2

NATIONAL CIRCUMSTANCES

This chapter describes the national circumstances relevant to Finnish greenhouse gas emissions and removals. Government structure as well as population, geographical and climate profiles are illustrated. Thereafter, the characteristics and development of the economy, energy supply and consumption, transport, industry, building stock, urban structure, waste, agriculture and forestry are described.

Photo:
Riku Lumiaro / Image bank of the Environmental Administration

2 NATIONAL CIRCUMSTANCES

2.1 Government structure

Finland is a representative democracy, with 200 members of Parliament elected every four years. The tasks of the Finnish Parliament include passing laws and approving national budgets. The head of state is the President of the Republic, who is elected for a period of six years and may serve a maximum of two consecutive terms. The President of the Republic directs foreign policy in cooperation with the Government, deciding, for example, on whether to join or withdraw from international organisations and on the signing, ratification and entry into force of international conventions. The Government, in its narrower sense, refers to the Cabinet, which runs the 12 ministries. The Prime Minister directs the activities of the Government and oversees the preparation and consideration of matters within the Government's mandate. Each ministry is responsible for the preparation of issues within its mandate and for the proper functioning of the departments and agencies within its administrative domain. The Government must enjoy the confidence of Parliament. It implements parliamentary decisions, presents legislative proposals to Parliament, directs state administrative activities and represents Finland in the European Union.

Matters related to the United Nations Framework Convention on Climate Change (UNFCCC) fall within the administrative responsibility of the Ministry of the Environment, which acts as the national focal point to the UNFCCC.

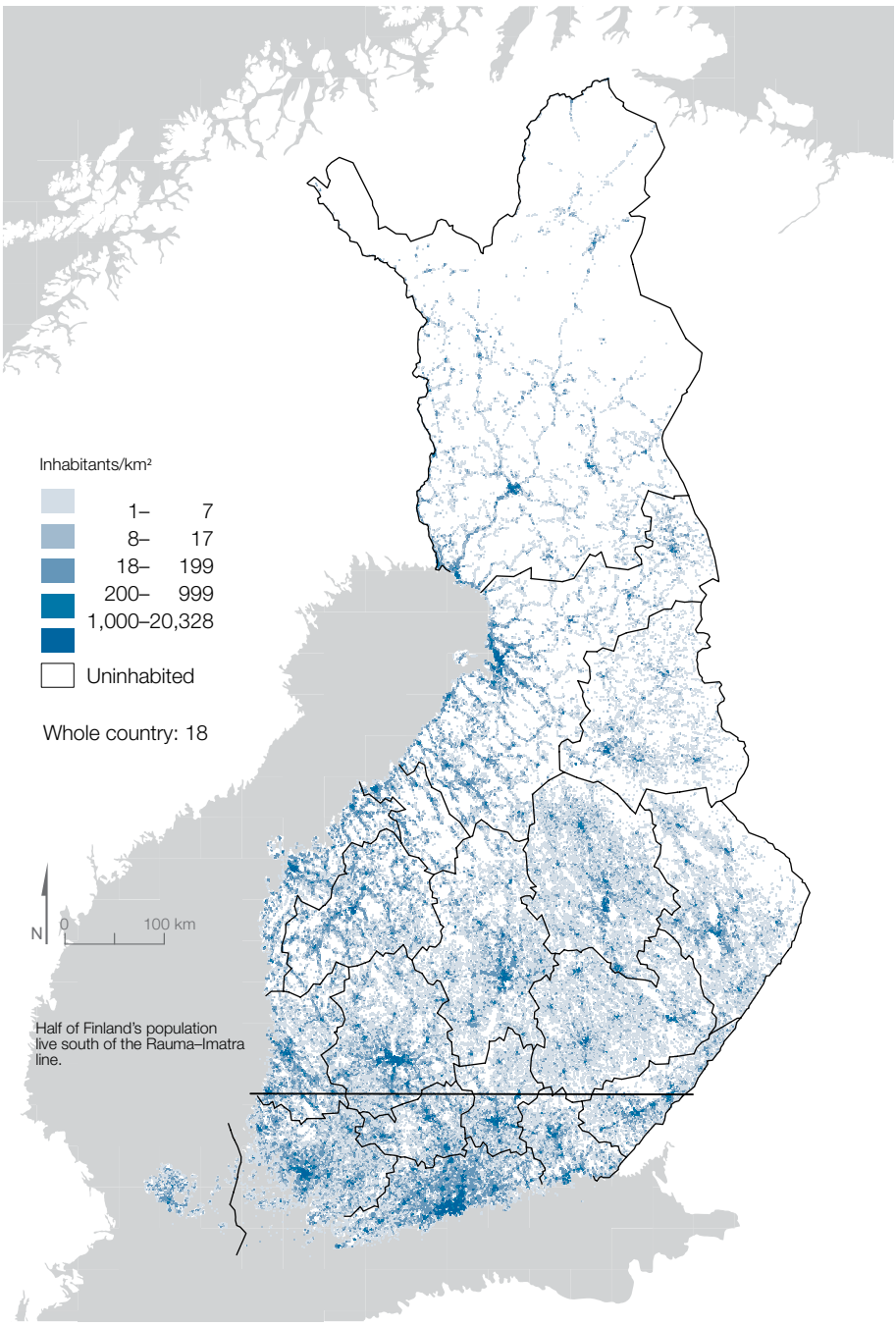
More information about the institutional framework of Finland's climate policy is presented in Section 4.2.

2.2 Population profile

The population of Finland was 5.5 million at the end of 2015. It increased by an annual average of 0.38 per cent between 1990 and 1999, by 0.34 per cent between 2000 and 2009 and by 0.46 per cent in the early 2010s. According to population projections made by Statistics Finland in autumn 2015, it is estimated that the Finnish population will increase to 6.0 million by 2060. The population density averages 18 inhabitants per km^2, but ranges from two inhabitants per km^2 in northern Finland to 170 inhabitants per km^2 in the south of the country in the Helsinki-Uusimaa region. As a result of the low population density and the geographical extent of the country (Figure 2.1), the distances travelled for different purposes can be quite long.

There is a strong internal migration from rural to urban areas. In the period 1990 to 2015, net migration from rural to urban areas amounted to a total of 152,900 people: 71,000 people during the years 1990 to 1999 and 81,900 people during the years 2000 to 2015. Many rural communities have a declining population, particularly in northern and eastern Finland. In 2015, net migration to urban areas was 8,300 people, which

Figure 2.1
Population density in Finland, 1 January 2015



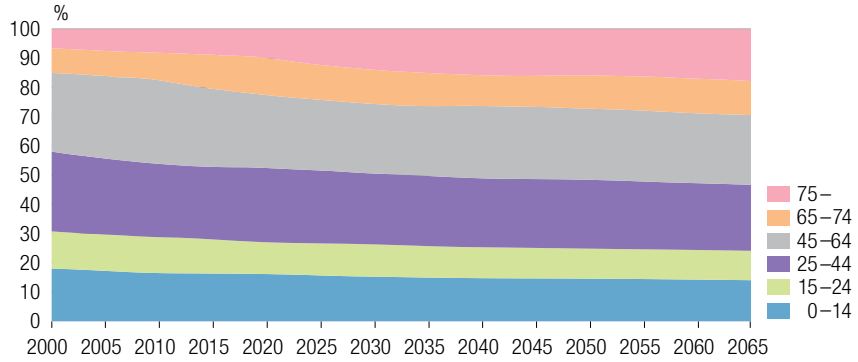
was considerably lower than in the latter half of the 1990s, when it exceeded 10,000 people per year.

The urban population (3.8 million) made up 69.2 per cent of the total population (5.5 million) in 2015. The corresponding figure in 1990 was 63.4 per cent (3.2 million) of the total population (5.0 million). The urban population has grown not only due to net migration, but also because of municipal mergers, as some rural municipalities have been joined to urban municipalities.

The number of one-person households has increased and the average household size has decreased. The total number of households at the end of 2015 was 2.6 million. 41 per cent of households, or 1.1 million of them, consisted of only one person. The average size of a household was two people. As recently as 1970, the average household size was still three people. Finland's current average household size is low in comparison with other countries.

The population is ageing. In 2015, the proportion of people aged over 65 was 20.5 per cent, while in 1990 it was 13.5 per cent. This trend will accelerate in the coming years and decades. It is estimated that by 2040, more than one-quarter of Finland's population will be above the age of 65 (Figure 2.2). Life expectancy has risen rapidly during the past 30 years. At present, women may expect to reach the age of 84.2 and men the age of 78.5. Despite this trend, population growth has slowed down, and it is expected that the natural increase in population will decrease in the coming decades. The proportion of elderly people out of the total population is increasing due to declining mortality rates and, therefore longer life expectancies. In the long run, the population will likely increase only if there is a surplus of immigrants.

Figure 2.2
Population profile for 2000 to 2065



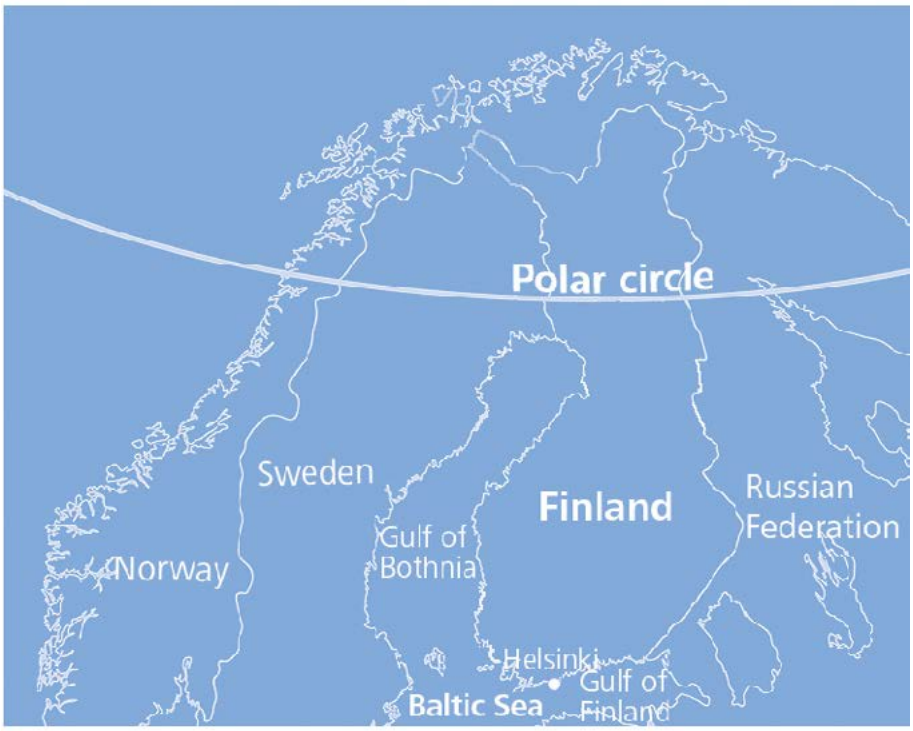
Years 2000–2015 actual, years 2016–2065 projected

2.3 Geographical profile

Finland is situated at a latitude between 60 and 70 degrees north, with a quarter of the country extending north of the Arctic Circle (Figure 2.3). In the west and south, Finland has a long coastline with numerous islands along the Baltic Sea coast. With a total area of 338,400 km^2, it is Europe's seventh largest country. The land boundary with Sweden is 614 km long, with Norway 736 km long and with Russia 1,340 km long.

Finland lies between the Scandinavian mountains and northern Russian plains. Its terrain is a varying mosaic of low hills, broad valleys and flat, low-lying plains, with higher fells in the north. The landscape is a mixture of forests, lakes and mires. Much of the country is a gently undulating plateau of mostly ancient bedrock. Nearly all of Finland is situated in the boreal coniferous forest zone, and 72 per cent of the total land area is classified as forest land, while only some nine per cent of it is farmed. Finland has more than 34,300 km^2 of inland water systems, which is about 10 per cent of its total area. There are some 190,000 lakes and 180,000 islands, with almost half of the latter existing along the Baltic Sea coast.

Figure 2.3
Finland's location



The Baltic Sea is the second largest brackish water basin in the world in terms of water volume. The water of the Baltic Sea is a mixture of ocean water and fresh water brought in by numerous rivers. The salinity of the surface water in the southern Baltic Sea is as high as 20 per mille, but in the northern reaches it drops to six per mille. A severe problem affecting the Baltic Sea is eutrophication, which is the consequence of more than a century of nutrient loading caused by human activity (settlements, industry, agriculture and forestry) in the Baltic Sea region.

Changes in land use since 1990 are shown in Table 2.1. The area of settlements has increased by 20 percent and that of grassland has decreased by nine per cent, whereas changes in areas of other land use categories have been small, one percent or less (Table 2.1).

Table 2.1
Land use in 1990 and 2015

Land use classification[1]	1990 (km^2)	2015 (km^2)	Change %
Forest land	221,097	218,889	−1.0
Cropland	24,722	24,853	0.5
Grassland	2,663	2,426	−8.9
Wetlands	30,068	29,913	−0.5
Settlements	12,225	14,688	20.2
Other land	13,139	13,102	−0.3
Total	**303,915**	**303,873**	
Inland waters	34,520	34,560	
Total with inland waters	338,435	338,433	

[1] The classification is based on the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Vol.4. Agriculture, Forestry and Other land Use

Source: National Resources Institute Finland (Luke)

2.4 Climate profile

The climate of Finland displays features of both maritime and continental climates, depending on the direction of air flow. Considering its northern location, the mean temperature in Finland is several degrees higher than in most other areas at these latitudes, e.g. Siberia and southern Greenland. The temperature is higher because of the Baltic Sea, due to the inland waters and, above all, as a result of the air flows from the Atlantic Ocean, which are warmed by the Gulf Stream.

The mean annual temperature is approximately 5.5°C in south-western Finland and decreases towards the northeast. The 0°C mean limit is approximately as far north as the Arctic Circle. Temperature differences between regions are the greatest in January, when the difference between southern and northern Finland is, on average, approximately 10°C. In June and July it is closer to 5°C.

Finland enjoys long periods of daylight around midsummer, when the length of the day, including twilight, reaches 22 hours even at the latitude of the capital, Helsinki. North of the Arctic Circle (66.5°N), it remains light throughout the night at this time of year, as the sun does not descend below the horizon at all. In the far north, there is a period around midsummer of more than two months during which the sun never sets. Conversely, in wintertime the northernmost region has two months of uninterrupted darkness.

The Finnish climate is characterised by irregular precipitation and typically there are rapid changes in the weather. The mean annual precipitation in southern and central Finland is usually between 600 and 750 mm, except near the coast, where it is slightly lower. In northern Finland, the annual precipitation is 450 to 650 mm.

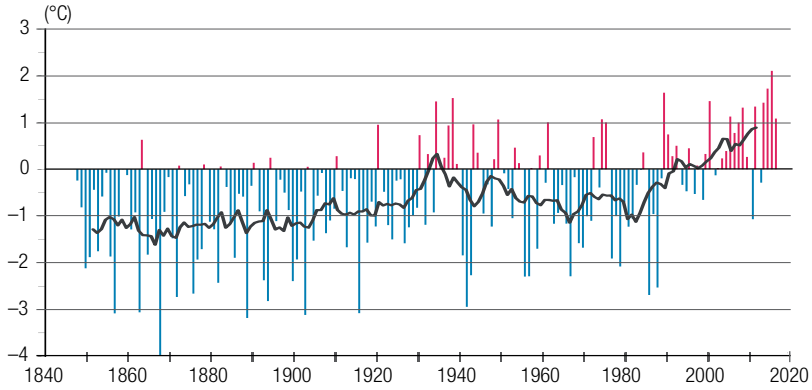
The seasonal variation in precipitation is similar throughout the country, with the driest months being February, March and April. From then on, precipitation gradually increases until July and August, or until September and October on the coast, after which it decreases towards the winter and springtime. The lowest annual precipitation ever recorded was less than 300 mm in northern Finland, while the country's maximum recorded precipitation exceeded 1,100 mm. The highest daily precipitation ever recorded was almost 200 mm, but values above 50 mm are not very common. During an average year, more than half of the days have some precipitation, except near the coastal regions. Even in southern Finland, some 30 per cent of the annual precipitation is in the form of snow, which remains on the ground for about four months. In Lapland, 50 to 70 per cent of the annual precipitation is in the form of snow and it remains on the ground for six to seven months. The lakes freeze over in October in Lapland and in early December in southern Finland. During severe winters, the Baltic Sea may freeze over almost completely, but during mild winters it remains open for the most part, except for the Gulf of Bothnia and the eastern part of the Gulf of Finland.

The most common wind directions (17 to 18 per cent) are from the south and southwest (land areas and sea areas, respectively). The least common wind directions (8 to 10 per cent) are from the east and northeast. Wind comes from all other directions with more or less equal frequency. The average wind speed is three to four m/s inland; it is slightly higher on the coast and five to seven m/s in maritime regions. Damage due to storms and strong winds occurs most often during autumn and winter, but also during summer in connection with thunderstorms. Cloud cover is especially abundant in the autumn and winter seasons, increasing from the northwest towards the southeast. The long-term average for the monthly cloud cover ranges from approximately 50 per cent in May to June to about 80 per cent in September to November.

The average annual temperature has increased during the last 150 years by slightly more than one degree (Figure 2.4). The increase has been the greatest in springtime. Winters have become about one degree warmer and summers and autumns about half

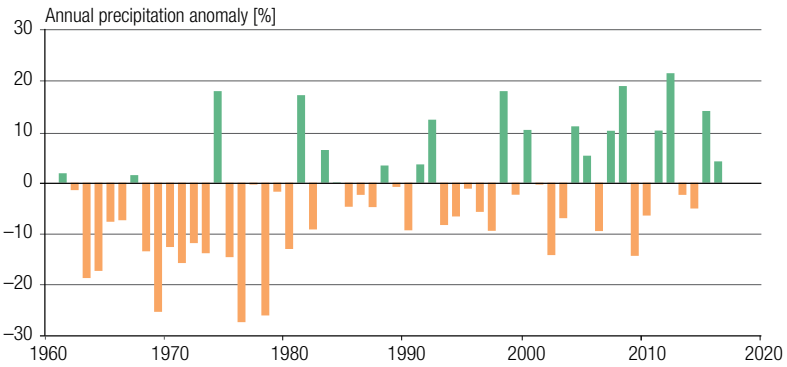
a degree warmer. Considerable temperature fluctuations have also occurred during this period. The winters of 1985 and 1987, for example, were very cold, whereas in the 1990s and during the present century there have been a number of mild winters. The culmination occurred in winter 2015, which was the warmest measured since the beginning of the 20th century. Twentieth-century observations indicate that such a mild winter will occur only once every 200 years. However, climate change projections suggest that by 2050, one in five winters will be as warm as, or warmer, as the record mild winter of 2015.

Figure 2.4
Annual mean temperature in Finland, 1847 to 2015, presented in anomalies (°C) for the reference period 1981 to 2010 in terms of mean temperature.
The curve represents temperature variability per decade.



Source: Finnish Meteorological Institute

Figure 2.5
Annual mean precipitation in Finland, 1961 to 2015, presented as anomalies (%) for the reference period 1981 to 2010 in terms of mean precipitation



Source: Finnish Meteorological Institute

The average annual precipitation shows significant variations from year to year (Figure 2.5) and long-term changes in precipitation are obscured by the natural variability in precipitation levels.

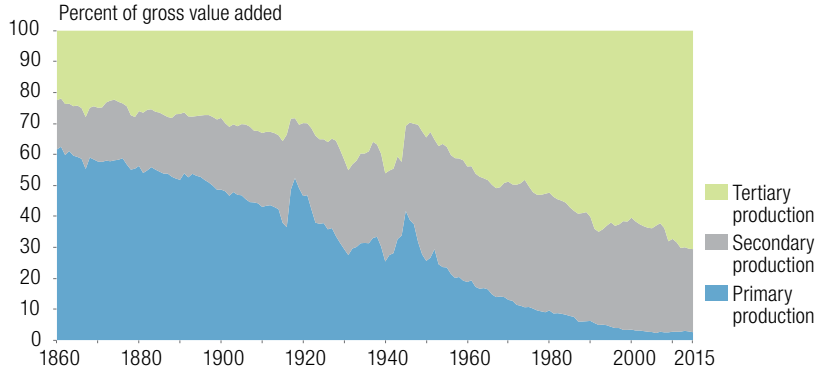
2.5 Economy

Finland has an open economy with prominent service and manufacturing sectors (Figure 2.6). As a member of the European Union and euro area, Finland's economy is integrated with the economies of other EU countries. The main manufacturing industries include electrical and electronics, forest and metal and engineering industries. Foreign trade is important, with exports accounting for approximately 40 per cent of the gross domestic product (GDP). The cold climate, energy intensive industry structure and long distances have led to a relatively high energy intensity and per capita greenhouse gas emissions.

For several decades, the Finnish economy was characterised by rapid growth combined with vulnerability to international cyclical fluctuations. Finland went through severe economic recessions in the early 1990s and again in 2008 to 2009 (Figure 2.7). The economy recovered rapidly after the first recession, and between 1994 and 2007 output grew by nearly five per cent and exports by more than 10 per cent per year. The growth rate was lower but still more than three per cent in 2001 to 2007.

During the 2008 to 2009 recession, the Finnish economy contracted by 10 per cent in the peak-to-trough period. By 2015, by the Finnish economy had still not fully recovered from the deep recession that began in 2008. The economy showed healthy growth in 2010 to 2011, but in 2012–2014 it once again contracted. World trade had already recovered to the same levels seen before the financial crisis, but Finnish exports still remained well below their pre-recession levels.

Figure 2.6
Structural changes in economy

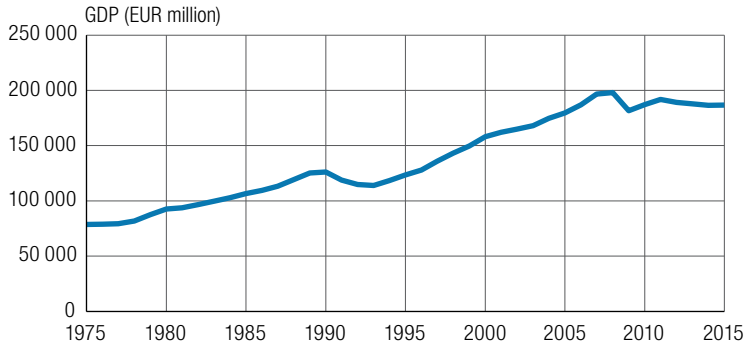


The volume of Finland's GDP gstayed virtually unchanged in 2015. The output of the national economy stood at EUR 187,000 million both in 2014 and 2015. Latest macroeconomic data and projections confirm that the national economy has returned to growth path in 2016. However, it is predicted that the average GDP growth will remain rather moderate in the next few years.

In 2015, net national income grew by 1.4 per cent in real terms, which was clearly more than the gross domestic product because the terms of trade or the ratio between export and import prices improved considerably. The volume of investments grew by 0.7 per cent, and demand in the national economy was mainly maintained by consumption; the volume of which grew by 1.1 per cent.

After a long period of strong growth, Finland's productivity performance weakened sharply amidst the 2008–2009 recession, reflecting not only a weak performance in information and communication technologies but also in the public sector. Over the ten-

Figure 2.7
Gross domestic product 1975 to 2015 (at 2010 prices)

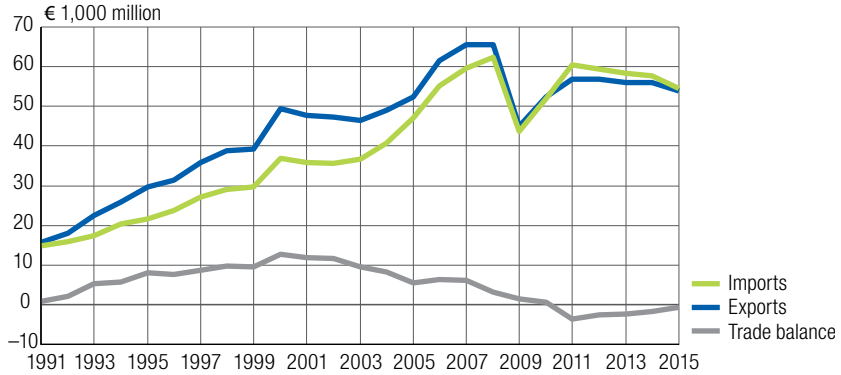


year period before the recession in 1998 to 2007, total productivity trend growth averaged 1.8 per cent per year, whereas from 2008 to 2015 total productivity trend growth has averaged −1.0 per cent per year. Potential output growth is expected to accelerate in the next few years together with the rebounding of total productivity. The growth rate of total productivity is, however, predicted to remain at lower level than in 1998–2007.

Finland's weak export performance (Figure 2.8), which has been especially clear in the information and communication technology (ICT), forestry and metal industries, reflects falling demand for many products that Finnish firms produce for the global market. To some extent, this development reflects a normalisation of the ICT sector's performance, following a lengthy boom period. Finnish exports are highly cyclical and the final extent of the structural adjustment in the traditional export sectors remains unclear.

The volume of exports was 42 million tonnes in 2015. The export volume of biotic products was nearly the same as that of abiotic products. In addition to wood and paper products, the highest volumes were seen in oil products, chemicals, base metals and stone products. The degree of refining in exported goods is clearly higher than in imported goods.

Figure 2.8
Finland's exports and imports, 1970 to 2015 (at current prices)



Finland imported nearly 54 million tonnes of goods in 2015. However, almost a quarter, 24 per cent of the weight of the imported goods was biotic, in particular, agricultural and forestry products, refined wood products and food.

The value of Finland's exports was EUR 77,156 million in 2015 and imports amounted to EUR 76,898 million. Oil products were the most important growth area

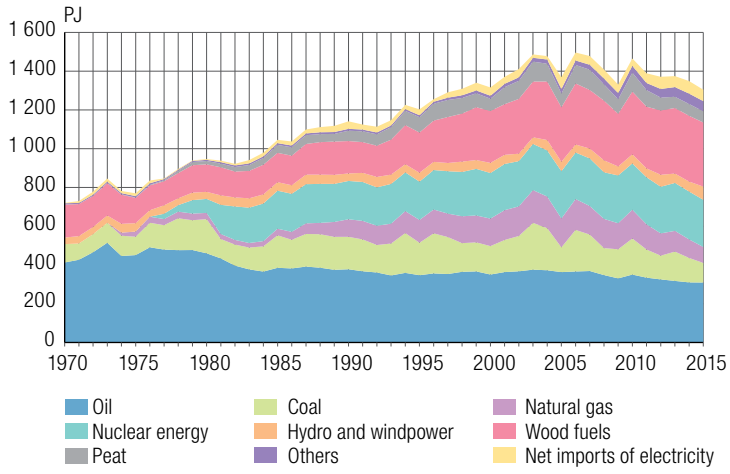
in exports. The export volumes for many electrical appliances and foodstuffs also increased. The long-term decrease in communication equipment exports continued. Exports to both non-EU countries and other EU countries diminished by one per cent in 2015. Imports from other EU countries declined by one per cent, while imports from non-EU countries stayed at the same level as in the year before.

2.6 Energy

2.6.1 Energy supply and consumption

Finland is dependent on imported fuels. Accordingly, the cornerstones of Finnish energy policy are a diversified and reliable supply of energy and improved self-sufficiency. The energy-intensive basic industries, cold climate and long distances underline the significance of energy for the wellbeing of its inhabitants and the country's competitiveness. Until the 1960s, Finland's energy policy relied on the electricity produced by hydropower stations and the extensive use of wood. Due to the limited hydro resources, the use of coal and oil started to increase rapidly, and the need to find new energy sources became clear. A gas pipeline from Russia to eastern Finland was completed in 1973 and later extended to the capital area and to some other cities. The first nuclear power unit was taken into use in 1977, followed by three other units in the years 1979 to 1982. A fifth unit is currently under construction and is expected to be completed in 2018. The 1970s also brought peat into the Finnish energy mix (Figure 2.9).

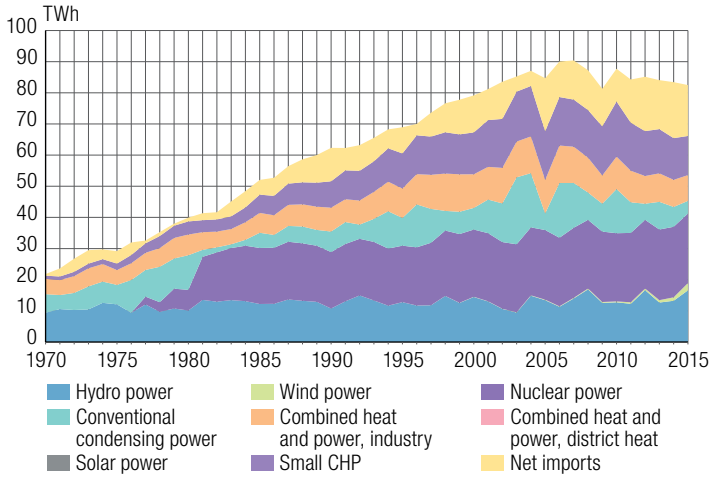
Figure 2.9
Total energy consumption, 1970 to 2015



In 2015, total energy consumption was 1,301 PJ. Finland's domestic energy sources are wood-based fuels, hydropower, wind power, waste and peat. Its energy dependence, calculated as the proportion of imported net energy in the total primary energy supply (TPES), was 47 per cent in 2015. In reality, Finland relies more on imports than this energy dependency figure indicates, as the indicator considers nuclear energy to be domestic.

Electricity generation was 66.2 TWh in 2015. This consisted of combined heat and power production (31 per cent), both in connection with district heat production and by industry for its own use, nuclear power (34 per cent), hydropower (25 per cent), con-

Figure 2.10
Electricity supply by production mode, 1970 to 2015



ventional condensing power (six per cent) and wind power (3.5 per cent) (Figure 2.10). Electricity consumption was 82 TWh.

The power system is interconnected with the power systems in Russia, Sweden, Norway and Estonia. Net imports from the Nordic and Baltic market and Russia vary considerably from year to year, mainly due to variations in hydropower production in the Nordic countries. Between 1990 and 2015, maximum net imports were 18.0 TWh (in 2014) while minimum net imports were 3.7 TWh (1996).

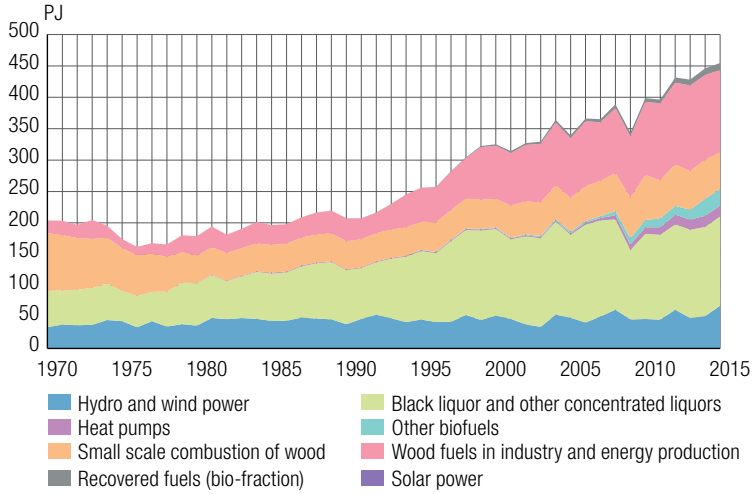
Renewables accounted for 16 per cent of final energy consumption within the EU in 2015. In Finland, the corresponding figure was consistently around 30 per cent for the period 2000 to 2007, but it has increased over the last years, reaching 39 per cent in 2015 (Figure 2.11). In 2010, an extensive package of specific targets concerning different renewable energy sources was launched in order to reach the EU 2020 renewable energy target set for Finland, i.e. 38 per cent of its gross final energy consumption. The package promotes the use of forest chips and other wood-based energy in particular, alongside wind power, the use of transport bio-fuels, and increased utilisation of heat pumps (see Section 4.5.1). Since 2010, measures have been strengthened and adjusted when needed.

Combined heat and power production (CHP) provides opportunities for the cost-effective use of renewables both by industrial producers and at district heating plants. The amount of energy Finland saves annually through CHP approximately corresponds to one-tenth of all primary energy used in the country. CHP accounts for more than one-third of all electricity production compared with the EU average of 12 per cent. Installed wind power capacity has increased steadily in Finland since 1990 as a result of the Government's support measures. The capacity was only about one MW in 1992, whereas it climbed to 82 MW in 2005 and reached 630 MW at the end of 2015. By the beginning of 2017, the installed wind power capacity had increased to 1,553 MW.

The use of fossil fuels and peat in energy production causes considerable CO_2 emissions (see also Section 3.2.1). Nevertheless, the CO_2 emissions per total primary energy unit are lower than in many other European countries. This is due to the relatively high share of non-fossil energy sources in power and heat production, i.e. hydro, nuclear and biomass sources.

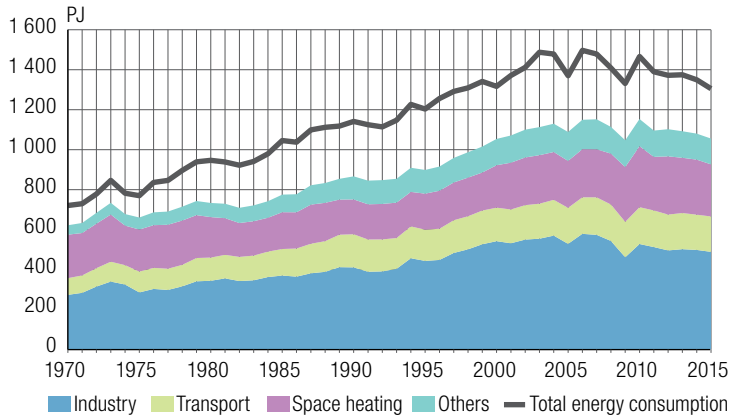
For several decades the use of primary energy, as well as electricity were increasing and they reached their peak values in 2006 to 2007. Demand rose more rapidly than GDP until 1994. Thereafter, both the energy intensity and the electricity intensity of the economy

Figure 2.11
Renewable energy sources, 1970 to 2015



have decreased. The decrease reflects the structural change within the economy from basic industry towards services and less energy-intensive industry. Furthermore, increased energy efficiency has contributed to the positive development of energy intensity. Industry is still the largest energy consuming sector, with a 45 per cent share of final energy consumption in 2015 (Figure 2.12). Space heating accounted for 25 per cent and transport for 17 per cent of energy consumption, while the share of energy used for other purposes was 12 per cent. Industry consumed 47 per cent of electricity, households 27 per cent and services and the public sector consumed 23 per cent of electricity.

Figure 2.12
Total energy consumption and final energy consumption by sector, 1970 to 2015



2.6.2 Energy market

The Finnish electricity market was opened gradually to competition with the enactment of the Electricity Market Act in 1995. Since autumn 1998, it has been possible for all electricity consumers, including households, to invite tenders for their electricity purchases. The electricity generation sector is characterised by a large number of actors. The total number of companies producing electricity is around 150 and the number of

production plants is around 400. To serve Finland's 3.3 million electricity customers, there are currently 72 retail suppliers.

The Finnish electricity wholesale market is part of the Nordic and Baltic power market. For more than a decade, Finland has formed an integrated wholesale electricity market together with Denmark, Norway and Sweden, and in the 2010s Estonia, Latvia and Lithuania joined the common market. The Nordic and Baltic power market is price coupled with the continental electricity markets. Physical day-ahead and intra-day trading takes place in the power exchange Nord Pool. The formulation of area prices and the allocation of cross-border capacity between Finland and the other Nordic and Baltic countries are managed by implicit auctions in the power exchange's day-ahead market. The share of electricity consumed in Finland and sourced through Nord Pool was 67 per cent in 2015. Electricity is also traded on the Over-the-Counter-Market and directly between the buyer and the seller.

The system operator, Fingrid Oyj, is responsible for managing the national power balance and ensuring that the transmission system is maintained and used in a technically appropriate manner. Together with the other Nordic system operators, Fingrid is responsible for safeguarding the necessary reserves for the operation of the power system.

The natural gas market in Finland has been relatively isolated and small. Up till now there has been only one importer and wholesale supplier: Gasum Oy. A total of 22.9 TWh of natural gas was consumed in 2015. The largest natural gas user groups are the energy companies, the pulp and paper industry and the chemical industry; together, they use approximately 90 per cent of the gas. There are 22 natural gas retail suppliers and approximately 29,000 retail customers. The retail supply of natural gas covers only about five per cent of the total gas consumption. A long-term objective is to increase the alternatives for the supply of natural gas. This is important in terms of safeguarding both the supply of natural gas and the functioning of the market. In October 2016, the promoters of the Balticconnector gas pipeline, Baltic Connector Oy from Finland and Elering AS from Estonia took the final decision to invest in the construction of the Balticconnector gas pipeline. Balticconnector is a gas pipeline between Finland and Estonia that will enable the natural gas markets of the Baltic countries and Finland to be connected, and allow the integration of these markets with the European Union's common energy market. On 11 May 2017, the Government gave a proposal to the Parliament concerning a new Natural Gas Market Act. According to the proposal, the wholesale and retail markets for natural gas will be opened for competition in the beginning of 2020. After that, Finland will apply the EU internal gas market legislation as a whole.

Emissions trading within the EU is a market-based instrument cutting emissions in the energy sector. Finland's Emissions Trading Act (311/2011) applies to the CO_2 emissions from combustion installations with a thermal input of more than 20 MW, to smaller combustion installations connected to the same district heating network, to mineral oil refineries, to coke ovens and to certain installations and processes of the steel, mineral and forest industries. Any installation covered by the emissions trading system needs an emissions permit. In Finland, the number of installations needing a permit is around 600 (see Section 4.5.1).

2.7 Transport

Transport demand and supply are influenced primarily by developments in the economy, by demographic factors, by employment patterns and by infrastructure provision. Increased access to high-speed transport has increased the commuting distance between work and home.

The Finnish transport network consists of roads, rail transport, waterways and the air traffic infrastructure, the main elements of which form part of the EU's Trans-European Networks. The Finnish road network has approximately 78,000 km of public roads. In addition, there are 350,000 km of smaller private roads, many of which are used for forestry purposes. Finland has about 780 km of motorways and 120 km of semi-motorways. The rail network amounts to a total of 5,920 km, of which 3,260 km is electrified.

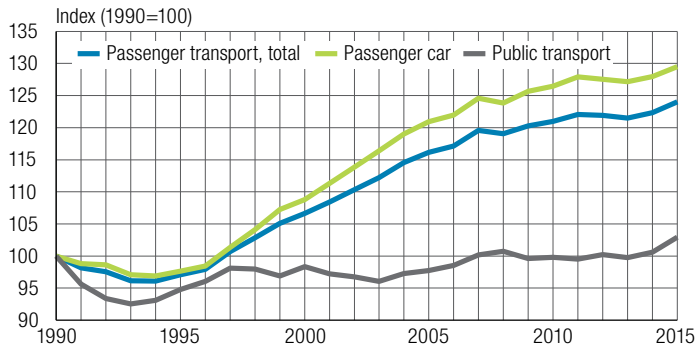
Three quarters of Finland's foreign trade go by sea, most of it from the country's principal ports. Most of Finland's many ports and harbours are small and the traffic flows vary considerably. Icebreakers have an important role to play, with nine of them being responsible for assisting freighters and passenger ships into the 27 ports and harbours that are kept open all year round. Given a normal winter, the harbours in the Bothnian Bay require icebreakers for half of the year, while in the Gulf of Finland they are needed for about three months.

Finland has a network of 28 airports, of which 25 are maintained by Finavia (formerly the Civil Aviation Administration). Approximately 95 per cent of the country's international air traffic operates via Helsinki-Vantaa Airport.

2.7.1 Passenger transport

Domestic passenger transport, measured in terms of passenger-kilometres, has increased by approximately 24 per cent since 1990. Cars account for approximately 83 per cent of the total passenger-kilometres. Since 1990, the number of passenger-kilometres travelled by car has grown by 29 per cent, and the number of passenger-kilometres by public transport by three per cent (Figure 2.13). Rail and air travel have increased, whereas the use of buses has decreased in terms of passenger-kilometres. Greenhouse gas emission trends in the transport sector are presented in Section 3.2.2.

Figure 2.13
Development of passenger-kilometres in domestic transport, 1990 to 2015



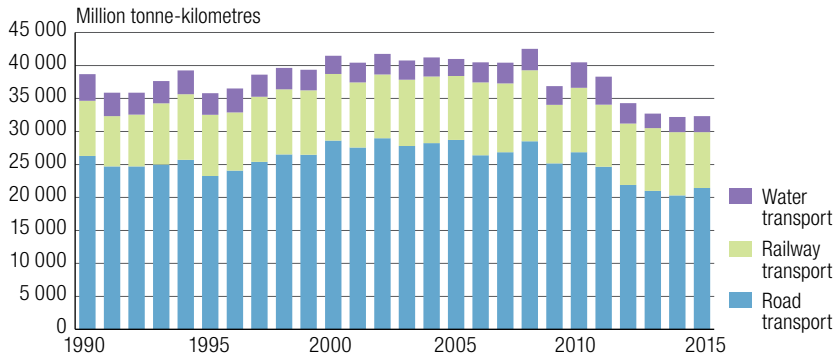
2.7.2 Freight transport

The total number of freight tonne-kilometres in Finland is almost double the EU average, mainly because of the long distances and the industrial structure. Heavy industries, such as timber, pulp and paper, and metal and engineering, have traditionally played a prominent role in the Finnish economy, and these industries all need transport for their raw materials and products.

Road haulage is the most important form of transport for domestic goods traffic (Figure 2.14). More than 66 per cent of all freight is transported by road, while rail trans-

port accounts for 26 per cent of all transport, and inland waterways for just under eight per cent. Air transport's share is almost negligible.

Figure 2.14
Tonne-kilometres in domestic goods transport, 1990 to 2015



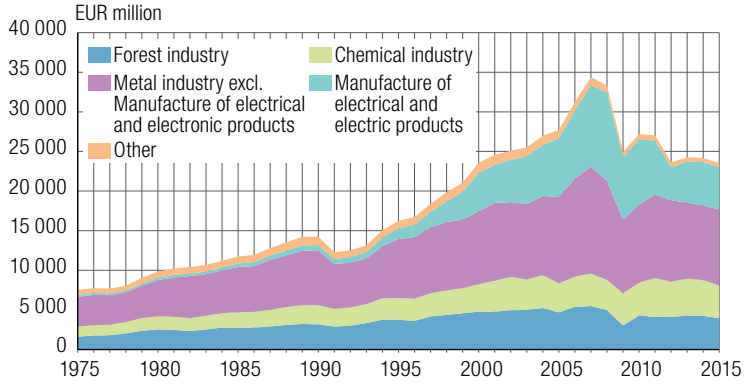
Almost 92 per cent of overseas freight travels by sea, while approximately seven per cent travels by road. Air freight is almost negligible in terms of tonnes, whereas in terms of value it accounts for more than nine per cent of all transport. Products with a high added value, such as electronics, are transported by air.

2.8 Industry

The main manufacturing industries include metal, chemical and forest industries (Figure 2.15). Finland's industrial structure has undergone a profound change, and this has occurred at a very fast rate starting in the mid-1990s. Following the economic recession of the early 1990s, the very rapid expansion of the metal products industry, especially electronics, changed the traditional industrial structure. The increase in the technology intensity of the country's manufacturing sector has been strong.

The value of the output of industry was around EUR 77.8 billion in 2015. The value fell by 4.3 per cent from the previous year. The metal industry had a share of 41.4 per cent in total value of sold output, the chemical industry 20.9 per cent, the forest industry 19.8 per cent, and the food industry 10.8 per cent.

Figure 2.15
Output of manufacturing industries by sector, 1975 to 2015 (at 2010 prices)

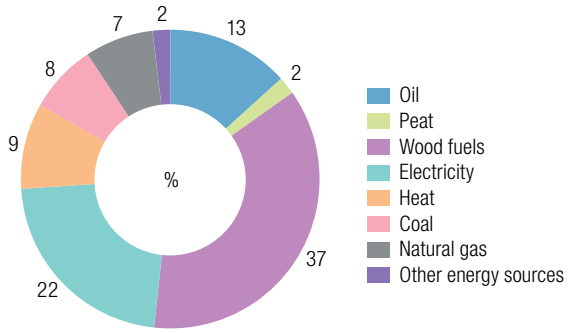


The forest industry, one of Finland's traditional industrial sectors, accounted for six per cent of the GDP in 2000, but by 2015 the share had fallen to 2.3 per cent. This occurred despite the increasing proportion of higher value added products in this sector. The forest industry has undergone structural change as manufacturers have downsized their capacity in certain paper segments. Recently, the export of pulp has increased and several new investments in pulp production are in the pipeline and under consideration. In general, the trend in industrial output at constant prices is fairly similar to that of the GDP. In 2015, a total of 45 mines and quarries were operating in Finland. The yearly volume of mining has been increasing since 2001 from around 30 to almost 90 million tonnes in 2015. The increase is mainly caused by few open pit operations. Expansion of present mines may increase the volume of mining in future.

Until the 1980s, Finnish industry was almost entirely domestically owned and the existing legislation placed strict limits on foreign ownership. For a long time, about one-fifth of all industry was state owned. The restrictions on foreign ownership were removed with Finland's accession to the EU in 1995. The state has also sold a considerable part of its industrial holdings.

In 2015, Finnish industry used 46 per cent of the country's total primary energy and 48 per cent of its total electricity (Figure 2.12). Final energy consumption by the industrial sector consists of biomass (37 per cent), electricity (22 per cent), oil (13 per cent), purchased heat (nine per cent), natural gas (seven per cent), coal (seven per cent) and other energy sources (four per cent) (Figure 2.16). The forest industry (57 per cent) uses more energy than any other industrial sub-sector; this is followed by the chemical industry (18 per cent) and the manufacturing of basic metals (14 per cent) (Figure 2.17).

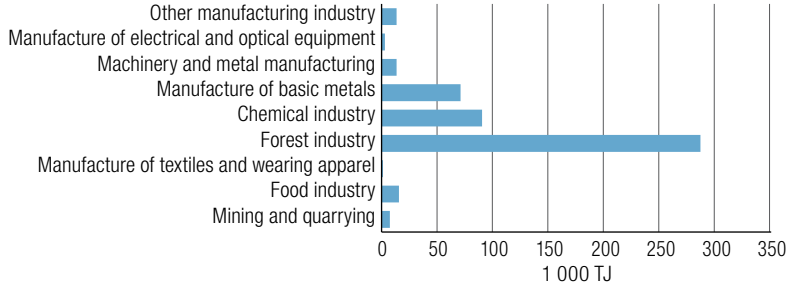
Figure 2.16
Energy use in manufacturing by source, 2015



A considerable number of the energy-intensive industries are export oriented. More than 90 per cent of paper and board production is exported and the share of exports is also high in the basic metal industry. Because of their high energy demand, these energy-intensive industries have also worked hard to improve their energy efficiency. For example, between 1990 and 2015 industrial output increased by 41 per cent (measured in terms of value added in 2010 prices), while the final consumption of energy rose by only about 15 per cent.

All pulp mills are self-sufficient in heating energy and produce energy in excess of their own requirements. At many industrial sites, the energy left over from the pulping process is channelled to the municipal district heating network. However, in their search for higher profit margins, industrial installations have increasingly outsourced their electricity generation to the open electricity market.

Figure 2.17
Energy use in manufacturing by industry in 2015



2.9 Building stock

Finland's largest cities are located in the south and western parts of the country, and the size of settlements tends to decrease towards the north and eastern parts of the country. Outside the relatively few larger towns and cities, Finland is a land of small towns and rural communities. Most of the economically important cities are located on river estuaries along the coast or inland at the intersections of the various lake systems.

In 2015, the total heated building area amounted to 466 million m^2. Residential buildings accounted for 63 per cent of the area, while office, commercial, public and industrial buildings made up 36 per cent of the area. The remainder consisted of free-time residences, agricultural buildings and other small outbuildings. There were 1,143,000 detached houses, 401,000 dwellings in attached houses (mainly semi-detached and terraced houses) and 1,326,000 dwellings in apartment blocks. The number of dwellings increased by 32 per cent between 1990 and 2015. In addition to this increase in the number, there has also been a gradual rise in the average size of dwellings. In 1990, the average residential floor space per dwelling was 74 m^2. By 2015, it had increased by six square meters to 80 m^2. This is driving up the energy requirement for heating.

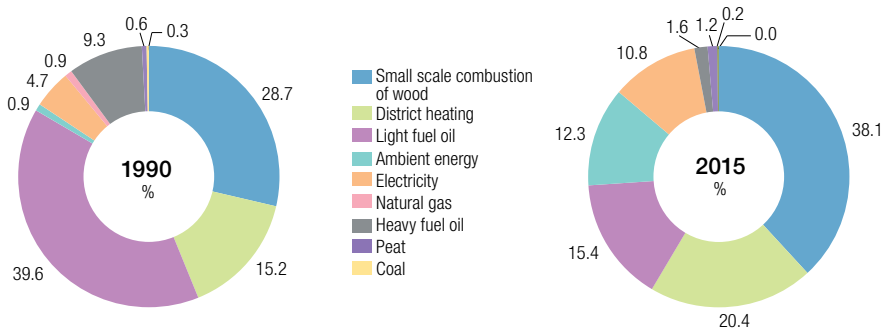
The figure for residential floor space per person has grown by more than the figure per dwelling. It was 40 m^2 in 2015 compared with 19 m^2 in 1970 and 31 m^2 in 1990. On average, Finns spent one-fifth of their disposable income on housing in the year 2012; since then, there have been no radical changes in the share of income spent on housing. The building stock is fairly new, with only 10 per cent of all buildings having been constructed before 1940. More than 97 per cent of dwellings have flush toilets and more than 98 per cent of them have a sewer and running water.

2.9.1 Energy use for indoor heating

Because of the country's northern location, a great deal of energy is used for indoor heating in Finland. It is the biggest source of CO_2 emissions by household and also within the public and service sectors (see also Section 3.2.1). However, during the past three decades the consumption of energy per unit of heated space has reduced significantly. This is largely due to a tightening of the building regulations, which have been set since 1976. The figure for heating degree days (HDD) is a quantitative index designed to reflect the demand for the amount of energy needed to heat a building; it is calculated using a 17°C indoor temperature as the base. The HDD varied in Helsinki, in southern Finland, from 3,200 to 4,700 per year during the years 1981 to 2010. In Sodankylä, in northern Finland, the corresponding range was 5,500 to 7,300. Energy conservation has been aided considerably by technical advances in insulation and window designs, and also by developments in

combined heat and power (CHP) production, district heating, heat recovery and air-conditioning and ventilation systems.

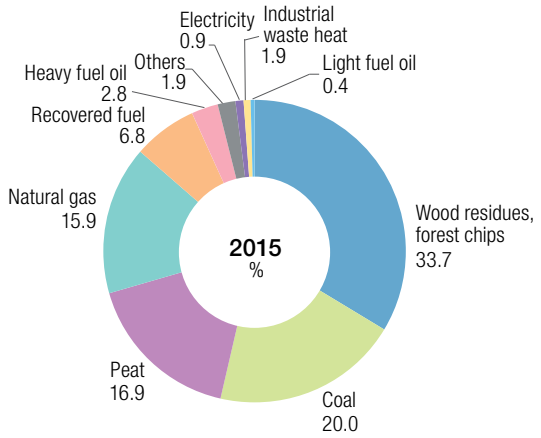
Figure 2.18
Heating energy used in residential, commercial and public buildings, 1990 and 2015



Between 1990 and 2015, the composition of energy sources used for heating changed significantly (Figure 2.19). The use of heavy fuel oil has decreased by 85 per cent and the use of light fuel oil by 55 per cent. At the same time, energy obtained from natural gas has more than doubled. Light fuel oil has lost some of its market share to electric heating and later also to ground heat pumps in detached houses. The share of energy produced by heat pumps was only one per cent in 1990, but in 2015, their share was almost equal to that by oil: 10 per cent. Since 1990 the energy obtained from heat pumps has increased more than tenfold. The increase in the use of heat pumps is due to economic and environmental reasons, as well as to advances in technology. Small-scale combustion of wood has increased by 47 per cent since 1990. It is often used as a secondary heating system, but in rural areas it is also used as the principal heating source. Electric heating has more than doubled and district heating increased by 48 per cent since 1990. The share of district heating was 46 per cent of the total heating energy in 2015. District heating is the primary heating system in apartment blocks, and one-half of the country's total building stock relies on it.

A wide range of fuels is used to produce district heat (Figure 2.19). Coal and oil are being replaced by natural gas. Peat, an indigenous fuel, remains competitive especially in inland areas. Government and industry efforts have helped to increase the use of

Figure 2.19
Fuels in district heating production in 2015



forest-based fuel, mostly in the form of by-products from the forest industry. The district heating network now covers most areas with a cost-efficient potential. CHP accounts for 70 per cent of the total heat produced in district heating, i.e. practically all of the potential for CHP has been exploited. CHP improves efficiency, especially when compared to separate condensing power production. CHP is also an efficient way to decrease CO_2 emissions from energy production.

2.9.2 Urban structure

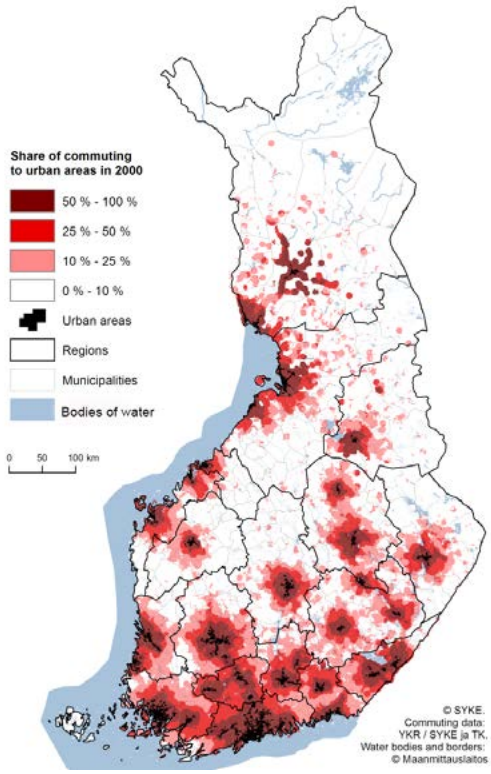
The regional development in Finland has been characterised by increasing differences between regions. Population growth and new jobs have concentrated mainly on a few big growing urban regions, principally Helsinki, Tampere, Turku, Oulu, Jyväskylä and Kuopio. Growth has occurred due to migration, immigration and large shares of young fertile age groups. Middle-sized urban centres have mostly kept the number of population and jobs relatively balanced. In rural areas, however, the population has been declining for many decades. The population of remote villages has been declining steeply, whereas villages closer to the growing urban regions have grown.

In 2015, the combined population of the 34 largest urban areas in Finland was 3.7 million, an increase of 460,000 since 2000. These urban areas contained 68 per cent of the total population in 2015 (63 per cent in 2000), and in 2014 they had 76 per cent of the country's jobs. This means that more than two-thirds of the population and jobs are located in areas that cover only approximately 1.3 per cent of the surface area of the country. In future, population growth is projected to be even more concentrated than before around the largest urban centres, especially in the south of the country.

Finland became urbanised relatively late and the urbanisation process is still continuing. The share of the population in densely built-up areas (urban areas and rural localities) has risen continuously, and these areas accounted for 85.4 per cent of the population in 2015. There are 749 built-up areas covering approximately 2.2 per cent of the land area. In 2000, the corresponding proportion was 1.8 per cent. The population density in these built-up areas was 685 inhabitants per km^2 in 2015. Density has declined by 68 inhabitants per km^2 since 2000 as the lower density fringes of these built-up areas have grown. However, in some of the biggest urban regions, the density has started to rise slightly in the main urban area particularly after 2010. Approximately 64 percent of the inhabitants of all urban areas live in neighbourhoods with a population density of more than 20 inhabitants per hectare. The percentage has declined until 2011, but increased after that by 0.5 per cent. Approximately 67 per cent of the inhabitants of urban areas live in pedestrian or transit zones, and 33 per cent in car-dependent zones in 2015. Compared with the other Nordic and European countries, the population density of these built-up areas is still quite low. It is less than half the population density of comparable areas in Sweden or Norway.

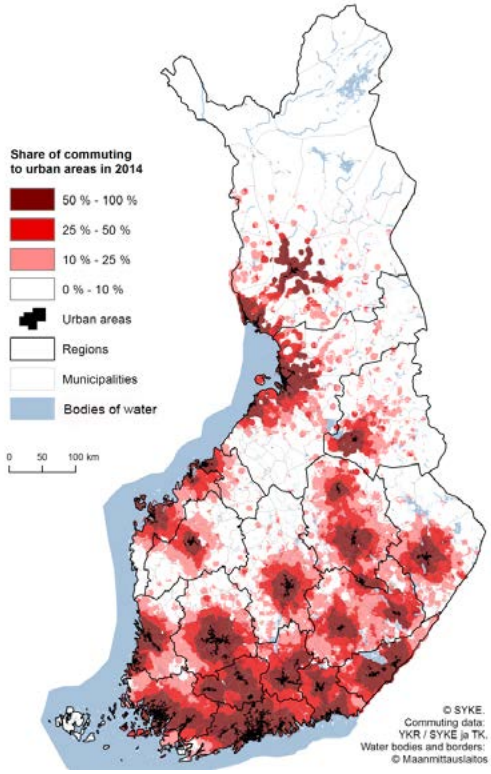
Often there is no distinct boundary between urban and rural areas, as in many cases there are some tight restrictions on construction close to urban areas. This has led to a dispersed and fragmented urban structure. Urban areas have typically expanded inexorably outwards, leading to the creation of unstructured, low-density built-up areas. These low-density districts of built-up areas outside the urban plan cover some 35 per cent of the land surface of the country's urban areas — even in the main growth centres. Low-density development causes problems in terms of arranging services, maintaining infrastructure and planning urban form. Many of the households in these areas need more than one car to manage their daily lives (commuting, school trips, acquiring services, and engaging in free-time activities). Despite the expansion of low-density areas, the share of population living in low-density areas and scattered settlements within urban regions has remained stable since 2000.

Figure 2.20
Share of commuting directed towards city centres, 1990



Source: Finnish Environment Institute (SYKE) and Statistics Finland

Figure 2.21
Share of commuting directed towards city centres, 2014



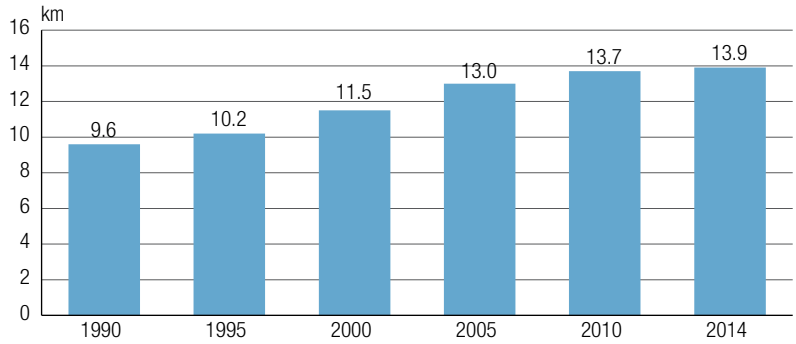
Source: Finnish Environment Institute (SYKE) and Statistics Finland

The average amount of kilometres travelled daily has increased due to the sprawl of residential areas, but also because of increased commuting distances and service-related mobility. Particularly retail trade has concentrated into bigger units, which are partly located on the fringe of urban areas.

The improvement of transport infrastructure has enabled people to travel longer trips to work than before. Commuting areas of cities have expanded significantly. This development can be seen in Figures 2.21 and 2.20, which show the development in commuting to urban areas from 2000 to 2014.

The average daily one-way commuting distance has more than doubled in just 30 years. After 2005, the average distance to work has risen only moderately and after 2010, the change has been minimal. The opportunities to use sustainable means of transport in commuting depend on the commuting distance and the location of both the home and the workplace in relation to public transport services. There are big differences between urban areas in the availability of sustainable options in commuting trips. The share of commuting trips, where sustainable means of transport are available, ranges between 49 and 76 in urban areas of urban regions. In most regions, the share has been declining, but in some regions, a small increase has taken place in the 2010's.

Figure 2.22
Average daily commuting distance, 1990 to 2014



2.10 Agriculture

Farming in Finland is possible as a result of the warming effect of the Gulf Stream, which makes temperatures three to four degrees higher than would otherwise be expected at these latitudes. As Finland is nearly 1,100 kilometres long from north to south, there are considerable regional variations in the climate. The rainfall in the growing period is 340 to 370 mm in Southern Finland and 220 to 280 mm in Northern Finland. The thermal growing season (the period with an average daily temperature of more than +5°C) varies from nearly six months in the south to between two and three months in the north. The growing season in Finland is too short for many cultivars grown elsewhere, and, therefore, frost-resistant varieties have been developed. Because of the short growing season, the yield levels of the field crop species are considerably lower in Finland than in central Europe. The harsh winters also reduce productivity, as they restrict the cultivation of winter cereals.

Climatic conditions are a decisive factor affecting the feasibility of crop production. Cultivation of wheat and oilseed plants is restricted to southern Finland, whereas barley, oats, grass and potatoes can be cultivated in most parts of the country. In many parts of Finland, livestock farming, especially dairy farming, is the only profitable form of agricultural production.

Finnish agriculture is based on family farms. In 2015, private persons owned more than 86 per cent of the farms, while heirs and family companies owned more than 10 per cent of farms and the state, municipalities and other communities about one per cent of farms.

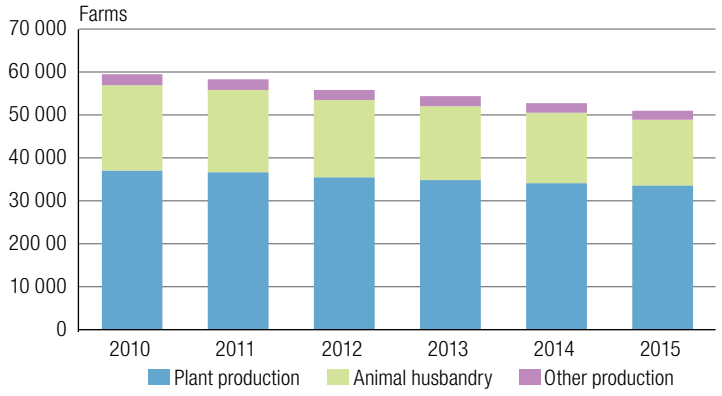
Between 1990 and 2015, the number of active farms fell from 130,000 to 51,000 (Figure 2.23). At the same time, the average farm size increased from 17 to 45 arable hectares. Total agricultural production as well as cultivated area have remained at almost the same level since 1990. In 2015, the utilized agricultural area in use was 22,733 km^2. Structural changes in agriculture have also led to a reduction in greenhouse gas emissions from the agriculture sector (see Section 3.2.4)

More than 60 per cent of the active farms practice crop production as their main line of farming. The share of grassland crops was 30 per cent, while the share of barley was 23 per cent, oats 13 per cent and wheat 11 per cent in 2015. These shares have remained fairly stable since 1990. By comparison, the number of dairy cows decreased in this period from 490,000 to 285,000. Dairy production is the main production line of farming, with just over 15 per cent of the farms engaged in it. Approximately six per cent of farms specialise in beef production and two per cent in pig husbandry, while one per cent of farms are poultry farms. The share of other production lines (sheep and goat husbandry and reindeer herding) is approximately six per cent. About eight per cent of all farms are organic.

In 2015, agriculture, forestry, hunting and fishing together accounted for 2.9 per cent of Finland's gross domestic product (GDP). The economic significance of the total food chain is much greater than this percentage alone indicates. Transportation and processing increase the role of food materials in the national economy considerably. Agriculture is the most important employer in the countryside and, alongside forests, the dominating element in the rural landscape.

As a member of the EU, Finland follows the Common Agricultural Policy (CAP, see also Section 4.5.5). The CAP is nationally implemented and aims to develop the agricultural production of the European Union in a balanced way, while taking the environment, climate and animal welfare into consideration. One important aim of the CAP is also to promote the vitality of rural areas.

Figure 2.23
Number of farms by production sector, 2010 to 2015



Source: Natural Resources Institute Finland (Luke)

2.11 Forestry

According to the national classification, forestry land covers 26 million hectares, or 77 per cent of the total area incl. inland waters in 2015. Land classified as forestry land consists of the subcategories of forest land, poorly productive land and unproductive land. Of the total forestry land area, 20 million hectares are classified as forest land according to the national definition, which is based on annual tree growth, or 22 million hectares according to the FAO definition, which is also used in the national greenhouse gas inventory. Within the EU, the significance of forests for the national economy and society at large has been at its greatest in Finland. The forest sector contribution has been two to five per cent to the Gross Domestic Production and some 20 per cent to export of goods (22 per cent in 2015).

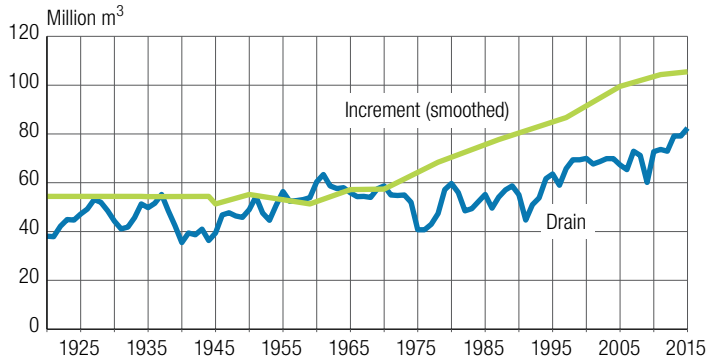
There are approximately twenty indigenous tree species growing in Finland. The most common ones are the Scots pine (Pinus silvestris), Norway spruce (Picea abies) and silver and pubescent birches (Betula pendula and B. pubescens). Usually, two or three tree species dominate a forest stand. More than one half of the forest land area consists of mixed stands.

Sustainable forest management is the basis for Finland's forest policy. The aim is to ensure the welfare founded on the use of forests and the diversity of the forest nature. Policy measures include the Forest Act and other legislation, Finland's National Forest Strategy 2025 (2014), financing and public forestry extension organisations (see Section 4.4: National forest legislation and programmes).

Finnish forests are managed sustainably. About one-fifth of the forests are regenerated naturally, while the rest is generated artificially by using indigenous tree species with local provenance. According to the Forest Act, measures for the establishment of a new seedling stand have to be completed within three years after the end of felling. Natural regeneration is based on seeding from trees already growing on the site, usually by leaving a number of seed trees standing at the time of felling. In artificial regeneration, a new stand is established on a clear-felled area, either through seeding or planting, which accounts for approximately 100,000 hectares annually. Every year, 150 million seedlings are planted in the forests.

The total volume of Finland's forest stock amounts to 2,356 million m3 according to the national forest inventory carried out from 2009 to 2013. The growing stock volume has been increasing for a long time, mainly because of active management of forests and the growth in forest volume has exceeded the harvesting volumes and natural drain (Figure 2.24). In 2015, the total drain was 82 million m^3, while the total increment of

Figure 2.24
Total annual increment and drain of stemwood in Finland since the 1920's



Source: National Forest Inventory at the Natural Resources Institute Finland (Luke)

the growing stock was 105.5 million m^3. The total drain includes cutting removals, harvesting losses and natural mortality. Of the total area undergoing felling annually, thinning accounts for roughly three-fourths, while other cutting, e.g. clear felling and seed and shelter wood felling, accounts for the rest.

The growing stock has increased almost by 60 per cent in the last 40 years. Pine has contributed most to the increase due to the large number of young stands at a rapid growth stage. The draining of mires in the 1960s and 1970s has also improved the growing conditions for trees in peatlands. This has also added to the increase in the growing stock.

More than 50 per cent of Finland's forests are owned by private individuals, 35 per cent by the state, about seven per cent by private companies and the rest by other owners (in 2015). The average size of a forest holding owned by private individuals is small, approximately 28 hectares, with a minimum size of one hectar. About 13 per cent of Finns are forest owners, i.e. 685 000 Finns with 376,000 forest holdings. The forest management associations provide the forest owners with advisory services in forest management and felling.

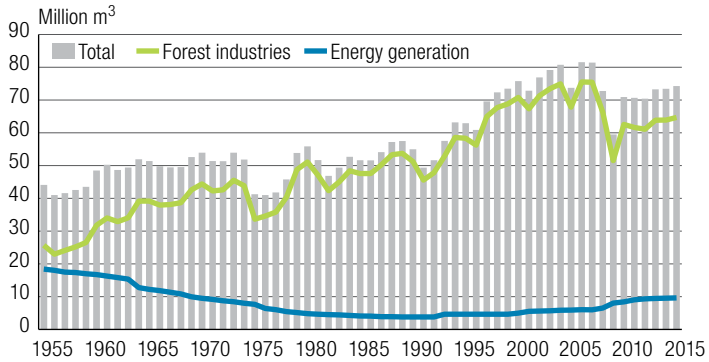
Approximately EUR 300 million is invested every year in forest regeneration, young stand management and other silvicultural practices. Investments in forests owned by the non-industrial private owners amount to some EUR 210 million of which more than two-thirds are financed by the owners and the rest is covered by state subsidies. The stumpage earnings paid to private non-industrial forest owners were about EUR 1.7 billion in 2015. More than 89 per cent of Finland's forests are certified according to the national forest certification standard or Forest Stewardship Council standard.

In 2015, the total use of round wood (raw, unmanufactured timber) in Finland was 74.3 million m^3. Approximately 87 per cent (64.7 million m^3) of this was used in the forest industry and 9.6 million m^3 was used for energy production (Figure 2.25).

Forests (trees and soil) absorb a significant proportion of Finland's carbon dioxide (CO2) emissions. The forest sink varied between 19.3 and 51.3 million tonnes CO_2 eq. during the years 1990 to 2015, which represents 25 to 75 per cent of Finland's total emissions. The proportion has varied considerably due to fluctuating trends in emissions and forestry activity (see Section 3.2.5).

During the past few decades, forest protection and biodiversity in managed forests have received special attention. Numerous protection programmes and decisions have contributed to a threefold increase in the area of protected forests over the last 30 years.

Figure 2.25
Total roundwood consumption 1955 to 2015



Source: National Forest Inventory at the Natural Resources Institute Finland (Luke)

Twelve per cent of the forest area (forest land and poorly productive forest land), or 2.7 million hectares, is protected or in restricted forestry use. Most of this, 2.2 million hectares, is in northern Finland, where the protected areas altogether account for 19

per cent of the forest area. In the south, the protected area is approximately 0.5 million hectares, which is five per cent of the forest area. Some 80 per cent (more than 2.0 million hectares) of the areas that are protected or in restricted forestry use are completely excluded from felling, i.e. under strict conservation. Their share of the total forest area is approximately 10 per cent.

The National Forest Strategy 2025 and national policies on nature and biodiversity conservation are mutually supportive and coherent. The Forest Biodiversity Programme for southern Finland 2008 to 2025 (METSO) targets both private and state-owned lands. It combines the protection and commercial use of forests. Annual funding for the programme is approximately EUR 13 million for 2008 to 2019 (see also Section 4.4).

2.12 Waste

The amount of waste deposited in landfill sites has been significantly reduced by effective waste regulation. Finland's waste policy aims at preventing waste, increasing re-use and recycling, reducing landfilling and reducing the environmental impact of various forms of waste management (see Section 4.5.7).

In Finland, 106.7 million tonnes of waste were generated in 2015, an increase of 10 per cent from the previous year. The largest quantities of waste came from mining and quarrying and construction and manufacturing and they were primarily of mineral origin. The amount of mineral waste was 76.8 million tonnes, or 72 per cent of all waste. The amount of wood waste was 3.9 million tonnes.

The rest of the waste in the total waste figure is mixed waste, which comprises the solid municipal waste generated by households and services. The amount of solid municipal waste generated in Finland in 2015 was 2.7 million tonnes. Though accounting for only 2.5 per cent of the country's total waste, this solid municipal waste is responsible for most of the greenhouse gas emissions from the waste sector (see also Section 3.2.8). The quantity of municipal waste has been 2.4 to 2.8 million tonnes per year in Finland after the turn of the millennium. Municipal waste generation in total was 499 kg per capita in 2015, which was the EU average.

The manufacturing industry generated 8.9 million tonnes of waste in 2015. The largest quantities of manufacturing waste were waste wood and bark, slag from the basic metal industry and various other types of waste, especially gypsum, from the chemical industry.

In 2015, the waste recovery rate was 84.4 per cent, i.e. 44.3 million tonnes of waste was recovered; altogether, 5.6 million tonnes of waste was recovered as material and 4.7 million tonnes as energy. The latter figure comprises mostly wood waste (almost 2.7 mil-

Table 2.2
Waste generation by source and waste category, in 2015

2015	Chemical waste	Wood waste	Mineral waste	Other waste [1]	Total
	1,000 tonnes per year				
Mining and quarrying			76,777		76,777
Manufacturing	561	3,352	2,389	2,603	8,906
Energy Supply	5	213	831	201	1,251
Construction		279	14,637	143	15,060
Service activities and private households	34	84	24	2,689	2,764
Other	18	35	512	1,321	1,351
Total	**618**	**3,963**	**95,170**	**6,957**	**106,709**
of which hazardous waste	394	27	1,345	329	2,098

1) Metallic waste, Glass waste, Paper and cardboard waste, Plastic and rubber waste, Household and mixed waste, Sludges (dry weight)

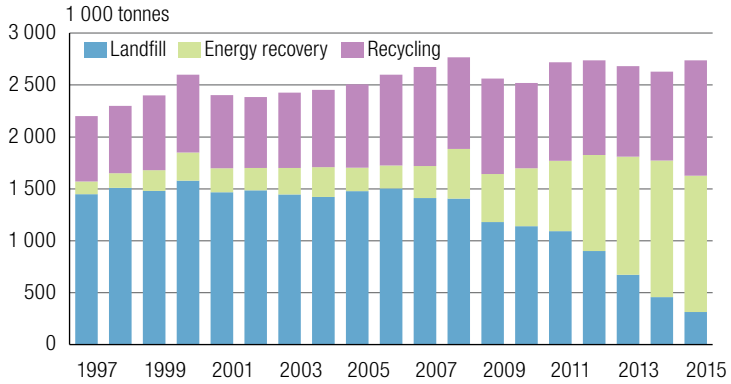
lion tonnes). The wood waste was almost fully recovered, as 0.2 million tonnes of wood waste was recovered as material in addition to the high energy recovery rate.

In 2015 almost 90 per cent, of all municipal waste was recovered as material (40.6 per cent) or energy (47.9 per cent) (Figure 2.26). Biowaste recycling has doubled from 2006 to 2015 mainly due to improved sorting and the separate collection of municipal waste and extension of treatment to anaerobic digestion. According to the Finnish Forest Industries Federation, 70 per cent of paper waste (e.g. newspapers, printed paper and cardboard) was recycled in the year 2015, which is the same as the average rate in Europe.

At the end of the 1990s, almost 65 per cent of all municipal waste was disposed in landfills. The proportion of municipal waste sent to landfills has decreased every year since 2002 as a result of the increased waste recovery rate. In 2002, the proportion was 62 per cent, and in 2015 it amounted to 11 per cent, or 315 thousand tonnes.

The share of waste incineration has increased considerably in the last two decades. Initially in the early 1990s, the focus of waste policy was on waste prevention and recycling. Only recently has waste incineration started to become more important in municipal waste management. There have been many investments in waste incineration plants beginning from the year 2006. In 2015, the incinerated amount accounted for 48 per cent of the total municipal waste. The amount of incinerated municipal waste has more than doubled since 2010. All waste incineration plants produce heat and electricity for municipalities and industry.

Figure 2.26
Municipal solid waste treatment in Finland, 1997–2015



2.13 Peatlands

Pristine peatlands are carbon accumulating ecosystems in the long term. Depending on weather conditions, a particular peatland can vary on a year-to-year basis from a net sink to a net source of emissions. It is estimated that since the last ice age, peatlands have accumulated some 5,400 million tonnes of carbon, forming the largest soil carbon stock in Finland.

Peatlands cover almost one third of the total land area in Finland, approximately 9.1 million hectares. Regional differences in coverage and drainage are considerable. The majority of the peatlands are located in the north (Lapland and Pohjanmaa-Kainuu), while only seven per cent are in southern Finland. Conversely, most of the drainage has occurred in southern Finland. Approximately six million hectares of peatlands have been drained for forestry. About 0.3 million hectares of peatland is in agricultural use. The total area of undrained peatlands is approximately four million hectares.

Almost 13 per cent of Finnish peatlands — amounting to 1.2 million hectares are protected. They consist mainly of areas under the national mire protection programme, areas in national parks and nature reserves, and old-growth forest conservation programme and wilderness areas.

Peat is a domestically important fuel source, one that currently represents approximately 4 per cent of the total primary energy supply. In view of its employment impact, it is also significant from a regional policy standpoint. The area used for the harvesting of energy and environmental peat is approximately 65,000 hectares. In 2015, the emissions from peat extraction areas were a source of 2.1 million tonnes CO_2 eq.

In 2012, the Finnish Government approved a resolution on the sustainable and responsible use and protection of mires and peatlands. The decision directs human activities to peatlands that have been drained or whose natural state has otherwise been significantly changed, it is used to implement sectoral policies and measures for sustainable and responsible use of mires and peatlands, and it is used to improve the status of the existing network of protected peatlands. As a part of the resolution, a long-term peatland protection and restoration programme will be carried out by 2025.

According to revised Environmental Protection Act (527/2014, 1.9.2014) the peat extraction must be situated to peatlands that have been drained or whose natural state has otherwise been significantly changed in a way that does not cause damage to a nationally or regionally significant nature value. The significant change of natural state is described more detailed by the Environmental Protection Decree (713/2014).

The Mire Conservation Group (2012–2015) identified the most valuable mires nationally in terms of their natural value, that complement best the current network of conservation areas. During 2015–2016 around 36 000 hectare state-owned mire land both in Southern and Northern Finland were protected based on the proposal of the Mire Conservation Group.

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