

# EGCA 2018, Umeå, Sweden

## 7. Waste production and management

### 7A. Present Situation

The City of Umeå has set out clear and concrete targets for how to improve waste management and is among the best in the world in preventing landfill. The municipal water and waste company UMEVA is responsible for waste management.

Indicator	Type of Data (City)	Unit	Year of data
Percentage of household waste sent to landfill	1	%	2014
Percentage of household waste sent for thermal treatment or similar recovery	56	%	2014
Percentage of organic waste collected separately	10 (food and garden waste) (Food waste=6)	%	2014
Percentage of recycled household waste	42 (incl bio treatment)	%	2014
Percentage of recycled packaging waste**	72	%	2013
Percentage of recovered packaging waste**	78	%	2013
Amount of Household Waste generated per capita*	451	kg/capita	2014
Amount of Municipal Waste generated per capita*	451	kg/capita	2014

Figure 7A1. Waste indicators for Umeå.

\*Household waste and municipal waste are not separately reported at the moment.

\*\* National statistics (source: Swedish Environmental Protection Agency)

## Waste Strategies or Plans in place

Document name	Content	Status
Waste Plan 2020	Sets the guidelines for the waste management in the municipality. Contains objectives, a summarizing consequence assessment, appendixes describing present situation, environmental impact assessments and follow-up on objectives in the previous waste management plan.	Current plan adopted by the City Council in June 2010.  Evaluated in August 2014. Next evaluation during 2016.  In accordance with the Waste Framework Directive (2008/98/EC).
Regulations on waste management and sanitation	Regulations on waste management and sanitation.	Current plan adopted in July 2013.
Umeå comprehensive plan	National and local targets for waste management.	Current plan adopted in 1998, geographical updates in 2008–2013.
The Environmental Code (Miljöbalken)	Aims to promote sustainable development and secure the environment. Overall environmental legislation.	National, adopted in 1998.
The Aalborg commitments	Road map to facilitate efficient use of resources and to promote sustainable consumption and production	Current plan Adopted in 2007.
Environmental objectives (National, regional and local)	Targets for a non-toxic environment and a good built up environment	National targets adopted by the government in 1999.

Figure 7A2: Waste management strategies and plans for the City of Umeå

### **Waste Prevention Measures, including food waste and packaging waste**

Waste Plan 2020 is based on EU's waste hierarchy with waste minimization as prioritized target area. Weight-based charge is applied on household waste, which gives citizens incentive to increase recycling of packaging waste. Separation of food waste is free of charge which gives incentive to separate food waste from combustible waste.

Waste analyses are made and statistics are collected for evaluations and actions. Information is given to citizens, campaigns are carried out and trainings are performed among municipal employees.

### **Reuse and/or repair initiatives/partnerships currently in the city; include an example of such initiatives describing the types and quantities of materials reused**

Citizens can leave material for reuse at the recycling centres. This is collected by Viva Resurs, a municipal labour market programme with the mission to strengthen the individual's opportunities to meaningful employment. Viva Resurs repairs and sells the material collected. The city also recently began to cooperate with Myrorna (Salvation Army's second hand shop) in collecting textiles for reuse and recycling.

Currently the material are weighed (furniture, interior details, and leisure equipment etcetera) at one of seven recycling centres and during 2014 64 tonnes of material was collected for reuse. At this recycling centre there is a manned re-use reception. During autumn 2015 there will be a new re-use reception at another recycling centre serving the city of Umeå. The five other recycling centres are smaller and located in the countryside. The textiles collected by Myrorna are weighed but no figures are presently available.

### **Describe current waste collection system including the types of waste collected separately and the extent of roll-out (% coverage) of the collection systems**

Combustible domestic waste and food waste are collected in a curb side system, green bin for combustible waste and brown bin for food waste. Packaging waste, i.e. glass, paper/cardboard, plastic, metal packages and newspapers are collected in about 80 recycle stations around the municipality. In addition to the recycle stations, a majority of the apartment buildings have garbage rooms where tenants can sort their packaging waste in separate bins. Bulky waste, waste for reuse and garden waste are collected at seven recycling centres.

Currently 100% of Umeå residents, both in the city and on the countryside, have access to source separated recycling collection service.

In Umeå, UMEVA is responsible for recycling centres (bulky waste) and collection of domestic waste. FTI AB (the Packaging and Newspaper Collection Service) is organizing the producer responsibility and is responsible for collecting packaging waste.

Collected from recycling stations (packaging)	Collected from garbage rooms	Collected from households (houses)	Collected from recycling centres
Glass Cardboard/paper Metal Plastic Newspaper	Glass Paper Metal Plastic Newspapers Light bulbs Batteries Combustible domestic waste Food waste (optional)	Combustible domestic waste Food waste (optional)	Waste for reuse Textile Glass Cardboard Metal Plastic Wood Furniture Combustible waste Hazardous waste Electronic waste Light bulbs Batteries Garden waste Latrine waste Landfill waste

Figure 7A3: Collection of different types of waste streams.

**Provide details of the treatment of the separately collected wastes;**

<b>Material</b>	<b>Waste treatment</b>	<b>Location</b>
Plastic	Sorted in automated sorting facilities. The new raw material is sold to packaging manufacturers.	Bredaryd (Sweden), Braunschweig (Germany) and Beckum (Germany).
Paper packaging	The majority of the collected paper packaging is recycled to new cardboard and sold to packaging manufacturers domestically. Some of the collected material is sold abroad.	Recycled in Norrköping, Sweden.  Collected paper packaging is also supplied to works in Europe and Asia.
Metal	Aluminium packaging is recycled into new raw materials domestically. FTI also provide aluminium to plants in Europe. Steel packaging is recycled domestically and large amounts are sent to Germany.	Recycling plants in Älmhult, Sweden and in Europe (aluminium).  Smedjebacken, Sweden and plants in Germany (steel)
Glass packaging	All collected glass in Sweden is recycled at Swedish Glass Recycling and made into new raw material and sold to various glassworks and a company that produces glass wool insulation.	Hammar, Sweden (glass)  Isover, Billesholm, Sweden (glass wool)
Newspaper	Transported to one of five Swedish paper mills that recycle newspaper. The new paper is made into newspaper, kitchen paper and toilet paper.	Sweden
Electronic waste	Transported to any of the 30 recycling facilities. After deconstruction and sorting, the various fractions are processed into	El-kretsen, Sweden

	new materials or energy. All of the facilities are certified and carefully selected by price, location and technical skills.	
Food waste	Recycled through an anaerobic decay process to fuel for vehicles. Remaining organic material can be used as fertilizer for forests and grassland.	Biogas plant in Skellefteå, Sweden
Wood	Wood is slivered to wood chips and incinerated.	Dåva, Umeå
Hazardous waste	Sorted in different fractions. Made into new substances recycled, energy recovered or goes for destruction.	Sweden
Combustible waste	Combustible waste is energy recovered for district heating and production of electricity and to reduce landfill.	Dåva CHP, Umeå
Garden waste	Composted and used for landfill cover (e.g. leaves, grass). Tree branches are chipped and incinerated.	Dåva landfill, Umeå
Waste for reuse	Left and sold at the second hand shop Returbutiken (B1).	Returbutiken, Umeå
Furniture	Incinerated at the CHP.	Dåva CHP, Umeå
Latrine	Treated at waste water treatment plant.	Umeå

*Figure 7A4: How separately collected waste is treated in Umeå.*

**Proportion of organic waste collected separately. Please provide details of the type of treatment and the capacity of the facilities**

Bio treatment	2008	2009	2010	2011	2012	2013	2014
Food waste	1%	2%	4%	4%	4%	5%	6%
Garden waste	3%	3%	3%	5%	5%	4%	4%
<b>Total</b>	<b>4%</b>	<b>5%</b>	<b>7%</b>	<b>9%</b>	<b>9%</b>	<b>9%</b>	<b>10%</b>

*Figure 7A5: Proportion of organic waste collected in proportion to total household waste.*

Food waste is recycled through an anaerobic decay process to produce fuel for vehicles. Remaining organic material from the process can be used as fertilizer. The volume of the digester is 3,800 m<sup>3</sup> and the facility can daily process 22 tonnes of food waste and 15 tonnes of slaughterhouse waste. This corresponds to approximately 1.8 million Nm<sup>3</sup> CBG, 1 Nm<sup>3</sup> equals the energy of 1.1 litre gasoline.

Garden waste is composted and used for landfill cover.

**If thermal treatment operations are in use, describe the scale of the facility, the type of energy recovered, including the energy performance, and the number of households who are part of the facilities energy network;**

Dåva, the ultra-efficient combined heat- and power plant outside Umeå produces one of the world's most energy effective and environmentally adapted waste-fuelled district heating. Thanks to a combination of innovative solutions the total efficiency of Dåva's two incineration plants, Dåva 1 (for waste) and Dåva 2 (for biomass) are 94% and 95%. The energy performance of the household waste is 3,0 MWh/tonnes. Dåva achieve R1 factor of 1.2 according to Annex II of Directive 2008/98/EC.

Waste energy recovery replaces coal and oil for heating and helps prevent landfills. The flue gas cleaning at Dåva is extremely good; 99.5% of acidic gases and 99.5% for particle-bound contaminants. Approximately 80% of the buildings in Umeå are heated with district heating.

**Proportion of biodegradable waste sent to landfill**

No biodegradable waste is sent to landfill.

**Application of the “polluter pays” principle, including “pay as you throw” (PAYT) initiatives.**

Waste management in Umeå is financed solely by waste fees, no taxes. The waste tariff is divided into three parts; basic charge (covers costs for recycling centres), vessel fee (covers cost for collection, transports and the purchase and maintenance of the vessels) and a variable weight-based fee (covers costs for treatment of combustible waste). The weight-based fee gives an incentive for households to reduce the amount of waste, e.g. through increased recycling and sorting food waste separately. The food waste is collected in the brown bin and there are no fees charged for the weight of the brown bin.

**Describe briefly how the city enforces waste regulations in the city; please provide some brief examples;**

UMEVA has a clear working procedure with objectives, strategies, balanced scorecards and action plans to ensure objectives are met. The waste plan, where EU-legislation, national legislation and environmental objectives are integrated, is very important. The waste plan has measurable and time-bound objectives which are monitored regularly. The responsibility for the achievement of the objectives is also clearly specified. Long term statistics is another helpful tool. The Environmental- and Health Protection Board are responsible for supervision of waste management and the treatment plants.



*Figure 7A6. One of seven recycling centres in Umeå where citizens can recycle their waste.*



## 7B. Past Performance

Historical trends in the amount of household waste produced per capita in the city .Trends in waste treatment in the city over the last 5-10 years; for example how have rates of recycling, recovery and disposal changed over this period;

Household waste produced in Umeå was 451 kg/capita in 2014, compared to Sweden 466 kg/capita and EU (28 member states) average 492 kg/capita in 2012.

Waste (kg per capita)	2008	2009	2010	2011	2012	2013	2014
<b>Household waste, total</b>	<b>430</b>	<b>422</b>	<b>421</b>	<b>447</b>	<b>452</b>	<b>451</b>	<b>451</b>
Domestic waste (Green and brown bin)	184	185	185	197	197	191	188
Bulky waste	141	131	128	144	145	148	149
Packaging and paper	87	89	88	87	90	92	94
Hazardous waste, incl electronic waste and batteries	18,1	17	19,5	19,3	20	20	20
<b>Trends in waste treatment</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
Incineration - domestic waste	42%	42%	40%	40%	39%	37%	36%
Incineration - garden waste	3%	1%	2%	3%	4%	3%	3%
Incineration - bulky waste	17%	17%	17%	16%	16%	17%	17%
<b>Incineration</b>	<b>61%</b>	<b>60%</b>	<b>59%</b>	<b>59%</b>	<b>58%</b>	<b>57%</b>	<b>56%</b>
Bio treatment - domestic waste	1%	2%	4%	4%	4%	5%	6%
Bio treatment - garden waste	3%	3%	3%	5%	5%	4%	4%
<b>Bio treatment</b>	<b>4%</b>	<b>5%</b>	<b>6%</b>	<b>9%</b>	<b>9%</b>	<b>9%</b>	<b>10%</b>
Recycling - packaging	20%	21%	21%	19%	20%	20%	21%
Recycling - bulky waste	9%	8%	7%	6%	6%	7%	7%
Recycling - electronic waste	4%	3%	4%	4%	4%	4%	4%
<b>Recycling</b>	<b>32%</b>	<b>33%</b>	<b>32%</b>	<b>30%</b>	<b>30%</b>	<b>32%</b>	<b>32%</b>
Hazardous waste	0,4%	0,4%	0,4%	0,4%	0,4%	0,5%	0,5%
Landfill	2,1%	2,0%	2,0%	2,0%	1,7%	1,5%	1,1%

Figure 7B1. Amount of household waste and trends in waste treatment

**Evolution of source segregated collection systems in the city;**

Curb side collection bins for apartments are increasing (packaging) as well as underground containers for combustible and food waste. Underground containers replace many bins and give room for more recycling bins in garbage rooms. At recycling centers textile is a new fraction since summer 2015.

**Separation of food waste**

Started in 2007 and now all residents in Umeå can sort out their food waste. If you sort out the food waste, the waste fee is reduced because no fees are charged for food waste.

**Re-using opportunities at the recycling centres**

Returbutiken (second hand shop) sells things left at the recycling centres by the citizens (A3). At recycling centres reusable material are sorted out, e.g. construction material, from waste that otherwise would be landfilled.

**Easier collection of batteries and electric waste**

To improve service, reduce transportation and increase recycling five containers has been placed out around Umeå. In those citizens can dispose small batteries, bulbs and electronic equipment. The project has started in cooperation with El-kretsen, the business sector's service company for the collection and recycling of electrical and electronic products.

**Waste management in municipal homes**

The municipal housing company, AB Bostaden, is working to reduce waste. The company owns around 40% of the apartments in Umeå. Source separation is possible in 98% of the buildings and food waste sorting in 93%. Bostaden has introduced recycling of textiles in some residential areas.

**Provide a brief description of the collection market in terms of the role of municipal (public) authorities and/or private waste companies;**

The collection of household waste is a municipal monopoly. Private waste companies are performing collection of domestic waste on behalf of Umeå municipality. Evaluations and audits of the contracts are done regularly. Recycling centers are operated by the municipality. Treatment and transport of waste is procured by the municipality. The Packaging and Newspaper Collection Service is responsible for collecting newspapers and packaging.

## **Measures or programmes which have promoted waste prevention and recycling;**

### **Waste education and training**

Since 2006, an initiative to raise awareness of water and waste is performed among all of Umeå's fourth graders. Two lessons per class are given, where theory and practical experiments are mixed. All municipal employees should complete a web-training in waste management.



*Figure 7B2. School information, discussions about sorting and recycling*

### **Dialogue meetings**

Annually owners of apartment buildings are invited to dialogue meetings about the development of the waste management in the city and to discuss how waste management and sorting of waste can be improved.

To improve sorting, door-knocking campaigns are performed in residential areas. For example, to inform on how and why the citizens should separate food waste.

### **Mobile waste reporting application**

During summer 2014 a campaign was initiated to decrease dumped bulky and garden waste in nature areas around Umeå and also to inform about the benefits of recycling. A mobile application and a website were developed where citizens could report founds of dumped waste. Information was spread via social media. More than 200 reports came in during one month via the application which resulted in 25 trailers and 7 trucks with waste taken to the recycling centres.

## National campaigns

The Swedish Waste Management and Recycling association annually initiates national campaigns. Umeå has used the material every year and adopted it to local conditions. The current campaign is focusing on waste minimization. The idea is to locate companies which primary business is based on re-use or repair. These companies are promoted with an ecolabel, *Miljönär* (Environaire – environmental millionaire). The eco labeling campaign is supported with information, ads and tv-commercials.

## Nolia Fair

UMEVA has participated in the large Nolia fair (more than 100,000visitors) several times. In 2013 the competition “Find five faults” created engagement and reflection from the visitors about what we consider garbage. The challenge was to find five new interior design objects in a room decorated with things from recycling centers.



Figure 7B3. The “Find five faults” competition at the Nolia Fair.

## Waste analysis

An important effort to reduce waste is waste analyses made on collected household waste. This is a quality control of the waste. Results are used as basis for campaigns etcetera.

### **Use of instruments (economic or regulatory) applied in the city to effect the management of household and or municipal wastes**

The landfill tax, based on national regulations, in 2000, resulted in a significant reduction of waste to landfill.

Producer responsibility is an instrument for achieving the environmental objectives. It includes packages, newspapers, electronic waste, batteries, light bulbs, cars and medicine. It motivates producers to develop products that are more resource-efficient, easier to recycle and free from hazardous substances.

### **Weight-based fee**

The waste management in Umeå is financed solely by sanitation fees. The waste tariff is divided into three parts; basic charge, vessel fee and a variable weight-based fee. The base charge covers costs for recycling centres and administration. The vessel fee covers the cost for waste collection and transports. The vessel fee depends on the size of the vessel and method of collection. The weight surcharge mainly covers the cost of treatment of the collected waste. Food waste is also weighed, but not charged. If the customer chooses not to sort out food waste, an extra environmental fee is charged.

### **These economic instruments work in three ways in order to reduce waste:**

- It's cheaper to sort food waste than having a bin for mixed household waste.
- A smaller bin is cheaper than a bigger bin.
- The weight-based fee differs depending on the amount of waste.

The foundation for waste management in the city is the waste plan. It's structured in accordance with EU's waste hierarchy (2008/98/EC), and has time-bound targets with clear defined responsibility for implementation and budgeted funds allocated. The plan is monitored and continuously evaluated.

### **Type and scale of infrastructure put in place to manage waste including the approach to managing residual waste and progress to date;**

UMEVA is responsible for the collection of household waste and for manned recycling centres. FTI AB (the Packaging and Newspaper Collection Service) organizes the producer responsibility and is responsible for recycling stations etcetera.

Infrastructure	Description
Waste recycling centres	Seven recycling centres allow the municipality's residents to recycle a wide range of waste, including heavy and bulky waste.
Recycling stations	At approximately 80 recycling stations the residents can leave packages (paper, plastic, glass and metal) and newspapers, there is also a battery disposal facility for small batteries.
Environmental stations	Households can submit their hazardous waste to any of the environmental stations in the municipality. The environmental stations are located at the recycling centres.
Biogas plant	Commissioned in 2007 and treating food waste collected from households. Collection of household food waste in separate bins. From 2013 all households can use the service. The food waste is transported to the neighbouring city Skellefteå for CBG production through anaerobic digestion.
Dåva combined heat and power plant	The utility company, Umeå Energi, has had a waste to energy plant since 1970. In the year 2000 Dåva CHP was put into operation and replaced the original plant. The plant is treating waste (Dåva 1) and bio-fuel (Dåva 2) from the Umeå region (Umeå and five adjacent municipalities). Dåva provides the city with sustainable district heating, cooling and electricity. The effect is 65 MW (district heating 55 MW and electricity 10 MW).
Wastewater treatment plants	Umeå municipality has a total of 19 waste water treatment plants. The largest one is now reconstructed and extended. In Sweden, latrine is defined as waste, not wastewater.
Composting facility	Treating garden waste from households, collected at the recycling centres. The product is used to cover the landfill.

Figure 7B4: Waste management infrastructure.

In Sweden, a landfill tax was introduced in 2000 which resulted in a significant reduction in residual waste sent to landfill. Landfill of combustible waste was prohibited in 2002 and organic waste in 2005. Most of the waste is recycled, bio-treated or energy recovered. For progress to date, see B2.

Year	Total waste to landfill (kg)	Difference from 2008 (%)	Waste per capita to landfill (kg)	Difference from 2008 (%)
2008	1 050 000	-	9,1	-
2014	584 000	- 44	4,8	- 47

*Figure 7B5: Total waste to landfill*

**Most effective measures to improve waste management:**

- Weight-based fee
- Dialogue meetings with large and small property owners twice a year.
- Separate collection of food waste
- Campaigns and school information

**7C. Future Plans**

**Describe the short and long term objectives/targets for the management of waste and the approach the City's propose to take to ensure these are achieved?**

Short term objectives for waste management include reduction of waste per capita, reduction of hazardous waste in household waste and increased recycling. Goals for waste prevention will be achieved by means of e.g. measures mentioned in the Waste Framework Directive (2008/98/EC). The work is supported by the City Council which adopts budget and determines the waste tariff.

Selection of objectives in the waste plan	Deadline for implementation
<p><b>Waste minimization</b></p> <p>All employees in municipal administrations and companies have been trained in waste management.</p> <p>All fourth graders in Umeå are offered a lesson on waste management.</p>	<p>2016</p> <p>annually</p>
<p>The littering in the centre square has decreased by 50% from the levels in 2009.</p>	<p>2016</p>
<p>Sludge-dehydrating car emptying septic tanks separates the water from the sludge and return the water to the septic tank. The function with active bacteria is maintained while more septic tanks can be drained, thereby reducing transports significantly.</p>	<p>2016</p>
<p><b>Re-use</b></p> <p>It will be possible to leave material for reuse at all recycling centres in Umeå.</p>	<p>2016</p>
<p>The second hand shop Returbutiken will receive disposed furniture, inventory and machinery from all city administrations and municipality owned companies to enable re-use within the city administration.</p>	<p>2020</p>
<p>Building materials suitable for reuse, like doors, windows etcetera, shall be sorted before demolition of city owned properties.</p>	<p>2020</p>
<p><b>Re-cycling</b></p> <p>95% of hazardous waste is sorted from domestic waste.</p> <p>No hazardous waste is mixed with other waste.</p>	<p>2016</p> <p>2020</p>
<p>90% of inhabitants in city-owned buildings have access to curb side collection of packaging, batteries and light bulbs</p>	<p>2016</p>
<p>60% of inhabitants have access to curb side collection of food waste.</p>	<p>2016</p>
<p>Share of recycled household waste, including biological treatment is 50%.</p>	<p>2016</p>
<p>Source separation of packaging, food waste and hazardous waste in all city administrations and municipality owned companies.</p>	<p>2016</p>
<p>70% of domestic waste is source separated.</p>	<p>2020</p>
<p>50% of total amount of food waste are separated.</p>	<p>2020</p>

Figure 7C1. short and long term objectives for waste management in Umeå.



**Emphasise to what extent plans are supported by commitments, budget allocations, and subject to monitoring and performance evaluations?**

All the targets in the waste plan have clear ownership in the city administration. Each administration is responsible for budgeting to achieve the targets.

**How is the city taking account of EU policy on waste management and its place within a wider resource efficiency and low carbon growth framework?**

Umeå's waste management is in compliance with EU legislation and according to the waste hierarchy, the polluter pays principle and extended producer responsibilities as stated in the WFD-directive (2008/98/EC). Waste Plan 2020 is implemented according to the directive. Waste analyses are made to evaluate the current situation. The amount of waste sent to landfill is constantly decreasing. No recyclable or organic waste is landfilled.

In procurements related to waste collection and transport there are environmental requirements including the vehicles' Euro-classification and share of renewable fuel. Electric hybrid garbage trucks are used in the central parts of the city.

**Constraints – economic, scale, institutional;**

The waste management system is well developed. A constraint is the consumer society. Therefore, future focus will be on customer contact and communication to change attitudes and behaviour and increase recycling and redesign.

**Measures to improve statistical data on waste collection & treatment;**

*Avfall web (Waste web)* is a statistical tool developed by the Swedish Waste Management and Recycling Association. Here all municipalities can register their waste data and also compare municipalities and identify trends. Statistics are followed up on daily-, weekly-, monthly- and yearly basis.

In the municipal environmental report Quality of life report, adopted in 2014, a number of criteria are presented in tables and diagrams.

**Waste prevention and awareness initiatives;**

Annually property owners are invited to dialogue meetings, UMEVA participates at the Nolia fair and information days at Umeå University. A couple of students each year are doing their Master thesis in cooperation with UMEVA. Annual recycle centre days are also arranged.

To increase public awareness, different compartments in the garbage trucks are clearly marked to show that different fractions are not mixed in the trucks.

UMEVA participates in a national campaign "Miljönär/Environaire" (Environmental millionaire) about waste prevention organized by The Swedish Waste Organization. The concept for the campaign is "Get rich by repairing, borrow and recycle". Focus is on

sustainable consumption, sharing, repair and reuse, regarding food, textile and electronic waste. The campaign is given local support in media, exhibitions and events.



*Figure 7C3. Several door knocking campaigns have been made during the past years. An effective measure to promote public participation*

In recent years Umeå has engaged internationally, e.g. with the city of Xián, China to support the development of a waste management plan and to support the development of eco-communication with the citizens. Just recently Umeå agreed to become a mentor city within the Municipal Solid Waste Initiative under UN's Climate and Clean Air Coalition.

#### **Quality of materials collected for recycling;**

A high proportion of recyclable materials are collected. From recycling stations and recycling centres the material goes to different sorting plants.

The quality of the paper packaging is assured by removal of waste and drill samples are taken at randomly selected bales at the paper mills. The cores are analysed in different fractions; cardboard, other paper packaging, other paper and other materials. Since the contractor is paid according to the quality of materials, it serves as an incentive to maintain high quality.

Steel, aluminium and glass can be recycled an infinite number of times. Of the recyclable glass 80 % becomes new bottles and building insulation, the rest is exported.

#### **Waste collection charges;**

Waste fees are constructed to stimulate effective waste management, finance waste

management without support from taxes. The weight-based fees stimulates sorting and minimization.

### Measures to promote public participation;

In a pilot with purpose to test different solutions effect on actual behaviour project office Be Green Umeå informed 517 households annually during 3 years on how and why they should recycle hazardous waste. Some of the households also got their hazardous waste collected at the door. The result shows that 31 % more of the residents have increased their recycling just by getting more information and the households whom also got better collecting service increased their recycling by 45 %. The results are now being implemented and will be a model for future information campaigns.



Figure 7C2. With the aim to change behaviour and increase the littering in the city centre, project office Be Green Umeå produced the musical Trash! A mini-musical taking place outdoors all around the centre of Umeå.

“Reduce the food waste!” was a competition held by UMEVA last year where advices were collected from customers on smart solutions for how to reduce the food waste. Suggestions included solutions for both school canteens and cooking at home and were shown at UMEVA’s web page.

Good conditions are created for recycling and reuse, for example the Returbutiken store and delbar.se (Shareable) a website where people can borrow things from each other.

In addition to traditional campaigns, door knocking campaigns are an effective measure to promote public participation which will be used as a measure to increase sorting of food waste.

School information will continue with further focus on minimization.

## 7D. References

The Government offices database, The Environmental Code (Miljöbalken)

<http://www.notisum.se/rnp/sls/lag/19980808.HTM>

UMEVA, *Avfallsplan 2020 (Waste Plan 2020)*

<http://www.umeva.se/download/18.1ba1eb9814afeb38cc94a4c/1423489053960/Avfallsplan+2020-reviderad+2014.pdf>

Umeå municipality, Föreskrifter om avfallshantering och renhållning (Byelaws about waste management and sanitation)

<http://umeva.se/download/18.2e2a679313f614d3c2b6ef8/1373395792046/F%C3%B6reskrifter+om+avfallshantering+och+renh%C3%A5llning+f%C3%B6r+Ume%C3%A5+kommun.pdf>

Umeå comprehensive plan

<http://www.umea.se/umeakommun/kommunochpolitik/planerochstyrdokument/utvecklingochplanering/stadsplaneringochbyggande/oversiktsplan.4.bbd1b101a585d7048000168114.html>

The Aalborg commitments

[http://www.umea.se/download/18.2aeb902411d30c9e460800015062/1225973601941/Aalborg\\_committments\\_english.pdf](http://www.umea.se/download/18.2aeb902411d30c9e460800015062/1225973601941/Aalborg_committments_english.pdf)

Environmental objectives

National: <http://www.miljomal.se/sv/Miljomalen/>

Regional: <http://www.lansstyrelsen.se/vasterbotten/Sv/miljo-och-klimat/miljomal/Pages/default.aspx>

Local: <http://www.umea.se/download/18.2aeb902411d30c9e460800015040/1225973075800/Milj%C3%B6m%C3%A5l.pdf>

UMEVA´s web page, Kretsloopen, spring 2013

[http://www.umeva.se/download/18.111c54ee13d1c0bc5274486/1362140698065/2013\\_Kretsloopen\\_mar-maj\\_liten.pdf](http://www.umeva.se/download/18.111c54ee13d1c0bc5274486/1362140698065/2013_Kretsloopen_mar-maj_liten.pdf)

Förpacknings och tidningsinsamlingen (FTI), Insamlingsstatistik (Collection statistics)

<http://www.ftiab.se/179.html>

Förpacknings och tidningsinsamlingen (FTI), Återvinningsanläggningar (Recycling plants)

<http://www.ftiab.se/183.html>

El-kretsen, Återvinningsystemet (The recycling system)

<http://www.el-kretsen.se/atervinningssystemet/>

Swedish Environmental Protection Agency, Producentansvar (Producer responsibility)

<http://www.naturvardsverket.se/Amnen/Producentansvar/>

UMEVA, Leftovers – a valuable resource

<http://umeva.se/download/18.65dd1d8513249566b028000210/1315511054521/Recycling+of+household+food+waste.pdf>

UMEVA´s web page, Avfallstaxor för Umeå kommun (Waste fees for Umeå municipality)

<http://umeva.se/avfallatervinning/avfallstaxa.106.678bddb2131da53a5ea80001025.html>

UMEVA´s annual report 2012

<http://umeva.se/download/18.63fc4d3e13e555aa526a55a/1368618355487/%C3%85rsredo+visning+UMEVA+2012.pdf>

UMEVA´s annual report 2011

<http://umeva.se/download/18.4166f9b6137178df873264c/1336980039506/%C3%85rsredovisning+UMEVA+2011.pdf>

UMEVA´s annual report 2009

<http://umeva.se/download/18.44d4102d1327f02669f8000508/1361888898724/%C3%85rsredovisning+UMEVA+2009.pdf>

Umeå Energi´s web page, Dåva kraftvärmeverk – hjärtat i Umeås fjärrvärmeförsörjning (Dåva CHP - the heart of Umeå district heating supply)

<http://www.umeaenergi.se/om-umeaa-energi/produktion/fjaerrvaerme-fraan-daava.ept>

Information about the biogas plant in Skellefteå

<http://www.skelleftea.se/default.aspx?id=21293>

UMEVA´s web page, Minska matsvinnet! (Reduce the food waste)

<http://www.umeva.se/avfallatervinning/sorteringforhushall/matavfallsatervinning/minskamatsvinnet.4.111c54ee13d1c0bc52744f1.html>

UMEVA´s annual report 2013

<http://www.umeva.se/download/18.4979a5f31460a35f14d19cb/1400666224416/%C3%85rsredovisning+UMEVA+2013.pdf>

Avfallweb

[www.avfallweb.se](http://www.avfallweb.se)

Avfall Sverige

[www.avfallsverige.se](http://www.avfallsverige.se)