

Baltic University Urban Forum City Status Report III

3



Waste Management



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Baltic University Urban Forum Cities Status Reports

3. Waste management

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Introduction

The city status reports in the BUUF project address ten key areas of city management, chosen at the outset of the project. These were later grouped in three areas of management, while integration was kept as a separate topic.

Material flows:

1. Water,
2. Energy,
3. Waste

Urban space:

4. Traffic and transport,
5. Green structures,
6. Built structures, especially brown fields

Socio-economy:

7. Education and information,
8. Economic development,
9. Urban-rural cooperation

Integration:

10. Integration of management

The areas were all discussed by the BUUF Scientific Advisory Council, which developed indicators for each of them. These indicators were later treated by the UBC Commission for the environment into a table, a short hand, for reporting indicator values. The indicator, the tables and the comments from the SAC are all found in the BUUF indicator book.

The reports

The city Status reports were/will be collected in the BUUF project at three occasions, 2004, 2005 and 2006. The reports will for each of the ten key areas, contain the following:

1. A description of the situation (collected 2004)
2. Basis indicator data (collected 2005)
3. Updating of indicator data. Comments on the choice of indicators. (2006)

The reports are edited for each area (water, energy etc) separately consisting of about 25 pages. The status descriptions consist of one page, with occasional additional pages for data diagrams etc, per city. The basic indicator data is collected in a table (one page) including all cities.

The Scientific Advisory Council members are asked to write benchmarking statements on these reports from the cities. The collected reports and benchmarking statements will be collected in a City status book from the BUUF project.

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The cities

The cities have been organised in five groups according to character to make comparisons more meaningful. In each group there are representative from both “East” and “West”. The list of cities then becomes as follows:

Group 1. Large port cities

1. Hamburg, Germany
2. Kaliningrad, Russia
3. Novgorod, Russia
4. Turku/Åbo, Finland

Group 2. Fairly large inland cities, metropolis issues

5. Lodz, Poland
6. Nacka, Sweden (close to Stockholm)
7. Minsk, Belarus
8. Örebro Sweden

Group 3. Medium sized inland university cities

9. Uppsala, Sweden
10. Tartu, Estonia
11. Jelgava, Latvia
12. Kaunas, Lithuania

Group 4. Small inland/coastal cities under economic restructuring

13. Livani, Latvia
14. Hällefors, Sweden
15. Norrtälje, Sweden
16. Sopot, Poland

Group 5. Small municipalities, ecovillage character

17. Enköping, Sweden
18. Tukums, Latvia
19. Kosakowo, Poland
20. Hågaby, Sweden

The data for the cities are thus listed in this order. There is also a table, which contain basic data for each of the cities.

3. Waste management indicators

Based on the audio conference on March 30, 2005.

Participants Dick-Urban Vestbro, KTH, Stockholm, Per E.O. Berg, Univ of Dalarna, Riga, and Mikko Jokinen, Turku City, members of SAC

Anna Granberg and Kyösti Lempa, UBC office Turku

Lars Rydén, BUP Secretariat, Uppsala University (taking minutes)

The indicators reflects the flow of materials (resources and products) through the municipality from consumption to wasting, through the waste management system to a recipient, where it is recycled, composted, sent to landfill etc., as well as the utilisation of the resources in the waste (energy, nutrients etc) and finally the environmental impact of this flow. For each indicator several values are asked for. Not all indicators are quantitative. Care has been taken to reflect both environmental, economical and social properties of the waste system of the municipality.

The indicator list is in harmony with both the UBC indicator project and the European common indicators, both managed by the UBC Turku Office, but even more so to be useful in the development of municipal management.

Core indicators to be reported by everyone are underlined. It should be noted that much of the detail are needed to report core indicators, and they are thus close to an instruction on how to collect data for a core indicator.

1. Origin of flows of material and products in the municipality

Indicators:

Comments: There is no indicator in this area, but the Council would like to comment on its role in the flow of material and products in the municipality. Promoting a healthy consumption pattern is a waste prevention strategy, especially prevention of hazardous waste. Avoiding products with mercury (such as thermometers with mercury) certain paints, some batteries, and in general promote environmentally friendly products will do this. The municipality has a moral task to constitute an model for the inhabitants, and institute green procurement, buy green products, use environmentally good cars etc. A possible future indicator may be the status for green labelled product in the municipality.

2. System to run the waste management

Indicators:

- Waste fractions that are covered by producers responsibility (mostly glass and paper)
- Role of households (Local rules requiring household sorting of waste)
- Number of (percentage of) households sorting waste according to the producers responsibilities (mostly glass and paper)
- Number of (percentage of) households sorting waste in more fractions than according to the producers responsibilities (mostly bio-waste and burnable (energy carrying) waste).
- Total waste charges for households (percentage of total cost for the municipality);

Comments: As the waste management system is divided between many actors this is difficult to monitor. Here we would like to know how this is divided between producers, households and municipality, both when it comes to waste fractions and costs to run the system.

3. Total amount of waste of various categories

Indicators:

- Total amount of waste in the municipality (kg/cap/year)

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- Total amount of waste from households and for public sector (kg/cap/year) (specify what they include)
 - Total amount of waste from households and for public sector (kg/cap/year) (specify what they include)
 - Amount of hazardous waste from households (kg/cap/year) (specify what is included in hazardous waste).
 - Amount of electrical and electronic waste.
 - Amount of bio-waste for composting (household and municipal) kg/c/a.
- Comments:** Waste from households, and public sector (such as schools, hospitals etc) but not industry, although it may be big in some municipalities, is included. Some fractions are asked for specifically although in everyday work with waste management there will be many more.

4. Treatment of waste

Indicators:

- Amount of waste to landfill kg/c/a (%) (including slag and ashes from incineration)
- Amount of bio-waste to composting (household and municipal) (kg/c/a; kg/y output as compost)
- Amount of bio-waste to fermentation (household and municipal) (kg/c/a; kg/y output as volume of biogas produced)
- Amount of burnable waste to incineration without heat recovery (kg/c/a to incineration)
- Amount of burnable waste to incineration with heat recovery (kg/c/a; kWh/y output as heat)

Comments: The amount going to landfill is especially important for sustainability.

5. Using the resource in waste

Indicators:

- Waste recycled per waste fraction (paper, glass, metals, plastic, biowaste and hazardous waste) (%)
- Compost from the municipality (kg per year; see above)
- Energy from incineration in the municipality (kWh/y as heat, as electricity; see above)
- Biogas production (volume of biogas produced; see above)
- Recycled waste (kg/capita and percentage; such as paper, glass and plastic etc)

Comments: The resources produced are listed here. Most figures are available in No 6)

6. Environmental impact of waste management

Indicators:

- Landfill gas collection (indicate if gas is collected)
- Landfill leakage from (indicate if the runoff is collected and treated)

Comments: Other serious impacts include the emissions from Solid Waste incineration; This is difficult to monitor, and regulated by EU environmental legislation.

WASTE MANAGEMENT

3. Total amount of waste in the municipality (kg/cap/year)

Exact <input type="checkbox"/> OR Estimate <input type="checkbox"/>	_____Kg/cap/year
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8. Percentage of waste that is sent to a landfill

Exact <input type="checkbox"/> OR Estimate <input type="checkbox"/>	_____ % of total
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9. Percentage of waste recycled per waste fraction in the whole city (paper, glass, metals, plastic, biowaste and hazardous waste). Measured as a percentage of total weight in kg.

Is your city implementing a recycling process of waste by fraction?						
<input type="checkbox"/> No	<input type="checkbox"/> No, but planning to within 3 years			<input type="checkbox"/> Yes		
	Paper	Glass	Metals	Plastic	Biowaste	Hazardous waste
Exact %:	_____.	_____.	_____.	_____.	_____.	_____.
OR						
Your estimate %:	_____.	_____.	_____.	_____.	_____.	_____.
Municipality is compiling data for recycling activity <i>within the city administration</i>						
<input type="checkbox"/> No	<input type="checkbox"/> No, but planning to within 3 years			<input type="checkbox"/> Yes		

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3. Waste management

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CITY	WASTE COLLECTION	WASTE DISPOSAL	WASTE RECYCLING AND SORTING	FUTURE MEASURES
<p>Hamburg, Germany</p> <p>Large port city 1</p> <p>Total surface area of municipality</p> <p>755,3 km²</p> <p>1,7 mln inhabitants</p> <p>The number of staff in the municipality administration - 14000</p>	<p>In the field of waste management, economists and environmental authorities work closely together. This is necessary because the present ruling in the form of the Recycling and Waste Law of 1996 leaves no clearly structured solution.</p> <p>The Hamburg municipal cleaning administration follows such programmes as the setting-up of a Municipal Cleaning Service (SOD), improving the Hotline "Clean City" or the pilot project "dog stations".</p> <p>In Hamburg's refuse incineration plant at Stelling Moor, modernised in 2002, an average of 160.000 tons of refuse is annually processed.</p>	<p>Hamburg places its hopes in new activities as decided upon by the senate for the improvement of safety and cleanliness in the city, especially with regard to waste disposal planning that addresses such issues as waste disposal procedures that employ resource-saving recycling methods, an improved image of the city, or safety in waste disposal.</p>		

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CITY	WASTE COLLECTION	WASTE DISPOSAL	WASTE RECYCLING & SORTING	FUTURE MEASURES
<p>Kaliningrad, Russia</p> <p>Large port city 2</p> <p>Total surface area of municipality 223,0 km²</p> <p>425 600 inhabitants</p> <p>The number of staff in the municipality administration – no data</p>	<p>According to the experts' evaluation, about 200000 tons of waste is produced in Kaliningrad region annually. It corresponds to approximately 180 kg/capita/year. It's hardly possible to define the precise waste amount from the other sources. Yet on the average it's about 20000 tons/year. The waste amount is expected to increase during the next years due to economic development.</p> <p>Waste is usually collected in Kaliningrad region by municipal enterprises. Sometimes municipalities employ private companies for this work, however, it is not wide practice. For example, private entrepreneur serves one of Kaliningrad districts (Oktjabrsky district). Other four districts are served by municipal enterprise, which is also responsible for the city dump exploitation.</p> <p>Municipal unitary enterprise "Chistota" ("Cleanness") continues working for keeping the city clean. In 2005 it performed different works for 69 mln. RUR, 148 dustbins and 1 sanitation car were bought.</p> <p>Construction of the manufacturing basis for the bio-waste utilization was financed (5.2 mln. RUR) according to the city address investment program.</p> <p>In 2006 special motor transport is</p>	<p>There are no official landfills in the region built and exploited in accordance with the existing regulation. 200 dumps are registered. It causes serious ecological problems including heavy pollution of the ground waters, rivers, the Vistula and the Curonian lagoon and the Baltic Sea.</p> <p>Besides, the exploitation term of many landfills is close to the end. Especially urgent situation takes place in Kaliningrad, where the environmental conditions are extremely unsatisfactory. In this connection, the local authorities have demanded to close the city dump in the nearest future (2005).</p>	<p>Nowadays, waste recycling is almost absent in Kaliningrad and only 2% of waste is reused. Attempts of glass and plastic recycling failed due to the relatively small market. By the moment of separation, composting, fermentation and incineration are not applied in Kaliningrad City. At the same time, there is potential for introducing new methods of waste management. Particularly, 25-30% of waste (including industrial) could be composted.</p> <p>In March 2003, the first meeting within the project "Decreasing the volume of the greenhouse gases forming on the Kaliningrad landfill" was organized in Kaliningrad. The goal of the project financed by Tacis is to study the possibilities of decreasing the negative impacts of Kaliningrad landfill (located in the Kosmodemjanskogo settlement) on the environment by means of utilizing the bio-gases and its farther use for</p>	<p>In the Comprehensive Plan, the following measures aimed at protection of the Kaliningrad city area from solid waste pollution:</p> <ol style="list-style-type: none"> 1. Construction of the waste separation plant, landfill for solid domestic and industrial waste in the area of the Golubevo settlement (located in the neighboring Gurievsk municipality); 2. Stepwise reconstruction and restoration of the city dump, restoration of the illegal dumps, liquidation of the industrial waste dumps in the water protection areas of the Pregolja river and Kaliningrad bay; 3. Construction of the waste reloading station; 4. Development of the system of recycling and processing of the industrial waste. <p>Negotiations about constructing the modern waste processing plant (without waste incinerating) outside the city boundaries, in the industrial zone close to the Heat-Electric Generation Plant-2, are carried on. It would demand 2 hectares of the land. The technology consists in steaming the heterogeneous waste</p>

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	<p>planned to be bought for “Chistota” which will clean the streets (16 mln. RUR).</p> <p>Waste-collecting trucks and containers are mostly in bad condition. Enterprises responsible for waste collection possess the containers. 10 m³ containers are widely used, but it is decided to change them in the future with 6 m³ containers, which are more mobile and have lid. It’s easier to carry and disinfect such containers. As for the trucks and lorries, some of them are used more than 20 years and they are in very bad condition.</p>		<p>heating and electricity production. The participants have visited the landfill and have preliminary determined the location for drilling with the purpose of taking the probes of bio-gases. The question on the prospective of the utilizing the bio-gas fuel in the nearby boiler-house in the Kosmodemjansky settlement and at the closely located production capacities was discussed.</p> <p>Center for the utilization of the dangerous medical waste was created at the basis of the Kaliningrad city multifield hospital in 2005. The incinerator was paid by Denmark (58 thousand Euro) within the Tacis project and delivered from St.Petersburg. The working resource of the old muffle furnace was depleted</p>	<p>(without the preliminary sorting) in the autoclaves under the high pressure. At this first stage volume of the waste diminishes for 85%. The raw materials for the secondary use can be extracted from this mass. Depending on the enterprise technological integration, it is possible to get heat, electrical energy, compost, raw materials for pulp and paper industry or for the production of the environmentally friendly building materials. The waste weight after finishing the waste processing cycle does not exceed 4% of the original one. However there is no any confidence that this project is going to be realized.</p>
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CITY	WASTE COLLECTION	WASTE DISPOSAL	WASTE RECYCLING & SORTING	FUTURE MEASURES
<p>Large port city 3</p> <p>Novgorod, Russia</p> <p>Total surface area of municipality 89 km²</p> <p>223 000 inhabitants</p> <p>The number of staff in the municipality administration – 500</p>	<p>“Novgorod Spetzaukhoziastvo” (SAKH) is a former municipal enterprise, which was reorganized into a closed joint stock company in 1995. Main activities of the company are focused on solid waste management and street cleaning. At present, the company performs the following work and provides the following services:</p> <ul style="list-style-type: none"> • Collection and transportation of domestic waste from the municipal apartment buildings and private houses to the landfill; • Collection and transportation of solid waste (similar to domestic waste in its contents) from the territories of industrial and trade companies; • Installation and maintenance of street garbage cans on the city’s territory; • Installation and maintenance of mobile public toilets during public festivals, cultural and sport activities. <p>In 2003, total volume of solid waste collected and transported by SAKH’s refuse vehicles has amounted to 435 000 m³. Number of population provided with this services reaches 240 000, number of organizations and enterprises – 965. Total square of mechanical and manual street cleaning equals 1 700 km².</p>	<p>The company “Novgorod Spetzaukhoziastvo” (SAKH) performs operation and maintenance of the landfill; reception and storage of solid domestic and industrial waste; maintenance of the snow dump and the area for temporary storage of swept dirt;</p> <p>In 2002, the company started the implementation of two projects: construction of the industrial waste section at the landfill and construction of the transfer station. The projects are accomplished within the frames of the Russia-Danish project “Improvement of Solid Waste Management methods in Veliky Novgorod” and the Russia-Swedish project “Cross Municipal Rehabilitation Project”.</p>	<p>Currently, the company is also working with such new trends in solid waste management as recycling of paper, plastic products and glass. At present, about 370 employees are working in the company.</p>	

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CITY	WASTE COLLECTION	WASTE DISPOSAL	WASTE RECYCLING AND SORTING	FUTURE MEASURES
<p>Turku/Åbo, Finland</p> <p>Large part city 4</p> <p>Total surface area of municipality</p> <p>306,4 km²</p> <p>175 000 inhabitants</p> <p>The number of staff in the municipality administration – 13695</p>	<p>In Turku, the collection of paper, glass and metal for recycling is regulated by waste management by-laws.</p>		<p>The rate of reuse of waste in Turku has been just under 60 percent for a long time, when also considering the use of non-recycled waste as a form of energy.</p> <p>The separate collection of bio-waste is optional in Turku. Bio-waste is collected from certain residential areas, private residential properties and establishments and restaurants. About 20,000-25,000 residents in Turku have bio-waste collection receptacles in their yard.</p> <p>Turku residents have traditionally been leaders in recycling paper. Approximately 80 percent of paper used is recovered. The national average is 71 percent.</p> <p>The amount of recycled cardboard has remained by and large unchanged. The majority of cardboard has been recovered from businesses.</p> <p>In recent years, the collection of recyclable cardboard has become commonplace in the yards of apartment building complexes. The amount of recyclable cardboard has nearly septupled between 2000 and 2004. The total amount is nonetheless still relatively little. Recycling of cardboard is still currently optional.</p> <p>Recycling of glass and metal is efficient, because there are recycling receptacles in the yard of every apartment building and row house complex. There is also a tight network of recycling locations for private home-owners.</p>	

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City	Waste collection	Waste disposal	Waste recycling and sorting	Future measures
<p>Lodz, Poland</p> <p>Large inland cities 1</p> <p>Total surface area of municipality 294,4 km²</p> <p>770 800 inhabitants</p> <p>The number of staff in the municipality administration - 1935</p>	<p>The system of municipal waste collection from real estate owners is based on bilateral agreements.</p> <p>Approximately 50 business entities are licensed to remove municipal waste.</p>	<p>No landfill is in operation within the city limits. Waste is transported to landfills outside the city, partly even outside the region.</p>	<p>The waste is sorted or handled at 3 stations, and The Municipality of Łódź, like other Polish municipalities, does not remove the waste, and consequently earns no revenues for this kind of business activities.</p> <p>The city runs a waste selection scheme with the use of containers and bags. There are 548 waste selection points, which partly have containers for paper, glass, plastics, or metals. The waste selection scheme is available to 72% of citizens. The assumed target is to increase the number of waste selection points to 800, and to make the scheme available to 92% of the city dwellers.</p> <p>In 2004, the City of Łódź has obtained ISPA funds for investments in waste management. A sorting and handling station with a capacity of 82,5 thousand Mg/year is being built at Lublinek as part of this project. The project also provides for the further development of the existing composting plant to increase its capacity from 7 thousand to 19 thousand Mg/year of biowaste to be container-composted, as well as for construction of a ballast storage yard with a capacity of 750 thousand m³. The development works are to be completed in the second half of 2005, while the ballast storage yard construction is expected a year later.</p>	<p>A „Waste Management Plan for the City of Łódź” has been developed, and it sets forth the directions of activities until the year 2014. One long-term objectives of the plan are to minimise the production and storage of waste, to implement modern recycling and neutralisation systems, and to develop selective waste collection in the further.</p>

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City	Waste collection	Waste disposal	Waste recycling and sorting	Future measures
<p>Nacka, Sweden</p> <p>Large inland city 2</p> <p>Total surface area of municipality 95,4 km²</p> <p>78 000 inhabitants</p> <p>The number of staff in the municipality administration – no data</p>	<p>The amount of waste collected per inhabitant is decreasing in Nacka. The goal, which is 400 Kg/inhabitant, is still not reached. In 2003, the amount was 420 kg/inhabitant and year. This should also be compared to the average amount in the whole country, which is app. 460 Kg/inhabitant.</p> <p>A collection of hazardous waste amount is 1,5 kilo/inhabitant and the goal was 1 kilo, thus, the collection was more successful than it was expected. In Sweden, the average amount is 2,7 kilo/capita. The collections of led batteries have been increased by 70%. 13% of the households have their own home composting; however, the goal for 2003 was 15%. The goal to collect 3,5 kg households elec(tro)nic waste per inhabitant has been fulfilled, but the amount is much lower than the national amount, which is 8,6 kg per capita.</p> <p>With respect to collection of metallic packaging, Nacka has reached the goals, however, it is lagging behind the country as a whole.</p>	<p>The burnable waste is incinerated and turned into Energy at Högdalen incineration plant.</p>		

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Minsk, Belarus Large inland city 3	No data			
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City	Waste collection	Waste disposal	Waste recycling and sorting	Future measures
<p>Örebro, Sweden</p> <p>Large inland city 4</p> <p>Total surface area of municipality 1380 km²</p> <p>126 288 inhabitants</p> <p>The number of staff in the municipality administration – 14 000</p>	<p>General information about the amount of waste that is collected from households and how much goes to incineration, is deposited on a waste dump, or is handled as dangerous or hazardous waste and other waste management and waste sorting is found in “Tekniska nämnden Örebro Årsredovisning 2003” , pages 64-68</p> <p>New goals and new indicators are included in the environmental program. See Örebro miljömål remissversion 2004-03-25, page 63</p>		<p>Through the companies (packing industry), which manage the waste sorting of packages, we can retrieve information on the amount of collected material in the municipality. This data can be retrieved, if necessary.</p> <p>Percentage of households who (1) have their own composting, (2) sort out their compost material or (3) leave their organic waste along with remaining garbage is given in “Tekniska nämnden Örebro Årsredovisning 2003”, page 68.</p> <p>How much methane gas that is withdrawn from waste dumps in the municipality and how much methane gas is produced through the fermentation of sewage (Environmental report, sewage treatment plant, Miljörapport Avloppsverket i Örebro 2003” page 23).</p>	

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City	Waste collection	Waste disposal	Waste recycling and sorting	Future measures
<p>Uppsala, Sweden</p> <p>Medium sized university cities 1</p> <p>Total surface area of municipality</p> <p>2189 km²</p> <p>182 076 inhabitants</p> <p>The number of staff in the municipality administration – 5 688</p>	<p>Sorting-at-source (when the organic waste and combustible material are separated) began in the beginning of 1990 in Uppsala. All households and companies are included in the sorting system. Households can choose to compost their green (organic) waste at home or pay the municipality for collecting it. The collected amount of organic waste from households and food shops has continuously increased by using sorting-at-source and it has now reached a level of 8 100 tons per year.</p> <p>Newspapers and packing should be left in some of the recycling stations, which can be found in almost all parts of the city. Glass, batteries, plastic and aluminium materials can also be left in containers at the station.</p> <p>36 000 tons of combustible waste was collected from Uppsala for energy production by Vattenfall AB. The energy is transformed to distant heating.</p> <p>Hovgårdens waste establishment is a strategic plant for the municipality. At the premises, industrial and building materials are sorted out, organic and garden waste is composted, mud from the water treatment plant and sludge and ashes from the heating plant are stored.</p> <p>Sludge from 10 000 private outflows of waste water is collected by the municipality and transported (by contracted transport entrepreneurs) to the water treatment plant in Uppsala. Latrine is also collected mainly from ca 400 summer cottages, and then, it is transported to a treatment plant in an other district.</p> <p>Sorting-at-source demands more space for containers than before. Old houses are rebuilt, and it is necessary to considerate the new requirements in the new buildings.</p>		<p>All of the organic waste from butchers, restaurants and school kitchens goes to the biogas plant for production of gas and bio manure. At a later stage, biogas will be also produced from the household organic fraction.</p> <p>The nine municipal recycling centrals take care of sorted coarse waste from households. In 2002, there were 17 000 tons of waste, which was taken care by the centrals. Households can bring their risk waste (for example leftover chemicals and painting colours) to the recycling centrals. Private persons can also leave a risk waste to some selected gas stations. Some of the recycling centrals can receive articles that can be reused (furniture). The goods are first repaired, and then they are sold. There is a need for a new recycling station and a central in the central parts of the city. Uppsala's population is increasing, and thus, more waste are sorted out and needed a treatment.</p>	

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<p>Tartu, Estonia</p> <p>Medium sized university city 2</p> <p>Total surface area of municipality 38,8 km²</p> <p>100 148 inhabitants</p> <p>The number of staff in the municipality administration – 290</p>	<p>No data</p>			
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<p>Jelgava, Latvia</p> <p>Medium sized university city 3</p> <p>Total surface area of municipality 60,32 km²</p> <p>66 088 inhabitants</p> <p>The number of staff in the municipality administration – no data</p>	<p>No data</p>			
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BUUF City Status Reports 2003

City	Waste collection	Waste disposal	Waste recycling	Future measures
<p>Kaunas, Lithuania Medium sized university city 4</p> <p>Total surface area of municipality 157 km²</p> <p>368 917 inhabitants</p> <p>The number of staff in the municipality administration – no data</p>	<p>In cooperation with the Danish consulting companies “Cowi-Consult” and “A. I. Moe”, Kaunas municipality has developed the Household Waste Management Program, which encompasses waste sorting, collection and disposal at the dump. The container method of waste collection is expanded in the city. For collection of glass, paper, cardboard, plastics, metal special containers are located in the city, according special plan, which was approved by the City Council last year. Total number of containers is 15 861, and 478 of them are for glass, 370 are for plastics and 243 are for metals.</p> <p>The Municipal enterprise “Svara” runs waste collection, sorting and dump management. For foliage and branch composting, “Svara” is using a composting site.</p>	<p>Since 1973, waste of the city has been deposited in the Lapes landfill that is 19 km from the city. Every year, about 700 000 m³ of household and industrial waste are dumped at the landfill. The Lapiu landfill is one of the most modern and safe in Lithuania. At present, the project of extension of the Lapiu landfill is under preparation.</p> <p>Until the hazardous waste issue is solved, hazardous waste is disposed in the industrial enterprises. Development and implementation of programs for utilization of medical and hazardous waste are future activities.</p>	<p>The waste trade is provided in a few industrial enterprises, which are specialized in recycling - paper factory, other factories, using recyclable materials.</p>	

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City	Waste collection	Waste disposal	Waste recycling	Future measures
<p>Livani, Latvia,</p> <p>Small cities economic restructuring 1</p> <p>Total surface area of municipality 306,06 km²</p> <p>9 500 inhabitants</p> <p>The number of staff in the municipality administration - 40</p>		<p>At the moment, most of the waste from Livani municipality is transported to a landfill situated 7km in the north east from Livani town. This landfill serves all Livani district. The area of the landfill is 5,1 ha, where both non toxic and hazardous waste is stored, and waste incineration is done.</p> <p>Hard waste from households is collected using 2 trucks for waste collection in Livani town. Capacity of each car is 8m³. Private house owners deliver their household waste to the landfill by themselves. Some of private house owners are doing waste composting in their households.</p> <p>Last year, the municipality partially improved the managing system of the landfill – a compound territory and a proper overpass were built. Still, the landfill conditions do not correspond to the environmental requirements of Latvian state and EU, and several plans have been evaluated for the improvement of waste management system in the town.</p>	<p>In spring 2004, partial waste sorting system was introduced in Livani town. 20 containers for waste sorting were placed in Livani town. According to the municipality’s observations, part of the inhabitants neither sorts waste no use the new containers. More information should be distributed on the importance of waste sorting and recycling, and motivating measures should be performed in order to facilitate better waste sorting activities performed by Livani inhabitants.</p> <p>Glass recycling has been started this year by a private enterprise Ltd. “L v nu stikla p rstr de” (Livani Glass Recycling) in cooperation with the company “Zalais punkts” (Green Dot). The enterprise has established a glass collection unit in Livani town, which is a part of a national waste recycling network. The enterprise mainly provides glass collection services from the local enterprises (not so much from the individual inhabitants).</p>	

City	Waste collection	Waste disposal	Waste recycling	Future measures
Hälsfors, Sweden Small city economic restructuring 2				

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City	Waste collection	Waste disposal	Waste recycling and sorting	Future measures
<p>Norrtälje, Sweden</p> <p>Small cities economic restructuring 3</p> <p>Total surface area of municipality 5700 km²</p> <p>16311 inhabitants</p> <p>The number of staff in the municipality administration – no data</p>	<p>The responsibility for the waste management in Sweden relies on local municipalities, producers of products and packages and households. In Norrtälje, the wastes are collected from households, offices, smaller enterprisers, food shops.</p> <p><i>Total amount of waste</i></p> <p>Each household produces in average 399 kg wastes/year. The amount of wastes has declined during the last 10 years.</p>		<p>Before the collecting of the wastes, there is a waste sorting of newspaper, paper, glass, batteries, plastic, metal and environmental dangerous materials.</p> <p>The sorting wastes are recycled and used in new materials. Of the municipalities ca 25 000 households, 20 % are composting the organic part of the waste. In addition, waste is transported to Uppsala and to Stockholm for waste incineration that produces warm water for the distant heating. Only 5 % of the collected wastes are dumped as land filling.</p>	<p>The municipality of Norrtälje has some local goals for the waste management, which are aiming to reduce the wastes, increase waste sorting and composting.</p>

BUUF City Status Reports 2003

<p>Sopot, Poland,</p> <p>Small city economic restructuring 4</p> <p>Total surface area of municipality 17,31 km²</p> <p>39 587 inhabitants</p> <p>The number of staff in the municipality administration - 197</p>	<p>Waste collection</p> <p>To prevent the formation of “wild” waste dumps and to enable residents to dispose of all sorts of waste, so-called “curbside”, collection system has been introduced. The city has been divided into 4 disposal districts, so that each resident can once a month discard used appliances, leaving them at designated places outside their houses. The collections have been organized since 1992.</p> <p>In October 1992, selective waste collection was initiated by introducing of glass and paper banks. Each year more containers are added and the assortment of waste collected are broadened. Currently, the city has 62 collection centers for such recyclables as glass, paper and plastic.</p>	<p>Waste disposal</p> <p>Sopot does not have its own waste storage area and the city’s waste is being stored in the waste storage area in Ł yce, which is situated in the municipality of Wejherowo, 22 km north from Sopot. It was put into operation in 1978 (land area - 25.6 ha, operating volume - 5.5 m m³).</p> <p>Since year 1995, the Ł yce waste storage area has been managed by the Communal Association of Municipalities “The Reda and Chylonia Valley”. It collects municipal waste from Gdynia, Sopot, Rumia and Reda as well as industrial waste. 360,000 m³ of waste is transported to Ł yce every year. The stored waste is leveled, compacted and interspaced with isolating layers of soil. Waste is collected by specialized companies that have municipal licenses to dispose of and re-cycle waste.</p> <p>In 2001, the total quantity of waste from Sopot to the waste storage area in Ł yce was 19,558 t, including 793 t of bulky waste (furniture, refrigerators, washing machines, etc.).</p> <p>Due to eating habits, municipal waste was before characterized by a high proportion of food waste. However, with lifestyle changes, the amount of paper and plastic waste has increased.</p>	<p>Waste recycling and sorting</p> <p><u>Municipal composting plant</u> A composting plant, which was put into operation in 1996, is located within the city borders. It processes only a green raw material, i.e. all green waste that remains after maintenance activities carried out in the city’s green areas. Its estimated capacity is approximately 1100 m³ (compost material) and approximately 300 m³ (tree branches). The plant area is fenced and hardened. The produced compost is partly used for introduction of new and for regeneration of existing lawns in the city. The municipal plant is managed by the Municipal Department for Roads and Green Areas.</p>	<p>Future measures</p>
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BUUF City Status Reports 2003

<p>Sopot, Poland,</p> <p>Small city economic restructuring 4</p> <p>Total surface area of municipality</p> <p>17,31 km²</p> <p>39 587 inhabitants</p> <p>The number of staff in the municipality administration - 197</p>	<p>In 2000, a pilot scheme for collection of recyclables from detached houses was started in a selected sector of Upper Sopot. 530 families were provided with written information on the scheme, its rules and pick-up dates for the collected recyclables. The collected waste was put into coloured bags (red bags for plastic, white bags for paper and blue bags for glass) and picked up once a month. The action was supported by journalists, who contributed by carrying out campaign for waste separation in the newspapers and on the radio. 54% of families have actively participated in the pilot scheme. As a result, it was decided to introduce this collection system to other areas of the city. At present, approximately 85 % of residents are involved in waste separation, whereas approximately 10 % are involved in “bag separation”.</p> <p>Waste separation in the city is conducted by the Municipal Department of Sanitation in co-operation with the Communal Association of Municipalities “The Reda and Chylonia Valley”.</p>	<p><u>Waste Neutralization Plant.</u> In 1998, the Communal Association of Municipalities “The Reda and Chylonia Valley” and the member municipalities (including Sopot), established a company Zakład Unieszkodliwiania Odpadów Sp. z o.o. (Waste Neutralization Plant). The plant is responsible for creating a technical base equipped with processing and neutralization system as well as waste storage area. The key purpose of the project called “Waste Neutralization Plant in Ł yce” is to create a technical and organizational base. This base is needed to implement a comprehensive waste management system, founded on selective accumulation, collection, transport and management of particular fractions of industrial, hazardous, green, construction and bulky waste. The plant will replace two current waste storage areas: Ł yce-I and subsequently, Rybska Karczma. Following complete activation of the plant, the reduction in waste stored will amount to 50%. Biogas from the new and old waste storage areas will be converted into energy. The impact of the old waste storage areas will be restricted by directing waste material to the waste treatment system within the new neutralization plant. The old waste storage areas will be, after closing and technical regeneration, controlled and environmentally monitored.</p> <p>The Waste Neutralization Plant is a part of comprehensive waste management system, which will serve nine municipalities with a total population of 400,000. The plant is planned to be located in neighborhood of the present waste storage area in Ł yce, Wejherowo municipality.</p>		<p>Future measures</p>
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BUUF City Status Reports 2003

<p>Enköping, Sweden Small ecovillage city 1</p> <p>Total surface area of municipality 1 184 km²</p> <p>38 211 inhabitants</p> <p>The number of staff in the municipality administration – 2 087</p>	<p>No data</p>			
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BUUF City Status Reports 2003

<p>Tukums, Latvia</p> <p>Small eco-village city 2</p>	<p>Waste collection</p> <p>Private company “Kurzemes ainava” provides services of waste management.</p> <p>For implementation of the National Solid Waste Management Strategy of Latvia, municipalities of Jurmala city, Tukums and Talsi districts have established SIA “Piejura”. Piejura region covers an area of 5295 km² and consists of 41 municipalities, its population is 162 900 inhabitants.</p> <p><i>Total amount of waste</i></p> <p>The total amount of municipal waste, collected in 2004 in Tukums town, was 31 844m³.</p>	<p>Waste disposal</p> <p>Regional waste management project is concerned about the development of an integrated waste collection and the disposal system. The main investment by the project is building of a new landfill with capacity at full development of 1 million cubic meters of non hazardous waste and remediation of all 40 existing dump sites in the region.</p>	<p>Waste recycling and sorting</p> <p>There are 15 sorting points for paper, glass and PET in the town.</p> <p>In 2004, 58 t of glass, 173 t of cardboard, 25 t of plastic and 30 t metals were sent for recycling.</p>	<p>Future measures</p>
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BUUF City Status Reports 2003

<p>Kosakowo, Poland</p> <p>Small eco-village city 3</p>	<p>Waste collection</p> <p>Municipal waste is collected and deposited in an organized way at the waste storage area located in Lezyce (Wejherowo municipality).</p>	<p>Waste disposal</p> <p>Industrial waste (products from liquid fuel bases, service areas and other isolated areas) is neutralized and eliminated by the businesses themselves.</p> <p>Three hazardous waste storage areas are located within the municipality: incineration landfill in Mosty collecting ash-slag products from “Wybrzeze” heating plant (branch of Gdynia heating system). The total storage area covers the area of 114 ha and includes the first-stage landfill of 56.7 ha. The landfill is divided into three exploitation areas (1, 2, and 3). The first area (1) has already been filled up and is going through recultivation process (see chapter 6.4). Currently, the waste is collected within the second area (2). 1 490 700 tons of waste had been stored until year 2002</p>	<p>Waste recycling and sorting</p> <p>Sewage purification plant in Debogorze recycles sewage from Gdynia, Reda, Rumia, Wejherowo and Kosakowo municipality. Part of the plant constitutes also a sewage incineration landfill covering 2.5 ha. 6000 tons of waste had been stored in the landfill until year 2001</p>	<p>Future measures</p>
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<p>Hågaby, Sweden</p> <p>Small eco-village city 4</p>			<p>Waste recycling and sorting</p> <p>The waste in Hågaby is sorted in 13 fractions. Half of the waste – the organic part - (based on weight) is recycled in plantations and fields in the area.</p> <p>The fractions include 1) organic household waste 2) newspaper 3) cardboard paper 4) smaller food cardboard packages 5) white glass 6) coloured glass 7) metal packages 8) plastic packages 9) bulbs (glass) 10) batteries 11) toxic waste and medicine 12) crude waste materials. 13) Burnable waste</p> <p><i>Waste recycling</i></p> <p><u>Composting</u></p> <p>Composting is carried out on two levels: a small fraction (about 3 %) is going via the burnable fraction. The largest part (90%) is treated in two automated compost machines and 10% is composted in individual family composts.</p> <p><u>Formal and Informal recycling of commodities</u></p> <p>There is a small second-hand shop for the rational reuse of clothes, books and smaller commodities. On the local homepage, there is also an electronic marketplace for exchanging furniture, electronics and other commodities. The informal exchange of usable goods is, however, the largest system for materials recycling. A large part of the furniture from the former care institution was reused in the local school when that was built. Most part of Hågaby was only rebuilt using already functioning parts of houses, windows, pipes, roadways, plantations.</p> <p><u>Local landscaping from excess soil and rock</u></p> <p>When the area was rebuilt, the resulting soil, dirt, clay, stones, gravel and rock were used for landscaping in the local area, which saved heavy transportation, landfill usage and which produced beautiful wind protecting, character forming hills and ridges around the housing area.</p>	
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