



City of Turku
**SUSTAINABLE DEVELOPMENT
REPORT 2006**
Summary





For Turku, the past year was a time of co-operation in terms of sustainable development. At the same time as the environmental strategy for Southwest Finland was prepared in regional co-operation, The PARAS project aimed at finding a more sustainable

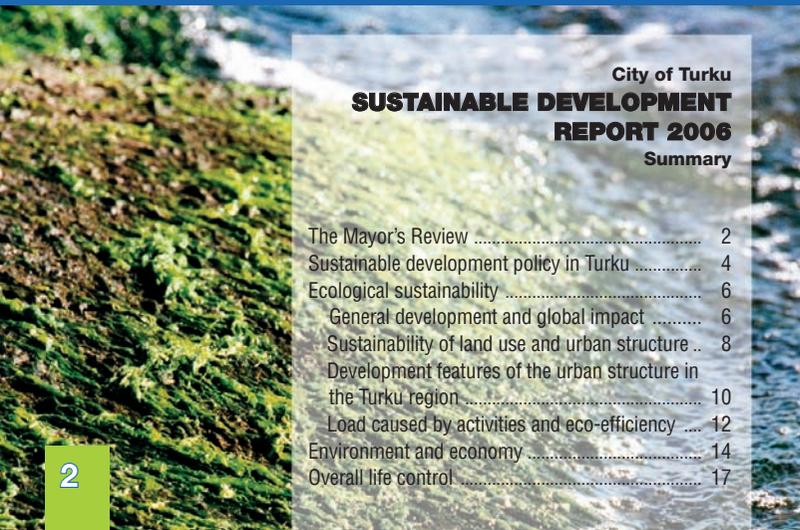
municipal structure and models for regional activities in different sectors. Initiating the implementation of the international Aalborg Commitments to sustainable development also occupied many planners in the administrative sectors.

The year 2006 was the first full year of implementation of the Sustainable Development Programme that was updated in the previous year. Experience has proven that many administrative sectors have taken the criteria for sustainable development seriously as conditions for guiding work. The Agenda 21 Agency for Southwest Finland has also

played an important supporting role in the implementation. On the other hand, there is still room for improvement in the guidance impact of the Sustainable Development Programme and making the goals of the Programme more tangible.

Implementation of the Aalborg Commitments approved by the City Board began in the autumn with a baseline review. The initial results show that Turku has made significant investments in different areas of sustainable development in recent years. Simultaneously, the baseline review lists a number of challenges that Turku is facing as well as concrete proposals for measures to ensure a more sustainable future. They offer a good foundation for the planning of more sustainable urban development.

The questions related to urban structure represent key challenges for sustainability in Turku. Last autumn, a group of international sustainable transportation experts examined Turku's progress in terms of developing a sustainable transport system. In addition to many unique quality factors, the analysis revealed the key questions to be regional transport planning, deficiencies in critical parts of the city centre's network of cycle lanes, pub-



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Climate change also affects the state of the Baltic Sea. Turku implemented concrete measures to control climate change in 2006 through, for example, the ILMU campaign co-ordinated by the Energy Agency of Southwest Finland.

Cover photo:
 Hannu Waher.

lic transport arrangements that are partially insufficient, and the challenging competitive situation in the city centre. In the future, Turku must be able to respond to these questions with concrete measures and revised policy guidelines.

Last year, Turku was recognised for its long-term cross-sectoral work in health when a groups of international experts gathered for the European Healthy Cities Networks Conference in Turku. The topics of discussion included good urban planning, ageing, immigration, and the activity of city residents. We are pioneers in keeping city residents active in terms of both Finland and Europe. We should be proud of that, since a sustainable city is also a healthy city.

All in all, 2006 showed that urban development in Turku is already sustainable in many ways. On the other hand, the many reports compiled during the year also revealed challenges and provide a foundation for initiating concrete corrective measures. Sustainable development is one of the greatest challenges of our time and will require an open co-operative spirit from all of us.

Mikko Pukkinen
The Mayor

TURKU 31.12.2006

POPULATION

Number of inhabitants	175,354 people
Swedish speaking	5.2 %
Foreign citizens	4.3 %

AREA

City area	306.4 km ²
land area	245.7 km ²
zoned area	89.7 km ²
water areas	60.7 km ²
Population density	714 res/km ²

PERSONNEL

Permanently employed	14,072 people
of which external substitutes	3,891 people
Average age of the personnel	47.4
Person-workyears	13,422
sick days/person-workyear	17.99
accident days/person-workyear	0.75

CITY FINANCES

Operating income	245.1 MEUR
Production for own use	40.2 MEUR
Operating expenses	-1003.2 MEUR
Tax income	501.4 MEUR
State subsidies	228.2 MEUR
Balance sheet total	1315 MEUR
Investments in fixed assets	97.7 MEUR
Annual margin % of depreciation	73.5 %
Gearing ratio	58.9 %
Tax rate	18 %

The delightful banks of the river Aurajoki are one of the attractions of Turku's vibrant city centre.

Photo: Heli Lempa.



On the road to sustainable development

Turku has long been one of Europe's leading cities in terms of working towards sustainable development. Turku signed the Aalborg Charter in 1996 and simultaneously committed to the European Cities sustainable development campaign, an essential part of which is compiling a Local Agenda for sustainable development.

The City Board approved Turku's second, updated Sustainable Development Programme in the autumn of 2005. The starting point for Turku's Sustainable Development Programme has been promoting and supporting sustainable development activities in the city's administrative sectors. Through the activities of the administrative sectors, the impact of the Programme extends to the living environment of all Turku residents.

The Aalborg Charter was followed up in June 2004 when Turku was one of the first cities to sign the Aalborg +10 Commitments. The aim of the commitments is to concretise the sustainable development work in municipalities.

Implementation of the Commitments began in 2005 with a baseline review.

The role of the city administration is to take responsibility for the Local Agenda and ensure the prerequisites for its implementation exist. In order to make this work more concrete the city, in accordance with the Aalborg Commitments, intends to begin the process of setting qualitative targets for important local sustainable development themes in 2007.

The Sustainable Development Programme as an implementation tool

Turku's Sustainable Development Programme is an implementation tool for sustainable development. It is guided by the Turku Strategy and other significant strategies. International agreements and commitments are also taken into account in the Sustainable Development Programme.

The year 2006 was the first year of imple-



Turku has gained a reputation for having an active sustainable development policy, which has led the city along the road to sustainable development.

Photo:
Tarmo Karjanoja.

mentation for the updated Sustainable Development Programme. Many administrative sectors accepted the opportunity to co-operate with the Agenda 21 Agency for Southwest Finland and the Energy Agency of Southwest Finland.

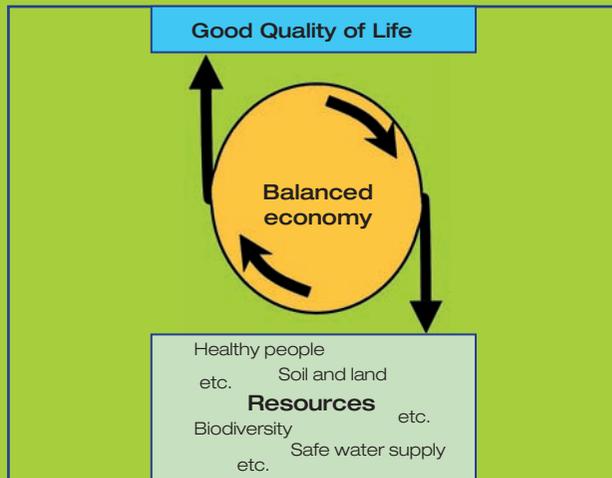
by means of this annual Sustainable Development Report, which includes the environmental report, sustainability indicators, and theme articles addressing the previous year's activities. Some of the indicators are common with other large cities and some with other municipalities in Southwest Finland.

Monitoring sustainable development

The City of Turku's implementation of sustainable development has been monitored

<p>Implementation phases for the Aalborg +10 Commitments</p> <ol style="list-style-type: none"> 1. Baseline review 2. Qualitative targets 3. Prioritising of measures 4. Monitoring and dissemination of information 	<p><i>"Our aim is to change our common vision of a sustainable future for our communities into concrete targets and actions at the local level."</i></p>
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In a sustainably developing society, a balanced economy produces good quality of life without depleting resources.



Indicators to describe general development and global impact

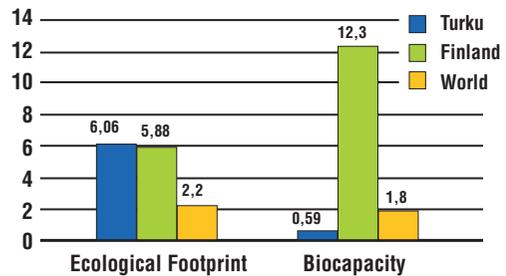
Ecological Footprint

An Ecological Footprint measures the land area that is directly or indirectly required to maintain human consumption. A Footprint expresses how many hectares of ecologically productive land area are needed to regenerate the resources needed to meet the population's needs and to absorb the waste and other emissions. The figure is calculated by means of a program specifically developed to calculate Ecological Footprint. Based on background information, the Ecological Footprint is now being calculated for 2001. Turku's Ecological Footprint was 6.06 global hectares per capita (gha), while the corresponding figure for Finland was 5.9 gha. If everybody were living like people in Turku biocapacity of 3.2 planets would be required to compensate for the impacts of the lifestyle.

Biocapacity describes biological productivity. Here it is expressed as global hectares, in other words, as a unit of area that indicates

Ecological Footprint and biocapacity in 2001

gha per capita



the planet's average biological productive capacity. Comparison of the Ecological Footprint and biocapacity shows whether a certain area lives within or exceeds the limits of its own ecological capacity. In 2001 Turku's biocapacity was 0.6 gha, which means that Turku exceeds the biocapacity of its own area by about ten times. However, this is typical of large cities where population density is high.



Transport and the use of coal for energy production have a major impact on Turku's Ecological Footprint. Favouring light and public transport can significantly decrease the Footprint.

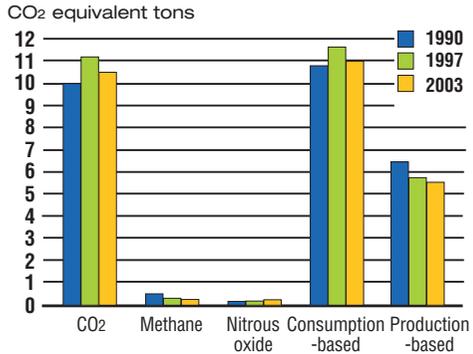
Greenhouse gas emissions

Turku's emissions balance sheet is calculated using a model developed by Finland's Environmental Centre. Based on the background information needed for the model, the balance sheet is now being calculated for 2003.

The amount of greenhouse gas emissions is measured in terms of the impact of the local community on climate change. In its Sustainable Development Programme, Turku has set a target of reducing greenhouse gas emissions by 20% from the 1990 levels by 2020.

Carbon dioxide emissions have been reduced since the last calculation in 1997. One reason for this is Turku Energy Company's biofuel-fired heating station, which began operations in 2001. Emissions generated by private car transport have also decreased as a result of improved engine technology and a slight increase in the share of diesel cars. Nitrous oxide emissions are still increasing. One reason for this is the growing number of cars

Per capita greenhouse gas emissions in Turku 1990, 1997 and 2003



with catalytic converters. However, in terms of local air quality, the increase in cars with catalytic converters is very positive.

Methane emissions have been reduced, due in part to methane recapture at the final disposal sites of the Turku Waste Centre. Long-term measures to reduce energy consumption in the City of Turku's own activities have also helped decrease greenhouse gas emissions.

The bio-heating centre's share of total procurement of district heating is about 20%. Construction of a second similar plant is in the planning stage.



Sustainability of land use and urban structure

Availability of services

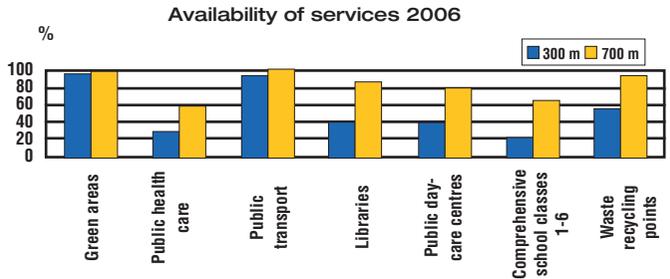
A study that involved determining the percentage of Turku residents who live within 300 and 700 metres of green areas and local services was used to assess the availability of those services.

The services compared this year include public health care, public transport stops, libraries and library car stops, public day-care centres, public comprehensive school classes 1-6, and waste recycling points. In terms of kindergartens and comprehensive school classes, the population was adjusted to reflect the population in the age groups utilising those services.

The most available local services are public transport and green areas. Availability is poorest for comprehensive school and public health care.

In recent years, the changes in availability of local services that have occurred have been quite slight in nature. However, the direction of development during the monitoring period was exceptionally negative, in other words, fewer and fewer Turku residents live within walking distance of local services. This development is contrary to a sustainable urban structure.

A sustainable urban structure makes it possible to reach essential services on foot or by bicycle.



A comprehensive light transport network provides safe conditions for reaching neighbourhood services.
Photo: Energy Agency of SW Finland

Sustainable transport

Quality land use planning lays the foundation for a sustainable transport system. As part of the BUSTRIP project, a group of international sustainable transport experts examined transport and mobility issues in Turku on 21-25 August 2006, and assessed the city's progress in developing a sustainable transport system.

The peer review identified several challenges, including poor regional planning, insufficient public transport, critical deficiencies in the network of cycle lanes, and the city centre's competition with shopping malls.

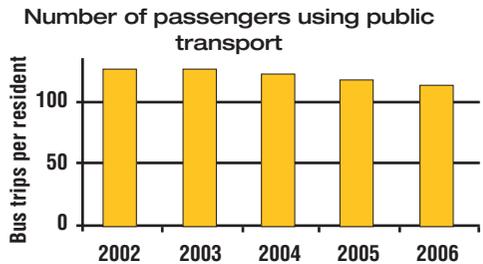
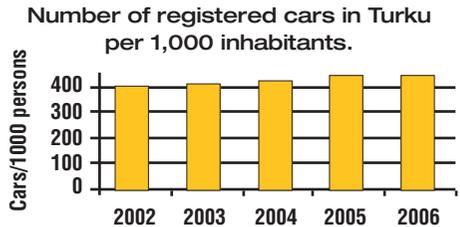
A reform of municipal structure is required to improve the situation. Public transport needs strong main routes, and the city should implement ambitious development plans for cycling.

An unsustainable transport system quickly becomes visible on the streets as increased congestion. Experience shows that it is futile to try to solve congestion problems by building more roads. It must be possible to

change the modal split so that the share of public transport and cycling increases and the share of private cars decreases.

Material and reports from the peer review is available at:

<http://www.bustrip-project.net/documents.htm>



In part, the development of Turku's land use and transportation can be seen as a vicious circle of car dependency.

THE VICIOUS CIRCLE OF NEGATIVE DEVELOPMENT



Development features of the urban structure in the Turku region

The urban area Turku has been reviewed in the KARA project, which examined the development features of large urban areas. In terms of the Turku region, the Regional Council of Southwest Finland and the City of Turku performed the KARA review. The preliminary report will be published in spring of 2007.

The study examined work trips from Southwest Finland to the central population area of the Turku urban area to an accuracy of 1 km². The central population centre stretches from Naantali to Piikkiö along the west-east axle and to Rusko and Lieto in the north. The years evaluated were 1985 and 2000. The population centre limits date back to 2000.

The results show that the commuting area has extended to the municipalities surrounding Turku and increased fragmentation of the urban structure. The fragmentation of the urban structure is also evident in an overall review that compares commuter trips to the population area of the urban area in 1985 and

2003: In 1985, 14.3% of the commuter trips (13,230 trips) were from outside the population centre, with the average trip being 16.9 km. The corresponding figures for 2003 are 16.5% (16,930 trips) and 22.9 km. A fairly small population group that lives in growing rural areas is responsible for the majority of commuter traffic mileage and the resulting environmental damage.

Zones of urban structure in the Turku urban area

After the war, people moved about in Turku on foot, by bicycle, tram, bus or local train. The construction of suburbs led to efficiently constructed residential areas that were dependent on bus transport. Later development has created a fragmented city of cars with large business centres, especially in the island and northern parts of Turku, and in the neighbouring municipalities. The change has been constant, and at this time the cities include many types of urban structures and environments.

CITY OF TURKU AND URBAN AREA 2002

Inhabitants and car ownership per household by area type

	Inhabitants	No car	1 car	2 or more cars
City of Turku	168 087	45 %	44 %	11 %
City centre pedestrian zone	55 630	57 %	37 %	6 %
Public transport zone	141 969	47 %	43 %	10 %
Car-oriented area	26 118	30 %	48 %	22 %
Turku urban area	243 579	39 %	45 %	16 %
Pedestrian zones	68 587	55 %	38 %	7 %
Public transport zone	158 742	46 %	44 %	10 %
Car-oriented area	84 837	22 %	49 %	28 %

Note: The public transport zone and the pedestrian zones are overlapping.

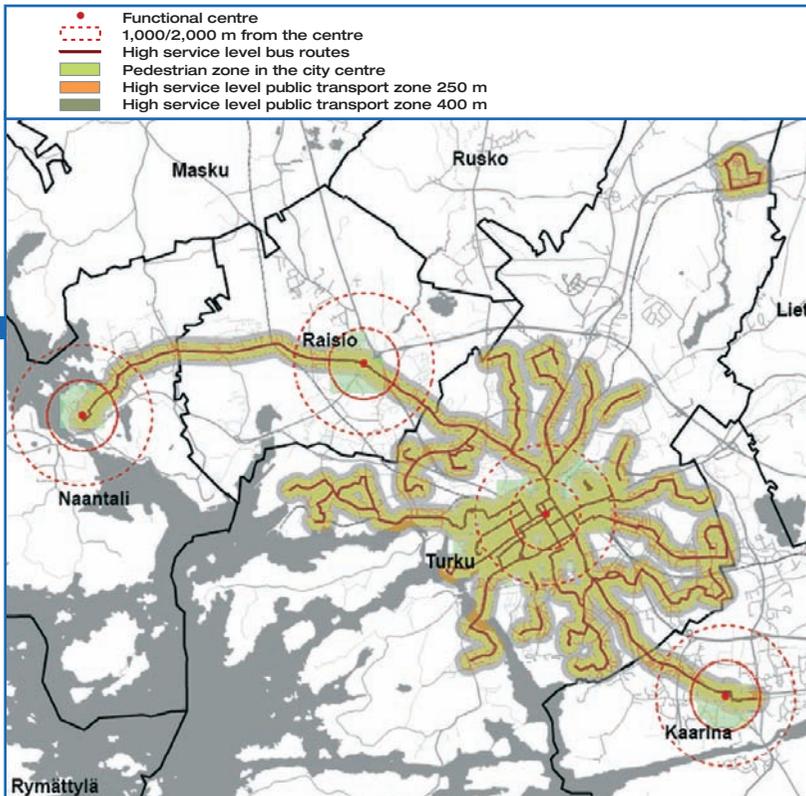
Note: Does not include people in institutions.

Note: Does not include company cars.

Sustainable city should be built on pedestrian and public transport zones.

During the preliminary research phase of the KARA project, a high service level public transport zone was outlined for the Turku urban area (diagram). The zone was formed by identifying the bus routes that had at least five buses running on weekday mornings between 7 and 8 am. Public transport zones of 250 and 400 metres were drawn around these routes. Furthermore, pedestrian zones were designated for the Naantali, Raisio, Turku and Kaarina city centres. They represented areas in which daily things could be easily handled on foot or by bicycle.

About 55,600 people live in the Turku city centre pedestrian zone. Fifty-seven percent of the families living in this zone do not own a car. The entire urban area has about 159,000 inhabitants, or 65% of the population, that live in the pedestrian and public transport zone. Thus the Turku region would have a good starting point to build a community based on sustainable mobility if construction focused on the pedestrian and public transport zones. This would require co-operation with other municipalities in the urban area regarding land use planning based on sustainable mobility.



Load caused by activities and eco-efficiency

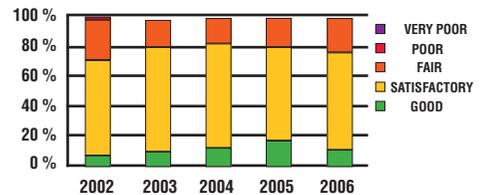
Air quality in the community

As an ecological indicator, ambient air quality describes the quality of breathing air and the impact of air quality on health, nature and the attractiveness of the living environment. The air quality index is a figure calculated from measurements and is based on the comparison of various concentrations of impurities with national air quality guideline values. In the Turku city centre, the impurities included in the index calculation and limit value examination are nitrogen dioxide (NO₂) and inhalable particles (PM₁₀).

In Turku the limit values set for the air quality were not exceeded in 2006. The annual limit value for nitrogen dioxide and inhalable particles is 40 µg/m³. The annual average for nitrogen dioxide was 33 µg/m³ and 14 µg/m³ for inhalable particles. There was one day in which the daily limit value (50 µg/m³) for inhalable particles was exceeded; the allowed number of days is 35.

According to the air quality index, the air quality in 2006 was mainly classified as satisfactory. The air quality was classified as poor on four days. Air quality was classified as good on 38 days.

Air Quality Index 2002 – 2006



In Turku, street cleaning has a significant effect on air quality, particularly in the spring when the sand spread during the winter is cleaned up.

Photo: Pekka Paasio

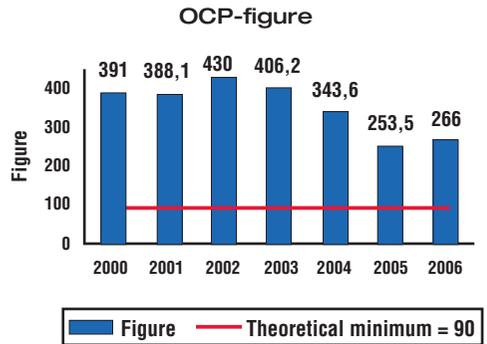
Community waste water load

In 2006, waste water in Turku was treated according to the environmental permits even though rainy weather at the end of the year made it difficult to achieve such results. The effective operation of the treatment plant and development of separate sewer system contributed to the good result. Co-operation between Turku Waterworks and industry has worked well.

The OCP (Oxygen Consumption Potential) figure describes the quality of waste water released into the water body in terms of organic material, nitrogen and phosphorous, and its impact on eutrophication in the water body. In 2006 the OCP figure was 266, which is a good result in national terms. This number remained at the same level in comparison to 2005 (254).

Development can be improved by maintaining the expertise of personnel and the finances of the water works by means of a sufficient budget, the necessary repair investments, improving separate sewer system and through communication.

The reduction of water use by industry, controlling emissions and performing preliminary treatment when necessary decreases the amount and load of waste water. Municipal residents can promote sustainable water use by reducing consumption and separating stormwater from waste water.



The picture illustrates the location of the regional waste water treatment plant under construction deep under the Kakolanmäki hill. The starting point for the design, construction and future operations of the plant is to keep the Baltic Sea, our valuable archipelago and the neighbouring urban environment a clean and pleasant place to live.



Environmental financial statement

Turku has been reporting on the environmental expenditures of the city organisation since 2000. The classification of the environmental economy now observes the European Commission's Eurostat classification more closely than earlier.

The figures in the environmental report describe the city's financial investment in ecological sustainability. No specific euro targets have been set for the figures. Turku has not yet made its environmental report part of the city's official financial statement.

Rather than coming from the accounting of the administrative sectors or from official financial statements, the source information

for the environmental expenditure is partially based on estimates. Many environmental issues are integrated into ordinary operations, so it is impossible to declare all the environmental costs or some of them may be indicative. This is why the economic significance of environmental issues is probably greater than the reported environmental costs.

For the most part, the environmental report covers the environmental costs that apply to the operating units of Turku's city organisation. City owned companies are not included, but information about, for example, Turku Energia's environmental costs is available in the Turku Energia's corporate social responsibility report.

Table: Distribution of environmental economy by environmental protection area 2006

Environmental economy figures 2006 (1000 €)	Environmental revenue	Environmental expenditure	Environmental investments
Protection of outdoor air and climate	0	497	0
Water conservation and waste water treatment	14462	9350	7645
Waste management	4660	7898	0
Protection of soil and ground water	0	433	837
Noise and vibration control	0	40	0
Nature conservation	250	293	11
Other environmental protection measures			
Environmental administration	246	1522	0
Environmental training, education and counselling	572	815	0
Actions to improve eco-efficiency	1596	1516	2644
Environmental management	651	1196	0
Sanitation in public areas	0	1097	0
Environmentally-based taxes	0	1456	0
Total	22 437	26 113	11 137
Share of city operating income, costs and investments in fixed assets	9.2 %	2.6 %	11.4 %
Euros/inhabitant	128	149	64

Turku has been reporting on environmental expenditure since 2000. Major investments in waste water treatment and activities to improve eco-efficiency were made in 2006. They included maintenance of the water supply network and building automation for various properties.

Environmental revenue and expenditures

In 2006 environmental income totalled EUR 22.4 million, which represented 9.2% of all of the city's operating income (EUR 245.1 million). Environmental revenue per capita was EUR 128. The greatest revenues came from water conservation and waste water treatment. In 2006, the amount of environmental revenue increased by 7.4%, or EUR 1.5 million in comparison to the previous year. Growth was steady in all areas of environmental protection.

Environmental expenditures totalled EUR 26.1 million, or 2.6% of all operating costs (EUR 1.003 million). Environmental revenue per capita was EUR 149. The largest single expenditure was waste water treatment (EUR 9.4 million).

Environmental expenditure, including depreciations, increased by EUR 1.9 million, or 7.7%, over the previous year. The most important reason for this growth was the final payment to purchase the leasing equipment for the waste incineration plant, which raised depreciations to EUR 1.7 million.

Environmental investments

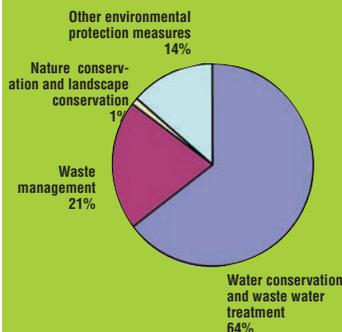
In 2006 environmental investments totalled EUR 11.1 million, which represented 11.4% of all the city's investments in fixed assets (EUR 97.7 million). The largest investment targets were associated with water conservation (68.6%) and activities to improve eco-efficiency (23.7%). Environmental investments decreased by EUR 4.5 million from the previous year, when the final payment was made on the leasing equipment for the waste incineration plant.

Environmental responsibility

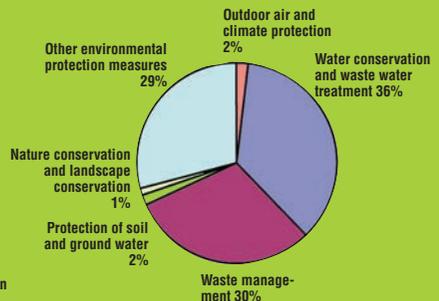
The City of Turku has acknowledged the environmental responsibility of its operations. A reservation of EUR 1.2 million for cleaning up polluted land areas was made in the financial statement and another reservation of EUR 2.2 million for landscaping of landfill areas. New statutory reservations totalling EUR 1.5 million were recorded. A total of EUR 1.0 million resulting from the over-estimation of clean-up costs in previous years was entered against the reservations. The reservation was reduced by EUR 0.1 million against accumulated costs.

The City of Turku's environmental revenue in 2006 totalled EUR 22.4 million. Based on information provided by the administrative sectors, environmental expenditure totalled EUR 26.1 million.

Distribution of environmental revenue in 2006



Distribution of environmental expenditure in 2006



Economic driving means savings and environmental friendliness

Turku Transport Services has been providing public transport services in the City of Turku since 1908. Today it is an independent service provider along with the other transport companies.

In recent years, Heikki Lepistö, manager of Turku Transport Services, has put the unit into good financial condition. In terms of drivers, one example of this is economic driving training.

Lepistö gives an enthusiastic description of the economic driving courses at the Motiva heavy equipment seminar. By the autumn of 2006, all drivers will have taken the course.

The economic driving training takes both time and money. Many people may be wondering if it is really worthwhile? "I have calculated that the training will pay for itself in about one year in the form of lower fuel costs. Furthermore, savings also result from the reduced need to service the equipment. At the same

time, emissions decrease and passenger comfort increases due to the gentler driving style," says Lepistö as he lists the benefits.

"Many drivers are certainly surprised to notice that a change in driving style can lead to double digit savings," he continues.

As time passes, people partially return to their old driving habits. According to Lepistö's calculations, the actual savings in fuel costs has been slightly less than 3%. This has a significant impact when we consider that fuel costs account for 13% of turnover.

As a result of the training, economic driving has become part of Turku Transport Services' normal activities observing the principles of sustainable development.

Finally, Lepistö says that he would recommend economic driving training for anyone else interested in the matter.



Economically driven Turku Transport Services buses can be identified by their yellow colour.

Photo: Tarmo Karjanoja.

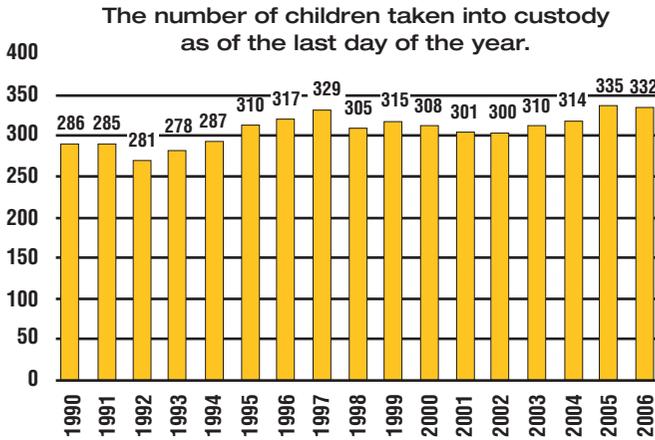
Overall life control

Life control

Overall life control refers to the general well-being of residents, safety, comfort and social development. The indicators include resident satisfaction, level of education, accumulated well-being shortages, the number of children taken into custody, unemployment rate, and number of crimes. Ensuring the health of residents is also part of good life control and a sustainable future.

Number of children taken into custody

The number of children taken into custody has grown steadily in recent years. The target is to reduce the need for taking children into custody. Many factors lie in the background of the custody cases. Family problems have become more difficult, complicated and extended in recent years. There are many risk factors in children's growth environments, including a broken family background and deficiencies in parenting.



The future is already here!

Photo: TAD Centre.



Unemployment rate

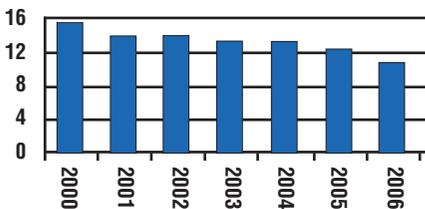
The unemployment rate in Turku was 10.2% at the end of 2006. Despite the loss of many industrial jobs, unemployment in Turku has dropped in recent years. However, the unemployment rate has remained slightly higher than the national average. A particular problem has been reducing long-term unemployment, which dates back to the change in industrial structure and the recession in the early 1990s.

Population's level of education

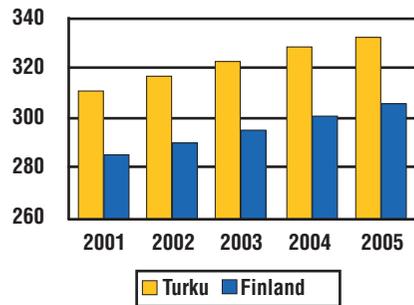
The population's educational level index describes the average length of the highest level of education completed after com-

prehensive school. The indicator expresses the population's level of education, which is measured by calculating the average length of the highest education completed after comprehensive school on a per capita basis. Typical of a university city, the population's level of education in Turku is clearly higher than the national average. The latest statistics are from 2005, when the figure for Turku was 331, which means that Turku residents has completed an average of three years and four months of education after comprehensive school.

Unemployment rate (%)



Population's educational level index



A diverse education obtained at a young age lays the foundation for the development.

Turku offers comprehensive school classes the opportunity to learn more about nature in a hands-on manner at the Ruissalo Nature School.

Photo: Nina Puistovaara

A sustainable city is a healthy city

Well-being is one of the three focal areas of the Turku strategy. The fact that Turku is a pioneer in encouraging its residents to keep active is concrete proof of this.

The city does a lot of nationally important work to promote health and well-being, including the Culture Path, development of local exercise and the TurkuDEE and Schools on the Move projects.

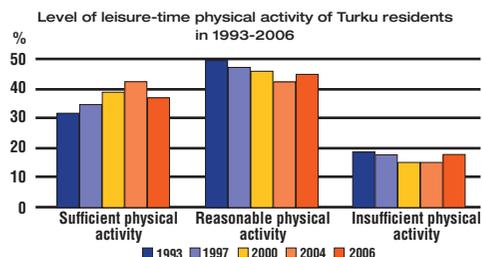
In the autumn of 2006, the Baltic Region Healthy Cities Project summarised Turku's physical activity practices. The 'Active living in Turku - Promoting health by means of physical activity' book summarises 15 years of experience of preventive work that utilises physical activity. For more information, please contact heini.parkkunen@turku.fi

Turku has been part of the WHO Healthy Cities programme since 1987. In October 2006, the European Healthy Cities network gathered in Turku to discuss good city planning, ageing of the population, immigration, and

encouraging city residents to keep physically active. The conference has participants from 108 cities.

The visitors learned about Turku's operating models for health-enhancing physical activity, volunteer activities for immigrants, green area planning, mapping quiet areas, and social impacts assessment of new city plans in the old Raunistula area.

Promoting the health of city residents and culture naturally go together, and that's why well-being is also linked to the European Capital of Culture project.



Cross-sectoral co-operation has helped Turku succeed in activating various target groups regarding health-enhancing physical activity.

Photo: Ere Viitasalo.





CITY OF TURKU
P.O. Box 355, 20101 Turku
Tel. +358 2 330 000
turun.kaupunki@turku.fi

Editor: Pekka Salminen, pekka.salminen@turku.fi

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