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National policies concerning eco-industrial parks in Europe

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Acknowledgement

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1. INTRODUCTION

Ecopadev is the name of a project of the European Commission within the programme of "Energy, environment and sustainable development", key aspect 4: City of tomorrow and the cultural heritage.

The project seeks to promote a change in urban planning policy of industrial and business areas, to reach greater sustainability, improve quality of life and enhance eco-efficiency, by the development of a decision-making tool and methodology based on Eco-industrial parks development strategy.

Almost 80% of European inhabitants live in urban areas and are, therefore, affected by the quality of living conditions in cities. The continuous economic expansion has produced many problems related to unsuitable planning of cities. Important topics are: Industrial areas surrounded by residential areas, Traffic congestion, Unsuitable environmental management, Lack of data for decision making by local authorities, Energy consumption and Social problems like unemployment due to the change of economical activities, from primary industry to services, etc.

Institutes of five European countries are working together to gather data of successful examples of sustainable industrial parks in order to disseminate and apply knowledge about the above-mentioned items. The Energy Research Centre of the Netherlands (ECN) is one of the participating institutes. ECN has, in co-operation with Ingenieurbüro Dr.-Ing. W. Trinius, contacted local authorities and industrial parks to exchange experiences about the subject. The following report will give you the results of this inventory with respect to national policies.

The national policies have been studied by means of a questionnaire, which is added as an annex to this report. A selection of countries with most detailed information about eco-industrial parks policy has been made. The data of the following countries are described in this report:

- Finland
- Germany
- Portugal
- The Netherlands

2. FINLAND

2.1 Overall National and Regional Information about Industrial Parks Policy

There are no national Finnish reference documents, which define industrial parks. Every industrial park defines itself and has its own policy. However, there exists clear difference in the definitions of industrial parks and technology centres. Industrial parks often comprise of industrial premises built and owned by the local authorities, which rent them to companies at economical tariffs in order to create jobs to the area. Industrial parks concentrate on the production of goods through industrial processes. Technology centres concentrate on innovative production in cooperation with academic world and are often situated in office buildings. In research and other activities where definition is needed the international definitions are used. In Finland there are not many industrial parks left, but technology centres are expanding and developing fast. In our research we have concentrated on technology centres.

Industrial parks in Finland make their own policies according to their own preferences. Owners and stakeholders of the Industrial park. In technology centres the main owner may be the Management company of the Technology park area (see Kajaani Technology Park) or the owners often include the town and municipalities, universities and polytechnics and big companies like Nokia, Orion, Fortum (depending on what the centre is specialized in), and smaller local companies. The Innopoli (Espoo) cluster is formed by such centrally positioned co-operative organisations as the Helsinki University of Technology, VTT, TEKES, different capital investors, and such Innopoli-based organisations as the Foundation for Finnish Inventions, Culminatum, Finntech, and different service- and consultant offices. In industrial parks the owners include the town and municipalities and local companies.

The owners/stakeholders choose the representatives to the administration and to the executive group. Every technology centre decides on its own which organizations will have a representative in the administration and in the executive group. The executive group is the presenting official to the administration but does not hold decision-making power. Administration has the highest authority. Usually the owner companies are represented in the executive group and administration.

At the moment there are no national or regional Research or Demonstration projects on industrial parks. The latest Research projects concerning industrial parks were made in the 1990's. However, there is continuous research on Technology centres but this is mainly concentrated in finding out the relevance of the centres to the participants of the projects and the success of the performance of the centres.

Industrial Parks in general are seldom included in the plans of Finnish administration. The concept of industrial parks was not as successful and the goals of the authorities were not met in practise. Usually the companies used the support given in the beginning by the municipality and disappeared after few months leaving the municipality with empty buildings. In most of the cases there were no long lasting jobs created in the area. This, however, is not the case with the Technology Centres. They have proven to be successful for the local community as well as to the companies. To ensure the progress the Ministry of Trade and Commerce (KTM) studies the subject rather regularly to find out the significance of the Technology Centre to all parties involved.

2.2 Procedures of Finnish Industrial Parks

Environmental Protection Act 2000 gives overall guidelines about the management by implementing the principles of IPPC including EPE, BAT, BEP. These guidelines do not concern or define the policies of companies but rather implementing the policies. They are not binding in a sense that there would be a requirement to have policies in a company or certain methods in implementing the policies. In practice, these subjects will be evaluated when giving the environmental permit and in cases of liability after an accident.

The problems in finding information about this subject are rather deeply rooted. The concept of management does not translate well into Finnish language and, consequently, is not mentioned in the law; the only exception being the EMAS law (Title: *Laki teollisuusyritysten vapaaehtoisesta osallistumisesta ympäristöasioiden hallinta- ja auditointijärjestelmään* 1412 / 1994). The laws are more concentrated in giving minimum guidance values or stating the overall policies of the whole country and as such, the administrative side of the companies is not directly mentioned. In practice, these values bind the administration, e.g. environmental centres, to ensure they are not exceeded. Environmental Centres implement the requirements of the law via environmental permits.
Exceptions are the Health and Safety issues which demand management procedures from the companies as well as the local authorities (e.g. The Oil Accident Protection Act).
If the company located at the technology centre is owned by the municipality or city, the Local Council's financial department is responsible for the policies and strategies. The municipalities own different companies and business strategies are made for them, e.g. the Finn-Medi company in Tampere.

2.2.1 An integrated system for environmental permits

The integration of the environmental permits system was one of the most important aims of the revision. With the integration of the environmental legislation, pollution can be prevented efficiently since the environment is considered as a whole.

Applications for the environmental permits are made from one authority, and all the environmental effects of the activity will be assessed during the consideration of the permit. For Example, technological solutions that save energy as much as possible and that are at the lowest possible cost will be applied to reduce emissions.

The act defines more explicitly, and in a more integrated manner, the requirements of environmental permits and the prerequisites for granting a permit. The permit requirements are not, however, more strict and activities that require a permit have not been added.

2.2.2 Responsibility for environmental permits

There are three environmental permit authorities that decide on the most important environmental permit. These authorities replace the three Water Courts that were abolished in Helsinki, Kuopio and Oulu.

Environmental permits of regional significance are still dealt with at the 13 regional environment centres. Other environmental permits will be granted by the environmental protection authority of the municipality.

Citizens have greater opportunity to influence the decision-making since the right to appeal has been extended. In addition to the parties involved (applicants for a permit and the party suffering inconveniences), associations and foundations that either promote the protection of the environment, health and nature or improve the living environment have the right to appeal.

2.2.3 Procedures for industrial park management

The only clear procedural requirement for management is for health and safety issues (Seveso act). There are voluntary management models the companies can use like ISO and EMAS. Many Finnish companies have committed themselves to the ICC Business Charter for Sustainable Development. In addition, major chemical companies follow the Responsible Care program. Various companies have also taken into use voluntary environmental management systems, such as ISO 14001 and the EU EMAS system.
The Environmental Protection Act itself does not require a management systems but the company has to be aware of the outputs and harmful effects it causes and about the possibilities to prevent it. In practice it might be difficult in large companies without a management system.

2.2.4 Issue-specific aspects of industrial park management

Pollution
The companies have to be aware of all the pollution they produce and the ways to prevent it. They need to use best available technology to do that according to the law.

Energy (with particular focus on CO_2)
Industry's voluntary Energy Conservation Agreement was established with Ministry of Trade and Industry (KTM) and The Confederation of Finnish Industry and Employers (TT) in 1997 and is valid till year 2005. The aim of the Energy Conservation Agreement is to encourage energy conservation in the industry. Improvement of energy efficiency will also reduce carbon dioxide emissions and other emissions.

Transport
In Finland, the municipalities traditionally had the right to decide their own matters to a rather large extent. Therefore, most decisions on transport systems can be made in each town. The most important acts impacting on transport and included in the national legislation are the Land Use and Building Act, Environmental Protection Act and Act on Environmental Impact Assessment (EIA) Procedure, which states that an EIA has to be conducted when building highways. The environmental policy of transport and cooperation in environmental issues are based on the administrative sector's environmental management system of the ISO 14 001 type.

Ministry of Trade and Industry (KTM) and Ministry of Transport and Communications (LVM) and Finland's Truck Association (SKAL) tied a contract in 1999 in improving energy saving in truck and van traffic. The contract was valid till the end of year 2002.

There is no national policy or strategy for ecologically sustainable industrial development as such. However, the Finnish Government's programme for sustainable development (currently under preparation) will have a section on sustainable products, production and consumption, and the programme on sustainable consumption and production patterns (Ministry of Trade and Industry 1997) contained several recommendations. Furthermore, the Industrial Strategy of Finland (Ministry of Trade and Industry 1993) has integrated environmental issues into the strategy.

The sustainability indicators for Finland are available at: http://www.environment.fiThe site includes the indicators of ecological, economical and socio-cultural issues and basic information about the indicators and subjects they are related to.

2.3 Procedures for Town Planning (related to Industrial Parks' Policy)

The aim of the legislation is to emphasise the importance of town planning in implementing the Nation wide policies e.g. concerning sustainable development. The Land Use and Building Act is the key law concerning town planning and the main law having practical influence on Industrial Parks. Other laws that should be considered in special cases are:

- Nature Conservation Act
- Environmental Protection Act
- Act on Environmental Impact Assessment Procedure
- Waste Legislation
- Noise Abatement Legislation
- Air Pollution Control Legislation
- Water Act
- Chemicals Act
- Act on Compensation for Environmental Damage
- Environmental Damage Insurance Act

(from: http://www.vyh.fi/eng/environ/legis/index.htm) http://www.environment.fi
The regulations are usually Nation wide but the local municipalities/cities can make their own restrictions on matters of local importance such as sudden, disturbing noise sources or cleaning of wastewaters.

2.3.1 National Policy Plans

The Ministry of Environment draws the National goals for land use, which are then approved by the Council of State. These goals comprise, e.g. main infrastructure networks or natural and built-up areas of national importance. The current policy emphasises Public Participation and Environmental Impact Assessment among other goals.

2.3.2 Regional Policy Plans

The National policies are implemented in the Regional plans drawn by the Regional Councils (alliances of municipalities) and confirmed by the Ministry of Environment.

Municipalities may decide on joint master plans, regulating e.g. road planning, and the location of retail trade, workplaces, and residential areas. Such joint plans require the approval of the local authorities and are confirmed by the Ministry of Environment. Usually, every municipality/city has its own master plan approved by the local council. When the local plans are drawn up consultations have to be held with the Regional Environmental Centre, which ensures that National goals are conformed and implemented in the plan. Special attention is given to ensuring that there is an appropriate regional and community structure, to preserving landscape values and ecological sustainability, and to providing the proper operating conditions for business and industry.

The local councils (municipalities) make the local detailed plans that are congruent with the regional plans and -policies and master plans. The Land Use and Building Act gives local authorities more extensive powers to make independent decisions in land use planning matters than before.

2.3.3 Town planning related to industrial parks (in general)

The Land Use and Building Act regulates both town planning and building concerning industrial parks. The local detailed planning is in crucial position; without an accepted detailed plan you cannot build anything bigger than a $10m^2$ cold storage. The local authorities can refuse the building permission if the building project is not according to the regulations or consistent with limitations (e.g. gross floor area) stated in the detailed plan. One can apply for a change in the detailed plan but there have to be good reasons for it and all the consequences of the change has to be studied by the authorities meaning that every office of the municipality will give a statement about the change in the plan. As the municipality is often a stakeholder in the project, the area for the Park is included in the district plan.

The Environmental Act aims for the prevention of environmental impacts. If the function of the Industrial park or Technology centre is likely to have an effect on the environment (e.g.

factories), according to the law, permission is needed. Permissions can be obtained from the environmental office of the local authority or from the Environmental Centre of the Region depending on the scale of the functions and impacts. The Environmental Act clearly states which enterprises need permit. The permission procedure is regulated by the Environmental Act and requires an Environmental Impact Assessment and target values for the environmental performance of the applier. This applies to all issues-specific aspects as well as other impacts.

According to Environmental Impact Assessment Act an EIA is mandatory in big operations that will have effect on the environment such as new landfill areas, big factories and motorways. The Act includes management models for conducting the EIA. As technology centres seldom have these, there is no need to explain it further.

2.3.4 Issue-specific aspects of town planning related to industrial parks

Pollution
The new Environmental Protection Act (86/2000) implements the European Union directive on Integrated Pollution Prevention and Control (IPPC), which obliges EU member states to integrate the control of emissions caused by industry.

The Ministry of the Environment is responsible for managing, directing and promoting the objectives of the Environmental Protection Act. Regional Environment Centres oversee and promote air pollution control regionally. An environmental permit is required for activities, which may cause environmental pollution specifically mentioned in the Act. Those who have permits have to pay yearly for a fund established for cases of accidents and incidents. The money from the fund is used to pay compensations if the responsibility of the accident is not found out in the court or if the responsible one is not capable to pay the compensations.
Energy (with particular focus on CO_2)
The energy economy of buildings is guided by legislation. The specific Energy requirements for buildings are laid down in the Building Code e.g. the insulation, energy-efficiency of the heaters and ventilation of the buildings are regulated and instructions are given on how the building has to be completed.

The Finnish government supports the less polluting energy sources in an indirect way. As the construction and real estate sectors produce one-third of Finland's annual carbon dioxide emissions and 40% of all primary energy produced is used in constructing industry and in existing buildings. Special attention is given to reducing emissions in these sectors. The Ministry of Environment has a programme aiming to reduce the emissions and improve eco-efficiency through use of new technology and research.

Since 1997, no taxes on fuels for electricity production have been applied. Instead, there is an output tax on electricity, which falls into two classes: a lower rate 0.4 €cents/kWh (2.5 pennies/kWh) for industry and greenhouse cultivation and a higher rate 0.6 €cents/kWh (4.1 pennies/kWh) for households and the service sector. To improve the competitiveness of renewable energy sources, taxes on electricity produced by wind and wood-based fuels are refundable. As a member of the EU, Finland has harmonised its VAT system by amending the VAT Act. The additional duty on natural gas based on the carbon content of the fuel is reduced by 50 per cent. The additional duty on peat is also reduced. This concerns the Park only if it has energy production, as the demand for the environmentally friendly energy is lower than for regular energy the taxation does not reduce the price of environmentally friendly energy below the price of regular energy.

Transport
The planning of road network and providing of public transport is the responsibility of the municipality. The decision of principle of Finland's Council of State declares that the road network should be planned in a way that makes traffic accidents theoretically impossible

providing the drivers drive according to the legislation. This affects all town planning, although transportation routes are usually presented in the Regional plans or Joint master plans. There are also aims to reduce the total amount of traffic.

The ways of providing the public transportation varies. Usually the city buys the service from a entrepreneur but some of the bigger cities also have their own companies that have to compete with the private firms. The public transportation is seldom profitable to the municipality, to attract customers the prices have to be low. The rail network and the trains are maintained and owned by the VR (Finnish railway company), which is owned by the State. There have been some changes in the management of these governmental organisations and VR is expected to make profit but there might be changes in that to make the railways more attractive to clients and to reduce the amount of traffic.

The energy tax system is one way of guiding consumer habits to non-pollutive direction. The present one consists of duties on traffic fuels and heating fuels, and on electricity. The fuel duty is divided into a basic duty and an additional duty. The basic duty is differentiated in order to promote environmental protection and, therefore, lower tax rates are applied to unleaded and reformulated petrol, as well as desulphurised diesel oil. The additional, environmentally based duty (the so-called CO_2 tax, introduced on 1 January 1990) is determined on the basis of the carbon content of the fuel. Since September 1998, the rate of the additional duty is € 17 (FIM 102) per tonne of carbon dioxide for liquid fuels and coal.

There is no special mentioning of industrial parks in the law as there has not been any need for that. However, the law differentiates the large, over 2000 floor area, retail trade premises for daily consumer goods. These are usually located in the outskirts of cities and increase the amount of traffic. The law now forbids building such a store outside the areas planned for city centres or especially for a large daily consumer good store. Shopping centres and other similar buildings (Retail Parks) are left out of the law but there has been public conversation also in the Parliament about extending the law in future in order to manage the traffic. This might influence Technology centres as well when they require a lot of daily traffic to their premises.

Building and construction
Finnish Building Act has clear regulations on all building related issues with management and procedure instructions. The National Building Code is included in the law and has obligatory and regulatory minimum instructions on building projects, maintenance, constructions, insulations, fire safety, free movement and transportation, to mention few. For example, because of Finland's cold climate, buildings are heated for the greater part of the year. The Building Code demands they are insulated so well that the annual amount of energy used per cubic metre is of the same order as in countries considerably further south.

Socio-economic issues
According to Land Use and Building Act the aim of town planning is to create premises for an advantageous environment and to advance ecologically, economically and culturally sustainable development.

One of the most important characteristics of local agenda process and in environmental impact assessment is a broad engagement of citizens in planning as well as their involvement in later stages, in a similar manner as in the new Land Use and Building Act.

Other
In waste prevention the main tool has been the education of the public and the taxation system encouraging recycling. The municipalities can have their own limitations on the amount of waste produced in the facility and dumped to the landfills implementing the goals of the Agenda 2001 of the municipalities. Usually the municipality charges more if the waste is not recyclable or is not sorted. However, the Waste service charges are set and collected by the municipalities,

which gives some alteration in the situation of the whole country. For example, if a company at Tampere region produces more than 20 kg/week paper, cardboard, glass, bio or metal waste the waste has to be recycled. The average municipal waste charges in 1998 were estimated at € 33,30 (FIM 200) per tonne for treatment and € 50 (FIM 300) per tonne for collection (+VAT 22%). Some municipalities are already collecting also plastics for incineration. The recycling degree and the cleanness of the waste collection site at the premises is very easily monitored by the collectors of waste and the waste charges are increased respectively.

In addition, The Government has set a waste Tax, which applies to waste deposited in landfills. This is to implement the Agenda 2001 aims of the whole country and to unify the waste charge procedure of the municipalities. The tax law is restricted to municipal landfills; private landfills, such as industrial waste dumps, are excluded from the tax system. The charge is currently € 15 (90 FIM) per tonne.

Where it is impossible to prevent waste generation, the waste generated must be recycled or properly treated and disposed of. Recovery and recycling should be the first priority; a second alternative is conversion to energy. Waste is not allowed to cause environmental or health danger or inconvenience. Waste management is to be based on the best economically available techniques and on sound practices for abating environmental and health risks. Anyone holding waste shall see to proper waste management. In some cases, however, municipalities are responsible for waste management.

The National Waste Plan includes programmes of action for different sectors and has adopted the following time-bound targets:

- In the year 2005, the amounts of municipal waste, construction and demolition waste and waste from industry should be at least 15% less than the forecast amount without waste minimisation measures;
- The recovery rate for municipal waste should reach at least 50% by the year 2000, and at least 70% by the year 2005;
- The recovery rate for construction and demolition waste and waste from industry should reach at least 70% by the year 2005;
- The amount of waste from mining and quarrying and from water and energy supply should be reduced in relation to production volumes, and their recovery rate should be at least 50% by the year 2005.

2.3.5 Stakeholders' participation in town

The new Building Act emphasizes the Public Participation from the early stages of planning and has a specific guidance on land use planning. The Act requires a special participation and assessment scheme to be made when the land use work begins. Participation is organised separately plan-by-plan, in consultation with all interested parties. In addition to all authorities and organisations whose area of operations is touched by the plan all those of whom living and working conditions or other circumstances are likely to be affected by the plan, are included. As the Finnish Association for Nature Conservation puts it, who ever walks by. The Ministry of the Environment has published guidebooks on participation and interaction in planning for the general public as well as for experts.

2.3.6 Support and/or incentives for implementing industrial parks' policy

There are several organisations that offer help for the company if needed. The procedure usually is that the company contacts the organisation and the organisation provides help if the issue concerns the domain of the organisation. These organisations are not specialised for helping just with implementing the policy but to help in every aspect of the management of the Park.

- Tekes: Tekes, the National Technology Agency is the main financing organisation for R&D in Finland. Tekes provides funding and expert services for R&D projects and promotes national and international networking.

- SYKE: The Finnish Environment Institute (SYKE) is the national environmental research and development centre of the environmental administration. Research and development in the SYKE deals with changes in the environment, cause and effect relationships, means of resolving environmental problems and effects of policy measures. SYKE is the national environmental information centre and provides expert services and takes care of certain national and international statutory tasks.

- Ministry of Trade and Industry: Ministry of Trade and Industry's funding for companies is mainly granted by regional Employment and Economic Development Centres (TE-keskusten) acquisitions. There may be EU subsidies in some of the funds.

- Employment and Economic Development Centre: Employment and Economic Development Centres provide many kinds of assistance, advice and consultancy for companies. For example, they help firms to set up, expand, and develop their business operations and personnel. A centre contributes to the development of its region by financing its client companies' investment and development projects and, more generally, projects aimed at enhancing their operational framework and the rate of employment within the private sector.

- Sitra: Sitra, the Finnish National Fund for Research and Development, is an independent public foundation under the supervision of the Finnish Parliament. The Fund aims to promote Finland's economic prosperity by encouraging research, backing innovative projects, organising training programmes and providing venture capital.

- Finnvera: Finnvera Oyj is owned by Finland's government. It is a special financing company, which develops domestic business and promotes export and companies internationalisation.

- Finpro: Finpro provides services, support and information to help Finnish companies enter the international market as swiftly, safely and efficiently as possible.

- SME Foundation: SME Foundation develops and promotes business management skills, principally for small and medium sized enterprises. Activities, Consultant Database, Background, Publications Registration form to the Consultant Database.

- Foundation for Finnish Inventions: Foundation for Finnish Inventions supports and helps private individuals and entrepreneurs to develop and exploit invention proposals. The Foundation's constantly updated Invention Market provides entrepreneurs with new business and product ideas for licensing.

- Nordic Industrial Fund: Nordic Industrial Fund - centre for innovation and commercial development is an institution under the Nordic Council of Ministers. Their goal is to strengthen the Nordic business sector through the creation of a Nordic knowledge market. They achieve this by initiating and financing projects and activities that create synergy between the actors in the Nordic innovation system.

- Many technology centres have joined The national Centre of Expertise programme (CoE programme), which supports regional strength, specialisation between regions and collaboration between different centres of expertise. The Centre of Expertise Programme is an objective programme created in accordance with the Regional

Development Act (1135/93). For example The Centre of Expertise Programme in the Tampere region (of which Hermia is a part of) is financed by TEKES, the Council of Tampere Region, the City of Tampere and nine of its neighbouring municipalities. The development projects are financed by participating companies and normal project funding such as TEKES, the Academy of Finland and the EU.

For example in Innopoli (Espoo) there are several service businesses operating in the technology centre that help the firms in taking care of routine tasks. Additionally, the non-profit organisations of Innopoli offer venture capital investment services, financial services and counselling services for the businesses in Innopoli. In Innopoli there are organisations (Spinno, Mentor Programme, Spinno Seed, Culminatum, Foundation for Finnish Inventions) that help the entrepreneur to develop and expand his operations. In Hermia Business Development specializes in the challenges of starting and developing business operations. Hermia Business Development comprises of evaluation of a business idea, incubator services, licensing services, development services, Financial services.

2.4 Public Policies and Future Perspectives

In Finland municipalities have committed to Local Agenda 21 (Rio declaration 28 §), which is municipality specific sustainable development plan. Finland's municipalities have actively met the claim of Rio. Most of Finland's municipalities have constructed or are constructing at this very moment their sustainable development plans and projects related to sustainable development.

The Ministry of Environment has a program for ecologically sustainable construction, which aims for incorporation of environmental aspects into decision making and construction planning in the construction and property sector. It includes the incorporation of environmental aims into quality requirements and management systems. To help companies to assess the significant environmental impacts, reference values and systematics will be developed in an environmental cluster programme (the Environmental Technology in Construction programme coordinated by the Ministry of Environment and TEKES).

The Ministry of the Environment and regional environmental centres take care of the preservation of biodiversity, good living environment, building heritage, development of community structure, and land use.

2.4.1 Sectoral Policy Plans for Sustainability

The growing importance of towns and cities in Finland has led to a need for systematic urban policies in the form of Regional Policy Plans. The working group on urban policy, which is made up of representatives of different ministries and various cities, has launched a number of projects to develop urban regions. The projects focus on urban structure, improving suburbs and services, preventing social problems and developing urban economies.

The Ministry of the Environment supported suburban renovation with an extensive research and development programme, and has subsidised repairs in 49 suburbs in conjunction with the Housing Fund of Finland. In addition, the Ministry of the Environment has drawn up a green strategy for the year 2000, to promote preservation of the vitality and diversity of nature in towns and cities. Finland's national programme on environmental health contains a proposal for considerably more research on the links between health and the built environment. This research has already been launched with government support.

The Ministry of Trade and Industry has signed energy conservation agreements with the organizations of industry and employers, energy producers, energy distributors and with the organizations of local authorities. In addition, the Confederation of Finnish Industry and Employers and its branch organizations have prepared and launched an Industry Action

Programme for Promoting Sustainable Development ("Responsibility for the Environment and Welfare" 1997). The main objectives of the programme continue to be improvement in the following fields: development of products and production methods; development of corporate culture and know-how; development of partnership with stakeholders. The programme also includes branch-specific qualitative targets. Industrial enterprises and industry federations are responsible for the implementation of the programme.

2.4.2 Other

The building authorities and the property and construction sectors are working together to pursue the goal of sustainable development in building and property maintenance in Finland on a general level. Experimental building is being used to test the results of research and development work in the construction sector and to speed up the introduction of technical innovations. Much research has been conducted on assessment procedures, planning instructions and other tools for planning, building design, the construction process and maintenance. The most important ongoing environment-related research and development effort is the Environmental Technology in Construction Programme (1995-1999)**.** The programme aims at developing methods and techniques for environmentally sound construction.

The management of industrial parks have to integrate the policies of the Finnish government implemented in the legislation. However, the management of industrial parks is not integrated in the policy making of National, Regional or Local authorities.

The Council of State has integrated some of the issues concerning management of industrial parks concentrating on the construction and management of the buildings through the Building Act. The implementation of these issues to the company level is the responsibility of the company in question. Local Environmental Centres and TE-Centres, etc. can help in the process. The services can also be bought from a subcontractor. Consequently, these issues are often company specific and obtaining information as well as the uniformity of information is difficult. The answers from the Centres will give some examples of the integration.

Finland has its own program within the united nations division of sustainable development:
http://www.un.org/esa/agenda21/natlinfo/countr/finland/index.htm

3. GERMANY

Germany is a federal republic made up of sixteen "Länder" (states belonging to the federation) with their own legislation and administrationEnvironmental protection and planning is carried out by the government with responsibilities between the federal government (Bund), the federal states (Länder) and the municipalities (Gemeinden).

As to the description of national data the German situation is complicated because of the large number of states. North Rhine-Westphalia (NRW) is the most highly industrialised area of Germany. From this point of view we have chosen this state for further research on the topic of development of sustainable industrial areas.

3.1 Overall National and Regional Information over Industrial Parks Policy

Most common translation of the concept of "industrial park" in the German language is "Gewerbegebiet" or "Industriegelände". In Germany the concept of industrial park is very old. There are many definitions in many different documents, e.g. regional development plans and land-use plans. In the land-use plan industrial parks are covered by the term of "industrial area". The policy of North Rhine-Westphalia aims at a balance between settlement of production, supply and service companies.

Definitions of ILS (Institute for State and City Development Research of North Rhine-Westphalia): a place for generation of products or services. In the North Rhine-Westphalia Regional Development Plan (LEP NRW) the definition is: area for the settlement of trade and industry; a special type of industrial area has been defined in 1978: "area for large settlements" (Groszvorhaben) with a minimum size of 200 ha per settlement. In 1995 the minimum size of one settlement is reduced to 80 ha. Nowadays this type of industrial area is hardly in use anymore. One of the latest publications mentions: areas for settlement of companies for production and companies in the secondary and tertiary sector.

The translation of the words eco-industrial park in German is "Nachhaltiges Gewerbegebiet" or Nachhaltiges Industriegelände". However these words are not often used in Germany. More common are the words Technologiezentrum, (Eco-)Gewerbepark or Technologie Park. With respect to sustainability and industry the concept of "(support of) sustainable industry" (Nachhaltige Wirtschaft(sförderung)) is very common. The development of sustainability in Germany is more related to industry than to industrial park. In policies there is no unambiguous definition for Eco-industrial parks.

<u>Governmental organisations:</u>

1. German federal government (Bund), federal ministry for spatial planning, building and urban design (Bundesministerium für Raumordnung, Bauwesen und Städtebau).
2. The federal states (Länder), ministry for economy, self-employed, energy and traffic and ministry of urban design, housing, culture, and sports (Ministerium fur Wirtschaft, Mittelstand, Energie und Verkehr und Ministerium für Städtebau, Wohnen Kultur und Sport).
3. Governmental region
4. District
5. The municipalities (Gemeinden)

Non- or semi-governmental institutes:

1. Gesellschaft für Wirtschafsförderung (as a daughter of the ministry for economy, self-employed, energy and traffic)
2. Regional Wirtschafsförderungsgesellschaften, for example: Agit, Emscher Lippe Agentur and Entwichlungsagentur Östlichtes Ruhrgebiet.
3. Landesentwicklungsgesellschaft Nordrhein-Westfalen Gmbh (LEG) as a daughter of the Ministry of Town planning, Housing, Culture and Sports
4. Project Ruhr Gmbh. supports economic development of several branches in the area.
5. Montan-Grundstückgesellschaft mbh is working together with municipalities and founds project development companies.
6. Institut für Landes- und Stadtentwicklungsforschung (ILS) (daughter of Ministry of THCS) for support of industrial development policy.

An important tool for area demand management is a model for development of demand prognosis for industrial areas (GIFPRO).

Other non-governmental institutes in Germany:
The International Council for Local Environmental Initiatives, Iclei, Freiburg. Hannover and Saarbrucken are active participants of Iclei in Germany.
European Academy of the Urban Environment. This institute is settled in Berlin and is researching the field of city planning (energy, noise, ecology, traffic) an industrial areas.

One of the publications of EAUE:is 'Restructuring of Derelict Industrial Areas'This report proposes strategies for conservation of industrial areas and restructuring of fallow urban areas, describes requirements and concepts for developments and execution of projects and examples specially of middle European cities and concludes with a list of recommendations

Table 3-1: Governmental organisation

The German federal government (Bund): federal ministry for spatial planning, building and urban design (Bundesministerium für Raumordnung, Bauwesen und Städtebau)	Responsibility for land-use planning laws: Federal Spatial Planning Act (Bundes-raumordnungsgesetz) Orientation Framework for Regional Planning Policy (Raumordnungspolitischer Orientie-rungsrahmen, 1993)
The federal states (Länder): ministry for economy, self-employed, energy and traffic (Ministerium fur Wirtschaft, Mittelstand, Energie und Verkehr) and ministry of urban design, housing, culture, and sports (Ministerium für Städtebau, Wohnen Kultur und Sport)	The state development programmes (Landesraumordnungsplan) Support, approval, promotion of industrial estates
Governmental region	The regional development programmes (Regionale Entwicklungsprogramme) are developed for parts of the various states
District	
The municipalities (Gemeinden)	Initiatives for planning development and acquisition of industrial areas

3.2 Research projects

There are research projects on several specific topics such as traffic, water, human resources, energy, etc. However, research on sustainable industrial area development as a whole is very rare. One example is the following study:

Management conditions for sustainable development of industrial areas (Organisatorische Voraussetsungen und Umsetzungsbedingungen fuer eine nachhaltigere Gestaltung van Gewerbe- und Industriegebieten.) Stuttgart Juni 1998.-Akademie fuer Technikfolgenabschaetzung in Baden Wuerttemberg-Arbeitsbericht Nr. 109

In this report, a group of specialists tries to answer the following questions:
1. Which are the possibilities for environmental friendly and aesthetic development and usage of industrial parks and why are these possibilities not being used?
2. Which possibilities and which barriers have the actors to deal with?
3. Which tools are appropriate?
4. Is it useful to have round the table discussions with all these actors?

Preface
The present situation in NRW could be described as difficult with respect to land use. The very high demand for space for industry, traffic, living and leisure is hard to combine with the requirements for a sustainable society. Not only the recycling of material but also the re-use of land is necessary to achieve the targets for sustainability. The flexible use of buildings and the high aesthetic quality of buildings and industrial parks are urgently needed. Besides high quality of land use politics and business promoting, the co-operation of companies and other actors is very important.

Conclusions
The requirements for an economically feasible and sustainable development of industrial parks are too complex to be managed by local authorities only. The informal discussions between the actors (officials, project developers, b rokers, investors, companies, builders, architects, conservationists, etc.) become more important. Re-use of buildings and old industrial areas will be a field of development. On this subject there are four main problems to be solved: time, image, responsibility and costs. Extensive meanwhile usage of these areas like storage of goods or utilisation for all kinds of public events seems to be a part of the solution. After a period of time, when some interested parties announce themselves, a plan could be made for refurbishment of buildings and revaluation of the area. For local authorities this means a much greater effort than only making building space for industry available. It depends mainly on the capability of the department of business and employment promotion to bring all relevant parties together round the table and thus creating the right investment climate for new business development. As a result of the shortness of space, the local authorities have to work together instead of having competition about the creation of business activity. As built areas are spreading out over the municipal area they are coming together at the borders of municipalities.

The aspect of aesthetic of buildings is very hard to cover. Nowadays most companies pay much attention to their image and identity. This could mean that a conflict of interest arises between the company and the industrial park because the former party wants to have a certain conformity and continuity at the park to be able to offer more flexibility to future developments. The overall conclusion of this discussion could be that the communication and co-operation of all parties involved is of great importance for the quality and sustainability of industrial areas.

3.3 Demonstration projects

1. Energy efficient industrial park Aachen-Heerlen (demoproject LZE)
In between Aachen and Heerlen (the Netherlands) an industrial area is planned. The aim of the project is to minimise the energy consumption by extra insulation, heat recovery, making use of passive solar energy, application of energy efficient appliances, demand controlled lighting and ventilation.

The building energy consumption is limited to 75% with respect to the German energy performance requirements (Wärmeschutzanforderungen). This extra limitation is mentioned as an obligation in the ground contract.

Heat and power will be generated by use of a biogas installation, wood burning, wind turbines and solar power panels.

2. Ecological industrial park Öko-Zentrum NRW Hamm

In the area of a former mining company Sachsen a new ecological industrial park has been created. At this park the Ökozentrum NRW is established. The old buildings are refurbished and reused in a sustainable way. The plant is energised by a combined heat and power installation. The other companies in the park are sustainability-orientated.

3. Emscher Park

The Emscher Park Building Exhibition is not an exhibition in the classical sense, but a process with many activities. In this process of structural change, the International Building Exhibition is working together with many bodies on a broad basis: with the local authorities, industry, associations, pressure groups and the people. The councils of the 17 local authorities of the Emscher region voted to join the building exhibition at its creation. In this complex framework, the IBA GmbH acts as a co-ordinator. The IBA is institutionalised in the Steering Committee and in the Board of Trustees. The Committee decides on the admission of projects to the exhibition, and the Trustees bring together representatives from public life that promote the Building Exhibition and support its initiatives.

The 17 local authorities of the Emscher region and various groups that co-operate on the project are currently developing and implementing 92 projects in the following fields:

- modernisation of coal mining settlements and construction of new housing, with a focus on quality of live and environmental issues;
  http://www.iclei.org/egpis/egpc-039.html
- 'Working in the Park': developing new corporate buildings on derelict land, to enable the creation of new economic poles
- preservation and re-use of industrial monuments as witnesses of history
- landscaping of the Emscher area into a park connecting all 17 urban areas, with pedestrian and cycle paths, and thematic areas;
- ecological restructuring of the Emscher river and its 350 km of tributaries.

The entire Emscher Park project contains a wealth of innovative elements that may serve as an example to areas with similar industrial histories. These include:

- increased public awareness of the historical significance of their surroundings;
- successful land use planning based on multi-disciplinary working involving planners, economists, ecologists, architects and artists;
- planning process goals set to attain a realistic optimum, rather than utopian ideal.

4. Gewerbepark Friedberg, Suhl/ St. Kilian

Although it could not be noticed from the name, this industrial park is designated as a sustainable enterprise. The municipality aimed at

- nice industrial architecture
- a good fit within the surrounding nature under the slogan "sound economy combined with sound environment"
- a dedicated and economically management

At the early nineties the city of Suhl was searching for new ground for industry. The old industrial sites were located in residential areas. The city is surrounded by the Thüringer Wald were the establishment of an industrial site would cost a lot of nature. For this reasons the local

authorities made an effort to obtain the grounds of a former officer's school. This school was no more running because of the changes of 1993.

The industrial area is extended over the premises of two municipalities: Suhl and St. Kilian. In order to develop this area an association of these municipalities has been founded. The Suhl-Friedberg industrial park was one of the cases of the research project: Experimental Housing and Town planning (EXWOST).

A design handbook as well as an investor's handbook has been published specially for this industrial area. In the design handbook special energy measures and provisions for vegetation and traffic are recommended. The area is equipped with special road indicators and panels with information about the area and the companies, which are settled there. Provisions have been taken to create green borders between buildings, trees and vegetation areas along the main roads.

The project has been financed with subsidies of several sources (regional, national and European). The management of the park was lead by the mayor of Suhl. The participating companies are all member of an association, which finances special provisions such as the connection to the public transport and the federal main road. The association also organises a big party every year for employees and neighbour citizens of Suhl and St. Kilian.

One of the main conclusions of this project drawn by the participants themselves is that the success of the project not lies in the power of rules and regulations but more in the good co-operation and communication between all participants of the project.

5. Value Park, Schkopau

The concept of the Value Park implies that for the first time a location wasdeveloped that is geared to a specific branch of industry. The official go-ahead for its implementation was given in April 1998.

The core objective of the Value Park is to locate companies from the plastics-processing industry and service providers in the immediate vicinity of the chemical plants, therefore making efficient use of the value-added chain of Buna Sow Leuna Olefinverbund GmbH. The locating businesses have the opportunity to process the widest range of raw materials practically on their doorstep, and so achieve synergies by using existing infrastructures and logistical structures. A speedy chain of supply, reductions in plant and operating capital, jointly available service functions and the integration of the materials flow are all decisive factors today in securing a competitive edge. The Value Park can offer such advantages and allows the companies located considerable scope for development. So far 7 national and international companies have been located on the approximately 70-hectare Value Park site in Schkopau, investing more than 130 million euros and creating over 300 jobs.

They include the Belgian company Ravago, a leading global plastics recycling and compounding company, Kurotec GmbH from Germany, which produces various glass fiber-reinforced plastic moldings, and the transport and logistics company Hoyer GmbH from Hamburg. The success of this concept is evident in that all the businesses located here so far are considering expansion at the site in central Germany, and negotiations on location are currently underway with further investors, in particular processors of polyethylene terephthalate, polystyrene and polypropylene. The biggest single partner using the ValuePark concept is the European Vinyls Corporation (EVC). The company has taken on the existing PVC division of Buna Sow Leuna Olefinverbund GmbH as well as invested 50 million euros in the construction of a new PVC production plant, consequently becoming the largest customer for the vinyl chloride monomer produced in Schkopau. Today EVC employs over 120 people at the site in central Germany.

Other eco-industrial parks, which are discussed in ECN publication: Eco-industrial Parks in Germany, are:
6. Öko-Tech-Park Windelsbleiche in Bielefeld
7. Technologie Park Hamburg Nord

3.4 Interpretation / analysis of the ongoing projects and experiences in this field

The need for sustainable industrial park development in NRW is very high because of the very intensive land use. Concentration of industrial activities is no longer possible because of lack of free surface. Re-use of land and buildings is becoming more important. Large areas of both industrial as well as residential functions are present.

Because of the lack of space a number of industrial parks are founded and developed by more than one municipality in a sort of co-operation. Suitable areas often lie next to the borders of municipalities and therefore a joint effort is mostly profitable.

The existing legislation and procedures for urban planning and development of industrial areas are no longer sufficient to fulfil the demands of specific, high qualities and sustainability of so-called eco-industrial parks. The quality of communication between all actors will play an important role in this matter rather than rules and regulations. The concept of Eco-industrial parks is very young. That is another reason why rules and regulation often do not apply to the specific demands of these parks. The vehicle of communication, co-operation, agreements, financial support, incentives and exchange of knowledge are more appropriate in this stage of development of the concept of eco-industrial parks. With respect to the complexity of the matter I think it will keep that way for the time being.

More fine-tuning and co-ordination of planning procedures and measures is necessary in Germany. Work on an Environmental Law Code is in progress.

Because of the reunification and the economic slow-down the emphasis is presently on speeding up and shortening planning and licensing procedures. Under these circumstances environmental planning does have the important task of a management tool, EIA (Environmental Impact Assessment) being one of the important measures.

3.5 Procedures of Industrial Parks

Procedures of Industrial Parks could be separated into land use planning and environmental acts:

3.5.1 Land use planning

Germany is a federal republic made up of sixteen "Länder" (states belonging to the federation) with their own legislation and administration. The government with regard to environmental protection and planning is carried out with responsibilities between the federal government (Bund), the federal states (Länder) and the municipalities (Gemeinden).

At the federal level responsibility for land-use planning lies with the Bundesministerium für Raumordnung, Bauwesen und Städtebau (federal ministry for spatial planning, building and urban design). The Federal Spatial Planning Act (Bundesraumordnungsgesetz) of 1965 sets the general rules for the lower levels of government. Next to this act there is an Orientation Framework for Regional Planning Policy (Raumordnungspolitischer Orientierungsrahmen, 1993).

The state development programmes (Landesraumordnungsplan) are developed for the area of one state (Land). The regional development programmes (Regionale Entwicklungsprogramme) are developed for parts of the various states. They cover the areas of settlement, industry, agriculture and forestry, nature protection and landscape planning, recreation, traffic, waste disposal, water resources, waste water treatment and environmental protection by technical means.

The preparatory land-use plan (Flächennutzungsplan) represents the type of land-uses arising for the entire municipal territory in accordance with the intended urban development. The binding land-use plan (Bebauungsplan) makes designations regarding type and degree of building and land-use, e.g. the coverage type, plot areas which may or may not be built on, spaces for common facilities, spaces for local public infrastructure, public and private green spaces. The construction plan (Bauplan) contains the requirements for a single construction project.

As to the description of national data the German situation is complicated because of the large number of states. North Rhine-Westphalia (NRW) is the most highly industrialised areas of Germany. From this point of view we have chosen this state for further research on the topic of development of sustainable industrial areas. Typical situation in NRW: high occupation rate. Re-use of areas, intensifying, mixed areas.

North Rhine-Westphalia State Development Plan (LEP NRW)

The following laws provide the legal foundations for the LEP NRW:

- Spatial Planning Act (*Raumordnungsgesetz* = ROG) as published on 28.04.93 (BGBl. I S. 630);
- Regional Development Act (Regional Development Programme - *Landesentwicklungsprogramm* = LEPro) as published on 5 October 1989 (GV. NW. S. 485 / SGV. NW. 230);
- Regional Planning Act (*Landesplanungsgesetz* = LPIG) as published on 29 June 1994 (GV. NW. p. 474).

Goals of the ministry of urban design, housing, culture, and sports of the state government of North Rhine-Westphalia are:
The following criteria must be met as a priority where commercial and industrial development areas are represented by local development planning and/or in area development plans:

- Inner-city development actions, in particular the use of derelict and unused sites has precedence over the use of open space in the suburbs.
- The possibility of rounding off existing commercial and industrial sites should be exhausted before other sites are used. Sites with rail and waterway connections should be given preference.
- Under-used commercial and industrial sites should be consolidated where possible.
- Opportunities for evening out the supply of land at supra-authority level should be exploited.
- In mixed-use areas the stock of commercial businesses should be safeguarded by drawing up plans to secure locations.
- New residential building land should be designated in reasonable proportion to existing/planned commercial and industrial land.

Sites that meet the following criteria should be given preference when new self-contained commercial and industrial development areas are being represented in area development plans:

- short connection (existing or planned) to the supraregional road network and high-capacity modes of transport (in particular rail, waterway and local public transport);
- integration into urban development planning;

- if possible with inter-authority co-operation;
- suitability for interlocal co-operation.

In the land-use plan industrial parks are covered by the term of "industrial area". The policy of North Rhine-Westphalia aims at a balance between settlement of production, supply and service companies.

The concept of a separate management body for an industrial park is rather new in Germany. Tasks for this type of management are development of areas, administration, supply of services, etc. Commercialisation however, should be done by regional authorities.

The initiatives for planning development and acquisition of industrial areas are mostly in the hands of municipalities. Plans for industrial parks are part of the preparatory and binding land-use plans. The state government defines development programmes and helps communities by giving support, approval and promotion (Ministerium fur Wirtschaft, Mittelstand, Energie und Verkehr und Ministerium für Städtebau und Wohnen, Kultur ind Sport). In-between states and municipality levels there are the levels of Regierungsbezirk and Kreis. The Regierungsbezirk is responsible for the regional planning. The input of the Kreis in the planning procedures is not very obvious.

3.5.2 Environmental acts

There are sector acts for all environmental sectors. In the case of industrial parks, air pollution, noise, odour and vibration would be the most important. These are covered by the Federal Immissions[1] Control Act (Bundesimmissionsschutzgesetz). The link between the Federal Immission Control Act and planning procedures is contained in article 50 of the Immission Control Act. It reads:

"As far as regional planning projects and associated measures are concerned, the land earmarked for specific types of use shall be zoned in such a manner, that harmful environmental effects on areas that are exclusively or predominantly used for residential purposes as well as other areas worthy of protection are kept to a minimum".

Within these areas environmental spillovers may be prevented by creating buffer zones. The size of such buffer zone can be estimated by using the information of a special decree (Abstandserlasz). According to the type of production, various classes of buffer zones are defined.

Specific regulations:
- The First General Administrative Regulation Pertaining the Federal Immission Control Law (Technical Instructions on Air Pollution Control-TA Luft) is of 27 February 1986
- Technical Instructions for the Protection against Noise (TA Lärm, 1978)
- Reviewing Noise from Industrial and Commercial Facilities in the Neighbourhood (Beurteilung von Arbeitslärm in der Nachbarschaft, VDI-Richtlinie 2058)
- Ordinance for the Protection against Traffic Noise (Verkehrslärmschutzverordnung)
- EIA (environment impact assessment)
- The german energy performance requirements (Wärmeschutzanforderungen)

[1] Immissions are air pollution, noise, vibration, light, heat, radiation and similar effects on the environment which affect human beings, animals and plants, the soil, the water, and the atmosphere as well as cultural assets and other material goods (article 3)

3.6 Public Policies and Future Perspectives

Definition of sustainable development.
Sustainable development is a development, which will fulfil the demands of the present generation without risking the possibilities of future generations (Brundtland commission 1997)

1992: founding by the Bundestag of the inquiry commission: "guarding human life and nature". Also the "Rat für Nachhaltigkeit" (council for sustainability) and the "Umwelt-Kabinett" (environment-cabinet) has been founded to implement sustainability in all relevant fields.

3.6.1 Agenda 21

Germany has committed itself by signing the declaration of Rio to implement the recommendations of agenda 21 in cultural, economical and social structures. Nowadays 120 municipalities in Germany have a plan with respect to local agenda 21.

At the governmental declaration of 17 June 1996 the state government of NRW proclaimed the willingness to implement the recommendations of agenda 21. Publication 12/3171 gives an overview of the initiatives of the state government of NRW with respect to agenda 21 objectives.

3.6.2 National Environmental Policy Plan / National Sustainable Development Plan

The state government of NRW has reached an appointment with representatives of business partners and unions, the so-called "Bündnis für Arbeit und Umwelt", the union for labour and environment. This appointment concerns a CO_2-mitigation in buildings of 2 million tons.

The federal government of Germany (Bundesrepublik) has unilaterally appointed a reduction of 25% CO_2 with respect to the emission of 1990, which is much more than the contribution of 8% of the European union to the elaboration of the Kyoto protocol. The Eco tax and the fee for supply of renewable energy to the grid are some of the instruments of the federal government to achieve the target.

NRW is elaborating its own climate protection strategy:
The ministry of building and dwelling has recently published the report: "NRW 2030: sustainable energy household" for promoting sustainable energy.
The energy agency of NRW has developed the "building check".
For companies they are running the Impuls-programs RAVEL (rational application of electrical energy) and Building and Energy.

The programme REN (rational energy application and use of renewable energy) has been started for support of further development, demonstration and marketing. "State initiative for future energy" is one of the projects. The project stimulates all society actors to develop and execute energy efficiency and renewable energy initiatives. Up to now 15 different profession groups (Facharbeitsgruppen) are working on all kinds of projects. Some of the projects are listed below:

- Fuel cells for a bus
- Factory for solar panels Gelsenkirchen
- Energy park Mont-Cenis in Herne
- Solar campus Jülich
- Wind test field Grevenboich
- Biogas installation in Herten
- Decentralised production of gas out of used oil and grease

- Use of waste heat from an aluminium production process for district heating, Neuss
- Aquifer-heatpump system, Rietberg
- Energy concept for an trans-border industrial park Aachen Heerlen
- Educational projects, etc.

The NRW PIUS (product integrated environment protection) programme supports development of recycling processes and the reduction of use of (hazardous) materials. More fine-tuning and co-ordination of planning procedures and measures is necessary in Germany. Work on an Environmental Law Code is in progress.

Because of the reunification and the economic slow-down the emphasis is presently on speeding up and shortening planning and licensing procedures. Under these circumstances environmental planning does have the important task of a management tool, EIA (Environmental Impact Assessment) being one of the important measures.

3.6.3 European orientated

The board for ministers for spatial planning in Germany has accepted the European Space Development Concept (EUREK) in 1999 in which the sustainable development of space is covered. The main objectives of Eurek are:

- reinforcement of economical and social cohesion
- conservation of natural basic elements for living and cultural heritage
- creation of a balanced competition in Europe

The elaboration of Eurek is realised by a number of programmes a.o. INTERREG. NRW is working within the Interreg II programme on the programmes North-west European metropolis space (NWMA) and Interreg-Rine-Maas-activities (IRMA). Within the NWMA programme the following projects are relevant:

1. Metropolitan Fringes: Control of urbanising, sustainable development of border areas, evaluation and innovative proposals
2. Spatial vision: the spatial planning prospective
3. ERIH: European direction of industrial culture
4. TRADE: co-ordination of the transnational spatial planning policy for regional development of buying centres "auf der grünen Wiese"

Item number 3 and 4 are under the lead of NRW.

Within the third phase (Interreg III) the follow up of the co-operation of EU nationalities is called "North-west Europe" (NWE). NRW is also participating in this program. The following objectives are mentioned:

- an attractive and coherent system of cities, towns and regions
- sustainable management of water sources and prevention of flood
- sustainable development and careful management of alternative resources and cultural heritage
- transport and traffic

3.6.4 Global policy

URBAN 21 discussed the problems, which the growth of cities generates in developing and in newly industrialising countries, as well as the various problems of urban development in industrialised countries. Population growth in the cities and migration to the cities represent serious obstacles to a development that is economically effective and beneficial to the society and the environment. The problem is not growth as such, but cities' lack of capacity and competence for taking action to manage this growth and to create the economic, social and planning conditions for liveable cities.

Final declaration of the recent Urban 21 conference (only relevant points are quoted):
"We, citizens and representatives of 1000 cities, governments and civil society organisations from over 100 countries from all regions of the world, met in Berlin, from the 4th to the 6th of July 2000, at the Global Conference on the Urban Future (URBAN 21). We commend this declaration to the public and as a contribution to the Special Session of the UN General Assembly (Istanbul+5)."

The declaration recommends the following actions as the most urgent:

- Cities and other levels of government should adopt effective urban policies and planning processes, which integrate the social, economic, environmental and spatial aspects of development, recognising the interdependence between the city and the region, and between the urban, rural and wilderness areas.
- Cities should embrace information and communication technologies and promote the life-long education of all their citizens to become learning cities and to achieve global competitiveness.
- Cities should promote the use of environmentally friendly technologies and materials, including renewable sources of energy and higher efficiency in the use of natural resources.
- Cities should strive to promote local economic development, including recognising the role of the informal sector and integrating the informal into the formal economy.
- Cities should, in co-operation with other levels of government, provide incentives, regulations and benchmarks, which will encourage the private sector to think globally, act locally and reach out to the poor in a non-discriminatory manner.
- Cities should, where appropriate, consider accepting and integrating informal settlements into the existing urban structure and social life.
- Cities should conserve their historical heritage and aspire to become beautiful places where art, culture, architecture and landscape bring joy and inspiration to the citizens.
- Cities should adopt appropriate land use planning and implementation measures with a view to promoting vibrant economies, functioning land markets, affordable housing and suitable infrastructure.
- Cities should promote the development of an appropriate integrated public transport system which is fast, safe, accessible and affordable; better manage the use of the private car, and encourage the use of environmentally friendly means of transport.
- Cities should attempt to achieve a good balance between the natural and built environment and should take action to reduce air, water, land and noise pollution, thereby enhancing the citizens' quality of life.
- Cities should govern themselves and order their relations with all their citizens, without discrimination, in accordance with the principles of democracy and good governance, with special outreach to women, youth and minorities.
- Non-governmental organisations and community-based organisations should be empowered to participate fully in equitable and sustainable development.
- The private sector, local, national and international, should bring to bear financial instruments and investments in a manner that promotes sustainable urban development.
- National governments should give high priority to their urban development policies in the framework of national and regional policies.
- National and regional governments should ensure that cities have sufficient power and resources to carry out their functions and responsibilities.

Since 1998 many German professional institutions, in particular, have organised symposia, conferences, exhibitions and workshops on sustainable urban and regional developments under the umbrella of Urban 21.

Through several support programs of the state and federal authorities for industrial developments the co-operation and communication between all stakeholders is promoted.

4. PORTUGAL

4.1 Overall National and Regional Information over Industrial Parks Policy

The concept has developed over time, since the 70's, when it was firstly introduced. In the beginning of the 90's industrial parks were understood as planned agglomerations of industrial activities aiming at industrial development. The reference document for this definition is the legal document "Decree-Law 232/92 from 22 October 1992".

As a consequence of the increasing importance of the service (or "tertiary") sector at the cost of the industrial (or "secondary") one, the concept of industrial park has developed towards "Enterprise Location Areas". This is defined as a spatially limited area especially planned and prepared to receive certain types of industries as well as commercial activities and services, that is managed by one single entity with administrative competences. The reference document for this definition is the recent legal document "Decree-Law 46/2001 from 10 February".
Because in Portugal there is not yet any Enterprise Location Area (at least as defined by the legislation), during the rest of the text we shall refer to the definition of industrial parks.

There is no specific definition of eco-industrial parks embodied in the Portuguese legal documents. However, the concept of "Enterprise Location Areas" includes some environmental aspects and refers the need for sustainable development. The reference document is the recent legal document "Decree-Law 46/2001 from 10 February".

Table 4-1: Governmental and non-governmental organisations

Political (Governmental)	**Civil (Non-Governmental)**
National: • Ministry of Economic Affairs, namely the Portuguese General Directorate for Industry (DGI) and the Institute for the Support of Medium and Small Enterprises and Investments (IAPMEI). • Ministry of the Environment and Land Use, namely the Portuguese Environmental National Agency (Instituto do Ambiente); • Ministry of Planning. **Regional:** • The Autonomous Regions of Madeira and Azores; **Local Government:** • National Association of Municipalities; • Different Municipalities;	• Portuguese Entrepreneur's Association (AEP) through a specific enterprise called "Parque-Invest". • Chambers of Commerce • Business Associations • Industrial Parks' management bodies; • Universities and Research Centres (such as National Institute of Industrial Engineering and Technology (INETI), UNINOVA, etc.).

Table 4-2: Division of authority and responsibilities between organizations
The Ministry of Economic affairs usually takes the initiative and plays the main role in the decision making process. The other stakeholders act as advisers, as follow.

Organization	**Authority and Responsibilities**
Ministry of Economic Affairs;	Defines the main policy and sets the priorities.
Ministry of the Environment and Land Use;	Participates in the decision making process regarding the land use and environmental aspects. Through the environmental impact assessment process this Ministry has the veto power in order to stop the licensing process in those cases where the environment would be at serious risk.
Ministry of Planning through the DGDR	Through the Portuguese General Directorate for Regional Development, the Ministry of Planning coordinates the allocation of Structural Funds from UE and articulates the different regional development goals.
The Autonomous Regions of Madeira and Azores;	
Regional Delegations from the Ministry of Economic Affairs;	Coordinates the licensing process of the: • Enterprise location areas; • Industrial licensing.
Portuguese Environmental National Agency ("Instituto do Ambiente")	Give environmental permits to industries
Commission for Regional Coordination	In case of only existing Municipal Land Use Plan (and no other detailed plans), the Commission for Regional Coordination gives permits for industries' location.
Regional Directorate for the Environment	• When the permits of location are conduced by the Commission for Regional Coordination, it is heard on this matter; • Participates on the emission process of environmental permits.
National Association of Municipalities**;**	Represents the interests of the municipalities at the national level.
Local Authorities	• In case of existing Urban Plans, Detailed Land Use Plans or Industrial Parks, the Local Authorities give permits for the location of the industry. • Building construction permits. • Through Municipal Land Use Plans, defines the main uses and rules for the territory • It may initiate the establishment of new industrial parks (usually by co-operating with business associations or individual enterprises)
Portuguese Entrepreneur's Association mainly through Parque-Invest;	• Represents Portuguese Enterprises in a national level • Co-operates with municipalities, creating

	new enterprises for the establishment and management of new industrial parks
Chambers of Commerce	Represents the interests of the local entrepreneurs.
Business Associations	Represents the companies.
Industrial Parks' management bodies	• Represents the industrial park and/or individual companies located there (only in some cases, depending on the services rendered by this body); • Defines rules for the establishment of companies on the park.
Universities and Research Centres (like National Institute of Industrial Engineering and Technology (INETI) and UNINOVA)	• Co-operating with the industry and other stakeholders; • INETI serves as an interface between Research and Development, technological integration activities and the business community, sustainable economic growth

4.2 Research and Demonstration projects and experiences over industrial parks

Several experts were interviewed and their opinion is that probably no such projects exist. The only reference that could be found points out to a working group, formed in 1998, by the Portuguese Institute of Quality (IPQ) aiming the creation of a qualification system for industrial parks. This working group had the participation of the Portuguese General Directorate for Industry (DGI), Institute for the Support of Medium and Small Enterprises and Investments (IAPMEI), Portuguese General Directorate for Regional Development (DGDR), Portuguese National Association of Municipalities, Portuguese Entrepreneur's Association and some municipalities. Efforts are being made to obtain more information on this. The existence of issue-specific small-scale experiences cannot be ruled out.

4.3 Procedures of Industrial Parks

There are two main legal documents concerning the definition of industrial parks as well as its licensing and management: Decree-Law 232/92 from 22/10/1992; and Decree-Law 46/2001 from 10/2/2001.

The Portuguese Government establishes guidelines and strategies for its mandate, which are stated and operationalized at the National Policy Plan "Grandes Opções do Plano", and the Operational Programme for the Economy "Programa Operacional da Economia".
The Government also presents on the Regional Development Plan (at national level) the so-called "Plano de Desenvolvimento Regional", several strategic projects and main actions considered to be of high priority, consequently to be financed by structural funds, both at European and National level.

There are several regional documents sometimes dealing with regions, sub-regions or other spatial areas, without a systematic approach. For example there are the following documents:
- Strategic Plan for the Region of Lisbon and Tagus Valley;
- Strategic Plan for the Development of the Sub-Region of 'Oeste';
- Regional Land Use Plans.

Each industrial park is to be managed by an administration enterprise (public, private or mixed capital). This enterprise is responsible for the planning, construction and maintenance of the industrial park and must assure that the services and facilities work properly.

4.4 Procedures for Town Planning

Law 48/98 from 11/08/1998, regarding land use and urban planning "Lei de Bases do Ordenamento do Território e do Urbanismo"; and Decree-Law 380/99, 22/09/1999, regarding the instruments of land use and urban planning.

4.4.1 Town planning related to industrial parks (in general)

In Portugal each Municipality has its own Municipal Land Use Plan ("Plano Director Municipal"), which defines, spatially, for the considered territory the main land uses. These main uses may include the existence of urban space, industry, agriculture, etc, according to the characteristics of the area and the interests / strategy defined by the municipality. The location of the industrial park must comply with this plan. Hence there are two possibilities:

1. If a proposed industrial park is to be located in an area where the Municipal Land Use Plan already foresees and defines the existence of specific industrial zones, then the plan's regulations state the conditions for the implementation of the industrial park. Additionally, if the industrial park is larger than 10 hectares or if an industry of class A (in a scale from A to D, presenting A a greater risk for human beings and the environment) is planned, then it is mandatory to elaborate an environmental impact assessment study.
2. If the proposed industrial park is to be located in an area where the Municipal Land Use Plan does not foresee the existence of industrial zones, then this Municipal plan has to be revised in order to locate the industrial park. The revision procedure depends on favourable feasibility studies. Once more, if the industrial park is larger than 10 hectares or if an industry of class A is planned, then it is mandatory to elaborate an environmental impact assessment study.

In all these situations it is the Municipal Land Use Plan that defines, case by case, the conditions to be respected and the relationship with the surroundings. Some of these items are considered with more detail for each industrial park on a Detailed Land Used Plan ("Plano de Pormenor"), which is elaborated whenever considered adequate. Usually these plans state specific rules regarding: building and construction; infrastructure; and restrictions for the industries, i.e., type of industry to be established, obligation to comply with the current legislation and others. Additionally there are environmental licences, issued by the Environmental National Agency ("Instituto do Ambiente"), which establishes the measures for preventing or reducing air, water and soil emissions, waste production and noise nuisance.

During the process of elaboration of the Municipal Land Use Plan there are public hearings where the stakeholders have the opportunity to express their interests, needs and concerns. The same applies to the environmental impact assessments.
Usually the hearings occur almost at the end of the planning process when the main decisions have already been taken. Therefore are not very efficient.

Industrial parks can apply for financial support from the Operational Program of Economy, which selects relevant initiatives and provides funds. In some cases, when available, they can also apply for funds on special programmes for the development of certain areas.

4.5 Public Policies and Future Perspectives

Portugal participated in the Earth Summit and signed the Agenda 21. However there are no valid legal references specifically concerning the sustainability of industrial parks or industry and urban planning. In spite of this, there are notable efforts on a voluntary basis towards sustainability in town planning as well as probably in industrial parks' management.

Concerning the stated voluntary efforts, there has been some work in certain municipalities, which have demonstrated interest in this field. Therefore, there is some experience on elaborating Local Agenda 21 (LA21). They usually focus on the main issues considered of very high priority for sustainable development. As far as the interviewed experts (listed below) know the industry has not yet been considered among those top priorities.

However, there are several legal documents, which serve as general frameworks for environmental, land use planning and sustainable development policies in Portugal and that refer to the integration of the industry on a general basis. These references are:

- Environmental Law 11/87, from 07/04/1987, "Lei de Bases do Ambiente";
- Law 48/98 from11/08/1998, regarding land use and urban planning "Lei de Bases do Ordenamento do Território e do Urbanismo"; and
- National Plan for Environmental Policy "Plano Nacional de Política de Ambiente".

On a local level the Municipal Land Use Plan reflects the overall strategy for the development of the municipality and therefore integrates the different complexities and inter-relationships between town planning and industrial parks.

The main stakeholders are the local government and the different departments of the municipality. The different competent departments of the central administration supervise and take position. Sometimes partnerships with the private sector are possible. These issues are integrated by traditional negotiation processes or through top-down approach.

The following experts have been interviewed in order to include the state of the art on this subject.

- Ms. Constança Peneda, Head of the Centre for Sustainable Business Development (National Institute of Industrial Engineering and Technology);
- Mr. Jorge Assunção, from ParqueInvest / Portuguese Enterprise Association;
- Mr. Manuel Seragoça, former president of the extinct Public Enterprise for Industrial Parks ("Empresa Pública de Parques Industriais");
- Ms. Maria José Brito, Operational Programme for the Economy "Programa Operacional da Economia"
- Mr. Reis Machado, Professor at the Faculty of Science and Technology, University of New Lisbon.

5. THE NETHERLANDS

ABBREVIATIONS

BLM	Business Area Monitor
BTs	Business Terrains
CPB	Central Planning Bureau
DCMR	Environmental Protection Agency for the Rotterdam Region
ECN	Energy Research Centre The Netherlands
EMA	Environmental Management Act
IPO	Inter Provincial Organisation
MinEZ	Ministry of Economic Affairs
MinVENW	Ministry of Transport, Public Works and Water Management
MinVROM	Ministry of Housing, Spatial Planning and Environment
NME	Nota for Environment and Economy
NMP 1	National Environmental Policy Plan 1 (1989)
NMP 2	National Environmental Policy Plan 2 (1993)
NMP 3	National Environmental Policy Plan 3 and its English Summary (1997)
NMP 4	National Environmental Policy Plan 4 (2001)
NOVEM	Dutch Organisation for Energy and Environment
SBTs	Sustainable BTs
TIPP	Provincial Investment Programmes Tendering Scheme
TNO	Applied Natural Sciences Research
VCC	Transport Coordination Centre
VNG	Association of Dutch Municipalities
VNM	Association for Nature and Environment
VNO/NCW	Association of Dutch Enterprises / Dutch Christian Employers
yns	Year Not Stated

5.1 Overall National and Regional Information over Industrial Parks Policy

5.1.1 Industrial parks

There are a number of terms used interchangeably for industrial parks in the Dutch context. The most commonly used terms can be stated as *industrial terrains, business parks and BTs*. In order to provide the uniformity, the term "business terrains (BTs)" will be used in the rest of this text.

The history of BTs in The Netherlands dates back to approximately three decades earlier. However, BTs, as a concept in national and/or regional documents is only present since approximately during the last one and a half decade.

Finding the traces of the concept of BTs in the Dutch national/regional policy documents is not always an easy task. This is due to two main reasons: First of all, the concept of BTs is not always present in general policy plans (such as National Environmental Policy Plans (NMP) as a strictly defined entity. It is rather a matter of concern in the sector-specific, national or regional documents to the extent it is interconnected with other issues such as energy, spatial planning, economic sustainability etc. Secondly, BTs' concept is very much in the agenda with some extra terms such as "revitalisation, renewing, restructuring etc." and surely, "sustainable

development", as the final goal. This is mainly related to the relatively ageing nature of the Dutch BTs, which requires much focus on the already existing BTs, rather than the ones to be newly established. Besides all these conceptual complexity in policy papers, two basic definitions of BTs could be derived out:

1. A basic definition for a BT comes from Dutch academic society. Hereby the definition refers to "a group of enterprises, which are located at a geographically proximate scale" (Boons et al. 1999).
2. According to the definition of State's Undersecretary for Economic Affairs in "Subsidy Regulation for Sustainable BTs" (2001), a BT must fulfil two basic qualifications. The so-called BT must be:
   a. A terrain or a cluster of terrains with a surface level of at least 10 ha,
   b. Used by the firms for the purposes of trade, industry, commercial and non-commercial services and industry excluding horeca (hotel restaurant and catering services) or retail trade.

A number of government institutions, academic organisations and consultancy agencies classified the BTs according to their activity areas, working structures, the technologies they use etc. Of those organisations, the Province of Flevoland (2000) made a distinction between four different types. These are:

1. Industrial terrains
2. Mixed BTs
3. Logistical BTs
4. High value BTs

Another classification comes from the Dutch scientific society. Boons and Lambert (2000) present three types of BTs:

1. Mixed BTs: These are usually the BTs where the local economic activities are brought together by the municipalities. In the time being, the position of the companies changes to a large extent, without realisation of a steering mechanism. The result is the great diversity in terms of the activities, environmental taxes, size and the professionalisation.
2. Segmented BTs: These are the BTs where a certain category of companies is concentrated. These can be offices (office parks), companies who have a specific image over the environment (eco-parks) or the process industry.
3. Single Company Terrains (Spill-terrains): BTs that are formed around a single company.

These different classifications have common and differentiating aspects: They all take the spatial characteristics and the nature of the activities as the basic classification. However, they differentiate to the extent that they evaluate the process and interaction of the activities of BTs.

References

1. Boons, F. et al. 1999, Industriele Ecologie: naar Duurzame Ketens en duurzame bedrijventerreinen (Industrial Ecology: Towards Sustainable Chains and Sustainable BTs in "Industriele Ecosystemen (Industrial Ecosystems)", Epe: SMO
2. Boons, F. and F. Lambert. 2000, "Duurzame Ontwikkeling Bedrijventerreinen. A Handleiding voor een interventiemethodiek (Sustainable Development of the BTs: A Guideline for an Intervention Method), Rotterdam: Erasmus University.
3. Provincie Flevoland. (2000), "Handreiking Duurzame Kwaliteit op bedrijventerreinen Provincie Flevoland (Assisting the Sustainable Quality in the BTs in The Province of Flevoland)", Flevoland.
4. State's Undersecretary for Economic Affairs. (2001), "Subsidieregeling Duurzame Bedrijventerreinen (Subsidy Regulation for Sustainable BTs)", published in State's Gazette 23 August 2001, nr. 162/p.8.

5.1.2 Eco-industrial parks

In the Dutch national and regional policy documents, eco-industrial parks are not mentioned directly. The conceptualisation is rather based on the "sustainable industrial parks/BTs". In the policy papers of the last half decade, there has been an increasing concern for creating sustainability of already established BTs via restructuring and revitalisation processes. Sustainable development is also an important matter of concern also for the new BTs.

Conceptually, NMP 1 (National Environmental Policy Plan 1, 1989) can be considered as a starting point of a consistent approach for Dutch environmental policy making. As indicated by Boons et al. (1999), it was through NMP 1 attention in The Netherlands was paid for the first time to the relation of different industrial activities. Parallel to that, the terms *"process integration"*, *"industrial ecology*" and *"integrated chain management"* were covered in the lexicon and increasingly used in the policy-making and academic worlds. Hereby, the three terms have a similar coverage but differ in the scales. The first term refers to the "mutual exchange of material and energy streams between the processes within a certain company", whereas the second would be implemented at an economic scale and the third would efficiently be conducted on the BT scale (Boons et al. 1999). This conceptualisation could fit the nature of BTs, having a number of companies, which are located at a geographically proximate scale and are likely to be active in different sectors.

The Nota for Environment and Economy (NME) (1997) defines a sustainable BT (SBT) as the one, in which the companies work together, and with the government for realising:
Sustainable production and/or More efficient use of space.

The companies can have common activities such as re-use of waste and subsidiary products, collective use of means of production, collective waste management and/or transport. Similar definitions come from MinEZ in different publications such as in "Terreinwinst for Economie en Milieu", Action Plan for Spatial Economic Plan, etc.

Similarly, MinEZ would name a BT in its different documents (1997, KPMG Report in 1998, yns), as a sustainable one if there is "a cooperation between the firms and between the government and the firms, aimed at

- Improving the economic profitability of the firms
- Decreasing the disturbance on the environment
- Creating a more efficient use of the space

Here, the main point is to strengthen the competitive power of the companies in the BT, to create a better economic profitability for the companies and at the same time to have environmental gains.

According to Novem (an independent research organisation in the field of SBTs policy), the starting point of sustainability is cooperation. Once it is initiated, there can be a number of environmental and economic advantages expected. The firms in a BT can make use of exchange of energy and water, collective waste management, collective transport etc. so that they can have less costs, less parking problems, better use of space and energy, etc.

According to their classification for BTs, Boons and Lambert (2000) define a SBT as "the one, whose companies cooperate with each other, with the management board of the terrain and with the other external actors such as national and local governments, NGO's, citizens, etc., in order to:

- Improve the economic profitability of individual companies and of the terrain as a whole.
- Decrease and (ideally) prevent the environmental burden their activities create.

- Use the space more efficiently.
- Create a socially responsible environment, reflected in the decision-making and communication activities within the park and its interaction with the city it is located in or nearby.

A parallel definition can be derived from "Subsidy Regulation for Sustainable BTs" (2001). Here, a SBT refers to the one in which the member firms develop collective efforts for economic advantage with each other and with the government on a number of environmental themes such as:

- Saving energy, water, natural resources and subsidiary materials.
- Decreasing the production of waste materials.
- Optimalisation of transport of people and the goods.
- Intensifying the spatial use.

The Province of South Holland puts in its Provincial Economic Vision 2001-2010 (2001) a special emphasis on the sustainability of the BTs. Due to the fact that most of the over four hundred BTs of South Holland were established in the seventies, the state of the art in these BTs requires revitalisation. As a result of this process, it is aimed that a sustainable revitalised BT would have:

- Efficient spatial use,
- Optimal energy and water infrastructure,
- Sustainable transport,
- Industrial ecology,
- Waste management,
- Environmentally-friendly business,
- Innovation,
- New finance and cooperation forms.

Further, it would also have social aspects such as providing employment (supplying interesting jobs, contributing to solving the unemployment problem etc.) and an attractive work environment (presence of shops, child-care, sports facilities and others) for the employees.

TNO (Organisation for Applied Natural Sciences Research), defines in its current website its understanding for a SBT in a scheme. The process starts at a point where a group of disorganised firms attempts to organise themselves with respect to the process and content of their activities. Further, the process ideally leads to a point where the firms are organised at the framework of environment, economy, spatial use and technology.

According to BECO, which is a leading Dutch consultancy company, a SBT would be the one, where the companies work together and with the government, having:

- The aim of higher economic profitability,
- Less environmental disturbance
- More intensive use of the space (http:///www.beco.nl).

A BT becomes a sustainable one via fulfilling cooperation at three levels:

- At the individual firm level,
- Via the cooperation between the firms
- At the terrain level (http://www.duurzameondernemen.nl).

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12. TNO. http://www.tno.nl

5.1.3 governmental and non-governmental organisations

Table 5-1: Governmental and non-governmental organisations

Political (governmental)	**Civil (non-governmental)**
National	**Companies**
National Government	
Ministry of Economic Affairs	Utility Companies
Ministry of Housing, Spatial Planning and Environment	BTs management bodies
	Chambers of Commerce
Ministry of Transport, Public Works and Water Management	Business Associations / Unions
	Knowledge Centres
Provincial	Universities
Provincial Governments	TNO
IPO	ECN
	Others
Regional	
DCMR	**Research Coordination**
VCC	Novem
	Senter
Local	
Local Authorities	**Consultancy Organisations**
VNG	Beco
	Many others
	Voluntary Organisations
	Foundation for Nature and

	Environment Friends of Earth, The Netherlands Many others

Table 5-2: Authority and responsibilities of organisations

Organisation	Authority and Responsibilities
Government	Initiating and facilitating the policy for BTs by:making related policy changes in the (future) environmental policy documents Providing available financial means Providing its knowledge and experience Laying down general rules (instead of environmental licences) for the companies, which are classified, in an "environmentally less harmful" sector.
Ministry of Economic Affairs (MinEZ)	Co-operating with the industry and other stakeholders in the field of sustainable BTs by: Frequently joining forces with other ministries. (For example, together with the Ministry of Social Affairs and Employment, MinEZ explores policies to stimulate job creation. Together with the Ministry of Transport, Public Works and Water Management, MinEZ works to find solutions for infrastructural problems.) Maintaining relations and exchanging information with organisations of trade and industry, trade unions and non-governmental organisations (such as consumer- and environmental organisations). Ensuring a reliable, affordable and clean supply of energy. In this regard, encouraging companies to develop and use environmentally friendly technologies, which use less energy.
Ministry of Housing, Spatial Planning and Environment (MinVROM)	Making and coordinating environmental policy for BTs at the government level (not as an executive organisation) in cooperation with: Several other ministries, who have duties in the environmental policy field (horizontal coordination) Local, regional national and international governments (vertical coordination); Companies and businesses; Intermediary organisations and institutions; Interest groups; Inhabitants of the Netherlands. Acting as a network ministry for environmental policy for BTs by: Guidance, Consulting, Reacting, Facilitating, Delegating, Controlling, Stimulating and Inspiring the partners. Via its Inspectorate, enforcing legislation related to BTs. This investigation process is divided into following stages:

	primary supervision: on voluntary agreements and enforcement of laws and decisions. secondary supervision: supervision of the framing and implementation of regulations by provincial authorities, municipalities and water boards. policy enforcement: The Ministry Inspectorate makes sure that the policy developed by local governments is in line with central government's policy memorandums. observation, identification and notification.
Ministry of Transport, Public Works and Water Management (MinVENW)	Via the Directorate-General for Freight Transport (DGG) General Freight Transport Policy Department: promoting improvements in the transportation system for freight as a whole. The most important task of the department is strengthening the Dutch position as a distribution country. Transport Industry Department: developing policy for shipping (including coastal shipping), road transport, inland shipping and transport by rail. The department strives to achieve the liberalisation of transport markets, the (international) harmonisation of legislation, and satisfactory environmental, safety and social conditions. Other activities via Transport Safety Department, Shipping Inspectorate, State Traffic Inspectorate Directorate-General for Passenger Transport (DGP) Innovation Department: developing new, innovative projects for passenger transport over land and water. Other activities Traffic Safety and Infrastructure Department and Mobility Market Department
Provincial Governments	1. Initiating, directing and facilitating the policy for BTs by: Developing a long term vision (streekplannen) providing environmental licences to the companies of a certain size according to Environmental Management Act (EMA) cooperating with the municipalities for sustainable BTs, (co) selecting the BTs (with the municipalities) which are to be made sustainable bringing in their knowledge and experience on sustainable BTs in different municipal initiatives (municipalities do not always know it very well how to reach the sustainable BTs optimally, while the province (due to the involvement with many sustainable BTs projects) has much more knowledge over do's and don'ts). providing the available financial resources for sustainable BTs' projects
IPO	Supporting the provincial governments by taking part in the implementation of EMA instruments such as environmental licences and enforcement. Acting an important role for implementing the precautions for environmental prevention by the companies.
DCMR	(This organisation has an exceptional role as it functions for (eighteen (18) municipalities in the Rotterdam Region) Giving environmental permits (based on the EMA) to the companies of a certain size, Controlling the companies' commitment for the rules and regulations Advising the companies on environmental management Continuously measuring the quality of environment in the Rotterdam Region

VCC	Acting as a consultant-advisory agency for the BTs in the field of sustainable passenger transportation.
Local Authorities	(In SBTs policy, municipalities act together with the provinces. In spite of the large range of duties defined for the municipalities, and due to the relatively small sizes of a large number of municipalities, they are not able to use all their authority competently. Therefore, it should be made clear that the provinces, with their compactly defined duties, are very influential in the SBTs policy) Initiating, facilitating and decision-making for BTs by: taking initiatives for the sustainability process of the BTs; using the available capacity and means for this purpose; and steering the process in the BTs towards the aimed sustainability level. Via the Department of Economic Affairs, initiating/coordinating the sustainability and/or revitalisation of BTs by: Initiating the development of new BTs striving for an optimal establishment climate for the companies selecting the companies to take part in the terrain. Via the Department of Spatial Planning: establishing the BT, basically with regards to the infrastructural precautions that must increase the sustainability level (enumerating the ambitions for a sustainable BT such as percentage of green in a terrain percentage of employees per hectare etc) in a Municipal Planning Framework (Bestemmingsplan). Via the Department of Environment: • giving the environmental licences to the companies of a certain size as defined by EMA • giving advices (tips, subsidy folders, directing to the specialists) to the companies, the environmental and economic management of whom to be optimalised. • adding the BTs issues in the municipal environmental policy plans • keeping the environmental burden of a BT as low as possible, • facilitating the process that sustainable companies make use of a wide range of collective services.
Companies	(For the companies which will take part in a BT), fulfilling the requirements of the Municipal Planning Framework (Bestemmingsplan). Meeting with the municipality, representatives of Chamber of Commerce, branch organisations, facility providing organisations etc. Having the potential for initiating and implementing the policy for BTs by performing: sustainable company management sustainable construction and building optimal management of energy, water, ground and subsidiary sources, waste, transport and traffic at the individual, group and terrain levels. realising collective activities at the terrain level
Business Associations/	Initiating, coordinating, motivating and implementing the policy for BTs by:

Unions	providing an important basis for successful collective initiatives for sustainable BTs representing the companies, streamlining their opinions, communicating with the other parties. motivating the companies to take part in sustainable BTs and initiatives in this level. performing activities such as taking part in the park management, signing collective contracts etc.
Utility Companies	Facilitating and implementing the policy for BTs by decreasing the use of energy and water. These companies have both the knowledge for minimisation and also the interest in (via the appointments with the government for minimisation of CO_2) decreasing the environmental burden of BTs.
Chambers of Commerce	Initiating, communicating and contributing to the policy for BTs by: Representing the interests of companies (In this sense, Chambers of Commerce are just like business associations) Playing an important role for stimulating the communication for sustainability for BTs. (This happens usually when there is no business association) Initiating activities for sustainable BTs (in cooperation with the municipalities).
Novem	Developing tools and action plans; and stimulating research projects for sustainable construction, working, production and mobility within the framework of energy policies.
TNO	Providing a link within the innovation chain between fundamental research as a source of knowledge and practical application as the use of knowledge, which can be commercially exploited. Sustainable enterprises, BTs, energy and mobility issues are a part of their working area.
ECN	1. Conducting research on: greater energy efficiency, the implementation of renewable energy and the reduction of environmentally harmful emissions from fossil fuels. Carrying out technology development activities in order to strengthen the synergy between the market and industry.
Voluntary Organisations	Lobbying and influencing the decision-makers in The Netherlands and Europe. Stimulating discussions and debates; mobilising the public opinion with research, insight, publications, juridical activities and alternatives. Concentrating on key themes and decision-makers so that ecological sustainability can be improved in the laws, financial instruments, in the culture.

Consultancy Companies	Searching for the possibilities for sustainability in a company Conducting interactive and thematic meetings with the different departments of the company Scanning the potential in a BT for cooperation for sustainability, stimulating a platform for bringing together different project partners Making inventory on the cooperation possibilities in a terrain. Organising workshops on the concept of sustainable BTs Scanning the potential of a region for sustainability at different BTs

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5.2 Research and Demonstration projects and experiences over industrial parks

There are a large number of R & D (theoretical and/or practical) projects over BTs in general and on issue-specific level. Below a rather limited number of projects can be found due to the fact that they represent the most characteristic of the projects on sustainable BTs in The Netherlands.

5.2.1 R&D projects on BTs in general:

1. KPMG. In opdracht van MinEZ (1998), "Duurzame Bedrijventerreinen: Handreiking voor het management van bedrijven en Overheid (Sustainable Business Terrains: Guideline for Management for the Business and Government)", The Hague: MinEZ.
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5. Bedrijfslocatiemonitor (BLM). (2000), "Veroudering van Bedrijventerreinen: Een Structuur voor Hestructurering (Ageing of BTs: A Structure for Restructuring)", BLM.

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The above 6 R&D projects are shortly discussed regarding scope, objectives, achievements and failures.

1. KPMG (in opdracht van MinEZ). 1998), "Duurzame Bedrijventerreinen: Handreiking voor het management van bedrijven en Overheid", The Hague: MinEZ.

a. Scope: As a reaction to the figurehead of NME, this project started, with a definition of a BT, description of sustainable business processes, sustainable establishment of BTs, and organisation of the process of sustainability.
b. Objectives: The research has the objective of fulfilling the figurehead "SBTs":
c. Achievements: This was the first outcome of the comprehensive start of the SBT related projects. It provided a handbook for the possible activities in a BT for sustainability and the description of the processes of sustainability. This guideline provided a reference for the subsidy regulation, indicating which BTs at which stage of sustainability efforts could apply for a subsidy.
d. Failures: Not reported.

2. Novem and Ministry of Economic Affairs. (1999), "Duurzame Bedrijventerreinenprojecten (Sustainable BTs Projects)", Utrecht: Novem.

a. Scope: This project is financed by the MinEZ and conducted by Novem. The program stimulates the initiatives, which aim to create the sustainability in the BTs. During its period 1999-2002, the project served for a number of BTs on their efforts for sustainability.
b. Objectives: unknown

- Organising, establishing, and maintaining the "sustainable BTs" as a part of the general aim on "realising economic growth with an improved management of space and environment.
- Looking for innovative and sustainable solutions.
- Attracting a large number of stakeholders such as companies and/or business associations, municipalities, provincial governments, project developers, employers, energy and water companies.
- Achievements: It proved to be a wide-range project, under the lead of MinEZ. Several publications are produced as a result: some building theoretical insights for working on sustainable BTs while others providing case studies from different provinces in The Netherlands. A guideline for subsidy possibilities was published for the sustainable BTs projects all over the country.

3. Boons, F. and Lambert, F. for Novem. (2000), "Sustainable Development of BTs", Rotterdam: Erasmus University.

a. Scope: The senior researchers, Boons and Lambert, fulfilling the request of Novem, conducted the research. The research was mainly based on three parts: the first part aimed to develop a guideline for intervention method; the second focused on a literature study whereas the last one provided background documents and the results of two case studies.
b. Objectives: The research aims to clarify the concepts, insights and instruments that can give a direction to the discussions in the domain of restructuring and sustainability of the BTs.
c. Achievements: The outcomes of the research (three publications) achieve to provide theoretical insights in the area. Parallel to the policy papers, sustainable BTs were defined and placed in the "regional scale" in striving for sustainability. A database on a possible widest list of references was provided for other researchers. Within the sustainability

problematic, characteristics of the ageing BTs and the possible precautions for their revitalisation were defined as a prologue to two case studies. The authors made a distinction between the "quality" and "sustainability" of BTs. Quality refers to a state of the BTs in order to preserve their attractiveness while sustainable development goes further with special environmental elements (in clusters: infrastructure, spatial, representative, environmental, economic, and organisational) as well as the environmental precautions that each individual company should take.

4. Province of Flevoland. (2000), "Handreiking Duurzame Kwaliteit op Bedrijventerreinen Province of Flevoland (Guideline for Sustainable Quality in the BTs in Province of Flevoland)", Haarlem.

a. Scope: Following one of the key points (sustainable economic development) defined in the Nota for Environment and Economy (1997) as, Province of Flevoland wanted to work on the sustainable quality of its BTs. At the background of this project, the same ambition has already been supported in the Regional Economic Development Plan Flevoland (1998), the new BTs' Vision Flevoland (1999) and the Provincial Surroundings Plan (2000).
b. Objectives: The project aimed to find out the answers to following questions:
    1. Which concrete precautions are applicable for which type of BTs at specific locations?
    2. What must be regulated in which phase of developing a BT?
    3. Who must take the initiative and which parties must be concerned with the issue?
    4. Which ambitions can be achieved with which instruments?
c. Achievements: The document outlines the theoretical steps for reaching the sustainable quality of BTs. Hereby, the term "sustainable quality" combines the two states that a BT should preserve and develop, already defined by Boons and Lambert (2000).

Policies for new and already established BTs were separately defined. Further, fourteen issue-specific areas of managing a BT were explained one by one (energy, water, natural resources, waste materials, accessibility and logistics, efficient spatial use, officebuilding, park management, visual quality, safety, nature and landscape, soil and cultural history, and air). This report presents a part of the sophisticated efforts of a Dutch Province for providing sustainability in its territory.

5. Bedrijfslocatiemonitor (BLM). (2000), "Veroudering van Bedrijventerreinen: Een Structuur voor Herstructurering (Ageing of BTs: A Structure for Restructuring)", BLM.

a. Scope: The above-mentioned title constitutes a single part of the project. This part of the project was conducted by BLM (Business Location Monitor) in 2000, in order to fulfil the request of MinEZ and MinVROM. Due to the fact that restructuring of BTs is rather expensive and the social cost of this process is difficult to bear, the two ministries wanted to obtain a clear view over the restructuring process and the related ageing problem of the BTs.
b. Objectives: The research has three objectives:
    - To draw a general framework on the process that BTs are restructured.
    - To provide insights on the effects of restructuring precautions; the means used; and the possible role of the government from the welfare theory point of view.
    - To understand the possibilities for a monitor, in which the ageing and restructuring of BTs are registered.
c. Achievements: As a result of the project, there were two other publications produced in addition to this single part of the project, which presents a theoretical guideline: the first one, analysing five restructuring projects; and the second, building a database on monitoring the spatial planning and work opportunities by the restructuring of the BTs.

The relevant part presents a theoretical research, which aims to develop a structure for restructuring the BTs. Therefore, this report can be considered as a tool for policy makers to gain a deep insight on the theoretical repercussions of the terms of "ageing BTs" and " restructuring".

The content of the report provides a useful tool for understanding the conceptual background of ageing BTs and their restructuring. The report starts with the relevant literature research and proceeds with the symptoms of an ageing BT. Structurally, ageing is defined in the technical, economic, social and spatial domains. Following the definition and classification of the role of the term "restructuring", the role of the government is discussed in its contribution to financing the restructuring process of the BTs. This discussion is linked to the welfare theory. Finally, concern was given to the monitor designed by CPB on ageing and restructuring of the BTs, fulfilling the will of MinEZ and MinVROM. It is a concrete achievement that the Monitoring system was already initiated, with the regional projections for 2010-2020.

6. Beco and Province of South Holland. (2001), "Duurzaam Duurt het Langst: Stand van Zaken Duurzaamheid bij de Herstructurering van Bedrijventerreinen in Zuid-Holland (Sustainable Takes the Longest: State of the Art of Sustainability in the Restructuring of BTs in South Holland)

a. Scope: Beco and Province of South Holland conducted the project. After a brief introduction on the connection of sustainability and restructuring of BTs, the situation in the Province of South Holland is explained and case studies were carried out on twelve BTs. Conclusions were drawn on three levels: regional level (the province is divided into five regions), municipal level and the terrain level.
b. Objectives: The research aims to contribute to drawing the state of the art of sustainability. For this purpose, the research over restructuring of the BTs in the Province of South Holland is placed in the overall picture, as an element of sustainability.
c. Achievements: The strength of the research derives from its attitude differentiating the state of the art in the Province of South Holland at different geographical scales. The conclusions were drawn not only at the provincial, regional and BT level, but also the key points were concluded at the provincial and regional scales for the policy makers. Parallel to the definition of "regional cooperation" as a key point, the specific key aspects were defined for each region in the Province. This attitude helps to recognise the differences between the regions as well as the similarities and creates a clearer view for cooperation possibilities within the Province.

5.2.2 R&D projects on BTs location specific

1. ECN. (2001), "Energieprogramma voor Bedrijventerreinen: Boekelermeer Zuid 2, Alkmaar (Energy Programme for BTs: Boekelermeer Zuid 2, Alkmaar), Petten: ECN.
2. Province of South Holland. (2001), "DECOR (Duurzaam Economisch Ruimtegebruik) Impuls voor Duurzaamebedrijventerreinen (DECOR (Sustainable Economic Spatial Use: Impulse for Sustainable BTs)", The Hague:PZH.
3. TNO. (year not stated), "Duurzame Bedrijventerreinen: Integrale Optimalisering van de Energiehuishouding in Ecofactorij Apeldoorn (Sustainable BTs: Integrated Optimalisation of Energy Use)", Apeldoorn: TNO.
4. TNO. (2001), "Logistieke Toets Bedrijventerreinen: Proces, Instrumenten, Case Study (Logistical Test for BTs: Process, Instruments, Case Study)", Delft:TNO.
5. TNO. (2001), "Naar een Mobiliteitsprofieltoets voor Bedrijven (Towards a Mobility Profile Test for Companies)", Delft:TNO.

6. VCC Rijnmond. (year not stated), “Vervoermanagement voor Bedrijven (Transport Management for Business), Rotterdam: VCC.
7. Province of North Holland. (2000), “MEI (Milieu, Economie, Innovatie) (MEI (Environment, Economy, Innovation)”, Haarlem:PNH.

5.2.3 Interpretation / analysis of the ongoing projects and experiences

The activities in the field of sustainable BTs gained an increasing pace to a considerable extent in the last half a decade. Mainly a single or a group of governmental organisation(s) such as MinEZ, MinVROM, and provincial governments, IPO etc. led the research and projects in this field. However, the implementation phase of these projects were carried out by larger partnership structures, including the municipalities, BTs, VNG, research and coordination organisations, consultancy companies, etc.

In terms of the policy planning considerations, there are three significant features that Dutch policy on sustainable BTs is closely linked to:

The first feature is related to the spatial planning. National and regional policy documents attached special attention to provinces (and the regions within the provinces) as the geographical unit of sustainability. Besides, SBTs policy was located in the regional development schemes. In this framework, SBTs were an element of achieving sustainable regions. Because of that, reaching the uniformity of SBTs policy at the regional scale formed an important role in the partnership structures and their efforts in this regard. It should also be noted that provinces provide the general framework and municipalities design their municipal framework plans (bestemmingsplannen) in that framework.

The second feature is content-related. Economic pillar of sustainable development has always played a prominent role in The Netherlands. Furthermore, this prominence had a close linkage with the spatial polices. Parallel to that, national and regional policy papers (such as Nota for Environment and Economy, Nota for Spatial Economic Policy Plans, provincial long term vision (streekplannen), etc.) paid a great deal of attention to economically sustainable regions. Complementing the first feature, economic policies were linked to spatial policies. As a result, it was unavoidable that the context appeared as sustainable BTs in the “economically strong regions”.

Finally, the third feature is oriented to the “nature” of the activities for SBTs. It is evident from the general R & D projects that most of the national and regional projects were directed to the restructuring and the revitalisation of the BTs. As was explained in section 1.A. and 1.B., this is due to the relatively long history of the BTs in The Netherlands. The restructuring and revitalisation is deemed as necessary not only in terms of the physical age of the most BTs in The Netherlands, but also in terms of the change in the expected functions of the BTs.

As a conclusion, it can be claimed that there is a certain level of awareness in The Netherlands for the sustainability of the BTs. There is a large inventory of BTs (mostly at the provincial level), and some of these terrains are already included in different projects for restructuring, revitalisation and for sustainability. On the other hand, it must be stated that policy making for new BTs is also in the agenda. Despite the scarce amount of space in The Netherlands, the future prospects show that there is a need for a number of new BTs to be built. Therefore, rehabilitating the already established BTs towards sustainability; efforts to create space for new terrains and to manage them sustainably in the future constitute the three main pillars of Dutch SBTs policy.

5.3 Procedures of Industrial Parks

5.3.1 Framework(s) of the industrial park policy

Other than the Subsidy Regulation for Sustainable BTs, there are no conventional legal documents specifically aimed at BTs in The Netherlands. The unit of concern in the conventional legal documents has been the "individual enterprise" and concern is on the incremental aspects of managing an enterprise in an environmentally sound way. Therefore, it is possible that every single enterprise in a BT fulfils these requirements. This means, it is expected that the sum of all the enterprises in a BT, which follow these rules and regulations, would lead the way to an environmentally sound BT.

On the other hand, the role of covenants in the Dutch legal system is undeniably of rising importance. Since the early nineties during which self-regulation was increasingly practised, Dutch government and sectors of industry have been signing various covenants on different policy issues. It can be concluded that conventional legal documents and covenants complement each other in identifying the procedures for managing the environmental aspects of the economic activities of BTs.

Parallel to the legally originated documents, which have a binding nature, national, and regional policy plans reflect the evolution of mentality changes within the Dutch government and society on business and industry policy and BTs' policy as well as several other fields. Therefore, it can be considered that the function of legal documents and policy papers go hand in hand, providing each other with scientific, societal and rational back-up systems.

In this regard, the legal and policy related documents connected to business, industry and BTs can be listed as follows:

a) Legal documents such as:
- Environmental Management Act (EMA)
- Law for Cleaning the Surface Waters
- Law for Spatial Planning
- Law for Nature Protection
- Subsidy Regulation for Sustainable BTs
- Law on Working Conditions
- Covenants: - Covenant Partnership in the Region
- Covenant Benchmarking

b) Policy documents
- National Policy Plans / National Policy Guidelines

5.3.2 Procedures (stated in laws, regulations, policy papers etc.) for industrial park management

General
Legal Documents
Acts: EMA is the basic legal document regarding the management of the environmental aspects of economic activities. The unit of implementation of EMA is the company. Considering that each company in a BT complies with this Act, it can be considered as a legal document very much related to the management of BTs. Many (though not all) environmental elements have been integrated in this act such as waste, noise nuisance, and air pollution. This act presents the requirement that each company should hold an environmental licence, which lays down specific

environmental regulations that the companies must comply with. The licences must include all the regulations necessary for the protection of the environment.

Subsidy Regulation for Sustainable BTs: It outlines the requirements to be fulfilled by a group of companies or a BT, which demand subsidy with the commitment for working for sustainable BTs.

Policy Papers
NMP 1 (1989): The concept of "company environmental management" was introduced.

NMP 3 (1997): It is the stage that the "national government stated its ambition for reaching an absolute reconciliation between the economic growth and environmental pressure" (Boons et al. 1999:23). This statement re-determines the position of BTs in the absolute ambition of the government for sustainable development.

Following the introduction by NMP 1, companies are increasingly observed taking initiatives to establish their own active environmental policies and to incorporate environment in their corporate strategies. This situation led to emission cuts, instituted in part by the target groups policy (covenant approach), licensing and regulation (NEPP 3, 1997). Furthermore, one can observe that efforts for sustainability in NEPP 3 varied from the company to the BT level. In this regard, NMP 3 attached a direct emphasis to the BTs. Government and business life was foreseen to develop a program that the BTs (both new and already established ones) can benefit from. Program would be based on the principle of ecological industry (energy saving, reusing the waste, improving water management etc.) spatial and transport related benefits.

NME (1997): One of the key action points (figureheads: an action of business life and government) defined by the NME is "sustainable BTs" for the period of 1998-2003 (p. 48).

Activities to be fulfilled by MinEZ, MinVROM, IPO and VNG in the short term (1997-1999) are oriented on:
- research on successes and failures
- preparing a practice book with sample BTs
- organising a symposium in 1997 (success and failures presented)
- inventory of financial regulations
- identification of hindrances created by the law for SBTs
- understanding the content and process of sustainability of BTs.

The aim in the longer term is to stimulate the SBTs by:
- developing new technologies that help completing SBTs, the knowledge for SBTs
- finding complementary financial means
- developing models for cooperation
- stimulating sustainability for new BTs
- For the period of 1998-2003, the Cabinet presented 7 million gulden for this project.

Within the perspectives for industry and services, a perspective is defined for the BTs. "Together and Stronger for SBTs". It was highlighted that a change process would be experienced. In the terrains to be newly developed, an optimal clustering and segmentation of companies can create the combinations of companies, which can cooperate in economic and ecological aspects and in other collective services. Special attention was paid to the common practice that rules, regulations and licences are aimed at individual companies. The suggestion in this regard was made that "licences should be arranged and tailored to cooperating companies".

Note for Spatial Economic Policy (1999): In the document it is stated that the 'quality of activities' needs to be an element of consideration. Identified areas of concern are transport, the spatial planning and the maintenance of the terrains. By improving these elements there will also be, besides the economic benefits, an environmental gain (a so-called win-win situation). By giving proper attention to these elements it can be prevented that a terrain needs restructuring after some decades or that firms move to other (more attractive) parks.

The Note also deals with the issue of restructuring existing industrial parks. There are two reasons to put this on the agenda: the first reason is that the quality of the older parks needs a strong improvement to reach present standards and secondly there is overall a big need for terrains (BTs) for industrial activities. Although this restructuring is an area of high priority, the government underlines that there are 3 big barriers to overcome compared to new terrains, namely soil pollution, a scarcity of financial means and support from the local governments and the firms. Therefore it is perceived as an important policy domain that needs public co-operation on the local and regional level and public-private co-operation.

Issue-specific aspects:
The issue-specific aspects of sustainable BTs are evaluated at the national level. Below can be found the intentions stated in the national policy documents. It must be noted that the information below is not complete due to the complexity and interconnectedness of the issues as well as the time limit for this research.

Pollution Prevention
NMP 1 (1989): The targets were oriented towards "recovery of polluted areas and pollution prevention". In this respect, BTs were a matter of concern in the process of cleaning up the pollution they created. In the longer term (until 2000), the policy expectation focused more on the pollution prevention by the business and industry. The BTs were zoned in different categories according to the disturbances they resulted in. Companies were expected to adopt cleaner technologies for their production and own management systems.

NMP 2 (1993): In the period of 1983-1993, eight (8) covenants were concluded with the industry on process emissions. The project PRISMA (Project Industrial Success with Waste Prevention) strengthened the waste prevention by the industry.

NMP 3 (1997): Industries attempted to decrease the trends in emissions and to meet the targets for 2010 set up by NMP 1 and 2. Data indicated that CO_2 and NO_x were growing more slowly than energy consumption, however efforts for further reduction were still needed. (English summary)

Environmental Programme 2000-2003 (1999): It mentions about a Programme on "Separate Collection of Business Waste" which was made for different sectors in 1998.

Energy (with particular focus on CO2)
NMP 1 (1989): It dwells on Government's plan to take action in 1990-1994 for energy saving by the industry.

NMP 2 (1993): In the period of 1983-1993, twenty-six (26) covenants were concluded with the industry on energy saving. Further, energy policy was intensified in order to reduce the contribution of Dutch industry to climate change.

NMP 3 (1997): It was suggested that in the regions where there are many energy intensive companies are located, they could benefit from the leftover heat from the production process ("restwarmte benutting"). It could be considered as a good reference for the energy efficiency of BTs where there was intensive use of energy. In addition, traffic was named as a sector, through which energy efficiency would be striven for.

Transport

NMP 1 (1989): Some recommendations were made for commuter (in cooperation with the Scheme for Transport and Traffic) and freight transportation: Daily commuter transportation and business related transportation were to be decreased via the kilometre reduction and special transportation facilities such as car-pooling, public transportation etc. It was suggested to stimulate the use of rail and water modalities for freight transport and to limit the freight-auto kilometres.

NMP 1 Plus (1990): It was recommended that "transportation regions" would be built up for the companies with more than 50 employees.

NMP 2 (1993): The emphasis was made on changing the modality choices for freight policy for transport efficiency

NEPP 3 (1997): Main focus on freight transport was directed to limiting the growth in road transportation by several precautions such as logistical efficiency, intermodality, modal shift, cleaner vehicles etc.

National Data on Sustainable Development The Netherlands: One of the three layers of strategy that government follows on energy is relevant: Encouraging the fuel switch to renewable energy (with the aim of obtaining 5 % of national energy by renewable resources by 2010, and 10 % by 2020) (http://www.un.org)

Covenant "Partnership in the Region" (2000): Multi-modal accessibility of the BTs. MinVENW is involved to stimulate this issue. Article 6 states that Provinces are going to translate their efforts for sustainable mobility for their BTs in their Provincial Transport and Traffic Plans (PVVP) (section 1), regional Directions of Rijkswaterstaat will support the provinces with manpower (section 2), MinVENW will provide its instruments and financial means (section 3), MINVENW will do research with provinces and regions on possibilities for multi-modal accessibility measures (section 4).

Spatial planning

NMP 1 (1989): It states government's plan for an action in 1990-1994 for zoning the locations of 15 complex BTs in terms of the environmental disturbance they created.

Environmental Programme 2000-2003 (1999): MinVROM initiated StIR, a Stimulation programme on Intensive Spatial Use for the period of 1998-2005. One of the themes of this project is to develop policy tools for sustainable BTs.

Fifth Nota for Spatial Planning 2001-2020: The majority of the seven goals defined by the Nota is applicable to BT policy. Spatial diversity, economical and social functionality, cultural diversity, social justice, sustainability, human measures. In p. 123, a reference is made to the intensification of spatial use. The business areas are an item in this field.

Action Plan Spatial Economic Policy (2000): This action plan was concluded as a result of the discussions following the Note Spatial Economic Policy. This plan stresses the economic potential of the regions. Two of the four challenges in the plan relate to the BTs policy. The first one is strengthening the spatial economic network, focused on three concepts: space creation, accessibility and main ports. Fulfilling the challenge in this category, one action refers to the BTs as the follow-up of BLM. Estimating the needs until 2030, it looks for further segmentation possibilities. The second challenge is to benefit of the economical potential of the regions. This can happen in different manners. One of those manners is by creating competent BTs, by developing new ones and restructuring the old ones, which are in need of it. The concrete

actions in this field are Covenant Partnership in the region and the programme for financial support for BTs are the actions.

Building and Construction
NME (1997): Innovative and underground building is one of the key points of the policy, in agreement with the business and the government. It was foreseen that a plan would be set up on "innovative buildings". Underground building and more flexible means of building (the ones, whose functions could be changed), demountable building (recycling of materials) can be used. There is a plan for solutions for underground building and underground use of space and transport.

Marketing
NMP 2 (1993): It was stated that eighteen (18) covenants were concluded with the industry on environmental quality of the products in the period of 1983-1993.

Occupational Health and Safety
Environmental Programme 2000-2003 (1999): By February 1997, implementation of European Seveso Guideline (96/82/EG) started. By this program, preventive protection of the employees was foreseen and for that purpose, government organised information courses.

Stakeholders' participation
NMP 1 (1989): Business sector was defined as a target group. Businesses were expected to cooperate with the government to make an inventory of their environmental problems and to develop solutions for them. It was desired that big companies would share their know-how and expertise for environmental issues with the smaller ones. Research was conducted, which questioned if regional innovation centres could play a role in common activities.

NMP 3 (1997): VROM and VNO/NCW presented the book "The Silent Revolution", which showed the results of industrial target group activities in the last 5 years with concrete examples.

NME (1997): Business sector, government, IPO and VNG agreed on conducting collective activities for the action point "sustainable BTs".

The motto defined for this action point was " Sustainable BTs: Together and Stronger". Hereby, examples on good practices were given, the change process, critical points, actions and actors were explained in the light of the strength created by partnership. Cooperation and mutual confidence is important for this.

Environmental Programme 2000-2003 (1999): Benchmarking Covenant was signed by the MinEZ and companies, through which companies were expected to prepare a Company Environmental Plan once every 4 years.

Covenant Partnership in the Region (1999): MinEZ, IPO, VNG and MinVENW signed this covenant to discuss three issues: On of these issues is "BTs". Novem (2001) defined the aims as:

- Restructuring the BTs
- Developing the sustainability quality
- Already established BTs
- Cooperation between the governmental organisations
- Attention for transport efficiency

Nota for Spatial Economic Policy (1999): Governments play acrucial role in the development and performances of industrial parks. Besides the fact that the need for public-private partnerships is stressed, governments are considered as a very important stakeholder . The

Governments are responsible for the development of industrial activities (as the reduction of unemployment), the spatial planning and enforcement of different regulations. At the same time the government has to look for co-operation with the private sector as she in many cases develops the real estate and the activities in the terrains (shops, offices, etc.).

Special emphasis is also given to the co-operation between actors. In generally it is already difficult to get information about the exact costs, benefits and risks for firms, but it is even worse if only one firm has to bear all the costs by itself. Therefore it is important that co-operation is stimulated.

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5.4 Procedures for Town Planning

The procedures and standards for town planning related to BTs in The Netherlands are defined by the legal documents and policy papers at varying scales (national, provincial, regional and local). Environmental Management Act (EMA) is the most fundamental legal document. It presents how the provinces, regions and municipalities deal with the environmental aspects of the economical activities of the enterprises (which is also applicable in the sectoral or terrain level as well). Law on Spatial Planning presents some roles for provinces in the field of BTs. Other than the two documents, it is hard to find exact matches (between municipalities and BTs) in the conventional legal documents. The town planning procedures for BTs in The Netherlands can be found mainly in covenants (where municipalities are represented by VNG, and provinces by IPO) and policy papers. The general framework is drawn in the national and provincial

policy papers, whereas specific actions could be found in the environmental policy plans and programmes of each municipality, region and province.

Legal documents
- Environmental Management Act
- Law for Cleaning the Surface Waters
- Law for Spatial Planning
- Law for Nature Protection
- Subsidy Regulation for Sustainable BTs
- Law on Working Conditions
- Provincial Environmental Ordinances
- Covenants: - Partnership in the Region
- Covenant Benchmarking

Policy documents
- National Policy Plans / National Policy Guidelines
- Provincial Policy Plans
- Provincial Policy Programmes
- Provincial Long Term Vision (Streekplannen)
- Regional Policy Plans
- Regional Policy Programmes
- Municipal Policy Plans
- Municipal Policy Programmes
- Municipal Structural Plans (Structuurplannen) (as defined by the Law for Spatial Planning)
- Municipal Policy Framework Plan (Bestemmingsplannen)

5.4.1 Procedures for town planning related to industrial parks

General:

Legal Documents
Acts: EMA foresees that companies should get environmental licences for their economical activities. It is either the municipality or the Province, who grants these licences on a company-by-company basis, depending on the size of the company. The licensing authority reviews the licence whenever technological progress makes it possible to tighten up the regulations, or whenever deterioration in environmental quality necessitates it. For smaller, less heavily polluting companies, the obligation to hold an environmental licence of this kind is often waived. Instead, the national government lays down general rules for such sectors of industry.

Law on Spatial Planning attaches a large extent of authority to the provincial governments to make decisions on the locations of BTs in the provincial territory.

Covenants
Covenant Partnerships in the Regions (2000): It was concluded by the MinEZ, MinVENW, IPO and VNG, forming a new model for partnership with regional and local governments. This negotiated agreement is based on "permanent dialogue on policy, organising capability, knowledge and financial support". VNG is involved in creating space for economic BTs whereas MinVENW deals with the accessibility of the BTs.

Policy Papers
NME (1997): It points out a significant responsibility of the municipalities and provinces. They are expected to scrutinise the process very well so that only the companies, which fulfil the requirements, can join a BT.

Action Plan for Spatial Economic Policy (2000): From the four challenges MinEZ defined, the second refers to "Utilisation of the Economic Potential of the Regions". A region is considered as an ideal scale for stimulating the investment climate, where the provinces and municipalities are expected to strongly cooperate. In order to stimulate and (in case needed), to support the provinces and municipalities, MinEZ acts for stimulating the formation of "competent BTs" by encouraging and supporting the regional parties, for developing and restructuring the (sustainable) BTs.

White Paper on Spatial Economic Policy (2000): The contents of this White Paper is very much parallel to the Action Plan, mentioned above. It is expected that the provinces and the municipalities would fulfil the aim of giving the economic policy its concrete form at the regional level. The challenge for these governments is to create a competitive business climate, fully utilising the region's specific features. One of the two pillars of the general objective of the Paper is crucial: "strengthening the spatial economic network:. This pillar mainly focuses on the problem of lack of sufficient space for economic growth and the need for varied supply of business locations".

Issue-specific aspects:

Energy (with particular focus on CO_2)
Of the National Data on Sustainable Development The Netherlands one of the three layers of strategy that government follows on energy is relevant: energy conservation by industry (and households) according to the Benchmarking Covenant (http://www.un.org).

Transport
White Paper on Spatial Economic Policy (2000): It was considered that improving accessibility is essential in a network economy under the first pillar "strengthening the spatial economic network".

Covenant Partnerships in the Region (2000): MinVENW has the role of assuring the multi-modal accessibility of industrial estates.

Stakeholders' participation:

White Paper on Spatial Economic Policy (2000): A single segment of the overall aim of this paper suggests, "strengthening regional economic policy primarily with the provinces and the cities". Because creating such a climate is beyond the administrative and financial resources of individual municipalities, regional cooperation between public stakeholders, as well as between public and private stakeholders is essential.

Creating Space for Economy and Environment (Terreinwinst voor Economie en Milieu,yns): This document of MinEZ, defines the variety of roles that governmental bodies can embody in the field of SBTs. National government can play several roles in the sustainable (revitalisation) development of a BT as "terrain manager, licence-issuing body, grounder and guard of a municipal policy framework plan (bestemmingsplan). The connection of the provincial governments and municipalities varies from observant or adviser to a full participant or self-initiator.

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5.4.2 Local and/or national support and/or incentives for implementing industrial parks' policy

The framework for the projects in this field is drawn directly by the national and/or provincial governments. Research and knowledge organisations, research-coordination centres and/or consultancy companies carry out the knowledge-based parts of the projects. Support and incentives for implementing BTs' policy in The Netherlands goes in a number of lines: mainly, in financial lines and in knowledge and expertise aspects.

Financial support is one of the means that national government provides for SBTs projects. The aim of financial support can be on different single issues or a combination of them: spatial planning, encouraging partnership structures, etc.

A KPMG study conducted for MinEZ (1998) indicates that MinEZ provided € 14 million for the period until 2003 in order to stimulate the SBTs.

Provincial Investment Programmes Tendering Scheme (TIPP) aims at the stimulation of co-operation between municipalities, provinces and the private sector in order to develop high

quality business terrains. Coherence and integrated activities are considered as pre-conditions for an integration of the spatial and other aspects for a flourishing economic structure. An important element in the programme is the paragraph on financial subsidies. The total budget for TIPP for the period 2000 to 2003 inclusive is Euro 22,7 million (2000a). A precondition is that the provinces and municipalities are required to make contributions equal to those of MinEZ.

Another Incentive Programme is "Sustainable Industrial Estates Incentive Programme", which aims to increase the quality of SBTs by enhancing partnership. The budget of the programme is Euro 13,6 million in the period 1999-2003.

Novem (2001) states that a budget of Euro 2,2 million has been available for Subsidy Regulation in 2001 in order to support the projects in different phases (already defined by KPMG for MinEZ), orientation projects, development projects and feasibility projects. Any organisation, as a stakeholder in this process and willing to develop a project can apply for this subsidy.

In order to protect the spatial quality of the BTs, MinEZ presents subsidies for the municipalities. In order to meet the need for 50,000 ha convenient area for the coming decade, the premiums are provided for three types of categories: restructuring terrains, new BTs, and a terrain that suits with one of the other nine great projects van de Architecture Nota. (http://www.minez.nl/nieuws)

The second line of support and incentives is in the field of knowledge and expertise. MinEZ (2000) states that as a result of the Covenant Partnership in the Region, brochures for restructuring BTs and handbook for spatial-economic municipal policy planned to be prepared beginning of 2000. A symposium on cooperation of municipalities and business life planned to be organised. Program for financial support for BTs is another action of MinEZ.

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5.5 Public Policies and Future Perspectives

The valid references for SBTs have a solid background in the overall environmental policy of the Netherlands, which was shaped by prominent national and international developments. Dutch environmental policy in connection with the economic social policies is shaped/influenced respectively by the Concern for Tomorrow (1988), Brundtland Report (1987), NMP 1 (1989), Agenda 21 (1992), NMP 2 (1993), Issue specific international meetings (such as Kyoto Climate Conference (1997), World Conference on Climate Change in The

Hague (2000)), NMP 3 (1997), NME (1997), Nota for Spatial Economic Policy (1999), NMP 4 (2001) and others.

The international documents played an important role as they supported the process of sound environment policy making and sustainable development oriented policies of The Netherlands. More importantly, the commitment for sound environmental policies and sustainable development was earlier present in the Netherlands and action for SD was already on the way.

The references for SBTs evolved through a range of concepts in the period 1989-2002. First, the emphasis was on the industry sector as a whole and different sector of industry. With the shaping of spatial policies and the willingness to combine spatial and economic policies, the BTs and their sustainability gained an increasing importance. Parallel to this conceptual movement, it became a common practice to dwell upon SBTs issues in the spatial planning and economic policy documents as well as the environmental policy plans.

There are two interesting points to be noted with respect to the most recent policy plans:

1. The latest National Environmental Policy Plan (NMP 4) (2001) presents no reference to the business terrains. Only in general terms, it is stated that extra emphasis should be given to spatial elements in policy making (gebiedsgericht beleid). The road towards quality improvement can be reached is indicated as: decentralisation, cooperation between the governments, introduction of quality standards and enforcement. However, there is still no operationalisation of these principles into concrete proposals.
2. The Fifth National Transport and Traffic Plan and Nota for Spatial Planning do not cover any relevant policy on the BTs.

The reason for the above-mentioned two points can be linked to a statement in the Nota for Spatial Economic Policy. There, it is stressed that it is the provincial governments who mainly handle the policy on the BTs. One can infer from this statement that provincial governments are in a position to tailor their spatial and transport related policies in accordance with their specific circumstances.

Due to the rising importance of the regions (and provinces) in The Netherlands, urban planning related to BTs is very closely linked to provincial policies. In order to provide the unity, the SBTs policies are evaluated at the provincial and regional levels. The national government (MinEZ who is mostly the financial supporter of the projects) and sometimes the provincial governments define the general framework of the policies. Besides, the provincial government and municipalities are the ones who can further modify the contents of the general framework in their provincial and local realities.

In terms of the issue-specific aspects, each issue, in accordance with its nature, requires action at a combination of different levels. For example, the energy, transport (national and local), construction and building policies are defined mostly at the national level, whereas spatial planning issues can be modified at the provincial level. Via the several partners from different geographical scales, from different expertise areas and with different levels of authority, it is attempted to combine relevant specific issues at the most possible optimal level. The most common sub-groups are related to energy (such as energy and transport, energy and building issues, etc.) and transport (such as transport and energy, transport and infrastructure, transport and spatial planning, etc.). In this regard, NMP 4 (2001) set environmental priorities, which indirectly refer to specific issues of Ecopadev project. External effects as noise and emissions, and activities such as transport, sustainable building etc. are named. However, it is hard to find concrete challenges for SBTs and to foresee what implications of these policies can be.

The main stakeholders attempting to integrate SBTs related issues can be listed as follows: MinEZ, MinVROM, MinVENW, IPO, Provincial governments, municipalities, VNG, knowledge centres, business sector, business associations, Chambers of Commerce, consultancy

companies, research-coordination companies. The way these stakeholders integrate these issues in a collective approach is linked to their roles defined in Annex 1.

The way the stakeholders integrate these issues is determined by legal documents, with special prominence of covenants; policy documents and negotiation-oriented tradition of Dutch organisational culture.

In this framework:

a. National governmental organisations are the ones determining the framework of the projects, providing financial and legal tools and policy related and administrative frameworks.
b. Research and coordination centres, knowledge centres and consultancy companies perform contracted research projects for the government.
c. Provinces, which are the geographical and administrative unit of economic development in The Netherlands, are both the policy makers and executors. They can modify national framework according to the provincial circumstances and actively take part in the implementation process.
d. The regions within a province can be the sub-units, providing the optimality of the projects.
e. Despite the local nature of the BTs, the role of the municipalities is not as dominant as the provinces since they constitute, in this regard, only an organic segment of the provinces; and the combination of BTs and localities in one province constitute a single unit of economic development.
f. Companies, business terrains, business associations and chambers of commerce represent another layer of the stakeholders. With their commitment, they use their expertise, human resources and organisational structures to develop and stimulate the implementation of SBTs policy.

The most important mechanism connecting all the stakeholders and their collective activities appears as the negotiation-based tradition of Dutch culture, which is further strengthened by the legal and policy documents.

APPENDIX A QUESTIONNAIRE

A.1 With Respect to the Overall National and Regional Information over Industrial Parks Policy

1.A. How is the concept of industrial parks defined in your country? What are the reference documents for this definition?

1.B. How is the concept of eco-industrial parks defined in your country? What are the reference documents for this definition?

2. Which governmental and non-governmental organisations (national, regional, local) organizations in your country play a role in the policy initiatives for industrial parks?

3. What is the division of authority and responsibilities between these organizations?

4.A. Are there current and/or finished national or regional Research and Demonstration projects and experiences over industrial parks (both general and issue-specific (energy, transport, waste management, emissions etc.) projects and experiences) in your country? Please make a full list of all the relevant projects.

4.B. Of the projects listed in 4.A., please focus ONLY on the projects based on general and overall policy on industrial parks and describe:

a) the scope,
b) objectives
c) achievements
d) failures (if any) of the project(s).

5. What is your interpretation / analysis of the ongoing projects and experiences in this field in your country?

A.2 With Respect to the Identification of Procedures of Industrial Parks

6. In which framework(s) is the industrial park policy in your country defined?

a) In the legal documents
- Laws
- Acts
- Regulations
- By-laws

b) In the policy papers
- National Policy Plans / National Policy Guidelines
- Regional Policy Plans / Guidelines

7. What do the procedures (stated in laws, regulations, policy papers etc.) propose for:

a) industrial park management in general, and
b) issue-specific aspects of industrial park management in particular such as
- pollution
- energy (with particular focus on CO_2)
- transport

- building and construction,
- socio-economic issues
- any other?

c) stakeholders' participation in the industrial park policy with respect to planning, consensus building and conflict resolution?

A.3 With Respect to the Procedures for Town Planning

8. In which framework(s) are the procedures/standards for town planning related to industrial parks defined in your country?

a) In the legal documents
- Laws
- Acts
- Regulations
- By-laws

b) In the policy plans
- National Policy Plans / National Policy Guidelines
- Regional Policy Plans / Guidelines

9. What do the procedures/standards propose for:

a) town planning related to industrial parks (in general)

b) issue-specific aspects of town planning related to industrial parks such as
- pollution
- energy (with particular focus on CO_2)
- transport
- building and construction,
- socio-economic issues
- any other?

c) stakeholders' participation in town planning related to industrial parks with respect to planning, consensus building and conflict resolution.

10. Are there local and/or national support and/or incentives for implementing industrial parks' policy? If so, please describe the process.

A.4 With Respect to the Public Policies and Future Perspectives

11. What are the valid references for providing the sustainability of industrial parks / industry and urban planning in your country?

a) Agenda 21

b) National Environmental Policy Plan / National Sustainable Development Plan

c) Sectoral Policy Plans for Sustainability

d) Any other?

12. Please, describe those references briefly.

13. To what extent do the initiatives attempt to integrate the different complexities of policy making for urban planning and the management of industrial parks?

14. Who are the main stakeholders attempting to integrate these issues? Please describe how they integrate these issues.