CO₂ reduction. By a more conscious use of energy and taking energy-saving measures, the business community and the citizens of Delft can contribute their mite to solving the climate problem. What helps in this respect is insight in the relationship between climate change and people's own conduct.

There is a task for the Municipality and DEA here. Within the projects named in the Climate plan there are plenty of points of departure for making the Delft citizens and companies energy-conscious and to stimulate them into taking concrete action. When elaborating the projects, the Municipality will control whether or not this actually happens. DEA will mainly focus on promoting concrete measures, varying from solar panels on private houses to quick scans of energetic performance in companies.

Finally, in consultation with DEA and the Sustainability Platform, the Municipality will draw up a plan for the promotion of involvement of Delft citizens in climate policy.

4.4 Monitoring

During the implementation of the Climate plan, the municipal council and the municipal organisation must have insight in the progress and the effects of this implementation. This enables the evaluation of the activities and, if this is required, adjustment of these activities and/or formulating new activities. For each programme, project or instrument it has been determined how its progress and results are to be visualised. Special attention has been devoted in this respect to the measurability of the objectives and the availability (during the entire plan period) of the information sources required.

The Municipality will report on the progress and the results of the implementation of 3E in the Delft Sustainability Monitor (Duurzaamheidsmonitor). The Delft Sustainability Monitor is published annually, after the summer. In addition, evaluation will take place per individual implementation phase of the Climate plan, including the corresponding effect measurement. Based on these, adjustments will be introduced if required.

The Climate plan encompasses programmes, projects and instruments in which the Municipality of Delft plays a (leading) role. For this reason, the monitoring of the plan will only give a visual representation of the reduction of the CO₂ emission as a result of the Climate plan. However, there may be other initiatives within the municipal boundaries that contribute to reducing CO₂ emissions. The Delft Energy Agency will monitor (the results of) external initiatives.

5 Finance



5.1 Costs

Cost estimates have been prepared per individual activity. Costs are divided into:

- hours of the official organisation on an annual basis;
- additional investments due to energy measures.

At this stage, cost estimates are based on ratios and expert experience (see table A in the Decision Points). In a later stage it will be possible to arrive at more exact cost estimates. All this requires careful financial monitoring of the Climate plan.

Reducing CO₂ emissions demands concrete, often physical measures. These measures cost money. The Climate Plan concentrates on taking measures in projects that have already been planned or even started. It is by way of teaming up with these existing (mostly redevelopment) projects that additional costs will remain as low as possible. They will be far lower anyway than in the case of independent 'climate projects' which would demand drastic operations in the city.

5.2 Coverage

Various sources will be broken into to finance activities. In principle, the Climate plan will only finance the additional costs as a result of energy measures. For this reason it will mostly concern a form of co-financing in practice. For each activity, the means (own funds, subsidies, funds contributed by third parties etc.) covering the additional investments have been indicated (see appendix III). Major external parties that could possibly cover a part of the additional expenses are Eneco Energie energy company, the province of Zuid-Holland, housing corporations, project developers and the business community.

5.2.1 The Municipality of Delft's own funds

Costs resulting from actual energy-saving measures can be co-financed by the Municipality out of the REM (Reserve Energiebesparende Maatregelen; energy-saving measures reserve). During the plan period, the Municipality will also consider the possibility of granting interest-free loans out of the REM. Investments and research activities characterised by innovation can furthermore be co-financed by the Municipality from out of its Milieutechnologiefonds (Environmental Technology Fund, MTF).

5.2.2 National co-financing funds

BANS-subsidy

To co-finance its extra input for personnel, Delft uses the BANS-subsidy related to the Climate Agreement (BANS-climate, see paragraph 1.2.2). Maximum subsidies vary per municipality and depend on land surface, number of inhabitants and the 'package' selected. Municipalities can opt for a basic package and a more extensive 'plus' package. As Delft opted for the 'plus' package, the BANS-subsidy equals the lower of the amounts below:

- a. 50% of the implementation costs;
- b. € 2.27 per citizen + € 4.99 per surface hectare

For Delft, option b. arrives at € 233,516.00; the maximum amount Delft will be entitled to claim.

National tax arrangements

Both the Municipality and other parties can turn to national (tax) arrangements for their investments. Naturally these will be used as much as possible. The municipal Environmental department and the Delft Energy Agency will point out these possibilities during projects.

National (project) subsidies

To finance feasibility studies, knowledge transfer activities and specific innovative projects, possibilities are offered by implementing organisations Novem and Senter. The municipal Environmental department and the Delft Energy Agency will point out these possibilities during projects.

Subsidieregeling Aanpassing Milieudruk

(SAM; subsidy scheme for the adaptation of environmental pressure)

The objective of SAM is to support the application of the extended scope within the Environmental Management Act. Energy is an important theme within this extended scope. The arrangement is for the duration of four years and is aimed at contributing knowledge, skills and instruments to municipal permit-granting and enforcing departments. To be able to prepare a policy plan in this respect, the Municipality can apply for a SAM-contribution of € 5,000.-. Regarding the implementing phase, subsidy is possible for combined projects (knowledge sharing, followed by application in practice) in the amount of 70% and to a maximum of € 200,000.-. The municipal Environmental department will apply for the SAM-subsidies.

5.2.3 European funds

For the duration of the Climate plan, Delft will use the possibilities offered by European subsidy programmes. To this end the Municipality makes use of its own network (including its membership of Énergie Cité) and the network of the Delft Energy Agency. The main subsidy options originate from the European Sixth Framework Programme. Good possibilities are furthermore offered by the SAVE/Altener and Life programmes.

Sixth Framework Programme

The purpose of the European Union's Sixth Framework Programme is research, for instance on energy. One of the main elements of the Framework Programme is the programme named 'Intelligent Energy for Europe'. This programme is aimed at innovation, introduction and practical applications and is therefore eminently suitable for municipalities, housing corporations and project developers. Intelligent Energy for Europe offers support in thirteen specific key areas (vertical key actions) and five umbrella key areas (horizontal key actions).

Literature

- [1] European Commission, *Green Paper: Towards a European strategy for the security of energy supply*, Luxembourg: Office for Official Publications of the European Communities, 2001.
- [2] European Commission, *Proposal for a Directive of the European Parliament and of the Council on the energy performance of buildings*. COM/2001/0226 final COD 2001/0098, Official Journal C 213 E, 31/07/2001 P. 0266 - 0270.
- [3] Ministry of Housing, Spatial Planning and the Environment, *Uitvoeringsnota Klimaatbeleid - Deel I: Binnenlandse maatregelen*, Den Haag, June 1996.
- [4] Winkels, Z., *Energiermasterplan Delft & Schipluiden*, Delft Energy Agency, December 2001.
- [5] Municipality of Delft, *3D: Duurzaamheidsplan Delft 2000-2003*, Delft, February 2001.
- [6] Municipality of Delft, *Energiebeleidsplan 1996-2002*, Delft, May 1996.
- [7] Municipality of Delft, *Delfts Ontwikkelingsprogramma (DOP)*, Delft, April 2000.
- [8] Municipality of Delft, *Voorzetten en doorzetten - Collegeprogramma 2002-2006*, Delft, April 2002.
- [9] Municipality of Delft, *Nota Ecologische Structuur Delft (draft)*, Delft, December 2002.
- [10] Das, M.C., *Klimaatscanrapportage Delft*, Novem, January 2002.

Abbreviations and terms

Autoratio

"Auto ratio" denotes the number of private cars in commuter traffic as a percentage of the total number of employees of a (business) establishment.

BANS Klimaat: Bestuurs Akkoord Nieuwe Stijl (New-style Executive Agreement) – climate

In 2002, the Netherlands government, IPO (interprovincial consultations) and VNG (Association of Netherlands Municipalities) signed the BANS climate voluntary agreement generating commitment on the part of the provinces and municipalities towards reducing greenhouse gas emissions.

The Dutch Ministry of Housing, Spatial Planning and the Environment has made available a subsidy of € 37 million for communication, research and additional personnel costs.

BOZ/HSM

Management department of municipal immovable property, housing, service and means

BSE

Energy programmes subsidies decree

BTM

Building supervision and monuments

CV

Collective transport

DEA: Delfts Energie Agentschap (Delft Energy Agency)

An Energy Agency is an independent organisation establishing and/or realising local energy policy. It initiates new energy policy or activities, motivates other parties to take part and coordinates the various energy-related activities.

DPP

Department of programmes and projects

EPA: Energieprestatie advies (Energy Performance Advice)

This is an evaluation including advice on energy consumption within a certain housing unit.

EPC: Energy Performance Coefficient

(also: EPN: Energie-prestatienorm (EPN: Energy Performance Standard))

Performance demands are imposed on energy consumption within new housing units and utility buildings. The energy performance of a certain building is defined by dividing standardised energy use by expected energy use as calculated. The lower the energy performance demand (EPC), the more energy-efficient the building is.

EPL: Energy Performance on Location

The EPL is a calculation system resulting in a value between 1 and 10. The higher the value, the lower the CO₂ emission, with grade 10 denoting CO₂-neutral. The additional value of the EPL over the EPN is that measures outside the building are evaluated as well.

EPR: Energiepremieregeling (Energy Premium Scheme)

The Energy Premium Scheme implies that households that buy or install energy-efficient equipment or have these installed for use in and around their houses will immediately be refunded part of the energy tax paid by them.

EZH: Electriciteitsbedrijf Zuid-Holland (Province of Zuid-Holland electricity company)

The municipal shares in EZH have been sold. Part of the proceeds will be used for climate policy.

GIM: Gemeentelijke Interne Milieuzorg (Municipal Internal Environment Care)

This concerns the introduction of business-internal environmental care within municipal companies. This implies for the municipality to gain insight in negative effects on the environment due to its company management, to control these and to reduce these wherever possible.

ISV-programme

Urban Renewal Investment Schemes

National programme with subsidies from the ministry of Housing, Spatial Planning and the Environment

LV

Slow transport

LVVP

Local Transport and Traffic Plan

Modal Split

This implies distinguishing among ways of transport related to specific moves, or to transport in general (expressed in percentages).

MTF: Reserve Milieu Technologiefonds (Environmental Technology Fund Reserve)

The environmental technology fund finances innovative, locally applicable environmental technology projects, or projects contributing to further development and execution of sustainability policy.

OEI: Optimal Energy Infrastructure

This stands for the Novem programme, which promotes research on optimal infrastructure. In addition it is a calculation model for the energetic, environmental-technical and financial consequences of the various energy-infrastructure alternatives.

OV

Public transport

PV-cellen: Photo-Voltaic solar cells

PV-cells convert (sun) light into electricity. Cells are mounted on panels connected to the electricity grid, so that unused electricity can be returned to the grid.

REM: Reserve Energiebesparende Maatregelen (Energy-saving Measures Reserve)

The REM is a possible source of contributions to projects saving 'extra' energy, or generating and/or applying sustainable energy. It can also contribute to experimental sustainable energy projects such as underground heat storage and heat pumps.

RO

Spatial planning

SAM: Subsidieregeling Aanpassing Milieudruk - Verruimde Reikwijdte

(Environmental Pressure Adaptation Subsidy Scheme – Extended Scope)

This scheme is intended to support municipalities in the improvement of their permit-granting procedures and the maintenance of policies of waste prevention, waste separation and energy saving among companies.

TD

Technical department

TZH: Transportnet Zuid-Holland (Province of Zuid-Holland Transport Network)

Concerning the possible sale of municipal shares; part of the proceeds to be used for climate policy.

W&P

City district affairs and projects department

Appendices

Appendix I	Project/Programme-matrix
Appendix II	Municipal Climate Policy Menu
Appendix III	Climate Plan Additional Costs Allocation Formula
Appendix IV	Substantiation of Calculations on CO ₂ reduction and Investment
Appendix V	Project Documents
Appendix VI	Financial Phasing

Appendix I Project/Programme-matrix

Novem menu	Nr.	Description	Type	Project-manager	Term	Ambition and CO ₂ reduction				Personnel input	
						Ambition and CO ₂ reduction	For BANS-application	Actual tons/year		Input hours/year	Personnel 2003-2012
B	1	New municipal buildings (excluding city office)	Programme	W&P	2003-2012	EPC > 12% more stringent and 40% of sustainable energy	innovative	300	0.9%	300	3,000
	1a	New municipal city office	Project	BOZ	2008	energy neutral	-	1,625	4.8%	Environment: 100	600
	2	Tackling energy consumption in existing municipal buildings/facilities	Programme	BOZ/HSM	2003-2012	term of return on measures for renovation < 10 years; 1% sustainable, generated independently	anticipating	750	2.2%	50	500
	2a	Renovation of 2 existing buildings	Pilot project	BOZ	2004	term of return on measures for renovation < 10 years; 1% sustainable, generated independently	-	20	0.1%	Environment: 100	200
	2b	Public installations: pumping-stations	Project	City management	2003-2012	all pumps and installations at replacement periods > 5 year energy-efficient and equipped with SE options	-	to be defined	#VALUE!	10	100
	2c	Public installations: traffic installations and lighting	Project	Mobility	2004	all public lighting and traffic installations to be equipped with a maximum amount of measures at return periods < 10 year	-	to be defined	#VALUE!	100	300
C	3	New housing projects	Programme	W&P	2003-2012	EPL > 7.5 (> 250 houses), EPC 15-20% more stringent	innovative	1,500	4.5%	200	2,000
	3	New utility construction projects (excl. municipal buildings, excl. TNO, Harnaschpolder, Railway zone, Zuidpoort, TU-South)	Programme	W&P	2003-2012	more stringent EPC 8-12%	anticipating	900	2.7%	200	2,000
	3a	Railway zone	Project	DPP	2003-2012	EPL at least 8 (residual heat DSM)	-	5,000	14.9%	300	3,000
	3b	Zuidpoort	Project	W&P	2008	EPC 30% more stringent	-	667	2.0%	400	1,600
	4	Existing housing and utility construction projects	Programme	W&P	2002-2010	Energy visions drawn up; starting from EPC 10% more stringent	anticipating	1,404	4.2%	100	1,000
	4a	Poptahof (3D)	Project	W&P	2003-2012	existing EPL 6.0	-	2,950	8.8%	150-2,004, then 80	940
	4b	Voluntary agreement on existing houses (3D)	Instrument	BTM	>2012	EPA for > 40% existing houses, 50% of which have been equipped with measures	-	included under 4c	-	1 st year 208, then 50 hours/year	658
	4c	Existing city saves energy	Project	DEA	2002-2005	performed ± 2,400 EPAs + > applied 1 measure (6% of existing houses) incl. 3 public actions	-	1,736	5.2%	25	75
D	5	Extended scope and duty of care of the business community	Programme	Environmental care	2002-2012	50% of companies with duty of care and 10% of companies performing energy efficiency scan, 50 % having carried out measures	anticipating	450	1.3%	1 st year 300, then 75	975
	6	Sustainable industrial sites (such as Harnaschpolder and TNO Zuidpolder)	Programme	Land	>2012	Energy vision comparable to EPL 7	anticipating	880	2.6%	100	1,000
	6a	Technopolis sustainable plan development (3D)	Project	DPP	>2012	Energy vision comparable to average EPL 7.5 for terms of issue	-	3,000	8.9%	100	1,000
	6b	Restructuring Schie river banks energy performance	Project	Land	>2012	Energy vision comparable to EPL 7.5 for terms of issue (excl. Delft Zuid) and housing see programme 3	-	525	-	120	840
B and F	7	GIM (3D)	Programme	Environment	2002-2012	Energy is focus point in municipal business management	anticipating	memorandum item	-	75	750
F	7a	Delft municipal transport plan	Project	P&O	2005	25-50% shift from potential car ratio for both commuter traffic and official trips	-	75	0.2%	1 st year 200; 2 nd - 3 rd year extra staff: 400	1,000
	7b	Vehicle fleet	Pilot project	City management	2003-2012	Energy is a major decision criterion for replacements in municipal vehicle fleet	-	to be defined	-	10	100
B	7c	Energy management of municipal buildings and facilities and purchase of green energy	Project	HSM	2003-2006	10-20% of use originating from sustainable sources; proper building management + energy-saving policy	-	1,400	4.2%	1 st 2 years 1,492, then 1,119	5,622
F	8	Defining improvements in local, public and collective transport as agreed performance within the LVVP	Project	Mobility	2003	Ambitions to be elaborated in new Local Traffic and Transport Plan	anticipating	75	0.2%	100	100
	9	Realising sustainable energy in built-up environments (see 1, 2, 3, 4 and 6)	Programme	Environment	2002-2012	Realising 3% local sustainable energy generated by 2003 and 15% during period 2010-2020	innovative	2,075	6.2%	20	200
	9a	Wind turbines	Project	DEA	<2006	Installed capacity ca. 10 MWV	-	10,134	30.2%	80	240
G	9b	Applying residual heat of DSM	Project	Environment	>2006	Useful application 300 TJ (maximum potential) residual heat, partly in Poptahof and Railway zone	-	16,800	50.1%	1 st 4 years 100, then 50	700
	9c	100 Delft-blue roofs (2 nd tranche)	Project example	City of Knowledge	2006	Realising circa 20 projects with PV-cells (circa 5,000 m ²) in existing constructions	-	148	0.4%	200	800
H	10	International performances	Instrument	Environment	2002-2012	At least 1 presentation per year at international congress or in international magazine	anticipating	does not apply	-	24	240
	10a	Continuation of the Delft Energy Agency	Instrument	Environment	2002-2005	3 years' continuation	-	does not apply	-	60	180
	10b	Applying for European subsidies	Instrument	Environment	2002-2012	-	-	does not apply	-	20	200
A	11	Monitoring	Instrument	Environment	2002-2012	-	-	does not apply	-	120	1,200
	12	General project management	Programme	Environment	2002-2012	-	-	does not apply	-	60	600
		TOTAL						33,538			31,720

1. Costs due to additional investments, indicated here as 'memorandum item', will be specified during project realisation.

blue italic = does not count due to double countings

Novem menu + Nr.	Coverage personnel input					Research	Additional investments of OT	Funds in k€								
	BANS applied for	Regular coverage	Specialist team	Remaining staff budget	Being	Expenses k€	Physical and research	National + EU subsidies (provisional sum)	Programme (if known)	REM	MTF	Already reserved in REM	Other municipal contribution	Budget	Remaining (other parties)	Covered from
B 1	600	1,500	Environment	900	REM	-	150	8	-	75	0	-	68	budget regular investment	-	-
1a	200	400	Environment	0	-	-	500	150	-	100	75	-	175	budget city office	-	-
2	100	400	Environment/BOZ	0	-	-	950	10-25%	-	333	0	-	40-55%	extra investment budget	-	-
2a	100	100	Environment	0	-	10	pm	-	-	10	-	-	-	extra investment budget	-	-
2b	0	100	City management	0	-	30	40	3	-	30	7	-	0	TD	-	-
2c	150	-	Mobility	150	REM	10	memorandum item	-	-	-	10	-	-	-	-	-
C 3	0	2,000	Environment	0	-	-	11,775	2,944	-	2,944	-	-	-	-	5,888	allocation formula of parties involved
3	0	2,000	Environment	0	-	-	563	141	-	141	0	-	-	-	281	allocation formula of parties involved
3a	600	-	-	2,400	DPP	85	1,335	534	CO ₂ reduction fund, EU subsidies	134	67	-	-	-	601	allocation formula of parties involved
3b	800	-	-	800	Zuidpoort	-	2,400	864	BSE-services, tax	720	-	190	-	-	816	allocation formula of parties involved
4	-	1,000	Environment	0	-	-	7,364	2,945	-	736	0	5	-	-	3,682	allocation formula of parties involved
4a	150	-	-	790	Poptahof	30	4,430	1,551	-	1,108	222	-	-	-	1,551	allocation formula of parties involved
4b	0	658	BTM	0	-	-	50	15	-	15	-	-	0	-	20	Eneco, corporations and possible inhabitants
4c	-	75	Environment	0	-	-	2,535	499	EPR and regulations	135	-	45	-	-	1,901	Eneco, corporations and inhabitants
D 5	262	713	Environment care	0	-	30	memorandum item	18	SAM max 60%	0	0	0	12	Environment care	memorandum item	for companies
6	-	500	Environment	500	project budgets	30	680	136	-	170	34	-	-	-	340	allocation formula of parties involved
6a	200	-	-	800	DPP	50	1,550	253	OEI programme to be investigated	388	78	-	-	-	833	allocation formula of parties involved
6b	240	-	-	600	Schie river banks	50	925	251	OEI programme (40%)	231	0	-	-	3D	443	allocation formula of parties involved
B and F 7	-	750	Environment	0	-	-	memorandum item	0	-	-	-	-	memorandum item	GIM budget and to be elaborated for specific proposals	-	-
F 7a	500	-	-	500	REM	-	85	9	-	17	-	-	17	GIM budget	43	Bicycle action plan, and other municipal budgets
7b	0	100	City management	0	-	25	memorandum item	-	-	25	-	-	-	-	0	-
B 7c	1,406	400	Environment	3,817	REM	-	-	0	-	0	0	-	-	-	0	facilities affairs
F 8	20	80	Mobility (LTP)	0	-	30	memorandum item	memorandum item	-	0	0	-	30	Mobility	memorandum item	to be defined in LVVP
9	40	100	Environment	60	REM	20	memorandum item	6	DEN	6	2	-	-	-	6	allocation formula of parties involved
9a	120	120	Environm. + RO	0	-	30	11,030	3,309	DEN and taxes	0	0	-	0	-	7,721	energy company
G 9b	0	700	Environment	0	-	-	8,250	3,300	Innovative energy saving, CO ₂ reduction fund, EU	2,063	413	42	2,475	-	-	allocation formula of parties involved
9c	400	400	Environment	0	-	-	1,900	475	DEN solar electricity	950	0	-	-	-	475	allocation formula of parties involved
H 10	0	240	Environment (communication)	0	-	-	7	0	-	5	-	-	-	-	2	inviting party
10a	0	180	Environment	0	-	-	600	0	-	450	150	-	-	-	0	corporations 50 k€ Eneco 50 k€
10b	0	120	Environment	80	current project	15	15	0	-	-	-	-	-	-	15	current project
A 11	240	480	Environment	480	project managers/regular	-	-	0	-	-	-	-	-	-	-	-
12	120	480	Environment	0	-	15	15	0	-	-	-	-	-	-	15	?
	6,248	13,596		11,877		460	57,148	17,409		10,783	1,056	282	2,777		24,630	

+research as memorandum item =

+10c, 1st tranche: ca. 250 k€

Appendix II Municipal Climate Policy Menu - March 2003

(fat print = part of performance card)

light blue = Delft Climate Plan ambition

Theme	Active	Anticipating	Innovative
A. Climate in policy			
	<ul style="list-style-type: none"> Climate policy determined in policy, including implementing programme Outlines of climate policy defined in environs policy (for instance the climate paragraph in the development vision, ISV-programme, zoning plans) Active involvement on the part of several relevant departments Annual monitoring and evaluation of climate policy implementation Determining climate policy implementing budget 	<p>Extra in relation to active:</p> <ul style="list-style-type: none"> Climate policy has been integrated to a large extent, and proportionally co-included in relevant areas of policy Active, structured cooperation among the departments involved Active, structured cooperation with target groups and external partners Extra budget for climate policy 	<p>Extra in relation to anticipating:</p> <ul style="list-style-type: none"> Innovative climate policy, such as a joint action plan on the part of municipality/ies, major target groups and external partners, characterised by a very high level of ambition
B. Municipal buildings and facilities			
<i>New constructions</i>	<ul style="list-style-type: none"> Applying an Energy Performance Coefficient (EPC) which is 4%-8% more stringent than legally obliged Implementing all fixed and cost-neutral measures from the Netherlands national package of measures concerning sustainable utility construction 	<p>Extra in relation to active:</p> <ul style="list-style-type: none"> Applying an EPC which is 8%-12% more stringent than legally obliged Implementing 30% of variable (non cost-neutral) measures from the Netherlands national package of measures concerning sustainable utility construction At least 15% of energy consumption to originate from sustainable resources Realising the generation of sustainable energy on/near a municipal building (as project example) 	<p>Extra in relation to anticipating:</p> <ul style="list-style-type: none"> Applying an EPC which is >12% more stringent than legally obliged Implementing 30% of variable (non cost-neutral) measures included in all themes from out of the Netherlands national package of measures concerning sustainable utility construction At least 40% of energy consumption to originate from sustainable energy resources Realising at least 1 innovative project example
<i>Existing buildings</i>	<ul style="list-style-type: none"> Implementing all fixed and cost-neutral energy measures from the Netherlands national package of measures concerning sustainable utility construction during renovations Introduced energy management (while observing duty of care) for all municipal buildings An active purchasing policy concerning energy (including focusing on origin) 	<p>Extra in relation to active:</p> <ul style="list-style-type: none"> Implementing 30% of variable (non cost-neutral) energy measures from the Netherlands national package of measures concerning sustainable utility construction during renovations Implementing all energy measures at cost recovering times <10 years during renovations At least 15% of the municipality's own electricity consumption to originate from sustainable energy resources Realising the generation of sustainable energy on/near a municipal building (as project example) Introduced an energy care system for all municipal buildings 	<p>Extra in relation to anticipating:</p> <ul style="list-style-type: none"> Implementing 30% of variable (non cost-neutral) energy measures from the Netherlands national package of measures concerning sustainable utility construction during renovations At least 40% of the municipality's own electricity consumption to originate from sustainable energy resources

Theme	Active	Anticipating	Innovative
B. Municipal buildings and facilities (continuation)			
<i>Infrastructural facilities and installations</i>	<ul style="list-style-type: none"> • Implementing all energy measures at cost recovering times < 5 years during renovations • Determined a Public Lighting policy plan, focusing on saving energy and sustainable energy 	<p>Extra in relation to active:</p> <ul style="list-style-type: none"> • Implementing all energy measures at cost recovering times < 10 years during renovations • At least 15% of electricity consumption to originate from sustainable energy resources • Realising the generation of sustainable energy (as project example) • Implemented the Public Lighting policy plan 	<p>Extra in relation to anticipating:</p> <ul style="list-style-type: none"> • Annual efficiency improvement by 4% on overall energy consumption of all facilities and installations • At least 40% of electricity consumption to originate from sustainable energy resources
C. Housing			
<i>New constructions</i>	<ul style="list-style-type: none"> • Applying an Energy Performance on Location (EPL) of at least 6.5 in housing construction projects exceeding 250 housing units • Established an energy vision, including it in the zoning plan for all housing construction projects exceeding 250 housing units • Agreed effort to achieve a 5%-10% more stringent Energy Performance Coefficient (EPC) for new construction projects • Municipal EPC-monitoring when testing against Buildings Decree • Implementing all fixed and cost-neutral measures from out of the Netherlands national package of measures concerning sustainable housing construction • Using the Netherlands national package of measures concerning urban development during plan formation 	<p>Extra in relation to active:</p> <ul style="list-style-type: none"> • Applying an EPL of at least 7 for housing construction projects exceeding 250 housing units • Public procedure for energy-infrastructure – including preconditions in the area of sustainable energy – for housing construction projects exceeding 500 housing units • Agreed effort to achieve a 10%-15% more stringent EPC for new housing constructions than legally obliged • Implementing 50% of the variable (non cost-neutral) energy measures from the Netherlands national package of measures concerning sustainable housing construction • Agreed effort to provide all new housing units with low-temperature heating systems 	<p>Extra in relation to anticipating:</p> <ul style="list-style-type: none"> • Applying an EPL of at least 8 for housing construction projects exceeding 250 housing units • Agreed effort to achieve a 15%-20% more stringent EPC for new constructions than legally obliged • Implementing 50% of all (non cost-neutral) variable measures from the Netherlands national package of measures concerning sustainable housing construction • Realising at least 1 innovative project example
<i>Existing buildings</i>	<ul style="list-style-type: none"> • Applying an Energy Performance on Location (EPL) of at least 6.0 for renovation and re-structuring projects exceeding 250 housing units • Established an energy vision, including it in the zoning plan for all renovation or re-structuring projects exceeding 250 housing units • Prepared an Action Plan for the implementation of the Energy Performance Advice (EPA) for private rented housing units 	<p>Extra in relation to active:</p> <ul style="list-style-type: none"> • Applying an EPL of at least 6.5 for renovation and re-structuring projects exceeding 250 housing units • At least 40% of existing housing units to be provided with an EPA, 50% of which having applied for a subsidy to implement measures • Realising at least 1 extra precondition for improving the application of sustainable energy resources 	<p>Extra in relation to anticipating:</p> <ul style="list-style-type: none"> • Applying an EPL of at least 7.0 for renovation and re-structuring projects exceeding 250 housing units • At least 50% of existing housing units to be provided with an EPA, 50% of which having applied for subsidy to implement measures

(Continued on p. 40)

Theme	Active	Anticipating	Innovative
C. Housing (continuation)			
Existing buildings	<p>(Continued from p. 39)</p> <ul style="list-style-type: none"> • At least 30% of existing housing units to be provided with EPA • Realising at least 2 pre-conditions for improving the application of sustainable energy resources • Using the Netherlands national package of measures concerning sustainable urban development during renovation and re-structuring plans 	<p>(Continued from p. 39)</p> <ul style="list-style-type: none"> • Performance agreed with housing corporations on sustainable construction 	
D. Business and Utility Building Construction			
Installations	<ul style="list-style-type: none"> • Active consultation and exchange of information with the local business community on saving energy and sustainable energy • Implemented an information course on energy efficiency and sustainable energy scans (EE and DE scans) • Active role during implementation of Multiannual Agreements on Energy Policy 2 • Implementing the granting and enforcement of environment permit in accordance with the circular named Energy in Environment Permits • Informing companies on, and promoting transport management 	<p>Extra in relation to active:</p> <ul style="list-style-type: none"> • At least 10% of companies to have performed an EE and DE scan, 50% of which to have taken measures • Transport management as part of the environment permitting and enforcement policy 	<p>Extra in relation to anticipating:</p> <ul style="list-style-type: none"> • At least 1 innovative project has been performed (relating to layout or industrial sites)
Industrial sites	<ul style="list-style-type: none"> • Existing instruments have been tested for possibilities of promoting sustainable industrial sites (having energy provision as major item) while an action plan has been started on 	<p>Extra in relation to active:</p> <ul style="list-style-type: none"> • Active policy to restructure existing industrial sites within the municipality towards sustainability • Reserved opportunities for energy saving and sustainable energy during plan development of industrial sites based on an energy vision • A consultation and information exchange structure (preferably super-municipal) with the local business community on sustainable industrial sites • The municipality formulated as an objective and promotes that at least 5% of energy consumption of industrial sites, which are to be revitalised or realised is based on sustainable energy resources 	<p>Extra in relation to anticipating:</p> <ul style="list-style-type: none"> • Purchasing and business establishment policy aimed at operational sustainability • Prepared a joint plan of the municipality and the local business community on behalf of the continuation of the sustainability development process in industrial estates • The municipality formulated as an objective and promotes that at least 10% of energy consumption of industrial sites, which are to be revitalised or realised is based on sustainable energy resources • At least 1 innovative project has been performed (concerning layout or industrial estates)

Theme	Active	Anticipating	Innovative
D. Business and Utility Building Construction (continuation)			
Utility construction	<ul style="list-style-type: none"> • Agreed effort to achieve an Energy Performance Coefficient (EPC) for new constructions which is at least 4%-8% more stringent than legally obliged • Implementing all fixed and cost-neutral measures from the Netherlands national package of measures concerning sustainable utility construction 	<p>Extra in relation to active:</p> <ul style="list-style-type: none"> • Agreed effort to achieve an Energy Performance Coefficient (EPC) for new constructions which is at least 4%-8%-12% more stringent than legally obliged • Implementing 30% of variable (non cost-neutral) energy measures from out of the Netherlands national package of measures concerning sustainable utility construction 	<p>Extra in relation to anticipating:</p> <ul style="list-style-type: none"> • Agreed effort to achieve an EPC for new constructions which is at least > 12% more stringent than legally obliged • Implementing 30% of variable (non cost-neutral) measures of all themes within the Netherlands national package of measures concerning sustainable utility construction
E. Agricultural sector (NVT)			
	<ul style="list-style-type: none"> • Active consultation with sector organisations and implementation of an information course on possibilities of energy saving and sustainable energy (EE and DE scan) • Active role during implementation of Glami, the greenhouse and environment voluntary agreement • Implementing the granting and enforcement of environment permit in accordance with the circular named Energy in Environment Permits 	<p>Extra in relation to active:</p> <ul style="list-style-type: none"> • At least 10% of companies to have performed an EE and DE scan, 50% of which to have taken measures • Implementing an action plan aiming for 5% of agricultural energy consumption to be based on sustainable energy resources 	<p>Extra in relation to anticipating:</p> <ul style="list-style-type: none"> • Implementing an action plan aiming for 10% of agricultural energy consumption to be based on sustainable energy resources • Zoning plans to allow for space for forest reserve (where relevant) • At least 1 innovative project has been performed
F. Transport and Traffic			
Transport of municipality's own organisation and communication activities	<p><i>Municipality's own organisation</i></p> <ul style="list-style-type: none"> • Preparing transport plan(s) • Energysaving is a criterion when testing alternatives for replacing municipal fleet of vehicles • Purchase of new private cars exclusively within categories A and B of Energy-labelling <p><i>Communication between the municipal organisation and Delft inhabitants</i></p> <ul style="list-style-type: none"> • Information on sustainable transport and traffic (such as energy-efficient driving, in-car equipment, purchasing of clean/energy-efficient cars) 	<p>Extra in relation to active:</p> <p><i>Municipality's own organisation</i></p> <ul style="list-style-type: none"> • Implementing transport plan(s) aimed at a 25-50% change in potential modal shift and/or a decrease in potential car ratio • An action plan to be prepared on energysaving, based on an environment efficiency scan (MES) of the vehicle fleet 	<p>Extra in relation to anticipating:</p> <p><i>Municipality's own organisation</i></p> <ul style="list-style-type: none"> • Implementing transport plan(s) aimed at a 50-100% change in potential modal shift and/or a decrease in potential car ratio • Implementation of the action plan based on an environment efficiency scan (MES) of the municipal vehicle fleet • CO₂ emissions of official trips to be compensated by national reforestation
Automobility, slow traffic (LV), collective transport (CV) and public transport (OV)	<ul style="list-style-type: none"> • Energy consumption is a point of interest during CV and OV contracting-out • Increasing insight in LV, CV (such as car-sharing) and OV options • Presenting automobility and relating environmental bottlenecks 	<p>Extra in relation to active:</p> <ul style="list-style-type: none"> • Deploying the Instrument of Environmental Demands in public transport (IMOVA) and its translation into concrete environmental demands for the granting of concessions • Laying down performance agreements on improving LV/OV/CV facilities • Introduced joint transport management for industrial sites 	<p>Extra in relation to anticipating:</p> <ul style="list-style-type: none"> • Implemented a chain mobility project • Contributing to the development and/or application of innovative transport systems

(Continued on p. 42)

Theme	Active	Anticipating	Innovative
F. Transport and Traffic (continuation)			
<i>Spatial Planning/ infrastructure</i>	<ul style="list-style-type: none"> • Implementing a study concerning Transport Performance on Location (VPL) on the (re)laying out of dwelling areas or housing construction projects exceeding 500 housing units • Applying at least 1 traffic and transport measure from the Netherlands national package of measures concerning sustainable urban constructions 	Extra in relation to active: <ul style="list-style-type: none"> • Implementing an energy-efficient alternative from the VPL-study • Implementing a feasibility study of the combined application of sustainable energy in infrastructure (such as solar panels on baffle boards along roads) 	Extra in relation to anticipating: <ul style="list-style-type: none"> • Implementing the most energy-efficient alternative from the VPL-study
<i>Goods transport</i>	<ul style="list-style-type: none"> • Promoting energy-efficiency within intermunicipal distribution 	Extra in relation to active: <ul style="list-style-type: none"> • Applying an energy criterion for admission demands in urban distribution 	Extra in relation to anticipating: <ul style="list-style-type: none"> • Energy as major criterion for admission demands in urban distribution • Promoting innovative distribution concepts
G. Sustainable energy			
	<ul style="list-style-type: none"> • A sustainable-energy (DE) scan has been performed • Expansion plans include at least 70% sun-directed parcelisation • (If relevant) zoning plans designating locations for wind energy, resulting from provincial policy, or BLOW, the Administrative Agreement on the nationwide development of wind energy • The municipality conducts an active policy for accumulating and providing biomass residual flows to generate energy 	Extra in relation to active: <ul style="list-style-type: none"> • Implementing an action plan aiming for 5% of overall energy consumption within the municipality being based on sustainable energy resources 	Extra in relation to anticipating: <ul style="list-style-type: none"> • Implementing an action plan aiming for 10% of overall energy consumption within the municipality being based on sustainable energy resources
H. International			
	<ul style="list-style-type: none"> • Using existing contacts and network organisations for international activities in the area of sustainable energy and energy-saving 	Extra in relation to active: <ul style="list-style-type: none"> • Active participation in projects aimed at energy-saving and sustainable energy abroad 	Extra in relation to anticipating: <ul style="list-style-type: none"> • National forerunner by realising innovative projects with foreign partners

Appendix III Allocation Formula (per column)

Nr.	Description	Type	National and EU subsidies	Programme (if known)	E-fund contribution	MTF contribution	Funds (E-fund and MTF)	Other municipal contribution	Budget	Remains	Covered from
1	New municipal buildings (excl. city office)	Programme	5%		50%		50%	45%	regular investment budget		
1a	New municipal city office	Project	30%		20%	15%	35%	35%	city office budget		
2	Tackling energy consumption in existing municipal buildings/facilities	Programme	10-25%		35%		35%	40-55%			
2a	Renovating 2 existing buildings	Pilot project	10-25%		35%		35%	40-55%			
2b	Public installations: pumping-stations	Project	10-25%		15%	10%	25%	20%	TD	45-60%	other municipal budget
2c	Public installations: traffic installations and lighting	Project	30%		20%	15%	35%	35%			
3	New housing projects	Programme	25%		25%		25%			50%	allocation formula of parties involved
3	New utility construction projects (excl. municipal buildings, excl. TNO, Harnaspolder, Railway zone, Zuidpoort, TU-South)	Programme	25%		25%		25%			50%	allocation formula of parties involved
3a	Railway zone	Project	40%		10%	5%	15%			45%	allocation formula of parties involved
3b	Zuidpoort	Project	30%		30%	0%	30%			40%	allocation formula of parties involved
4	Existing housing and utility construction projects	Programme	40%		10%	0%	10%			50%	allocation formula of parties involved
4a	Poptahof (3D)	Project	35%		25%	5%	30%			35%	allocation formula of parties involved
4b	Voluntary agreement on existing houses (3D)	Instrument	30%		30%		30%			40%	Eneco, corporations and inhabitants
4c	Existing city saves energy: EPAs and public actions	Project	25%	EPR and regulations	fixed amount 135 k		fixed amount 135 k			rest	Eneco, corporations and inhabitants
5	Extended scope and caring duty of business community	Programme	10-25% (measures)	SAM (60%) internal / research expenses	0%	0%	0%	> 40%	Environment care	mem. item	for companies
6	Sustainable industrial sites: Harnaspolder and TNO Zuidpolder	Programme	20%	DBT (Novem), province 60% in research	25%	5%	30%			50%	allocation formula of parties involved
6a	Technopolis sustainable plan development (3D)	Project	15%	additional investment; OEI programme (40%)	25%	5%	30%			55%	allocation formula of parties involved
6b	Re-structuring Schie river banks energy performance	Project	25%	OEI programme (40%)	25%		mem.item		3D	50%	province/companies
7	GIM (3D)	Programme					0%	mem. item	GIM budget and to be elaborated for specific proposals		
7a	Delft municipal transport plan	Project	10%		20%		20%	20%	GIM budget	50%	Bicycle action plan, etc.
7b	Vehicle fleet	Pilot project	10-25%		20%		20%	mem. item	mem. item	55-70%	
7c	Energy management of municipal buildings and facilities and purchase of energy	Project						100%	facilities affairs		
8	Defining improvements in local/public/collective transport in the LVVP	Project	memorandum item		0%	0%	0%	mem. item	mem. item (to be defined in LVVP)	mem. item	to be defined in LVVP
9	Realising sustainable energy in dwelling areas (see 1,2, 3, 4 and 6)	Programme	30%	DEN	30%	10%	40%			30%	allocation formula of parties involved
9a	Wind turbines	Project	30%	various and taxes (provisional sum)	0%	0%	0%	0%		70%	various external investors
9b	Applying residual heat of DSM	Project	40%	Senter Innovative energy saving	25%	5%	30%			30%	allocation formula of parties involved
9c	100 Delft-blue roofs (2 nd tranche)	Project example	25%	DEN solar electricity	50%	0%	50%			25%	allocation formula of parties involved
10a	Continuation of Delft Energy Agency	Instrument	0%		0%	60%	60%			40%	corporations 50 k€ Eneco 50k€

Appendix IV Substantiation of contribution to CO₂ reduction, costs and effects in other areas of policy

Nr.	Description	CO ₂ reduction (tons CO ₂ per year)	Explanation CO ₂ calculation	Investment x 1,000 Euro	Explanation of investment calculation	Effects of other areas of policy	Weighing Delft as City of Knowledge: 0 = none + = likely ++ = highly likely
1	New municipal building constructions	300	Municipality: 20,000 m ² (based on building programme until 2005 incl.) excl. City Office) until 2006 incl. Assume realised savings of 10 kg CO ₂ per m ² : 10 * 20,000/1,000 = 200 ton * 1.5 for duration until 2012	€ 150	Utility: rough ratio for new constructions: € 5 per m ² .	Saving on exploitation account for welfare organisation etc.	0
1a	New municipal city office	1,625	25,000 m ² , E-neutral, at average emission of 65 kg CO ₂ /m ² this implies a reduction of 25,000 * 65 = 1,625 ton CO ₂	€ 500	Utility: Provisional sum has been estimated!	Example function/image of municipality. Contribution to Delft as City of Knowledge by way of innovative (E) design. Future saving on exploitation costs.	++
2	Tackling energy consumption in existing municipal buildings	750	Energy consumption in municipal buildings: DE-scan: municipal offices: 0.7% + primary and secondary education ca 5%+ social services 2% of 6,500,000 GJ = 500,500 GJ. Assume potential savings during the plan period averaging 10%: ca 50,000 GJ. Now assume 1GJ corresponding with 60 kg CO ₂ (rough average of electricity and gas), and we arrive at 50,000 x 60 = 3,000,000 kg CO ₂ per year. Assume that the programme applies to 25% of buildings: total savings 750 ton CO ₂ kg	€ 950	Utility: rough ratio for new constructions: € 5 per m ² . No ratio is known for renovations. The same ratio is to be applied here as for housing construction: € 10 per m ² ; E 5,-/m ² for limited renovations. One quarter of the buildings corresponds to 190,000 m ² (145,000 m ² of which are schools, based on an average of 0.56 GJ/m ² , average for offices 0.97 GJ/m ²).	Saving on exploitation account for welfare organisation etc.	0
2a	Renovating 2 existing buildings	20	Start from a total of circa 5,000 m ² , see above calculation		To follow, based on actual project plan	Learning effect for programme 2 Required to estimate opportunities for Delft as City of Knowledge (progr. 2)	0/+
2b	Public installations: pumping-stations		To be defined in detail	10 + mem. item	Based on project manager's specifications	Innovative project: contributes to Delft as City of Knowledge Saving on exploitation costs	0/+
2c	Public installations: traffic installations and lighting		To be defined in detail		To be defined	Innovative project: contributes to Delft as City of Knowledge Saving on exploitation costs Nationwide image	++
3	New construction projects	900	Utility: 75,000 m ² (based on construction programme until 2005 incl., excl. storage) excluding the projects named (industrial sites programme, Railway zone, Zuidpoort, TU-South)). Assume savings realised of 8 kg CO ₂ per m ² : 8 * 75,000/1,000 = 600 * 1.5 for total duration until 2012 incl.	€ 563	Utility: rough ratio for new constructions: € 5 per m ² . No ratio is known for renovations. The same ratio is to be applied here as for housing construction: € 10 per m ² .	Innovative solutions required: contributing to Delft as City of Knowledge Improved company establishing climate because of lower exploitation costs	0/+
		1,500	Houses: total 2,617 units (based on building programme until 2005 incl., excl. storage) x 1.5 for total duration until 2012 incl. = 3,925. Allocation unknown, assume 15% single-family (589, 85% multi-family (3,336). EPC 0.8 instead of 1. Reduction: 12,800 - 11,300=1,500 tons CO ₂	€ 11,775	Houses: Per renovated housing unit a ratio of € 6,000 has been applied to save 20%. New constructions: € 3,000 additional expenses.	Increased living enjoyment at equal or lower housing costs	0/+
3a	Railway zone		Total 2,000 houses: 15% single-family (300), 85% multi-family (1,700). At a targeted 20% lower EPC (1 -> 0.8) and based on the CO ₂ model, we arrive at 4,209 tons CO ₂ (EPC 0.8) instead of 4,756 tons CO ₂ . Reduction: 4,756 - 4,209 = 547 tons CO ₂	€ 6,000	Houses: Per renovated housing unit a ratio of € 6,000 has been applied to save 20%. New constructions: € 3,000 additional expenses.	Lower exploitation costs have a positive effect on business establishing climate Better living enjoyment at lower housing expenses	+
			Offices: 50,000 m ² gross floor surface, 50% of which occupied by the city office. EPL 8.5 or even 10 at a later stage. Calculations assume reduction by 15% (innovative according to menu). Starting from EBM numbers: large offices average 59 kg compared to 65 kg CO ₂ /m ²	€ 125	Utility: rough ratio for new constructions: € 5 per m ² . No ratio is known for renovations. The same ratio is to be applied here as for housing construction: € 10 per m ² .		
		5,000	Utility + houses, based on 'Vision on Railway zone energy provision' of W/E consultants dated Nov. 30, 2001; alternative progressive 70/40 or 35/20 (figure 2 p. 26).	€ 1,250	Vision of W/E consultants on energy provision of Railway zone dated Nov 30, 2001; autonomous investments (totalling € 36.30 million) as compared to progressive alternative 70/40 (totalling € 40.29 million) or 35/20 (totalling € 44.11) (figure 4, p. 28). Additional investment € 6.0 million, € 1.25 million of which are additional expenses for U-building and housing, remaining additional investments booked under project 10b Residual heat DSM.		
3b	Zuidpoort	667	Total 234 houses: 100% multi-family. At a targeted 30% lower EPC (1 → 0.7) 200 to 234 houses EPC > 15% = 225 tons, 220,000 m ² gross floor surface EPC > 15%: 180 tons extra savings by way of heat-cold storage: 220 tons (report of Zuidpoort Delft Energy provision of DWA dated Nov. 9, 2000): HOP 37 tons (8 kg/m ²) provisional sum for Theatre: 5 tons.	€ 2,400	Field 5/7 k€ 1,000 (Novem application 2000; OT 152 k€); HOP: € 30; Field 9 k€ 900 (Provisional sum); Field 10 k€ 225 (Provisional sum) Theatre 93 k€	Higher living enjoyment at equal or lower housing expenses	++

Appendix IV (continuation: nr. 4 - 6)

Nr.	Description	CO ₂ reduction (tons CO ₂ per year)	Explanation CO ₂ calculation	Investment x 1,000 Euro	Explanation of investment calculation	Effects of other areas of policy	Weighing Delft as City of Knowledge: 0 = none + = likely ++ = highly likely
4	Existing construction projects (utilities excl. industrial sites + houses)	943	Based on DOP appendix 4 until 2010 incl.: 6,171 corporation houses - EPA 2,400 houses = ca 3,770 houses. Assuming circa 250 kg savings per housing unit CO ₂ model) results in 943 tons	€ 6,598	Houses: Per renovated housing unit a ratio of € 6,000 has been applied to save 20%. New constructions: € 3,000 additional expenses. EPA additional expenses € 1,000; € 3,500 on average. Assume: 10% less stringent, 50% lower costs	Improved quality and (living) enjoyment at lower (housing) expenses	0
		462	Utility: 725 m ² based on building programme + elaboration programme 5. Assume a reduction of roughly 8 kg CO ₂ /m ² : 8 * 725 = 5,800 kg CO ₂ . Until 2010 multiplied by 2 = 11.6 tons. Further elaboration of programme 5 (CO ₂ savings included under programme 5!)	€ 766	Utility: rough ratio for new constructions: € 5 per m ² . No ratio is known for renovations. The same ratio is to be applied here as for housing construction: € 10 per m ² . For companies at extended scope: same ratio as for Schie river banks: k€ 1.67 / ton CO ₂ saved		
4a	Poptahof		Houses: 650 new, 650 renovated. Starting from multi-family houses, EPC-reduction from 1 to 0.8. Same ratio has been used for renovation. Reduction: 1,456 - 1,291 = 165 tons. Multiplied by 2: 330 tons Utility: 1,000 m ² new and 3,000 renovation New constructions: EPC 20% better: average reduction 8 kg CO ₂ /m ² . Renovation: same criteria: 8 kg CO ₂ /m ² . Total: 4,000 * 8 = 32,000 kg CO ₂		Houses: Per renovated housing unit a ratio of € 6,000 has been applied to save 20%. New constructions: € 3,000 additional expenses: 5,850 k€ Utility: rough ratio for new constructions: € 5 per m ² . No ratio is known for renovations. The same ratio is to be applied here as for housing construction: € 10 per m ² or k€ 35	Improved quality and (living) enjoyment at lower (housing) expenses Innovative solutions contribute to Delft as City of Knowledge	+
		2,950	Final report OEI Poptahof W/E consultants dated June 2002, p. 26; autonomous 1-2 -/- prog4/ambi1/ambi2	€ 4,400	Final report OEI Poptahof W/E consultants dated June 2002, page 27; autonomous 1-2 -/- prog4/ambi1/ambi2: autonomous investments 1-2 (average total € 7.07 million) as compared to progressive alternative 4 (totalling € 13 million), ambitious (totalling € 15 million) and ambitious (totalling € 15.5 million). Additional investments are € 7.4 million, out of which € 4.4 million additional expenses according to EPA/ Novem, other additional investments booked under project 10b Residual heat DSM.		
4b	Voluntary agreement on existing houses		15,000 houses EPA research (Energy master plan December 2001 DEA, page 18); savings included under 4c	€ 50	15,000 housing units: research expenses € 50,000	Higher living enjoyment at equal or lower housing expenses	0
4c	Existing city saves energy (EPAs amount ± 2400)	1,736	1 household uses 3,300 kWh and 2,000 m ³ gas annually -> 4,821 kg CO ₂ per household. Assuming 1 household per unit and 15% reduction in energy consumption on account of EPA, an annual 723 kg in CO ₂ emissions are avoided per household. Multiplied by 2,400 this results in 1,735 tons.	€ 2,400	EPA investments: a rough ratio of € 1,000 investment per unit.	Higher living enjoyment at equal or lower housing expenses If local companies are contracted, this will also result in a contribution to employment	0
				€ 135	Public actions: total available from municipality per action: € 45,000!		
5	Extended scope and duty of care of the business community	450	Source: graduation report by Lidewij van Trigt, minimum 9,000, maximum 14,000 tons taking all companies together. This project: at least 10% of companies to undergo an energy scan, 50% of which to take measures: total 450 tons, included under programme 4.		Investments among companies come under programmes 3 and 4; this project only includes the research expenses of 29 k€	Improved quality of municipal implementing organisation	0
6	Sustainable industrial sites (Harnaspolder and TNO Zuidpolder)	880	Utility: Harnaspolder 180,000 m ² , 33% of which Delft = 60,000 m ² . TNO 50,000 m ² . Assume a reduction of ca. 8 kg CO ₂ /m ² : 110,000 * 8 = 880 tons CO ₂ .	€ 650	Utility: rough ratio for new constructions: € 5 per m ² . No ratio is known for renovations. The same ratio is to be applied here as for housing construction: € 10 per m ² . Harnaspolder: 60,000 x € 5 = k€ 300 and TNO Zuidpolder: 30,000 x € 5 + 20,000 x € 10 = k€ 350.	Lower exploitation costs have a positive effect on business establishing climate	++
6a	Towards sustainable plan development of Technopolis (TU-South)	3,000	Utility: 600,000 m ² . Assume a reduction of ca. 10 kg CO ₂ /m ² : 6,000,000 kg CO ₂ . Assume 50% realised by 2012.	€ 1,500	Utility: rough ratio for new constructions: € 5 per m ² . Total realised until 600,000 m ² by 2023 (20 years). Assume 50% to be realised by 2012.	Lower exploitation costs have a positive effect on business establishing climate Innovative solutions required: contribute to Delft as City of Knowledge	+
6b	Re-structuring Schie river banks energy performance	525	Assume 50% of re-structured ha: savings 6 kg/m ² . Total 175,000 m ² gross floor surface	€ 875	Existing buildings € 10 per m ²	Improved business establishing climate can indirectly result in a contribution to improved employment	+

Appendix IV (continuation: nr. 7 - 12)

Nr.	Description	CO ₂ reduction (tons CO ₂ per year)	Explanation CO ₂ calculation	Investment x 1,000 Euro	Explanation of investment calculation	Effects of other areas of policy	Weighing Delft as City of Knowledge: 0 = none + = likely ++ = highly likely
7	Municipal Environmental Management (GIM)		Elaboration of programme mainly found within other projects (below)		Idem	Municipal example function, serving as stimulus to motivate other projects	0
7a	Delft transport plan	75	DE-scan traffic contribution (total): about 1,400,000 GJ. Assume savings of 0.1% (municipal organisation only) and an emission of 60 kg CO ₂ per GJ: 78 tons, rounded off to 75	€ 85	Delft Municipal Draft Transport Plan	Municipal example function, serving as stimulus to motivate other projects; personnel motivation included	0
7b	Vehicle fleet		To be defined in detail		To be defined	Municipal example function, serving as stimulus to motivate other projects; also reduces exploitation costs	0
7c	Energy management of municipal buildings and facilities	1,400	Average of alternatives A, B and C from 'De gevolgen van de liberalisering van de energiemarkt voor Gemeente Delft' dated May 17, 2002 by PME consultants.		No investments apart from personnel expenses	Municipal example function, serving as stimulus to motivate other projects; also reduces exploitation costs	0
8	Agreed performance under LTTP	75	Start from the same order of magnitude as in the transport plan		Here it only concerns defining the level; possible investments will be included under programmes	Fewer traffic jams	0
9	Sustainable energy	2,075	Source: DE-scan, exclude wind. Electricity: 1,000 GJ -> 60 tons CO ₂ Heat: 36,000 GJ -> 2,016 tons CO ₂ . Not considered in total amount, as it can be found as part of other programmes/projects		Part of these can be found in other programmes/projects (see project document)	Highly innovative project: contributes to Delft as City of Knowledge	+
9a	Delft wind turbines	10,134	Turbine park 6 mills at 1.5 MW each: total 9 MW giving 18,162 MWh (according to Kema statements). 1 kWh = 0.566 kg CO ₂ . Wind turbine: 8 g CO ₂ /kWh: savings: 0.588 kg CO ₂ /kWh: total 10,134 tons	€ 11,000	Costs per wind turbine ca. fl 4 million (€ 1,815,121). Maximum of 6 wind turbines! = 11,000,000 (rounded off)	Highly innovative project: contributes to Delft as City of Knowledge	+
9b	DSM residual heat	16,800	300 TJ (high + low), emission 56 kg per GJ. Not considered in total amount, as it can be found as part of other programmes / projects	€ 8,250	Additional investments in energy-infrastructure of Railway zone: € 6.0 million - € 1.25 million = € 4.75 million. Additional investment in energy-infrastructure of Poptahof: € 7.4 million - € 4.4 million = € 3 million. Provisional sum € 500,000.- for research and / or central facilities not to be included under building projects yet to be linked up	Highly innovative project: contributes to Delft as City of Knowledge	++
9c	100 Delft-Blue Roofs	148	Assume a realisation of 5,000 m ² (grid-linked) PV, yield: 80 kWh/m ² per year: 8,000 kWh, 0.37 kg per kWh	€ 1,900	Costs of 1 st tranche already partly paid, remainder having been reserved, 2 nd tranche is comparable. Total costs for 1 st tranche: DEA-overview 270802: 1,900,000	Highly innovative project: contributes to Delft as City of Knowledge. Will contribute to employment if local business is contracted	+
10	International performance		Supporting other projects/programmes	€ 7	Travelling and presentation expenses	Improved image of Delft as City of Kn.	+
10a	Continuation of DEA		Supporting other projects/programmes	€ 600	Founding + personnel costs ca. € 200,000 per year; see substantiation of the contribution of Delft to DEA dated Febr. 13, 2003. DEA until 2005 incl.	Contributes to employment (DEA-staff)	+
10b	Applying for European subsidy		Supporting other projects/programmes		Supporting other projects/programmes	Project costs saved	d. not apply
11/12	Monitoring/general project management		Supporting other projects/programmes		Supporting other projects/programmes	Inherent to projects/climate plan	d. not apply

Appendix V Project documents

For an updated status of the projects, please apply to the Municipality of Delft, Environmental department, Margreet de Wit, telephone +31 15 2602219, e-mail: mdewit@delft.nl.

Appendix VI Financial Phasing

Novem menu	Nr.	Description	Type	Total personnel input				Municipal contribution to additional investments (physical and research) x 1,000 euro (REM + MTF-fund)				Explanation
				2003-2006 Phase I	2007-2010 Phase II	2011-2012 Phase III	Totaal	2003-2006 Phase I	2007-2010 Phase II	2011-2012 Phase III	Total new	
B	1	New municipal buildings (excl.city office)	Programme	1,200	1,200	600	3,000	30	30	15	75	costs of building programme have been evenly distributed over a 10-year period
	1a	New municipal city office	Project	400	200		600	25	150		175	completion by 2008
	2	Tackling energy consumption in existing municipal buildings/facilities	Programme	200	200	100	500	133	133	67	333	costs of building programme have been evenly distributed over a 10-year period
	2a	Renovating 2 existing buildings	Pilot project	200			200	10	mem.item	mem.item	10	duration until 2004 incl.; costs for study + investments: memorandum item
	2b	Public installations: pumping-stations	Project	40	40	20	100	37	mem.item	mem.item	37	costs for study + pilot; investments: memorandum item
	2c	Public installations: traffic installations and lighting	Project	300			300	10			10	duration until 2005 incl.; costs for study + investments: memorandum item
C	3	New housing construction projects	Programme	800	800	400	2,000	1,178	1,178	589	2,944	costs of building programme have been evenly distributed over a 10-year period
	3	New utility construction projects excl. municipal buildings, excl. TNO, Harnaspolder, Railway zone, Zuidpoort, TU-South)	Programme	800	800	400	2,000	56	56	28	141	costs of building programme have been evenly distributed over a 10-year period
	3a	Railway zone	Project	1,200	1,200	600	3,000		134	67	200	completion by 2012. Additional investment is ca. 6 million, 1.25 million of which are additional expenses for utility and housing construction, other additional investments booked under project 10b. Residual heat of DSM. Investments at building level have been evenly distributed over periods II + III
	3b	Zuidpoort	Project	1,600			1,600	720			720	realisation in Phase I, 190,000 euro already reserved in REM
	4	Existing housing and utility construction projects	Programme	400	400	200	1,000	295	295	147	736	costs of building programme have been evenly distributed over a 10-year period
	4a	Poptahof (3D)	Project	460	320	160	940	332	665	332	1,329	investments: 1/2 Phase I until 2012 incl. (evenly distributed over 8 years)
	4b	Voluntary agreement on existing houses (3D)	Instrument	358	200	100	658	6	6	3	15	duration of voluntary agreement until 2012 incl. Number of housing units remains 15,000 (DEA); costs for study
	4c	Existing city saves energy	Project	75			75	135			135	duration until 2005 incl; 3 public actions € 45,000 already reserved in REM
D	5	Extended scope and duty of care of the business community	Programme	525	300	150	975	mem.item	mem.item	mem.item		costs of policy development of programme under Environmental care+investment: mem. item
	6	Sustainable industrial estates (such as Harnaspolder and TNO Zuidpolder)	Programme	400	400	200	1,000	35	113	56	204	study: Phase I Harnaspolder investments: Phase II and Phase III; TNO Zuidpolder investments: 1/2 Phase I + Phase II + Phase III
	6a	Technopolis sustainable plan development (3D)	Project	400	400	200	1,000	165	150	150	465	study (kE:15) Phase I : 1/2 investments: 1/3 Phase I + 1/3 Phase II + 1/3 Phase III. Total investments cover a period until 2023
	6b	Energy performance of re-structuring of Schie river banks	Project	480	240	120	840	13	146	73	231	study: Phase I + investments: Phase II and Phase III
B en F	7	GIM (3D)	Programme	300	300	150	750	mem.item	mem.item	mem.item		programme + investments: mem. item
F	7a	Delft municipal transport plan	Project	1,000			1,000	17			17	duration until 2005 incl.
	7b	Vehicle fleet	Pilot project	40	40	20	100	25	mem.item	mem.item	25	study: Phase I + investments: mem. item
B	7c	Energy management of municipal buildings and facilities and purchase of green energy	Project	5,622			5,622	0			0	duration 2003-2006
F	8	Defining improvement of LV/OV/CV as agreed performance within LVVP (LTTP)	Project	100			100	0	mem.item	mem.item	0	2003 costs of study into coverage LVVP+
G	9	Realising sustainable energy in dwelling areas (see 1,2,3,4 and 6)	Programme	80	80	40	200	8	mem.item	mem.item	8	study: Phase I + investment: memorandum item
	9a	Wind turbines	Project	240			240	0	0	0	0	duration until 2006 incl. + investments by third parties
	9b	Application of residual heat of DSM	Project	400	200	100	700	975	1,500		2,475	study + central provisions (30% of kE 500); Phase I + investments: Phase 1/2 I + II (additional investment Railway zone and Poptahof excl. costs at building level in these projects!)
	9c	100 Delft-Blue Roofs (incl. 2 nd tranche)	Project example	800			800	950			950	duration until 2006 incl.
H	10	International performance	Instrument	96	96	48	240	2	2	1	5	one presentation each year
	10a	Continuation of the Delft Energy Agency	Instrument	180			180	600			600	expires before 2006
	10b	Applying for European subsidies	Instrument	80	80	40	200	0			0	continues + possible costs to be placed in the project concerned
A	11	Monitoring	Instrument	480	480	240	1,200	d.not apply	d.not apply	d.not apply		continues
	12	General project management	Programme	240	240	120	600	d.not apply	d.not apply	d.not apply		continues
		TOTAL		19,496	8,216	4,008	31,720	5,756	4,556	1,528	11,840	