INNOVATION POLICY AND SUSTAINABLE DEVELOPMENT IN FLANDERS

Paper for the Brussels Workshop of the OECD MONIT network

Brussels/IWT 23-24 October 2003

Ilse Dries, Peter Van Humbeeck and Jan Larosse (*)

Abstract

The OECD TIP-activity MONIT aims at improving innovation policy governance and creating a more coherent horizontal innovation policy. As a part of the project, a set of case studies has been initiated in different countries. The objective of the case studies is to analyze the role of the innovation policy in other policy domains. One of these domains is sustainable development policy. The Flanders region in Belgium agreed to prepare a case study for Flanders. In this interim report for the Brussels workshop, we analyze (1) the policy space and the policy processes related to the sustainable development policy in Belgium and Flanders, (2) the links between the sustainable development and innovation policies and the role of the innovation policy in enhancing sustainable development, and (3) suggest some ways to improve the synergy between these two policy domains. In the following months, we hope to test and develop these ideas in a case study for energy and climate change.

(*)
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 Humbeeck is working for the Commission for Environment and Economy of the Social-Economic Council of Flanders (SERV) and is a member of the Regulatory Management Unit in the Services of the Flemish Prime Minister. Contact: peter.vanhumbeeck@coo.vlaanderen.be ; +32/2 553.17.15 or pvhumbeeck@serv.be ; +32/2 22.95.201

Jan Larosse is working for the Institute for the promotion of Innovation by Science and Technology in Flanders (IWT). Contact: JL@iwt.be ; +32/2 209.09.00

INTRODUCTION

The MONIT-framework and the Brussels Workshop

The OECD TIP-activity MONIT (Monitoring and implementing horizontal innovation policy) aims at improving innovation policy governance and creating a more coherent horizontal innovation policy. As a part of the project, a set of case studies has been initiated in different countries (WP2 of the MONIT project). The objective of the case studies is to analyze the role of the innovation policy in other policy domains.

One of these domains is sustainable development policy. The Flanders region in Belgium agreed to prepare a case study for Flanders. This paper is an interim report for the Brussels workshop. An in depth analysis for a particular case in Flanders shall be prepared later this year.

The aim of the Brussels workshop is to bring together the MONIT network at a crucial stage in the project, exchange lessons and perspectives, present recent work and intermediary findings from the national efforts.

Case studies sustainable development

The case studies on sustainable development have three main objectives:

- Analyze the policy space and the policy processes related to the sustainable development policy.
- Analyze the links between the sustainable development and innovation policies and the role of the innovation policy in enhancing sustainable development and vice versa.
- Analyze possible ways to improve the synergy between these two policy domains.

This paper is structured likewise. We first give a brief description of the sustainable development policy in Flanders. Our focus is on the environmental policy part of sustainable development. We then look at the relationship between environmental policy and innovation policy. We conclude with some ideas to promote co-operation between the two policy domains.

SUSTAINABLE DEVELOPMENT POLICY IN FLANDERS AND BELGIUM

The MONIT-WP1 analyzes the innovation policy space and its coherence. A similar analysis needs to be done also for each policy space in each case study, in this case for the sustainable development policy in the Flanders region in Belgium.

General socio-economic and environmental characteristics of Flanders

In our presentation it is important to emphasise the specific situation of Flanders: Flanders is situated in the hart of Europe. Due to its location, close to several industrial sites and harbours, it has to deal with consequences of these economic activities such as transport in transit, environmental problems, and problems of space. As a consequence of this and the fact that Flanders is densely populated, it has also one of the densest road and railway infrastructures of Western Europe. The transport density is also still increasing, often resulting in big traffic-jams during peak hours. Furthermore the consumption rate of the families is rising, increasing the pressure on the environment. The number of families is increasing, but

their seize is getting smaller. People have more income but less time. They use more timesaving but energy consuming machines.

The economic growth of Flanders is stagnating. Recently a lot of small and medium enterprises had to shut down. Belgium is an important actor in the new technological development: i.e. IMEC (centre for micro-electronics) is one of the most important independent micro-electronic research institutions of Europe, but this sector recently suffered the loss of some very prospective enterprises (such as Lernhout and Hauspie). The last few years, the unemployment rate is also increasing again.

The environmental quality is gradually improving for a few topics. The efforts done by the agricultural and the industrial sectors, the citizens, and the government are gradually beginning to pay off. Nevertheless, the quality of the environment is still very critical due to the historical pollution and the high consumption rate. A decoupling between the economic growth and the pressure on the environment has not taken place yet. Flanders still has some real bottlenecks in this field:

- the emission of greenhouse gasses is still increasing: in 2000 the emission was 11 % higher than in 1990; also the energy consumption has increased: the net production of energy has increased by a quarter (in 2000) since 1990.
- The water quality is worrisome: only 25 % of the checkpoints fulfil with the biological basic quality norm.
- For only one quarter of the known polluted soils the sanitation has started.
- Also the situation of the biodiversity stays critical. A lot of species are threatened extinction (20 % of the total known species). The total area nature and forest reserves amounts to merely 1.5 % of the total surface of Flanders.

But there are also some positive evolutions. For example: the total acid emission has decreased, the total amount of waste is no longer increasing and the amount of selected waste has increased.

Situation of de regions, in comparison with de federal government and the communities

Belgium is a federal state. Apart from the federal government there are also three community governments: the Flemish, the French and the German. These three are authorised for the policies concerning language and cultural issues. There are also three regions: the Flemish, the Wallonian and the Brussels region with their own government.
The federal government and the regions and communities are legally spoken on the same level, but they have competencies on different policy issues. The federal government can make policy documents for the policy issues that it is competent for. A lot of policy issues are regionalised, particularly environment, energy, mobility and agriculture. The federal government still has the power of justice, finance, social security, and an important part of the public health.
The policy of sustainable development is spread out between these different federal and regional policy domains. These different policy levels have to agree to come to a common policy on sustainable development.

Sustainable development on the federal level

Belgium still does not have a national policy on sustainable development. Only the federal government has a law for the co-ordination of the sustainable development policy and an own

strategy. Following the agreements of Rio on the national sustainable development policies, the federal government voted this law in 1997. The law describes a set of different steps in the procedure that contribute to a policy concerning sustainable development.
The two most important products are the federal plan for sustainable development (every four years) and the federal report for sustainable development (every two years).

The first *plan* started in 2000 and shall be executed until 2004. At the moment the second plan is being prepared. This second plan follows the structure of the European strategy for sustainable development and has the following subjects:

- climate change
- transport
- health
- natural resources
- combating poverty and social exclusion

It is the Interdepartmental Commission for Sustainable Development (ICDO) that is responsible for elaboration of the federal plan. The ICDO is composed of different federal officials, each of them representing a member of the federal government. More or less all the policy domains are represented. The ICDO is responsible for the elaboration of the plan and for the follow up.

For these tasks it can rely on the input of the federal *report* for sustainable development. The report is published every two years by the planning bureau. The report provides an analysis of the current situation and an evaluation of the policy on sustainable development and proposes a longterm analysis. The report can be used as an input for the elaboration of the new plan as well as for the follow-up.

Another important actor for the federal policy on sustainable development is the *federal council for sustainable development (FRSD)*. The federal council is composed of a huge number of experts, representatives of the socio-economic and cultural organisations, representatives of the other governments…. The government can ask its advice, but it can also take its initiatives itself. It has several thematical working groups where interaction and discussions can take place. The outcome of these discussions is used for the elaboration of the advice. It has also the task to sensitize the public on sustainable development. For example for the preparation of the world summit on sustainable development it has organised several conferences.

As you can see the report, the plan, and the advices alternate. In the policy cycle the first report (two yearly) is giving an input to the policy plan, the federal council give also an input during the period when a public enquiry is held on the plan. During the execution of the plan, the federal council on sustainable development can give advice on governmental laws or initiatives that implement the policy intentions of the plan. Also the second (two-yearly) report can give an input to the execution, due to the fact that it gives an evaluation of the policy of sustainable development. The advice and the report can improve the execution. For the preparation of the next plan, the next report can be used etc.

Lessons to learn from the federal experiences
We can point out following important lessons:

- The federal government is ahead of the governments of the regions: it has stimulated during the last 6 year the discussion on sustainable development. It has a real strong framework with a law, council, different institutions, a planning and a report system.
- The federal plan for sustainable development is a strategic plan but longterm objectives are not stated in the plan, although they exist implicitly. There are also no clear indicators.
- If sustainable development is not a political priority, it seems to be very complicated to execute certain actions of the plan. Therefore a lot of actions are delayed.
- Participation is very important and very well integrated in de Belgian decision-making process. For example: there is a public enquiry onevery new policy plan on sustainable development. All the citizens of the country can give their opinion on the policy plan during two months. But there are no strict rules on how this public enquiry has to be organized, nor on the instruments to be used, and on the method to approach the actors, the right timing etc.
- For the region of Flanders, it is very important to learn from the experience of the federal government. The most important challenge is how to achieve real integration and to implement sustainable development more as a horizontal approach than as additional actions in the different policy domains.
- The ICDO has the task to develop the policy plan (ICDO). Although there is a sort of integration, there are no tools disposed available to resolve a conflict of interests.
- Integration seems to be the most difficult problem to tackle when discussing sustainable development in Belgium. A few examples illustrate the lack of integration:
    - The policy plan seems to be more a list of additional actions to tackle specific problems in a particularly policy domain, with a relation with only one (or mostly two) of the main aspects of sustainable development, rather than an integrated approach to tackle horizontal problems and challenges in the global context of sustainable development. It seems that everybody concentrates on her or his policy domain without bothering about the others.
    - This is also reflected in the working of the ICDO-members: for the follow up of the actions of the plan, every member is preparing a document for their own policy domain. Little interaction is taking place. These docuemnts have also no official status: they are not integrated in a yearly real published progress report or yearly integrated action plan, which is approved by the government.
    - On the other hand, there is also a problem with the mandates of the members of ICDO: often it is not the highest official in rank who is following the monthly meetings of the ICDO, and often their ministries do not cover them.
    - Because the federal government is the competent authority for only a limited number of the instruments and policy issues, it is very difficult to come to a real ‘integrated policy plan on sustainable development’. For example: it can introduce certain labels or product norms i.e. for recycled objects but the Flemish government is the competent authority for the other instruments such as subsidises for the recycling centres, agreements with the different industrial sectors, sensitization campaigns and all the other tools of the waste chain. For water, the federal government has almost no policy competence. Under these circumstances it is logical that it is very difficult to make a real integrated plan. A real ‘integrated plan’ needs the complementary consent of the regions.

- Recently a new horizontal institution has been founded with the new task of helping other institution to prepare and implement the policy on sustainable development (PODDO). But it remains an external institution. Considering the lack of integration as the main bottleneck, it is perhaps more important to work with responsible persons for sustainable development in each policy domain.

- The policy agreement of the new federal government (July 2003) stipulates the setting up of 'new cells for sustainable development' in the different ministries. This new cells can improve the integration of the sustainable development policy although the governmental agreement stipulates that their task is to analyse the effect of all the different governmental decisions on sustainable development.

Environmental policy in Flanders: inspired by sustainable thinking

Since 1995 the environmental policy domain has a law (a decree) that stipulates that the environmental policy will be organised by a policy cycle of planning (every five year), reporting (yearly) and a yearly program.

– *The environmental policy plan* is an 'action oriented' plan: it defines the outlines as well as the future actions and measures of the environmental policy of the Flemish region. The plan aims the protection and management of the environment on the one hand, and it aims to improve the effectiveness and efficiency and the internal coherence of the environmental policy on all different levels on the other hand.

– *The yearly environmental programs* serve to execute the policy plan and to make it operational. They stipulate the organization, the planning of the actions and the priority setting of the different measures. It gives a short progress report of the last year.

Both these documents have to be approved by the government.

– Different types of environmental *reports* are published. The *environmental thematic report* is published yearly. It is very important because it is the scientific basis of the environmental policy plan. It describes the quality of the environment by means of the *DPSIR*: for every environmental topic (such as climate change, acidification, …) the report describes the ***d****riving forces*, these are the actors of the pollution and their activities, the environmental ***p****ressure* they causes, the relation with the ***s****tate* of the environment, the ***i****mpact* on the biodiversity, health, and economy, and the ***r****esponse* of the government. Every five year, as an input for the environmental policy plan, a special report is being elaborated, *the scenario report*: this forecasts the possible evolution of the environment under different possible scenarios of socio-economic, technological, and policy conditions. A third type of report *'the evaluation report'* analyses how the environmental policy conducted until now has resulted in an improvement of the quality of the environment.

Also in this case, an interrelation between the different products of the planning cycle can be observed: the scenario report gives an input to the formulation of the policy plan and the yearly environmental quality reports are giving an input to the yearly environmental program.

The new *environmental policy plan 2003-2007* contains a lot of principles and outlines for sustainable development. It contains a *vision* on sustainable development from an environmental point of view. From this point of view, sustainable development has to deal with the relation between the quality of the environment and the evolution of the society.

Socio-economic developments are depleting the environment and conversely environmental problems are harming the socio-economical function of the environment. Sustainable development is closely related to the care for the environment: we have to respect the limits, the boundaries of our environmental system.
The environmental policy plan is putting the longterm dimension, which is fundamental in the sustainable thinking, into practice. Several projects and measures, particularly those relating to difficult topics such as climate changes, loss of biodiversity, hazardous substances), outline a long term strategically approach. But the more concrete translation of the longterm vision can be found in the objectives and the related indicators. For every topic (12 in total), at least one longterm objective (20020/2030) and several objectives for the planning cycle (five year) have been defined. For every objective, indicators have been defined, which allow a follow up of the objective.

The environmental policy puts a big emphasis on the importance on the participatory approach. Stakeholder analysis and participation (i.e. during the preparation of the plan) are key elements in the plan.

Another important accent of the plan is the integration with other policy domains. A special chapter analyses into detail the cooperation with other policy domains such as agriculture, economy, health, territorial planning, mobility and energy. This chapter has been written in close co-operation with the other policy domains.
Integration is still a very difficult issue. Traditionally, there has been little contact between the policy domain of innovation and the environmental policy domain, and a total lack of integration. Later in the presentation, my colleague will address this issue.
The last few years this integration has increased due to several reasons. Several types of integration can be distinguished:

- *Formal integration* to elaborate a common product such as a plan. This is often to fulfil the international obligations. Examples of this can be: the NEHAP, National environmental health program, which has stimulated integration on different levels (the regions and the government) and different policy domains (health, environment). Another example is the Flemish Climate plan which is a co-operation of the ministry of environment and the ministry of energy. Also a national climate plan has been elaborated which includes a co-operation on different levels (regions and federal government). The co-operation on climate is formalised in a Flemish task force for climate changes, as well as a national task force on climate change.
- *Informal integration*: an example of this is the formulation of a policy plan with no legal frame such as the mobility plan. But also an integration to improve the policy towards a *common stakeholder*, in function of an socio-economic sector has been taken place: for example the policy concerning the agricultural sector. We can mention also *the instrumental integration*: to execute a certain multi- disciplinary instrument i.e. discussion on territorial plans (discussion with the policy domain of territorial planning, agriculture and environment).

Informal and formal integration are very dependent on the willingness and the attitude of the officials themselves. Integration has been enhanced by the first environmental policy plan. To resolve certain bottlenecks, the first plan has already stimulated integration as a possible solution. The co-operation between the ministries of environment and energy was initiated and stimulated by the plan (special actions were being formulated and had their own budget).

Although the integration with the ministry of health, the mobility cell and the ministry of energy are satisfactory, there is still lot of work to do with other policy domains such as innovation and technology.

Sustainable development in Flanders

The last decennium different governments have put lots of emphasises on sustainable development in their respective governmental policy agreements. Already in 1995 the policy agreement stated that '*to strive for an economic growth while maintaining social justice and a better ecological equilibrium is one of the five most important challenges of the new government'.*

Also the present government has emphasised in his policy agreement (July 2000) 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 to 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.'*

In the policy letters of the different ministers, which contain the intentions of the minister at the beginning of a new legislative period, a lot of interesting activities related to sustainable development can be found. For example in the policy letter of the minister of employment, a lot of emphasis is put on sustainable entrepreneurship and increasing employment in the environmental sector. Also the minister of mobility stated in his policy letter that the mobility policy shall reduce the damage it causes to the environment and nature. This policy letter contains a set of very concrete measures to attain the objective. The minister of energy has written in his policy letter the objective of stimulating rational energy consumption. The minister of agriculture wanted to stimulate a sustainable agriculture, which means: to deliver qualitative products and services on an environmental and animal- friendly minded way; to manage the open space in a responsible way and to take care of the fact that this activities will ensure a satisfactory income to the farmers. Not in every policy domain the sustainable development thinking is present in the same way i.e. foreign affairs and economy have not incorporated sustainable development explicitly in their policy letter.

Even though a lot of politicians have been stressed the importance of sustainable development, there is still no 'integrated plan' for sustainable development. In 2001 the government has launched an intention called '*colourful Flanders***',** which is in a way a first step, because of its long term thinking. Six working groups worked out answers for the future challenges concerning entrepreneurship, study, work, culture, care, and environment in different vision texts. The working groups were composed of experts, members of the different cabinets, officials of the ministries, and in some cases representatives of different NGO and socio-economic organisations. This resulted in different vision texts on the different items. During a conference the Flemish government distilled 21 objectives for the 21st century from this vision texts and they put them together in what was called '*the pact of Vilvoorde***'** (a town in Flanders). The different ministers, and the representatives of the socio-economic and environmental organisations formally signed this pact.

Although the fact that the vision texts are an interesting medium to come to a sustainable development strategy, they can only be considered as a first step in the right direction:

- The process was characterised by a lack of integrated thinking and working: the different vision groups worked independent without interaction.
- As a consequence of this, the transversal character in the text is absent: the items are treated without a relation to other items; no sustainable test check was made during writing.
- Certain dimensions that are important for sustainable development are lacking completely: i.e. the external dimension. In the texts of entrepreneurship and study there is no link with technology transfer to the developing countries. Also the solidarity thought is absent: the texts are very much directed towards a future vision for Flanders itself, without links to the rest of the world.

Towards a framework for sustainable development in Flanders?

Taking into account the agreement of Johannesburg, stating that every country has to make a national strategy for sustainable development against 2005, two possible scenarios exists in the situation of Flanders:

1. Or we will make at once a strategy on the Belgian level with the federal government, the three regions and the three communities: this will be a very tough exercise if non of the different partners themselves have a vision on sustainable development (except the federal). As long as each of the regions and the communities do not have a common internally coherent and integrated view on the subject, it is difficult to reach a common view of all the partners. But this will not be the only problem. This cooperation will require the formal approbation by the government and the parliament by means of an official 'co-operation agreement'. This is a very heavy and long during procedure.
2. Or we make first an internal strategy on sustainable development. Different officials are prepared to work on this option. To enhance this, an external study will be carried out soon that will examine different scenarios, tools and conditions necessary to come to this objective. But still the government must still approve the making of the strategy before we can start elaborating it.

Important initiatives tried to stimulate a more coherent framework or a legal basis for sustainable development.

We can for example mention the initiative of the Flemish commission for environment of the Flemish parliament (that is composed by members of parliament). During the public enquiry of the environmental plan (in may 2002), this commission stated in its official recommendation relating to to the plan that a lot of objectives can not be achieved unless the they will be put in a larger scope of sustainable development, in which the environmental policy will be more integrated with other sectors. They suggest rethinking the environmental policy plan into the direction of an integrated Flemish sustainable development plan.

Also the Flemish minister of environment stated in an official conference after the summit, that there is a need for a minister responsible for sustainable development, and that she will make work of this. Also this statement has not resulted in concrete action.

Due to the fact that issues related to sustainable development are included in the different policy letters of the ministers and thus in their priorities, a lot of officials in the different ministries have to deal now with the issue. So we end up with the very contradictory situation

that there are a lot of concrete realizations in the field of sustainable development, but that there is not a a common view, or a common strategy.

Because of the increased number of officials that have to deal with issues related to sustainable development, these officials started to meet each other in March 2003 in an informal way in what was called a 'working group on sustainable development'. One of the tasks was to prepare common papers for international meetings on sustainable development (such as the CSD commission for sustainable development of the United Nation), and to give an advice on the preparatory texts of the federal plan for sustainable development, and eventually, what was felt as a priority by the group, to prepare a Flemish strategy on sustainable development.

A document recommending making this a formal working group has been handed to the government, but also this has not had any effect.

Comparing the situation of Flanders with this of the federal government: conclusions
Comparing the situation of Flanders with this of the federal government we can conclude:

- Sustainable development can only succeed if integration is taking place between the different levels, horizontal as well as vertical.
- On the federal level, the integration seems to be the bottleneck for the fluent execution of the initiatives of sustainable development. In some ministries there is a lack of support for sustainable development plans and this obstructs integration;
- In Flanders: In some issues related to the environment such as energy, agriculture, economy, mobility… efforts towards integration have been made, but the social aspect of sustainable development, and with the technology aspect, little has been done. Some things concerning sustainable development have been realised in certain policy domains, but they remain very isolated and dependent on the intentions of the minister in charge of the issue. There is a strong need for a common strategy and this not only to comply with the international agreement but also to improve the performance of the government.
- both have a strong tradition with actor-participation, public enquiries, and advisory councils.

THE LINKS BETWEEN SUSTAINABLE DEVELOPMENT AND INNOVATION POLICIES

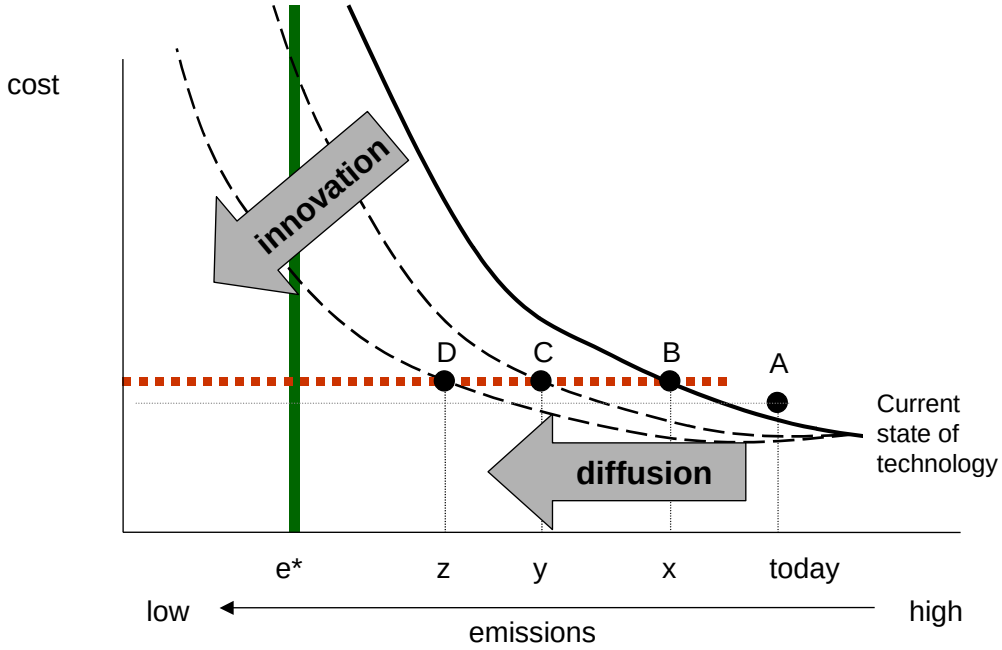
The case study for Finland concluded that today in Finland the links between the sustainable development or environmental policy on the one hand and the innovation policy on the other are weak. There is:

- No contact at the 'agenda setting' level
- No capability/capacity for recognizing potential for synergy
- No recognized conflict at the policy level

The present situation in Flanders is no different. To a large extent environmental policy and innovation policy are two separate worlds, with different frameworks, concepts, strategies and instruments. What are the underlying reasons for this separation of worlds?

Environmental policy

Let us first look at environmental policy. Today, environmental policy is mainly concerned with the formulation of environmental objectives and targets, and the selection of policy instruments to achieve those targets. The figure below illustrates how this works. Suppose that today, the existing package of measures puts us in point A, with a certain amount of emissions and costs. We are required by law to search for the best technologies that are available to reduce those emissions, and use these technologies. If we know these best available technologies and rank them in a way that we use the best technologies first, that is to say the technologies with the lowest emissions and lowest costs, we get the full curved line. This line gives us the present status of all best techniques. The concept of best available technologies or BAT also implies that these techniques have to be affordable. They should not entail excessive costs. This means that the use of BAT-techniques cannot exceed a certain level of costs (the horizontal dotted line). Our environmental policy arrives therefore at point B, and this is the reduction in emissions that has to be attained by tightening environmental standards and permits or other environmental policy instruments.



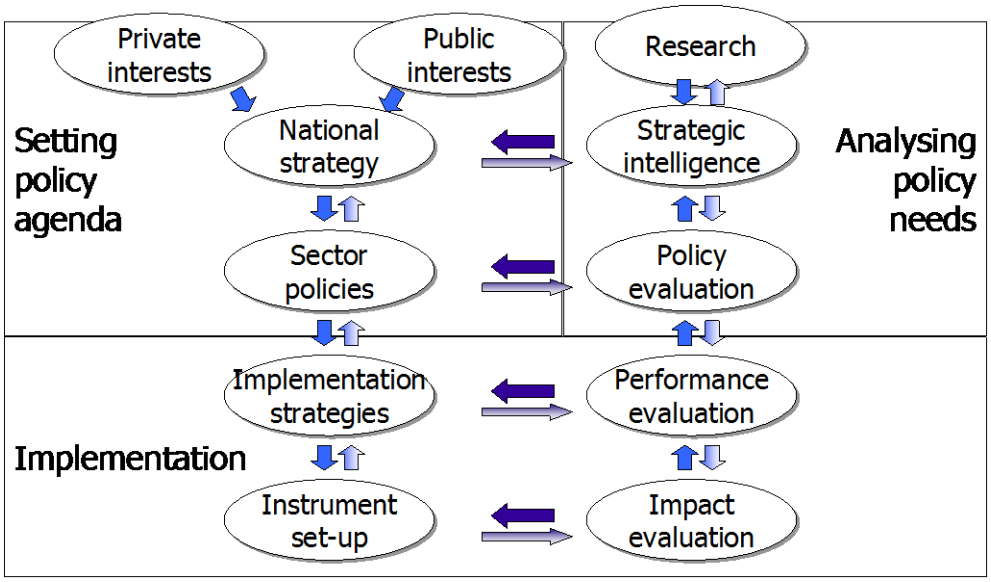
But the problem is that ecologists and biologists tell us that this is not enough. To protect our environment effectively, we should reduce a lot more (the vertical line at e*). When you look at the curve of available technologies, it is clear that this would be very expensive. Our society is not prepared to accept such large efforts. Thus we have a problem. Thus the environmental policy maker says: this is our longterm objective, our sustainable development goal; point B is our shortterm target. And we will increase this target regularly.

How do we do this? Our environmental policy maker re-examines periodically, for instance each five years, whether new techniques have become available, and he reconstructs the curve of best available techniques. And he tightens environmental standards and permits to make sure that the new techniques are indeed applied. So we end up in point C, and a few years later in point D and so forth.

We can learn two things from this mechanism:

1. Technologische innovation is crucial to attain ever rising environmental targets at affordable economic costs; (in other words, technological innovation is crucial to attain a sustainable development).
2. Environmental policy is occupied first and foremost with diffusion of already existing technologies, NOT with innovation or the development of new technologies. For environmental policy makers, technological innovation is exogeneous, it is something that happens (or does not happen) outside the environmental policy. From time to time they see if new techniques have become available, but the question if and how they come about is not something that keeps environmental policy makers busy.

This last conclusion is valid for each of the building blocks in the policy circle.



Let us give some anecdotical examples for Flanders, starting with the role of research and policy learning. The Flemish government has recently created research focal points in each policy domain to co-ordinate, strengthen and raise the relevance of applied policy research. In the five-year working programme of the environmental policy siences focal 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.

Also in the policy formulation part and the setting of the policy agenda, there is little consideration of the role of technological innovation in environmental policy. Usually, the importance of green technological innovation is mentioned somewhere, but in the policy strategy as well as in environmental policy plans it remains a subject in the margin. This can be illustrated by the recent environmental policy plan 2003-2007. In the chapter that deals with integration of environmental policy and co-operation with other policy domains, there are sections about co-operation 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 our environmental policy instruments and the way we use them, 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 response to 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 (see table).

Environmental technologies of Belgian companies 1997-1998 (Patris e.a., 2001)

	Advertising		Company reports	
	supply	investments	supply	investments
Preventive	9,6%	8,2%	2,0%	5,8%
End-of-pipe	49,3%	52,3%	49,0%	49,0%
Curative	5,3%	2,1%	1,3%	4,0%
Monitoring	19,6%	4,8%	0,0%	5,8%
Substitution	3,3%	6,6%	19,6%	9,2%
Resource use	12,9%	26,0%	28,1%	26,2%
	100%	100%	100%	100%

To conclude, we think it is fair to say that in the policy circle in environmental policy, the consideration that is given to the role of technological innovation is very limited. We think this due to the fact that technology is still seen by a large part of the environmental community in Flanders as a part of the problem is stead of a part of the solution 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, and about the dominance of technological diffusion and incrementalism in environmental policy, rather than radical innovation or systemic change.

Innovation Policy
The situation in our innovation policy is not much better. 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, still 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. So when supporting an innovation project, government mainly looks at technical and economic characterists. Environmental performance is at best a bonus in the final deliberation.

The dominant culture in research towards the environment that is also underlying most initiatives in innovation policy, is that 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. Today's focus 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.

Finally, in the implementation phase of innovation policy, the environmental performance of technology instruments and programmes has been very limited. The reasons are threefold:

- Firstly, environmental technologies in Flanders have been supported through several special innovation programmes in the '90, but they were poorly integrated in the mainstream of industrial innovation. As a result, effects have been moderate. Only 16% of the projects that were meant to promote innovative environmental technologies generated significant reductions in emissions, waste, energy consumption or the use or natural resources. Out of this 16%, only 11% can be labeled as systemic innovations. 89% had to do with optimalisation and innovation in products and processes.
- Secondly, the amount of public financial resources that are spent for environmental research and development is limited. The figure for Flanders is around the European average of 3.5% of the total public R&D budget. Moreover, the larger part of this budget is devoted to monitoring, data collection and policy oriented and ecological research. Relatively few resources are spent into genuine technological innovation. Our estimation is that in Flanders less that 25% of the total R&D budget of the public sector has to do with technological R&D.
- Thirdly, R&D subsidies, on the whole, do not seem to have stimulated firms to undertake research in environmental technology they would not have done otherwise. Except when there were high support levels, but then it turned out that many of these projects were second-rate projects that didn't pass the market test.

So the conclusion is that environmental policy as well as innovation policy routinely provides insufficient incentives for environmental technological innovation.

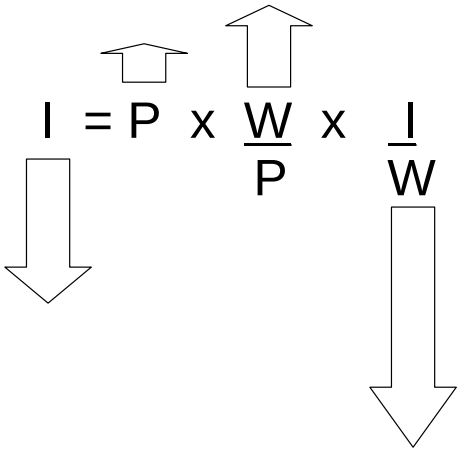
The role of the innovation policy in enhancing sustainable development and vice versa

A first step to bring the two worlds together is to convince both sides that the promotion of innovative environmental technological change is important and necessary. Among the various good reasons, we can mention, for environmental policy:

- environmental effectiveness: an innovation oriented environmental policy is necessary to promote the development and introduction of a new series techniques that make major improvements in environmental quality attainable;
- decoupling economic growth from environmental pressure: an innovation oriented environmental policy is necessary to realize 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 unused win-win opportunities 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.

The argument we usually stress in our discussions with policy makers, is based on the well known formula below, that presents the environmental impact of our society as the product of population size, the welfare per capita and the environmental impact per unit welfare (or technology). By lowering each of these three factors, one can reduce environmental impacts. But the first two (population and welfare per capita) have a tendency to rise at world level but also in rich countries. In order to reduce environmental impacts, it is therefore necessary to put more effort in the reduction of the last factor and increase environmental technological and social innovations.



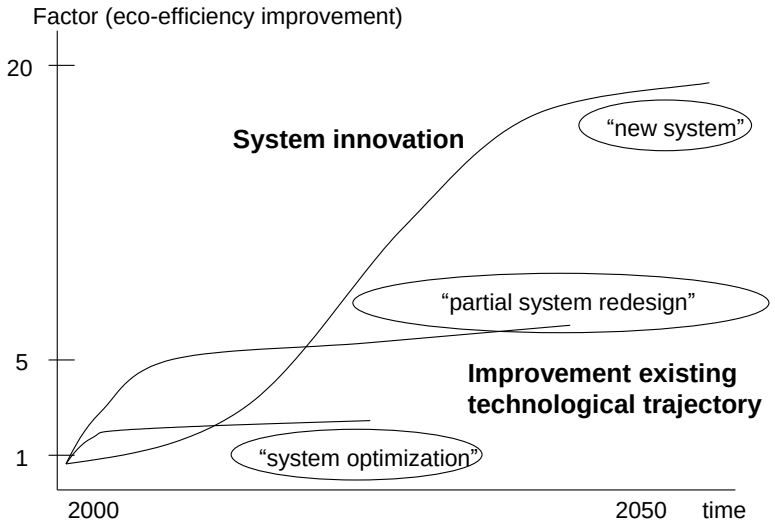
I = environmental Impact

P = population size

W/P = welfare per capita

I/W = impact per unit welfare (technology)

The rate at which these innovations are taking place in Flanders today is too low. It is clear that the necessary factor 10 (or higher) improvements in our eco-efficiency are not attainable by the current rate at which new technologies become available. We need 'system innovations' that may provide factor 10 improvements in environmental impact compared to the factor 2 improvements associated with incremental changes or factor 5 improvements connected with partial system design (figure below).



For innovation policy, we can mention two main reasons for a more explicit environmentally oriented innovation policy:

- We mentioned earlier that acoording to innovation policy, environmental policy has to make sure that market prices reflect environmental externalities properly and that, in that case, there is no need for innovation policy to stimulate green technology explicitly. But there are serious doubts whether it is possible and achievable to reach a full internalization of external environmental effects due to scientific 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 such situation, there is obviously an important role for innovation policy in solving this problem.
- Secondly environmental innovations have some particular properties compared to most other types of technologies that explain why there is relatively little environmental R&D. A first difference is the importance of government policy in creating demand on the market by regulatory and other environmental instruments. The problem is that these signals are often too weak and predictable, which explains why uncertainties are higher for environmental technologies than for other types of technologies. A second difference is that R&D in environmental innovations are often very complex because various scientific and technical disciplines are involved, and the necessary competence can be far away form the basic compentences that are available inside the company that is seaching 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 longer pay back periods for environmental innovations than for other investments.

We therefore need not only an environmental policy for industry but also an industrial policy for the environment.

WAYS TO IMPROVE THE SYNERGY BETWEEN INNOVATION POLICY AND SUSTAINABLE DEVELOPMENT POLICY

In order to improve the synergy between innovation policy and environmental (sustainable development) policy, we need actions on three levels:

1. We need to stimulate environmental technological innovation and diffusion, because this can create important win-win opportunities for economy and environment;
2. We need system innovations because ambitions environmental targets at the background of a growing economy and welfare are not attainable with incremental innovations;
3. We need an active government that co-operates with other partners, because at the one hand sufficient environmental technological innovations will not materialize at the desired rate without an active government policy, and, at the other hand, government alone will not succeed in creating the necessary technological and social innovations.

In more specific terms, this could mean the following:

Promotion of environmental technological innovation
Each of the two policy fields should promote explicitly rather than implicitly environmental technological innovations. Environmental policy must keep trying to get the prices right, create an more innovation friendly regulatory and policy framework, and extend its toolbox with new, promising environmental instruments such as innovation waivers and environmental technology verification programmes. It needs to do so with a clear view of new trajectories for technological change in industry, agriculture, and infrastructure that can move in the direction of sustainability.
Innovation policy, for its part, must continue with its traditional mechanisms – R&D funding, training, technology transfer – that increase flows through the innovation pipeline. But it should target a much greater proportion of these resources explicitly toward environmental sustainability, increase the use of environmental criteria in policies and programs that support technology development and make use of new instruments and measures such as demandside oriented research, technology forecasting and 'technology roadmaps'. In addition to this, the two policy fields could develop joint measures and projects that take advantage of the synergies between environmental and innovative strategies.

Transition management
The two policy fields should co-operate in implementing transition management for the long term. Fundamental environmental improvements at the background of a growing economy require major transitions in manufacturing practices and distribution and consumption of goods and services. But 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.

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 'departalism'.

Transition management implies a policy process that is different from existing policies in its extent, duration, and approach:
- It is build 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 fixed objectives on 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.

Transition management has furthermore 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 op options (wide playing field)

Transition management is also a normative framework for a participatory process of political coaching:
- The direction of transition must not be based on quantitative but qualitative and flexible goals setting. The objectives are determined in the process of co-development of policy with stakeholders, without government giving away to the prevalence of particular interests.
- The consultation of social actors should be reoriented in the advantage of forerunners 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 he process are the learning by experience and insight. They should be confronted with international benchmarking.

An active government that co-operates with other partners
The two policy fields should work together to create a network and develop an integrated horizontal strategy towards other policy fields such as energy, transport, housing, agriculture etc. To be able to do that, it seems necessary to reach a consensus that this policy should be organized as a learning process and in strong interaction with different actors and institutions.

Case study for Flanders: next steps
What we would like to do the following months in the context of MONIT, is to test and develop these ideas in a case study for energy and climate change.

In the meantime, it looks like we are succeeding in changing attitudes, little by little. Among the recent developments and initiatives in Flanders, we can mention:
- The formulation and formal appoval at the end of 2001, by the government, the social partners and the environmental movement of a contract titled "21 targets for the 21st century", with as one of the 21 targets the objective to belong to topregions in the world when it comes to eco-efficiency, and thus realize a decoupling of economic growth from pollution and the increased usage of materials and energy;
- The colloquium organized by IWT, the Flemish technological institute, about innovation policy and sustainable development in february-march 2002;
- The discussion paper of the Social and Economic Council of Flanders (SERV) of October 2002, later published as a report in the Socio-Economic Report Flanders 2003, 'towards

an industrial policy for the environment; Technology and innovation as keys for a sustainable welfare'.
- The study financed by the environment ministry (AMINAL), on resource stock management that was finalized july 2003, with a important part dedicated to the factor four idea and the concept of transition management;
- The decision of the Flemish government in September 2003 to devote more financial resources to environmental technology in the context of research and innovation;
- The symposium that the largest organization of engineers in Flanders will organize in November this year for its 50-year anniversary, and that will handle the subject of innovation policy and transition management for energy policy.
- The draft environmental program 2004, which plans several initiatives to promote the idea of system innovations (forecasting studies, development of a knowledge infrastructure in co-operation with the innovation and technology policy field, creating of a multi-actor network).

These encouraging results show that we are making progress in bringing innovation policy and sustainable development policy together.

REFERENCES

Dries, Ilse(mimeo). Duurzame ontwikkeling in Vlaanderen en België.

Jansen, J.L.A. (1994). The environment: towards a sustainable future. Kluwer academic publishers, Dordrecht.

Kemp, René (2002). An integrated policy for innovation for the environment. In Patries Boekholt (Ed.) Innovation policy and sustainable development: can public innovation incentives make a difference? Contributions to a Six Countries Programme, IWT, Brussel.

Larosse, Jan (mimeo). Transition management as an instrument for leadership and coaching in systemic transformations.

Patris, Céclie, Gérard Valenduc, Françoise Warrant (2001). L'innovation technologique au service du developpement durable. Fondation travail-université, Namur.

Rotmans, J., R. Kemp and M.B,A, van Asselt (2001), 'Transition Management: a Promising Perspective', Chapter in Decker, M. (Ed.), Interdisciplinarity in Technology Assessment: Implementation and its Chances and Limits, 165-197, Springer-Verlag, Berlin.

Van Humbeeck, Peter (2002). Naar een industrieel beleid voor het milieu. Technologie en innovatie al sleutels voor een duurzame welvaart. Discussienota. Brussel, sociaal-economische raad van Vlaanderen / Academia Press, Gent.