



## SUMMARY

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### I FOREST RESOURCES

Of the land area in Finland, 86% or 26.3 million ha is classified as forestry land. Based on site productivity, forestry land is divided into forest land (20.2 million ha), scrub land (2.7 million ha) and waste land (3.2 million ha of treeless or almost treeless land). In addition, forestry land also includes 0.2 million ha of forest roads, timber depots, etc. The national definitions of the forestry land categories are as follows:

- *Forest land*: the potential annual average increment of the growing stock is at least 1.0 m<sup>3</sup>/ha.
- *Scrub land*: the potential annual average increment of the growing stock is less than 1.0 m<sup>3</sup>/ha, but at least 0.1 m<sup>3</sup>/ha.
- *Waste land*: the potential annual average increment of the growing stock is less than 0.1 m<sup>3</sup>/ha.

FAO's definition of forest differs from the Finnish national classification. According to FAO, all forest land and most of the scrubland in Finland would be considered forest land.

Of the total forestry land in Finland, 52% is under non-industrial, private ownership; the State owns 35% and forest industry companies own 8%. The remaining 5% represents forests under municipal, parish, shared or joint ownership. State-owned forests are mainly situated in northern Finland. The State also owns extensive nature conservation and wilderness areas, most of which are located in northern Finland. Almost all of Finland is within the boreal coniferous zone, and growth conditions deteriorate sharply from south to north.

The majority of the Finnish stands grow on areas classified as forest or scrub land. The volume of the growing stock is marginal on scrub land, so practically all forestry activities take place on forest land. The essential forestry statistics (growing stock volume,

increment, etc.) are presented for forest and scrub land stands (or merely for forest land stands). The total area of forest and scrub land in Finland amounts to 22.9 million ha, of which 92% is available for wood supply. The remaining 8% is protected.

The growing stock volume in Finland amounts to 2 201 million m<sup>3</sup> (over bark). Since the late 1960s, the standing volume has continuously risen and is now 48% higher than four decades ago. Half of the growing stock volume consists of Scots pine, 30% Norway spruce and 20% broadleaves (mainly birch). The proportion of pine has increased and that of spruce has decreased. The proportion of growing stock on mires is 23%. Draining of mires has improved the growing conditions for trees on peatlands, and hence the importance of growing stocks on mires is rapidly increasing. Of the total growing stock volume, 94% grows in forests available for wood supply or under restricted forestry use.

The annual increment of the growing stock in Finland is 99 million m<sup>3</sup>; this is an increase of 73% since the 1960s. The increment consists of 48% for pine, 30% for spruce and 23% for broadleaves. The main contribution to the increase in increment is from pine, due to the large amount of young stands at the stage of rapid growth. The increment of broadleaves has also clearly risen, but that of spruce only slightly. Of the increment, 97% is in forests available for wood supply.

Since the early 1970s, total drain (removals + natural drain) has continuously remained lower than the volume increment of the growing stock. The 2007 total drain was 73 million m<sup>3</sup>. Even though the total drain amounted to an all-time high, the increment was still notably higher than the drain. Of the total drain, 42% was pine, 38% spruce and 20% broadleaves. A major part of the pine- and broadleaved-dominated stands are young stands with rapid growth, but the potential removal is less than the increment. Spruce

drain has represented a markedly higher proportion of the total drain than the proportion of spruce in increment and volume of the growing stock, and mature spruce stands have been abundant amongst our spruce stands.

Statistics on forest resources in Finland are based on the national forest inventories (NFIs), which were started in the 1920s. The most recent forest resources data is based on the field measurements obtained during the 10th national forest inventory performed over 2004–2007.

Finland is a signatory to the Kyoto Protocol and is committed to limiting its greenhouse gas emissions. In 2006, the annual increase in carbon stocks sequestered by forests was 41 million tons. This means that Finnish forests act as carbon sinks.

## 2 FOREST BIODIVERSITY AND HEALTH

Protecting the biodiversity in forests is one of the main goals of the Finnish forest and environmental policies. It is the basis for the essential policies applied in controlling protection and use of forests and the related legislation and recommendations. They protect biodiversity through, for example, establishing protected areas, protecting valuable habitats to save threatened species, and taking into consideration the goals of biodiversity in forestry.

The total area of protected forests and areas under restricted forestry use in Finland is 2.9 million hectares. This amount represents 13% of the total forest area, i.e., forest land and scrub land. Most of these areas are located in northern Finland, where they account for 22% of the forest area. Of the total forest area in Finland, 16% in northern Finland and 2% in southern Finland is strictly protected and unavailable for wood supply. During the latter part of 2008, the area of statutory nature conservation and wilderness areas on State land was 2.8 million hectares. Conservation areas on private land totalled 0.2 million hectares. The nature conservation areas not yet established in accordance with the various nature conservation programmers totalled 0.7 million hectares.

The range of methods available for maintaining biodiversity has become more diverse over recent years. In selecting new areas for protection, one of the methods applied has been the voluntary participation of forest owners and protection agreements made

for fixed-term periods. On previously established protected areas, some effects caused by human activities are being removed. For example, during 2007, various restoration procedures were carried out on almost 3 000 hectares of state-owned forest land. In total, the area of forest restoration in Finland amounts to over 28 000 hectares.

In 2002, a new forest biodiversity programme for Southern Finland, called the METSO Programme, was adopted. The importance of this programme in its pilot phase in 2002–2007 was, e.g., to test new voluntary means for non-industrial, private forest owners to increase the biodiversity in their forests. During that pilot phase, more than 3 000 hectares of forests were bought under the protection of the State. In addition, more than 1 500 hectares were protected by the method of natural values trading. A new METSO programme for the period of 2008–2016 was presented in spring 2008.

In commercial forests, biodiversity is promoted by maintaining valuable habitats, increasing the amount of deadwood and saving large broadleaves in cuttings. Approximately 85 000 hectares of especially valuable habitats, as defined in the Finnish Forest Act, have been found in private forests; the area corresponds to 0.6% of the total forestry land. In 2007, more than 90% of the valuable habitats on felling areas were preserved or almost preserved during fellings. In regeneration fellings, the average volume of retained trees was 5 m<sup>3</sup> of living trees and 1–1.5 m<sup>3</sup> of dead trees per hectare.

The latest assessment of threatened species in Finland was made over 1997–2000. Of the total of 43 000 species, 15 000 were known sufficiently to enable the assessment, and 1 505 of them were classified as threatened. Forests and mires were the primary habitat for 631 threatened species.

Over 2004–2007, damages reducing the silvicultural quality of stands were observed on 4.8 million hectares of forest land available for wood supply, representing 21% of the forest land in southern Finland and 31% of that in northern Finland. The most significant causes of damage were weather factors and fungal diseases. The increment rate of the growing stock and defoliation, i.e., premature loss of needles and leaves, have also been used as indicators of tree vitality. In 2007, 4% of pine, 24% of spruce and 11% of broadleaves were moderately or severely damaged (proportion of defoliation >25%). The condition of

tree crowns has remained stable over recent years and the degree of defoliation is lower in Finland than in most European countries. Forest health in Finland can be regarded as at least satisfactory.

### 3 SILVICULTURE

In 2007, the amount of silvicultural and forest improvement work increased compared to the previous year. Ditch-cleaning and supplementary ditching represent the only work class where the amounts decreased. The area of natural and artificial regeneration was 154 000 hectares, which had increased by 8 000 hectares from the previous year. 30 000 hectares were left for natural regeneration. Of the artificial regeneration area, 91 000 hectares were planted and 33 000 hectares were seeded. Of the planted area, 70% were planted for *Norway spruce*, 26% for *Scotch pine*, and the remaining 4% for other tree species. Almost all seedlings were performed with pine seed, and machine seeding represented 73% of all seedlings.

Soil preparation amounted to 130 000 hectares. About half of this area was mounded, one-third harrowed and one-fifth scarified. During the last five years, the proportion of mounding has increased from one fourth to 44 per cent, and the proportion of harrowing has decreased from about one-half to one-third.

The tending of seedling stands and improving young stands was carried out on 248 000 hectares. The area increased 31 000 hectares compared to the previous year. Three-fourths of the increase were carried out in forests owned by forest industries and the State, and only one fourth – 8 000 hectares – in private forests. Of other work done by the clearing saw, the clearing of regeneration area was 69 000 hectares and the clearing of thinning area for felling 29 000 hectares.

The amount of road improvements was extremely high, 3 218 kilometres. All forest owner groups increased their investment on road improvements. Proportionally, the increase was biggest in State forests, where the costs used for road improvements were doubled. Construction of new forest roads amounted to 852 kilometres, which was more than during the previous year.

In 2007, 19 000 kilometres of ditches were cleaned over an area of 67 000 hectares. In private forests, the total was 15 000 kilometres of ditches on 53 000 hec-

tares, which was 13 per cent less than in the previous year. However, the total decrease in the area of ditch-cleaning and supplementary ditching was only six per cent, due to the area of ditch-cleaning in State forests increasing by a third. The area of fertilization was 35 000 hectares, which increased by 10 000 hectares compared to the previous year. Increased fertilization in the forests owned by the forest industries and the State caused this growth.

The area treated with fellings was 688 000 hectares, of which 551 000 hectares were in private forests. Since 1970, the felling area has not been as extensive as in 2007. The clear felling area was 174 000 hectares, which increased by one-fifth compared to the previous year. The thinning area amounted to 415 000 hectares, of which first thinnings totalled about one-half and other thinnings another half.

The costs of silvicultural and forest improvement work came to EUR 266 million. At nominal value, this was EUR 31 million more than the corresponding figure for 2006 (+13%). In private forests, EUR 188 million were spent on silvicultural and forest improvement work. The corresponding cost allocations by the forest industries and State were EUR 34 and 44 million, respectively. In total, EUR 60 million of State grants were used to secure sustainable wood production, and of this amount, EUR 51 million were spent on silvicultural and forest improvement work. The State grants covered 27 per cent of the costs expended in private forests.

### 4 ROUNDWOOD MARKETS

Statistics are compiled in Finland on roundwood trade volumes, prices, removals and inventories. The statistics on roundwood purchases and prices refer to roundwood trade in non-industrial, private forests only. In addition to non-industrial private forests, the statistics on roundwood removals also contain removals from forests owned by forest industry companies and the state. Based on data gained from national forest inventories, estimates are also calculated for annual allowable removals.

Roundwood trade reached to a new record level in 2007. The forest industries purchased 40.5 million m<sup>3</sup> of roundwood from non-industrial, private forests. The amount increased by 25% compared to the previous year. The previous record was from the year 1997 (39.8 million m<sup>3</sup>).

The roundwood trade was boosted by a steep rise of roundwood prices, especially for softwood logs, during the first half of 2007. The roundwood markets peaked in July, by which time the prices of pine and spruce logs had been historically high, having risen by 50% from the corresponding price in 2006. During the second half of 2007, stumpage prices for logs decreased and the roundwood markets slowed down. The rise of prices in 2007 was mainly due to good demand for sawn softwood in construction industries and increased exports prices.

In 2007, nominal stumpage prices rose by 25% on average from the previous year. The highest increase occurred for softwood logs (33–34%). Prices for pulpwood assortments increased by 11–23%.

In the first half of 2008, the roundwood markets were slow, and the trade was reduced with over 50% compared to the previous year, which, however, was a record year in roundwood trade. The decrease of trade occurred mostly in logs, while demand for pulpwood continued strong. After the drop in log prices in autumn 2007, roundwood prices were relatively stable during the first half of 2008. At the end of July, the Finnish government boosted the roundwood trade with a temporary sales income tax relief for private forest owners. The decision speeded up the roundwood trade in the late August, whereas in September the trade was on an average level.

The 2007 commercial roundwood removals were increased by 14% to a new record of 57.7 million m<sup>3</sup> (over bark). The increase occurred in non-industrial, private forests, where removals (46.4 million m<sup>3</sup>) increased by 18% from the dip of the previous year. In the forest industries' own forests, removals were exceptionally high for a second year in a row, 6.2 million m<sup>3</sup>. Removals from the state forests increased by 3% to 5.2 million m<sup>3</sup>. The non-industrial, private forests' share of the total commercial removals rose to 80%. Also taking into consideration the imports of roundwood, the non-industrial, private forests accounted for 61% of the industrial roundwood procurement in Finland.

In addition to removals for industrial use, approximately 5 million m<sup>3</sup> of fuelwood is annually harvested for domestic heating purposes in small-sized dwellings (private houses, farms and recreational dwellings).

Imported roundwood (18.2 million m<sup>3</sup> in 2007) is discussed in Chapter 11 and wood-based fuels in Chapter 9.

According to the results gained from the 10th national forest inventory and the calculations on maximum potential removals based on them, wood resources in Finland are not a factor restricting the consumption of domestic wood. The results indicate that the annual increment of the growing stock is 99.2 million m<sup>3</sup> (over bark), and the maximum sustainable removal for 2007–2016 is 71.4 million m<sup>3</sup> per year. The statistics accumulated over 1998–2007 show an average annual removal of 56.9 million m<sup>3</sup>, i.e., 14.5 million m<sup>3</sup> less than the maximum sustainable removal. Annual allowable removals are calculated for the forest and scrubland available for wood supply. Restricting factors affecting wood production due to other forms of forest use have been taken into account.

## 5 HARVESTING AND TRANSPORTATION OF ROUNDWOOD

The statistics on roundwood harvesting and transportation mainly cover the roundwood fellings and forest haulage carried out by the forest industries and Metsähallitus. The statistics cover 88% (50.5 million m<sup>3</sup> in 2007) of the commercial roundwood production in Finland. Timber fellings performed by the forest industries and Metsähallitus are almost completely mechanized: in 2007, the mechanization degree was 99%. In 2007, the harvesting volume reached a new record height, but the costs of roundwood harvesting remained at the same level as in 2006, i.e., EUR 9.08/m<sup>3</sup>. The average number of forestry machines, used by the forest industries and Metsähallitus, increased by 280 from the previous year figure to 1 830 machines. The number of forwarders increased by 350 to 2 020.

The long-distance transportation statistics include the commercial roundwood for which transportation is handled by the shareholding companies of Metsäteho. There was a 9% increase in this roundwood volume, the 2007 volume being 49 million m<sup>3</sup>. The main long-distance transportation chain in Finland is direct road transportation by trucks to the mills. In 2007, over three-quarters of the roundwood was delivered to the mills using this method of transportation. Normally, road transportation is always used at the beginning of the transportation chain, even when roundwood is transferred by rail- or waterway.

On average, 1410 timber trucks were employed in domestic roundwood transportation. The mean transportation distance of domestic roundwood was 151 km. In road transportation, the mean distance of transportation was 106 km and in rail- and water transportation it was about 300 km. Compared with 2006, distances in road- and rail transportations remained unchanged, whereas in water transportation the distance shortened.

There was a slight increase in the cost of long-distance transportation of domestic roundwood to the mill: the average cost in 2007 was EUR 6.44/m<sup>3</sup>. The average unit cost for total transport volume (transported volume x number of km) remained at the same level as in 2006. In domestic road transportation, forest sector products comprised 17% of the total freight by road, while in rail transportation the proportion was 64%.

The volume of imported roundwood was 18 million m<sup>3</sup>. Of this amount, 34% was transported by rail, 43% by water and 23% by road. Exports of roundwood and forest industry products accounted for 47% of freight exported from Finland. The exports of roundwood and forest industry products (altogether 22 million tons) decreased by 2% from the corresponding amount in 2006. The decrease was mainly due to a decrease in exports of sawn wood and wood-based panels.

## 6 MULTIPLE-USE FORESTRY

In Finland, forests represent a major material as well as a recreational, spiritual and cultural resource. Financially, the most important forest-based product is commercial wood. In 2007, commercial roundwood production amounted to 58 million m<sup>3</sup>, which corresponds to approximately EUR 2.4 billion in stumpage price earnings. Forests are also a source of energy-wood. The value of fuelwood (5 million m<sup>3</sup>) used for domestic purposes was approximately EUR 70 million, and that of forest chips (3 million m<sup>3</sup>) was EUR 75 million.

Forests are also important as an outdoor environment for sports and hiking, as well as a landscape factor supporting both mental and socio-economic well-being. The recreational use of forests in Finland is mainly based on the public right of access, which makes it possible to wander in the forests as well as pick wild berries and mushrooms almost anywhere. Practically every Finn enjoys nature by, for example,

hiking, picking wild berries/mushrooms or hunting. Adult Finns make approximately 600 million recreational visits per year to enjoy nature. The number of overnight visits to nature tourism destinations per year is about 14 million, and together these figures account for 40 million travel days. It is estimated that actual nature tourism accounts for a quarter of all value added in Finnish tourism.

There are almost 40 edible species of wild berries in Finland, 16 of which are picked for food. The annual estimated harvest of berries is 500–1 000 million kg, of which 30–40% are acceptable for picking. In favourable years, the harvest of lingonberries and bilberries amounts to approximately 40 million kg and the total of other wild berries accounts for 10 million kg. The majority of these are picked for private domestic use. In 2007, about 11 million kg of wild berries were marketed; this was double the amount in 2006. The volume of purchased wild mushrooms, 0.4 million kg, decreased by one fifth from previous year. The earnings of pickers on wild berries and mushrooms increased by 17%, amounting to more than EUR 14 million.

There are approximately 300 000 hunters in Finland, and two of every three of them went hunting at least once during the year. In 2007, 63 000 moose and 23 000 white-tailed deer were bagged by hunters. The over-winter moose population was reduced to about 86 000. Of all cervids, the total amount of meat obtained decreased to 9.5 million kg, representing 89% of the total amount of game. The estimated monetary value of this 10.6 million kg of game meat and furs totalled EUR 63 million.

Reindeer husbandry is a traditional and unique means of livelihood in northern Scandinavia. In Finland, the area of reindeer husbandry is more than a third of the total area of Finland, and the number of reindeer owners is approximately 5 000. During autumn and winter 2007, 103 000 reindeer were culled. This produced 2.4 million kg of venison with a total value of EUR 13 million. The size of the winter herd after culling was about 200 000 reindeer.

## 7 FOREST SECTOR LABOUR FORCE

Positive developments prevailed on the Finnish labour force markets in 2007. In the total of national economy, the number of employed persons went up by 2%

from 2006, and the unemployment rate fell further. In the forest sector (i.e., forestry and the forest industries together), employment decreased by approximately 3 000 persons, totalling 86 400 persons in 2007. This corresponds to 3.5% of all industries' labour force. Of the sector's total, three-quarters (62 600 persons) worked within the forest industries, and the rest (23 800 persons) were employed in various forestry activities. The average unemployment rate within the forest sector went down to 4.3%, well below the average in the national economy as a whole (6.9%).

The role of the forest sector has continuously diminished for several decades. In the early 1970s, the sector employed close to 10% of the total workforce. The downward trend is mostly due to the rapid mechanization in the harvesting of roundwood. During recent years, however, employment in forestry has stabilized at about 24 000 persons. Hence, the long-lasting decline in the forestry labour force seems to have come to an end. Even new work opportunities have become available for forestry workers, e.g. in the harvesting of energy wood and in some silvicultural works.

In 2007, the labour force in the forest industries, in contrast to forestry, decreased by 4 000 compared to 2006. This drop focused on the pulp and paper industries, while in the wood products industries the labour force remained at the previous year's level. Part of the declining trend, which is expected to continue in the near future, is due to closed production plants and outsourced operations. In the wood products industries, small and medium-sized companies play an important role, especially in sparsely inhabited rural areas. In this sector, a major growing branch is the carpentry industry, mainly supplying to domestic markets. In 2007, it represented more than a quarter of the entire employment of the forest industries. In total, the wood products industries employed 31 900 persons in 2007, while the corresponding figure in the pulp and paper industries was 30 700 persons.

In 2008, the average earnings of felling workers at the nominal value were increased by 1% to EUR 11 per hour. The corresponding statistics in the forest industries refer to 2007. Earnings in the forest industries at the nominal value grew less than in industrial work in Finland on average. In the wood products industries the average hourly earnings amounted to EUR 14, and in the pulp and paper industries they were EUR 20. With reference to labour disputes, only six were reported in the pulp and paper industries in 2007.

In 2006, the number of accidents at work in the forest sector increased marginally from the year before. A total of 3 800 accidents at work was registered in the forest sector, and more than half of these occurred in the wood products industries. In fact, measured as accident frequency, it is the fourth most risk-prone branch of industry.

## 8 WOOD CONSUMPTION

In 2007, the roundwood consumption in Finland totalled 81.4 mill. m<sup>3</sup>. This volume was the second largest of all times and almost equal to the top volume achieved in the previous year. Of this amount over 90%, or 75.4 mill. m<sup>3</sup>, was used in the forest industries. Around 6 mill. m<sup>3</sup> was used for energy generation in the heating and power plants and in small-sized dwellings. Wood consumption in energy generation is more precisely presented in a new chapter, Energy (Chapter 9).

Amongst the branches of the forest industries, the chemical pulp industry used the largest volume of roundwood, 31.9 mill. m<sup>3</sup> (−0.5 mill. m<sup>3</sup> compared to the previous year). The second largest roundwood user was the sawmilling industry, reaching a total of 28.0 mill. m<sup>3</sup> (+0.6 mill. m<sup>3</sup>). The increase of wood consumption in sawmilling resulted from high demand for sawn goods, accounting for the increase in the production of sawn goods by 2% (see Chapter 10). On the contrary, the production of wood pulp decreased by 2%, resulting from the reduction of the export of chemical wood pulp. In general, the wood consumption amongst the various branches of the forest industries was quite the same as that of the previous year.

The most important roundwood assortments consumed were pine pulpwood (16.7 mill. m<sup>3</sup>) and spruce logs (15.1 mill. m<sup>3</sup>). The consumption of pine logs (+1.5 mill. m<sup>3</sup>) increased the most, compared to the previous year. High export prices of pine and spruce sawnwood scaled up the consumption of softwood logs. The consumption of hardwood pulpwood decreased 1.5 mill. m<sup>3</sup>.

In 2007, the consumption of imported roundwood was 16.0 mill. m<sup>3</sup>, less than 17% compared to the previous year. Since 1997, this was the first year when the consumption of imported roundwood decreased. The main reasons for this were expected to be difficult har-

vesting conditions caused by the mild winter in Russia (the most important foreign roundwood supplier) as well as the raised custom taxes set by Russia. The most important assortment imported was hardwood pulpwood (mainly birch pulpwood), which made up almost half of the total roundwood imported.

The decreased volumes of imported roundwood were compensated by the corresponding increase of domestic roundwood consumption. In 2007, the forest industries' roundwood consumption was 59.4 mill. m<sup>3</sup> – the highest volume ever. With the exception of hardwood pulpwood, the consumption of all domestic assortments increased. The largest increase (+1.8 mill. m<sup>3</sup>) was in pine logs, resulting from the high demand and export prices of pine sawnwood.

In addition to roundwood, the forest industries used 11.4 mill. m<sup>3</sup> of sawmill chips and dust originating from the sawmilling and plywood industries. This assortment was mainly consumed by the pulp and mechanical pulp industries: in both branches, the consumption of sawmill chips and dust was about one-fifth of the total wood consumption. Additionally, in 2007 the paper and paperboard industries consumed recovered fibre 0.7 mill. m.t. for raw material (see Table 10.5). The consumption of saw and cutter dust for the manufacture of wooden pellets was 0.7 mill. m<sup>3</sup>. The volume of exported wood was 1.4 mill. m<sup>3</sup>.

## 9 ENERGY

Energy consumption in Finland reached 1 476 petajoules (PJ) in 2007 (preliminary data). This was only one per cent less than that of the previous year. The decrease in consumption was influenced by a mild climate in Finland in 2007 which diminished general heating needs. Simultaneously, electricity generation by coal-consuming condensation power plants also decreased and was replaced by hydro power generation and imports of electricity from abroad.

The most important energy source in 2007 were oil products, also including oil consumed by transportation, which made up approximately one-fourth (361 PJ) of the total energy consumption. Compared to the previous year, the consumption of peat (+12 PJ) and hydro power (+10 PJ) increased the most. Correspondingly, the consumption of coal (–25 PJ) and wood-based fuels (–14 PJ) decreased the most.

In 2007, wood-based fuels covered one fifth (295 PJ) of the total energy consumption in Finland,

and they are the second most important source of energy after oil products. This makes Finland one of the leading EU countries when it comes to utilizing wood for energy purposes. When compiling statistics, wood-based fuels are divided into industrial waste liquors (mainly black liquor produced by pulp industries) and solid wood fuels. Solid wood fuels can be further divided into wood fuels consumed by heating and power plants and fuelwood consumed by small-sized dwellings (i.e., private houses, farms and recreational dwellings).

During 2007, more than half of wood-based fuel consumption – 153 petajoules – was covered by waste liquors. Solid wood fuels were consumed to the total of 137 petajoules or 19.2 million m<sup>3</sup>, of which the heat and power plants accounted for 89 petajoules or 13 million m<sup>3</sup>. The combustion of bark, with a volume of 7.5 million m<sup>3</sup>, exceeded that of other wood fuels. The small-sized dwellings currently use a total of 48 petajoules or 6.1 million m<sup>3</sup> of wood for heating.

The consumption of wood-based fuels decreased by 14 petajoules or 5 per cent by reference to the previous year. This decrease took place mainly in the power and heating plants, where consumption decreased approximately 2 million m<sup>3</sup> (–12%) compared to that of the year before. The main reason for the decrease resulted from the fall of the emission prices in the trade of EU greenhouse gas emission rights in 2007 – the reason why power and heating plants were able to increase the consumption of peat without any extra costs. The consumption of waste liquors as well as the wood consumption in small-sized dwellings were on approximately the same level as during the previous year.

Heating and power plants burned 2.7 million m<sup>3</sup> of forest chips in 2007, with a decrease of 13 per cent compared to that of the previous year. When the consumption by small-sized dwellings is added to this, the total consumption of forest chips reached as high as 3.0 million m<sup>3</sup>. Finland aims to increase the annual consumption of forest chips to 8–12 million m<sup>3</sup> by the year 2015.

## 10 FOREST INDUSTRIES

In 2007, despite capacity reductions, forest industry production remained unchanged. The production of sawn goods increased by 2% to 12.5 million m<sup>3</sup>, al-

though the demand on export markets sharply weakened towards the end of the year. Domestic consumption of sawn goods (0.99 m<sup>3</sup> per capita in 2007) in Finland was the highest in the world. Plywood production, amounting to 1.4 million m<sup>3</sup>, was close to the record volumes of 2006.

Only minor changes occurred in paper and paperboard production in 2007, whereas the production of chemical pulp decreased by 3%. A total of 14.3 million tons of paper and paperboard was produced last year; this was 1% more than in 2006. Volumes in the paperboard industry exceeded, for the first time, 3 million tons, indicating an increase of 3% from the preceding year. The production of printing and writing paper (9.8 million tons) remained on the previous year's level. In 2007, 0.74 million tons of recycled paper and paperboard were used in the paper industry. By international comparison, the collection rate in Finland was high: 66%.

Approximately half of the Finnish forest companies' turnover is generated in their foreign production units, most of which are located within the European Union. Domestic turnover of the forest industries increased by 3% from 2006 to EUR 23 billion, of which two-thirds came from the pulp and paper industries. The forest industries currently represent 16% of the total manufacturing turnover, while in the mid-1990s the share was a quarter. Domestic investments increased by one fifth to EUR 0.9 billion, which is the highest figure since 2001. Around 70% of the investments were made in the pulp and paper industries.

The profitability development in the sub-branches of the forest industries was opposite. In the wood products industries, the profitability improved significantly, primarily due to strong demand and rising prices on the sawn goods market. In the pulp and paper industries, profitability dropped drastically, owing to rising costs. In the forest industries as a whole, the total operating margin decreased to EUR 1.4 billion, corresponding to 6% of the annual turnover.

In 2006, the amount of Finland's greenhouse gas emissions corresponded to 80.3 Mt of CO<sub>2</sub>. This was 16% more than in 2005, and 13% more than the commitment under the Kyoto Protocol. In 2006, fuel-based emissions by the forest industries amounted to 5.7 million tons, corresponding to 7% of the total greenhouse gas emissions in Finland.

## 11 FOREIGN TRADE BY FOREST INDUSTRIES

In 2007, the total volume of wood imported into Finland decreased to 18.2 million solid cubic metres (over bark). However, the amount was still the third largest ever imported, and corresponds to almost one third of domestic commercial roundwood removals. During recent years, Finland has been the third largest wood importer in the world.

Although 12.0 million m<sup>3</sup> of wood imports originated from Russia, its share has constantly decreased over the 2000s. In 2007, Latvia and Sweden were the second and third most important suppliers with imported wood volumes of 1.7 million m<sup>3</sup> and 1.4 million m<sup>3</sup>, respectively. The wood imports from Sweden have increased rapidly, whereas the role of Estonia as a wood supplier has decreased. The gradual increases in customs tariffs on Russian roundwood exports have reduced the share of imported Russian wood to two-thirds and have thus affected Finnish roundwood markets. If the last planned increase in 2011 is implemented, it has been predicted that wood imports from Russia to Finland will cease. Then the minimum customs duty will climb to EUR 50/m<sup>3</sup>. Only Russian chips will remain almost duty-exempted.

The most important assortment was birch pulpwood, representing one third (6.1 million m<sup>3</sup>) of the total imports of roundwood. Chips (2.8 million m<sup>3</sup>) were the second most important assortment procured abroad. Imports of logs amounted to 2.8 million m<sup>3</sup> and that of pulpwood (incl. chips) 14.9 million m<sup>3</sup>. The imports focused more and more on pulpwood. Roundwood is mainly imported to meet the needs of the pulp industries in eastern Finland. The real prices of imported wood have clearly risen during 2007. Contrary to imported volumes, exports of roundwood from Finland are of minor importance.

In 2007, the value of exports of Finnish forest industry products totalled EUR 12.8 billion, accounting for 19% of Finland's total exports of commodities (EUR 65.7 billion). The proportion of Finnish forest industry exports was high by international comparison, but it was the lowest ever in Finland. In the value of exports of forest industry products, 75% represented pulp and paper industries and the remaining 25% was wood products industries. The most important export products were magazine paper (EUR 3.2 billion) and fine paper (EUR 2.1 billion). A large majority of the

Finnish forest industry production is exported. In 2007, the exports accounted for 93% of paper production, 86% of paperboard, 57% of sawn goods and 88% of plywood. The export prices of sawn goods peaked in 2007, but the prices of paper and paperboard have gradually declined since 2001.

Finnish exports – especially exports of forest industry products – are in the hands of just a few companies. Looking at product groups, this centralization is most intensive for pulp, paper and paperboard products, where five companies accounted for 73% of the total corresponding exports in 2007.

The European Union (EU27) is the main market area for Finnish forest industry products, accounting for 64% of exports in 2007. As the second important market area, Asia's share was 11%. Germany was the most important customer, receiving EUR 2.3 billion worth of Finnish forest industry products. As previously, Germany's share of the total exports of forest industry products was 18%. The United Kingdom was Finland's second most important trade partner with a value of EUR 1.4 billion, and with a share of 11%.

The imports of forest industry products were slight, for they amounted to only EUR 1.6 billion. However, the value of imported forest industry products increased by 14% from the previous year. The most important product group was converted paper and paperboard products (EUR 0.3 billion). One-fourth of forest industry product imports originated from Sweden.

The Finnish foreign trade statistics on forestry products are based on data compiled by the National Board of Customs.

## 12 THE FOREST SECTOR IN FINLAND'S NATIONAL ECONOMY

In 2007, the Finnish national economy continued to grow rapidly. The gross national product (GDP) at market prices rose 8% from the preceding year, reaching EUR 180 billion. There was an economic boom also in forestry and, thanks to increased felling volumes and rise in stumpage prices, its value added grew by as much as 38% to EUR 3.7 billion. The wood products industries had a prosperous year, too, and it grew by 14%. In the most important branch of the forest sector, the pulp and paper industries, the times

continued to be hard. Its value added fell by 6%, to EUR 3.8 billion.

At the end of the 1970s, the total value added in forestry, wood products industries and pulp and paper industries represented more than 10% of the total value added in GDP. Although in 2007 the value added in the forest sector (EUR 9 billion at current prices) was, in real terms, approximately 1.7 times the value added 30 years ago, its proportion had fallen to 6%. The major reason for the decline has been the diversification in the industrial structure, particularly the growth in electronics and metal industries. During the 2000s, the weak price development for paper products has made the decline even steeper. The forest sector was still an essential exporter in Finnish foreign trade. In total exports of goods and services in 2005, the forest sector accounted for 18% of gross and 22% of net exports.

In non-industrial, private forestry, gross stumpage earnings in 2007 increased by 50%, to EUR 2.1 billion. For the total of ownership categories, the rise in stumpage earnings was 46%, resulting in EUR 2.5 billion. A total of EUR 266 million was invested in silvicultural and forest improvement works, of which EUR 188 million was spent on private forests. The operating profit for non-industrial, private forests rose to EUR 136 per hectare, which is EUR 30 more than the average for the preceding 10-year period. The strong increase in stumpage prices that reached its peak in the summer of 2007, raised the real return on timber production to 26%.

## 13 INTERNATIONAL FOREST STATISTICS

In 2006, the Food and Agriculture Organization of the United Nations (FAO) published the most recent data on global forest resources (*Global Forest Resources Assessment 2005 – FRA 2005*). According to the FRA 2005, there are about 4 billion hectares of forests in the world, representing 30% of the Earth's land area. The countries with the largest forest cover are Russia, Brazil and Canada, which together make up almost 40% of the total forest area. The global growing stock volume (over bark) was 434 billion m<sup>3</sup>. One third of the growing stock is found in South America, where Brazil has the world's largest volume of 81 billion m<sup>3</sup>. The growing stock volume in Europe is 109 billion m<sup>3</sup>,

of which Russia accounts for 80 billion m<sup>3</sup>. The forest land area of the European Union increased in 2007 when Bulgaria and Romania joined the EU. The EU now has 156 million hectares of forest land where the growing stock amounts to 23 billion m<sup>3</sup>.

Approximately 5%, or 47 million ha of Europe's forests are currently protected. Protected forests are categorized according to the MCPFE (*Ministerial Conference on the Protection of Forests in Europe*) - classification into four different classes. About 27 million ha of the protected forests are found in the area of the European Union. This represents 18% of the Union's forest land area. In the EU, Germany has the largest area of protected forests: almost 8 million ha, or 70% of its forest land area. Europe's largest areas of protected forests are in Russia, altogether 16 million ha.

In 2006, the global roundwood production (remov-als) amounted to 3.5 billion m<sup>3</sup> (without bark) and the production of sawnwood to 425 million m<sup>3</sup>. Compared to the previous year, the production of roundwood decreased slightly whereas the production of sawn-

wood increased by one per cent. The production of wood-based panels has grown steadily and reached the volume of 260 million m<sup>3</sup> in 2006, which was 5% bigger than in 2005. Paper and paperboard production, 365 million tons, exceeded the volumes of the previous year by 2%.

The EU has an important role as a producer of forest products. In 2007, the production of roundwood amounted to 467 million m<sup>3</sup> in the EU. This amount was only a few million lower than that of the USA. About one-fourth of the world's sawnwood, 115 million m<sup>3</sup> in 2007, is produced in the EU. Also as a producer of wood-based panels and paper and paperboard, the EU maintains the leading position. In 2007, the EU's production of wood-based panels amounted to 66.8 million m<sup>3</sup> and the production of paper and paperboard to 102 million tons.

Globally speaking, the forest sector employed 13.8 million persons in 2006. This represents 0.4% share of the total labour force. The forest sector's contribution to the world's GDP total was only one per cent.