STIMULATING INDUSTRIAL INNOVATION FOR SUSTAINABILITY:
AN INTERNATIONAL SURVEY FOCUSED ON TECHNOLOGY

AUSTRIA

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1. INSTITUTIONAL CONTEXT/BACKGROUND

1.1. AUSTRIA’S INDUSTRIAL PROFILE

Austria’s economy is dominated by the industrial sectors Basic Metals and Metal Products, Food, Beverages, Tobacco and Chemicals and Pharmaceuticals, as well as by the services Transport/Communications; Banking and Insurance and Wholesale, Retail Trade. Public Authorities and Personal and Social Services are quite important too. The Austrian unemployment rate has persisted at a level of around 6% over the last years. Table 1 shows Austria’s industrial profile and its changes through the last years.

Table 1-1: Percentage Shares GDP by Industry of Origin (at 1990 Prices)

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</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>3.3</td>
<td>3.1</td>
<td>2.6</td>
<td>2.7</td>
<td>2.7</td>
<td>2.6</td>
<td>2.5</td>
<td>2.2</td>
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<tr>
<td>Manufacturing</td>
<td>22.6</td>
<td>22.7</td>
<td>21.7</td>
<td>21.7</td>
<td>22.0</td>
<td>23.2</td>
<td>23.2</td>
<td>23.0</td>
</tr>
<tr>
<td>Transport/Communications</td>
<td>6.2</td>
<td>6.4</td>
<td>7.3</td>
<td>7.5</td>
<td>7.7</td>
<td>7.8</td>
<td>8.7</td>
<td>9.6</td>
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<td>Services</td>
<td>27.4</td>
<td>27.9</td>
<td>28.0</td>
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<td>27.7</td>
<td>26.8</td>
<td>27.5</td>
<td>28.1</td>
</tr>
<tr>
<td>Public Authorities</td>
<td>13.5</td>
<td>12.7</td>
<td>12.7</td>
<td>12.7</td>
<td>12.5</td>
<td>12.1</td>
<td>11.5</td>
<td>10.8</td>
</tr>
<tr>
<td>Other</td>
<td>27.0</td>
<td>27.2</td>
<td>27.7</td>
<td>27.8</td>
<td>27.5</td>
<td>27.6</td>
<td>26.9</td>
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<tr>
<td>Total</td>
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<td>100</td>
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Source: Prognos.

Between the last 10 to 12 years only a relatively slight structural change is visible among the main sectors of the Austrian economy. Manufacturing’s share tends to be almost stable through the years. Similar to Germany, the Transport and Communications as well as Services sectors have gained importance in the last years. The share of “other” sectors is relatively large in Austria. This is a result of the important economic role of the sectors “Restaurants and Hotels” and “Wholesale and Retail Sale” in Austria.

In the future, Prognos expects this slight structural change to become more evident albeit less obvious than it will occur in Germany. In 2010, Services plus Communications will produce almost 40 per cent of the Austrian GDP. Manufacturing then will create 23 per cent of the Austrian GDP. The public sector will also loose its importance, but still remain on a relatively high level.

Austria’s economy mainly consists of small and medium-sized enterprises. In 1997 188.735 companies employed 499 or less workers. Especially very small enterprises with only up to 9 employees are dominating the economy (156.259 companies). Only 373 companies gave work to 500 and more employees.

1.2. AUSTRIA’S INNOVATION PROFILE IN INTERNATIONAL PERSPECTIVE

Compared to other OECD-Countries, Austria’s total R&D investment can be characterized as slightly beneath EU-average.\(^1\) In 1998, Austria spent 1.63% of its GDP on R&D. But the Austrian R&D investment increased within the last 10 to 11 years. This development is expected to remain fairly stable.

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\(^1\) For an OECD comparison see the German country report.

AUSTRIA-1
In total Eur 3 Billion was spent for R&D in 1998. The companies invested a slight majority of the money, namely 51 per cent. Compared to Germany and many other OECD countries, Austria’s private R&D investment is relatively low. This is due to the Austrian industrial structure: traditionally R&D-intensive sectors, for example Aircraft Construction or Computer Manufacturing, are almost non-existing. That is the main reason for the relatively low private R&D investments. Three Austrian industrial sectors can be characterized as R&D-intense: Chemical and Pharmaceuticals, Machinery Manufacturing and Electrotechnical Products and Communications dominate the industrial R&D activities.

These three sectors can be regarded as the “technology-giving” sectors within the Austrian economy: in these sectors technological advancements and solutions are developed, and transferred to and implemented by other industrial sectors. By far the most important R&D sector is Electrotechnical Products and Communications with a share of almost 38% of the total private R&D investment. In an isolated view this sector spends 26% of its value added on R&D. This is about 8% higher than the OECD-average. In contrast, the Austrian sectors Chemicals, Fine Mechanics and Optics spend less than the OECD-average on R&D.

Similar to Germany, the three R&D intensive Austrian industrial sectors mainly consist of big companies, most of which are global players. Small and medium-sized enterprises act as suppliers within this system.
1.3. THE STRUCTURE OF AUSTRIA’S R&D SYSTEM

The following picture illustrates the public R&D innovation system and its main players. The Austrian industry is also an important player in this field as mentioned before.

The public R&D system is dominated by the Ministry for Science and Transport. Due to recent political changes, this ministry will soon become the Ministry for Transport, Innovation and Technology (BMVIT). The science issues will become part of the Ministry for Science, Education and Culture (BMBWK).

At the moment, the Ministry for Science (and Transport) coordinates all federal R&D Expenditures, in future the Ministry for Transport, Innovation and Technology will do so. It issues about 70% of the total public R&D budget. Other important players on the public level are the Ministry for Economic Affairs and the Ministry for the Environment which in the near future will be brought together with the Ministry for Agriculture. The federal R&D expenditures doubled between the last 10 years (in real prices). In 1999, the public R&D expenditure increased about 0.3% in comparison to 1998.

In addition to the federal ministries there are nine states governments in Austria. These governments also financially support R&D activities, namely 6 per cent of Austria’s total R&D expenditure is issued by the states. Different to Germany these states governments only have executive duties (in contrast to legislative duties in Germany).

The public sector concentrates its R&D activities on fundamental research and on short- and long-term applied developments. Therefore universities, research institutes and engineering companies are sponsored financially. The private sector dominantly conducts applied research activities: technological development, pilot projects and implementation activities are taking place here. It is interesting to notice that about 33 per cent of the total public R&D expenditure is given to Austrian companies. By far the greatest share of this financial support is spent for the Austrian sector Electrotechnical Products and Communications.

It is noticeable that Austria’s public R&D policy has changed its emphasis from a rather strong distinction between the support of fundamental research on the one hand and the support for applied R&D on the other hand to a more general support of knowledge transfer and networks (between public and private institutions) and a quicker application. This has lead to the implementation of some new cooperation models to support the knowledge
transfer between the public and the private sector (see also part III), introduced by the Austrian Ministry for Science and Transport. One important element is the foundation of special research centers for applied R&D activities that cooperate closely with private enterprises. Also universities for applied science have received additional financial support.

1.4. AUSTRIA’S POLICY FRAMEWORK

In the sixties and early seventies public R&D policy in the field of developing and supporting technologies that reduce the environmental burden concentrated on technologies for water and waste water treatment. In the mid seventies air pollution issues became the center of interest. The main reason for this development was the relatively high emissions in many industrialized Austrian regions. Environmental policy set the standards and public R&D policy supported the development of end-of-pipe-technologies, which were able to reduce these emissions. As a consequence quite some Austrian companies decided to profit from these developments and started to invent and to produce end-of-pipe technologies. (Even now this sector is quite competitive on a national as well as on an international level).

From 1981 to 1985 the focus switched to waste management. Until this time the impact (and sometimes the danger) of certain waste treatment methods was not recognized. This changed in the beginning of the 80ies. Environmental policy then demanded for a new waste treatment. Because of these developments public R&D policy as well as the producers of environmental protective technologies concentrated their efforts on this new media.

In the mid 80ies up to the early 90ies politicians and the broader public became aware that a specific emission does not only effect one environmental media (e. g. air) but the entire environmental system. Therefore regional as well as international cooperation on environmental issues were intensified. Also the focus of environmental policy and public R&D policy gradually changed to a greater use of integrated cleaner technologies. In the early 90ies the Austrian government committed itself to a sustainable development. Within this context the so-called National Environmental Plan (known by the Austrian acronym NUP) was designed. Within NUP about 300 measures on a relatively broad basis were proposed for a more sustainable Austrian development. But it has to be stated that NUP – at least until now – is a rather weak instrument since most of the proposals stayed on the proposal level.

Right now the development of and a greater use of cleaner (integrated) products and technologies is in the center of Austrian interests. Maybe Austria is just a bit ahead of Germany within this context. While German public R&D programs for a greater use of sustainable technologies are still on a more theoretical level, the Austrians already started some pilot projects.

The Austrian definition of a sustainable development is based on the definition given by the Brundtland-Report (“development that meets the needs of the present without compromising the ability of future generations to meet their own needs”). The necessity for an ecological, economical and social sustainable development was recognized on the governmental level relatively early (1996).

Some important innovation policy programs in the field of sustainable development are (apart from the programs analyzed later on):

- Innovation and Technology Funds (ITF),
- European Recovery Program (ERP),
- R&D support Funds for Private Enterprises (FFF).

ITF is conducted by the Ministry for Science and Transport. The general goal of the fund is to support R&D projects within strategic priority programs on a national as well as on an
international level. These strategic priority programs only last a limited time, within these programs cooperation between universities, research centers and companies are initiated. At the moment 5 strategic priority programs are in progress: IT-technologies, technology transfer, energy technologies and transport technologies. (See also part III for ITF program on energy technologies.) ITF offers direct financial support to universities, research centers and private enterprises.

**ERP** is a fund which offers cheap loans to companies. The ERP capital of about 2.2 billion EURO comes from the former Marshall-plan. About 0.4 billion EURO are issued per year. The general goal is to support growth, international activities, regional development and the implementation of innovative technologies. ERP dominantly sponsors the Austrian industry, almost 90% of the ERP means are donated to this sector. ERP is managed by the Ministry for Science and Transport.

The **third program** basically supports applied R&D activities on innovative projects conducted by companies. Also cooperation between research institutes and private enterprises with the explicit goal to design new products/technologies are sponsored. Within FFF special sub-programs were implemented to support **small and medium-sized enterprises**. A special emphasis is also laid on the support of international research cooperation. Per year about 95 million EURO are issued. The Ministry for Science and Transport also manages this program. Another important Austrian program is called **PREPARE** (Preventive Environmental Protection Approach in Europe). Since ECOPROFIT is a special version of PREPARE and will be thoroughly analyzed in part III, no further interest is taken to deeply explain PREPARE at this point.

**1.5. INTERACTION OF GOVERNMENT WITH INDUSTRY**

The **industrial perspective** is quite **important** in Austria. The local/regional or federal **employees associations** as well as the local/regional or federal **industry associations** are asked and heard before any important law in the fields related is designed. This procedure can be interpreted as an **institutionalized discussion platform** initiated by the ministries involved. Consensus is sought within these processes, therefore discussions take quite a long time. But at the end most of the times a practicable compromise is found. Laws or measures which basically run counter to the interests of industry won’t be implemented in Austria.
2. CLASSIFICATION OF POLICY INSTRUMENTS

2.1. ROLE OF GOVERNMENT

On the one hand side the Austrian government dominantly acts as a financier subsidizing fully or partly R&D in universities, research institutes as well as in the private sector. On the other hand side the government acts as an initiator, creating and supporting co-operations between public institutions and private enterprises as well as networks between researchers, politicians and people from ministries and companies. The Austrian government also acts as an initiator of R&D on and the implementation of sustainable technologies, for instance within ATSD (see part III).

2.2. TYPE OF SUPPORT/INSTRUMENTS

There is a big variety in instruments in general. In the following the distinction is made between instruments directly supporting sustainable innovation on the one hand side and instruments not specifically aiming at sustainable innovation but indirectly being able to support such innovation. In Austria innovation is no longer defined as only technology oriented but also as services related or behavior oriented. The innovation process itself is understood as a dynamic development which can only be supported, rather than directly determined.

The general furtherance idea can be characterized as
- improving the strengths, namely in the Electronics and Communications sector.
- maintaining the status quo for the sectors Machinery Manufacturing and Metal Products
- catching up for the sectors which are not innovative enough at the moment, namely Fine Mechanics and Optics.

Taking a look at instruments directly supporting sustainable innovation, first of all technology oriented measures which give a certain financial support have to be mentioned. In 1998 about 38 per cent of the total Ministry for Science and Transport R&D subsidies were spent for these measures. Second regional subsidies are issued, which are not technology specific and have a share of almost 36 per cent. Environmental research support is not that important financially speaking, it only got 7.2 per cent of the total Ministry for Science and Transport R&D subsidies. Institutional support for universities and research centers has to be added.

Same as in Germany, a lot of instruments not directly supporting sustainable innovation but indirectly being able to support such innovation exist in Austria. There is a very thorough command-and-control system setting environmental standards for almost every environmental field. Also “soft” instruments such as information and motivation, labeling as well as subsidies for the use of specific products and technologies are implemented. In contrast to Germany there is no ecological tax reform in Austria.

2.3. MODALITIES OF CONTRACTING IN CASE OF FINANCIAL SUPPORT

Control over outcome differs between the programs/projects. While the rather traditional programs only required (and still require) for very limited reports, within the new programs (aiming at co-operations and a quicker application) explicitly a number of reporting requirements has to be fulfilled. The basic idea here is that the people from the ministries involved want to be informed about the progress of the projects rather than the need for (just another) study or paper.
The same is true for the conditions to which performers of research have to adhere. While the traditional programs only set rather unspecified conditions, the conditions for the new programs set by the ministries involved are relatively precise. These conditions for example refer to the technology or project chosen for sponsoring, the idea that public-private-partnerships or co-operations rather than isolated approaches shall be supported as well as the idea that international co-operations are preferable too.

The allocation of financial support differs between programs/projects. Rather “old” respectively traditional programs such as FFF or ERP (see above) are giving financial support to every company/institution which meets certain criteria. It is noticeable that competitive bids are a quite new allocation method within public R&D policy. Only since a few years public support is partly selected by the criteria best idea/lowest price/most interesting project etc. Also co-operations between (public) research institutes and private enterprises jointly submitting a proposal are fairly new in Austria. Most of these co-operations only exist for a limited time. International and national experts are involved in the decision about who is getting the project.

2.4. INTERNAL ORGANIZATION, MANAGEMENT STRUCTURE OF THE PROGRAMS

As mentioned before the Ministry for Science and Transport is by far the most important player within the public R&D policy system. In future the Ministry for Transport, Innovation and Technology will have this function. It issues 70% of the total public R&D expenditure and co-ordinates all public R&D activities. Another – but much less – important player is the Ministry for Economic Affairs, but its R&D policy is basically heading for a general technological development rather than for a specific technological development related to environmental issues.

All of the programs/funds mentioned before are strategically managed by the Ministry for Science and Transport. The rather traditional programs (such as ERP or FFF, see above) are also operationally managed by the ministry itself. The new and innovative programs such as the ATSD impulse program (see part III) are operationally managed by a private institution. These institutions here act as project managing and implementation organizations. The new programs also have a steering group or a steering committee.

The Austrian Ministry for the Environment mainly deals with strategic and political issues while the Federal Environmental Agency has to fulfill environmental research management duties (on behalf of the Federal Ministry for the Environment).

Since the Austrian states mainly have executive duties, they basically prioritize federal activities on the state level and thereby execute the federal R&D policies. Project managing (private or public) institutions are sometimes involved. ECOPROFIT for instance (see section III) is jointly managed by Stenum ltd. and the Environmental Agency of Graz.

2.5. METHODS TO ASSES EFFECTIVENESS

Same as in Germany (and probably in most other industrialized countries) the definition of effectiveness or impact differs between the programs/projects in Austria. The rather traditional Austrian programs offering financial support to every company which meets certain conditions (for instance ERP, FFF, ITF, see above) define and measure effectiveness by the number of patents applied for/patent pending, the number of technological solutions/innovations found, the number of new systems implemented or products used, the knowledge gained (which is a rather “soft” criteria), the number of companies involved, the amount of money spent on R&D in the companies or the technological investment created by
the program etc. Not all the time all of these criteria are analyzed, but some of them are always taken into account.

The fairly new programs with a special emphasis on co-operations between public research institutes and private enterprises (selecting financial support by competitive bids) in addition to the criteria mentioned above define and measure effectiveness by the number of international and national co-operations initiated (public-private or private-private) as a follow-up on the sponsored program(s). Another rather new criteria is the question how strong the Austrian companies/public institutions are integrated in the European innovation system.

The Austrian Technology-Report also defines and measures the - national, not program specific - R&D intensity and its development within the last years by analyzing the diffusion and the use of new information and communication technologies, such as the Internet or innovative telecommunication services. (Of course also rather traditional criteria, such as the number of college graduates or papers published, are investigated).

Most of the government programs are being evaluated in order to look at their effectiveness. This is especially true for the rather new co-operation programs between public research institutes and private enterprises. These programs are evaluated quite deeply. Evaluations in general are conducted by extern institutions. Same as in Germany in general there are two approaches: an evaluation at the end of the program/initiative and an evaluation while the program is in progress. Evaluations are mainly conducted by Austrian research institutes. The general experience is that evaluations while the programs are in progress are more useful but mean a greater effort. Also there are model-based, more theoretical investigations for specific issues which depend a lot on the assumptions set and the models chosen.
3. SPECIFIC EXAMPLE PROGRAM DESIGN CHARACTERISTICS

3.1. PROGRAMS/INITIATIVES SELECTED

The basic idea was to choose programs that are fairly innovative for Austria. Therefore we looked for programs not just offering a specific amount of money for a greater use of an innovative technology but being rather non-traditional. Also different instrumental approaches as well as programs on different levels (national, State, communal) were in the center of interest.

For these reasons, the Austrian initiative ATSD was selected. ATSD has a much more holistic approach than traditional R&D programs. ATSD heads for a number of stages of the innovation process at the same time, more traditional programs don’t. The Austrian initiative ECOPROFIT-Graz was chosen because of its – fairly new - network-building capacity and because it is a good example for a well functioning regional public-private partnership.

A) Austrian Program on Technologies for Sustainable Development (ATSD), which is a so-called impulse program initiated and sponsored by the Austrian Ministry for Science and Transport (BMVV), Vienna. Some relevant areas are efficient energy use and renewables, cleaner production and products (ECODESIGN) and sustainable regional development. The program started in 1999 and will last until 2003. Per year about 3.6 million EURO shall be issued. ATSD focuses the target areas improvement of existing product and processes, redesign of products and system innovation as well as market introduction.

B) ECOPROFIT-Graz (German abbreviation for Ecological Project for Integrated Environmental Technology). This project is a good example for a functioning regional public-private-partnership. Within this project the (public) Environmental Agency of Graz, the (public) office for commercial development Graz and Stenum ltd. (private engineering consultancy) co-operate closely. The goal is to give financial and organizational support for R&D on and especially the implementation of integrated environmental protective technologies. In detail a number of knowledge transfer activities are supported. More than 150 companies in 11 cities and regions have participated in ECOPROFIT Projects (which were copied from the Graz project) in the last few years. ECOPROFIT basically focuses on the target area market introduction.

3.2. AUSTRIAN PROGRAM ON TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT (ATSD)

3.2.1. Background

Within the 90ies a lot of different programs punctually supporting R&D on specific technologies for a more sustainable development were implemented in Austria. Therefore the need for a holistic approach supporting sustainable development as a process arose in 1997. In addition some extra budget was available for selected ministries, one of them was the Ministry for Science and Transport (then the so-called “Technology-Billion” was available). Both developments were responsible for the invention of ATSD. ATSD was designed to focus governmental activities on measures to support a general sustainable technological development. Because of the rather small budget which could be issued per year (3.6 million EURO), the Ministry for Science and Transport chose to sponsor only selected projects.

In order to get ideas for the design of ATSD, the ITF program for the support of innovative energy technologies mentioned above was evaluated thoroughly. The main findings relevant for the design of ATSD were:
• The target area should be defined in a specific but not too narrow manner, in other words not concentrate on a certain technology but on any technical or non-technical solution which is able to fulfill a certain goal. If the target area is defined that way, incentives for co-operations (between companies or between research institutes and private enterprises or even interdisciplinary co-operations) are given. Also this method to design the target area fits much more to the needs of the companies. Therefore the ATSD target areas were defined specific but not too narrow (see below).

• The greatest impulse effects (for applied research, pilot projects, implementation of innovative technologies) were observed for small enterprises. On the contrary the biggest wind-fall profits were realized by rather big companies. In order to reduce wind-fall profits ATSD was designed to sponsor only selected projects.

• Sustainable innovation needs complex innovation strategies. But experience showed that most of the companies are not able to design such strategies (not even for certain isolated issues) themselves. To help private enterprises on this issue it is necessary to provide information in order to support a gradual change in awareness and to give assistance for the design of the companies’ strategies towards sustainable innovation. Therefore so-called “active guidance” and “active strategy development” instruments, such as round-tables shall be implemented within ATSD.

• Successful implementation and diffusion of R&D results on a broad level is only possible if a great number of actors and institutions is involved. To fulfill these goals all main actors involved (Ministry for Science and Transport, project managing company Technology Impulse ltd. and EVA (Austrian Energy Agency; see below) systematically inform the broader public about ATSD.

It took 2 years to design ATSD. In general ATSD is not a “classic” R&D program but a rather holistic concept consisting of R&D projects and supporting as well as communication activities. A special emphasis is laid on the last element mentioned.

As just mentioned, ATSD is managed by the private enterprise Technology Impulse ltd. The main reason for the decision to involve a project managing and implementing organization is that the people form the Ministry for Science and Transport were not capable to manage ATSD themselves due to a lack of time and man-power.

So far it’s much too early to estimate the success of ATSD. But ATSD seems to be accepted on a relatively broad level.

3.2.2. Objectives
Immediate objective of the program is to support a structural change towards an environmental friendly development. The explicit goal of ATSD is to practically demonstrate that a much higher energy and material efficiency (reduction factor 10 is mentioned) is possible without losses of welfare or life quality. Priority areas are:

• Solar energy,
• Energy from biomass,
• Sustainable construction and living,
• re-growing raw materials,
• Cleaner products, technologies and services,
• Sustainable regional development and implementation strategies.

A wider objective of ATSD is to support the competitiveness of Austria’s environmental technology (manufacturing) industry and the Austrian industry in general. By this additional employment shall be created and economic growth be positively supported.
3.2.3. Elaboration of the types of policy instruments

On the one hand side ATSD offers **financial support** for selected programs related to the target area chosen. On the other hand side within ATSD **systematic information activities** are conducted.

**Financial support:** in summer 1999 the first ATSD call for tenders started. Therefore the priority area “Sustainable construction and living” was chosen. Other areas mentioned above are to follow. The Ministry for Science and Transport asked for proposals offering:

- **fundamental studies** on the socio-economic issues related to sustainable construction and living,
- **R&D projects** on innovative technological construction elements (such as very efficient and innovative heating systems or innovative construction elements) and
- **innovative pilot construction concepts** (heading for innovative holistic construction concepts on a communal or regional level).

Also **already realized innovative construction projects** were searched for in order to donate awards. The projects awarded get about 700 – 3’600 EURO as a price.

This first call for tenders **addressed** to research institutes and universities, engineering companies and consultants, architects, construction and other companies and private households (planning to build a house). A special emphasis was laid on co-operative and/or interdisciplinary projects applied for.

About 240 proposals were written, an international committee chose 40 projects for sponsoring. Some of these projects started in January 2000. The next call for tenders heads for the target area Cleaner Production and Technologies.

**Systematic information:** in addition systematic information activities started. The Ministry for Science and Transport and the so-called “umbrella-management” (see below) are responsible for these activities. The idea is to initiate a close co-operation between all ATSD actors involved and at the same time to inform the broader public about the program itself and the solutions found. Thereby the diffusion and implementation of the innovations found shall be supported.

It is remarkable that ATSD heads for a **number of stages of the innovation process at the same time**. The reason for this “innovative” approach was the knowledge that a number of questions/issues were missing within traditional R&D programs. ATSD was designed to address these issues and thereby to fill the gaps recognized. ATSD shall therefore support all necessary stages within innovation processes. It is interesting to notice that this specific design element **did not find acceptance** by the management experts of the Ministry for Science and Transport first. They argued such a design would not work. But at last the decision was made to give this new approach a try.

3.2.4. Role of government in the program/project

The Ministry for Science and Transport on the one hand side acts as a **stimulator** of sustainable innovation by financial support. Here the government can be characterized as a co-investor of selected R&D activities. On the other hand side the Austrian government acts as an **initiator** of networks being able to support the diffusion and the implementation of the solutions found on a broader level. The idea is to create follow-up initiatives which are financed by the companies (or other non-governmental actors) themselves.
3.2.5. Internal organization and management structure

The Ministry for Science and Transport is responsible for the strategic design of ATSD and for its financial and organizational supervision. Apart from the ministry two other organizations are mainly involved: Technology Impulse Ltd. and EVA (Austrian Energy Agency). Both build the so-called “umbrella-management”. One important duty of the umbrella-management is to create a close co-operation between all institutions conducting the projects sponsored. In general Technology Impulse Ltd. acts as the project managing and implementation organization. It organizes the call for tenders and decides about the proposals in co-operation with the Ministry for Science and Transport and EVA. In addition Technology Impulse Ltd. and EVA provide consultancy services to the sponsored companies/institutes and manage all information and network-building activities. EVA works on behalf of Technology Impulse Ltd. and is responsible for specific technology oriented issues. All ATSD projects will be evaluated by external independent organizations. The first evaluation is planned to start in September 2000.

3.2.6. Stages of knowledge addresses

As mentioned before a number of knowledge stages within innovation processes are addressed by ATSD at the same time (see III.4). It is remarkable too, that only very selected projects related to the target area chosen are sponsored.

3.2.7. Modalities used

As explained above competitive bids are the modalities chosen. Only the proposal offering the most interesting project/lowest price/most interesting co-operation/project with the greatest expected demonstration effect etc. will be sponsored. The program is financed by the Ministry for Science and Transport, but the money is issued by Technology Impulse Ltd. At the moment about 3.6 million EURO are spent per year. This sum can increase if companies/other institutions are willing to donate additional money.

In addition ATSD awards are donated by the Ministry for Science and Transport. The ministry and the umbrella-management jointly decide who is getting the award.

3.2.8. Hurdles encountered

So far its too early to analyze possible hurdles.

3.2.9. Focus on specific industrial sector?

Referring to the target or priority area chosen, ATSD focuses on specific industrial sectors but in a relatively broad sense. The program just started focuses on the Construction sector and all related sectors, such as Services (architects, engineering companies), Machinery Manufacturing (as producer of heating equipment) and Non-Metallic Mineral products and Wood and Wood products (as producers of innovative construction material).

3.3. ECOPROFIT-GRAZ

3.3.1. Background

In 1991 the working group “STENUM” at the Graz University of Technology designed and conducted a Cleaner Production project for companies which was called ECOPROFIT. The project was commissioned by the Environmental Agency of Graz as one part of Austria’s PREPARE program (Preventive Environmental Protection Approach in Europe). Those days ECOPROFIT was just an innovative research oriented case-study involving 5 rather small Graz companies. The goal was to jointly figure out methods or measures which were able to introduce Cleaner Production to SMEs. Thereby not only environmental benefits but
also economic benefits for the companies involved and the City of Graz itself were to be realized.

It turned out that the case-study was so successful and impressive that on the one hand side STENUM ltd. (private engineering consultancy) was founded and on the other hand side ECOPROFIT became a long-term project on a much broader basis. Nowadays more than 60 small, medium and large Graz companies belonging to very different sectors have already participated in the ECOPROFIT beginners’ program. Meanwhile the concept of the program has been copied and transferred to a number of other cities and regions (including a Bavarian ECOPROFIT adaptation).

The first important design element of ECOPROFIT is the idea to include all major regional actors such as public authorities, research institutes and the University of Graz, consultants and companies. Thereby a local/regional network was initiated. The underlying idea was to generate synergy effects with benefits for all parties involved. The second important element was the invention of a special regional Cleaner Products Award in 1993, which is donated to quite a number of companies on a yearly basis. Both elements had and still have a strong influence on the development of Graz towards sustainability.

The idea behind the invention of a Cleaner Product Award was to create an instrument which gives a permanent incentive for innovation and implementation activities on the companies level. Not only companies just having participated the ECOPROFIT beginners program but any company which has participated since 1993 can get this award. Thereby an incentive is given for continuos Cleaner production activities. It is interesting to notice that the local major presents the award and that local media are invited to join (and to inform about) the ceremony.

The third and probably most important idea was to develop specific learning units with practical relevance (such as workshops, working visits and interactive learning), an emphasis on implementation by individual consulting and institutionalized platforms for the exchange of experience. This specific design element came out by a trail-and-error-process (“learning by doing”) which took 2-3 years. Experience showed that these learning units enable the education and training of the participants as well as the implementation of long-term Cleaner Product activities. Also it helped to reduce wastes and emissions significantly. It is remarkable that an engineering consultancy invented such rather sociological respectively behavior-oriented measures.

3.3.2. Objectives

Immediate objective of the program is to support the implementation of environmental friendly technologies and measures on a broad regional level. Thereby environmental management systems on a companies level shall also be initiated as a next step. ECOPROFIT should reduce the local and regional environmental burden and strengthen the regional economic competitiveness.

The wider objective of the program is the de-coupling of economic growth and environmental pollution in Graz. Until now ECOPROFIT supported significant waste and emission reductions as mentioned above and enabled a de-coupling of production and emissions within a number of participating companies. Other objectives are marketing advantages for the City of Graz itself. Because of ECOPROFIT Graz was awarded as the first European Sustainable City in 1996. Also Graz was invited to participate in EXPO 2000 in Hanover this year.
3.3.3. Elaboration of the types of policy instruments

ECOPROFIT combines different knowledge transfer instruments: training and education, creating awareness, individual consulting as well as network building. The close cooperation of companies, consultants and the communal public institutions is an important characteristic of ECOPROFIT. The City of Graz partly sponsors ECOPROFIT, the other part has to be spent by the participating companies. No specific criteria have to be fulfilled in order to be able to take part in an ECOPROFIT project.

The ECOPROFIT basic program (for beginners, takes about a year) consists of three elements:

- Common workshops,
- individual consulting and
- ECOPROFIT award.

In principle each element can be looked at separately. But only a parallel implementation of all elements makes up the key success factor of the program. In total about 10 workshops are conducted. Experience showed that the fact of different sizes and branches participating is not problematic at all. On the contrary, companies and local authorities even felt that it had a very positive influence on the project because the structural, organizational and also technological problems often are the same and the companies learn from each other and innovate each other. Individual consulting is given in the range of 4-7 consulting days per company.

Consulting includes companies’ visits, discussion of improvement areas, coaching/preparation for the award and environmental review (done by benchmarking).

The final element of each ECOPROFIT project is the award mentioned above which is donated to selected companies. The award is a strong sign of the company’s environmental friendly production. To achieve this award several ecological and organizational criteria have to be fulfilled. As the companies in general are quite eager to receive the award it is possible to influence them by “soft” pressure to implement further environmental friendly technologies or measures. The award also helps the companies’ project managers to get a better commitment from the top management and to get a higher acceptance among the employees. In many cases this award helped the companies to demonstrate to clients that they are working in the field of environmental improvement.

In addition the so-called ECOPROFIT Club Graz was invented and implemented. The idea was to create an institutionalized discussion and meeting platform. At the moment about 50 companies are participating in this regional network.

3.3.4. Role of government in the program/project

The City of Graz here acts as a stimulator of sustainable innovation and especially its implementation within regional companies. As the City of Graz only sponsors part of the program, the communal authorities can be characterized as co-financiers of measures supporting knowledge transfer. Since the co-operation of the three parties involved (companies, consultants and local authorities) is an important element of the project, the City of Graz also acts as a co-operator by providing (financial and organizational) assistance in the field of knowledge transfer.

3.3.5. Internal organization and management structure

Apart from the City of Graz the private consultancy Stenum Ltd. can be characterized as an important player within ECOPROFIT Graz. Stenum Ltd. and the Environmental Agency of Graz jointly act as the project managing organizations. As mentioned before Stenum was one of the key actors responsible for the specific design of ECOPROFIT. Stenum conducts the workshops and most of the individual consulting activities. Stenum Ltd. is directly sponsored for its ECOPROFIT-activities by the City of Graz and the private enterprises participating. It
turned out to be an important design characteristic that Stenum ltd. is a local consultant. This way the local informal networks/contacts could be used for a successful implementation of ECOPROFIT-Graz.

In the beginning the City of Graz and Stenum ltd. jointly decided about the ECOPROFIT award. Nowadays the award is donated by a committee in which all important local actors are taking part of (the University of Graz, local employees and industry associations, the state government, the City of Graz and Stenum ltd.). This specific design element helps to find a broader acceptance.

3.3.6. Stages of knowledge addresses
ECOPROFIT mainly addresses the knowledge stage “implementation” by supporting a knowledge transfer on various levels (training and education, creating awareness, network building). But also technological developments as well as organizational and service-related innovations can be supported. Therefore also technological development can be promoted by ECOPROFIT.

3.3.7. Modalities used
As mentioned before the City of Graz only sponsors part of ECOPROFIT, the other part is given by the participating companies. On average the City of Graz sponsors about 60-65% of the total cost of the ECOPROFIT beginners programs. Consequently the companies pay 35-40% of the total cost. In absolute values smaller companies pay less, e.g. enterprises with up to 20 employees pay about 1'090 EURO, companies employing up to 100 workers pay about 2'030 EURO and companies with up to 500 workers have to pay 3'050 EURO for participating in an ECOPROFIT beginners program.
The public money is directly issued to Stenum ltd. As mentioned earlier companies do not have to meet specific criteria in order to be able to take part in an ECOPROFIT project. Apart from the direct financial support ECOPROFIT awards are granted for selected companies on a yearly basis. Financial means are not related to this award.

3.3.8. Hurdles encountered
Three main hurdles were encountered over the last years:
- The acquisition of new companies willing to participate in an ECOPROFIT beginners program turned out to stay difficult even after quite a number of companies had already successfully taken part. Once the companies agreed to participate they were quite happy with the project, therefore the main barrier was to convince the companies to take part. The solution found was to ask companies which already participated (and were happy with the project) for recommendations which they addressed to potential newcomers.
- In the beginning the companies participating felt a little bit uneasy about sharing information with people from the City of Graz. They were afraid that confidential information/data could be used by third parties. This problem disappeared after a few workshops because the participants got to know each other better.
- The third hurdle encountered is not solved yet since it came up just a few weeks ago. It seems to be unclear which of the main actors involved (Stenum ltd. and the City of Graz) has the right to claim the specific ECOPROFIT design as its own idea. At the moment both actors use it as a marketing argument.

3.3.9. Focus on specific industrial sector?
ECOPROFIT does not focus on a specific industrial sector but has a strong regional orientation. ECOPROFIT-Graz focuses in fact on SMEs, but this is due to the fact that only 3 big companies exist in Graz. In principle ECOPROFIT is also functioning for big companies as experience from other regions shows.
4. LIST OF INTERVIEWEES AND POINTS OF CONTACT

The following is a list of interviewees and contact people which are interested to join a European Network on Sustainable Innovation in Industry

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