



**Air quality:** Tallinn ranks sixth in the category for air quality, supported by well-below-average levels of nitrogen dioxide (about one-third of the index average), sulphur dioxide (about one-fifth) and particulate matter (about half). The absence of a coherent strategy to reduce air pollution is perhaps understandable, given that Tallinn's relatively good performance in this area makes it a low-priority concern.

**Initiatives:** In conjunction with Civitas, and EU initiatives for cleaner transport in cities, Tallinn is

undertaking a study to improve the flow of public transport, which should in part assist a vehicle-related reduction in emissions (see highlight project).

**Environmental governance:** Tallinn ranks 18th in the environmental governance category. The city would perform better if its Development Plan 2009-27, which is its main strategic policy document, addressed environmental concerns more directly. Instead the emphasis, as in previous plans, is on housing provision, eco-

nomical development and social issues. Nevertheless, the plan does address some key areas, including for road traffic reduction, improving the quality of public transport and improving waste-management systems.

**Initiatives:** Tallinn is a signatory to the Aalborg Commitments and the Covenant of Mayors. The city council collaborates with a number of outside expert agencies, such as the Tallinn Technical University, to help the collection of data in a number of areas, including air quality.

### Quantitative Indicators: Tallinn

	Average	Tallinn	Year	Source
CO <sub>2</sub> emissions per capita (tonnes/inhabitant)	5.21	6.80 <sup>1</sup>	2007	Estonia statistics
CO <sub>2</sub> emissions per unit GDP (g/€m)	356.12	543.92 <sup>2</sup>	2007	Estonia statistics
CO <sub>2</sub> reduction target to 2020 (% pa, from yr in which target set)	14.48	0.00	2007	
Energy consumption per capita (GJ/inhabitant)	80.87	89.56 <sup>3</sup>	2007	Estonia statistics
Energy consumption per unit GDP (MJ/€m GDP)	5.25	7.16 <sup>4</sup>	2007	Estonia statistics
% of renewable energy consumed by the city (%)	7.30	0.19 <sup>5</sup>	2007	Estonia statistics
Energy consumption of residential buildings (MJ/m <sup>2</sup> )	908.88	1,429.73 <sup>6</sup>	2007	Tallinn city planning department (energy); Estonia statistics (floor space)
Share of people walking or cycling to work (%)	20.94	30.00	2008	Tallinn transport department
Share of people taking public transport to work (%)	41.56	31.00	2008	Tallinn transport department
Length of cycle lanes (km/km <sup>2</sup> )	1.15	1.01	2008	Tallinn transport department
Length of public transport network (km/km <sup>2</sup> )	2.33	4.70	2008	Tallinn transport department
Annual water consumption per capita (m <sup>3</sup> /inhabitant)	105.43	50.39	2008	Mayor of Tallinn
Water system leakages (%)	22.63	25.87	2008	Mayor of Tallinn
Dwellings connected to the sewage system (%)	95.02	97.50	2008	Mayor of Tallinn
Municipal waste per capita (kg/inhabitant)	510.93	882.91 <sup>7</sup>	2008	Mayor of Tallinn
Share of waste recycled (%)	17.62	31.40	2008	Mayor of Tallinn
Average daily nitrogen dioxide emissions (ug/m <sup>3</sup> )	35.18	12.20	2007	EEA airbase
Average daily ozone emissions (ug/m <sup>3</sup> )	40.38	52.36	2007	EEA airbase
Average daily particulate matter (ug/m <sup>3</sup> )	34.86	18.64	2007	EEA airbase
Average daily SO <sub>2</sub> emissions (ug/m <sup>3</sup> )	6.96	1.36	2007	EEA airbase

<sup>1</sup> Estimated from fuel combustion, in turn based on mixture of local and national data. 90% of national electricity derived from coal. <sup>2</sup> Estimated from fuel combustion, in turn based on mixture of local and national data. 90% of national electricity derived from coal. <sup>3</sup> Total energy estimated from national average and local published data on oil, gas/heating, and historical electricity. <sup>4</sup> GDP from 2006. Total energy estimated from national average and local published data on oil, gas/heating, and historical electricity. <sup>5</sup> Estimated from national. No information on local production. Most national electricity derived from coal. <sup>6</sup> Residential energy estimated from national, and local figure for heating. <sup>7</sup> Based on assumption that municipal waste makes up 75% of solid waste. City authorities could not provide figure on municipal waste.



Photography: Kaido Haagen for Siemens

### Select city data

Population:	398,000
GDP per head, PPP:	€ 26,580
CO <sub>2</sub> emissions per head:	6.8 tonnes*
Energy consumption per head:	89.56 gigajoules*
Percentage of renewable energy consumed by the city:	0.19% *
Total percentage of citizens walking, cycling or taking public transport to work:	61 %
Annual water consumption per head:	50.39 m <sup>3</sup>
Share of waste recycled:	31.4 %

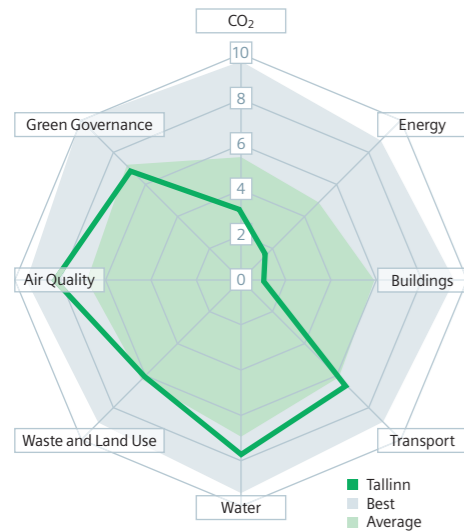
\* Estimate

Estonia's capital city, Tallinn, is the hub of the country's economic, financial and political activity. The city has a population of just under 400,000, making it the third-smallest of the 30 cities in the index, but is by far the largest city in Estonia, accounting for 30% of the country's total population. About 34,000 companies operate there, which was 44% of the country's manufacturing and utilities companies, but over 70% of Estonia's financial sector companies and over half of the entire service sector in the country. The city accounts for around 16% of total employment in Estonia, but almost 37% of the country's total tertiary-sector employment. As the above figures show, most of the city's economy is oriented towards trade, financial intermediation and other services, including tourism, although industry remains significant. The port of Tallinn is the largest in the Baltic states in

terms of freight and passenger transit. The city's industrial sector encompasses light industry, food processing and textiles.

Tallinn ranks 23rd in the European Green City Index, with a score of 52.98 out of 100. As elsewhere in the Baltic states, green issues played a significant role in the anti-Soviet movement in the late 1980s and early 1990s. However, economic pressures have made it difficult for the city to prioritise environmental concerns. Nevertheless, sustainability has received more attention in recent years. The city performs best on air quality, water and transport

**CO<sub>2</sub> emissions:** Tallinn ranks 26th in the category for carbon dioxide (CO<sub>2</sub>) emissions. This reflects Estonia's nationwide energy usage, with most power being generated from oil shale rather than greener alternatives. Accordingly, the city produces 6.8 tonnes of CO<sub>2</sub> per head per



## Tallinn's e-enabled transport

Working with Civitas, Tallinn city council is undertaking a project to increase the use of public transport by improving traffic flow and reducing journey times. The key plank of the project is to establish a priority network for municipal passenger bus transport. Following Tallinn's tradition of e-innovation, buses are being installed with priority signalling equipment that will alert traffic-lights of their approach and engineer a quick passage through junctions. Electronic displays in public transport and pre-recorded automatic stop-announcements are also being introduced, with a view to making the system more passenger-friendly and to reducing the precipitate decline in public transport in favour of private cars that was observed in the past decade. Initial reports, from 2008, suggest that the decline has been halted, but further measures are planned to attempt to reverse it. For example, sensors in buses will carry out automatic passenger counting to optimise timetables according to fluctuations in passenger flow.

year, above the 5 tonne average. Since February 2009 Estonia has been a signatory to the Covenant of Mayors, which commits it to monitor CO<sub>2</sub> emissions and to reduce emissions by at least 20% by 2020. However, no specific plan has yet been announced.

**Initiatives:** There are no sustained, targeted campaigns underway to reduce emissions, although the city does encourage sustainable transport policies, with frequent publicity campaigns to promote cycling and reduce passenger-car use. As part of its membership of the Covenant of Mayors, the city will need to produce an environmental plan by early 2010.

**Energy:** Tallinn ranks 29th in the category for energy. This is partly because of the lack of a clear sustainable energy policy, and also because of the national structure of power generation, which is skewed towards coal- and oil-shale-fired generation. There are plans to phase out the use of oil shale as part of Estonia's EU entry commitments, but this will be a lengthy process. Energy consumption per head stands at almost 90 gigajoules, significantly higher than the 30-city average of about 81 gigajoules. Currently only a tiny proportion of the city's energy consumption is accounted for by renewable energies, which also affects Tallinn's overall score.

**Initiatives:** Energy policy tends to be determined at a national level, but Eesti Energia has opened a number of renewable energy plants in recent years. Hydropower and wind energy provide about 2% of total electricity production in Estonia. There are several wind farms within a 50 km radius of Tallinn, and more are planned.

**Buildings:** Tallinn ranks 29th overall in the category for buildings, ahead only of Kiev. Despite a housing construction boom in 2005-07, most of

Tallinn's housing stock was built in the 1960s to 1980s. Owing to a lack of investment, most of this housing is in dire need of maintenance and renovation. This is particularly a problem in the area of heating efficiency: a study earlier this decade found that Estonian housing stock consumed 30% more energy than west European countries. Over the past few years there has been greater emphasis on construction and renovation that incorporate more energy-efficient targets. Tallinn city council was a pioneer in 2000-05 in introducing local government subsidies to renovate private housing and in encouraging the sharing of technical expertise, and in a few years this strategy will no doubt begin to bear fruit.

**Initiatives:** Estonia has a national government-led initiative to help finance and support the refurbishment of buildings, in order to improve energy efficiency. The scheme, KredEx, provides loans for renovation projects in apartment blocks that will improve efficiency by at least 20%, rising to 30% on larger buildings. It also provides advice and support on such projects.

**Transport:** Tallinn is ranked joint tenth with Budapest in the transport category—one of its highest rankings in the index. As of 2008, 61% of inhabitants either walk, cycle or take public transport to work. This puts it more or less on par with the overall average, but the distribution is weighted towards walking and cycling, which boosts its overall score. The city public transport network includes buses, trams and electric trolleybuses, as well as suburban electric rail links. Tallinn scores highly for the extent of its non-car transport network (on which measure it ranks fourth among the 30 cities in the index), and for the promotion of public transport usage. However, as of 2009, commuter traffic into and out



of Tallinn city has more than doubled since 1999, reaching almost 250,000 vehicles per day. This is part of a general decline in public transport usage over the past decade.

**Initiatives:** Tallinn is a member of the Civitas Mimosa project (along with Bologna, Funchal, Gdansk and Utrecht), which aims to promote clean transport usage. It frequently runs publicity campaigns to promote public transport and discourage car use. It has been a pioneer in the promotion of e-ticketing (such as via Internet or mobile telephony) for both public transport and car-parking fees, for example.

The urban transport network shares a unified ticketing system. Tickets can be bought either singly or in the form of period passes; they can be bought from kiosks or via mobile phone.

**Water:** Tallinn scores fairly highly in the category for water, ranking 12th overall. However, this ranking is skewed by the city's high score in the water consumption sub-category, where it ranks first of the 30 cities, with the lowest consumption per head. At 50.4 cubic metres per inhabitant per head, its consumption is less than half the 30-city average of 105 cubic metres. In terms of water system leakages and the treatment of wastewater, it ranks much lower: its leakage rate of nearly 26% is above the average of 22.6%. Almost the entirety of the public water supply comes from surface water collected into Lake Ulemiste, close to Tallinn airport. Around 10% of the supply comes from groundwater boreholes, which are maintained less for reasons of capacity than as a back-up supply in the event of contamination of Lake Ulemiste. The potential health risks of Tallinn's groundwater drinking supplies is currently under study, as naturally occurring radioactive isotopes affect some of the supply, owing to the geology of the area.

**Initiatives:** Tallinn Water is working with, among others, the European Investment Bank (EIB), to extend its supply and treatment network. An EIB co-funded project, to run up to 2010, will provide a total of €82.5 million to add a further 142 km of supply and sewage network, as well as pipeline rehabilitation to avoid deterioration in leakage indicators. Tallinn Water has also for several years been carrying out a „biomanipulation“ project at Lake Ulemiste to improve the quality of raw water.

**Waste and land use:** Tallinn falls midway in the rankings in the category for waste and land use, coming 16th overall. It scores highly in terms of waste recycling and reuse and in waste-reduction policies. However, the city performs poorly on the production of municipal waste, creating an estimated 883 kg per inhabitant, compared with a 30-city average of about 511 kg. For recycling, however, Tallinn scores highly: over 30% of municipal waste is recycled, which places the city sixth overall. Historically, both Tallinn and the country as a whole have suffered from a lack of good waste management: landfill sites were not properly monitored and groundwater was at threat from the dumping of waste products from oil-shale-generated electricity by the energy sector. However, significant progress has been made in recent years.

**Initiatives:** Since 2003 the city administration has been the main organiser of the periodic Tallinn Waste Conference, which aims to share experience and best practice in municipal waste management. It has also been in the vanguard of implementing national waste directives, which are often advisory in nature and left to municipal councils to implement. Since 2008 Tallinn city council has made the separate collection of kitchen and food waste compulsory.

## Biomanipulating Lake Ulemiste

Tallinn Water has been involved since 2002 in the biomanipulation of Lake Ulemiste, the city's main water supply, as an attempt to improve overall water quality. The lake suffers from a high biomass of phytoplankton and a high proportion of planktivorous fish, with little zooplankton. Piscivorous fish (which survive by eating other fish) form only 5% of the total fish population. All this results in a high degree of cloudiness in the water because of the preponderance of phytoplankton, which causes blooms of blue-green algae; in turn, this increases the costs of water purification. The project's main emphasis has been on improving the diversification of native fish species in the lake, establishing a more classic and fully rounded top-down food chain, thus controlling the growth of phytoplankton. Although other approaches are possible, such as aeration, the addition of phosphorous and mud removal, biomanipulation was chosen as it is the most environmentally friendly and doesn't disturb the daily operation of local waterworks. The early stages of the project involved catching large quantities of plankton-eating non-predatory fish (such as bream, ruff and roach), along with the introduction of piscivorous species (such as pike and perch). The project is a long-term one—in 2009 the main focus has so far been on monitoring, by catch-samples, the changes that have taken place in the diversification of the food chain.