



SWOT-analyses for the Environmental-Industry in Austria



The results of the SWOT analyses are provided within the INTERREG III B project ASPECT by the following project partners:

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SWOT-analysis for the Environmental-Industry in Austria

The following SWOT-analysis describes the Strengths, Weaknesses, Opportunities and Threats for the Environmental Industry (EI) in Austria and has been carried out within the project ASPECT - Alpine Space Promotion of Eco Companies Transboundery. The sources of information for this SWOT are:

- the questioning of 72 persons in the Austrian EI-branch, four workshops with companies, lobbying organisation and administration entities operating in the EI,
- five studies about environmental technology markets in several regions of Europe.
- the study "Austrian Environmental Technology, Branch Study" by the Austrian Institute of Economic Research.
- the pre-study „Network Environmental Technology“, Oberösterreichische Technologie- und Marketinggesellschaft mbH
- The catalogue „Erfolgsgeschichte Umwelttechnik“ ("Success Story Environmental Technology")
- the study "Eco-industry, its size, employment perspectives and barriers to growth in an enlarged EU" by the European Commission – DG ENV
- the internet website www.umwelttechnik.at presenting Austrian EI-companies

To facilitate the over viewing of this detailed SWOT-analyses, the results are structured in 8 thematic fields (chapters):

- a) Structure of the Austrian EI
- b) Domestic market for EI companies
- c) Export market for EI in generally
- d) Export market for EI by export regions
- e) Structure of the EI - branch concerning "end of pipe-technologies" versus "cleaner production technologies"
- f) Investments of EI companies in R&D
- g) Future market climate protection
- h) Innovative financing and business models

Each chapter starts with the description of the relevant questions discussed in this field and basic information about the EI branch.

a) Structure of the Austrian EI

What is the structure of the Austrian EI-branch in the region compared to the EI in Europe or worldwide. E. g.:

...."EI is dominated by few multi national companies, who dominate the market".

...."EI mainly consist of SME, and smaller companies up to 200 employees are most represented"

and how does the EI asses this attitude by themselves. As an S, W, O, T ? It is also possible, that an attitude is both strength and weakness

This topic is important to be able to decide, if the EI companies are restrained by there small size or not.

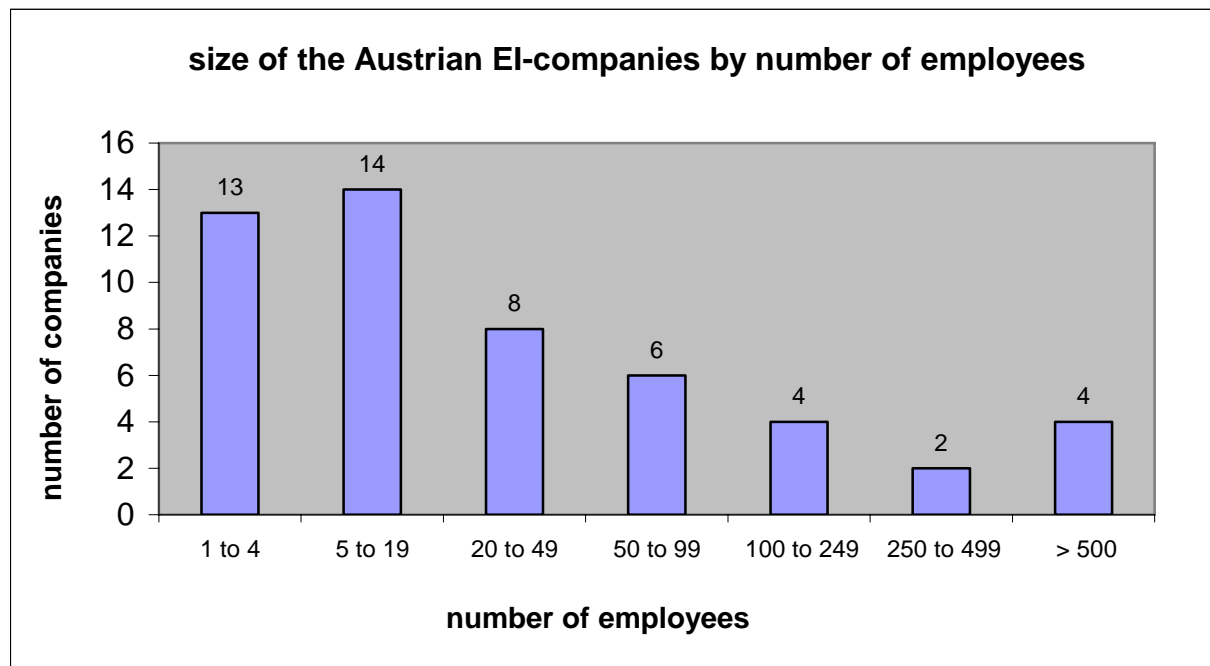
E.g.: they are too small to carry out large infrastructure projects of World Bank, EIB, EU.

E.g.: Or if they feel, that they main actors are too large (multinational companies) and the decision process within the company is too slow to react for smaller projects or the large companies are not flexible enough for special needs of the clients (financing schemes like energy performance contracting, ...)

Structure of size: Comparison Environmental Industry and real asset production in general (2003)

employees	companies		turn over total		employees total	
	Environmental Industry	real asset production in general	Environmental Industry	real asset production in general	Environmental Industry	real asset production in general
	quota in %		quota in %		quota in %	
Up to 9	31,9	72,5	0,9	4,6	0,9	10,7
10 – 19	16,0	12,7	1,4	4,1	1,5	7,8
20 – 49	21,1	8,0	4,3	7,3	4,3	11,1
50 - 249	17,4	5,3	11,8	27,4	12,9	26,9
>250	13,6	1,5	81,7	56,6	80,4	43,6
total	100,0	100,0	100,0	100,0	100,0	100,0

Source: "Austrian Environmental Technology, branch study", 2005, WIFO,



Source: Aspect questionnaire Austria

- a) **STRENGTHS:** About 2/3 of the employees in the Austrian EI work in companies smaller than 50 employees. The results of the ASPECT-questioning correspond very close to those of the Branch Study Austrian Environmental Technology in the year 2005. This facilitates flexible project work and individual services and concepts for the clients. The strength is limited on the regional and national area.
- a) **WEAKNESSES:** As many Austrian EI-companies are small sized, long term acquisition, pre financing and innovative financing and operation models are not often established. Smaller companies have only a small budget for market survey (export) and for R&D. There are structural difficulties with large size projects (EIB, World Bank, ..) due risk management and minimum size for the companies as a precondition to take part at the procurement.
- a) **OPPORTUNITIES:** The internationalization can be enforced by finding international sales partner. Strategies for the entrance into new international markets can be joint ventures, daughter companies in the export countries, increased partnership with international companies – Austrian EI companies as sub-contractors to deliver high specialised EI-products and services)
To establish specific (regional) networks within the EI can facilitate to tender as a consortia for large and complex projects.
- a) **THREATS:** For Austrian EI-SMEs there is the pressure of prices due “economy of scale”. Here large international companies can produce and sell a higher number of units.

Smaller companies might have disadvantages at the export market, as they have a lack

of legal experience at procurement procedures and contract design. Also they have limited competences in language skills (negotiations, legal texts).

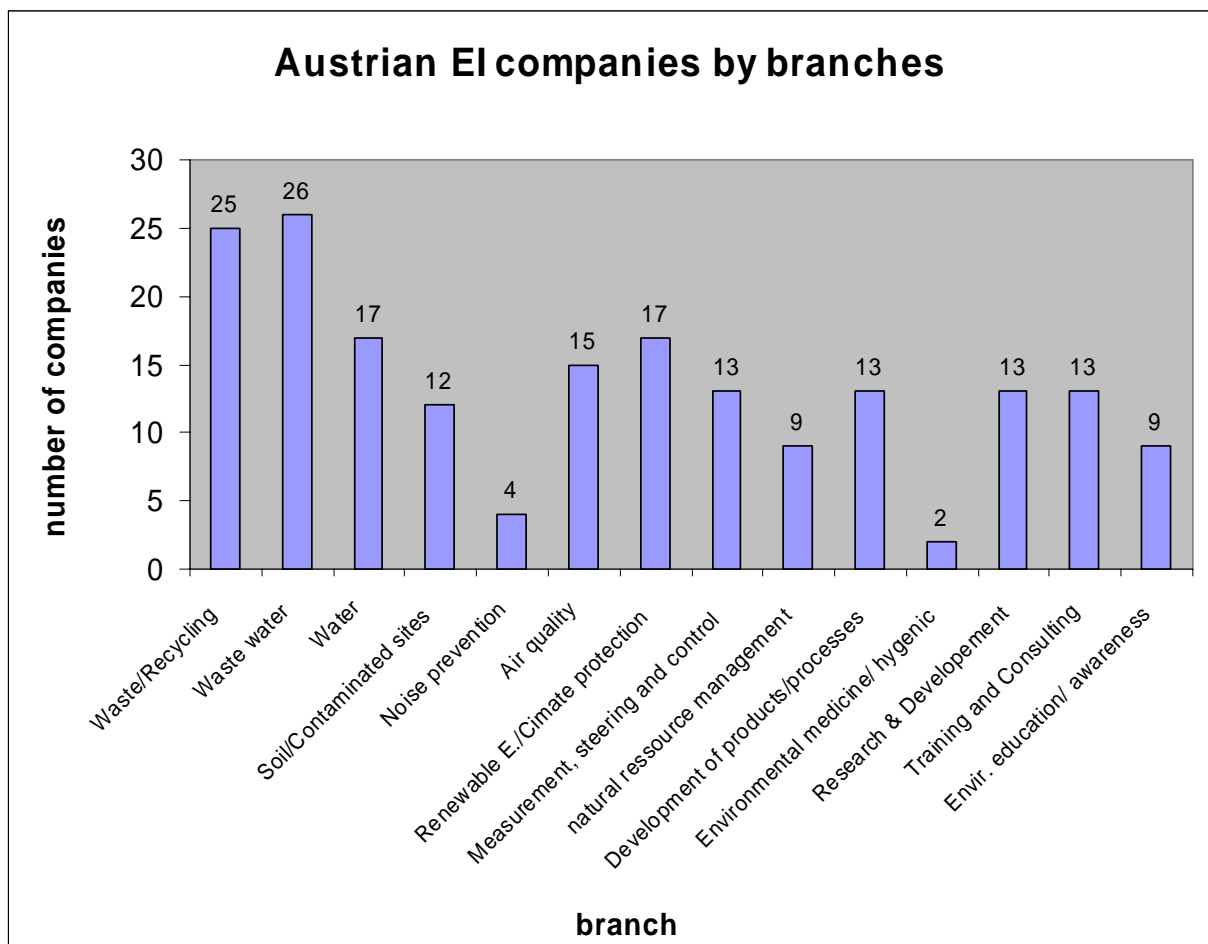
In some sectors the strategy to prepare the market is to invest in a demonstration project in the region. The profit will be earned later by the following projects. This long term strategy is risky and needs financial background.

b) Domestic market for EI companies:

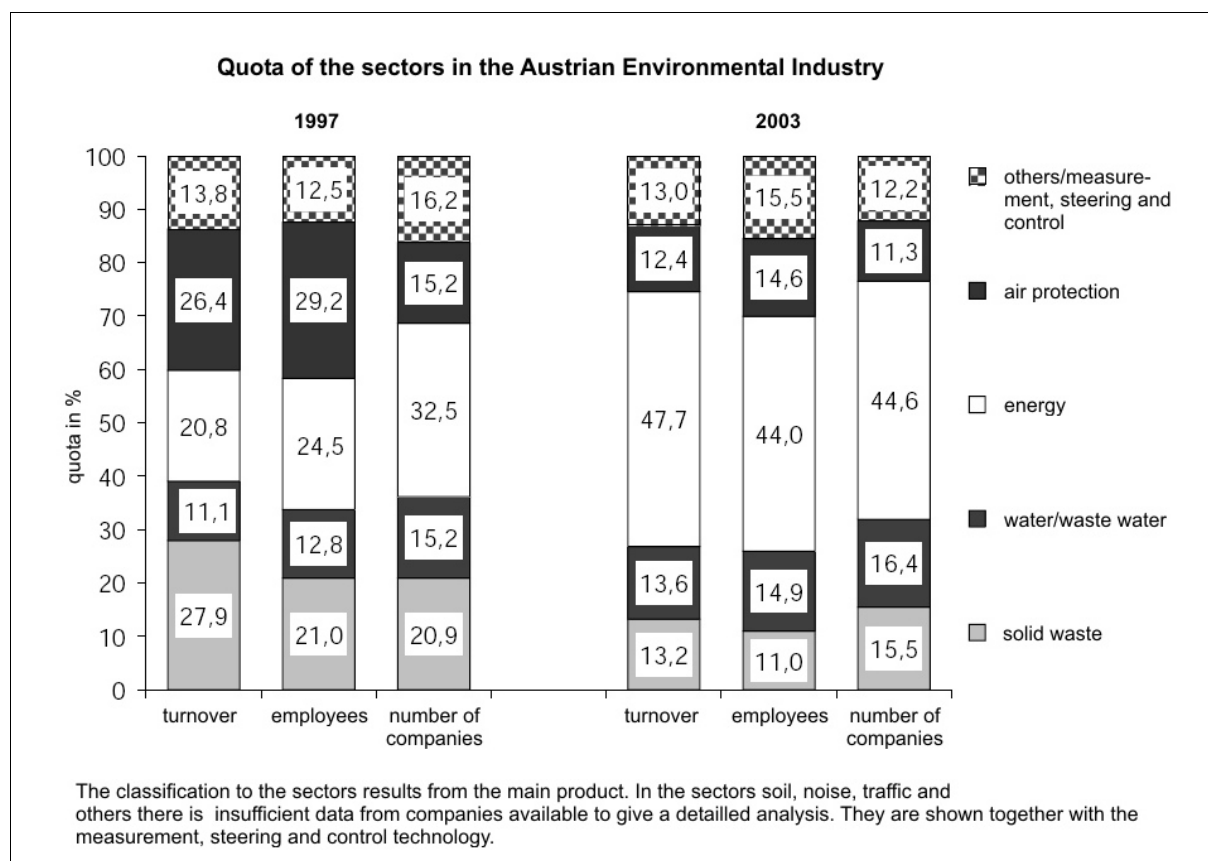
Which branches (solid waste, waste water, renewable energies,) have a strong domestic market – many projects are committed – and does the regional EI profit by this?
– Or do mainly companies from other region/countries profit from the strong market

Do the EI-companies in the region match the demand of the region? How do the companies assess their position in the domestic market?

How will the domestic market develop in the future? (e. g. market saturation, technological leaps, upgrading of environmental standards, new emission limit values) which fields will decline, which will increase and can this be a W. or a T.?



Source: Aspect questionnaire Austria



Source: "Austrian Environmental Technology, Branch Study", 2005, WIFO, Köppl

Market structure of Austrian EI by sectors (main sector of the company)

How many provider are active on the market?

	solid waste			water/waste water			energy			air protection		
	Dom-estic	EU15	rest of Europe	Dom-estic	EU15	rest of Europe	Dom-estic	EU15	rest of Europe	Dom-estic	EU15	rest of Europe
	quota in %			quota in %			quota in %			quota in %		
only one provider	17,4	0,0	0,0	9,1	4,5	5,0	8,9	0,0	1,9	26,7	0,0	0,0
up to 5 provider	60,9	34,8	13,3	45,5	31,8	25,0	26,6	14,7	18,9	46,7	27,8	28,6
few large a. many small provider	17,4	52,2	60,0	31,8	31,8	30,0	41,8	57,4	47,2	26,7	55,6	50,0
many provider	4,3	13,0	26,7	13,6	31,8	40,0	22,8	27,9	32,1	0,0	16,7	21,4
total	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
number of companies	23	23	15	22	22	20	79	68	53	15	18	14

For the sectors soil, noise, traffic and others there have been not enough data for a detailed reporting

Source: "Austrian Environmental Technology, Branch Study", 2005, WIFO, Köppl, p.74

The Austrian companies assess the market in EU15 and “Rest of Europe” as dominated by few large providers and by many small providers.

The share of Austrian eco companies in “Renewable Energies and Energy Efficiency” has increased from 25% (1997) to 47% (2003). In the ASPECT questionnaire the share of eco companies in Renewable Energies and Energy Efficiency is not as dominating, the reason therefore might be, that the companies from this sector have been under represented at the sample.

STRENGTHS: Initiated by high environmental standards in 80s and 90s, Austrian EI companies have a long lasting experience in the traditional sectors waste water, solid waste and air protection. As Austria was among the most ambitious countries in the environmental sector, it still gains a very good reputation as a model country for environment protection.

WEAKNESSES: In Austria there is a declining domestic market for the traditional products at the sectors waste water, solid waste and air protection. The EU-guidelines and the national environmental standards are fulfilled, higher standards are not planned, and therefore the domestic market is saturated. New, additional technologies as membrane technologies in the sector waste water cleaning are available, but not obliged by the Austrian environmental law and therefore not often applied. In other countries membrane technologies are widespread, reasons might be the geographic situation as small receiving waters, use of the purified water for other purpose.

OPPORTUNITIES: Following the global trends the sector “Renewable Energy and Energy Efficiency” will become even more important. As the Austrian companies are already strong established in this sector, they will be well prepared for the growing market.

If existing aims of the European Union regarding Renewable Energy and CO₂ reduction will become committing, the market in Europe will grow rapidly.

As a result of Austrian grant schemes the market of thermal solar energy has been strongly developed. With 600m² per 1000 inhabitants Austria is one of the leading countries in Europe and one of the largest solar panel producers. 66 % of the Austrian solar panel production has been exported, mainly to Germany, France, Italy and Spain.

Due the support programmes for the use of biomass, especially for wood chips and pellets heating plants, a large number of companies have made their European way of business and have a large share of export.

Higher standards in the waste water purification could increase the demand for new innovative technologies as the membrane technology also in Austria and therefore develop a domestic market.

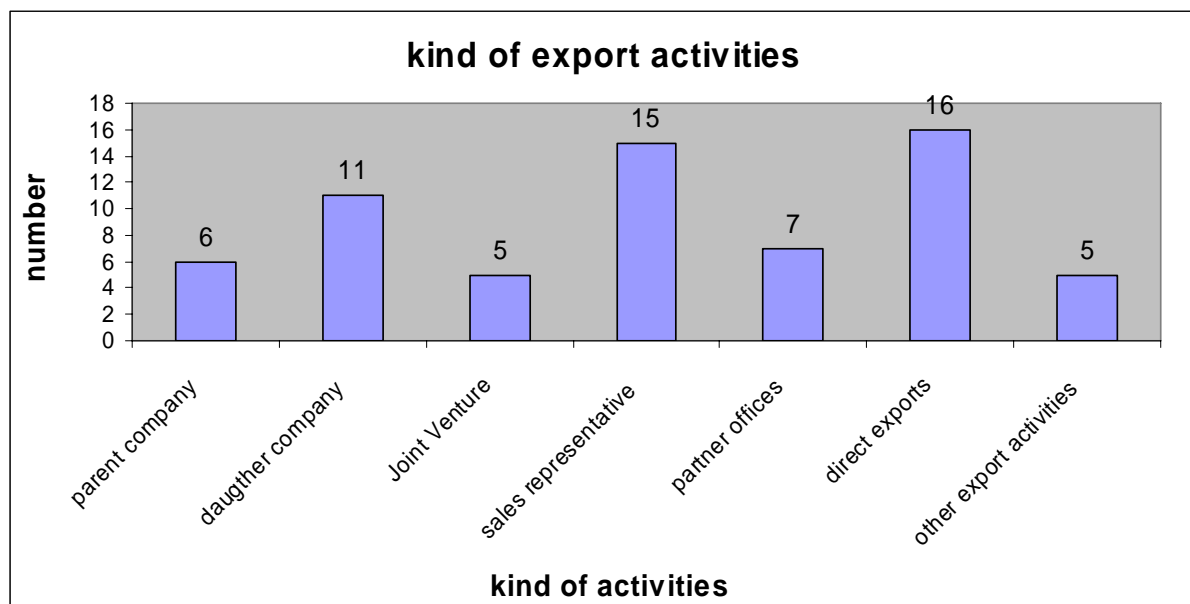
Within the sector air protection during the last years the issue “particulate matter” became more important within and will initiate further demand for “end of pipe” – technologies (filters, catalyser) as well as “integrated concepts” to avoid these emissions.

THREATS: Compared to the “traditional” EI-branches as waste water, water and solid waste the market for the sector “Renewable Energies and Energy Efficiency” is not predetermined by European or national environmental laws. The market for “Renewable Energies and Energy Efficiency” mainly depends on the price of fossil and nuclear energy and of national or regional subsidies, which can change short time. A decrease of the oil price or a strong expansion of the nuclear energy endangers the development of the sector “Renewable Energies and Energy Efficiency”.

c) Export market for Austrian EI in generally

Relations between the domestic market and the export market (hypotheses: “companies develop their products and know-how at the domestic market). After they covered their R&D cost at the domestic market and build up well educated staff, they can offer at the export market with higher quality and/or lower prices. Is that true?

The topic should be regarded separate for the several sectors like waste, waste water, ... This topic is important to evaluate possible support measures to foster the export and the competitiveness of the EI-companies in the Alpine Space.



Source: Aspect questionnaire Austria

- c) **STRENGTHS:** In the sector solid waste and recycling an enormous know how has been build up due the strict environmental laws in the 80s and 90s. This is important in planning waste management concepts, collecting systems and awareness building at the citizen for separate waste collection and recycling products.

At the sector air protection during the last decades high tech solutions for flue gas cleaning has been developed for the domestic market, especially for thermal power plants, incineration plants and industrial plants.

- c) **WEAKNESSES:** Technologies developed for the Austrian market and according the Austrian laws might not be able to be transferred directly to export countries. Especially in emerging countries and developing countries there is the need of low cost technologies and concepts, which can be maintained by regional companies. For this sector, Austrian

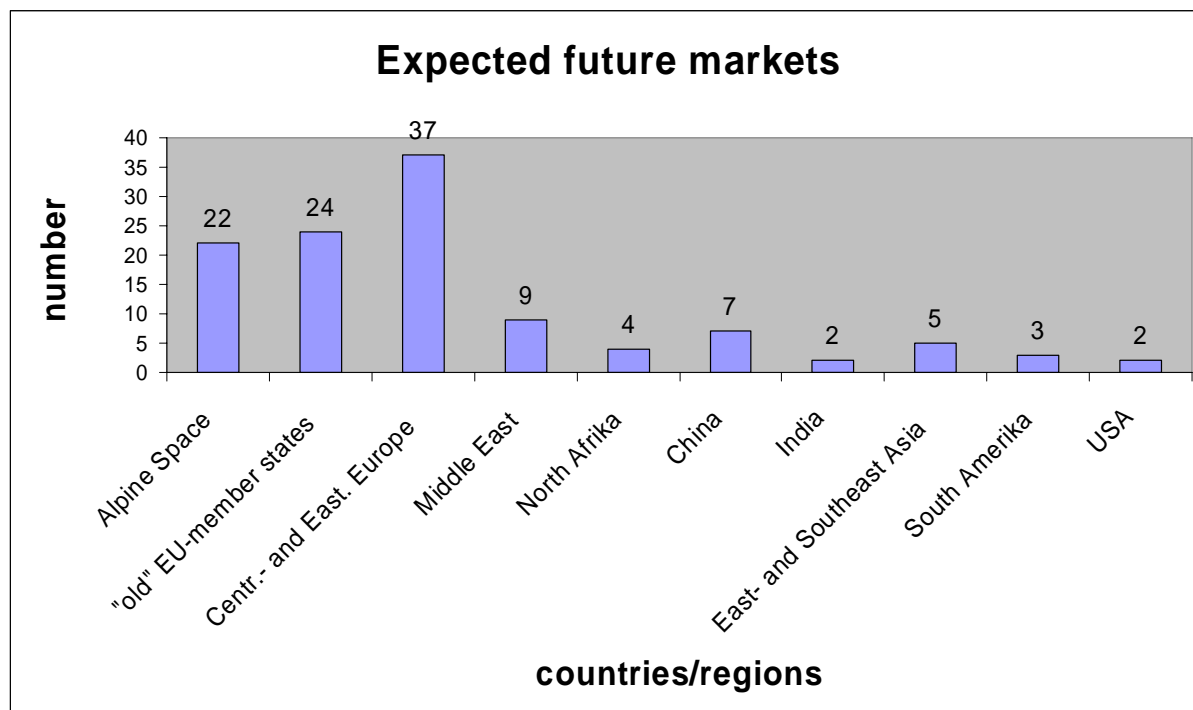
technologies are often too expensive and need high qualified experts for service and maintenance, who are not available in emerging and developing countries.

c) **OPPORTUNITIES:** Austria has highly developed structures in R & D. These structures as “Technologiezentren”, “Kompetenzzentren”, Cluster, Science parks, Research centres can be used to keep on being at the latest state of technology.

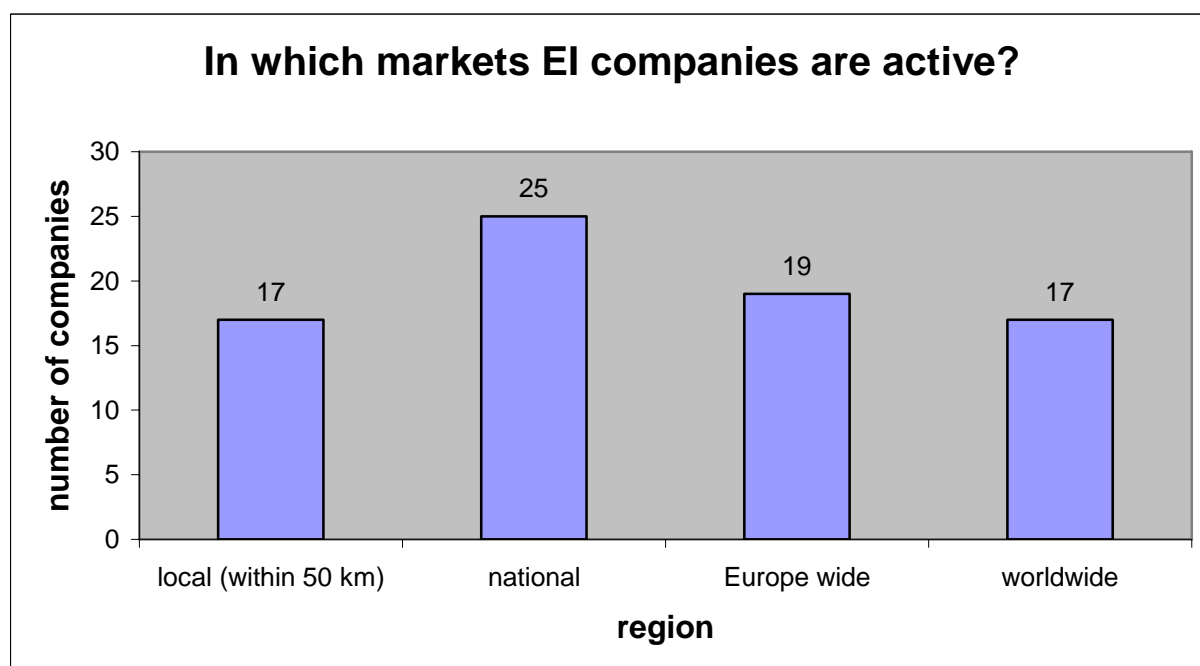
c) **THREATS:** companies in air protection and solid waste do apply the traditional technologies in export countries, but they are not active involved in developing and applying the latest technologies, as the domestic market is quite saturated. Therefore the might lose their leadership in technology.

d) Export market for EI by export regions

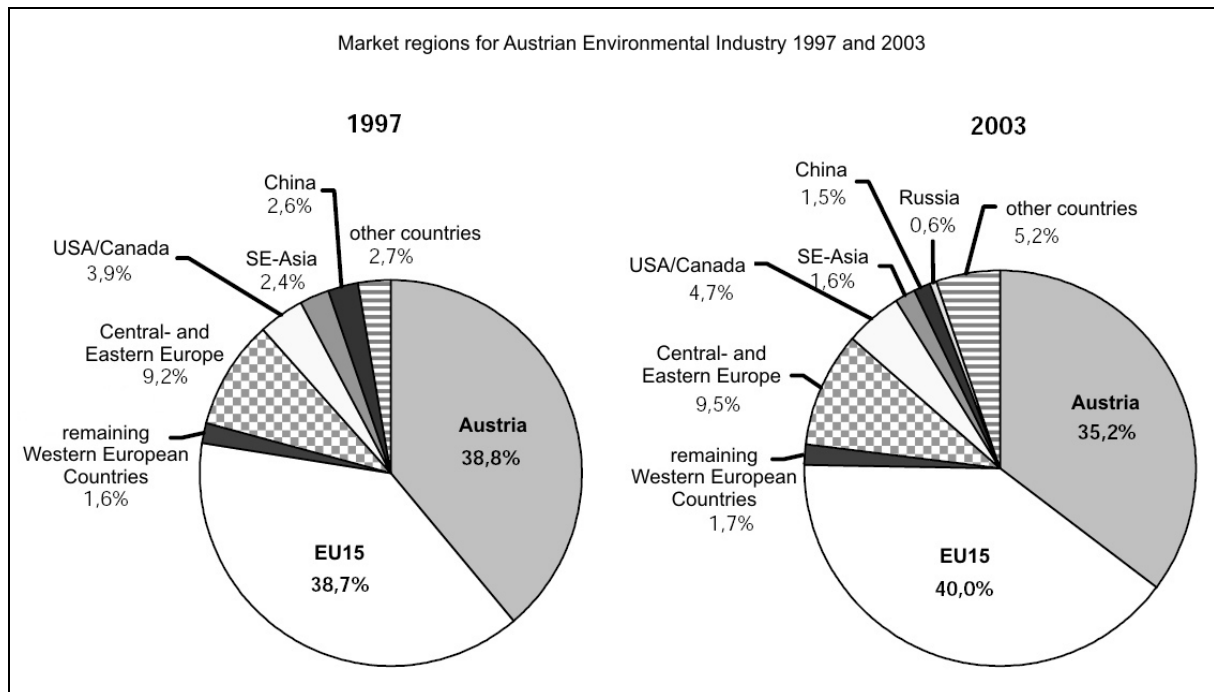
In which Export region is the EI already represented (Southeast-Asia, North America, South-America,), in which not?, why not?, what are the obstacles for the EI-companies to do projects in this regions. What of this can be seen as a S. W. O. T.?



Source: Aspect questionnaire Austria



Source: Aspect questionnaire Austria



Source: "Austrian Environmental Technology, Branch Study", 2005, WIFO, Köppl, p. 38

The most important export market for Austrian EI companies is the Central and Eastern European Region, especially the new EU-member states. 51% of the Austrian EI companies estimate the Central and Eastern Region as a future market for their products. An advantage of the EI-market in the new member states is that the investments in ET are calculable and obligatory by EU-standards. In new MS 10%/a growth of environmental market until 2010 (source)

d) **STRENGTHS:** Austrian companies are strongly represented in the new member states in CEE. Austria is among the top investors in CEE and SEE, e. g. is 2nd position in Romania. Austrian bank institutes have been one of the first foreign banks in the new member states.

An important strength is the geographically neighbourhood of Austria and the new member states. The short travel distances allows intensive acquisition and makes the founding of daughter companies easier.

A long common history and the cultural similarities facilitate the communication in business and the finding of partners in CEE.

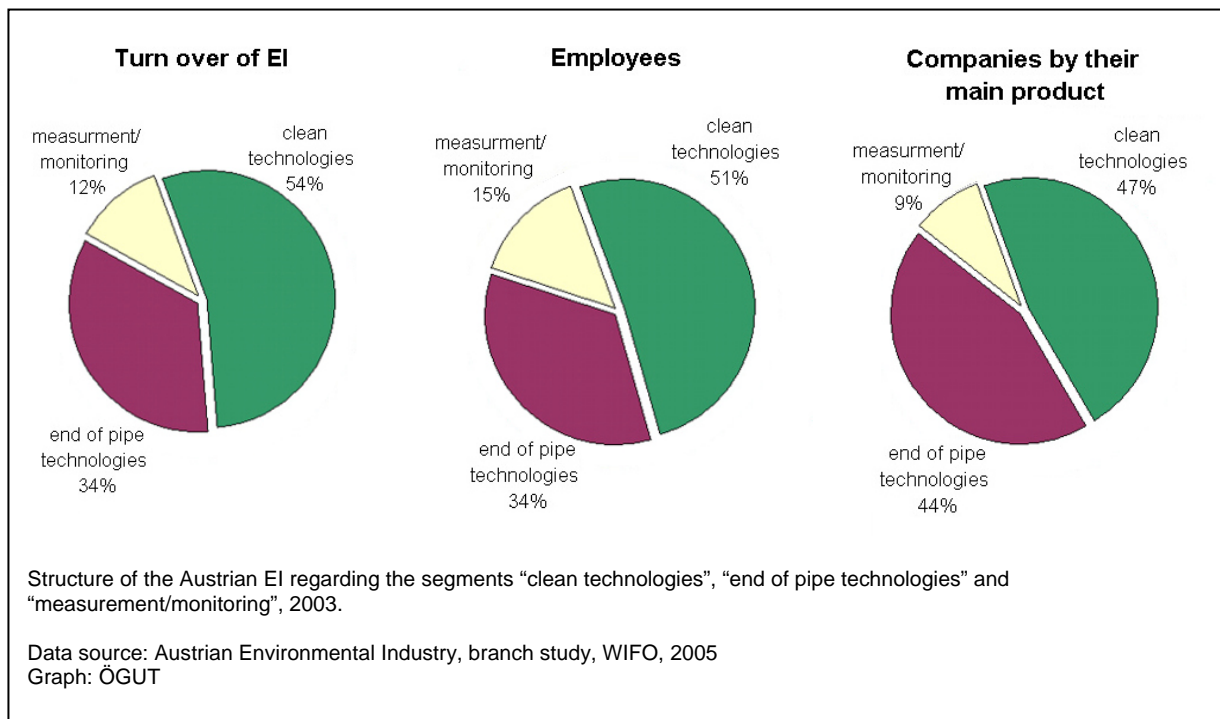
- d) **WEAKNESSES:** The Region China, India and Southeast Asia shows very high rates of economic growth and a high demand for environmental technologies and products. Until now only few Austrian EI companies are represented in this region and market potential can not be fully gained.
- d) **OPPORTUNITIES:** The booming export market potentials in overseas, which are not fully gained yet, can be extended by building up export cooperations and increased efforts of internationalisations. 87% of the Austrian EI companies estimate internationalisation as the most important future tasks for their business.
- d) **THREATS:** Technologies developed by Austrian EI companies can be adopted by companies with low salary costs and offered in their countries.

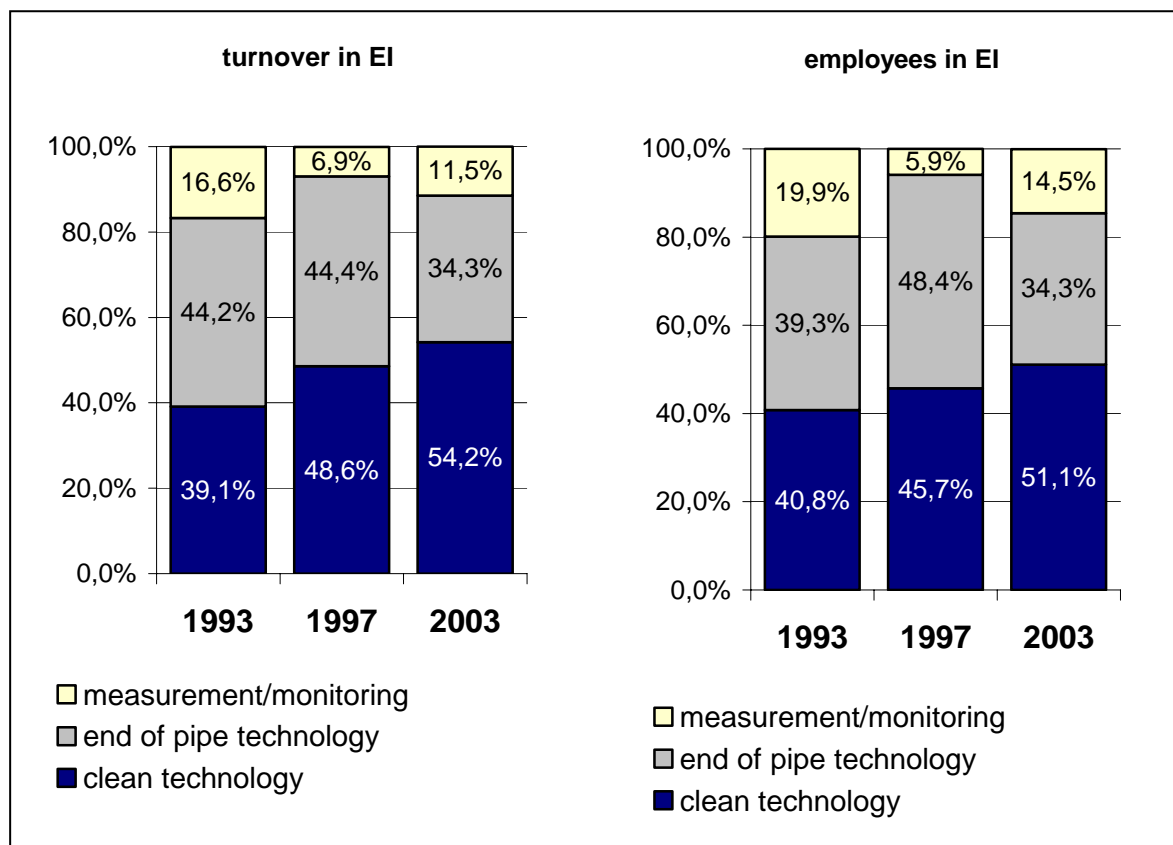
e) Structure of the EI - branch concerning “end of pipe-technologies” versus “cleaner production technologies”

What is the structure of the EI - branch concerning “end of pipe-technologies” versus “cleaner production technologies”. Hypothesis is, that “the cleaner production – technologies” are the “technologies of the future”, “end of pipe technologies” will phase out.

Are the EI-companies in the region/country ready for the demands of the future?

Is the branch up to date with the latest EI- technologies like membrane technologies, nanotechnologies, recycling technologies, bio fuels 2nd generation, PV-cells, fuel cells, network supply of biogas...? Can this considered as a S., W., O., T ?



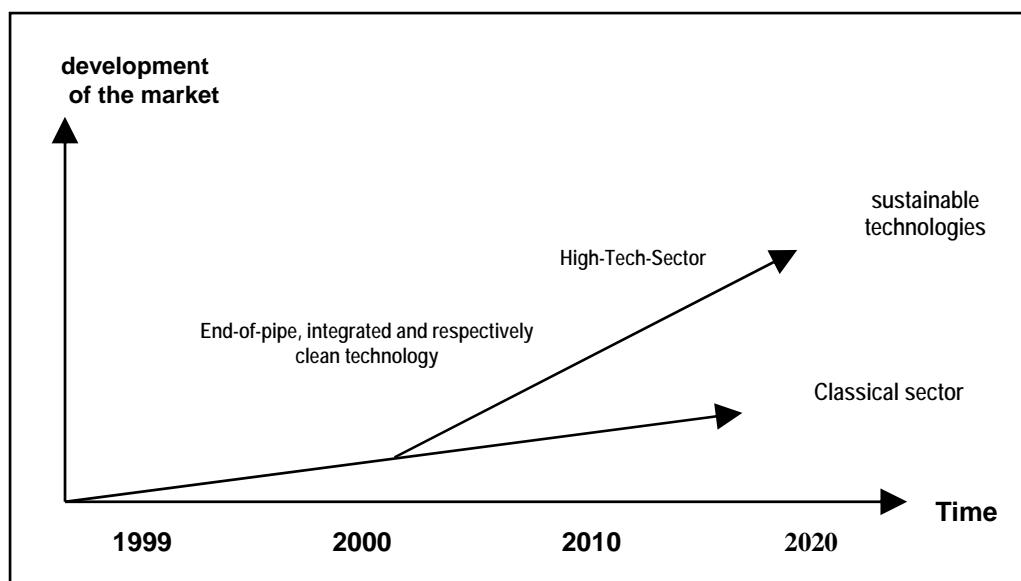


Development of the structure of the Austrian EI regarding the segments "clean technologies", "end of pipe technologies" and "measurement/monitoring" between the years 1993 and 2003

Data source: Austrian Environmental Industry, branch study, WIFO, 2005

Graph: ÖGUT

The study "Austrian Environmental Industry" figured out, that between 1993 and 2003 the share of the "clean technologies" has grown continually from about 40% up to more than 50%. Many companies estimates, that in the future the share of clean technologies will still grow.



Source: "pre-study network environmental technology", Oberösterreichische Technologie- und Marketinggesellschaft mbH

- e) **STRENGTHS:** In industrial countries there is the trend, that old "end of pipe" technologies are being replaced by high tech solutions, which enable environmental friendlier results and lower operational costs. Austria as a high tech-country can profit from this trend.

The Austrian EI has a tradition in developing and implementing "cleaner production" concepts, as the costs for energy, for raw materials and for waste disposal has been higher than in many other countries. Therefore the Austrian EI is well prepared for gaining the increasing share of "cleaner production" concepts at the future international market

At the field of developing biofuel of the 2nd generation, especially gasification of biogenic material Austria is among the technology leader and Austrian companies are involved in EU-wide R&D projects like RENEW.

Also in the passive house technologies Austria is one of the most advanced countries with more than 1 Mio. m² of passive house buildings. The energetic reconstruction of building will be one of the most important tasks to reach the climate protection goals. In these two market segments Austrian EI is in the pole position.

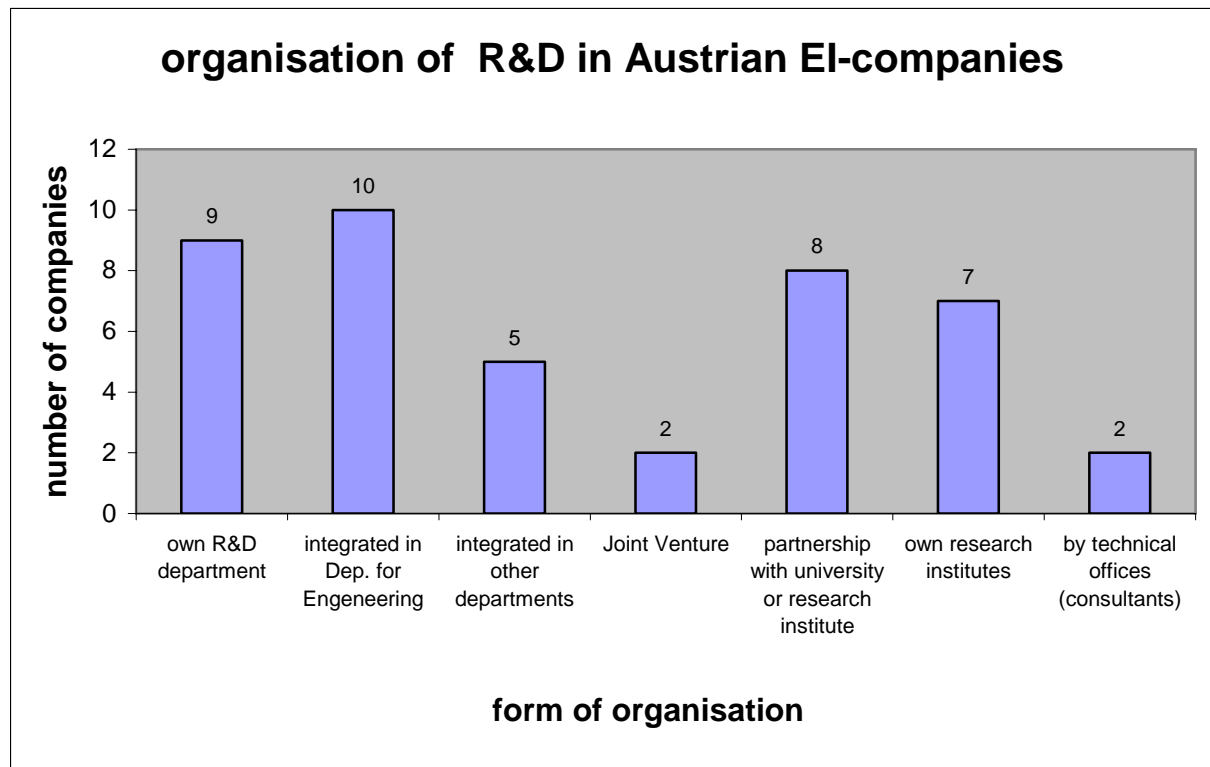
- e) **WEAKNESSES:** In developing and emerging countries the demand is focused on low cost products, why Austrian high tech and high quality products are not requested. Austrian "cleaner production" concepts will have limited chances in those countries, where prices for energy, raw materials and waste disposal are low.

- e) **OPPORTUNITIES:** To force R & D in the future markets photovoltaic, fuel cells and membrane technology can bring the Austrian EI in order to get the leadership in these markets

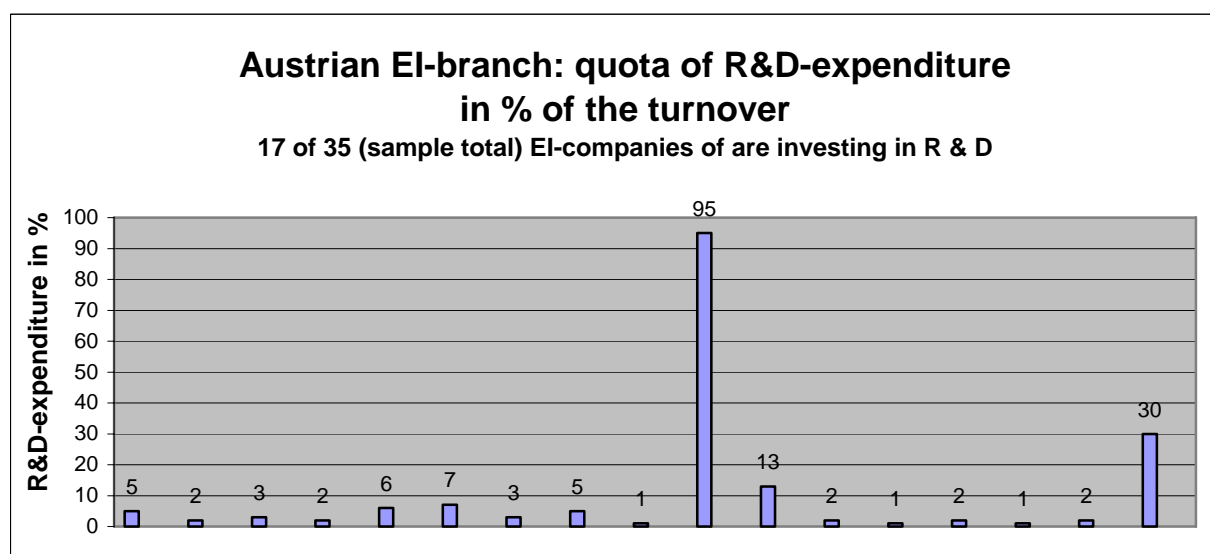
- e) **THREATS:** R & D will be carried out at large international companies outside Austria. Austrian EI will no more be up to date with the latest state of technology, especially in the field photovoltaic, fuel cells, recycling and membrane technologies. Following this, the production of these new products will be settled in the regions where they have been developed.

f) Investments of EI companies in R&D

How much do the EI-companies invest in R&D? compared to other branches ?
Is it enough to be up to date?



Source: Aspect questionnaire Austria



Source: Aspect questionnaire Austria

R&D-quota of the Austrian EI by technologies, 2003

Size of the company by number of employees	Environmental Industry total	Clean technologies	End of pipe technologies
up to 9	7%	5%	13%
10 – 19	6%	9%	3%
20 – 49	4%	6%	2%
50 – 249	4%	3%	5%
> 250	6%	3%	4%
average	6%	4%	4%
number of companies, total	117	63	42

Source: "Austrian Environmental Technology, branch study", 2005, WIFO, Köppl, p. 86

R&D-quota by environmental sectors, 2003

	Main product of the companies in %			
	solid waste	water/waste water	energy	air protection
weighted average R&D quota	6,7%	3,6%	3,5%	4,3%

Source: "Austrian Environmental Technology, branch study", 2005, WIFO, Köppl, p. 85

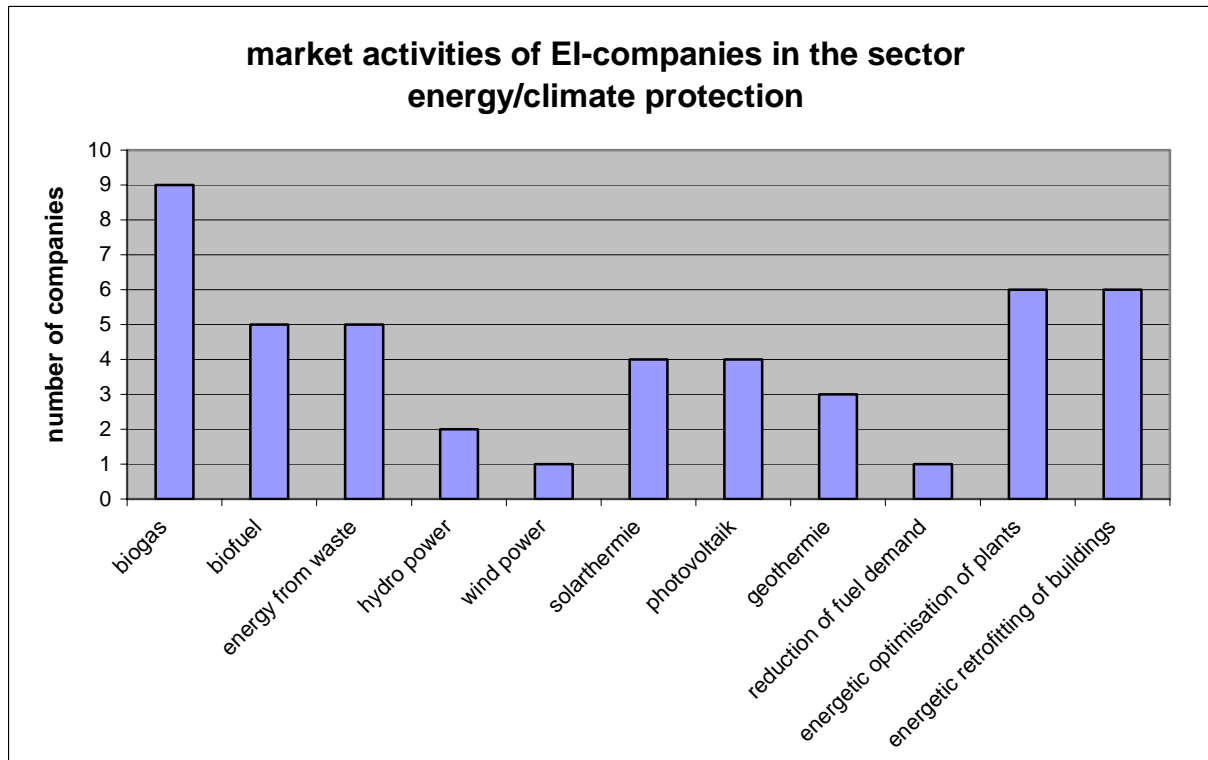
At the ASPECT-questioning the R&D-quota shows 5,45%, at the questioning of the branch study "Austrian Environmental Technology", the quota for R&D is 5,6%. The highest R&D – quota has been identified in the sector "solid waste" by 6,8% and the lowest in the sector "energy" by 3,5%. In generally the R&D quota for EI in Austria is much higher than the R&D quota for the whole real assets production in Austria, which is about 2%.

- f) **STRENGTHS:** For large companies, which have enough money available, the costs for R&D to be up to date are no problem.
- If companies have no own R&D departments, many of them have close contacts to R&E-Institutes and to specialist to handle projects and to work flexible, e. g. in the automotive sector or in the sector indoor climate simulation. Because auf the cooperations the companies have a broad basic knowledge and so they are high flexible.

- f) **WEAKNESSES:** In Austria nearly 80% of the EI-companies are less than 100 employees, and so they have no own department for R&D, because they will not have enough resources.
A low budget for research; a lack of skilled labours; a high pressure of competition
- f) **OPPORTUNITIES:** For the SME's it's the opportunity, that they work together with several specialised R&D-Institutes, specialists and so they always get the newest Information.
They will also force cooperation's and develop together to survive.
- f) **THREATS:** loss of know-how because of opening doors during cooperation's; High cost for acquisition of R&D, so they depend on the success of every project.

g) Future market climate protection

It figured out, that products and services for climate protection will become more important (EU-climate protection policy). Are the EI-companies in the region prepared for this growing EI-market segment? In which fields (wind power, biogas, bio fuel, CHP, efficiency in industry, energy efficiency in buildings,) they are strong, in which not?



Source: Aspect questionnaire Austria

Subdivision of the sector "Renewable Energy and Energy Efficiency" by the several technologies, regarded by turnover, employees and number of companies, 2003

	by turnover in %	by employees in %
combined Heat and Power Generation, Energy Efficiency	43	37
biomass	23	32
hydro power, others	19	11
thermal solar	8	10
photovoltaic	3	3
heat pumps	3	5
biogas	1	2
total	100	100
total of the sample, absolute	1,152 Mio. €	4,812 employee

Source: "Austrian Environmental Technology, Branch Study", 2005, WIFO, Köppl, p. 28

As the questioning of the Aspect study has different classifications as the branch study “Austrian Environmental Technology”, a direct comparison of the results is not possible. Differences of the results may also occur because the Austrian Energy sector is a very dynamic EI sector with many new companies and many of them are active in more than one sector. Both studies show, that energy efficiency, including CHG is a relevant sector. Within the Renewable Energies, the biomass sector might be the most developed in Austria.

g) **STRENGTHS:** As Austria has no relevant domestic fossil energy resources and no nuclear power plant, renewable energies and energy efficiency has been an important political topic during the last centuries. In Austria the share of renewable energies represent 23% of the total primary energy supply. This quota is one of the highest in Europe and has secured a strong economic branch and well developed know how in this sector.

By a large number of national and regional support programmes Austria has a European wide leading position in the use of biomass, solarthermie and hydropower as well as in energy efficiency for buildings. Especially in the sector “passive houses” Austria takes together with Germany a worldwide leading position.

In the sector solid biomass Austria has several companies which had a crucial role at the development of the pellets and wood chips heating technology. These companies now are very successful and many of them show export rates higher than 50%.

g) **WEAKNESSES:** Wind Energy: Though the wind situation in Austria is suitable, the “wind boom” started not until 2002, 10 years after the “wind boom” in Germany, Denmark. Therefore the latter countries are the leading producer at the market and in Austria own wind power plant production could have established.

Photovoltaic: The geographically and meteorologically framework for photovoltaic in Austria is not as appropriate as in many other countries, e.g. in Southern Europe. Also the lack of an attractive feed in tariff system in Austria has not led to a well established PV-branch as it has in Germany or in Japan.

Hydro power: The domestic market in Austria is already saturation, most of the potential large hydro power sites are already utilized, and the less remaining potentials are in ecological sensitive areas.

g) **OPPORTUNITIES:** Though the domestic market for large hydro power in Austria nearly vanished due the lack of further available sites for new plants, the strong activities of the branch between 1950 and 1995 led to a well established hydro power branch, which is now exporting know how as well as a large number of technical equipments to North and South America, Asia and Africa. A future market potential will be the modernisation and the repowering of existing hydro power plants. These activities will be discussed and

planned in detail within an “Austrian Master plan for Hydro power”, which should be carried out soon.

Even if the wind power utilisation in Austria has started lately compared to other countries, now in Austria there are important producer for components like generator or special plastic materials for the blades of wind power plants, which are being exported worldwide. Also a group of wind power plant operators has established and they founded daughter companies in the new EU-member states as well as in Croatia.

Passive house concepts are already the present “state of the art” in Austria, the county Vorarlberg, but also the city of Frankfurt/Main set up passive house standard for all non-commercial residential buildings from beginning of 2007. Soon or later this standard will be adopted in Europe and worldwide, so that the corresponding components and know how will become an enormous future market.

There are several projects running in developing systems to produce biofuels 2nd generation from wood and also innovative combined heat and power plant (CHP) systems therefore. This can open a new market for smaller units of biomass power plants.

- g) **THREATS:** The share of solid biomass (wood) from the total energy supply in Austria is about 12% and in order that rather high. If the demand for fuel wood, timber, chipboard and wood fibre boards and celluloses will continue to rise, the price for fuel wood will become significantly higher. This happened already in 2006 and it could danger the branch for biomass heating systems.

The companies which develop wind parks, biomass heating plants and biogas plants in Austria are rather small compared to other countries. In many export regions the energy supply systems are still structured centralised and large power plants are favoured. That might be an obstacle for Austrian companies, which do not have the necessary size and financial background.

There is no relevant R & D in Austria in the field of PV-cells. If the PV-technology will further improve and a PV-boom will start, Austria might not be among the leading PV-producing countries.

h) Innovative financing and business models

Are the EI-companies in the region ready and flexible enough to meet the wishes of the clients concerning innovative financing models (e. g. PPP-models, Contracting, Build and Operate, Concession model) and concerning “turn-key” projects, where a general contractor offers planning, coordination of the building phase, service and maintaining.

h) **STRENGTHS:** These companies in Austria which can handle such projects are companies which are part of an international group and therefore they have the know how and financial background in this field.

h) **WEAKNESSES:** Only few players in Austria offer projects together with flexible and innovative financing or business models.

h) **OPPORTUNITIES:** Increasing networking between the companies especially for the SME's to handle large projects with higher risks or with a need of high knowledge in legal and economical terms.

To establish consortia of several SME's or the cooperation of Austrian SME's with large international groups as sub-suppliers might be suitable solution.

Especially at projects for public entities, which have less capital resources or which prefer continually annual expenses more than one-time investments, innovative financing models can strongly improve the chances of the EI-company within the international competition. Innovative financing models are highly requested in Central and Eastern Europe. There existing infrastructure systems like drinking water networks, waste water systems, waste disposal systems and energy infrastructure system have to be build up and modernized in accordance with the environmental guidelines of the EU.

h) **THREATS:** High financial risks for SME's, especially if they don't have experience in creating appropriate contracts, e. g. at PPP-models, Contracting models, Build and Operate models.

Innovative financing models often show higher financial risks for the EI-companies. At long term projects in export regions with high politically and economically risks, smaller companies might become serious problems with liquidity.