Austria

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Summary

In Austria, per capita consumption of wood products is comparatively high and has increased considerably during the last decades. One reason is the high apparent consumption of wood by Austrian intermediary products producers. It is also an effect of an increasingly wood friendly culture in wood construction, a society that has overall positive attitude to wood as a material, amongst others. Consumption of wood products is to some parts dependent on the image of these products in the eyes of consumers, especially vis-à-vis substitution products. Here, the shift to urban societies, technological developments and competitive behaviour of substitute producers have for some time left wood with a not-so-favourable image of being old-fashioned. Recent PR campaigns have successfully tackled this problem. The fact that Austria has a diverse landscape ranging from plains to high alpine regions creates a wide range of recreational, environmental and protective services. However, these are generally not exploited on a commercial basis but embedded in legal and customary rights and often provided by the state.

Forestry and forest-based industries are important sectors for Austria. The wood working industry accounts for a share of 20% in the production sector, is very export-oriented and comparatively competitive. The wood working industry is one of the most important contributors to the balance of trade of Austria. A main barrier to entrepreneurship and enterprise development in forestry is the high fragmentation of forest ownership and the decreasing share of income and time spent in forest management by an increasingly considerable part of forest owners. On the other hand, demand for wood as a raw material by the processing industry is high and increasing. In addition bioenergy is a growing factor for raw material demand. Further increasing also seem to be amenity values and demands for non-wood utilisation of forests, including recreation. Policy implications for these trends are many, and a range of issues is already covered by policy programmes, such as support for horizontal co-operation or on bioenergy as well as research on innovation policies and strategies.

Wood processing industries in Austria are competitive on a world market, and under stiff world market prices, in a range of commodity products, including sawn wood, paper and panels, amongst others. Most of these industries have gone through a consolidation phase, with decreasing numbers of mills and larger production volumes. Recent efforts by these traditional industries have focused on opening up new markets and new sources for raw material. A range of product concepts was developed to a more industrial and standard type of production, including laminated beams by sawmills and prefabricated houses. However, the typical barriers to innovation and entrepreneurial behaviour abound. The majority of firms are small-scale family firms, there is a low knowledge generation and application capacity within firms, lack of venture capital, etc. Overall, the share of the forest sector in the Austrian GDP has decreased during the last decades. On the other side, per capita consumption of wood and wood products has increased considerably during the last decades and is much higher than in the EU or world average. Research is increasingly being recognised as a main source of long-term competitive advantage and a series of programmes have recently been initiated to support research efforts and better networking amongst related institutions, which has been a somewhat weak point in the past. Some major efforts towards innovation and strengthening competitiveness in the wood working industry include among others innovations in wood composites and in logistics as well as the use of computer tomography in sawmilling.

NWFPS have not only been of high relevance in history (resin tapping, leaf and litter). Today some older uses are still important (hunting and fishing, cattle grazing, gravel digging), and new uses add to these: protection against natural hazards, kerbing of drinking water, horse-back riding, or mountain biking. The forestry sector itself has contributed by some specific services, e.g. forest pedagogics and the erection of biomass-based village heating systems. The examples of nature conservation services and village heating systems show that forest owners find ways to market new services from the forest. In the case of district heating, in Austria especially farm forest owners' co-operatives do not only provide wood chips but run the plants themselves and thus benefit directly from the value added produced. Although the income from NWFPS in Austria is still almost negligible (without considering bio-energy), there seem to be high latent potentials. Competitiveness is affected negatively by small forest properties and high labour costs, but positively by the image of forests as regional resources, and a

good institutional support in many provinces. Barriers to entrepreneurship are found as follows: timber-dominated education, missing entrepreneurial orientation in education, mental barriers of forest owners to new forest uses (services), farmers' focus on agricultural production, missing income interests of „new" or urban forest owners, and a generally limited entrepreneurial orientation of owners (most owners are only interested in secure capital investment; hunting etc.).

1. Consumption

Summary

In Austria, per capita consumption of wood products is comparatively high and has increased considerably during the last decades. One reason is the high apparent consumption of wood by Austrian intermediary products producers. It is also an effect of an increasingly wood friendly culture in wood construction, a society that has overall positive attitude to wood as a material, amongst others. Consumption of wood products is to some parts dependent on the image of these products in the eyes of consumers, especially vis-à-vis substitution products. Here, the shift to urban societies, technological developments and competitive behaviour of substitute producers have for some time left wood with a not-so-favourable image of being old-fashioned. Recent PR campaigns have successfully tackled this problem. The fact that Austria has a diverse landscape ranging from plains to high alpine regions creates a wide range of recreational, environmental and protective services. However, these are generally not exploited on a commercial basis but embedded in legal and customary rights and often provided by the state.

1.1. State of the art and historical development

In Austria, per capita consumption of wood products is comparatively high and has increased considerably during the last decades. However, these facts don't give indication about the consumption by private households. Data for private consumption is difficult to find and to isolate. Indication for private consumption could be found in input-output tables for the Austrian economy.

Regarding the demand and consumption of non-wood forest products (NWFP) and services some studies dealing with the attitudes of the Austrians or the urban population with respect to forests, forests products and services were consulted. In general, it is difficult to distinguish between urban and rural consumption of forest products and services. There is a clear trend towards increased demand for forest-related services.

1.2. Forest products' and services consumption / General information

The **population** of Austria comprises approximately 8 million inhabitants (8,053,106 in 2002), of whom about 1.55 million (1,550,874 in 2002) or 19.26% live in the **capital city** – Vienna (Statistik Austria 2004). **Urban population** accounted for 65.8% of total population in 2001. This number is below the average in the European Union, where the share of urban population amounts to 80%. While the total number of urban population increased slightly over the last decade (from 5,128,422 in 1991 to 5,285,263 in 2001) the share of urban population in total population remained constant. Table 1 shows the distribution of the Austrian population across different size classes of communes. There is one city – the capital Vienna - with more than one million inhabitants and four cities with more than 100,000 inhabitants (Graz, Salzburg, Innsbruck, Linz).

Table 1. Number of communes by size classes of communes (in 2003) and share in population (in 2001)

Size classes (inhabitants)	Number of communes (2003)	Population (2001)	
		total	%
-,500	173	57,746	0.7
501 - 1,000	426	317,612	4.0
1,001 - 1,500	543	675,734	8.4
1,501 - 2,000	346	605,286	7.5
2,001 - 2,500	242	538,595	6.7
2,501 - 3,000	159	433,747	5.4
3,001 - 5,000	253	949,859	11.8
5,001 - 10,000	144	953,094	11.9
10,001 - 20,000	49	622,440	7.7
20,001 - 30,000	12	290,383	3.6
30,001 - 50,000	4	168,389	2.1
50,001 - 100,000	3	204,116	2.5
100,001 - 200,000	3	439,558	5.5
200,001 - 500,000	1	226,244	2.8
+1,000,001	1	1,550,123	19.3

Source: Statistik Austria 2004, 43

The **Gross Domestic Product** (GDP) of Austria in 2003 amounted to 224.3 billion euro. The average **GDP per inhabitant** amounted to 27,760 euro. Without taking into account income differences between urban and rural population, this means an 'urban GDP' of 148 billion euro and a 'rural GDP' of about 76 billion euro (http://www.statistik.at/fachbereich_02/vgr_tab1.shtml, own calculations). Table 2. shows the structure of **household expenditure** in 1999/2000. Housing accounts for the largest share of household expenditure (23.5%). Further large expenditures include transportation (15%), food (about 13%), and recreation, sport and hobby (12.3%). Expenditures for furniture, household equipment and repairs amounts to 7.1% of the monthly expenditures. The distribution of household expenditures in Austria differs only very slightly from the EU-15 average.

Table 2. Monthly expenditures of private households 1999/2000 (Konsumerhebung)

Categories of expenditures	Expenditure in euro	Share of total expenditure (%)
Total household expenditure	2,437.3	100.0
Habitation, heating, lighting	572.6	23.5
Transportation	365.6	15.0
Groceries, Non-alcoholic beverages	322.9	13.2
Recreation, sport, hobby	300.5	12.3
Other expenditures	212.4	8.7
Furnishing	172.5	7.1
Clothing, shoes	160.3	6.6
Cafe, restaurants	135.4	5.6
Alcoholic beverage, tobacco products	66.4	2.7
Communication	64.8	2.7
Health	57.8	2.4
Education	6.4	0.3

Statistik Austria, www.statistik.at/konsumerhebung/deteilergebnisse.shtml (26.07.2004)

1.3. Market demand for forest related products and services by urban population

Table 3. Apparent consumption in Austria for main wood product categories, including main trends over the last decade

Product Name	Unit	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Roundwood	**1000 m³**	**17006**	**17089**	**19404**	**18525**	**19718**	**19930**	**18467**	**20243**	**20924**	**20176**	**21436**	**23886**
Wood fuel, including wood for charcoal	1000 m³	3271	3450	3506	3207	4080	3570	3288	3201	2981	3053	3202	3498
Industrial roundwood (wood in the rough)	1000 m³	13735	13639	15898	15318	15638	16360	15179	17042	17943	17123	18234	20388
Chips and particles	**1000 m³**	**n.d.**	**n.d.**	**n.d.**	**n.d.**	**n.d.**	**n.d.**	**n.d.**	**n.d.**	**3904**	**3816**	**4002**	**4363**
Wood residues	**1000 m³**	**n.d.**	**n.d.**	**n.d.**	**n.d.**	**n.d.**	**n.d.**	**n.d.**	**n.d.**	**2027**	**2029**	**2116**	**1928**
Sawnwood	**1000 m³**	**3746**	**3640**	**4028**	**4192**	**5123**	**4609**	**4931**	**5356**	**5697**	**5463**	**5417**	**5282**
Wood-based panels	**1000 m³**	**1084**	**1064**	**1142**	**1030**	**896**	**899**	**889**	**1052**	**1022**	**1294**	**1311**	**1357**
Veneer sheets	1000 m³	30	26	33	42	39	37	34	27	27	30	27	30
Plywood	1000 m³	110	98	96	83	86	88	91	99	60	38	102	111
Particle board	1000 m³	877	848	921	818	691	665	684	816	913	889	882	907
Fibreboard	1000 m³	67	92	92	87	80	109	80	111	22	337	300	309
Wood pulp	**1000 m.t.**	**1794**	**1795**	**1958**	**1949**	**1852**	**1902**	**1973**	**1906**	**2022**	**1892**	**2040**	**2116**
Mechanical woodpulp	1000 m.t.	381	387	420	408	362	381	379	371	394	380	382	423
Semi-chemical woodpulp	1000 m.t.	59	61	66	50	50	21	10	26	5	4	5	10
Chemical woodpulp	1000 m.t.	1211	1201	1322	1327	1275	1348	1420	1336	1442	1319	1435	1457
Dissolving grades woodpulp	1000 m.t.	142	147	150	164	165	152	164	173	181	189	218	226
Other pulp	**1000 m.t.**	**1**	**6**	**4**	**1396**	**1442**	**1483**	**1521**	**1559**	**1679**	**1620**	**1631**	**1718**
Recovered paper	**1000 m.t.**	**1273**	**1125**	**1181**	**1263**	**1235**	**1235**	**1732**	**1787**	**1980**	**1890**	**1884**	**1986**
Paper and paperboard	**1000 m.t.**	**1413**	**1550**	**1640**	**1688**	**1795**	**2052**	**1985**	**2136**	**2333**	**2349**	**1899**	**1769**
Graphic paper	1000 m.t.	533	580	568	744	776	902	767	857	904	1001	569	379
Sanitary and household papers	1000 m.t.	83	86	89	88	103	109	113	109	113	114	104	108
Packaging materials	1000 m.t.	751	836	932	809	869	930	991	1052	1188	1104	1086	1105
Other paper and paperboard	1000 m.t.	46	48	51	47	46	111	115	118	128	130	140	177

Source: UNECE TIMBER database, as of July 19 2004, own calculations; Consumption = production/removal + imports - exports

Table 3 shows the **consumption for main wood categories** over the last decade in Austria. However, apart from fuel wood, most of these data do not represent end consumption by private households, but are used as intermediate goods for further production. Overall, the construction industry is the biggest consumer of sawnwood and panels. Within the category paper and paperboard the distribution of consumption has

shifted over the last years: While consumption of sanitary and household papers, packaging materials and other paper and paperboard increased, the consumption of graphic paper decreased considerably during the last few years. Consumption in roundwood increased considerably as well. Overall, a slightly increasing consumption in most wood products could be observed in Austria over the last decade.

Data on the consumption of wood and wood products by private households could be derived form input-output tables from Statistik Austria. The consumption of wood and products of wood by private households amounted to 365 million euro at purchasers' prices in 2000. This accounts for a share of 0.3% in overall household consumption. Private households consumed pulp, paper and paper products of a value of 542 million euro at purchasers' prices, that is about 0.5% of household consumption. Furniture and other manufactured goods amounted to 6,106 million euro or 5.4% of household consumption (note that this category does not only include products from wood. However, differentiated data could not be found) (Statistik Austria 2004).

Data on the consumption of wood products by urban population is hardly available. However, it is assumed that urban population consumes a disproportionate share of the total Austrian paper consumption.

Compared internationally, Austria consumed 7% of the coniferous sawnwood, 3% of panels and 3% of paper in the European Union – 15 in 2002. World shares were about 1-2%. Overall, the per capita consumption of wood products in Austria is higher than the EU average and many times above the world average (Schwarzbauer 2004, 46). Between 1965 and 1998, Austrian domestic wood consumption (measured in roundwood equivalents) has more than doubled (+118%). During the same period, European consumption has only increased by 30%, and world consumption by 25% (Schwarzbauer 2004, 5). For the future, international studies by the UN-ECE/FAO predict further increases in production of and demand (consumption) for wood products in Austria (Schwarzbauer 2004, 5). However, as mentioned before, this does not necessarily mean an increasing consumption of wood products by Austrian private households, rather these trends indicate an increase in the further processing industries.

Data on the **consumption of non-wood forests products** (NWFP) in Austria is only partly available. Mostly only data on the production of non-wood forest products is available (see chapter 4). Austrians consumed on average 0.8 kg game and rabbits per capita in the year 2002 (2. Lebensmittelbericht). This means an overall consumption of about 6.4 million kg game and rabbits by the Austrian population per year.

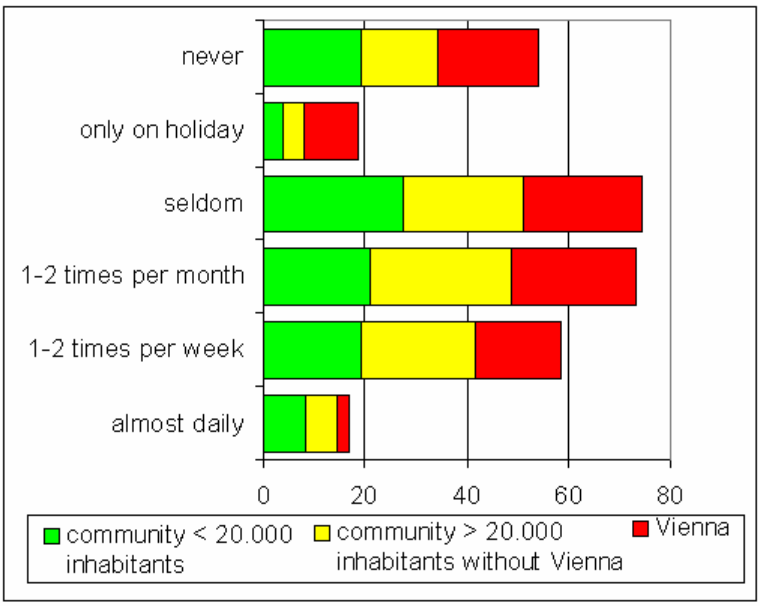
It is allowed to collect berries and mushrooms up to a certain amount per day (see Chapter 4). However, no data are collected on the amount of collected mushrooms and berries.
In the year 1999 Austrian households consumed about 2.2 million Christmas trees, of whom 1.7 million were bought and 0.5 million were given (www.weihnachtsbaum.at).

Over the last years a number of **forest services** has gained higher importance. These are above all recreational and environmental services. The provision of these services has mostly been forced by a strong demand from society. For example, the right for horse-

back riding on forest roads and trails or the right for the use of land for skiing tracks have been offered for many years while riding mountain bikes is a younger development and forest roads have been opened on contractual basis with tourist clubs for about 10 years. Other recreational offers are still rather rare but comprise, e.g. renting of mountain cabin or cottages, use of rivers for water sports, etc.

A study on the attitudes of the population of Vienna to their forest (Wiener Wald) showed that there is an increasing trend in the exercise of sports in the forest (Bürg, Ottitsch and Pregernig 1999). Thus, there is expected to be an increasing demand for recreational services in the future.

The microcensus survey of Statistik Austria (Statistik Austria 1998) gives indication about the frequency of forest visits and the differences in behaviour of rural and urban population. Over 80% of the Austrian population visit forests for recreational purposes. 18.6% of the Austrians stated that they never visit the forest (see Figure1).



Source: Statistik Austria 1998.

Figure 1: Frequency of forest visits by community size

As Figure 1. shows there is a remarkably higher share of inhabitants of Vienna visiting the forest only in holidays than among the population of other community sizes. On the other side, only a very little share of the inhabitants of Vienna visit the forest daily.

An important service of forests is the provision of water. For example, the capital of Austria - Vienna obtains its drinking water from especially protected forests for watersheds (Quellschutzwälder). The overall water consumption in Austria is about 2.6 billion m^3 per year. On average, Austrians consume 145 litres water per day and capita (Österreichischer Walddialog 2004).

About ten years ago a new specific service has been developed by foresters and is offered by forest enterprises, namely forest education. Forest education activities are aimed at teaching nature and forest matters to the broad public. Clients are school children but also adults.

Data on the overall **number of secondary residences** in Austria is difficult to find. Only, data for single regions could be easily found. For example, in Upper Austria there were 17,000 secondary residences in 2001, that is about 8.4% of all residences in Upper Austria (Sozialbericht 2001, own calculations).

The main **market surveys** on demand of wood, non-wood and services by the Austrian population are:

- Bürg, Josef; Ottitsch, Andreas and Michael Pregernig 1999: Die Wiener und ihre Wälder. Zusammenfassende Analyse sozioökonomischer Erhebungen über die Beziehung der Wiener Stadtbevölkerung zu Wald und Walderholung; Schriftenreihe des Instituts für Sozioökonomik der Forst- und Holzwirtschaft, Band 37, Universität für Bodenkultur Wien.
  This study is not a classical market survey, but surveys the attitudes and activities of the inhabitants of Vienna regarding the forests. These attitudes comprise for example the satisfaction with infrastructure in the forest or with the supply of services. The study can therefore be used for an estimation of urban demand for forest related services.
- Rametsteiner, Ewald 1998: Einstellungen zu Wald, Holz, Umwelt und Nachhaltigkeitszeichen in Österreich und Europan. Ergebnisse einer Repräsentativumfrage in Österreich und deren internationaler Vergleich; Schriftenreihe des Instituts für Sozioökonomik der Forst- und Holzwirtschaft, Band 34, Universität für Bodenkultur Wien.
  This study comprises the attitudes of the Austrian population to forest, wood, sustainability and certification of wood.
- Schwarzbauer, Peter 1996: Long-Term Supply and Demand Projections for Wood Products in Austria. A Contribution to the Study 'European Timber Trends and Prospects: Into the 21st century'; Schriftenreihe des Instituts für Sozioökonomik der Forst- und Holzwirtschaft, Band 27, Universität für Bodenkultur Wien.
  This study covers the long-term projections for the general demand for wood products in Austria, however this does not tell much about end consumption and does not explicitly cover demand by urban population.
- Schwarzbauer, Peter 2004: Marktstudie: Die österreichischen Holzmärkte. Größenordnungen-Strukturen-Veränderungen, Universität für Bodenkultur, Department für Wirtschafts- und Sozialwissenschaften, Institut für Marketing und Innovation, Wien.

1.4. Main problems and research questions in consumption for enterprise development

Main problems result from the scarce data availability for final consumption of wood products and the production and consumption of non-wood forest products and services. In addition, no differentiations are generally made between the consumption and demand of rural and urban population.

Annex A: Organisations studying forest products' consumption and main publications and information sources.

Organisations

University of Natural Resources and Applied Life Sciences, Vienna (BOKU), Department of Economics and Social Sciences

Kompetenznetzwerk Holz - FFF Forschungsprojekte Holz, Wood K Plus: Kompetenzzentrum Holz, Forschungsprogramm Holzverbundwerkstoffe und Holzchemie

Main publications and information sources:

Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasser 2003: 2. Lebensmittelbericht Österreich, Wien.

Bürg, Josef; Ottitsch, Andreas and Michael Pregernig 1999: Die Wiener und ihre Wälder. Zusammenfassende Analyse sozioökonomischer Erhebungen über die Beziehung der Wiener Stadtbevölkerung zu Wald und Walderholung; Schriftenreihe des Instituts für Sozioökonomik der Forst- und Holzwirtschaft, Band 37, Universität für Bodenkultur Wien

Rametsteiner, Ewald 1998: Einstellungen zu Wald, Holz, Umwelt und Nachhaltigkeitszeichen in Österreich und Europa. Ergebnisse einer Repräsentativumfrage in Österreich und deren internationaler Vergleich; Schriftenreihe des Instituts für Sozioökonomik der Forst- und Holzwirtschaft, Band 34, Universität für Bodenkultur Wien.

Schwarzbauer, Peter 1996: Long-Term Supply and Demand Projections for Wood Products in Austria. A Contribution to the Study 'European Timber Trends and Prospects: Into the 21st century'; Schriftenreihe des Instituts für Sozioökonomik der Forst- und Holzwirtschaft, Band 27, Universität für Bodenkultur Wien.

Schwarzbauer, Peter 2004: Marktstudie: Die österreichischen Holzmärkte. Größenordnungen-Strukturen-Veränderungen, Universität für Bodenkultur, Department für Wirtschafts- und Sozialwissenschaften, Institut für Marketing und Innovation, Wien.

Oberösterreichische Landesregierung 2003: Sozialbericht 2001, Linz.

Statistik Austria 1998: Mikrozensus Dezember 1998, Statistik Austria, Wien.

Statistik Austria 2000: Input-Output-Tabelle 2000, Statistik Austria, Wien.

Statistik Austria 2004: Statistisches Jahrbuch 2004, Statistik Austria, Wien

Internet resources:

- UN-ECE timber database : http://www.unece.org/trade/timber/Welcome.html
- Statistik Austria: http://www.statistik.at
- http://www.weihnachtsbaum.at

2. Small-scale forestry practices

2.1. State of the art knowledge and historical development at country and regional level on small-scale forestry and its related policy framework

The following overview shows the development of management units over the recent decades without different categories.

Table 4. Development of management units over the recent decades

Year	Management units	Area (ha)	Agricultural area (ha)	Forestry area (ha)	Average area (agr .+ for. in ha)
1950	432,848	8,135,744	4,080,266	2,988,586	16.3
1960	402,286	8,305,565	4,051,911	3,141,725	17.9
1970	342,169	8,307,527	3,896,027	3,205,920	20.8
1980	318,085	8,321,226	3,741,224	3,281,773	22.8
1990	281,910	7,535,201	3,500,298	3,227,069	24.2
2000	217,508	7,518,615	3,389,905	3,260,301	30.9

The total **private forest area** accounts for 80% of the total Austrian forest area. The Federal Forests of Austria (ÖBF AG) manage around 15% of the forest area. Other public forest area accounts for 5% of Austrian forests.

Table 5. Forest holdings in categories with forest area only in 1999

Categories	Forest area		Number of units	
	ha	%	n	%
2 - 5 ha	14,809	3	3,879	28.3
5 -10 ha	29,902	5	4,478	32.6
10 - 20 ha	31,510	6	2,410	17.6
20 - 30 ha	18,649	3	824	6.0
30 - 50 ha	23,898	4	669	4.9
50 - 100 ha	29,981	5	494	3.6
100 - 200 ha	61,308	11	488	3.5
200 - 500 ha	87,581	16	319	2.3
500 - 1,000 ha	55,372	10	96	0.7
> 1,000 ha	194,839	37	67	0.5
summary	547,849	100	13,724	100

Table 6. Share of agricultural and forestry economy to national GDP from 2000 to 2003

Year	Total GDP	GDP agriculture+ forestry		GDP forestry	
	Mrd. €	Mrd. €	%	Mrd. €	%
2000	206.67	2.89	1.4	0.69	0.3
2001	212.51	3.02	1.4	0.69	0.3
2002	218.33	2.94	1.3	0.79	0.3
2003	224.27	2.94	1.3	0.88	0.4

Table 7. Distribution of forest area according to type of purchase

Type of purchase	Total number	Share	Total area (ha)
Major purchase	68,363	40%	948,054
Secondary purchase	96,260	56%	785,880
Juristic persons	6,303	4%	1,526,367
Total	170,926		

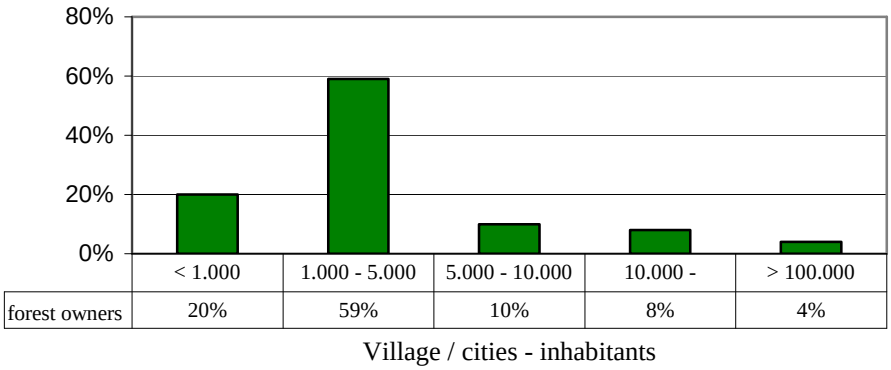


Figure 2. Forest owners domicile

The following overview shows volume and share of wood harvesting in Austria; information about smaller units is not available.

Table 8. Volume and share of wood harvesting according to forest holding size

Categories	Wood harvesting		Utilisation
	Standing gross volume	%	Standing gross volume per hectare
Small-scale forestry	9,046,000	48.1	4.8
200 - 1,000 ha	1,900,000	10.1	5.7
> 1,000 ha	4,727,000	25.2	7.9
Public management units	441,000	2.3	5.0
ÖBF AG	2,683,000	14.3	6.1
Summary	18,797,000	100	5.6

Non-wood products for example hunting, fishing, tourism, forest service, gravel, Christmas trees, contracting nature conservation.

Table 9. Income from non-wood forest products

Year	Non-wood forest products, million euro (nominal)
1988	11
1992	16
1996	18
2000	17
2003	20

There are no essential studies or statistics on **non-wood activities** of forest holdings available. Basically non-wood goods are of low importance for small-scale forestry. Only a few of them emphasise non-wood products such as selling Christmas trees, gravel, fishing.

Regional differences for example in Styria do exist from southern to northern regions. In the north you can find farms with larger wood areas than in southern regions. The next thing is the closer relationship between farmers and landowners of northern Styria to their land and forest compared to low benefits in southern Styrian regions caused by smaller harvesting areas. Therefore people in this region have to find work in other professions.

23 Small-scale forestry practices

Timber harvesting per year and hectare amounts to 4.8 standing gross volume while the annual increment is about 10.4 standing gross volume in small-scale forestry. This results in 46% utilisation. This low utilisation percentage is caused by a low interest to gain profit from managing small-scale forestry. The timber harvesting report (HEM, Holzeinschlagsmeldung) also shows that 25% of total timber harvesting volume in Austria's small-scale forestry is used for self-consumption.

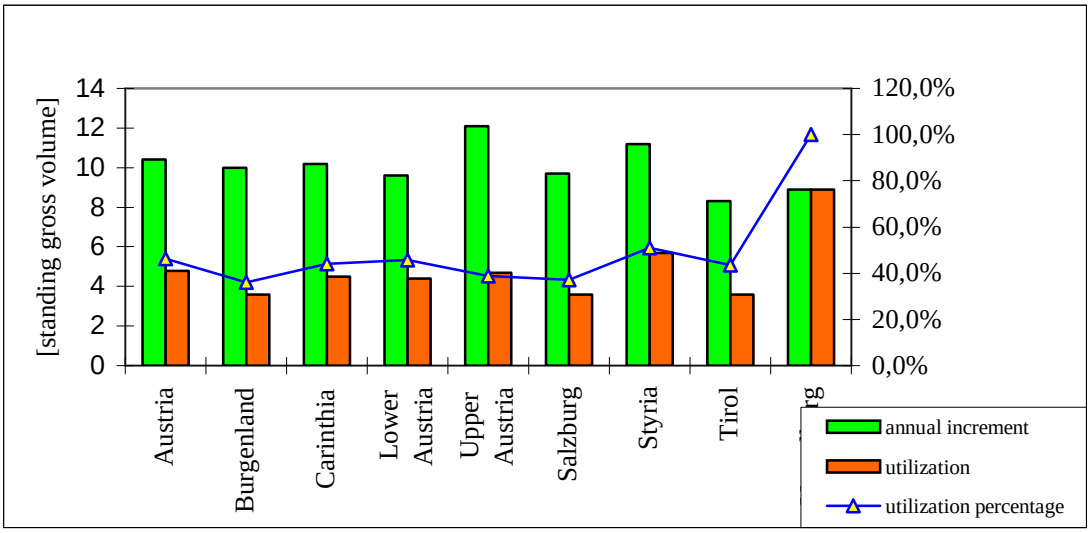


Figure 3. Annual increment, utilization and utilization percentage in Austria and regions

In **small-scale forestry practises** there is a low degree of mechanization (chainsaw and tractor skidding). The main trend for small-scale forestry in Austria in recent decades is that there is a growing number of owners without relationship to the property and that there is a shift from primary income from forestry to secondary income from forestry.

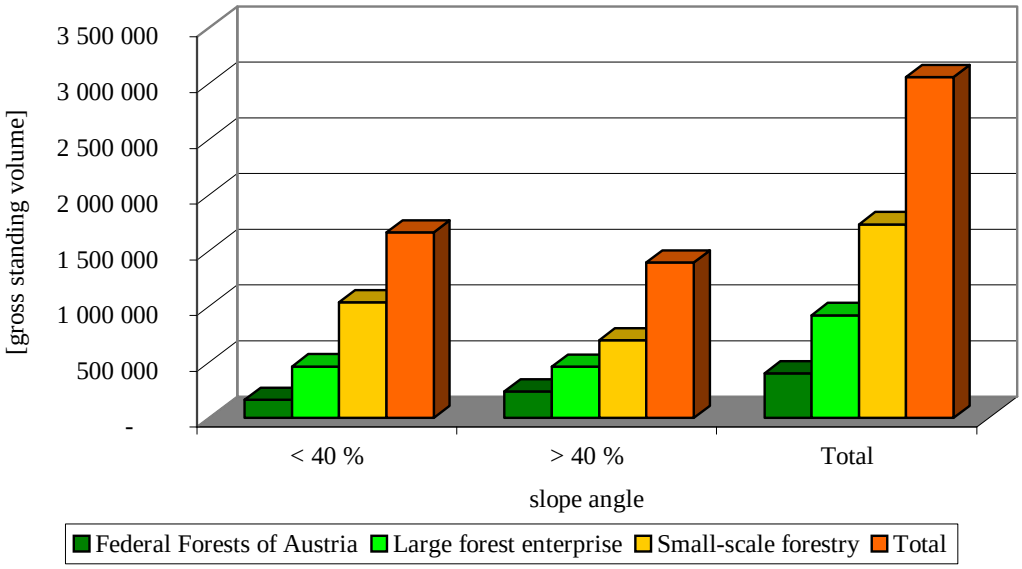


Figure 4. Distribution of commercial forest areas correlated to slope

Considering **forestry techniques** in harvesting, less than 40% of small-scale forest owners use harvester and forwarder, tractor and winch while over 40% use the cable crane.

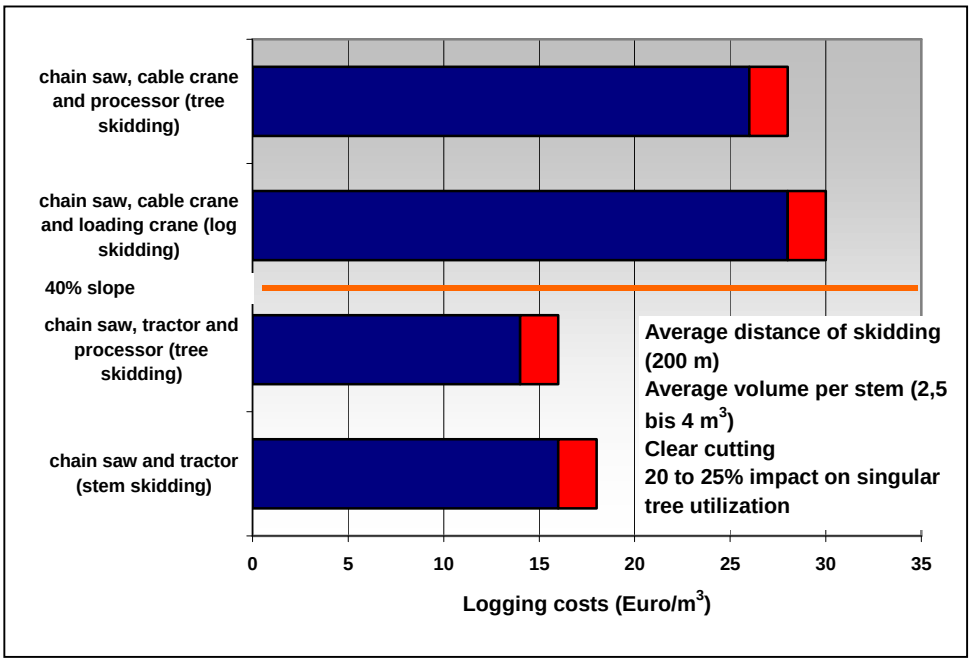


Figure 5. Logging costs depending on different harvesting methods and slope

Table 10. Austrian forest management association (Waldverband Österreichs)

	Number of members	**Forest area, ha**	**Sold timber volume, m³**
Austria	51,574	805,681	2,249,268
total share	30%	24%	15%

The main goals and activities of the Austrian Forest Management Association are:

- joint timber sale;
- increasing utilisation percentage for sustainable timber supply of saw mills;
- offering forest services;
- jointly using logistic projects;
- using Pan-European Forests Certification (PEFC);
- supply of biomass for wood heating projects.

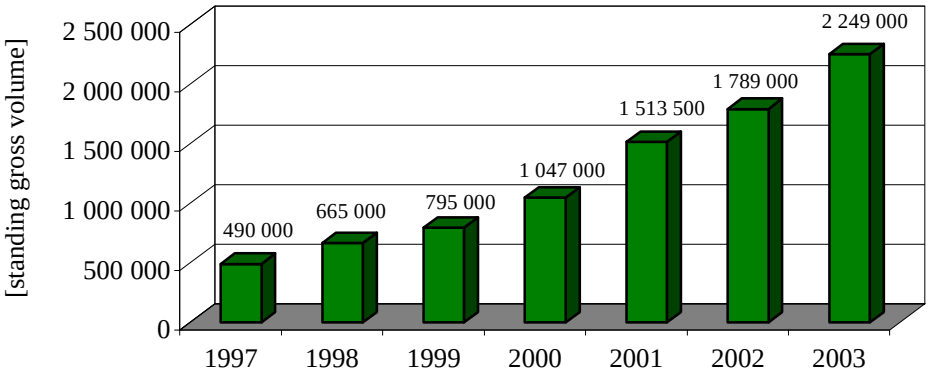


Figure 6. Total timber sale of the Austrian Forest Management Association

On average the **share of self-consumption** in small-scale forestry production amounted to 26% in the years 1974-1999, according to the timber harvesting report (HEM). In 2003 the share of self-consumption was 24% according to timber harvesting report (HEM).

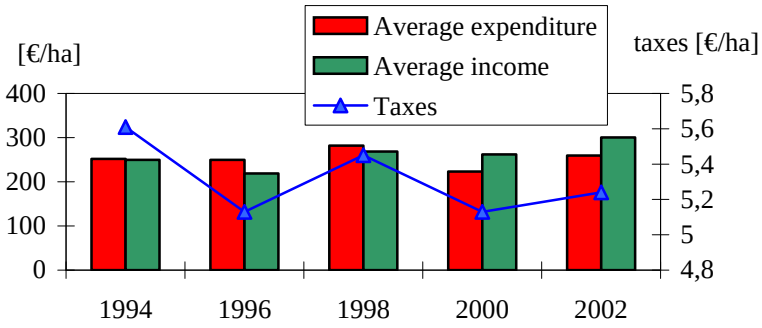


Figure 7. Costs and benefits of small-scale forestry related to annual felling volume

Usually no accounting records about **owners´ investments** in small-scale forestry exist because of the sporadic utilization. Additionally, there is no obligation for small-scale forestry to account investments. But since 1999 owners´ investments in small-scale forestry have been accounted (see Table 11).

Table 11. Investments in small-scale forestry per hectare related to annual felling volume

Years	Investments in euro per hectare related to annual felling volume
1999	52.52
2000	31.73
2001	50.65
2002	37.62

The average share of working days in forestry in total family working days (Familienarbeitstage) 2000 was 6.4% in 2000. The share of forestry yield on total yield was about 5.0% in 2000.

A main characteristic of **innovation behaviour** is building forest management associations and joint ventures for investments, working groups, etc.

In the main, the Austrian forest owners are divided in private forest owners, Federal Forests of Austria (ÖBF AG) and public forests. Small-scale forestry owners are mainly pooled in **forest management associations**. Large Styrian firms, for example, have concentrated their timber sale in one forest management association called “mountain forest” (Bergwald) as member of the Association of Styrian Forest Owners (Waldverband Steiermark).

In Austria there are about 843 **long-distance biomass heatings** with a total output about 1005 MW existing (including all locations with more than 100kW). Most of them are managed by forest owners.

In the case of **wood energy contracting** farmers act as contracting entrepreneurs. They sell “heat” and so they are no longer raw material suppliers. Under this scheme, a group of farmers invests in the complete biomass plant including any building measures and rents the heat customer’s cellar. They are responsible for ensuring proper functioning, maintenance and repair of the heating system. The customers are buying the heat and pay a one-time connection charge and the heat price measured by a heat meter. The money for energy supply remains in the region – valuable jobs in forestry and trade are kept respectively created.

One essential safety factor for heat customers in such models is that the Association of Styrian Forest Owners (Waldverband Steiermark), as the umbrella organisation of forest owners, assumes liability for non-collection for the farmer-operator group when supplying to public customers and multi-storey residential buildings.

The first wood energy contracting project in Styria was completed at the end of 1995, in the middle of 2003 the hundredth Styrian wood energy contracting project has opened.

In these 100 projects with 10.5 MW heat output, about 30 000 m³ wood chips from domestic forests are used to produce comfortable and renewable heat.

Actually there are no studies or statistics on the **form of timber procurement** existing. But generally it works as in the following described:

- First a written contract (Schlussbrief) is made between forest owner and timber demander about tree species, quantity, assortments and price;
- Timber is mostly supplied after cut into lengths; it's not very common to sell timber on stand to harvesting companies;
- Recently it is very useful in small-scale forestry to sell timber within a forest management association: The community negotiate with a few varying timber demanders written contracts as described above. So if the forest owners (members) like to sell timber, they only have to contact their association and inform themselves about the valid contracts, before cutting trees. Therefore it's up to the community to co-ordinate especially the removal of timber to each purchaser.

Timber markets, in principle, work as described above. The most important thing in making a written contract is to fix the quantity and price within the opponents and to fix time of delivery. Usually they are valid over a period of a couple of months. Contracts are legally binding for both (supplier and demander). There also exist a policy for timber-business; it is called the Austrian "Holzhandelsusancen". This should be the foundation for each contract.

A special case is the auction market (Wertholzsubmission) – in Austria there exist three of them for a few years. It is a market only for top qualities of broad-leaved logs. The emphasis is to offer hardwood (the share of broad-leaved trees in Austria is very low, it is close to 20 percent) in a concentrated form. This results in advantages for supplier and demander: for demanders it is possible to get a lot of best qualities within a short time and the suppliers are able to get adequate prices.

2.4 Policy framework and production conditions

Legislations that regulate and influence activities in small-scale forestry are:

- Forest Act;
- environmental legislation;
- the Austrian Civil Code (ABGB - Allgemeines Bürgerliches Gesetzbuch);
- water right.

District governments (Bezirksverwaltungsbehörden) directly influence small-scale forestry by watching the application of the Forest Act. Chambers of agriculture and forestry consult forest owners in all forestry interests.

Financial incentives respectively financial supports are provided for:

- forest road building;
- innovation and information;
- silviculture;
- forest management associations;
- forest engineering.

District governments and regional chambers for agriculture and forestry take directly influence on small-scale forestry production. Main tasks of regional chambers are for example to support farmers and landowners in managing their forest and agricultural areas, building forest streets or establishing forest management associations. At least chambers inform about financial supports and help to receive them. District governments take care of the Forest Act, laws for conservation of nature and water concerning forest management.

Research institutions and their main competencies:

- University of Natural Resources and Applied Life Sciences in Vienna (BOKU, Universität für Bodenkultur Wien). Main competencies: science and teaching.
- Austrian Federal Office and Personal Centre for Forests (BFW, Bundesamt und Forschungszentrum für Wald). Main competencies: science concerning different parts of forestry (forest engineering, forest street building, job security), Austrian Forest Inventory (Österreichische Waldinventur), forest genetics, etc.
- Education and training institutions (Forstliche Ausbildungsstätten, FAST)
    - FAST Pichl
    - FAST Ossiach
    - FAST Ort

Education and training institutions:

- University of Natural Resources and Applied Life Sciences in Vienna (BOKU, Universität für Bodenkultur Wien)
- Technical Forestry High School in Bruck/Mur in Styria (Höhere Technische Lehranstalt für Forstwirtschaft)
- Forstfachschule Waidhofen an der Ybbs
- Two education and training institutions (Forstliche Ausbildungsstätten, FAST) FAST Ort and FAST Ossiach are part of the Austrian Federal Office and Research Centre of Forests BFW (Bundesamt und Forschungszentrum für Wald). FAST Pichl in Styria is part of the Landeskammer für Land- und Forstwirtschaft in Steiermark.
- Forstliche Kursstätte Hohenlehen, Hollenstein an der Ybbs

Extension services and consulting institutions can be pooled in chambers for agriculture and forestry. Also rural and development institutions like the LFI (Ländliches Fortbildungsinstitut) are part of the chambers.

National state forest services have to watch the application of forest act. Chambers of agriculture and forestry consult the owners of forest areas concerning different forest interests.

3. Wood-processing industries

Summary

Wood processing industries in Austria are competitive on a world market, and under stiff world market prices, in a range of commodity products, including sawn wood, paper and panels, amongst others. Most of these industries have gone through a consolidation phase, with decreasing numbers of mills and larger production volumes. Recent efforts by these traditional industries have focused on opening up new markets and new sources for raw material. A range of product concepts was developed to a more industrial and standard type of production, including laminated beams by sawmills and prefabricated houses. However, the typical barriers to innovation and entrepreneurial behaviour abound. The majority of firms are small-scale family firms, there is a low knowledge generation and application capacity within firms, lack of venture capital, etc. Research is increasingly being recognised as a main source of long-term competitive advantage and a series of programmes have recently been initiated to support research efforts and better networking amongst related institutions, which has been a somewhat weak point in the past.

3.1. State of the art and historical development

On average, there is a good data situation on wood-processing industries in Austria. Since the EU accession of Austria, data are collected monthly (previously periodically). However, these data only include enterprises with 20 or more employees. Results of production and other statistics are not extrapolated to all enterprises (including <20 employees). Therefore, there are problems in finding data on SMEs with less than 20 employees. Further, some data are collected on a random sample basis (20% of all enterprises) and comprise 90% of value added.

Overall, the data and information stock and availability reflects the structure of the Austrian woodworking industry, i.e. strong sectors are quite well covered, fragmented sectors are considerably less well covered.

Regarding innovation activities and cultures in the wood-processing industries as well as the contribution of these industries to rural development there exist large information gaps. But research in and for the woodworking industry has risen over recent years (e.g. WoodKplus, FFF, other initiatives). Main challenges for wood-working industries comprise for example strong diameter wood as a technical, economic and ecologic problem.

Furthermore, continuous supply situation, prices and co-operation along the forestry-wood chain has considerable potential for improvement, e.g. by more integrated logistics concepts.

3.2. Wood processing industries

Wood processing industries contribute about 3.9% to the Austrian **GDP** (in 2002). This means a slightly decrease in economic importance over the last decades (contribution to GDP in 1976 = 4.1%). However, within the production sector the wood industry could increase its share (from 16.3% in 1976 to 19.8% in 2002) (Schwarzbauer 2004, 7). Table 12 shows the contribution of forestry, woodworking industry and paper industry

to GDP in the years 1976 and 2002. Only the paper industry could increase its contribution to GDP by 0.2%.

Table 12. Contribution of the Austrian wood industry to GDP 1976 and 2002

Sector	**1976**	**2002**	**% change 2002/1976**
Forestry	1.0	0.4	- 0.6
Woodworking industry	2.3	1.9	- 0.4
Paper industry	1.8	2.0	+ 0.2
Wood industry in total	4.1	3.9	- 0.2

Source: Schwarzbauer 2004

Although the share in GDP decreased, production of wood products increased over the last decades and Austria remains a quite important producer of wood products in the world. For example, in roundwood production, Austria ranks 8th in Europe and 40th worldwide. In coniferous sawnwood production Austria ranks 4th European-wide and 8th globally. In 2002, Austria produced 14% of the coniferous sawnwood in the EU-15, 8% of wood based panels and 5% of paper and paperboard. World production shares are between 1% (paper) and 4% (coniferous sawnwood). The per-capita production of coniferous sawnwood is twenty-five times higher than the world average, fourteen times higher for wood based panels and eleven times higher for paper and paperboard. Per capita fuel wood production is far above the EU average and even higher than the world average (Schwarzbauer, 2004, 5).

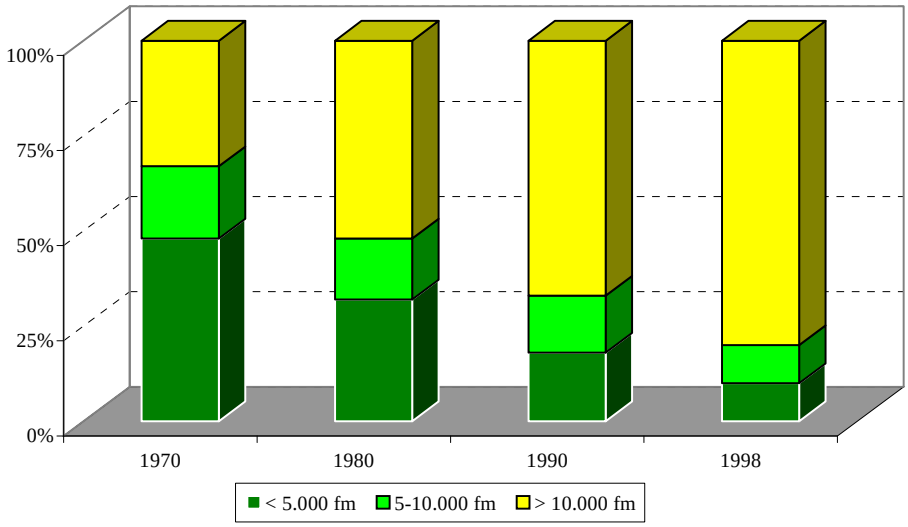
In 2002 sales by the Austrian wood industries amounted to 5.15 billion euro. The wood industries comprise about 1,750 enterprises of which 1,400 are sawmills. Most of these enterprises are medium-sized. They employ 30,878 people (companies >20 employees). The wood industries are an extremely wide-ranging economic sector. Of greatest importance in terms of production are the sawmilling industry, the furniture industry, the construction sector, the board industry and the ski industry.

In most important woodworking industry sectors (sawmill, pulp/paper, panel) a concentration tendency could be observed over the last years: While on the one side, the number of mills as well as the number of production locations decreased, the production capacity, productivity and number of employees in remaining sites increased on the other side.

Furthermore, international orientation increased in wood-processing industries. Imports increased and exports partly increased. There is a tendency to expand value added production, i.e. a shift from secondary to further processing (e.g. furniture). In addition, many firms established new production facilities in Central and Eastern European Countries.

There are large differences in the **structure of wood industries** sectors with regard to the **number of companies** and distribution of sizes. While the Austrian sawmilling industry counted 1400 companies in the year 2002, the paper and paperboard industry and the panel industry counted only 30 respectively 39 companies. About 1200 companies in the sawmilling industry are small-scale, with a total number of employed people of about 10,000.

In the last decades a major concentration process has occurred in the Austrian wood industry, mainly due to technological developments. The number of sawmilling companies decreased by over 70% between 1964 and 2002 (in 1964 there were 4 965 companies, in 2002 1400). In the paper industry the number of companies decreased from 78 in 1964 to 30 in 2002 that is over 60% (Schwarzbauer 2004, 34). Only in the panel industry the number of companies increased from 33 companies in 1964 to 39 companies in 2002. Above all it were small companies in the sawmilling industry that disappeared. This trend caused a loss of craftsmen culture in the wood industries. In 1998 1-2% of all companies produced about 50% of the total sawnwood (Schwarzbauer 2004, 34).



Source: Quelle: Fachverband der Sägeindustrie (1966, 1999) cited in Schwarzbauer 2003.

Figure 8. Share of production of annual production of different sawmill sizes in%

The production sold by the Austrian sawmilling industry in 2002 amounted to 1.84 billion euro. Exports of sawn softwood reached the record quantity of some 6.3 million m³. Approximately two thirds of all exports go to Italy.

The Austrian particleboard, fibreboard and MDF Industry is an important part of the Austrian wood working industry. This industry has experienced rapid growth during the past few years. Nine sites are the locations for the following main producers: Egger, Funder, Kaindl, Homogen, Novopan. In 2002, the value of the particle and fibreboard produced amounted to 668.4 million euro while the production of MDF board amounted to 105.6 million euro (The Austrian Wood Industries 2003).

In 2002, sales by the construction elements industry amounted to 1.51 billion euro. The production of windows, the most important branch contributed 340.9 million euro in 2002 while the production of prefabricated wooden houses had a production value of 333 million euro. Regarding doors, production in 2002 was at 231.5 million euro. Wood floorings (parquet and strip floorings) had a production of 134 million euro. The

production of glued laminated timber elements in 2002 was at 159.4 million euro (The Austrian Wood Industries 2003).

In 2002, the Austrian furniture industry produced furniture in the value of 1.33 billion euro, of which 380.6 million euro (23.6%) was exported. The volume of the Austrian domestic market in 2001 amounted to 1612 billion euro.

The Austrian paper industry is a major industry branch of the Austrian forest sector, with a turnover of about 3 billion euro. In 2002 27 companies were operating in Austria with 29 mills, down from 31 companies and 33 mills in 1990. The paper industry employed 9560 persons in 2002, down from 12300 total manpower in 1990. This industry is highly export oriented, with 84% export, up from 76% in 1990. A further main component of the paper industry is the high rate of recovered paper collection (52% of total paper consumption is apparently collected). About 40% of total paper consumption is recovered paper utilisation (The Austrian Wood Industries 2003).

More than 60% of the alpine skis produced worldwide came from Austrian factories. The quantity sold last season is estimated to be some 4.5 to 4.6 million pairs of skis. In 2001, Austria exported alpine skis to the value of almost 200 million euro (The Austrian Wood Industries 2003).

The demand for wood pellets increased continuously during the last years due to a boom in combined heat and power plants. In 2004 sales of pellet furnaces increased by 20%. However, the production of pellets grows even faster. For 2005 a production of about 450 000 t is forecasted, while the Austrian consume will amount to only 250 000 t. It is envisaged to export a large share of the pellets to Italy and to increase domestic consume, for example by promotional means.

In 1999 the Austrian forestry and forest sector industries, excluding the furniture sector, produced an **added value** of about 5 2 billion euro. To this value added the woodworking industry contributes about one third, followed by the printing and publishing sector with about 30%.

The Austrian forest sector is characterised by two main value flows: the first leads from the "roundwood and raw wood" via "sawn and planed timber", "veneer and wood panels" and "turnery and wooden products" to the sector of "wooden furniture and carpentry". A small percentage goes directly into the building sector. This value flow ends for the most part in final usage. The second value flow goes from the sectors "roundwood and raw wood" via "sawn and planed timber" and the sector "pulp and paper" into export. One third of the value from "pulp and paper" flows into "processing of paper and paperboard" and to production of "printing and publishing". From there the flow ends up again in end usage (Eder 2000).

The wood industries are highly export oriented with an **export share** of almost 60%. Sawn softwood, wood-based panels and skis are the most exported articles. In 2002, the total export volume was 4.08 billion euro. With 65.6% (2.68 billion euro), the European Union is the most important buyer of Austrian timber products. The two main export

destinations are Germany and Italy. In all, products amounting to 2.32 billion euro were imported. The foreign trade surplus in 2002 was at 1.77 billion euro.

Table 13. Distribution of wood exports and imports in 2000

Wood export (2000): 2.49 billion euro.
- 45% sawn wood (1.11 billion euro)
- 20% chip and fibre panels (490 million euro)
- 18% construction joinery (436 million euro)
- 11% veneer, finger joints and other (276 million euro)
- 4% round wood (94 million euro).

Paper export (2000): 2.88 billion euro.
Furniture from wood (seat and office furniture) and prefabricated houses: 457 million

Wood import (2000): 1.45 billion euro.
- 34% round wood (494 million euro)
- 19% sawn wood (276 million euro)
- 16% construction joinery (225 million euro)
- 12% veneer, finger joints and other (174 million euro)
- 9% chip and fibre panels (131 million euro)

Paper import: 1.42 billion euro
Furniture from wood (seat and office furniture)
and prefabricated houses: 828 million euro

Table 14. Austrian foreign trade of the forest sector 1966-2003 (billion ATS)

Year	Product	Import	Export	Trade balance
1966	Total Austrian trade balance	60.5	43.8	-16.7
	Wood, wood products	0.9	3.4	+ 2.5
	Paper	0.8	2.8	+ 2.0
2003	Total Austrian trade balance	1,098 5	1,079.8	-18.7
	Wood, wood products	18.9	39.1	+20.2
	Paper	28.2	53.0	+24.8
Change	Total Austrian trade balance	+1715	+2365	+12
2003/1966	Wood, wood products	+2000	+1050	+708
(%)	Paper	+3425	+1793	+1140

Note: currency in ATS (13,7603 ATS = 1 euro), Source: Schwarzbauer 2004, 10

3.3. Wood processing industries practices

In the wood working industries small enterprises dominate. In 1995 on average twelve employees were employed per enterprise. However as outlined above, there are large differences in the structure and sizes of enterprises. There are few larger enterprises in the panel industries on the one side and many small-scale enterprises in sawmilling industry on the other side (see Chapter 3.2.)

The **employment** structure of the woodworking industry is presented in Table 15. About one third of the employees in the forest sector works in enterprises with less than 20 employees.

Table 15. Employment in the Austrian forestry and forest sector

Sector	Employees (1000 person)
Forestry	14.1
Forest sector (> 20 employees)	59.0
Of which: Sawmilling	6.0
Panels	3.5
Construction	13.7
Furniture	21.7
Other wood products	5.7
Paper	8.4
Forest sector (< 20 employees)	32.3
Of which: Sawmilling	4.9
Construction	7.2
Furniture	17.9
Other wood products	2.3
Forestry and forest sector combined	105.4
Total employment Austria	3 447
Share of forestry and forest sector	3%

Source: Schwarzbauer 2003

Table 16. Investment 1993-2000 in selected forest sector industries

	1993	1994	1995	1996	1997	1998	1999	2000
	in million ATS current prices							
Paper producing industry[1]	2 084	2 538	5 406	4 028	8 508	3 668	2 650	3 352
Paper processing industry[2]	733	664	628	797	560	935	1 017	1 097
Sawmilling	604	834	1 102	2 573	1 660	1 134	5 517	3 181
Wood processing industry	1 894	2 599	1 528	1 726	2 205	1 962	2 294	2 096

Notes: 1: In German: Papiererzeugende Industrie
2: In German: Papierverarbeitende Industrie

Source: Fischer 2001.

As Table 16 shows there are large fluctuations in the investments in forest sector industries. Overall investments increased during the last decade. Especially the sawmilling industry experienced a large raise in investments.

In terms of cost structure, only the **profitability** of the sawmilling and panel industries are to a good part dependent on the cost structure of raw material input. Costs for forest products input in 1990 was slightly higher than 50% in these sectors, followed by wages and other costs. In the panel industry, costs for wood material amounted to 20% in 1990 (Eder 2000).

In the wood working industry there are some sectors that are quite innovative and competitive. These sectors comprise the paper industry and wood processing industry. Altogether small enterprises innovate less than large companies.

The wood industry has increased its activities for research and development in the last years. Until recently the wood research scene in Austria was characterised by a number of small research groups that were hardly connected.

In recent years some major initiatives and support programmes were established to promote co-operation on research and innovation in the forest sector. For example, the 'Wood K Plus Centre' combines research at universities with industrial research on wood composites and wood chemistry. The Austrian Wood Cluster (Kompetenznetzwerk Holz) aims at bundling the relevant research groups for the industry. The whole field from cutting the tree to the end product is covered.

The Austrian Wood Research Society (OEGH) (Holzforschung Austria) supports research and testing in the field of wood technology and strives towards the dissemination of research results into practice.

In recent years co-operation and networking in the forest sector has also increased through **cluster initiatives** ('Holzcluster'). Several regional clusters (e.g. 'Holzcluster Steiermark', 'Holzcluster Kärnten') exist that provide a platform for co-operation, research and innovation in the forest sector.

3 4. Policy framework and production conditions

Three Austrian **ministries** are addressing key areas of relevance to the forest sector (apart from the finance ministry). These are the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW), the Federal Ministry for Economic Affairs and Labour (BMWA), and the Federal Ministry for Transport, Innovation and Technology (BMVIT). A further important **institution** is the Austrian Standardisation Institute.

The main **private institutions** active in the forest sector are institutions from the Austrian Federal Economic Chamber and platforms created by these institutions. The main branches of the Austrian Federal Economic Chamber comprise:

- Fachverband der Holzindustrie Österreichs
- Fachverband der Papierindustrie
- Bundesgremium Holz- Baustoffhandel
- Bundesinnung der Zimmermeister
- Bundesinnung der Tischler
- Präsidentenkonferenz der Landwirtschaftskammern Österreichs

There are a multitude of other institutions active in the sector. This comprises institutions such as the „proHolz Austria" platform or the Kooperationsabkommen Forst-Papier-Platte (FPP). Important further alliances or associations include:

- Hauptverband der Land- und Forstwirschaftsbetriebe
- Österreichischer Holzleimbauverband
- Verband Österreichischer Hobelwerke
- Verein Österreichischer Bau- und Fensterkantelerzeuge
- Österreichischer Biomasse-Verband
- Pelletsverband Austria
- Österreichischer Fertighausverband

The main **reform policies** affecting the wood industry development are the accession to the EU of Austria in 1995 and the enlargement of the EU in 2004. In addition the law on green electricity caused a boom in the establishment of combined heat and power plants. This, in turn, promotes the production of wood pellets.

There are a range of **financial support initiatives and institutions** that are also active in investment support for the sector. The most important ones are the:

- Austrian "Wirtschaftsservice Gesellschaft" as a specialised bank for enterprise support that runs a range of special programmes for investment and inducement of innovation;
- the Austrian Council on Research and Technology Development and
- the Austrian Kommunalkredit AG, a special-purpose bank to provide low-interest, long-term finance for the Austrian local authorities.

The main **research institutions** for the forest sector comprise:

- Holzforschung Austria
- Institut für Stahlbau, Holzbau und Flächentragwerke, TU Graz
- Institut für Tragwerkslehre und Ingenieurholzbau, TU Wien
- Institut für Stahlbau, Holzbau und Mischbau, Universität Innsbruck
- University of Natural Resources and Applied Life Sciences, Vienna: Institute of Wood Science and Technology
- Bundesamt für Wald
- Kompetenznetzwerk Holz - FFF Forschungsprojekte Holz
- Umwelt- und Innovationszentrum Judenburg
- Kompetenzzentrum Holz, Forschungsprogramm Holzverbundwerkstoffe und Holzchemie

The main **education and training institutions** are:

- University of Natural Resources and Applied Life Sciences, Vienna
- Holztechnikum Kuchl, HTBLAs in Mödling, Graz, Hallein, Imst, Wien, Bruck/Mur

The main **extension services** and consulting institutions are:

- Bundesamt für Wald and training institutions in Ossiach and Gmunden
- Civil engineers and technical bureaus as consulting institutions

3.5. Supporting and limiting factors for enterprise development in wood processing industries and barriers to entrepreneurship

Barriers to entrepreneurship have been well captured by the EU Community Innovation Survey 3 – they are mainly related to risk, costs, sources of funding, adequately trained and educated personnel, and proper information on markets and new developments.

Annex C: Organisations studying wood processing industries and main publications and information sources.

Organisations

- University of Natural Resources and Applied Life Sciences, Vienna (BOKU)
- Technical University Graz, Institut für Stahlbau, Holzbau und Flächentragwerke
- Technical University, Institut für Tragwerkslehre und Ingenieurholzbau
- University Innsbruck, Institut für Stahlbau, Holzbau und Mischbau
- Joanneum Research
- Holzforschung Austria (Austrian Wood Research Society)

Main publications and information sources

Eder, Asta 2000: Holzströme in der österreichischen Volkswirtschaft: Untersuchung der Verflechtung der österreichischen Forst- und Holzwirtschaft an Hand von Input-Output-Tabellen; Schriftenreihe des Instituts für Sozioökonomik der Forst- und Holzwirtschaft Band 41, Universität für Bodenkultur Wien.

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4. Non-wood forest products and services

Summary

NWFPS have not only been of high relevance in history (resin tapping, leaf and litter). Today some older uses are still important (hunting and fishing, cattle grazing, gravel digging), and new uses add to these: protection against natural hazards, kerbing of drinking water, horse-back riding, or mountain biking. The forestry sector itself has contributed by some specific services, e.g. forest pedagogics and the erection of biomass-based village heating systems. The examples of nature conservation services and village heating systems show that forest owners find ways to market new services from the forest. In the case of district heating, in Austria especially farm forest owners' co-operatives do not only provide wood chips but run the plants themselves and thus benefit directly from the value added produced.

Although the income from NWFPS in Austria is still almost negligible (without considering bio-energy), there seem to be high latent potentials. Competitiveness is affected negatively by small forest properties and high labour costs, but positively by the image of forests as regional resources, and a good institutional support in many provinces. Barriers to entrepreneurship are found as follows: timber-dominated education, missing entrepreneurial orientation in education, mental barriers of forest owners to new forest uses (services), farmers' focus on agricultural production, missing income interests of „new" or urban forest owners, and a generally limited entrepreneurial orientation of owners (most owners are only interested in secure capital investment; hunting etc.).

4.1. State of the art and historical development

Historical NWFPS that are hardly utilised any more in Austria are the collection of **resin** (Austrian black pine in lowlands, cembra pine and larch in mountain areas), and the collection of **leaf and litter** and the cutting of **foliage and branches** for agricultural purposes (animal fodder and bedding). Other historical forest uses that are still relevant are the collection of **berries and mushrooms** as well as **livestock grazing** and **hunting**. Historical uses of the forest are often carried out on farmers' forest land or they are rights that farmers hold in State forests or forests of other owners. Since mid of the 19th century, the hunting rights are allocated to the land owners and thus can be rented to others with the exemption of small parcels (below a minimum area that may be used as a hunting district in itself) that are taken together to a local hunting community (cooperative) by law.

In mountainous areas the role of forests in **preventing natural hazards** has been known since centuries. Forest law regulations provide for the securing of these protective forest services since the Empire's Forest Act in 1852. The regulations, adapted in the Forest Act of 1975, are still valid today and provide that beneficiaries have the right to demand necessary forest measures to maintain the protective services but have to pay for the costs. As these regulations are hardly implemented, subsidy programmes grant money for forest restoration measures in protective forests (Weiss 2000a).

Kerbing of **drinking water** sources is very important and has a long tradition as many communal drinking water systems are provided from forest areas. Connected with this tradition is the fact that usually the forest owners don't receive any reimbursement for the water although ground and spring water is generally regarded as private property.

Since decades a range of other "modern" forest uses are known: **quarrying** and **digging of gravel** (e.g. for house building and road construction), **renting** of forest land or buildings, etc.

Relatively new forest services are **various recreational and environmental services** (see e.g. Mantau et al.); the provision of these services has mostly been forced by a strong demand from society. While the open public access to all forest land in Austria was secured by the Forest Act since 1976, other – additional – recreational services are offered by forest enterprises on a free basis or for payments. The right for horse-back riding on forest roads and trails or the right for the use of land for skiing tracks have been offered earlier; riding mountain bikes is a younger development and forest roads have been opened on contractual basis with tourist clubs since some 10 years. Other recreational offers are still rather rare but comprise, e.g. renting of mountain cabins or cottages, use of rivers for water sports, etc.

Some ten years ago a new specific service has been developed by foresters and is offered by forest enterprises, namely **forest pedagogics** (Voitleithner 2002). Forest pedagogics activities want to teach nature and forest matters to the broad public. Clients are school children in the first place but also adults. The focus of such services may be more on the educational or more on the adventure side. Therefore, it is difficult to classify these activities as educational or recreational.

Since recently **nature conservation** on forest land is seldom realised through official directions but rather on contractual basis. Nature conservation services are usually paid for by public institutions today, mostly by the provincial governments that are in charge of nature conservation matters, or by other public institutions (e.g. the federal forest research institute for the Austrian forest reserves network). The legal status of the protected forest land through these projects may be only the time restricted contract (10 or 20 years), a nature conservation area by decree or even a National Park. In the case of the Natura 2000 framework, the protected areas are decided but contracts and management plans are still to be developed (Kautz 2002). Examples where forest enterprises offer actively their land and where private institutions pay for the services are very rare (Neuwirth and Weiss, forthcoming).

One might also mention the production of **heating** energy on forest biomass basis as a forest-related service, as Austrian forest owners often do not only provide the raw material (wood chips) but also run e.g. district heating plants (Weiss, forthcoming; Kubeczko et al., forthcoming).

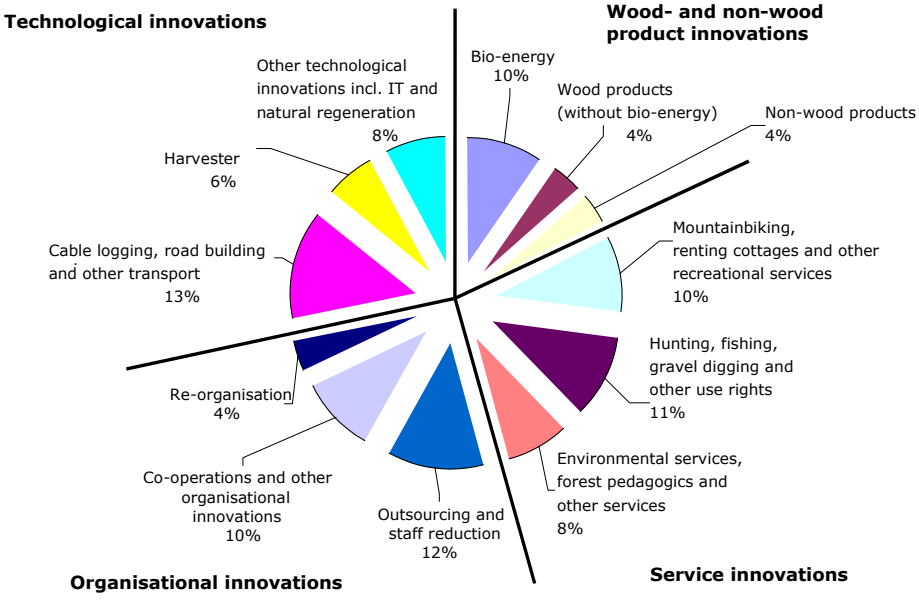
In future, new applications of chemical compounds from trees for technical, cosmetic and chemical - pharmaceutical applications in industry might be used. NWFPs (or, better non-timber products) in that field may be defined as all parts of the tree. Besides of wood these are bark, foliage, fruits and also "residents" of the trees (mistletoe, fungi).

The focus lies on by-products, that primarily occur during silvicultural activities, e.g. during harvesting and in the sawmill. Ingredients such as terpenoids, phenolic compounds (phenols, polyphenols, flavonoids, lignans, tannins), alkaloids, essential oils, resins, gum rosin, terpentine, etc. show a big potential of being industrially used (see Box 1).

Box 1. Taxol as a possible new non-timber forest product

Taxol is a plant - derived anti cancer drug. Its anticancer properties were discovered during clinical trials conducted by the National Cancer Institute (NCI) of the United States. The compound was first isolated from the bark of the Pacific yew, Taxus brevifolia, but was also found in the bark and needles of Taxus throughout the world. Another promising alternative to taxol because of its greater yield in plant parts is taxotere, a related compound, which is produced by extraction of the needles of Taxus baccata, the European yew. For market penetration their production, conversion, processing, preparation (price!), demand within the industry (chemical industry, wood adhesives industry, cosmetic industry,..) as well as their market potential in Austria must be studied. This shall lead to one or more concrete product developments with identification of the potential to convert the product into a pilot scale production. This would play an important role in the generation of value added for the Austrian forestry sector in order to strengthen sustainable incomes and create additional jobs in rural areas. The research field furthermore intends to raise the awareness of the forester for NWFP and their utilisation potentials. The Joanneum Research - Institute of Sustainable Techniques and Systems began to study in that field of research recently. Results on concepts on technological processes and economic preconditions are still at the beginning.

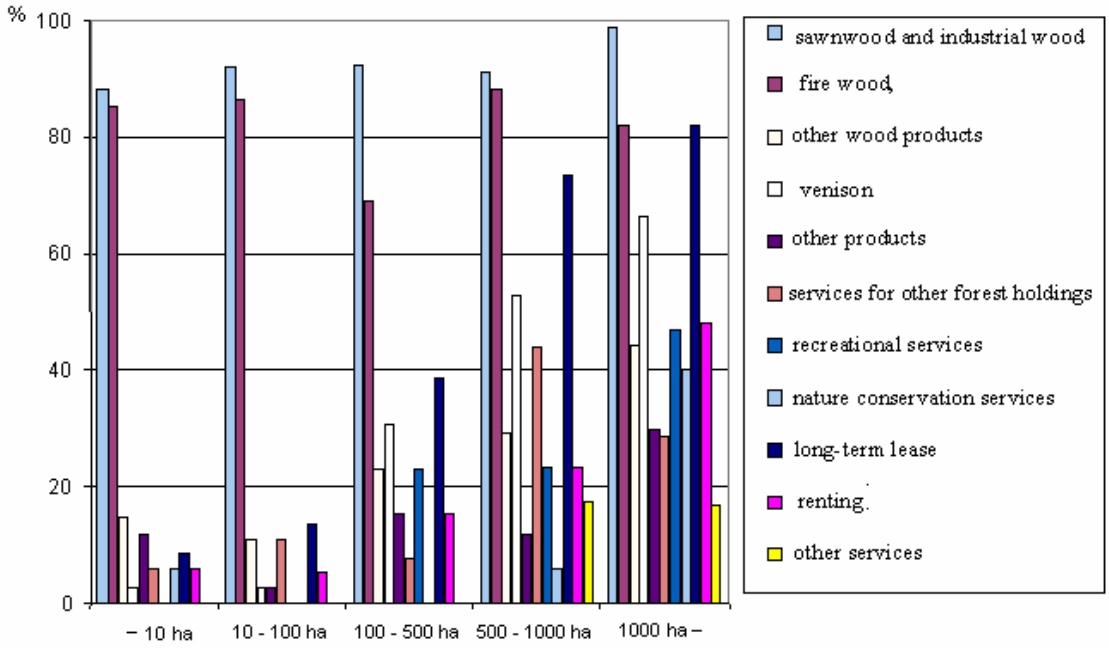
A recent survey among forest holdings on innovation and entrepreneurship has asked for the role of different products and services in forestry. The results show that 33% of all types of innovations (technological, organisational, products and services innovations) concern NWFPS (see Figure 9).



Source: Translated from Rametsteiner and Kubeczko 2003: p. 70.

Figure 9: Distribution of innovations of Austrian forest holdings across different types of innovation

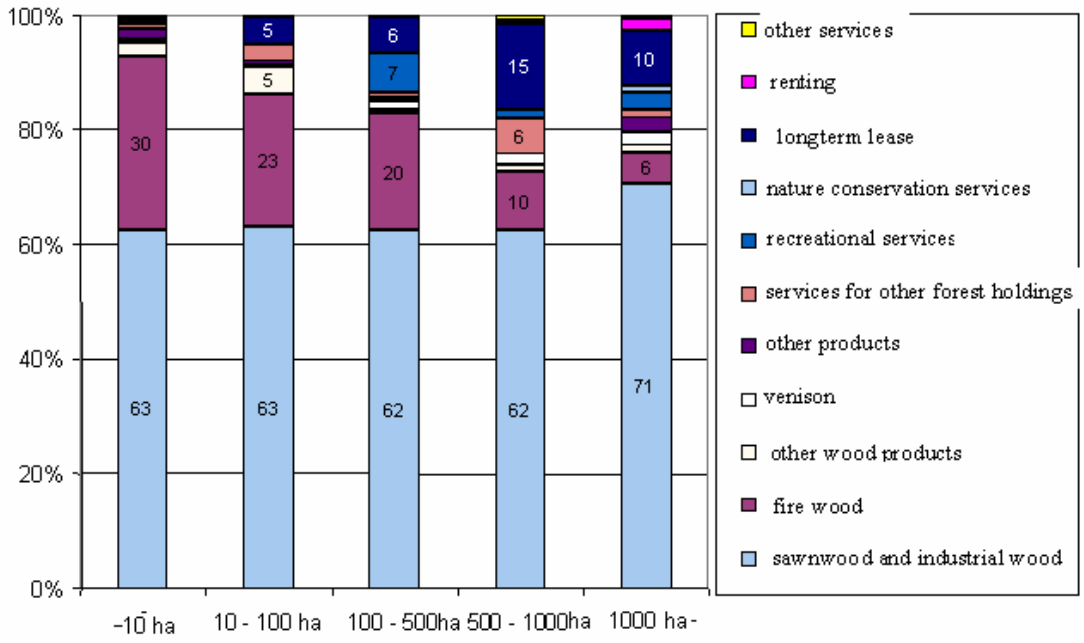
The mix of forest products and services offered by Austrian forest enterprises is quite broad. There are significant differences in this mix between small and large forest holdings; while small (farm) forest owners rarely offer many more products and services besides of timber, larger forest enterprises are quite active (Figure 10).



Source: Rametsteiner and Kubeczko 2003: p. 65

Figure 10. Product mix of Austrian forest holdings for different size classes

The main income of Austrian forest owners is clearly generated by timber (and fuel wood). According to the survey, a quarter of the income of medium forest holdings is generated by NWFPS (Figure 11.). Examples for a much higher share of this category are known from forest holdings that are located close to bigger cities. In larger holdings still a considerable share of income are NWFPS. In smaller forest enterprises this category is not so important.



Source: Rametsteiner and Kubeczko 2003: p. 66 (products and services as above)

Figure 11. Income generation of products and services in Austrian forest holdings of different size classes

In the Austrian forest act a restricted number of forest functions is **defined:** timber production, protective functions, welfare functions and recreation. Other forest products and services are not defined as forest functions by law and partly are regulated in other laws (e.g. nature conservation laws, hunting laws). The forest law in general sets the goal of timber production as the main purpose of forestry and thus restricts other activities in forests. The utilisation of forest land for other purposes is generally forbidden; exemptions are made for protective and recreation services and in certain cases for nature conservation (Weiss 2000b).

The agriculture and forestry sector enjoys some exemptions from the trade law regulations (Gewerberecht): up to a limited extent, farmers may be active in certain production fields, e.g. in tourism, food trade, etc. without being registered as such an enterprise. The range of these minor activities has been broadened recently offering more economic opportunities to farm forest owners.

A **classification of forest products and services** is used in the Eurostat programme "economic accounts for forestry". The results of this programme can be used to assess the relevance of NWFPS for rural economies. According to the database the value at producer prices of NWFPS is some 18 million euro/year (without hunting). In comparison, the value for wood is some 900 million euro/year. The data for this programme origin primarily from the Farm Accountancy Data Network, produced in Austria by the LBG Wirtschaftstreuhand and are reported in the Austrian Report on Agriculture (Grüner Bericht). The database comprises all forest holdings from 1 ha to 200 ha which covers about half of the forest area in Austria. Bigger forest holdings

contribute only little to the amount quoted above, respective values being derived from the accountancy network of bigger forest enterprises, which is maintained by the Forest Owners Association (HVLFÖ).

The Global Forest Resources Assessment of the Timber Committee at UN-FAO has no data for Austria. The IEEAF of Eurostat and the MCPFE (minister conference of the protection of forests in Europe) deal with indicators for other products and services of the forest but does not focus on market relations.

Details concerning the quantification of NWFPS have been documented by Grieshofer. Data might be found in the regional reports produced in course of the PEFC certification programme in Austria (6 regions).

A **general problem in studying NWFPS** shall be stated here, namely the fact that many of such activities are often excluded from the forest enterprise into new economic entities (e.g. companies Ltd.) if they exceed a certain turnover or if forced or suggested by trade or tax laws.

With regard to **property rights definitions**, the functions of forests as defined in the forest law have some indirect effects on the provision of forest services via the market. The Austrian forest act defines four **forest functions**, namely timber production, protective functions, welfare functions and recreation. While timber production is fully accepted as a private good, the other three services are partly defined as public goods: forest management in protective forests and in forests important for welfare services, e.g. drinking water protection, is partly restricted. Everybody has access to forest land for recreational purposes. According to the forest law, also mushrooms and berries may be collected by everybody for personal use if the forest owner not explicitly prohibits this use.

Water (ground water, springs and creeks) are generally by law regarded a private good in Austria. Further regulations, however, restrict the marketing considerably as public water providers have access to the water resources without compensation.

Nature and landscape conservation laws (that are in the competence of the federal provinces) in different ways restrict forestry activities for the purpose of nature conservation. In some federal provinces, the collection of mushrooms is restricted, e.g. to every second day. This regulation for some part is for the benefit of the land owner, however, landowners are not exempted from the regulation.

The **main information sources** for NWFP&S in Austria comprise:

- statistical information sources: EAF (economic accounts for forestry);
- databases:
    - EU RES-project on (Mantau et al.);
    - FADN (farm accounting data network);
    - GFRA (global forest resources assessment, FAO – by now no data for Austria available);
    - IEEAF (indicators);
    - Grüner Bericht.
- Studies:
    - Rametsteiner, Kubeczko 2003: Innovation und Unternehmertum in der österreichischen Forstwirtschaft. Wien: Universität für Bodenkultur.
    - Web sites: BMLFUW (ministry of agriculture, forestry and water management: www.lebensministerium.at);

The main **scientific organisation** studying non-wood forest products and services is the Department of Economic and Social Sciences at BOKU, covering economic (Sekot), market (Schwarzbauer, Meixner), and policy aspects (Rametsteiner, Weiss). Further activities in the field are known of the Austrian Institute of Regional Planning ÖIR (Schremmer), the Bundesanstalt für Bergbauernfragen and the IFF (University Klagenfurt). Natural science basics are studied, besides of the Department of Forest and Soil Sciences at BOKU, the Austrian Environmental Agency UBA (Hackl) and the Austrian Federal Forest Research Institute BFW. Single activities are known from other Universities (e.g. studies on the market potential of tourism use of forest buildings at WU). Data on the value of protective services of the forest may come out of the ongoing research programme FloodRisk.

4.2. Case studies of successful marketing strategies

Case 1. Nature conservation services of forests

Technically seen, nature conservation services of forests may be divided by using different criteria. With regard to the conservation object different forest types may be mentioned. With regard to the scale of the object, whole landscapes may be protected (e.g. national park), or smaller patches of forests, single forest stands, groups of trees or even single trees (e.g. tree monuments). With regard to the conservation goal, the service may be divided into the conservation of naturalness or biodiversity, or may be divided into total protection of the area or the maintenance of a particular management. Conservation goals that are related but are not nature conservation in the narrower sense, are drinking water protection, protection against natural hazards, etc.

In a project of the EFI PC INNOFORCE work programme on forest-related environmental services, classifications using different criteria are used, including the following (Table 17).

Table 17. Classifications of forest-related environmental services used in Innoforce Task 2.2.

		Conservation object									Conservation target							Ecosystem conservatn.			
		forest land	(single) trees	agricultural land	bog/moor	water	garden/park	rock/desert	snow/ice	cultural landscapes	protection of soils	water protection	protection against air pollution	climate protection	landscape conservation	traditional management practices	ecosystem conservation	naturalness	bio-diversity - genes	bio-diversity - species	bio-diversity - habitats
Market arrangement	sporadic payment																				
	long-term contract																				
	Certification																				
	Subsidy																				
	Purchase																				
	prize/award																				
Market partners	private to private																				
	private to public																				
	public to private																				
	public to public																				

In the Innoforce work, the nature conservation services are classified with regard to ecological as well as market dimensions. Regarding ecological aspects, conservation object and conservation goals may be used for a typology. Regarding market aspects, the kind of market arrangement and the involved market partners (private/public) may be used. A more detailed and developed categorisation is used in the Innoforce work (case studies database).

There seems to be a **high latent potential** to offer nature conservation services of forests, however, many forest owners are reluctant to utilising this potential. Forests in Austria covering half of the terrain, they are of interest for nature conservation in various respects. In general, this ecosystem/land use type is relatively “natural”, as a recent study about the degree of anthropogenic influences on forest ecosystems shows (literature): 35% of Austrian forests are strongly influenced or “artificial”, 25% are natural or very near to the natural state. Some of those ecosystems that are of particular interest for nature conservation are forests, or stand in close relation to forests (bogs, riperian zones, canyon forests, etc.). Forests are frequently the motive of campaigns of

nature conservation groups and have been the major ecosystem type of various recently protected lands or ongoing campaigns (national park, biosphere reserve, etc.). Most Austrian national parks have at least major shares of forest land.

Regarding **technical characteristics** of production it has to be noted that total protection will be differently administered than the maintenance of certain management practices. With total protection monitoring will be necessary and the main tasks are the protection of the forest against disturbance (e.g. public access, etc.) and to make sure that no hazards start from the protected area to other areas (e.g. bark beetle outbreak, avalanches, etc.). Specific management practices may demand certain skills and knowledge. Such management practices are often close-to-nature management, e.g. uneven-aged management, or traditional forest management, including grazing by livestock.

As mentioned, significant shares of Austrian national parks are forest; one of the most important instruments used in forest-related nature conservation are **total protection** areas (national parks, nature conservation or landscape protection areas, protected trees, etc.). Regarding the maintenance of sustainable management, **certification** initiatives should be mentioned. In Austria, two certification schemes are relevant: the Forest Stewardship Council (FSC) and the Pan-European Forest Certification scheme (PEFC). Whereas only few cases exist in Austria for FSC certification, practically the whole forest area of Austria is PEFC certified. Therefore, both are not very market relevant at the moment. FSC certification seems to be a market advantage because there is a certain demand and only little offer. PEFC certification seems to be without market effect as there is no discrimination to non-certified timber.

Of the Austrian territory 46% are forests. Almost a quarter of the national territory is under some nature conservation regime (23%), and 12% of these are forests. So, also about a quarter of Austrian forests is protected for nature conservation (26%). Most of this area, however, does not mean management restriction in forests. In sum, 3% of Austrian forests can be classified as a strongly protected area with the management objective “biodiversity” (according to the classification of the MCPFE category 1; UBA forthcoming).

Areas of protected forests
- Nature or landscape conservation: 26%
- Nature conservation: 3%

Areas of certified forests
- FSC: 4 004 (5 sites) (source: UNEP-WCMC, WWF, FSC & GTZ 2004)
- PEFC: practically all forest area.

In principle, all types (public and private) and all sizes of forest holdings are active in the **“product chain”** of nature conservation offers, however, larger companies seem to be more active as they are generally more active in market-oriented forest management (see Figure 10 and Figure above). With exception of the Austrian Federal Forests, all forest companies in Austria are medium or small or – most of them – micro (family) enterprises.

Most Austrian forest owners are not particularly active in offering nature conservation services, and, such activities are usually confined to contracts with the government. There are only very rare examples of market oriented activities. This behaviour is proven by the fact that only few owners actively pursue certification activities; the PEFC certification project is an activity, which was initiated and implemented by a forest owners' interest group (chamber of agriculture) without explicit and active involvement of the single forest owners.

One example for pro-active behaviour is the initiative BIOSA (Biosphere Austria, Box 2), an initiative of the non-obligatory land owners' interest group (Hauptverband der Land- und Forstwirtschaftlichen Betriebe Österreich, HVLF) that is actively pursuing nature conservation projects. This association of forest owners offers forests for conservation measures to governments or private sponsors.

Another example are the **Austrian Federal Forests** (Österreichische Bundesforste AG, Box 3) that also actively have contacts to nature and landscape conservation authorities and nature conservation groups. They implement nature conservation contracts with governments or joint projects with interest groups where they partly receive payments for conservation services, partly offer such services for free and where they sponsor nature conservation campaigns (sponsoring activities for PR reasons).

The majority of nature conservation projects can be seen **domestic**, although it is not in principle excluded that international sponsors or other organisations get active in nature conservation in Austria. In some cases, money from supra-national bodies might be used for nature conservation projects (EU structural funds, e.g. Interreg programme). Austrians may be active and paying for nature conservation abroad. One such project is known: the rainforest of the Austrians sponsored by private donations. In case of trade of certified forest products the market is principally international. There is, however, no detailed information available about domestic and international trade with these commodities.

In nature conservation, traditionally regulatory **policy instruments** have been applied by Austrian provincial governments (who are responsible for this policy field). Such instruments are national parks, nature or landscape conservation areas, natural monuments, etc.). Since recent years, however, the policies almost exclusively use contractual solutions. However, with regard to forests, the provinces to a very different extent include forest land into their programmes of contractual nature conservation. Historically, land owners only received money as a compensation for protected areas (and often only, if they took the case to the court). Today, contracts are usually negotiated on a voluntary basis.

The **Austrian forest law** itself provides for regulations to maintain forest land. Recent forest policy is oriented at maintaining or supporting rather "natural" forests (close-to-nature management), however, policies rely rather on financial means than regulations in this respect. Policy instruments include monitoring (Austrian forest inventory), subsidies (reforestation of natural mixed stands) and informational instruments (e.g. campaigns for close-to-nature management, state prize for exemplary forest management, etc.). The forest law is not particularly supportive or impeding with regard

to nature conservation projects. The recent amendment of the Austrian forest act, however, included the term of habitat conservation forests which makes it easier for forest owners to dedicate forest land for nature conservation, not being forced to maintain traditional forest management, at which the forest law in principal is oriented (so, e.g. reforestation is demanded after a number of years, forest protection measures are demanded in case of pests, etc.).

In practice, **forest agencies** are not very active in promoting nature conservation services of the forest, as traditionally this goal is not regarded a "forest management" goal. Forest agencies are rather used to block demands of nature conservation groups in forests as these commonly demand such services without payments. Research and education, in principle, exists at University level, but translation into practice is limited. It seems, however, that the situation is changing presently.

Nature conservation provides only small shares of **income** for forest holdings (see Figure 11.), however, it can gain small but significant shares in certain cases or if the company is active in this field. The Austrian Federal Forests, for instance, run two of their management units exclusively for nature conservation purposes (national park management). A considerably higher share of forests of the Austrian Federal Forests are under some conservation scheme than other Austrian forests, namely 46% of all of their land (Österreichische Bundesforste AG, no year). In the case of the Austrian Federal Forests it can be said that certainly a small but significant share of income is through nature conservation, when thinking of two management units with some 30 employees that are financed by national park funds, and a range of nature conservation projects on contractual basis. Alone in the forest nature reserve programme of the Austrian government 49 projects covering 2700 ha are on their land. The company, on the other hand, also dedicates preserved land areas without compensation, e.g. for the bog preservation programme of the WWF, and has a yearly budget of between 200,000- and 500,000 euro for ecosponsoring purposes.

Contracts in the most cases are made between the land owner and governmental bodies. Forest owners mostly provide the management by their own staff. This is even true in the case of national park zones on areas of the Austrian Federal Forests: two management units are particularly dedicated to the management of the national park areas, including all tasks like monitoring ecosystems or guiding visitors. In certain cases, land owners co-operate with nature conservation groups or universities, e.g. in a bog preservation programme of the Austrian Federal Forests with the WWF and the University of Vienna, or in a bog preservation project (Drescher-Schneider et al. 2000) of private forest owners in Styria and a research project. The latter project, like other conservation projects is managed by the above mentioned association BIOSA.

Box 2: The BIOSA initiative of Austrian land owners

BIOSA (Biosphere Austria) is an association of Austrian land owners that offers nature conservation services to public bodies or private organisations. BIOSA was founded in 1995 and has the goal to defend forest owners' competency and to defend their property rights in nature conservation issues. By actively offering contracts forest holdings strive to improve their image in the public and to maintain their influence on the management of their land. BIOSA is supported by the association of Austrian land owners. It designs and manages the projects and negotiates with possible financiers. Most areas are offered in the province of Styria and most projects are financed by public bodies. However, the organisation presently also strives to develop ecosponsoring projects.

Box 3: Nature conservation activities of the Austrian Federal Forests

Nature conservation as an issue has gained high attention within the Austrian Federal Forests Inc. (Österreichische Bundesforste AG) in the last twenty years. Almost half of their land is under some nature or landscape conservation regime, a quarter is strongly protected (nature conservation areas or national park). In history demands for nature conservation was defended, but today the company presents itself with a "green image". It wants to be a "competent partner" in the field of nature conservation and proves that in a number of joint programmes with various nature conservation groups (WWF Austria or Österreichischer Naturschutzbund) and the government (e.g. forest reserves network Austria). The company itself is active as a sponsor of nature conservation activities. The strategy of the company today is to offer nature conservation areas for compensation. This strategy was successfully employed in the case of two national park projects, where the company is compensated for the areas and receives a yearly budget for the (nature conservation oriented) management of their areas. In two "national park" management units a staff of 35 is employed. The company also manages a range of contractual nature conservation projects that are usually paid by governments. The goal of the company is not so much to make profit from nature conservation but to keep the land under their management, possibly with compensation and to improve their public image.

It can be said that forest holdings in the majority act as **necessity driven** entrepreneurs. Initiatives for environmental or nature conservation projects are usually set by the demand side, e.g. nature conservation groups or the provincial governments. There are, however, a few examples where also the forest owners actively offer such services, e.g. the Austrian Federal Forests or the land owners' initiative BIOSA.

In conclusion, it can be said that one of the most relevant aspects in the development of environmental services of forests is the fact that most Austrian forest owners are used to stand in opposition to nature conservation groups or agencies. On political level, nature conservation is demanded in forests without compensation schemes, e.g. by regulatory means. There is an **interest conflict** between as well as an **ideological opposition** of "users" and "conservationists" as the commercial utilisation stands against the preservation of nature.

A few examples of forest owners active in nature conservation show that the conflict may (at least partly) be solved through common projects of both groups with compensation schemes. It seems that successful examples of co-operation between the groups may act as impulses for better communication between the potential market partners.

So, in sum, **strengths** of the forest sector are the disposal of close-to-nature ecosystems and the technical competence of foresters and their experience in natural resource management. **Weaknesses** are the ideological prepossessions of both foresters against nature conservationists, and vice versa, of conservationists against foresters. The

resulting limited relations between the forest sector and nature and environmental conservation groups and, as a result, a limited understanding of the needs of the potential customers on the side of the forest owners and managers. In general, it can be added, that in the forest sector there is little understanding of new emerging needs of urban groups of our society. The sector acts and thinks rather resource-oriented than demand-oriented. **Opportunities** are seen if relations of the forest sector with potential clients are further developed. Forest holdings might offer all different kinds of environmental services, including bio-diversity conservation, water, carbon sequestration and many others through different market mechanisms (certification, ecosponsoring, eco-tourism, contractual management, etc.). **Threats** are only seen with stagnating economic development.

Open questions refer to the stated opposition of groups of land owners and conservationists that might also be potential market partners. Possibilities for their co-operation in various forms should be investigated in more detail. Relevant topics are different fields of co-operation are different market arrangements, for instance, contractual nature conservation, eco-sponsoring, certification, etc. For some of the many possible market arrangements first experiences in practice could be studied in more detail, but some forms of marketing nature conservation services have even not yet been tried much. Another question of interest could be the role of the "Austrian forest dialogue", an ongoing national forest programme process, on the co-operation of and communication among the potential market partners.

In course of the EFI PC Innoforce a **database** of cases of forest-related environmental services has been developed. This database could be further developed and could also be used in the COST Action E33. The database describes cases on about one page, including short description of the projects and a range of information like conservation goals, market arrangement and market partners, financing, etc. Such a database could be used for comparisons between different types of environmental services or between countries.

Case 2. Wood chips production and biomass based district heating systems

The cases on wood product innovations represent innovations in different stages of the production process, and not exclusively in the "forest" stage. Forest owners have much innovation potential if looking beyond the forest production itself. Austrian farmers do not restrict themselves to the production of wood chips – they also offer **biomass based district heating systems** for entire villages.

In this case we present a new field of activity of forest owners in Austria, namely the **production of energy from forest biomass**. Forest holdings and often farmers' co-operatives do not only produce wood chips but also run district heating plants themselves. By this they do not just offer the non-timber product of wood chips, but they diversify into energy production and offer the service of heating to public and private buildings. The district heating systems are often established in rural settings, including just few buildings, central parts of villages, or even parts of larger cities.

The potential of Austrian forests to provide biomass is great. Almost half of the country's territory is covered with forests, but only **two thirds** of their increment is

harvested. Non-harvested wood assortments are particularly small-diameter wood that is not easily marketed. For these assortments the biomass market is a new opportunity.

The **production** of forest biomass for energetic use is usually not the main product of a stand. Exemptions are forests on bad sites that are not able to produce quality timber (e.g. dry sites of broad-leaves) or so-called "energy-woods" that are planted on formerly agricultural land. Biomass usually comes from thinnings and/or is residues of harvesting activities in general. The wood material of smaller diameters or bad quality which is not usable for sawnwood is usually first stored on the site of the timber depot in the forest, chipped and transported to the costumers. Costumers (e.g. district heating plants) provide for storage room with capacities between 2 or 6 months. District heating plants usually dispose of open but roofed storage rooms were the material dries before usage.

Different **technical processes** are available for producing the heat. Besides of conventional furnaces also other technical solutions have been developed for large scale bio-energy systems. Larger systems, furthermore, increasingly combine biomass with solar energy (which is particularly used in the summer period when the solar system replaces the biomass system), and combine heat with electricity production. Different technical solutions have been developed for the electric power generation and there are several research programmes active in this field at the moment. Austria is a leading country in the bio-energy field.

A specific problem to be solved is the logistical problem of wood transport, especially with large scale bio-energy systems. At the moment a few larger bio-energy plants (> 20 MW) exist and around ten are in the planning stage. In one example, a site in Vienna, 62 MW shall be produced, needing 625,000 m^3 of wood chips per year (see Box 4).

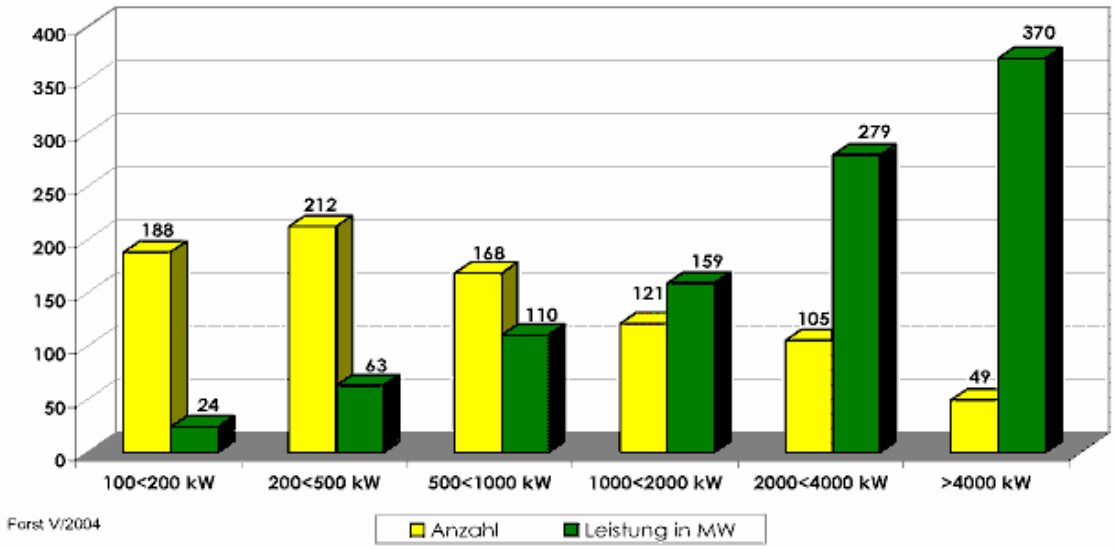
By the end of 2003, 843 biomass-based district heating systems with a capacity of 1005 MW existed (see Table 18 below; Jonas/Haneder 2004). According to estimations, some 600 systems with capacities <100 kW have been established during the last years (EVA 2004).

Table 18. Biomass district heating plants in Austria, data for 2003

Federal province	Number of plants 2003	kW	MW	kW/1000 pop.
Burgenland	39	54,962	55	198
Kärnten	84	140,810	141	250
Niederösterreich	207	242,870	243	157
Oberösterreich	154	153,262	153	112
Salzburg	73	74,120	74	143
Steiermark	206	209,696	210	174
Tirol	41	94,430	94	141
Vorarlberg	39	34,710	35	99
Total	843	1,004,860	1 005	124

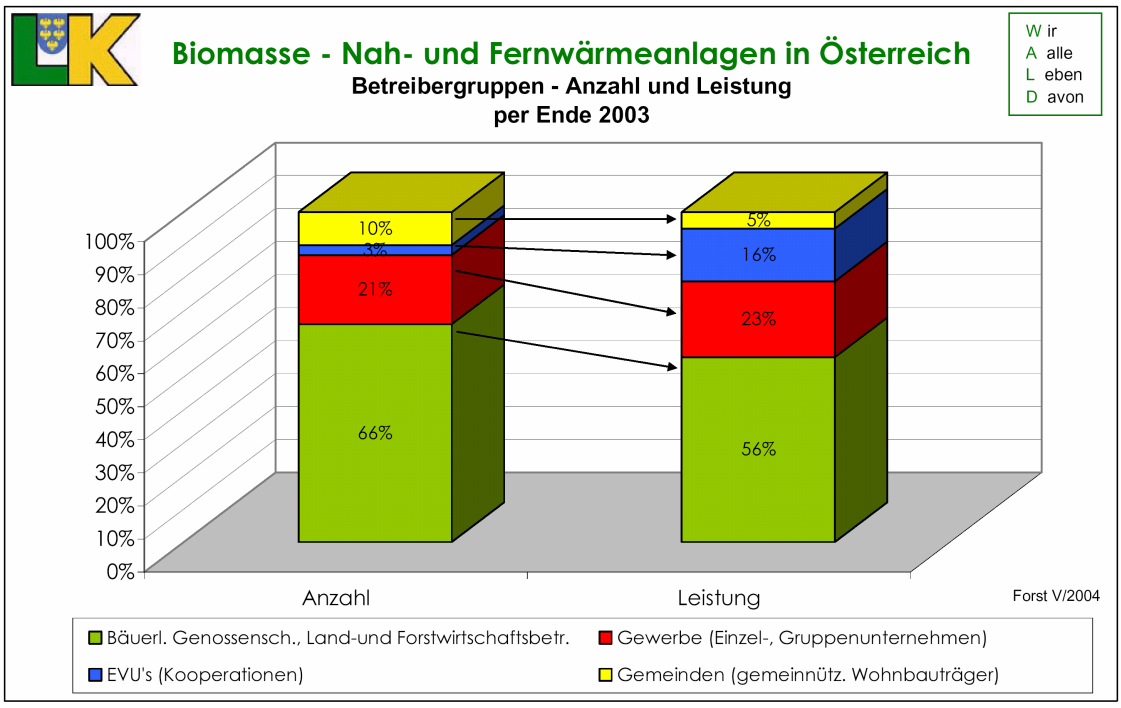
Source: Niederösterreichische Landwirtschaftskammer; http://www.lk-noe.at/

Biomass district heating systems in Austria are in the majority run by **farmers' co-operatives**. They run 66% of these systems by numbers, which corresponds to 56% of their capacity (see Figure 12 and Figure 13 below). Other carriers are industry (21% by numbers), communes (10%) and power companies or co-operations with those (3%).



Source: Niederösterreichische Landwirtschaftskammer; http://www.lk-noe.at/

Figure 12. Size distribution of biomass district heating systems in Austria (number and capacity)



Source: Niederösterreichische Landwirtschaftskammer; http://www.lk-noe.at/

Figure 13. Biomass based district heating systems in Austria as of end 2003

The **farmers' co-operatives** are usually made up of local farm forest owners that produce up to 100% of the heating material from their own forests for the plant they run (wood chips). Often they additionally buy residues from sawmills or other wood industries because of their cheap prices. Farm forest owners were pioneering in the technology of biomass-based district heating systems. For a case of such a pioneer see Box 4 below.

Box 4: Heating co-operative Grossraming – a biomass district heating pioneer in Austria

The "Heating Co-operative Grossraming" (Heizgenossenschaft Großraming) was founded in 1985 by 30 farmers. The plant provides heating for the whole of the closed settlement area of the village Grossraming, being some 80 objects. The capacity of the plant is 2 5 MW and it is fueled to 85% by wood chips from the farmers' forests. The rest are residues from a nearby sawmill. The project was initiated by the mayor of the commune together with an entrepreneurial farmer. The mayor was a farmer himself and his motives were to reduce air pollution and to use local resources. The farmer collected the necessary know-how, organised the implementation of the project and is president of the co-operative and manages the plant. The interest of the commune was crucial as a number of public buildings were the first and largest clients of the plant, by this guaranteeing the profitability of the plant. Furthermore, the commune has to approve the erection of the building and the pipe system as the responsible authority.
Most important support for the project came, besides of the commune, from a public regional development agency which helped in economic calculations and in applying for funding from the national funds for regional development. Further support was given by the chamber of agriculture, which contributed organisational know-how. The Raiffeisen association (the biggest Austrian farmers association) supported the establishment of the co-operative. The total cost of the plant were some half a million Euro from which 15% were financed by the regional development funds and another 15% by the agricultural innovation funds, a public funding source as well. The remaining 70% were borne partly by the co-operative partners (farmers) and partly by bank credits. The necessary technical know-how was provided by the farmer who collected it from literature and from visits to companies (various wood-processing industries and Vienna district heating system).

In the category of industrial carriers besides of wood-processing industries also **larger forest companies** are found. Some of them were pioneers in this innovation just like farm forest owners. The Austrian Federal Forests do also engage in bioenergy projects. Their largest project is the partnership with the biomass-based combined heat and power plant in Vienna, being the largest biomass project in Europe at the moment (see Box 5 below).

Box 5. The city of Vienna and the Austrian Federal Forests Inc. plan the largest biomass project in Europe

In the year 2006 Europe's largest biomass project shall start in Vienna. The project is a combined heat and power plant based on forest biomass. Carrier of the project is the city of Vienna, the heating material is provided by the Austrian Federal Forests Inc. on the basis of a long-term contract. The electrical capacity will be 12 MW, heat will be 39 MW. Technical efficiency will be 82% (use of energy). The maximum capacity will be 62.5 MW. Investments are between 40 and 45 millio euro.

Since 6 years the Austrian Federal Forests Inc. are building a new business field "biomass". This goal is realised together with a partner from the energy business in form of a joint venture, the "Strom und Wärme aus Holz", SWH (power and heat from wood). The SWH is engaged in a number of projects where the Federal Forests not only deliver raw material but also participate in the plants, mostly combined heat and power plants.

Increasingly **power companies** engage in bio-energy. Especially large plants are carried by regional power companies, often together with city governments, as farmers' co-operatives cannot bring the bank credits for such undertakings. In several cases, farmers' co-operatives run district heating systems together with power companies. In these cases they are not only **contracted** for delivering the heating material but also run the plant. The power companies in these cases are responsible for financing the plant and consumers care. It has been shown that farmers sometimes shy the investment risk or that the potential clients do not give them enough trust

Pioneer biomass plants were **co-financed** by regional development funds and agricultural innovation funds. Very soon after the first examples a special budget title was launched, particularly supporting farmers' co-operatives engaged in biomass projects. Around 30 to 50% of investments of such endeavours are borne by public funding, through EU rural development programmes, today.

The forestry institutional system was the main driving factor for a **rapid diffusion** of the innovation. The **chambers of agriculture** in some provinces of Austria engaged not only in lobbying for a budget title but also in distributing the knowledge among the farmers. They built up knowledge in their own organisation as well as supported the foundation of "biomass associations". Through these activities it is relatively easy to get the necessary knowledge for starting with a biomass project today. Nevertheless, it will be highly important also in future for the chambers and biomass associations together to **promote** the idea as today such farmers have to be motivated to become active that are **not so entrepreneurial** or risk-taking as the first pioneers. It will also be a challenge for the agricultural sector to stay in the business as power companies have started to engage as well. These competitors have the advantage that they are often trusted better by the public and by communes, i.e. by the potential clients, to be able to run such plants professionally and reliable.

At the moment a **boom of biomass-based power plants** can be registered in Austria. This is for one part possible through a range of projects that were realised in recent years, but the main impulse for this development is a new directive for so-called "eco-electricity" in Austria, on which basis a fixed (and higher) energy price is guaranteed for ecologically produced electricity, among others on the basis of biomass. This policy is part of the EU goal to increase the share of renewables in the domestic energy supply.

The particular situation in Austria, where two thirds of the biomass district heating plants are run by farmers' co-operatives, makes sure that a **greater share of the value added** is appropriated by the land owners. In such cases, where the forest owners only deliver biomass, the profit is smaller. It seems that in larger projects, however, a partnership with a power company is advisable.

The main **strength** of the Austrian forest sector in biomass use is their unused biomass potentials. Another strength can be seen in the good organisation of the sector, e.g. by chamber organisations, wood associations, etc. A particular strength of Austria is the high technical development of bio-energy that has been reached through recent years. **Weaknesses** are seen in the high labour costs, making the profitability difficult. A weakness is the degree of disintegration of forest ownership (many small parcels of forest ownership). One of the challenges will be to get access to the wood resources on land of non-traditional or "urban" land owners. **Opportunities** are the further use of wood biomass and the engagement of forest owners in district heating and/or combined heat and power plants. This is especially promising before the background of the Kyoto protocol coming into force next year and EU policies for increasing the share of renewables in energy supply. **Threats** exist in an unstable political environment, which means that the future of ecological energy policy seems unclear.

The future of sustainable development and sustainable energy policy is the **open question**. As the profitability of the new business highly depends on political framework conditions, policy-makers, primarily in Brussels, make the future development. **Research needs**, besides of technological questions and logistic concepts, are on the one side related to the mobilisation of biomass resources from non-industrial private forest owners, and on the other side to policy-making in the field of sustainable energy production. Cross-country co-operation in research and practice are **recommended**, as Austria takes a leading position in biomass use. The EFI PC Innoforce may contribute to this purpose by its research and its network.

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5. Forests and ownership

Summary

As already pointed out in Chapter 2, the existing structure of forest ownership and management poses a series of important challenges to enterprise development, including the fragmented structure of ownership (a multitude of small forest holdings), an increasingly small fraction of work and investment that is invested into forest and forest work by smaller owners, who over time become more distanced from forest work. In addition, goals and strategies of owners of smaller forests are usually not geared towards innovation or entrepreneurship but towards maintaining capital in a "business-as-usual"-fashion. Recently, outsourcing of work and the build-up of forest co-operative arrangements were two major trends by which those affected try to address the issue.

5.1. State of the art and historical development

In general, there is good date availability of forest development and ownership characteristics in Austria. The BFW collects data in regular intervals on forest area and management and the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) publishes data on an annual basis (Waldbericht).

Around 47% of the Austrian land area is covered by forests of which 85.5% is available for wood supply. Most of the forest area is managed by private forest owners of whom the majority owns forest holdings smaller than 200 ha. The forest area continuously increased over the last decades as did the forest area managed by private forest owners. In addition, more and more forest owners do not live near to their forest asset any more. About 0.4% of the Austrian employees are employed in forestry. The forestry sector is characterized by a high unemployment rate of about 12%.

5.2. Forest resources

In Austria around 47% of the **land area** (3,960,000 ha) is covered by forests. Thus, Austria is one of the most densely wooded countries in Europe. The region Styria is the most densely wooded area in Austria with a share in forest area of 61.1% of the total land area, or around one million ha. The area of Vienna is least covered with forests (21.7%). The total **growing stock** amounted to around 1 094 million m³ in 2002. The average volume per hectare of forest land is about 325 m³ in Austria. That is the highest volume per hectare in the EU-15. The highest average **volume per hectare** is found in the region Vorarlberg with 385 m³ and the lowest volume is found in the region Burgenland with 252 m³. The annual **increment per hectare** is on average 9.3 m³. The following table provides detailed data for the regions of Austria.

Table 19. Forest area, growing stock, volume and increment

Federal State	Area (ha)	Forest area (ha)	Share (%)	Growing stock (1000 m³)	Volume/ ha (m³)	Increment /ha/year (m³)
Burgenland	396,591	133,000	33.5	32,544	252	9.3
Carinthia	953,301	578,000	60.6	164,368	324	9.8
Lower Austria	1,917,413	764,000	39.8	216,795	298	8.9
Upper Austria	1,197,955	494,000	41.2	157,486	355	10.7
Salzburg	715,391	371,000	51.9	94,436	337	8.6
Styria	1,638,822	1,002,000	61.1	293,709	338	9.8
Tyrol	1,264,720	515,00	40.7	109,420	316	7.2
Vorarlberg	260,140	97,000	37.3	23,729	385	8.6
Vienna	41,495	9,000	21.7	2,693	311	6.8
Austria	**8,385,828**	**3,960,000**	**47.2**	**1,094,731**	**325**	**9.3**

Sources: BFW, Waldinventur 2000-2002

The area of **forests available for wood supply** (*Ertragswald*) amounts to 3.37 million ha, that is about 85.5% of the total forest area of Austria. Forests not available for wood supply cover around 14.5% of the forest area. This area is not available for wood supply due to conservation/protection reasons.

Around two thirds of the Austrian forest area is covered by conifers, of whom spruce is the majority. Table 20 gives an overview over tree species in Austria and their shares in forest area and volume.

Table 20. Occurrence of tree species in Austrian forests

Tree species	Forest area (1000 ha)	Share (%)	Volume (1000 m³)	Share (%)
Conifers (total)	2255	66.9	8,867,599	81.0
Spruce	1810	53.7	673,794	61.5
Fir	78	2.3	47,977	4.4
Larch	155	4.6	73,182	6.7
Pine	189	5.6	86,540	7.9
Other conifers	23	0.7	5,267	0.5
Broad-leaved	802	23.8	207,971	19.0
Beech	323	9.6	101,470	9.3
Oak	66	2.0	26,685	2.4
Other hard-wood	269	8.0	49,122	4.5
Soft-wood	144	4.3	30,694	2.8
Unstocked areas, gaps and bushes	313	9.4		
Total	3371	100	1,094,730	100

Source: BFW Waldinventur 2000-2002

Afforestations in 1998 amounted to 11,676 ha in Austria, that is about 0.3% of the forest area.

Table 21. Afforestation in 1998 in Austria and its regions

Federal State	Afforestation in ha
Burgenland	335
Carinthia	1,121
Lower Austria	3,900
Upper Austria	1,638
Salzburg	441
Styria	2,965
Tyrol	813
Vorarlberg	173
Wien	192
Austria	11,676

Source: BMLFUW 2004

There is no data available for the **stock and accessible yield of non-wood forest products** in Austria.

5.3 Forest ownership

Private forest holdings (private forests and community forests) manage 2,938,491 ha forest area that is about 80% of the Austrian forest area (data for 2002). The majority of private forest holdings is smaller than 200 ha and manages 1,804,137 ha or 50% of the Austrian forest area (BMLFUW 2004, own calculations).

Publicly owned forest holdings (community forests/forests as assets; provincial forests; federal Austrian forests-ÖBF and other publicly owned forests) manage 698,918 ha of the Austrian forest area that is about 20% of the total forest area. Most of this area (522,700 ha) is managed by the Federal Austrian Forests (Österreichische Bundesforste). Table 22. shows the trends of forest area managed by different ownership categories and forest holding size over the last decade.

Table 22. Forest area in ha managed by different types of forest holdings

Year	Private forests < 200 ha	Private forests > 200 ha	Community forests	Community forests (forests as assets)	Provincial forests	ÖBF and publicly owned forests	Total
1993	1,647,297	776,226	341,567	76,389	44,622	589,210	3,475,311
1994	1,607,174	765,394	341,311	75,410	45,387	573,660	3,408,336
1995	1,665,919	781,422	343,180	76,380	46,358	578,969	3,492,228
1996	1,685,020	781,917	343,153	77,746	51,771	546,354	3,485,307
1997	1,636,520	722,420	333,862	80,440	44,139	537,687	3,355,068
1998	1,687,205	726,659	333,449	80,546	44,052	542,898	3,414,809
1999	1,729,039	773,702	335,772	81,387	44,060	575,658	3,539,618
2000	1,770,979	770,542	333,830	81,629	44,082	575,577	3,576,638
2001	1,786,268	776,632	359,051	89,391	41,810	564,459	3,617,611
2002	1,804,137	785,488	348,866	90,666	39,101	569,151	3,637,411

Source: BMLFUW 2004

The **right to collect and sell NWFP from public and private forests** is regulated by the Austrian Forest Act 1975. The Austrian Forest Act (1975 and amendments) only

allows the collection of non-wood forest products such as fruits, seeds, mushrooms, twigs, earth, turf or other soil constituents in small quantities. Article 174 makes it an administrative offence to collect without authorisation fruit or seed of woody plants for the purpose of profit, mushrooms to a quantity of more than two kilograms per day, or conduct or participate in mushroom or berry collection events (UNECE/FAO 2004).

Nature and landscape conservation laws (that are in the competence of the federal provinces) in different ways restrict forestry activities for the purpose of nature conservation. In some federal provinces, the collection of mushrooms is restricted, e.g. to every second day. This regulation for some part is for the benefit of the land owner, however, landowners are not exempted from the regulation.

5.4 Forest Production

Table 23 shows the annual wood harvesting by forest ownership categories. The Federal Austrian Forests (ÖBF) harvested about 13% of all harvested wood in 2002. Forest holdings larger than 200 ha harvested about 33% and forest holdings smaller than 200 ha harvested about 54% of the wood. This distribution reflects the distribution of forest area among the different ownership categories and size classes.

Table 23. Wood harvesting by private and publicly owned forest holdings

Year	Federal Austrian Forests	Private forest holdings		Total	Federal Austrian Forests	Private forest holdings		Total
		> 200 ha	< 200 ha			> 200 ha	< 200 ha	
	1000 m^3 under bark				%			
2003				17 055				
2002	1 931	4 958	7 957	14 845	13.0	33.4	53.6	100
2001	1 848	4 898	6 720	13 466	13.7	36.4	49.9	100
2000	1 692	4 722	6 862	13 276	12.7	35.6	51.7	100
1999				14 083				
1998				14 034				
1995	2 046	4 629	7 130	13 806	14.8	33.5	51.7	100
1990	2 044	5 225	8 441	15 711	13.0	33.2	53.8	100
1985	2 026	4 518	5 081	11 626	17.4	38.9	43.7	100
1980	2 067	4 358	6 308	12 733	16.2	34.2	49.6	100

Source: BMLFUW 2004, Statistik Austria 2004

Regarding the annual harvesting of non-wood forest products data is only hardly available. A study of the UNECE on Non-Wood Goods and Services of Forests gives some estimation for the annual production of foods from forests for 1995:

- Mushrooms: 66,000 Kilograms
- Berries: 1,900,000 Litres
- Christmas trees (number): 134,000

The number of harvested game in 2003 amounted to 989,005 (BMLFUW 2004).

Game and fishery accounted to 9.9% of **total revenue of the Federal Austrian Forests (ÖBF)** in 2002**.** The **annual harvesting of fuel wood** in the year 2003 amounted to 3 336,173 m³ that is about 20% of total removal. According to the forest management plan around 1.2% (~ 46,000 ha) of forest area is forest area with **recreational function** .

Forestry contributes 0.88 billion euro to the Austrian **Gross Domestic Product**, that is a share of 0.4% (2003) (Statistik Austria). The share of forestry in the GDP has decreased over the last decades. In 1976 forestry amounted to about 1% to the Austrian GDP.

The share of forest-based industries in the Austrian GDP was 3.9% in 2002, down from 4.1% in 1976. Overall, the share of forestry and forest-based industries of the GDP decreased from 5.1% in 1976 to 4.3% in 2002 (Schwarzbauer 2004, 7). The furniture manufacturing industry had a production in value of 1.33 billion euro in the year 2002.

5.5. Employment

In 2001 14,000 persons were employed in forestry, that is about 0.4% of all employees in Austria (Schwarzbauer 2004, 9) (number of employees in Austria: 3,523,000).
115 500 persons were employed in the forest based industries in 2001, that is a share of 3.3% in total Austrian employment. (Schwarzbauer 2004, 9)

In the furniture industry about 10,500 people are employed, that is about 0.3% of all employees. The **unemployment rate** in agriculture and forestry in 2003 was about 12.7%. This rate is nearly three times as high as the average unemployment rate of 4.4% in Austria in 2003. The unemployment rate in the sector ”wood and wood products” amounted to 8.2% and to 7.7% in the sector “paper and paperboard” in 2003 (Source: BMWA 2004).

No data could be found on the **share and amount of seasonal workers in forestry** in Austria.

5.6. Main problems and research questions in forest resources and ownership for enterprise development in the forest sector

Main problems for enterprise development in the forest sector arise from a small average forest holding size and consequently the high fragmentation of forest ownership in Austria. The small forest holding size implicates that there is hardly full-time engagement in forestry work by forest owners and that only a little share of income is earned from the forests. Most of the forest owners in Austria, especially the owners of small forest holdings, pursue a ‘business as usual strategy’ with regard to the management of their forest area. The prevailing goal is to maintain capital, while increasing profit is much less important Rametsteiner and Kubeczko 2003). In addition, there is a growing number of urban or absentee forest owners. These frame conditions are overall not supportive for entrepreneurial behaviour and enterprise development in forestry.

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