



Institute for the Promotion of Innovation
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Innovation Science Technology



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**Linking innovation policy and sustainable
development in Flanders.**

**Contribution to the OECD-TIP Project on 'Monitoring
and Implementing Horizontal Innovation Policy'**

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ENGLISH ABSTRACT

Sustainable development and innovation policies meet each other in their horizontal ambition towards other policy domains. This working paper on 'integration of innovation policy and sustainable development policy' deals with the policy response to the industrial lock-in of the Flemish innovation system in material and energy intensive production systems. The way out in 'system innovation' demands a long-term horizon of transition to a new less resource intensive and more knowledge intensive economy. But the present governance of both sustainable development and innovation policy is still dominated by a sectoral logic of institutional behaviour and policy development that is a bottleneck for integrated policy development. Sustainable development has not achieved an integrated governance structure that can implement the planning framework. Innovation is not at the top of policy agenda's outside the core domain either. In fact sustainable development and innovation have been largely strangers to each other until recently. The establishment of the Environmental Technology Platform (MIP) by the Flemish government can be a decisive institutional lever for changing the governance structure for the 'management' of the transition process in more coherent sense, in particular in achieving greater

coherence between supply (stimulating excellence in research and innovation) and demand (procurement policies etc.). MIP can become an instrument in fostering the development of visions and cooperation among different actors in the relevant innovation system. Whether this will materialize, depends however on a set of conditions that still have to be fulfilled.

This working paper was prepared for OECD-TIP, in the context of the MONIT project. MONIT (Monitoring and implementing horizontal Innovation Policy) aims at improving Innovation Policy governance and creating a more coherent horizontal Innovation Policy. MONIT offers a stimulating environment to advance explorative research and international policy learning for Third Generation Innovation Policy in Flanders.

We hope this paper not only can contribute to the discussions at OECD level on horizontal innovation policy, but also to the discussion in Flanders on governance for sustainable development and in particular on the implementation of the Innovation Platform on Environmental Technology that was created by the Flemish Government in May 2004. For the latter purpose of stimulating the discussion in Flanders, we prepared an extensive policy summary of this working paper. It can be obtained from the authors.

FOREWORD

Context

Innovation policy and sustainable development policy are both relatively new policy domains that share characteristics as a high degree of complexity of the subject matter, heterogeneity of actors, horizontal approach and still weak institutionalisation. They embody a lot of challenges for managing complexity in modern societies in general, but exemplify the changed context for the striving of policy making to build new futures.

Innovation Policy evolved from a linear technology-push strategy that assumes that economic performance follows research performance, into a system approach where the innovation process is recognised to be an **interactive** process in which different types of interconnected actors and institutions engage in the production, diffusion and use of useful knowledge. This interactive innovation process provides the elements and relationships that - located within the borders of a country - constitute its '**national innovation system**' (NIS).

The system approach is well suited to help policy makers to deal with dynamic complex processes as innovation, by focussing on the relationships between actors and the knowledge flows in the system. But this system approach is still very young. The challenge remains to derive more operational guidelines from the NIS-approach to conduct successful innovation policies. In fact, policy practice seems often ahead compared to policy theory in developing new ways to capitalize on the interactive nature of the innovation processes. In the OECD-TIP Committee (Working Party on Technology and Innovation Policy), which had an important stake in the elaboration and diffusion of the new policy framework, therefore new steps are taken to give the approach more operability and focus, in particular on the **institutional preconditions** to enhance performance of innovation processes. Because the institutional setting of its national innovation system determines to a large extent the adaptive capacity and competitive advantage of a country, the governance issue is indeed of strategic importance and is

becoming more and more a focal point of policy development.

At the same time, Innovation Policy is evolving towards a 'Third Generation Innovation Policy', stressing the need for integration with sectoral policies. It means that those sectoral policies have to put forward innovation as a distinct objective, and that innovation policy also has to expand its scope from economic goals to other types of policy goals, as a part of a coherent mission. New types of horizontal policies and governance structures are needed to achieve this type of multi-sector, multi-goal Innovation Policy. In this evolution Innovation Policy meets Sustainable Development Policy in its ambition to balance economic, social and ecological goals to preserve the well-being of future generations.

MONIT

The OECD MONIT-project (Monitoring and Implementing Horizontal Innovation Policy) that started in December 2002 has brought together participants from 13 member states for a comparative research exercise to learn more from the successes and failures in putting into practice **horizontal** innovation policies. In particular it wants to analyse the national **capabilities** in the strategic management of a coherent innovation policy. This concerns mainly the organisation of the whole **policy cycle**, from agenda setting to evaluation of the effectiveness of policies, the analytical tools of **strategic intelligence** for decision support, and the **participative methods** for consultation and coordination. **Coherence** is defined here as the degree of correspondence between goals and instruments, policymaking and policy implementation in the domain of innovation itself (**vertical** coherence), the consistency between further goals and current targets of different policy domains and their potential for integration (horizontal coherence) and the modulation in time of short term and long term objectives or the mutual fit of current policies and perceived challenges (**temporal** coherence).

MONIT's aim is to gain a better understanding on the (governance) conditions for horizontal innovation policies. To this end three

Work Packages have been defined:

- Work package 1 aims to develop a crude **profile** of the national innovation policies on the basis of a balanced selection of common indicators that enables to understand and assess the different national innovation systems, in particular in their horizontal governance.
- Work package 2 concentrates on national **case studies** of selected horizontal policy areas as learning arenas on how to achieve innovation policy coherence. Following themes have been chosen: information society, sustainable development, regional policy and transport policy.
- Work Package 3 is meant to come to a **synthesis** that will make the learning loop complete.

IWT, as represented in the Belgian TIP delegation, has engaged itself to contribute to this MONIT-project on horizontal innovation policy, as a learning opportunity. In Work Package 1 the 'Policy Profile' of the Flemish Innovation System, in the context of the decentralised Belgian Innovation System, was developed¹. In Work Package 2 the interaction of Innovation Policy with Sustainable Development policy in Flanders is investigated. The selection of this topic was not accidental since it has been high on the policy agenda in the last period, with important policy initiatives as the creation

of a new subsidy facility in IWT and the preparations to establish an ambitious Environmental Technology Platform.

Case studies on Sustainable Development

This working paper is an interim report for The MONIT-Work Package 2. Although the resources were too limited to allow a full-scale participation at the MONIT-project the participation resulted in a self-standing document that can be regarded as an extensive contribution to the case study on the integration of innovation policy and sustainable development policy, more precisely environmental policy.

The MONIT case studies on Sustainable Development have three main objectives:

- Analyse the policy space and the policy processes related to Sustainable Development policy.
- Analyse the links between the Sustainable Development and innovation policies and the role of the Innovation Policy in enhancing Sustainable Development and vice versa.
- Analyse possible ways to improve the synergy between these policies.

This paper is structured likewise.

Paul Zeeuwts
President IWT

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This working paper is based on an informal collaboration between the different authors, originating from different administrations. **Ilse Dries** is working in the Environmental Planning Unit of the Flemish Environment Ministry. Contact: ilse.dries@lin.vlaanderen.be; +32/2 553.80.34. **Peter Van Humbeek** is working for the Commission for Environment and Economy of the Social-Economic Council of Flanders (SERV) and is a former member of the Regulatory Management Unit in the Services of the Flemish Prime Minister. Contact: pvhumbeek@serv.be; +32/2 22.95.201. **Jan Larosse** is working for the Institute for the promotion of Innovation

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An important side effect of the project is the improved networking between the different administrative units.

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The authors take the full responsibility for the content of this contribution, which is not reflecting an official position.

¹ See IWT-Studies 50 (2004).

> 1.1 GENERAL SOCIO-ECONOMIC AND ENVIRONMENTAL CHARACTERISTICS

Belgium is a small and densely populated country (10,263,414 inhabitants, 32,545 km²). Flanders is the economically more prosperous and even more **densely populated** Dutch-speaking part of Belgium (5,972,781 inhabitants 13,522 km²). It accounts for about 60% of Belgium's GDP and an export ratio of 110%. Flanders has evolved from a more rural economy before 1945 to a modern industrial economy with a lot of trade and service activities that support its open economy. Flanders is now one of Europe's key economic regions. It lies in the heart of the large West European industrial area and can count on a highly educated workforce. A good transportation network provides direct links to all major European markets and - through the harbour network - the world.

Flanders has an **important and differentiated industrial base** (from agro-food to software). But the industrial structure is characterised by the scale intensive chemical and metallurgic sectors. Car assembly is also an important sector with the world highest production per inhabitant. The economic growth of Flanders is rather low because of its rather mature industries. On the other hand, Flanders is a dynamic region in the development of new technologies, with a sustained effort to promote micro-electronic and biotechnological research. As a result IMEC is the most important independent micro-electronic research institute in Europe and in pharmaceutical biotechnology Flanders is a top performer in innovation. The last few years however, the unemployment rate is rising again. Economic policy has therefore adopted the Lisbon agenda to promote the development of a competitive **knowledge based society** to maintain welfare on the basis of sustainable growth.

Linked to its small scale, high population density, central location and transit economy, Flanders has to deal with problems related to these characteristics such as congestion, road safety, high emission levels, environmental degradation and lack of

space. Furthermore, consumption is rising, increasing the pressure on the environment. The number of households is increasing, but their size is getting smaller. People have more income but less time. They use more timesaving but energy consuming household appliances.

The environmental record of Flanders is rather **weak**. Surface water quality is worrisome (e.g. only 25 % of the checkpoints comply with the biological basic quality norm). For only one quarter of the known polluted soils sanitation has started. A lot of species face the threat of extinction (20 % of the total known species). The total area of nature and forest reserves amounts to merely 1.5 % of the total surface of Flanders. But environmental quality is gradually **improving** thanks to efforts by the agricultural and industrial sectors, citizens and governments. For example: total acid emissions are decreasing, household waste generation is no longer increasing and Flanders performs very well on selective collection of household waste. Nevertheless, the overall quality of the environment is still critical due to historical pollution, a high energy and material intensity of the economy and a high consumption rate. A decoupling between economic growth and pressure on the environment has not taken place yet. For example, emissions of carbon dioxide in 2002 were 12% higher than in 1990; energy consumption still increases and the net production of energy rose by a quarter the last ten years.

Environmental issues have been gaining **political interest** throughout the nineties. In 1999 a culmination point was reached with the 'dioxin crisis', an environmental scandal that had a big impact on food safety because of the large-scale contamination of livestock. As a result, the green party for the first time entered government. Environmental issues were high on the political agenda, but gave way to debates on interventionism, economic impacts, delocalisation and unemployment. In last federal elections the green party was even eliminated from the federal parliament. In this new political context, the discussion on envi-

¹Thanks are due to Jan Larosse, Patries Boekholt and Wolfgang Polt for their comments on this draft.

ronmental issues is more than in the past focussing on **integration** of environmental policy with socio-economic objectives such as competitiveness and employment. A similar trend is apparent in many other countries and at EU level.

> 1.2 GOVERNANCE FRAMEWORK AND POLITICAL CHARACTERISTICS WITH IMPACT ON SUSTAINABLE DEVELOPMENT POLICIES

Since the mid-1970s, in a series of state reforms, Belgium has experienced a profound transformation of its governance structures that continues today. During this historic reform, Belgium was gradually transformed **from a unitary into a federal state**. In a **federal state** political decision-making is decentralized. But the Belgian model has specific characteristics. Apart from the Federal government there are now three Community governments (the Flemish, the French and the German) and three Regional governments (the Flemish, the Walloon and the Brussels). The community governments have powers on language and cultural issues. The regional governments have territorially linked competences. Each region is further divided into provinces and municipalities. The Federal government still has the power over foreign affairs, defence, justice, taxation, social security, police and an important part of public health. Many important economic issues are still decided by the federal government (such as commercial and competition law, and regulatory regimes governing network industries, except for significant aspects of energy and water supply). But a lot of policy issues have been regionalised: culture, tourism, media, youth protection, family policy, child-care, education, economy, employment, energy, town and country planning, housing, land development, nature conservation, environment, water, public works and transport, agriculture and science and research policy. It is important to emphasize the exclusiveness of these powers without hierarchy between federal laws and regional decrees. Because of its wide scope, Sustainable Development Policy is **distributed** between different federal and regional policy domains.

As in other OECD countries, the Belgian public sector grew significantly over the past 50 years. Though there are clear cultural differences, important structures and characteristics are shared by most public services in Belgium. The public administration is **compartmentalized** into strong ministries and departments, reflecting in particular the effects of power distribution in coalition governments. On the other hand, horizontal oversight bodies and coordination mechanisms and institutions usually lack strength. This weakness has often slowed and undermined the implementation of administration-wide reforms. Strong **hierarchical** relations govern the day-to-day working of the administration. Delegation of power to lower levels is highly controlled. Other important features of the traditional Belgian administrative culture are a highly developed **legalism**, reliance on precedent, and formalism in actions and procedures, which has made it difficult to move toward policy practices and tools that are results-oriented and responsive to citizens and businesses. Policy-making is more often seen as a process of drafting new laws than a discovery process that compares the pros and cons of various options to find the best solution. Last, the Belgian political culture is characterized by a search for **consensus** among coalition parties, informality of procedures, acceptance of the necessity of compromise, and institutionalised power sharing. The Belgian 'social model' has been described as having strong corporatist elements in the traditional European sense. Attitudes and institutions tend to reflect powerful social partnership interests, competing and some time diminishing the parliament and encouraging specific interests to significantly influence the design and implementation of regulation and administrative practices. A consequence is that "insiders" such as strong business and trade union interests, who often prefer the status quo to dynamic change, are over-represented, while "outsiders", such as consumers, innovators, and new market entrants are underrepresented in decision-making. This structural imbalance creates an inherent inertia within Belgian policy processes that can reduce the quality, flexibility, and responsiveness of policy, regulatory and administrative practices.

These traditional tendencies have a mixed impact on the responsiveness of the governance system.

Since the early 1990s, the different governments have tried to **modernize** the public administration to make it more responsive and to improve its efficiency through the professionalisation of civil servants, organizational restructuring, legal rationalization, and e-government. Modernization of the administration has also been considerably affected by European convergence, and particularly by the harmonization of Belgium's legal frameworks with European policies in many areas.

In 1999, the federal government launched an ambitious reform called Copernicus to transform the federal public administration. The project covered many dimensions of a thorough modernization of the federal civil service using the concepts of New Public Management, which is concerned with the systematic analysis and management of public management policy. However, after the 2003 elections and following a bitter campaign by the media, labour unions and some politicians, the reforms were stopped. The Copernicus name was dropped and reforms were drastically reoriented and reversed.

In parallel, the new Flemish government in 1999 unveiled an ambitious 'Better Governance Policy' (BBB) to restructure the Flemish administration. The core of the program consists of three major reforms: restructuring the public administration (the Flemish administration will be organized into 13 new and homogeneous ministries), restructuring advisory boards and processes (BBB will drastically reduce the number of boards from more than a hundred to a single board for each ministry) and strengthening the policy making function within the administration. A leading principle is the 'primacy of policy' that has to secure the final control of the policy maker over policy choices, compensated by a larger role of the administration in policy preparation (at the expense of the large Ministerial 'Cabinets'). But the transformation into new regulations and practices also meets big **difficulties**. The

'homogeneity' principle has to be reconciled with the growing demands for integrated, border-crossing policies. After the regional elections in June 2004, the new government will be responsible for further implementing the reform.

In theory, the organization and thus the relationships between levels of government should be clear. In practice, the legal and administrative landscape in Belgium is complicated and has required a fair amount of **pragmatism and flexibility**. Often the 'technique' of federalisation is used to shift problems to the other regional level for which the political majority is not available at the federal level. The 'creeping' federalisation is a permanent source of rebalancing the distribution of competences. Schematically, two basic relationships between the federal centre and the regions are recognized: the first is built on cooperation between levels (positive incentives), while the second relies mostly on controls (negative incentives). The first type of cooperation mechanism mainly involves building and sustaining mutual trust through **exchange of information and discussions**. For this, governments rely on many mechanisms, some sanctioned by law, such as mutual representation in decision-making bodies, consensus building (i.e. "concertation") committees and inter-ministerial conferences. It is in this type of forum that day-to-day coordination on key aspects of Belgian Policy is dealt with. A second category of coordination is a **cooperation agreement** sanctioned by the Constitutions since 1984. They are increasingly used. Their formality often means a more durable and enforceable relationship, but such agreements need to be approved by all parliaments to produce legal effects.

> 1.3 SUSTAINABLE DEVELOPMENT POLICY AT THE FEDERAL LEVEL AND NATIONAL COLLABORATION

LEGAL AND ADMINISTRATIVE FRAMEWORK

The Federal government created a legal and administrative framework for the coordination of the federal Sustainable Development

Policy and Strategy in response to the international commitment of Belgium to the UN-treaties. Following the Rio-agreements on Sustainable Development, the 1997 federal law describes a set of policy instruments for building a Sustainable Development Policy. Two important elements are the four-year Federal **Plan** for Sustainable Development and the bi-annual Federal **Report** on Sustainable Development. The first Plan dates from 2000. It covers the period 2000-2004. Recently the (draft) second plan has been launched. This second Plan follows the structure of the European strategy for Sustainable Development and covers climate change, transport, health, natural resources, poverty and social exclusion, and ageing of the population.

The Interdepartmental Commission for Sustainable Development (**ICDO**) is responsible for preparing the four-year Plan and an annual follow up report. This **Commission** is composed of Federal officials, each of them representing a member of the Federal government. More or less all the policy domains are represented, as far the competences of the Federal government goes.

The ICDO is assisted by the Task Force on Sustainable development of the **Federal Planning Bureau** that prepares the Federal Report for Sustainable Development every two years. That report provides an analysis of the current situation and an evaluation of the Sustainable Development Policy. It is used as an input for both the follow-up of the present plan and the elaboration of a new plan.

Another actor in the federal policy on Sustainable Development is the Federal Council for Sustainable Development (**FRDO**). The **Council** is an advisory body composed of a large number of experts, representatives of socio-economic and cultural and environmental protection organisations, and representatives of the federal and regional governments. The Federal government can demand an advice on its proposed policy, but the Council can also initiate advisory procedures. It has several thematic working groups, in which interaction and

discussion take place. It can also take initiatives to communicate with the public on Sustainable Development. For example for the preparation of the World Summit on Sustainable Development, the Council has organised several conferences.

NATIONAL COLLABORATION

There is no policy integration between the different Belgian governments on the level of the national strategy. For specific topics collaboration between the Federal government and the Regions and Communities has been set-up: for example for health policy (the national environmental health programme), environmental policy (the Interministerial Conference on Environment CCIM), climate policy (the National Task Force on Climate), etc. Linkages for horizontal policy development are weak.

ASSESSMENT OF THE FEDERAL EXPERIENCE

- The Federal government is ahead of the Regions in developing a more formal strategy on Sustainable Development. The government created a governance framework with a law, a council, different institutions, and a planning and reporting system. This was primarily driven by the **formal** obligation to comply with international treaties.
- A legal framework is clearly not enough (and probably not the most important issue in building a sustainable development policy ...). Since Sustainable Development has not been a political **priority**, it has proven to be very difficult to implement the plan. There has also been a lack of human and financial **resources**. As a result, a lot of actions have been delayed.
- Most of the time it is not high officials who attend the monthly meetings of the ICDO, and often these representatives do not have an **impact** on the decision-making within their administrations.
- The Federal Plan for Sustainable Development is a strategic plan, but long-term **objectives** are not clearly stated in the Plan (although they exist implicitly). Also, clear **indicators** are lacking.
- Although the content of the Federal Plan for Sustainable Development is still highly

fragmented, some **progress** has been made in different domains.

- The annual follow-up report prepared by ICDO has **no official status**. It is not published as a progress report approved by government.
- Stakeholder **participation** is considered to be very important. Therefore it was integrated into the 1999 Law. For example, there is a public inquiry on every new Federal Sustainable Development Plan. All citizens can give their opinion during two months (three months in the future). But there are **no rules** on how this inquiry should be organised, nor on the instruments to be used, the method to approach the public, the appropriate timing etc, nor of how the results of inquiries should be taken into account.
- The ICDO develops the draft policy plan. Although there is some kind of **coordination**, there are **no mechanisms** to resolve conflicts of interests. An important challenge is how to achieve a real integration of policies and implement Sustainable Development as a horizontal approach, instead of a set of scattered initiatives in each policy domain. Today, the Federal Plan looks like a list of actions to tackle specific problems in particular policy domains, rather than an integrated approach to tackle horizontal challenges in the global context of Sustainable Development. This fragmentation is also reflected in the functioning of the ICDO. For example, for the composition of the annual follow-up report, every member prepares a document for his or her own policy domain. Little interaction is taking place.
- Because the Federal government is the competent authority for only a **limited** number of policy issues and instruments, it is very difficult to come to a real 'integrated policy plan' on Sustainable Development. For example, it can introduce certain labels or product standards, i.e. for recycled materials, but the Regional governments are the competent authorities for other instruments such as subsidies for the recycling centres, agreements with industrial sectors, information campaigns etc. For water, the Federal government

legally has almost no policy competence. Under these circumstances it is understandable that it is very difficult to make a 'real' integrated SD-plan. This would need the consent of the Regions and thus the elaboration of a **common** national strategy on Sustainable Development as agreed in de Johannesburg Plan of Implementation (JPOI) by 2005.

- For the purpose of drafting a national strategy it is clear that the current ICDO is **not** the right instrument. The Regions and Communities with their vast range of powers with regard to SD are only represented by one member each with a limited observer-status.

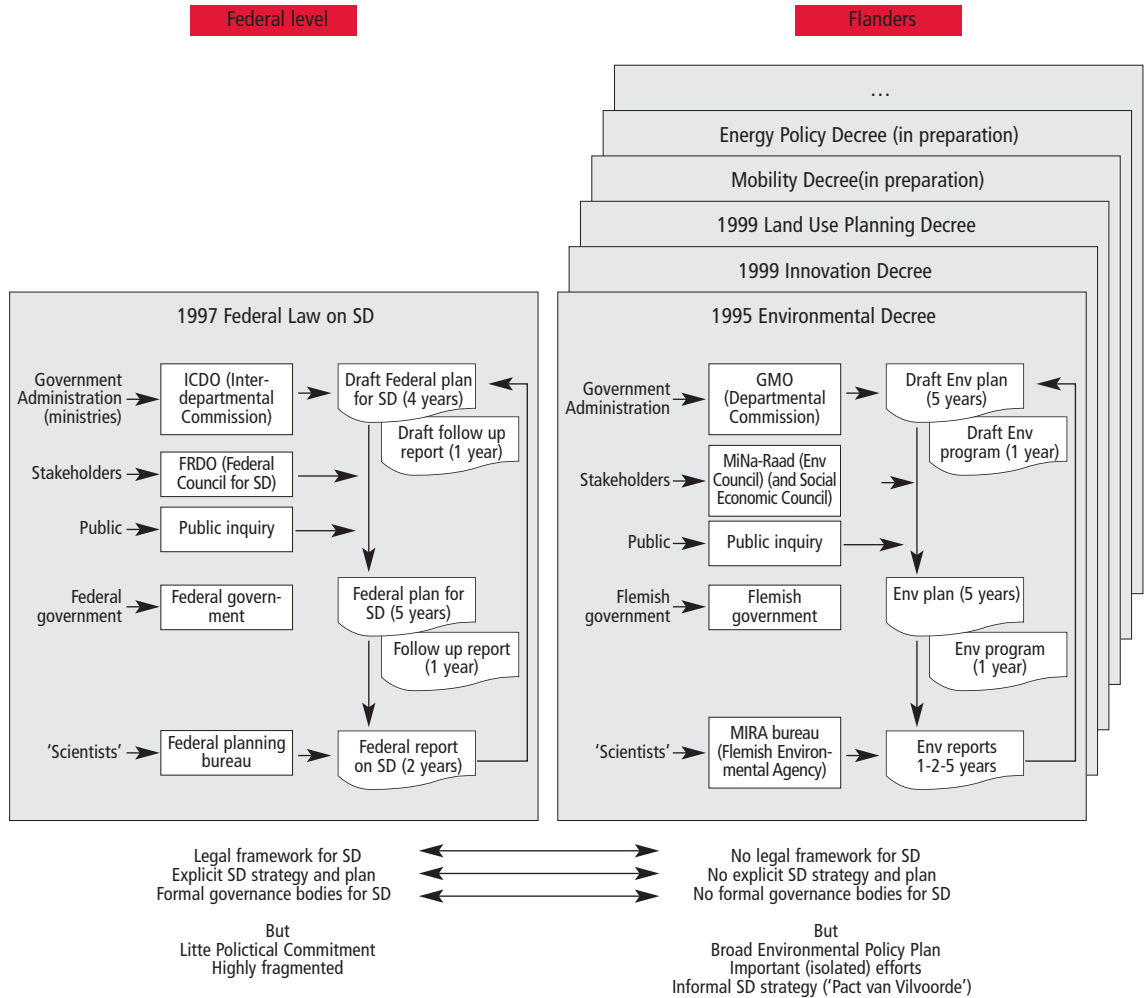
RECENT DEVELOPMENTS

Recently, the Federal government has responded to some of these drawbacks by founding a new 'horizontal' central administration (PODDO: **Programmatic Public Service on Sustainable Development**) to support Sustainable Development policy. Its mission is to help other institutions to prepare and implement the Sustainable Development Policy, i.e. when organising a public inquiry.

Following the policy agreement of the new Federal government (July 2003) 'cells for Sustainable Development' in the different ministries have been approved. Their main task is to analyse the effect of all governmental decisions on Sustainable Development (**Sustainable Development Impact Analysis**). Government has also announced that it will pay more attention to the annual follow-up report of the ICDO, as well as to the reports of the Planning Bureau. It will ask each year the advice of the Federal Council, and all these documents will be delivered to Parliament.

The Federal minister has, in response to a repeated demand from the Flemish representatives in the ICDO, recently (May 2004) taken the initiative to form an **Inter-Governmental Working Group** to elaborate a draft National SD Strategy, composed of representatives from the Federal and Regional level.

Figure 1 > Sustainable Development policy governance at Federal level and in Flanders



> 1.4 SUSTAINABLE DEVELOPMENT POLICY AT THE FLEMISH REGIONAL LEVEL

ENVIRONMENTAL POLICY AND SUSTAINABLE DEVELOPMENT

Because formal compliance to the international Sustainable Development objectives was organised through a national strategy building process and thus no regional strategy was elaborated, most weight for SD policy development in Flanders was carried by the Environmental Policy domain.

Like in many countries, Environmental Policy in Flanders is laid down in Environmental Policy Plans. Since 1995, there is a law (a

decree) stipulating that Environmental Policy will be organised through a planning cycle composed of a five year environmental action plan, an annual action programme and environmental reports prepared by an independent institute.

The **Environmental Policy Plan** defines the outlines and the long-term objectives as well as the future actions and measures of the Environmental Policy of the Flemish Region. It aims to protect and manage the environment, and to improve the coherence and coordination of the Policy between all levels and policy fields. The annual **Environmental Programme** serves to execute the policy plan and make it more concrete and operational. Both documents are approved by government.

Three different types of **Environmental Reports** are prepared. An Environmental Thematic Report is published each year. It describes the quality of the environment for every environmental topic (such as climate change, acidification, ...), using the *DPSIR* method (*Driving forces*, environmental *Pressure*, *State* of the environment, *Impact* on biodiversity, health, and economy, and *Response* of the government). Every five years, a Scenario Report is prepared. It forecasts the state of the environment under different socio-economic, technological and policy scenarios. A bi-annual Evaluation Report analyses the effectiveness, efficiency and impacts of Environmental Policy conducted until now has resulted in an improvement of the quality of the environment.

There is in principle a strong interrelationship between these different products of the policy planning cycle: the scenario reports are an input for the policy plan and the environmental thematic reports for the environmental programme.

Some other policy domains in Flanders have a more or less comparable policy cycle framework. For example, the 1999 Innovation Decree introduced among other things a four-year innovation policy plan, to be advised by the Council for Scientific Policy and the Social-Economic Council. But this is not implemented because the Environmental Policy domain is the only one that has invested resources in the necessary apparatus.

The new **Environmental Policy Plan 2003-2007** contains a **vision** on Sustainable Development from an environmental point of view, stressing the need to respect the carrying capacity of the environmental system. The Environmental Policy Plan is also putting the long-term horizon - a fundamental aspect of sustainable development policy - into practice. Several projects and measures, particularly those relating to difficult topics such as climate changes, loss of biodiversity, hazardous substances, are based on a long-term strategic approach. For every topic, at least one long-term target objective (2020/2030) and several targets and follow up indicators for the five year

planning cycle have been defined. The Environmental Policy also puts strong emphasis on a **participatory** approach to decision making, especially during the preparation of the Plan.

An important part of the Plan deals with the integration of environmental policy in other policy domains such as agriculture, economy, health, territorial planning, mobility and energy, most of them 'close' to the traditional area of environmental care. Notably, Science and Innovation Policy has been **ignored**.

The last few years this integration with other policy areas has improved along three different paths. There is now more **formal integration**, aiming at the elaboration of a common product such as a plan or programme. Examples are the Flemish input in the National Environmental Health Programme (cooperation between health policy and environmental policy and between the regions and the Federal government), and the National Climate Plan that was prepared by a Task Force with representatives from the environment, energy and economy ministries from the regions as well as the Federal government. **Informal integration** exists in many degrees. Examples are the Flemish Mobility Plan that was prepared without legal obligation or framework, or the agricultural policy that is now being prepared in close cooperation between different administrations. Lastly, there is **instrumental integration**, needed to execute a certain multi-disciplinary policies, such as the preparation of land use policy and multi-sectoral plans (discussion with the policy domains of territorial planning, agriculture, environment, economy, housing, transport etc.).

SUSTAINABLE DEVELOPMENT: AN EMERGING FRAMEWORK FOR GOVERNMENT POLICY IN FLANDERS

In the last decade Sustainable Development was present in many policy declarations. In the **1995** policy agreement of the Flemish government 'to strive for an economic growth while maintaining social justice and a

better ecological equilibrium' was considered as one of the five most important challenges of the new government. The following government emphasised in its policy agreement of July 1999 more explicitly the importance of Sustainable Development: *'Prospective and modernised governance means that the government has an eye for Sustainable Development in the different policy domains. This means that we must provide in the needs of this generation without limiting the possibilities of the future generations. Sustainable Development has to take place within the borders of the ecological system and pays attention for the less beneficiary in the society.'* Next, between 2000 and 2004 there have been some interesting **projects** relating to Sustainable Development. The Minister of Employment for example worked on sustainable entrepreneurship and employment in the environmental sector. The Minister of Mobility worked on the reduction of damages to the environment caused by transportation and infrastructures. The Minister of Energy worked on rational energy consumption and renewable energy supply. The Minister of Agriculture worked on sustainable agriculture (space management, animal welfare,). The Minister of Science and Innovation worked out a scheme to promote Sustainable Technology Development, etc.

Although many politicians stressed the importance of Sustainable Development, there is no 'horizontal, integrated plan or strategy' for Sustainable Development in Flanders. However, in 2001 the government launched a **policy vision project** called *'Colourful Flanders'* to establish a platform with all social actors for a longer-term societal development project. It can be considered as a **first move** towards an integrated strategic policy that finds its inspiration source in the sustainable development agenda, because of its horizontal choice of goals and themes, and its longer term thinking (2010). Six working groups, composed of experts, members of cabinet, officials of the ministries, and often representatives of socio-economic organisations and NGOs, drafted long-term vision texts on entrepreneurship, education, work, culture, care and

environment. These were translated into "21 objectives for the 21st century" and signed during a high level Conference by all ministers and by representatives of the social partners and the environmental organisations. Afterwards, a set of indicators was agreed to follow up this *'Pact of Vilvoorde'* (named after the town where the conference was held).

The new 2004-2009 government declaration is less explicit in its reference to Sustainable Development but affirms a continuation of policies to integrate economic, social and ecological concerns. The new policy agreement states that one of the core tasks of Flanders is *'to evolve towards a competitive and responsible region, with an economy that fosters simultaneously an economic, social and ecological development'*.

ASSESSMENT OF THE FLEMISH EXPERIENCE

- Flanders does not have a defined and **overall** Sustainable Development Policy. There is neither a legal framework for coordination of that policy (although such a legal framework does not seem to be a priority to develop a SD policy). Until recently, only Environmental Policy was inspired directly by the principles of Sustainable Development. It has set-up a well-integrated policy cycle that can develop and assess SD policies that are underpinned with research and stakeholder participation.
- However, things start to **change**. Many issues relating to Sustainable Development have been included in the policy letters of different Ministers between 1999 and 2004. And the Pact of Vilvoorde can be considered as a valuable effort to formulate policies with a longer-term horizon, combining ecological, social and economic objectives for 'sustainable growth'.
- On the other hand, the Pact of Vilvoorde cannot be more than a **first step**. The process was characterised by a lack of integrated thinking. The six vision groups worked independently without much interaction. As a consequence, the transversal character is absent. The different topics were treated without relationship to others. Certain dimensions that are impor-

tant for Sustainable Development are lacking: i.e. the international dimension (international solidarity, technology transfer to the developing countries, ...), a balanced approach to the three pillars of SD, ...

- In sum, the synthesis drawn by the high level Conference must be seen as a **political message** that long term thinking is important, but objectives were not checked for consistency and merely express additional policy priorities of the different partners, not a common integrated sustainable development strategy. The 'governance by Conferences' that is common trend in political decision-making in Belgium has a limited impact if it is not combined with **institutional reforms** on the level of policy development to translate objectives into coherent policies.

RECENT DEVELOPMENTS

Taking into account the Johannesburg Plan of Implementation, every country has to implement a national strategy for Sustainable Development by 2005. There are two possible **scenarios** for Flanders. Either Flanders cooperates with the Federal government and all Regions and Communities in Belgium to agree on a **common** strategy that is not limited to a formal framework. This might be a tough exercise because often there are very different interests, not only between the Regions and the Federal level but also between departments and policy areas. It requires a huge effort to realise this two types of horizontal integration at the same time. This scenario will also require a formal approval by all government and parliaments, a cumbersome and time-consuming procedure. The other option is to let the Flemish Region develop its **own** Sustainable Development Strategy. Many officials seem prepared to work on this option, but political commitment is not clear (although the Parliamentary Commission for Environment suggested rethinking the Environmental Policy Plan into the direction of an integrated Flemish Sustainable Development Plan). To enhance this scenario, a study is being carried out in 2004 to examine the necessary tools and conditions on how to structure the future dialogue and policy framework for SD.

In each scenario, Flemish public servants will have to deal with **department-crossing issues** relating to Sustainable Development. Therefore, an 'Interdepartmental **Working group on Sustainable Development**' was established in 2003. One of its tasks was to prepare common papers for international meetings on Sustainable Development, such as the Commission for Sustainable Development of the United Nations. Other tasks were to prepare a coordinated advice on the preparatory texts of the Federal plan for Sustainable Development, and, what was felt as a priority by the group, to prepare a Flemish strategy on Sustainable Development. Feelings about whether a real Flemish strategy will develop in the next years are mixed. In the new political context, the discussion on environmental issues is focussing more on integration of environmental policy in **socio-economic** objectives such as competitiveness and employment. This could become a danger to environmental objectives but, on the other hand, it might pull a sustainable development approach out of its environmental corner where its ownership has been for too long. The mounting unrest about the overall perspectives of maintaining welfare in Flanders (jobs now, pensions in the future) might be translated in a growing demand for a long-term vision for sustainable growth in new development paths.

An important tool for the integration of Sustainable Development thinking in policies and regulations might come from an unexpected source as well, notably from the new **regulatory management** instruments that have recently been approved by the Flemish Government. Especially the introduction of a **Regulatory Impact Analysis** system seems important in this respect. Its aim is to improve the quality of regulation and policies by carrying out a systematic analysis of the social, economic and environmental effects of existing and proposed regulations. Another regulatory management instrument worth mentioning is the enhancement of **transparency** in the policy process by setting up a regulatory forward planning agenda, establishing 'notice and comment' procedures to broaden consultations and introducing the use of 'white

papers' to allow for early consultation and public debate on proposed policy measures.

Following the regional elections of June 2004, the responsibility for Sustainable Development policy for the first time was formally assigned to a minister, notably to the **Minister-President** of the Flemish Government. His cabinet prepared a first policy note for sustainable development. MiNa and SERV, two major advisory councils (for environmental and socio-economic topics), moreover recently decided to collaborate on the issue of sustainable development. They already published a call directed to the whole Flemish government, to prepare a Flemish Strategy for Sustainable Development.

> 1.5 IMPROVING POLICY COHERENCE AND INTEGRATION FOR SUSTAINABLE DEVELOPMENT²

THE IMPORTANCE OF GOOD GOVERNANCE FOR SUSTAINABLE DEVELOPMENT²

The traditional response to how to integrate an emerging issue in the policy debate has been to create **new institutions**. The same pattern is evident with respect to sustainable development. However, new institutions may be insufficient to respond to the challenges posed to public management systems by broad policy principles as sustainable development, as these institutions tend to be independent and fragmented, and tend to operate according to closed decision-making processes. Notwithstanding that new institutions might be necessary (e.g. to 'enforce' and provide guidance on sustainable development strategies, implementation of sustainable development goals often requires specific initiatives by government to better **integrate** economic, environmental and social goals within the mandate of each existing institution and make them **cooperate**.

This means that good governance and sound public management are **preconditions** for the implementation of sustainable development policies. These preconditions include efforts to ensure a more **transparent** government process, as well as decision-

making practices sufficiently **open** to stakeholders, to assure a broad support. In addition to these basic preconditions, the importance for sustainable development of key **management tools** such as performance measurement, specific policy and implementation processes, and continuous strategic assessment is crucial to improve the quality of the policy decision-making process.

What institutional adjustments are required to implement sustainable development policies? For instance, how to raise awareness and maintain commitment both within and outside government when **short-term** economic considerations such as job growth and inflation are the absolute priority? During economic recessions, for instance, short-term stabilisation policies are often preferred to **long-term** sustainable development policies.

In addition, traditional government procedures for addressing cross-sectoral and inter-generational issues often display a **deficit of coherence**. Constitutional, legal and political obstacles to policy coordination exist partly in order to maintain clear distribution of responsibilities and specialisation of tasks among sectors and across levels of government. In addition, segmented working methods prevail. A lack of effective co-ordination between sectors and across the various levels of government is therefore one of the major challenges. Similarly, coherence is still lacking between the key choices made by the public sector and those made by the private sector.

Achieving greater policy coherence demands sustained efforts to improve the integration of sectoral policies, to ensure policy integration across levels of government, and to ensure consistency in the choices made by the various stakeholders. An important issue is how to advance this "**integration agenda**". Central agencies have a role to play in monitoring the implementation of the sustainable development agenda, and this process should be mainstreamed into the regular policy process. Longer-term budgeting and sound regulatory instruments, for example, are impor-

²Based on OECD (2004).

tant tools for integration. Governments also have a key role in providing the right incentives for improving coherence and integration, including through financial and fiscal mechanisms.

INVOLVING ALL STAKEHOLDERS

Progress in developing further internal government mechanisms, while necessary, is not sufficient for achieving progress towards sustainable development. Major barriers to policy integration are strongly rooted in the differing stakeholder perceptions of the issues involved. **Conflicting interests** are often at stake in discussions about sustainable development, and trade-offs remain a major feature of policy-making. Efforts have been made to address this problem, in particular when agreement on a common interest can be identified or when the unsustainable nature of specific activities becomes obvious. Governments have an important role to play in addressing the major conflicts of interests among stakeholders, in particular by involving them in constructive discussions on these issues, but also in forging compromises and advancing solutions.

Innovative decision-making mechanisms that **associate** the private and public sectors as well as NGOs are in demand, and, increasingly, business actors are playing a positive role. A careful review of the mechanisms for interacting with civil society requires the capacity to identify and use the best available instruments for managing this broad involvement. If sustainable development policies are to be implemented by governments, then they need to be supported by effective systems for broader consultation and participation throughout policy processes (e.g. to ensure transparency, fairness, realistic timeframes, procedures for managing feedback, etc.).

IMPROVING KNOWLEDGE MANAGEMENT

The complexity and unpredictability of the long-term effects of most issues related to sustainable development imply that, for most policy decisions to be made, conclusive scientific evidence is not always available.

Most decisions will therefore involve stakeholders with different backgrounds and objectives. A limited capacity on the part of institutions to deal with the range of **perspectives** on the issue, as well to absorb complexity and to manage change, will be at odds with the need for a mutual understanding among the different disciplines, audiences or constituencies involved.

Managing knowledge for sustainable development is therefore extremely challenging. Scientific knowledge should be the basis for raising awareness in different constituencies and increasing the visibility of the sustainable development concept within and outside government (including in the media). However, since conclusive scientific evidence will not be available for many of the decisions to be made, it is crucial to ensure that sufficient debate occurs to **confront** values, perceptions and views, in order to take decisions that are more universally acceptable. Most importantly, perhaps, this requires a government that is prepared to assess its interventions in the policy debate appropriately.

Better inputs from scientific research in policy decisions will require that governments stimulate the production of scientific **data** in a number of key disciplines, and that they set clear and transparent rules for "assessing knowledge". Governments should therefore fund research based on a range of paradigms and options including "dissenting opinions", stipulate that scientific institutes should reflect broader societal concerns, where appropriate, and organise public **discussion** guided by forward-looking and concrete scenarios on conflicting information and knowledge.

POLITICAL LEADERSHIP AND INSTITUTIONAL MECHANISMS

Effective implementation of sustainable development goals requires also a common understanding of sustainable development, a clear **commitment** and leadership and specific institutional mechanisms to steer integration.

Clear commitment and leadership within government to sustainable development

goals, and communication of this commitment, are essential to support the development of a concrete strategy and subsequent action. This commitment should come from the top, but developing leadership and capacity throughout public sector organisations is also essential. This is particularly challenging given the potential for conflict among various interests both in the public and private sectors. Stronger political leadership is needed to shape the debate on how to take sustainable development forward. This leadership has, in turn, to address problems that result from 'silo' thinking, from a reluctance to cede decision-making authority, and from "short-termism".

The need to 'enforce' and provide **guidance** on sustainable development strategies through an overarching 'institution' of unit acting as a "**catalyst**" is particularly important. This "catalyst" should be located strategically within the government machinery (e.g. at the level of the Prime Minister's Services). Another important tool are **mechanisms for critical evaluation**. There should be specific reviews of laws and regulations to check whether they conflict with sustainable development, and whether sustainable development objectives are embedded in new legislation and regulations; there should be a clear framework for assessing the performance of public organisations with regard to sustainable development; there should be evaluation and reporting mechanisms installed to support sustainability appraisal within the public sector (i.e. indicators of progress, cost/benefit analysis, environmental and social impact assessment), etc. Within this framework, policy sectors should be mandated to develop their own sectoral strategies in conformity with overall objectives.

Also, maintaining the right balance between local autonomy and central steering capacities is a major challenge for managing across levels of government. To support sustainable development, specific attention should be paid to translating international, national and regional strategic policy directions into measures that can be implemented at lower levels. This requires paying attention to the risk of frag-

mentation and overlap of responsibilities. In addition, decentralisation should not take place at the expense of accountability for sustainable development.

> 1.6 CONCLUSIONS AND RECOMMENDATIONS

Sustainable Development can only succeed if integration takes place both between policy domains and between different policy levels. On the Federal level, there is a **strong formal framework**, but 'integration' seems to be the bottleneck for the elaboration and execution of the Sustainable Development Plan. Informal and formal integration very much depend on the willingness and the attitude of the officials themselves. But political **commitment** is key.

In Flanders efforts towards integration of policies for SD have been made in some areas such as environment, energy, agriculture, economy, mobility and innovation policy. But concrete measures and results remain very **isolated** and dependent on the intentions of the minister in charge. There seems to be a strong need for a common strategy, not so much to comply with international agreements but to improve the policy **performance** of government. 'Copy and paste' the federal governance structure and regulations for sustainable development is probably not the best way to proceed for Flanders. The main concern is to take initiatives to better **integrate** economic, environmental and social goals within the mandate of each policy sector. This requires measures to build and strengthen a sound policy cycle in every individual policy sector (**vertical** coherence), measures to improve the coordination of sectoral policies (**horizontal** coherence) and measures to allow for the modulation of short term and long-term objectives (**temporal** coherence). So good governance and sound public management seem more important preconditions for the implementation of sustainable development policies than new institutions and regulations. Most important preconditions are political leadership, institutional mechanisms for policy coordination, transparency and knowledge management (table 1).

Table 1 >

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Preconditions	Current situation	Recent developments	Recommendations for Flanders
Political leadership	<ul style="list-style-type: none"> Federal: Low, not a priority Flanders: Low, not a priority 	<ul style="list-style-type: none"> Federal: rising, new minister-secretary of state for SD Flanders: 'Pact of Vilvoorde'; Minister-president formally responsible for coordinating SD policy in Flanders 	<ul style="list-style-type: none"> Strengthen political leadership and vision Better include SD in 'social contracts' and 'pacts' ...
Institutional mechanisms	<ul style="list-style-type: none"> Federal: ICDO and the SD Plan are weak and are not working properly Flanders: lack of mechanisms for coordination of policies (BBB) 	<ul style="list-style-type: none"> Federal: programmatic public service on Sustainable Development and Sustainable Development Impact Analysis Flanders: interdepartmental working group for SD; promising regulatory management instruments (e.g. RIA) 	<ul style="list-style-type: none"> Set up a central SD unit to act as a catalyst Install evaluation and reporting mechanisms to support sustainability appraisal Develop longer-term budgeting and sound regulatory management instruments ...
Transparency	<ul style="list-style-type: none"> Federal: public enquiries; Federal Council for Sustainable Development (FRDO) Flanders: public enquiries; Environmental Council, Social-Economic Council, ... 	<ul style="list-style-type: none"> Federal/ Flanders: a lot of separate and often small scale initiatives and experiments such as focus groups, test panels and forms of interactive policy making, developed by government administrations, at universities, by NGO's, etc. 	<ul style="list-style-type: none"> Ensure a more efficient and effective participation of citizens, stakeholders and advisory bodies Use new and more flexible consultation methods Introduce "white papers" for earlier consultation Introduce a regulatory agenda and "notice and comment" Develop clear guidelines and minimum standards for consultation ...
Knowledge management	<ul style="list-style-type: none"> Federal: Federal Planning Bureau Flanders: Advisory Councils, MIRA, NARA, ... 	<ul style="list-style-type: none"> Federal: PODO Flanders: emerging use of scenario analysis and foresight at APS, ViwTA, VRWB; establishment of university Policy Support Points, departmental policy units in BBB, ... 	<ul style="list-style-type: none"> Build strategic intelligence capabilities. Strengthen analytical instruments such as foresight, scenario analysis, etc. and integrate them in the policy cycle Build competences on process management, participative methods for coordination, policy instruments and policy mix, etc. Develop forums for sharing experience and knowledge ...

- Political interest for sustainable development policy is still high on the agenda at Federal level as well as in Flanders. A particular promising development is that, following the regional elections of June 2004, the **responsibility** for coordinating Sustainable Development policy in Flanders has for the first time been assigned formally to a minister, notably the Minister-President of the Flemish Government. Anyhow, it remains to be seen whether this will lead to a strengthened political leadership for Sustainable Development.

- The **new institutional mechanisms** that have been introduced very recently such as the Programmatic Public Service on Sustainable Development and the Sustainable Development Impact Analysis at federal level and the new regulatory management instruments (e.g. Regulatory Impact Analysis) in Flanders are promising tools and arrangements to proceed on sustainable development strategies. They should be developed further to act as catalysts for improvement.

- The Flemish as well as the Federal government has a strong tradition working with

advisory councils and public enquiries. These are necessary but insufficient components of a full-fledged 'open' policy development process. More effort to enhance the transparency of the policy process is necessary to allow more interaction between administrations as well as more stakeholders' involvement. At present, there are several **experiments** with focus groups, test panels, etc. and there is an increasing use of different forms of interactive policy making, developed by government administrations, at universities, by NGO's, etc. However, it often involves separate and small-scale initiatives. For Flanders, the priority is probably not to install a Flemish Council for Sustainable Development. Not so much because there are already several well-established advisory boards such as the Environmental Council (MiNa), the Social-Economic Council (SERV) and many others, and the space and resources for yet an **additional** council is limited (MiNa and SERV moreover recently decided to collaborate on the issue of sustainable development), but because such a council would again institutionalise consultation practices, tend to monopolize stakeholder involvement and hinder **new** participants and innovative consultation methods. The priority should therefore be to integrate sustainable development thinking in **each and every** advisory council, and more important, to ensure a more efficient and effective participation of citizens, stakeholders and advisory councils in important public policy decisions. Here progress is slow both in Flanders and at Federal level.

- Political commitment and policy integration can only go together if a **framework** for

long-term strategic convergence is created. At Federal level the Research Program for Sustainable Development (PODO) and in particular the Planning Bureau provides an important support in this set-up. In Flanders such kind of institute is not available, but advisory councils like SERV and MiNa in practice sometimes fulfil a comparable think-tank function. Also instruments like MIRA (the system of environmental reporting and foresight) play an important role. There is moreover an emerging use of scenario analysis and foresight in Flanders (APS, ViwTA, VRWB, universities, ...), scientific policy support points have been established at universities and departmental policy units are underway (BBB). But generally, the instruments for strategic intelligence to support the decision processes are not well developed, neither at Federal level nor in Flanders. Initiatives with foresight, back-casting and other explorative techniques for policy development are scattered and not well linked to the actual policy cycle. **Forums** for sharing experience and knowledge are nearly inexistent.

Combining positive points of the Federal and the Flemish level, and giving more attention to the **integration** aspects, it should be possible to develop and execute strong and coherent national and regional strategies for SD. Therefore the different governance elements have to find **mutually reinforcing** dynamics, between the governmental levels in Belgium as well as between the administrative levels in Flanders. An illustration of a possible way to advance this 'integration agenda' is the recent collaboration between environmental policy and innovation policy in Flanders we now turn to.

COORDINATION AND INTEGRATION OF ENVIRONMENTAL AND INNOVATION POLICIES IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

> 2.1 THE CASE FOR LINKING ENVIRONMENTAL AND INNOVATION POLICIES IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

SUSTAINABLE DEVELOPMENT AND TECHNOLOGICAL INNOVATION

Sustainable Development argues among other things that economic and social development has to take place within the borders of the ecological system. These borders pose limits to the use of the environment as a source and as a sink. Combining economic, social and environmental goals therefore needs a **decoupling** of economic growth and environmental pressure. If society for example wants to double wealth and at the same time halve the pressure on the environment, a 'factor 4' improvement in 'eco-efficiency' (or a reduction of the amount of emissions, resources and energy per output of the economy) is needed. In the long run, we will probably need factor 10 improvements or more to balance social, economic and environmental objectives.

But present policy will only increase eco-efficiency by about factor 2 if we keep concentrating on incremental changes (figure 2). Small improvements in eco efficiency (i.e. a car that consumes less fuel) will not do the job. We also need more radical innovations to reach factor 10 improvements and the Sustainable Development goals on a long-term basis. This implies radical, systemic changes (other types of mobility or labour

organisation such as teleworking), and a thorough reflection on the necessities and the services society is demanding to look for the most efficient way to provide in those necessities.

Technological, economic, social and institutional innovations are therefore at the core of Sustainable Development policy, and to implement a coherent strategy a close collaboration between Environmental Policy and Innovation Policy is urgent.

ENVIRONMENTAL POLICY AND INNOVATION

But in Flemish environmental policy, the consideration that is given to the role of technological innovation is very **limited**. This is probably due to the fact that technology is still seen by a large part of the environmental community as a part of the **problem** instead of a part of the **solution**.

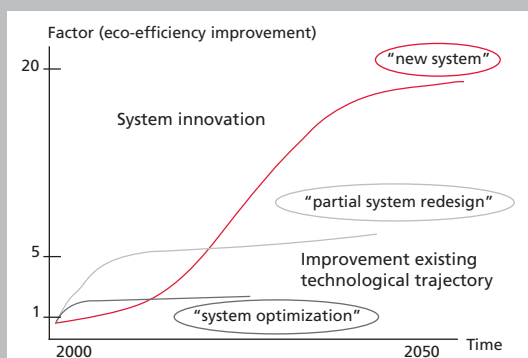
Let us give some anecdotic examples, for each of three the building blocks in the policy cycle (role of research and policy learning; policy formulation and setting of the policy agenda; implementation).

- Starting with the role of research and policy learning, the Flemish government has created research Support Points in each policy domain to coordinate, strengthen and raise the relevance of applied policy research. In the five-year working program of the environmental policy sciences Support Point, the word 'technology' is mentioned somewhere in the introduction, but **none** of the research clusters or research projects deals with the promotion of environmental technological innovation.

- In the policy formulation part and the setting of the policy agenda, there is little consideration for the role of technological innovation in Environmental Policy. Usually, the importance of green technological innovation is mentioned, but in the policy strategy as well as in Environmental Policy plans it remains a marginal subject. This can be illustrated by the recent Environmental Policy plan 2003-2007. In the chapter that deals with integration of Environmental

Figure 2 >

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INCREMENTAL VERSUS RADICAL INNOVATION

Innovations differ with respect to how and where they create novelty. Noticeably they differ with respect to how radical they are, requiring new competencies, and with respect to how systemic they are: to what degree they require complementary innovations in the value chain, in the wider technical infrastructure or in the consumption patterns of civil society.

Incremental innovations, then, are minor modifications of existing processes or products, while radical innovations imply a technological discontinuity based on a break with existing competencies and technologies. The very radical innovations may entail the formation of new technological paths providing new solutions to a problem, e.g. renewable energy sources as opposed to fossil fuels. The radical innovations tend to be more systemic than the incremental ones, but many incremental innovations require complementary innovations at least in other parts of the value chain. The more systemic and the more radical the innovation, the larger the transition costs of the innovation. An example of a very systemic innovation involving change at multiple levels, including both organizations and institutions, is the hydrogen economy. Incremental innovations are an important source of productivity and should not be considered of lesser importance than radical innovations. All types of innovation are important to eco-innovation and are closely interlinked, and should be of concern to policy. Systemic innovations are based on a set of radical innovations and incremental ones. A radical innovation opens up an avenue of incremental innovations.

Source: Kemp and Andersen (2004)

Policy and cooperation with other policy domains, there are sections about cooperation with economy, energy, agriculture, transport, land use and health care, **not** with Innovation Policy.

- Thirdly, in the implementation phase evidence shows that the effect on the technological development of environmental policy instruments is limited and concerns typically diffusion of existing technologies, not innovation. They result in the diffusion to laggards of technology that is being used by forerunners. The evidence even shows that environmental policy instruments often hinder technological innovation. This is largely due to some characteristics of environmental policy instruments and the way they are used, such as lack of flexibility, rigid time schedules for implementation, poor predictability, a political focus on incremental short-term improvements in environmental quality and a build-in preference for the application of today's 'best available technology'.

As a result, the most common solution for environmental regulation in Belgium and Flanders has been **incremental** innovation in

processes and products and diffusion of existing technologies, often in the form of end-of-pipe solutions. This is clearly reflected in the supply side as well as the demand side of the environmental industry in Flanders. It is also clear that environmental policy makers are ignorant about the preference for the technological status quo that is underlying in most regulatory solutions.

INNOVATION POLICY AND THE ENVIRONMENT

The consideration that is given in the innovation policy field to the promotion of environmental quality is very limited as well.

Using again the three main building blocks of the policy circle, the main focus in innovation policy, when setting the policy agenda, is to support competitiveness and economic growth through the development of new technologies that increase productivity and offer new functionality. Innovation policy aims to stimulate technological change, but wants to be neutral when it comes to the direction of that technological change, that is left to the innovation actors to decide.

In the policy formulation stage, the dominant culture in innovation policy is still 'neutrality' of innovation policy in social choices and 'departmentalism': environmental policy has to do its job, making sure that market prices reflect environmental externalities properly. In that case, there is no need for innovation policy to stimulate green technology explicitly. As a practical matter, what this means is that the technology policy community has largely ignored the environment. Thematic programs that started in the early nineties to stimulate basic research in industry in environmental and energy technology were abandoned and replaced by a 'generic approach' towards all innovation themes. Today's main stream thinking on the 'innovation systems' as the locus of policy concern does not involve a change in purpose, but rather, a new understanding of the process and factors that influence technological change as such. Competencies for technology assessment – that do integrate the socio-economic context - are weak and scattered.

Finally, in the implementation phase of innovation policy, the environmental performance of technology instruments and programs has been very limited. When supporting an innovation project, government mainly looks at technical and economic characteristics. Environmental performance has been up to now at best a bonus in the final deliberation.

THE CASE FOR INTEGRATION

To summarise, although the common challenge is to contribute to system innovations that alter the 'lock-in' of Flemish growth model in unsustainable technological trajectories of energy and material consumption and environment in general, there has been little contact between Innovation Policy and Environmental Policy, and a total lack of integration. Taking into account the **three pillars** of Sustainable Development (ecological, economic, and social) we can say that Innovation Policy domain has put its emphasis on the **economic** pillar and Environmental Policy on the **ecological** pillar. Successful integration can only be obtained if both adopt a more **systemic** approach, introducing additional

selection criteria in their policy development that 'internalise' these other objectives.

But in the case of Innovation Policy, which is a new policy domain that is hardly emancipated from its historical subordination to Science Policy, bridging the gap between the science and economic domains is still the main challenge. And the Environmental Policy hardly knows anything about the internal viewpoint of the economic actors, because the economic area and profession are poorly represented in environmental departments. These institutional characteristics may explain partly the lack of integration.

Nevertheless a better integration between the two policy domains is necessary from an environmental and socio-economic point of view, and especially with regard to sustainable development.

For *Environmental Policy*, there are several good reasons why a more explicitly innovation oriented Environmental Policy is needed:

- Environmental effectiveness: an innovation oriented Environmental Policy is necessary to promote the development and introduction of a new series of techniques that make major improvements in environmental quality better attainable;
- Decoupling economic growth from environmental pressure: an innovation oriented Environmental Policy is necessary to achieve simultaneously ambitious socio-economic and environmental objectives, and substantially raise the eco-efficiency of our economy.
- Cost-effectiveness: an innovation oriented Environmental Policy is necessary to reduce the cost of environmental measures and achieve more environmental results for the same level of costs;
- Take advantage of win-win opportunities: an innovation oriented Environmental Policy is necessary to focus on win-win opportunities that have remained unused so far to lower production costs and at the same time pollute less;
- Market and socio-economic benefits: an innovation oriented Environmental Policy

is necessary to benefit from the promising market- and socio-economic benefits of the fast growing environmental industry.

For *Innovation Policy*, we can mention at least four main reasons for a more explicitly environmentally oriented Innovation Policy:

- Innovation Policy promotes research and development of promising future technologies. Given the scale and magnitude of environmental problems, technologies limiting the environmental damages of production and consumption are no doubt in that category. But according to the traditional view, Environmental Policy has to make sure that market prices reflect environmental externalities properly. If this is the case, there is no need for Innovation Policy to stimulate green technology explicitly. However, there are serious doubts whether it is possible and achievable to reach a full internalisation of external environmental costs in all prices due to informational and political constraints. This means that market prices will not reflect environmental externalities properly, and will not provide adequate price signals to research and investments in green technology. In the case of ecological innovations there exists therefore a '**double externality problem**' (according Michael Porter). These innovations are not only hampered by 'positive' knowledge spillovers that discourage inventors in general but also contribute to lower the 'negative' environmental externalities in the diffusion stage. In such a situation, there is obviously an important role for Innovation Policy in remediating these **market failures**.
- Secondly, environmental innovations have some particular properties compared to most other types of technologies. That explains why there is relatively little environmental R&D. A first difference is the importance of government policy in creating the **demand** by regulatory and other environmental instruments. The problem here is that these signals are often too weak and unpredictable. This explains why the **uncertainties** are bigger for environmental technologies than for other types of technologies. A second difference is that

R&D in environmental innovations is often very **complex** because various scientific and technical disciplines are involved, and the necessary competence can be far away from the basic competencies that are available in the company that is searching for solutions. This complexity combined with an uncertain demand explain why **risks** are often higher and companies employ a higher internal rate of return and shorter pay back periods for environmental innovations than for other investments.

- Thirdly, innovation policies intend to be internalised by other policy domains to become really comprehensive and more performing through better integration with the **demand** side. Innovation becomes a pull factor if it is an integrated part of the sectoral policies and if public tenders take it into account explicitly. These 'third generation' innovation policies have to become fully **horizontal** and support a broad range of social goals to achieve its functional objective of increasing the overall innovation rate in societies. Environment is an obvious candidate for this wedding of interests.
- Fourthly, innovation policy is the key for restructuring the Flemish economy towards new, future oriented specialisation patterns. In the present global context the historic **specialisation pattern** of the Flemish economy in some material and energy intensive activities has become unsustainable from as well an economic as an ecological point of view. The economy has to find an entirely new energy basis. Therefore innovation policy has to adopt the mission to position Flanders among the most advanced and competitive economies in the new environmental industries.

From a sustainable development point of view, all foregoing arguments matter of course. But the concept of sustainable development focuses in particular on integration and coordination of policies, improved interaction between government and society and applying a long-term view in policy making. From this, the need for system innovation and new governance styles is obvious. This parallels the horizontalisation of innovation policy. Both sustainable development

and innovation system analysis meet in the diagnosis of the systemic lock-in of the economy in an unsustainable growth model and the need for a change in **governance** to change policies.

> 2.2 INSTRUMENTAL INTEGRATION AND COORDINATION OF POLICIES

Approaches for a better integration or coordination of environmental policy and innovation policy can take either the perspective of **single** policy instruments focussing on **changing (economic) behaviour**, or of **transition** programmes for **system changes**. Both can be complementary (figure 3). We now describe some major policy instruments that are being used in Flanders and their relation to technological innovation. In the next paragraph we focus on governance for system changes.

REGULATIVE INSTRUMENTS

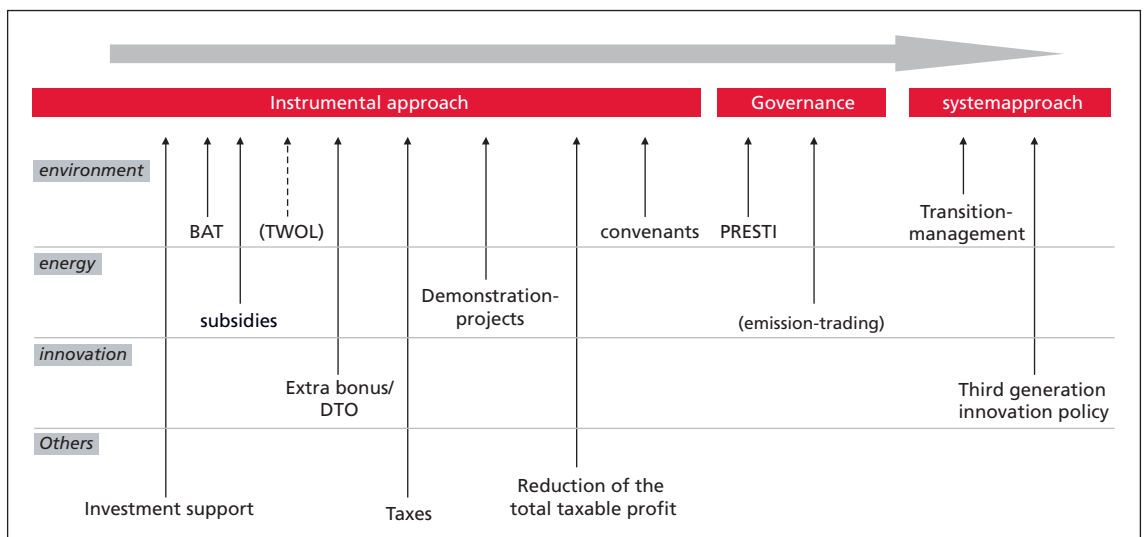
A central instrument in Flanders is regulation by means of environmental **standards and permits**. Standards are in principle set according to the concept of “*Best Available Technology*”. In Europe the Integrated Pollution and Prevention Control Bureau in Seville is responsible to define BAT’s for different processes and sectors. It acts as an information exchange centre of countries,

industries and NGOs. In Flanders this function has been attributed to VITO.

‘Best Available Technology’ however is preoccupied with **diffusion** of already existing technologies, not with invention or the development of new technologies. According to the European directive ‘available’ techniques mean ‘*those developed on a scale which allows implementation*’, and ‘*the practical suitability of particular techniques must already be indicated*’. Therefore BAT will stimulate already existing technology with reliable results, not new inventions with uncertain results. Implementation of new inventions that are not yet BAT will also be a risk for the firm in terms of its legal obligations. Nevertheless BAT is pushing the technological innovation market. But this process of innovation is rather slow. More networking of testing centres so as to check the performances of new techniques in view of possible standards and making sure that new or revised technical standards refer to the performances of these techniques is needed here. But even then, BAT is oriented towards system improvement instead of system innovation. To reach the long term sustainable objective a **system innovation** is required which needs a more comprehensive policy approach.

It is also clear that regulation with detailed prescriptions of the type of solution that is

Figure 3 > Possible approaches: instrumental/system



to be used works counterproductive for innovation. Regulations describing **performance** criteria have a more positive impact on innovation, especially when the criteria are made stricter from time to time. Therefore, the Flemish government recently has made explicit efforts to make regulative policies **more flexible and innovation friendly**. A decree adopted in 2004 stipulates that whenever possible, environmental standards and permits should formulate what environmental results are to be

attained, and not how they should comply (“ends, not means”). If it is necessary to use technology standards, firms can always comply by using an alternative with the same environmental effectiveness. They can be challenged by the administration to prove that the environmental effectiveness of the alternative is equivalent. This will give companies more flexibility to invest in new technologies, and eliminates one of the most important barriers in environmental legislation for technological innovation.

SOME EXAMPLES OF ENVIRONMENTAL COVENANTS IN FLANDERS

Benchmarking Covenant Energy Efficiency. The Benchmarking Covenant for Energy Efficiency was approved by government in November 2002 and continues until 2012. It is cooperation between the Flemish government and large-scale industrial energy consumers (responsible for more than 75 % of the total industrial energy consumption). The companies commit themselves to achieve the world-top level of energy-efficiency (taking into account that this world-top is also evolving). Their energy performance is compared with similar companies of the world-top by a ‘benchmarking consultant’. If there is a large distance with the top of the world, the company has to take measures: by 2005 all the measures with a payback period of five years have to be implemented, and by 2008 the measures with a payback of 7.6 years. If, with these measures, in 2008 the world top still has not been achieved, the companies must implement non-profitable measures, or use flexible mechanisms such as Joint Implementation, Clean development mechanisms, or Emissions trading. Government guarantees that it will not take any other measures in the field of energy-consumption. It committed itself to defending an exemption from a possible energy-tax by the Federal government. Companies that comply with the covenant will not have to buy additional emission rights in the future (because a sufficient part will be allocated to them). The implementation of the Covenant is supervised by an independent Verification Office and it is coordinated by the Benchmarking Commission composed of representatives of the government and the participating companies. Costs for this scheme can go down when other countries adopt this type of schemes, and information is exchanged.

Energy Audit Covenant. There are also concrete intentions to introduce an Energy Audit Covenant to reduce the energy consumption in the companies with an energy consumption of less than 0.5 PJ per year, but it is not put in practice yet. It is estimated that about 400 companies will be interested in this type of Covenant. Companies that sign this Covenant must perform an external audit to determine the total energy saving potential of the company and implement all the measures with pay back period of five years and less. Companies that comply will be exempted from a possible federal CO₂ or energy tax.

SO₂ and NO_x Covenant with the electricity sector. In December 2003 the government approved a Covenant with the electricity sector to reduce the total emission of NO_x and SO₂ between 2004 and 2012 by 14.000 ton (from 25.000 to 11.000) and by 20.700 ton (from 25.000 to 4.300 ton) respectively. The electricity producers commit themselves to respect these emission ceilings, also when they build new facilities. The government will no longer examine and calculate the emission for each facility but for the whole sector. This means that the electricity producers can continue operating an old facility on the condition that new installations use the most recent environmentally friendly technologies.

But much will depend on the way this new regulation will be interpreted and implemented by the administration, in combination with other instruments.

Other ways to promote innovative responses of regulative instruments apart from the use of performance based standards are an orientation to prevention, continuous improvement, long-term targets, less detailed rules in some cases, less "red tape" regulations, etc.

COVENANTS

Covenants can be an important tool to stimulate innovation. The examples in the box below illustrate how. By signing the Covenant, the companies are **committed** or stimulated to implement the newest technology available. Government offers a long-term perspective and regulatory stability as a precondition for a coherent policy. Also in this case, government is not directly stimulating technology invention, but **pushes** the market in a way that technology developers are ensured of a broader market.

PUBLIC R&D AND R&D SUBSIDIES

On the whole, the budget for environmental R&D is **limited** in Flanders. The total Flemish budget of 'Science Policy' in 2004 is 538 million euro. The amount of public financial resources spent on *environmental* research and development is estimated to be 3.5% of the total public R&D budget, and the larger part of that budget (75%) is devoted to research for monitoring, data collection and policy and ecological research, not to technological innovation.

The government is supporting the research (invention), market introduction and investment (diffusion) of new technological innovations **directly** through public R&D and specific instruments like financial support, subsidies and support programs.

The 'Flemish Institute for Technological Development' (VITO) is a public research institution with about 650 researchers with the mission to stimulate - for the benefit of government, industry and SMEs- sustainable

technological development in the fields of energy, environment and materials. It is the largest research institute in these domains in Flanders and has a central role in the different stages of innovation, ranging from basic research to diffusion of best available technologies. Although publicly financed, it obtains an increasing part of its budget from competitive programmes and contract research.

The 'Institute for the promotion of Innovation by Science and Technology' (IWT) is the 'one-stop-shop' for all **industry related** science, technology and innovation support. IWT has supported environmental technologies in industrial research in Flanders by two impulse programmes in the '90s (one for energy technology and one for environmental technology). But these programmes were poorly integrated in the mainstream of industrial innovation. As a result, effects have been moderate. The thematic impulse programmes were abandoned for purely 'bottom-up' programmes of research and innovation stimulation. The industry subsidy scheme of IWT is permanently open for all types of firms and for all kind of projects that pass the quality control. In this generic channel also environmental technologies receive support. But over the last years, only 15% of the projects generated significant reductions in emissions, waste, energy consumption or the use of natural resources. Of these projects only 11% can be labelled as radical innovations; 89% had to do with optimisation and innovation in products and processes.

In May 2002 however, IWT introduced a new subsidy mechanism called 'Sustainable Technological Development'(DTO). This mechanism is an **additional** support instrument for all R&D projects that have an environmental component. It is not conceived as a particular support program (a "ghetto") for environmental and energy technologies. On the contrary it applied to all technological research and innovation support schemes. This bottom-up system of stimulation is quite novel (see box), but its effectiveness has not been well documented yet.

'Additionality' of financial support is a basic question for the effectiveness of R&D- and investment support. Do subsidies alter innovation behaviour as compared to what firms would have done without them? Subsidies can **make a difference** by allowing more risk-taking behaviour in this difficult market segment. But to encourage more radical innovations the public leverage has to be strong

enough. Present-day innovation systems are 'locked-in' in eco-inefficient production and consumption technologies because of inadequate price signals and unsustainable social choices made in the past. Therefore one single instrument is too weak to alter these trajectories. Up to now, R&D subsidies, on the whole, do not seem to have stimulated firms to undertake significant research efforts in

SUPPORT FOR INNOVATION PROJECTS CONTRIBUTING TO SUSTAINABLE DEVELOPMENT

Flanders has no thematic technological research programmes any more. Only horizontal "bottom up" programmes exist, where all technological areas and industrial sectors can apply for support. However some general measures favour the support of SMEs, networking activities and sustainable development.

Since May 2002 projects contributing to sustainable development with a scope mainly limited to the ecological dimension (contributing to seven key-innovation objectives: reduced raw materials consumption, energy savings, reduction of emissions, waste minimisation, increased use of renewable resources, enhanced re-use of materials and recycling and increased lifetime of products and processes) can indeed receive extra incentives. However the exploitation potential is also of major importance. A broader scope of sustainability (including social aspects) will be examined in the coming years. The goal and motivation for this extra incentive is to contribute to the reduction of negative externalities of non-sustainable technologies, as part of an overall policy towards sustainable development.

The objective of IWT is to fund an increasing number of projects that take sustainable development into account. The total budget of IWT amounted to 237 million euro in 2003. In 2003, approximately 15 % of the budget was allocated to projects contributing substantially to sustainable development. It was the first year that the new DTO mechanism was applied. To be eligible for the benefits of this DTO-mechanism, the project proposal should demonstrate a possibly important impact on the global eco-balance of products and processes, taking the whole life cycle into account. This implies that the eco-efficiency improvement of products and processes should be substantiated, combined with an important valorisation potential. In subsidy schemes where a high level of subsidies is foreseen (80-100%, mostly towards research organisations), a mechanism of "positive discrimination" in the selection is put forward, which means that, given the budgetary constraints for the program, a project ear-marked as contributing substantially to sustainable development, will receive a higher place in the ranking list than justified by the other quality criteria. This treatment of "positive discrimination" is however limited to a quota that should be reached as a % of the overall budget, and which increases gradually over the years. The goal for calls in 2004 is set at 18% of the projects and/or budget.

This mechanism of "priority projects" is also applicable in programmes with a lower level of subsidies, in particular industrial R&D. Moreover, industrial R&D projects can receive a 10% subsidy bonus if the project meets the criteria, resulting in total subsidies between 35 and 75% of the project costs. R&D projects can also include an LCA, LCI or eco-design study for max 10% of the overall project budget, to be supported at a 50% rate (60% for SMEs).

Source: Kathleen Goris, IWT

environmental technology, which they would not have done otherwise. The most important effect of an environmental R&D support may have been to 'signal' changing social priorities, and not really to alter trajectories. But as part of a policy mix with upstream (life cycle analysis, eco-design...) and downstream (demonstration and investment) instruments, innovation subsidies could be made more effective.

To summarize, support to research programmes can be an important instrument for advancing systemic innovation towards Sustainable Development. But up to now it has not had a major impact due to its small scope and the fact it was not embedded in larger long-term policy programmes.

INVESTMENT SUBSIDIES AND TAX DEDUCTIONS

Companies can receive **investment support** for the additional costs of environmentally and energy friendly investments. These are investments saving raw materials, saving energy, or reducing emissions below European standards.

Companies can also apply for a **reduction of the total taxable profit** for energy saving and environment friendly investments (Federal level). There is a scheme to allow for tax deductions for 14% of 'environment friendly R&D' but in practice this criterion is used only as an exclusion criterion to ban 'environment-unfriendly' R&D, as it allows all the companies to obtain the tax deduction without reference to environmental technologies.

For 'new' innovations like photovoltaic solar panels there is a subsidy of 50 % for **households** and public organisations of the total cost of the investment. Households can also receive a tax reduction for energy saving investments. This support is important to create new markets for environmental technologies that are not competitive as long as existing technologies profit from their systemic advance (economies of scale and scope). But subsidies for adopting specific technologies should to be used on a temporary base. After a period, when the

assimilation of the new technology is a fact and the prices are lowered, they are no longer justified.

TAXES AND EMISSION TRADING

In Flanders there are several taxes and charges: a wastewater charge, a ground water charge, a waste levy, and a manure tax. In 2004 the Federal government started a system of **eco-bonuses** (positive discrimination) and **eco-taxes** on packages for beverages, replacing the former (eco-taxes on several products).

The European directive on **energy taxation** has not had an important impact for Belgium up to now. In general, politicians hesitate to use more taxes because of social (rising costs for the poor) and economic counterarguments (loss of competitiveness). Energy taxation is not taken up in the policy agreement of the Federal government nor in the new Federal Sustainable Development plan, so there little chance that it will be introduced in the next few years. The link with other problems, like the competitive disadvantage of the economy because of high labour costs, and the subsequent discussion on changing the fiscal basis of the social security system, might bring this issue back on the agenda at a later stage.

Emission-trading systems have not been put into practice yet, apart from the tradable certificates for renewable energy that was introduced in 2002. At the moment government is working out the allocation plan and trading system for greenhouse gases as required by the European Community. It will be introduced in 2005.

It is difficult to draw conclusions yet on the **dynamic efficiency** of these instruments. On the one hand, there are signs that the traditional economic view holds that market-based instruments like taxes and tradable permits are superior with regard to fostering innovation. Especially in the case of the wastewater charge, it seems that in the early '90s the successive rises of the charge have led to significant diffusion and innovation in water purification technology. On

the other hand, the innovation stimulus is severely hindered by **frequent changes** and hence a lack of predictability of the policy instruments. The calculation of the wastewater charge for example was revised five successive years in the early '90s; the system for renewable energy certificates has been modified as much as seven times since its introduction in 2002. In a survey of the Flemish environmental industry, business leaders mentioned this uncertainty as the most troubling barrier for technological innovation³. It is also one of the explanations for the success of minimum compliance technology and end-of-pipe solutions in the portfolio of the Flemish environmental industry. These conclusions confirm the view that the actual effect of environmental instruments on technological innovation is perhaps depending more on the political leadership in **setting clear targets** reflected in the design and implementation of the instruments than on the technical characteristics.

INFORMATION AND COMMUNICATION TOOLS, DEMONSTRATION PROJECTS, GREEN PROCUREMENT

New innovative **demonstration projects** for energy saving and renewable energy receive a financial support from the Flemish Government (50 % of the total costs). Recently, to encourage the diversification of energy sourcing with the opening of the energy market, Ecopower, a new energy supplier has received a subsidy for the demonstration of three new types of fish-friendly waterpower facilities. Demonstration projects are useful to experiment with new radical innovations in a very early phase of market introduction. This can support the forerunners in an early stage and open new markets. Until now it is not clear what the results of this new instrument are in Flanders. Moreover, these subsidies can only support a weak market for the new technology on a temporary basis. System innovation also often represents high risks. Therefore the government, when supporting important innovations with subsidies or venture capital, should accept the possibility of technological and economic failure.

OVAM, the Flemish waste agency, has introduced **prevention stimulating** programmes ('PRESTI') since 1994. The earlier programmes aimed at stimulating small and medium enterprises to implement prevention measures and environmental management systems. After a learning phase, this programme has evolved into a programme to stimulate eco-efficiency by subsidising business federations, regional development companies, education and research institutes and environmental organisations for research projects, pilot projects, demonstration projects, exchange of experience, information and communication. A maximum of 65 % of the total cost can be subsidised. The new scheme started in 2003, and has had some interesting results. An important feature of the PRESTI programme is that it is not focusing on particular technologies, but at enhancing the **management capacities** of firms to detect their technological needs, find solutions and develop new technologies. But also this programme probably will have little impact, if it is not tuned to other very similar programmes of IWT (research), and of the Ministry of energy (demonstration).

The Flemish Institute for Technology Research (VITO) hosts the BAT **Knowledge Centre**. It is the Flemish focal point for the distribution of BAT-information from the European Integrated Pollution and Prevention Control Bureau as well as from its own surveys.

Finally, the Flemish environmental administration is promoting green government **procurement**. This is a promising instrument for stimulation environmental technology market creation. Green public procurement can make the public sector a "launching customer" for innovative firms, giving them the potential for a more credible access to internal and export markets. But lack of information and conflicts with standard purchasing procedures are main barriers. At Federal level a 2004 amendment of the 1993 law on public tenders stimulates sustainable purchasing by regulating that the decision criteria must deal, among others, with environmental characteristics and social and ethical considerations.

³ Bollen e.a. (2000).

CONCLUSIONS

The effect on the environmental technological development of **single** policy instruments is **limited**. It typically concerns diffusion of existing technologies, not innovation. It results in the diffusion to laggards of technology that is being used by forerunners and incremental improvements. This can be said for instruments such as regulation by means of the best available technology, some types of covenants and even for economic instruments (subsidies, taxes, tradable certificates) that are being used in Flanders.

The reasons for this are twofold. First, details in the **set-up** of instruments matter a lot. Innovations tend to be incremental in a context of uncertainty or when the long-term **framework** is lacking. Emission taxes or emission trading systems for example will only promote the picking of low-hanging fruit in stead of radical innovation, unless charge rates respectively total emissions ceilings are fixed for a longer period. Also policy style and underlying policy strategy are very important. But clear goal setting, consistent goal keeping and practical and consistent policies are often lacking in Flanders.

Second, the traditional policy instruments cannot hope to achieve much more if they are isolated measures. But as a component of a **cumulative innovation process**, starting with strategic foresight, life cycle analysis and eco-design up to market creation, these traditional support instruments can find new significance. The 'innovation chain' has to be reflected in the **design** of policy chains or policy mixes that mutually reinforce each other's in space and in time. Therefore the discussion on the efficiency of instruments cannot be uncoupled from governance issues as strategic intelligence, cluster platforms, and the role of technology assessment. **Cluster policies** are cross-roads for policy coordination because the instruments need to be tailored into policy mixes that are most appropriate for the stimulation of these specialised networks.

Some tools like the Benchmarking Covenant and the SO₂ and NO_x Covenant with the

electricity sector take a long-term perspective with a commitment on a long-term basis to search for 'new frontiers'. Although they are only stimulating the diffusion of 'world class' technologies, and are not directly intervening in the innovation process, they could provide a **platform** for organising the 'transition' from one technological regime to another.

We conclude that the different policy instruments should be better-tuned one to another in a coherent set of incentives to change behaviour and provide **strategic guidance** for the development of new trajectories. This implies that the design and tuning of policy instruments has to be embedded in a broader programme to encourage transition to new socio-technological trajectories.

> 2.3 GOVERNANCE FOR SYSTEM CHANGES

In Environmental Policy as well as in Innovation Policy, we can observe an evolution towards a 'system approach'. System approaches take a broader view of policy as an institutionalised multi-actor and multi-dimensional process. In this perspective policy integration problems are problems of coordination in the governance structure that reveal systemic failures.

THE SYSTEM APPROACH IN INNOVATION POLICY

The Innovation Policy in Flanders evolved from a traditional 'First Generation' Innovation Policy towards an explorative 'Third Generation' Innovation Policy⁴.

In the eighties, after the establishment of the first Flemish Regional Government - still with limited competencies - the Flemish Minister-President launched the DIRV campaign (Third Industrial Revolution in Flanders), with emphasis on basic research of international level in the new generic technologies and the creation of university spin-offs. This linear, technology-push strategy assumed that economic performance fol-

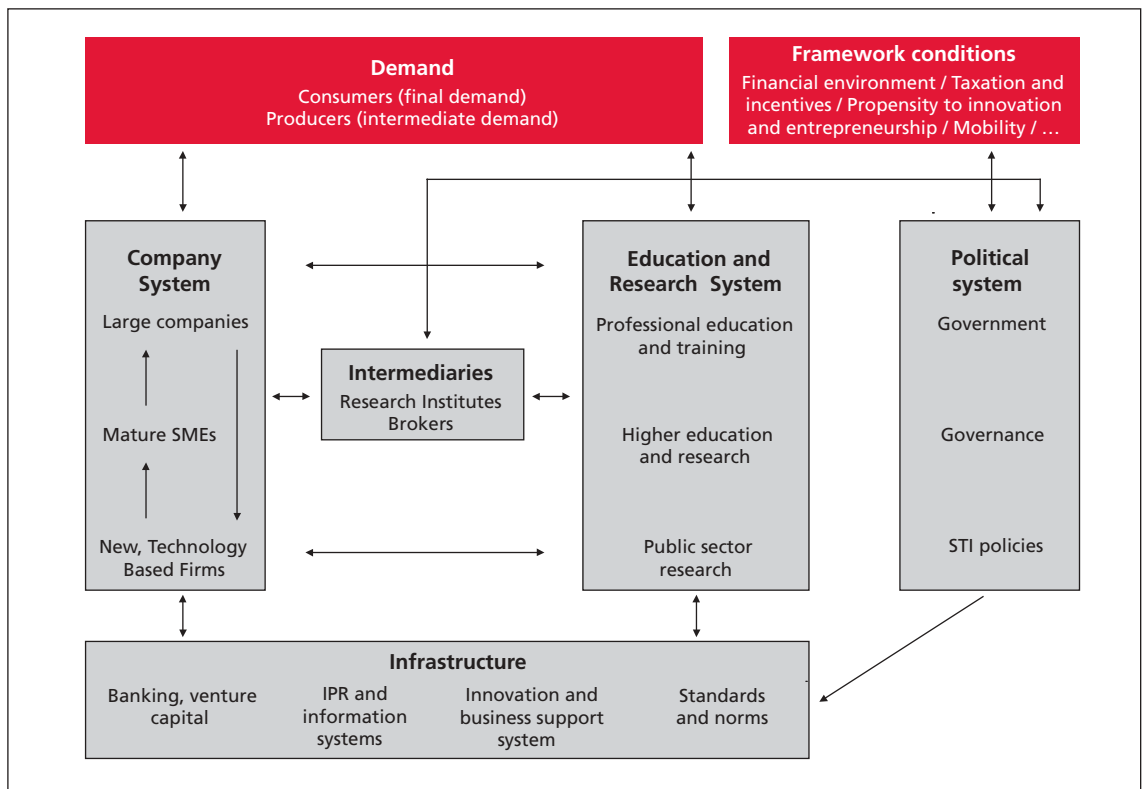
⁴Innovation Tomorrow, Innovation policy and the regulatory framework: Making innovation an integral part of the broader structural agenda, Innovation papers No 28, European Commission Directorate-General for Enterprise, Brussels, 2002

lows research performance and coincided with the **First Generation Innovation Policy**. Environmental research and technological innovation was stimulated by special impulse programmes for energy and environment. VITO, the Flemish public research institute was assigned environmental R&D as one of its main missions. At the time high hopes were invested in the development of a new environmental industry on this basis.

In the nineties a full-fledged Flemish Innovation System started to become institutionalised with the establishment of a Technology Agency (IWT, the 'Institution for the promotion of science and technology in Industry') to support bottom-up technology development. After the isolated impulse programmes for Environmental and Energy Technologies in the early nineties, no specific interest was devoted to environmental technological innovation. Early Flemish pioneering results in wind energy or hydrogen energy were not pursued when time-to-market revealed to be much longer than pre-

sumed. The introduction of a cluster policy as a new economic development policy for Flanders failed because the cooperative mood was not strong enough yet. So this road to industrial renewal was temporary blocked. But R&D policy evolved into a broader Innovation Policy, with the 1999 'Innovation decree' that provided the legal framework to extent support as well as the institutional leverages to stimulate 'collective innovation'. This embodies a **Second Generation Innovation Policy**. Instead of relying entirely on a 'technology-push', it puts the economic outcome as objective, and supports actively the **interactive model** of organisation to bring together all requirements for success. IWT evolved from a purely technology-push subsidy agency to the stimulator of innovation with different roles. In addition to being a distributor of subsidies and financier of near-risk capital, it became the coordinator of intermediary innovation agents under the influence of the new conceptual framework of 'national innovation systems' (see figure) that acknowledges the

Figure 4 > Example of a national innovation system



central role of interaction between different innovation actors. IWT changed name to become 'Institute for the promotion of innovation by science and technology'. New programmes of collective innovation stimulation (VIS or Excellence Poles) created an opportunity for innovation platforms on environmental issues like wastewater treatment.

The recent period witnesses a phase of consolidation and maturation of the Flemish Innovation System in which all instruments are deployed. The signature in 2003 of an 'Innovation Pact' between all social actors, which is committed to the Lisbon targets, has put Innovation high on the political agenda. The **Third Generation Innovation Policy** is announcing itself with the shift of focus from pure Science and Technology objectives to 'Sustainable Growth' as a programme of broad societal goals. It employs a holistic view and a system-wide approach, stressing the need for an "integrated Innovation Policy", where innovation is integrated with other sectoral policies. In this approach these sectoral policies have to put forward innovation as a distinct objective. But the innovation policy also has to expand its scope from economic goals to other types of policy goals, not only as constraints but also as a part of a coherent mission. Sustainable Development as a combination of economic, social and ecological goals is such a policy. New types of horizontal policies and governance structures can achieve this type of multi-sector, multi-goal Innovation Policy.

THE SYSTEM APPROACH IN ENVIRONMENTAL POLICY

The new ecological approach in Environmental Policy shares a **common** 'holistic' par-

adigm with Third Generation Innovation Policy and reflects the **shift** from a 'mechanical' to a 'biological' worldview in sciences in general.

Indeed, we can see that roughly until the mid-nineties, Environmental Policy, institutions and legislation were built around the traditional environmental sectors (water, air, waste, soil, ...). Environmental problems were tackled by issuing environmental standards and permits and by building large-scale waste and wastewater treatment facilities. It was the rather engineer-like and bureaucratic way of traditional Environmental Policy making by 'commanding' new regulations.

From the mid-nineties on, it has become clear that this approach is not entirely effective, and it has been complemented by other policy concepts. Firstly, there was a **broadening** of the set of policy instruments. Following the high costs and low effectiveness of traditional 'command and control' regulation, we saw an increasing use of other types of instruments like covenants, economic instruments etc. Secondly, government clearly wanted to steer more 'at arms length' and aimed at more **cooperation** with target groups to achieve environmental objectives. Following the view that society cannot be steered by government and that government is only one of the many actors influencing the behaviour of citizens and firms, we saw a changing relationship between state, market and "civil society" and a multi-actor policy approach appearing. Lastly, environmental policy is stressing more and more the strong linkage between environmental problems and socio-economic activities, and thus the need for an

Table 2 >

xxx

DOMAINS	Sectoral innovation policy	Multi-sectoral innovation policy
GOALS	FIRST GENERATION	
Single-goal innovation policy (economic growth)	Traditional S&T policy (linear model)	Integrated innovation policy SECOND GENERATION
Multi-goal innovation policy (sustainable economic growth and quality of life)	Sectoral innovation policies (Innovation in other domains) ()	Horizontal innovation policy THIRD GENERATION

integrated approach, meaning that environmental objectives should be 'internalised' and pursued by other government policies such as agriculture, economy, energy, transport, etc. Following the **internationalisation** and the growing of supranational policy levels on which environmental problems are dealt with on the one hand, and the active involvement of local governments along the subsidiarity principle on the other, there is also more attention for 'multi-level governance'.

Recently, the policy concepts of '**system innovation**' and '**transition management**' appeared in Flemish environmental policy. To make the transition to a new, sustainable evolutionary trajectory a combined set of strategies to change behaviour is necessary. The policy maker is now conscious of this challenge. The new Environmental Policy plan 2003-2007 presents a **framework** for the strategy of 'transition management' and for stimulating 'system innovation'. A specific **project** has been elaborated from mid 2004 on, focusing on 'sustainable building', to learn to bring this strategy into reality. Also the environmental programme 2004 announces several **initiatives** to promote the idea of system innovations (forecasting studies, development of a knowledge infrastructure in cooperation with the innovation and technology policy field, creating of a multi-actor network). The challenge is now to concretise and implement this.

TRANSITION MANAGEMENT

Transition Management follows from the system approach and may be the **missing-link** to put into practice the structural renewal of the Flemish economy and society towards a coherent and sustainable model of production, consumption and innovation. Environmental technological innovation will be at the heart of this transformation.

Fundamental environmental improvements at the background of a growing economy require major transitions in manufacturing practices and distribution and consumption

of goods and services. To attain Sustainable Development, there is a need for real system innovation and not just improvement of the national innovation system. Such a structural transformation of the economic system cannot be other than the result of a collective effort of all actors.

Transition management consists of a deliberate attempt to bring about a transition, in an **iterative** (stepwise) and **interactive** manner, involving sequential and participatory decision-making. It is a collective learning process, facilitated by government that aims to shorten the desired transition and prevent the lock-in in disadvantageous and not-desirable development paths, which are caused by mutually reinforcing mechanisms in consuming and producing as we do.

In transition management the policy-maker conducts the setting of a **transition agenda** and establishes a **communication platform** between all actors to promote strategic convergence. The transition agenda mobilises society for long-term goals on Sustainable Development and gives an opportunity to radical innovators to interact with complementary actors. One of the main tasks of transformation concerns government itself, because an integrative horizontal policy approach is needed that has to overcome vertical 'departmentalism'.

Transition management implies a policy process that is different from existing policies in its extent, duration, and approach:

- It is built on **policy integration**: horizontal cooperation between policy agents is a fundamental condition because it supports the coordination between system actors and creates new interaction possibilities for the transition.
- It sets **long-term goals** whereas policy today is dominated by short-term concerns. Fundamental is the treatment of the short-term agenda in a long-term perspective. The transition agenda sets no fixated objectives in the long run, but formulates a shared concept of SD as point of departure to coordinate existing and new initiatives.

- The particularity of transition management over system innovation is that it stresses the challenges in the path towards an end state. It redefines the role of policy as 'modulation' agent where there are conflicting **time-scales** of transformation at different systemic levels and different sub-systems. This is achieved through the organization of project-based learning experiences, policy experiments in the coordination of the different time-scales of different institutional processes.

Furthermore, transition management has the following properties:

- Using **long-term** thinking as a framework of consideration for **short-term** policy
- Thinking in terms of more than one domain (multi-domain) and **different** actors (multi-actor)
- The use of **sequential** and **interactive** (participatory) decision-making
- Guiding and redirecting through **learning** processes (learning-by-doing and doing-by-learning)
- Trying to bring about **system** innovation and system improvement
- Keeping open a large number of **options** (wide playing field)

Transition management is also a normative framework for governance as a participatory process of political coaching:

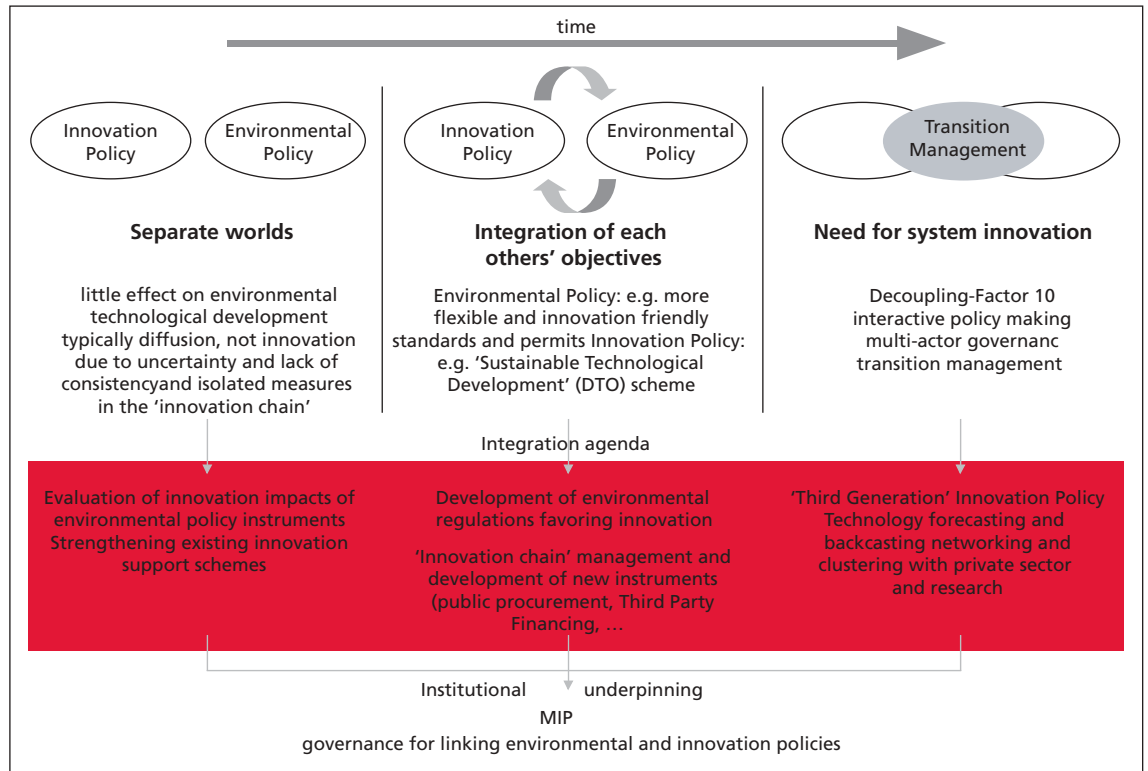
- The direction of transition must not be based on quantitative but **qualitative and flexible** goal setting. The objectives are determined in the process of co-development of policy with stakeholders, without government giving way to the prevalence of particular interests.
- The consultation of social actors should be reoriented in the advantage of fore-runners instead of the laggards. They should be given opportunities for **experimentation**.
- The policies must be accountable, but not in the classical retrospective sense of input-output efficiency. Results of the process are the **learning** by experience and insight. They should be confronted with international benchmarking.

CONCLUSIONS

Until recently, there has been little contact between Innovation Policy and Environmental Policy, and a total lack of integration. Not only the two policies, but also their entire policy communities, including policy research, are to a large extent completely **separated worlds**. Not surprisingly, the traditional environmental and innovation policy instruments have had little effect on environmental technological development. Nevertheless, there are some **promising examples** of environmental and innovation policies starting to integrate each others' objectives. The Flemish government recently has made explicit efforts to make regulative policies more flexible and innovation friendly, and on the side of innovation policy, the Innovation Agency introduced the new DTO-subsidy mechanism.

A new drive for the integration of environmental policy and innovation policy is coming from a **mutual evolution towards a 'system approach'** in the context of a broader perspective of policy, one in which structural change and interactive policy making are at the heart and environmental policy as well as innovation policy are developing into generic policy areas where a great number of ministries are affected. In a complex society a lot of interactive players determine the outcome of evolution. New technologies are the result of many complementary inputs and success conditions. The management of this **complexity** is vowed to fail if it is not adaptive towards an ever-changing policy environment and the unpredictability of interaction effects. Therefore the management of system innovation has to follow transition strategies of permanent adaptation of current agenda's in view of also shifting long term objectives in order to maintain progress in the direction of the societal goals on which a sufficient strategic consensus has been forged. Policy makers in Flanders are starting to realize this and are experimenting with new concepts such as interactive policy making, multi-actor governance and transition management. Transition management might serve as the **'missing-link'** between Innovation Policy and Environmental Policy in the years to come.

Figure 5 > Emerging collaboration between Innovation- and Environmental Policy in Flanders



But the translation of these principles into practice is a lengthy process in which further institutional innovation is necessary. The strategic initiatives to establish new kinds of social contracts ('Pact of Vilvoorde', 'Innovation Pact') need specific institutional underpinnings. In this context, the Flemish government decided to create a new form of institutional cooperation that might be of great importance: the Innovation Platform for Environmental Technologies.

> 2.4 THE INNOVATION PLATFORM FOR ENVIRONMENTAL TECHNOLOGIES⁵

During the last months the Flemish Government of 1999-2004 was in charge, it decided to create an Innovation Platform on Environmental Technology. Integrating the policy instruments of three ministries (Innovation, Environment and Energy Policy), it has the **potential** to grow to an example of Integrated Innovation Policy. Its success will depend on the will of all involved parties to cooperate on the lines that were put forward.

⁵The authors gratefully acknowledge the contribution of Paul Zeeuwts for this paragraph.

CONTEXT AND GOALS

At the end of 2003 an 'Enterprise Conference' took place, involving Flemish public authorities, enterprise organizations and labour unions. All parties agreed that the future of social and economic welfare has to be ensured with a strategy of enhancing creativity and innovation. Building on the new concepts of innovation systems and Third Generation Innovation Policy, it was agreed to launch an Innovation Platform, involving all relevant private and public actors, with the **objective** of boosting up the innovation potential of environmental technologies in the region of Flanders for internal and export purposes.

This ambition was formulated in very general terms. VITO, the public research institute specialized on environmental and energy issues, was instructed to execute a feasibility study on a SWOT analyses of the potentials of environmental and energy technologies in Flanders. In April 2004 IWT was instructed to develop the outlines and

working principles of the platform. The decision of the Flemish government on these outlines was taken on 7 May, shortly before the general elections for the new regional parliaments in June 2004.

INTEGRATING POLICY INSTRUMENTS

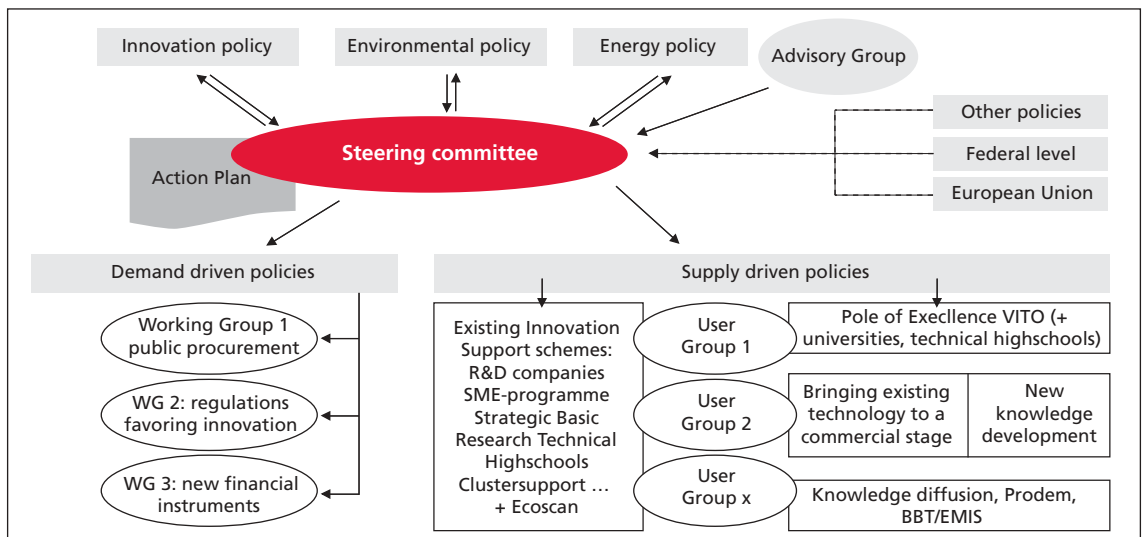
The **mission** of the Platform is to activate innovation synergies between all relevant private and public actors. As such this doesn't differ from well known cluster innovation policies. The new dimension is that the policy instruments of three ministerial attributions will be "pooled" on a common goal. This is conceived in a "non hierarchical" way of networking of ministries and administrations. Therefore structures and new policy instruments had to be outlined.

STRUCTURING THE PLATFORM NETWORKING

The scheme below gives a general overview of the components and relationships of the Platform. To start with, a central **Steering Committee** will be in charge for the coordination of all activities and for major decisions within this respect. It is composed of representatives of the three ministers involved, the major environmental and energy administrations, IWT (the agency for innovation support), VITO (in charge for the intended Excellence Pole on Environmental Technologies), three major enterprise organizations

(Agoria, Fedichem, FEBEM). In relation to these policy attributions involved, the Steering Committee will not have a decision power, but can advise measures to be taken. It is essential that the innovation objectives on environmental and energy technologies can match with the more general objectives on environmental, energy and innovation policies. As not all policy attributions that matter are situated in the attributions of the three ministers involved, it is also essential that links are made with other policy levels, within the Flemish government, but also with ministries and administrations at the Belgian Federal level and with the European Commission. The Steering Committee was kept relatively concise. In order to involve a wider range of societal stakeholders on major strategic issues, an **Advisory Group** will be installed. A major way to deal with the central strategic objectives is to elaborate an **Action Plan**. This Action Plan should develop the key objectives for the necessary initiatives and pinpointing the synergies for the actors to be involved in the implementation of the Innovation Platform. Along the outlines of this Action Plan the different policy instruments will be developed involving an even wider number of actors. The intended policy instruments can be divided in two categories: the demand driven innovation instruments and the more classical instruments strengthening the supply of environmental and energy technologies.

Figure 5 > MIP set-up



STRENGTHENING SUPPLY-SIDE

To begin with, it is important to remember that environmental issues were already taken into account within the framework of Flemish innovation policy. In 2001 a general scheme on "Sustainable Technology Development" (Duurzame Technologische Ontwikkeling - DTO) was launched by IWT, based on a governmental decision. It was important to integrate this scheme in the policy instruments of the Innovation Platform. In order to maximize the better use of the scheme User Groups will be installed (cf. the overview scheme) in charge of developing new synergies and collaborations between relevant actors from companies and research centres, resulting in new projects submitted to IWT for support. These **User Groups** will also play a major role in the "demand driven" research activities of the intended Excellence Pole on Environmental Technologies.

A second instrument to strengthen the supply-side is the creation of a new 'Pole of Excellence'. Especially during 2003 and 2004 Innovation Policy was developed creating new Excellence Centres and Excellence Poles as a way of providing a knowledge infrastructure for important sectors of companies in need for more innovation efforts. These Centres are based on existing capabilities at universities, technical high schools, research centres, etc ... These capabilities are brought together and strengthened in "virtual" Excellence Centres with a central program body. It is considered essential that this program is "demand driven", given economic and societal goals, even if in most cases the focus of the activities is put on strategic basic research for longer-term innovation results.

Along these general policy objectives a new **Pole on Excellence on Environmental Technologies** was created, embedded in VITO but with the aim at involving university and other research capabilities. This Pole of Excellence will cope with **two kinds of projects**: firstly, projects bringing existing knowledge to a feasible commercialisation stage and secondly, project developing new basic knowledge. The priorities for its activities will be organized on "demand driven" pri-

orities, given the technological and commercial potentials and taking into account the need for public supported knowledge development. The Steering Committee of the Innovation Platform will finally have to decide on priorities, acting as a "Board".

NEW DEMAND DRIVEN POLICY INSTRUMENTS FOR INNOVATION

The policy instruments just mentioned are part of the more "classical" policy instruments of innovation policy. A newer objective consists in developing new innovation instruments based on cooperation with and policy instruments of other policies. These "new instruments" target on the demand side of environmental technologies. Commercial (and societal) success of innovation is indeed not only the result of technological success but even more the result of conditions in the market or more generally of the opportunities offered by the **demand side** for new innovative solutions. Normally these instruments are the responsibility of the ministers of environmental and energy policy. **Three main potential instruments** have been announced: smart technology procurement, adapting regulations for the case of innovation; and introducing new financial instruments.

- **Public Technology Procurement.** To begin with, public government can be a major driver for innovation. It implies that some public offers rather focus on expected results rather than on the means to reach them. Public Technology Procurement (or "smart procurement") is a well-known way of dealing in the defence sector, especially in the US and the UK. The implementation of this instrument would be preferably regulated at a European level. Indeed, public procurement is strongly regulated by European Competition instructions. Smart public technology procurement cannot be reserved to the offers from national/regional firms, which are the target for the national or regional innovation policy. Nevertheless, it can be envisaged to couple procurement to R&D-subsidies, which can be limited to national or regional firms. In the field of environmental and energy technologies opportunities in this record

will be analysed and developed. Public or semi-public procurement is particularly important in the environmental sector. It does not only imply procurement from public departments and agencies, but also from public or semi-public enterprises like Aquafin (water treatment), Indaver (high risk waste disposal), etc ... Even big private utility companies like Electrabel (electricity production) could be interesting partners in this approach. Public procurement can make the public sector a "launching customer" for innovative firms, giving them the potential for a more credible access to internal and export markets.

- **Public regulations favouring innovation opportunities.** In general environmental and other regulations can favour or hamper innovations. If the latter is the case, it is important that regulations could be adapted without questioning their main objectives. The Platform will have to iden-

tify problems and opportunities within this respect. The Platform will only advise involved ministers in this field, who keep in charge of the final decisions.

- **New financial instruments.** Contingent to this approach of demand side empowering for environmental technologies are the development of new financial instruments. An example in this respect is the formula of the so-called "Third Party Financing" in the field of energy savings. It could be applied to publicly owned buildings. The formula implies that investments in energy savings are taken up by a "third party" which recovers its investment costs by the energy savings of the customer.

To deal with these issues **thematic Working Groups** will be installed (see scheme). They will mainly be composed by members of involved administration, (semi) public companies and relevant firms.

> **3.1 SUSTAINABILITY: THE NEED FOR A NEW APPROACH TO PUBLIC SECTOR MANAGEMENT**

PUBLIC MANAGEMENT FOR SUSTAINABLE DEVELOPMENT

Public sector management is in need of new management methods to **match present urgencies and long-term vision**. On the one hand there are challenges as the aging of the population, immigration flows, the financing of the social security system, prevention of infrastructural congestion and environmental degradation that require long-term visions and strategies. On the other hand the pressure of the day-to-day decisions and the management of conflicting claims on limited resources is becoming ever so difficult in an 'open' society where short term success parameters such as opinion polls, news bulletin headlines or 'hard' statistics like budget or unemployment figures tend to dictate the agenda. In particular the growing constraints of competitiveness in the global economy are strongly dominating in ways that can overrule other policies. The art of governing is to combine these conflicting agenda's of long term and short-term decision-making in new styles of political leadership and new methods of political and administrative management.

The 'discovery' of a transition path to a sustainable development on the economic, social and ecological domains is maybe the main challenge for present policy development. Making abstraction from disaster scenarios that may require disaster management, the evolutive strategies that societies are pursuing, are heavily depending on the **rebalancing** of the economic system on which our welfare is based. Technological 'progress' carries the high hopes of ecological modernisation and is bringing innovation policies and environmental policies closer together.

This does not discharge from making important political **choices**, among other things about the kind of technology trajectories our societies will adopt for energy procurement and use of finite resources since pres-

ent trajectories are not sustainable for next generations' welfare. But these 'decisions' are seldom the privilege of single players, be it in the market place or in the political arena. In a complex society a lot of **interactive players** determine the outcome of evolution, and new technologies are the result of many complementary inputs and success conditions.

The management of this complexity is vowed to fail if it is not adaptive towards an ever-changing environment and the unpredictability of interaction effects. Therefore the management of system innovation has to follow **transition strategies** of permanent adaptation of current agenda's in view of also shifting long term objectives, in order to maintain progress in the direction of the societal goals on which a sufficient strategic consensus has been forged.

FROM GOVERNMENT TO GOVERNANCE

The present management structure of innovation systems tends to underproduce the 'breakthroughs' that are necessary to shape sustainable growth. System improvement by rationalisation and end-of-pipe solutions to ecological problems are the normal way the industrial system reacts to pressures.

Moreover, we are still in a transitional phase where the signals from the markets for eco-innovations are weak and unclear. Markets can be efficient (to a certain extent) but favour short sightedness because of difficulties to cope with uncertainties and the limitations to use adequate prices for all choice situations. Therefore the 'mixed economy' where government corrects these **market failures** has proven more robust for handling socio-economic shifts. Environmental policies are crucial in developing 'new markets' on supply as well demand side. Innovation policy is also about such market creation, where government can play a role in promoting the new market settings by active support to new 'breakthroughs' (fundamental research, product standards, public procurement, ...).

But the underproduction of environmental technological innovations is not just a prob-

lem of prices that don't reflect societal costs. The innovation strategies of companies depend on their appraisal of market potentials and risks, but companies are also part of networks and national systems of innovation on which their **ability** and **willingness** to innovate depends also. The cumulative and embedded nature of technical change means that companies are locked into non-eco-efficient systems and products. Internalising the environmental costs is therefore a necessary but not a sufficient condition for **escaping lock-in**.

The systems model of innovation shows that environmentally friendly innovation requires **other** change conditions besides price incentives. Regulation is usually mentioned as the most important one, but the institutional settings of the innovation system have a much broader scope. Making companies behave more pro-actively requires change at multiple levels of the innovation system: the government-business relationship has to change, producers and consumers must develop new competences and the economic framework conditions have to change too to make the innovation system more performant from a sustainability point of view. This is a political challenge as much as it is a challenge for business. It calls for partnership between companies, between governmental administrations (willing to learn from each other) and between companies and government. The rationale of governmental intervention shifts therefore from '**market failure**' to '**system failure**'. The system failures here are imbalances between its institutional components and technological 'lock-ins' that the present growth dynamics have produced.

So there is a strong case for active policies to stimulate environmental innovation for sustainability. But the problem of '**government failures**' needs to be addressed as well. Is government better informed than markets to conduct innovation? In innovation systems the **dichotomy** between market and governments is watered down by the multitude of actors that provide necessary components of the innovation process. Markets are **only one of the several** coordination

mechanisms of interaction besides other institutions as hierarchies (governments or firms), networks and 'clans' (families or social communities). And many stakeholder communities as researchers, NGO's, social and professional organisations watch over the decisions in the innovation system. Policy development therefore has become an open process of 'governance', the arena of interest group dialogue that affect the way in which powers are exercised. This **societal dimension** of innovation system management is profoundly mixed with the system logic of interactive knowledge processing. Therefore the governance structure has to take full account of the complex social 'self-organisation' dimension.

Different layers in the governance system of innovation are important to assure good performance. The role of government is widely acclaimed to be decisive for providing adequate framework conditions for the market economy to function, but its role in **structural changes** in the economy is less clear. One can advocate that the largest 'additionality' governments in a market economy can have for the stimulation of ecological modernisation is to provide **leadership** for system innovations.

> 3.2 NEW PUBLIC SECTOR MANAGEMENT FOR SUSTAINABILITY IN FLANDERS

INNOVATION FOR SUSTAINABILITY

The political and socio-economic system in Flanders has been marked by mechanisms of consultation and compromise that were born out of severe conflicts of social, religious and cultural nature throughout the formation of modern society. The welfare state that has emerged – and seems threatened now - has to find **new models** to bring about the structural shift to a competitive knowledge society and a sustainable growth. The "Pact of Vilvoorde" ('21 Objectives for the 21st Century') is an attempt of the Flemish political and socio-economic leaders to shape a framework for medium term decision making. It was concluded in 2001 between the Flemish government and the major stake-

holder organisations with a ten-year horizon to create a policy attention span that transcends the electoral cycle. This Pact contains important references to sustainability, and the commitment to longer term targets is a starting point for 'back-casting' the change strategies that are necessary to implement them, and for assessing short-term decisions in the light of their coherence with these commitments.

One of the 21 targets of the Pact of Vilvoorde is to position Flanders among the top performers for environmental well-being and eco-efficiency. This commitment was reaffirmed in the 2004 Policy Agreement of the new government, that adds: *'For this purpose we realise a far reaching decoupling between economic growth on the one hand and environmental impact, material and energy usage on the other.'* To increase the use of renewable energy a dedicated effort in R&D is announced. On the other hand the Flemish government wants to support business development by significant results in administrative reform to reduce the level of regulations. *'We will stop being too prescriptive, and instead set targets and give society the space to determine how it will achieve them. Government will restrain to the evaluation of results'*. From this priority, a new policy approach to environmental regulation is announced. *'Only when there is a broad consensus of a clear value added in terms of food safety, road safety or public health, or to build a technological advance leading to a higher eco-efficiency, government can go beyond the standards and targets agreed upon in EU-Directives, without unnecessary administrative burdens and keeping the competitiveness of our companies in mind'*.

EMERGING GOVERNANCE FOR SUSTAINABILITY

To reconcile these two policy directions (decoupling of economic growth and environmental pressure versus supporting business development), much **more collaboration and coordination** between innovation policy and environmental policy is needed, as well as an active form of 'transition management'.

Very significant is that the 2004 *Policy Agreement* of the new government introduced 'horizontal policy' as a reference term: *'We see innovation as a horizontal policy, affecting all policy fields and striving for synergies'*. The new policy agreement signals also the transformation from government to governance. 'Government', characterised by bureaucracy (lots of rules), centralised policy (top down obligations) and collectivistic behaviour (only the government and public companies are involved), is evolving towards a policy style characterised by a more flexible management approach, partnerships with private companies and more space for all actors to take responsibility, in order to be able to better respond to new challenges in a complex environment. Public management becomes a combination of ad hoc arrangements and long-term strategies. This new 'governance' approach is built upon the notion that government does not have to or cannot regulate everything, but has an important role to create and support networks of actors with a common goal.

Furthermore, the *Environmental Policy plan 2003-2007* presents a framework for the strategy of 'transition management' and for stimulating 'system innovation'. A specific project has been elaborated from mid 2004 on, focusing on transition management for sustainable building and 'learning by doing'. The environmental programme 2004 announced several initiatives to support system innovations, such as forecasting studies, development of a knowledge infrastructure in cooperation with the S&T policy field, and creation of a multi-actor network. Also, a project focussing on a transition from a 'waste management system' towards a 'sustainable material management system' is underway.

These initiatives need specific **institutional underpinnings**. In this context, the Flemish government decided in may 2004 to create a new form of institutional cooperation: the **Innovation Platform for Environmental Technologies (MIP)**. The mission of the Platform is to activate innovation synergies between all relevant private and public

actors. The new dimension is that the policy instruments of three ministerial domains will be “pooled” on a common goal. This is conceived in a “non hierarchical” way of networking of ministries and administrations. The Platform will work closely with (semi) public companies and relevant firms and stakeholders. It will elaborate an Action Plan developing the key objectives for the necessary initiatives and pinpointing the synergies for the actors to be involved in the implementation of the Innovation Platform. The structure of the platform is tailored to encompass and coordinate supply- (DTO-scheme, User groups, Excellence Pole on Environmental Technologies) as well as demand driven instruments (technology procurement, regulations favouring innovation, and new financial instruments).

The Platform is an important **opportunity** to introduce and experiment with real horizontal integration of policies for innovation purposes, in line with an Innovation Policy of the “Third Generation”. In particular, this implies a more pro-active role of different policies within an innovation objective of networking and clustering together with players of the private sector and the research world.

> 3.3 ASSESSMENT AND RECOMMENDATIONS

To achieve an ambitious program of structural transformation, a **combination** of key **instruments** that influence behaviour of individuals (consumers and producers) and institutional engineering in the form of **transition management** will be necessary. The coordination between policy design and policy implementation, especially between Environmental Policy and related domains (such as energy, agriculture, transport) and Innovation Policy, is of utmost importance.

But progress is rather slow. Flanders is still finding it difficult to capitalize on the synergy between various policies, especially environment, research and competitiveness. Investing in the future has no sense of urgency in the actual ‘political business

cycle’; therefore the self-imposed targets (Kyoto targets, the 3% target for R&D) risk to be delayed. Other types of governance are necessary to create societal consensus and direction in complex issues of this kind.

To improve the coordination of innovation policy and environmental policy under the umbrella of Sustainable Development, we can easily define some **common goals and strategies**:

- Promote **explicitly** rather than implicitly environmental technological innovations;
- Develop an **integrated horizontal strategy** towards environmental innovation with other policy fields such as energy, transport, housing, agriculture etc.
- Create a **network** with all relevant partners; stimulate integration and interaction models to stimulate innovation as a common learning process.
- Promote **system innovation** and new management styles such as **transition management**.
- Develop joint measures and projects that take advantage of the **synergies** between environmental and innovative strategies.
- Use public technology **procurement** as a major drive for strategic innovation policies for SD.

In *Environmental (and related) Policy* the following actions can be recommended:

- Keep trying to get the **prices** right;
- Create a more innovation friendly regulatory and policy framework; **consistency and predictability** is more important than financial incentives;
- Set **distinctive innovation objectives** (together with the Innovation Policy domain) in transition programs;
- Integrate technology **foresight** models into policy design;
- Better integrate and coordinate the different **instruments** and estimate their **impact** on innovation;
- Use a **mix** of instruments – favouring instruments with a stronger impact on system innovation (with long term goals) compared to instruments for system improvements - and analyse the **impact** on innovation;

- Take the existing **platforms** e.g. for Covenants as a starting point to build better **trust** in more far reaching changes;
- Promote an integrated approach to the **value chain** (life cycle analysis; eco-design);
- Promote and evaluate the support for **demonstration** projects;
- Extend the policy toolbox with **new**, promising environmental instruments such as innovation waivers and environmental technology verification programs.
- Develop **joint measures** and projects with the relevant policy domains (environment, energy...);
- Pay explicit attention to new policy development for Third Generation Innovation Policy by (international) **policy learning** and **strategic intelligence**, with a focus on integration with SD.

In *Innovation Policy*, the following actions can be taken:

- Strengthen the **traditional** mechanisms – R&D funding, diffusion, technology transfer – by better synchronised innovation policies along the **innovation chain** for environmental technologies.
- Increase the use of environmental criteria in policies and programmes that support technology development. Sustainable Development or global responsibility has to be an explicit **selection criterion** on the same level as the technical and financial aspects of project evaluation by IWT;
- Improve the convergence of supply and demand in environmental innovation in Flanders by promoting **platforms** of strategic actors, supported by Foresight capabilities.
- Support the development of new economic **clusters** of competitive strength in the domains of environmental and energy technologies, as well on the suppliers side (technology providers) as the users side (sectors that improve their competitiveness by increased eco-efficiency).
- Target a much greater proportion of the **resources** explicitly toward environmental sustainability in experiments of transition to new technology trajectories where Flanders has comparative advantages (e.g. in energy technology as been announced in the Policy Agreement);
- Promote the development of **new instruments** and measures such as demand-side oriented research, innovative public procurement, technology forecasting and ‘technology roadmaps’ that ensure that technology meets the societal and environmental needs for sustainability;

The new ‘Innovation Platform for Environmental Technology’ (MIP) can **integrate several aspects** of these recommendations. It could become a powerful instrument for assessing promising areas where societal needs and technological capacities meet to realise breakthroughs in sustainability and to bring together the strategic actors for the development of new innovation chains. It can become an instrument in fostering the development of visions and cooperation among different actors in the relevant innovation system.

Whether this will materialize, depends on a set of **conditions** that still have to be fulfilled. To assess the Flemish experience and developments we focus on some key factors we consider of major importance for the governance of innovation for environmentally sustainable growth (see table below).

POLITICAL SUPPORT AND LEADERSHIP

Sustainability requires policy integration or coordination, improved interaction between government and society and a long-term view in policies. This cannot happen in a bottom-up manner. It requires **political commitment at the highest level** and willingness to directly deal with tradeoffs and conflicts of interests.

Political support and leadership in setting up and implementing the MIP is vital as well. The decision to create an Innovation Platform was taken at high level, by the Flemish Government, as a result of a commitment taken by Flemish public authorities, enterprise organizations and labour unions in the “Enterprise Conference”, with the aim to create new sustainable growth opportunities for the Flemish economy in the domain of environmental technology. So there seems to be a

broad recognition of the need to coordinate innovation and environmental policies by new mechanisms and arrangements. However, this is not certain. Perhaps the MIP was nothing more than an elegant way to have a 'green stamp' on the outcome of the Enterprise Conference. Anyhow, the MIP was created 'in a hurry', in the last weeks of the previous government, without much debate. It is therefore possible or even probable that parties agreed to an environmental innovation platform without having a clear picture of its role and relevance. So there is a real danger that the MIP will be captured by particular interest and lobbying to create just

another 'delivery point' for R&D subsidies and business support.

So the rollout of the Platform will depend a lot on the understanding, support and political will of the new Government to implement its goals and working principles.

INTERACTIVE POLICYMAKING AND TRANSPARENCY

Decisions on the future shape of society or important sectors that involve different actor groups need to build consensus through adequate institutional arrange-

Table 3 >

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Governance component	Importance	Assessment of MIP	Recommendations
Political support and leadership	Policy coordination and improved interaction between government and society in the context of a long-term view in policies cannot happen in a bottom-up manner. It requires political will at the highest level.	Outcome of the "Enterprise Conference", so in principle broad support	Provide a clear picture of role and relevance of MIP
Interactive policymaking and transparency	Decisions on the future shape of society imply interactions with different actors to build consensus through adequate institutional arrangements.	Central Steering Committee , Advisory Group, User groups	Tackle the hybrid and unbalanced composition of the Steering Group; clarify the role and composition of the Advisory Group and User groups; provide adequate mechanisms for transparency
Strategic intelligence	Without strategic intelligence, there is a real danger that MIP will be captured by particular interest and lobbying to create just another 'one stop shop' for R&D subsidies and business support	No analytical instruments such as foresight, scenario analysis, technology assessment, etc. and no competences on process management, participative methods, policy instruments and policy mix, system innovation and transition management, etc.	Underpin MIP with a strong and intelligent secretariat or Task Force and institutionalise learning
Policy portfolio and policy mix	There is not one single best instrument or program for promoting environmental technological innovation	The basic propositions of MIP are sound and innovative	Do not limit the scope to the three potential instruments put forward, provide additional focus on programs for system innovation; create interfaces for developing tailor made policy mixes such as cluster platforms
Policy Style and Governance tools	Integrating environmental and innovation policy or making environmental regulation more innovation oriented is not just a matter of technical fine-tuning of rules and regulations. Key issues are policy style and governance arrangements for policy integration	Action Plan; participation of different ministries in the Steering Committee and in Working Groups	Create governance tools and arrangements for policy coordination, such as an innovation impact assessment tool; provide clear responsibilities and mandates, clear procedures for decision-making

ments. This requires much more than traditional interface structures as 'management by conferences' and traditional consultation of advisory bodies. Government, business, investors, consumers, researchers, NGO's and educators all have important roles to play in redesigning the innovation system. By involving stakeholders and companies, government also helps them to anticipate and constructively deal with the future. This is important because in the globalising economy assessment of markets and new technologies is key to the long-term survival of companies. Also, companies themselves are challenged to take care of a broader set of objectives and integrate social, environmental and ethical considerations in their businesses (socially responsible corporate governance).

On a general level, 'New Public Administration' has abandoned the 'command' style to implement stakeholders' democracy into different stages of policy development. This is a difficult balancing between the different partners: policy makers, administrations and stakeholders. The recent modernisation of the Flemish administration (BBB) has restated the 'primacy of policy' as a guiding principle, the role of administrations in preparing and implementing policies and the proper place of stakeholders in 'strategic advisory councils'. But interactive policy making should be considered more as a learning process in which **further institutional innovation is necessary**. In the present BBB only coordination on the political level ('inter-cabinet') has been formally recognised. Political dynamics are determining coordination and sectoral divisions of administrations are maintained as influence domains of Ministries. There is no sufficient administrative coordination in BBB. The administrative reform in Flanders therefore cannot succeed if the **division** of competences is put at the centre of debate instead of the process of **interaction** of all actors.

At the level of MIP, coordination of policies is the task of a central **Steering Committee**. It can be an important opportunity to introduce and experiment with real horizontal integration of policies for innovation pur-

poses, giving a more pro-active role to different policies within an innovation objective of networking and clustering together with players of the private and the research world. However, it is unclear whether the composition of the Steering Group and the relationship with an Advisory Group is the best way to go. The Steering Group is hybrid because it is composed of representatives of government and of a few particular enterprise organizations. Involvement of other stakeholders will be organized through an Advisory Group, but it is unclear why some enterprise organizations are more involved than others, who will take part in the Advisory Group, how the participation of the Advisory Group will be organized, and what the relationship will be with the traditional consultation of advisory councils. So at the moment, participation in drafting the Action Plan seems unbalanced and transparency seems to be lacking. **Transparency** however is essential to establish a credible policy that is supported by a wide range of actors and to protect against undue influence by special interests.

STRATEGIC INTELLIGENCE

Strategic public intelligence is another key issue in the integration of policies and in the successful implementation of the Innovation Platform. It is a major success factor to maximize the ambitions and results of MIP for the case of the environment as well as for new innovations in environmental technologies.

Up until now, policy debates in innovation policy are largely discussions about **budget** allocation between industry and science, and strategic decisions on Excellence Centres are not consequence of a well informed, open debate but of more or less informal lobbying. They are established without ex ante evaluation framework for assessing success or failure and without structural programming to fit into a broader strategy. Prioritisation of strategic **choices** is often 'implicit'. There is a risk that this would happen with MIP as well.

To be able to tackle the high ambitions of MIP, it is important to underpin it with

strategic intelligence capabilities. This involves **analytical instruments** such as foresight, scenario analysis, benchmarking, cost-benefit analysis, monitoring, technology assessment, etc. and competences on **process management**, participative methods for consultation and coordination, policy instruments and policy mix, system innovation and transition management, etc. to create a common mindset, provide a common framework of reference, rationalize the decision processes and help to implement the important choices that will have to be made.

For example, MIP needs further **domain exploration** before programme choices can be made. The best strategy is to build upon own strengths and develop regional clusters of **specialisation** in sectors and disciplines where Flemish actors are leading or have potential to become international leaders. When there is no technological base from the past, market support alone will not easily lead to a strong home based industry. But to make such kind of management decisions there needs to be an assessment of strengths and weaknesses of Flemish industry, based on strategic environmental and technology forecasting, balancing between long term goals and short term results, and integrating an international perspective to avoid duplication and to use 'free' knowledge in the international arena. In particular, the European Commission's Environmental Technologies Action Plan (ETAP) already decided to establish technology platforms, to coordinate research and improve partnerships and funding (2004-2007), for hydrogen and fuel cells (2004), photovoltaics (2004) and water supply and sanitation technologies (2005).

This **international dimension** is of increasing importance. The power of national governments is shrinking because of economic globalisation and political supra-nationalisation. The impact of the EU on economic policies and environmental policies has become predominant, leaving a subordinated role to the national governments. Their role resumes largely to implementing European policies. The 2003 EU Action Plan has set the lines of strategic priorities for stimulating innovation in environmental technologies.

Also, from the perspective of global sustainable development, the issue of 'technology transfer' is gaining importance.

What is the role of the Flemish government in this context? Will it choose to be a fore-runner, a follower or a lagger? Where are the comparative advantages of Flanders? What are the 'gravity centres' of innovation policy in environmental technology in which Flanders can try to differentiate itself on the international level and in which domains alliances are necessary. To be able to make such kind of management decisions the **interface** with this international level of governance is of great importance. Participation in international policy learning is a basic condition. This is an important aspect of strategic intelligence for the Flemish Innovation System (see box).

This strategic intelligence seems vital for the success of MIP, but has not been organized sufficiently yet. It is also very difficult to do so, because the 'community of strategic intelligence' is very limited in Flanders and there is no culture of strong policy research institutes. Policy preparation is dominated by technocrats and lobbyists and channelled to a large extent into the ministerial cabinets. Cabinets tend to be preoccupied by short term political considerations and cabinet personnel shifts a lot following election cycles and changes in government or changes in the division of competences between ministers. This also means that there is no '**institutional memory**' of the acquired experience.

It would therefore merit consideration, at the level of MIP, to underpin it with a strong and intelligent **secretariat** or Task Force, to tap the information, knowledge and competence that is available and create an institutional memory of experience by pooling it in an organised information network. To allow for learning government should **institutionalise learning** by requiring assessment, evaluation and adaptation as a regular feature of the policy process. So government should already plan the 'milestones' to reflect and evaluate the cooperation and outcomes of MIP and provide for the capacities and capabilities in its administration to do so.

SUSPRISE AS LEARNING ARENA

EU policies in the field of a sustainable industrial development include among others the Environmental Technology Action Plan (ETAP), the Sixth EU Research Framework Programme (2002-2005) initiatives, the LIFE-Environment programme. The EU also established the Innovation Relay Centre-Network (IRC), a leading European network for the promotion of technology partnerships and technology transfer, including environmental technologies. In line with these EU-initiatives, a wide range of regional and national sustainability Research and Technological Development (RTD) programmes has been put in place. The diversity of these national, regional and EU programmes and policies call for a strong coherent strategy, as they all face similar issues. Improved co-ordination of national and regional sustainability programmes can stimulate synergies, promote economies of scale and help disseminate good practices. This is the focal area where the European Research Area- Network project "the Sustainable Enterprise" (SUSPRISE) has been elaborated.

The SUSPRISE objective is to strengthen European efforts to realise a sustainable development in industry by enhancing European co-ordination and co-operation of national sustainability RTD programmes. The project will:

- Set-up a continuous, structured and systematic exchange of national programme information;
- Benchmark, co-ordinate and synchronise national programme features towards a common programme design and towards a common programme implementation strategy for industry and research infrastructure;
- Identify and analyse aspects that encourage or hinder mutual opening of national programmes;
- Establish a framework for a joint programme.

The ERA-NET SUSPRISE will have substantial impact on governmental and industrial stakeholders, as it:

- leads to more effective and efficient national sustainability RTD programmes (current and new generations of programmes) across Europe;
- supports the implementation of the European policies such as IPPC, IPP and ETAP;
- represents a major step towards the structuring of an European Research Area (ERA) for sustainable industrial development;
- prevents duplication of RTD efforts within industry and research infrastructure;
- widely disseminates experiences and results of programme co-ordination and co-operation throughout Europe;
- encourages new partners (especially Southern and Eastern EU) to join in;
- represents an important first step towards an article 169 of the Treaty for financial participation of the EU in research programmes undertaken by several Member states and gives a major input for the 7th Framework Programme-preparations.

Project deliverables include a common knowledge base on the state of the art of the programmes involved, common programme design cases (evaluation, monitoring and project criteria), common target group implementation cases (sectoral RTD, cross-cutting RTD and non-technical), a high-level integration conference in Brussels and a framework for a joint programme, including an ex-ante evaluation. The SUSPRISE consortium consists of 13 partners from 8 EU member states, with SenterNovem of the Netherlands as co-ordinator. The consortium brings in 11 national RTD programmes. The project budget over 4 years is € 2,5 mln.

Source: Kathleen Goris (IWT)

At a more general level, we recommend a **Knowledge Centre** or expert group inside the government administration to give methodological advice and to assist departments and agencies on a strategic level with integration of policies, implementation of

governance tools and building strategic intelligence (see the comparable Units for Regulatory Management and Public Private Partnerships). It should also promote initiatives to strengthen institutional capacities at all levels (see box below).

FIVE LEVELS OF INSTITUTIONAL CAPACITY

“Capacity” can be defined as the ability to perform functions, solve problems and set and achieve objectives. There are different factors that influence a country’s ability to perform functions, solve problems and set and achieve objectives, in a particular policy field. A well-known dimension of capacity is the ability to allocate appropriate financial and human resources to solving problems. However, the capacity to find financial and human resources is just one aspect of capacity. **Institutional capacity** is another key aspect, whose importance is, however, often less understood. Institutional capacity of a particular country is defined as its ability to mobilize and/or adapt its institutions to address a policy issue. Institutions should be seen broadly as sets of rules, processes and practices that prescribe behavioural roles for actors, constrain activity, and shape expectations. Thus, institutions are pervasive throughout society: they not only include discrete organisations, which are often called “institutions”, but also all formal or informal rules, processes and practices that exist within society.

Capacity assessment studies often distinguish five institutional levels:

Individual level: the performance of individuals in their functions is the basis for the success of any action or policy. This performance is influenced by the sufficiency of human resources, but also by the variety of rules, processes, practices that exist for hiring, training or providing individuals with financial and non-financial incentives.

Organisational level: the performance of organizations is another key measure of capacity. Human and financial resources, as well as rules, processes and practices that structure interactions between individuals within organizations, form the backbone of an organisation’s performance.

Network level: policies or actions often require the cooperation –or partnership– of many individuals and organizations, through networks. The efficiency of these networks, which are developed for a specific purpose, depends on the ability to develop appropriate institutional arrangements that define how individuals and organizations interact with each other.

Government level: the actions of individuals, organizations, or networks of organizations are embedded in a wider institutional context, or an “enabling environment”, which consists of the rules, processes and practices that shape political institutions and the civil service, including the body of existing laws and regulations. Public governance will to a large extent determine a country’s ability to design, implement and enforce effective policies and regulations in a specific field.

Society level: the public sector itself functions within an even broader cultural, economic and social environment. The nature of societal norms, values and practices will determine civil society’s acceptance of any policy or regulation, as well as the degree to which civil society will take initiative on its own to address societal concerns.

Source: OECD (2004). Institutional Capacity and Climate Actions: Summary Paper.

POLICY PORTFOLIO AND POLICY MIX

There is not one single best instrument or program for promoting environmental technological innovation. We need a **mix** of strategies for developing an eco-efficient market economy with good conditions for eco-innovations. Government therefore has to manage a wide **portfolio** of different policies. Economic instruments for example are important but not sufficient. A tax tells companies what not to do (to pollute) but does not tell them how to reduce pollution. One also needs innovation and knowledge-oriented policies. However, close attention should be made to the interplay and balance between instruments and the way they work with or against each other. This policy mix will be very **time and context depending** and therefore should be tuned to the demands of specific clusters in cooperation with the innovation actors. The generic 'offer' of policy instruments has to be tailored to the concrete 'needs' of the different innovation arena's by **bridging** organizations, intermediaries or platforms that can close the **information gap** between policy supply of support and innovation demand in certain contexts. The portfolio of policy instruments should therefore cover the **whole trajectory** of the innovation and diffusion process and focus on a combined push and pull approach. Market or demand side oriented programs can promote the application of new technologies and stimulate wider application of already proven technology, all within a **strategic context** of well-defined specializations.

Here, the basic propositions of MIP are sound and innovative. The efforts will be concentrated on well-defined **target areas**. And there is a clear commitment, not only to strengthen the more classical policy instruments of research and innovation policy for the purpose of environmental innovation, but also to complement them with **new instruments** targeting on the demand side of environmental technologies and to **work together** across the traditional borders of environmental and innovation policy.

tial instruments that were put forward (smart technology procurement, modification of regulations for the case of innovation and introduction of new financial instruments). All three are no doubt important components of a good policy mix, but there are many other promising policy instruments that merit consideration. For example the use of environmental management systems, measuring and benchmarking, eco-labels and product declarations, innovation waivers, environmental technology verification programs, etc⁶. So much more policy instruments have a role to play⁷. Again, this requires some **strategic intelligence**. The question remains whether the necessary competence is available in Flanders and who will bring it into the activities of MIP at what level and moment in time. It is clear that the installation of thematic Working Groups, composed by members of the administration, (semi) public companies and relevant firms, to deal with policy instruments and policy mix will not suffice.

A last remark is that in MIP a clear focus on programs for **system innovation** seems to be missing. This is also a necessary and important dimension of strategic intelligence that is concerned with transition management. We recommend more emphasis on the need to aim for simultaneous systemic change in technology, the wider infrastructure and surrounding institutions to promote the more radical eco-innovations. In the outset of the new 'Pole of Excellence' for example, MIP considers economic and societal goals given, whereas the basic strategy should be to develop alternative visions of how certain services (energy, transport and food) could be provided more sustainable, as a reference for policy and support programs. We also recommend that **learning** will be made an important objective in its own right. MIP should stimulate **experiments**. The programs should be targeted on broad technology areas that are likely to deliver the required performance outcomes at a competitive cost. This should be done without favouring specific technologies or stifling radical innovation, and without abandoning support for high-risk, high-social benefit projects. The balance of support to incremental innova-

⁶ Van Humbeeck (2002).

⁷ Van Giessel e.a. (2004).

However, one should be cautious to limit the scope of the work in MIP to the three poten-

tion in mature technologies and open innovation for new breakthroughs can only be found in a concrete analysis of the technology trajectories from the point of view of their overall contribution to sustainable development.

POLICY STYLE AND GOVERNANCE TOOLS

An important part of the strategy to integrate environmental and innovation policy, recognised by the decision of the Flemish Government to install MIP, is to make environmental regulation **more innovation oriented**. Research indeed suggests that more innovation oriented policy instruments have a larger impact on sustainability than strict environmental regulations, but innovation has not been a goal of environmental regulation. Important innovation opportunities are missed this way, and innovation barriers persist.

However, making environmental regulation more innovation oriented is not just a matter of technical fine-tuning of rules and regulations. Key issues here are also policy style and governance arrangements for policy integration. Creating **favourable conditions for a longer period** is far more important than the revision of a particular piece of environmental regulation.

For this we need policy styles oriented to innovation, based on dialogue and long-term goals. The issue of policy style is important because there is a relation between policy styles and the type of solutions that are adopted by companies. Firms can innovate more comfortably when risks are reduced; and risks are lower when environmental policy is stable, credible and reliable over the

long term, and when regulatory processes are based on open, informed dialogue and executed by competent, knowledgeable regulators. Present inefficiencies have much to do with environmental policy being too impatient, too much focused on particular solution and too rigid (non-adaptive). Environmental regulation should not only aim for short-term direct environmental results but also seek long-term gains. Government should adopt **learning as a policy goal**, and accept experiments (with sometimes failures).

We also need governance tools and arrangements for policy integration. Despite the logical arguments for win-win opportunities that may result from more cooperation between environmental and innovation policy, 'cultural' differences pose potential barriers (see table below).

In MIP at the outset the only tools for the coordination of environmental and innovation policies are the Action Plan and the participation of different ministries in the Steering Committee and in Working Groups. These are important, but policy integration cannot happen in a bottom-up manner. It requires clear **responsibilities** and **mandates** for the people involved in MIP, and clear **procedures** for decision making, evaluation and modification of MIP. It requires **political backing**, budget support and enabling governance instruments and procedures. Policy integration also requires **competences**, capabilities, communication and mutual learning. It depends furthermore on changes in informal **institutions** (ways of thinking and ways of doing things). In this context, the set of mechanisms for policy integration could be much broader⁸. We can

Table 4 > 'Cultural' differences between environmental policy and innovation policy

	environmental policy	innovation policy
Driver	Often internationally driven (EU, UN)	Mostly internally driven (the national innovation system)
Attitude	Often restrictive towards public	Mostly client oriented
Measures	Often prescriptive	Mostly stimulating - catalysing
Management	Often extensive administration, developed decision model	Mostly smaller administrations, weak decision model
Resources	Often use of regulative powers	Mostly financial
Politics	Often conflicts	Mostly cooperative style

⁸ Zie Verhoest e.a. (2003).

think for example of **exchange** of civil servants between the ministries responsible for environment and innovation, establishment of **'mixed' task forces**, extended **consultation and dialogue** on sectoral policies and projects, sectoral capacity building, information tools and indicators, etc. A concrete and promising example is the use of an **'innovation impact assessment'** tool, to be used by all policies when preparing new regulations. It could easily be integrated into the Regulatory Impact Analysis system that was recently adopted in Flanders.

MIP: A SHOWCASE FOR HORIZONTAL INNOVATION POLICY

The OECD TIP activity MONIT aims at improving Innovation Policy governance and creating a more coherent horizontal Innovation Policy. This is a long-term process that is highly dependent upon policy learning. The MIP initiative offers the possibility for learning and can function as an 'experiment' of new innovation governance. The conditions are gathered to make MIP a strong showcase of policy coordination and integration.

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VTO-STUDIES:

- 1/ Het Vlaams Innovatiesysteem: een nieuw statistisch beleidskader
1 annex/ Theoretische en empirische bouwstenen van het 'Vlaams Innovatie Systeem'
- 2/ Innovatiestrategieën bij Vlaamse industriële ondernemingen
- 3/ Octrooien in Vlaanderen: technologie bekeken vanuit een strategisch perspectief
Deel 1: Octrooien als indicator van het technologiesysteem
- 4/ De impact van technologische innovaties op jobcreatie en jobdestructie in Vlaanderen
- 5/ Strategische verschillen tussen innovatieve KMO's : Een kijkje in de zwarte doos
- 6/ Octrooien in Vlaanderen: technologie bekeken vanuit een strategisch perspectief
Deel 2: Analyse van het technologielandchap in Vlaanderen
- 7/ Diffusie van belichaamde technologie in Vlaanderen: een empirisch onderzoek op basis van input/outputgegevens
7 annex/ Methodologische achtergronden bij het empirisch onderzoek naar de Vlaamse technologiediffusie
- 8/ Schept het innovatiebeleid werkgelegenheid?
- 9/ Samenwerking in O&O tussen actoren van het "VINS"
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Deel 4: Sporadische en frequent octrooierende ondernemingen : profielen
- 11/ Technologiediffusie in Vlaanderen. Enquête-resultaten - Product- en diensteninnovatie: evolutie 1992-1994-1997
- 12/ Technologiediffusie in Vlaanderen. Enquête-resultaten - Hoogtechnologische producten: evolutie 1992-1994-1997
- 13/ Technologiediffusie in Vlaanderen. Enquête-resultaten - Procesautomatisering: evolutie 1992-1994-1997
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BIOGRAPHY

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WHAT IS IWT-FLANDERS?

The Institute for the promotion of Innovation by Science and Technology in Flanders (IWT-Flanders) was established in 1991 by the Flemish government as a regional public institution to provide R&D and innovation support in Flanders. In order to execute this task IWT has several financial tools available and an annual budget of 235 million EUR (in 2003) available to support projects. In addition to **direct funding**, a variety of **services** is provided to the local industry in the field of technology transfer, partner search, information about international subsidy options, etc. IWT has also an important mission as co-ordinator, aiming for a strong co-operation between all organisations in Flanders offering technological innovation services to companies.

Over the years IWT has expanded into the **knowledge center** for R&D and innovation in Flanders.

WHAT IS THE IWT-OBSERVATORY?

The IWT-Observatory functions as an analytical unit, supporting the role of IWT as a **Knowledge Centre for R&D and Innovation** in the Flemish Innovation System.

The Observatory has a **supporting function** towards IWT's operational activities in evaluation and service support, supplying analytical information concerning aspects of innovation and company-specific data and developing systems for performance measurement.

Being a part of **Innovation-monitoring** by the Flemish Government, the IWT-Observatory analyses collects and analyses indicators on the R&D and innovation activities of companies and other actors in the Innovation System in Flanders.

The **analytical capacity** of the Observatory is built upon a multitude of internal and external sources, the results of innovation studies and IWT specific data about companies, and recombined into knowledge components for stimulating innovation and innovation policy in Flanders.

As an **information provider**, frequent demands for information by policy-makers and interested third parties are being answered about benchmarks from foreign (policy) experiences, introduction of new policy concepts within the innovation theory, and other matters in the field of innovation. Results are published in periodic reports and IWT-Studies.

