



# City of Antwerp

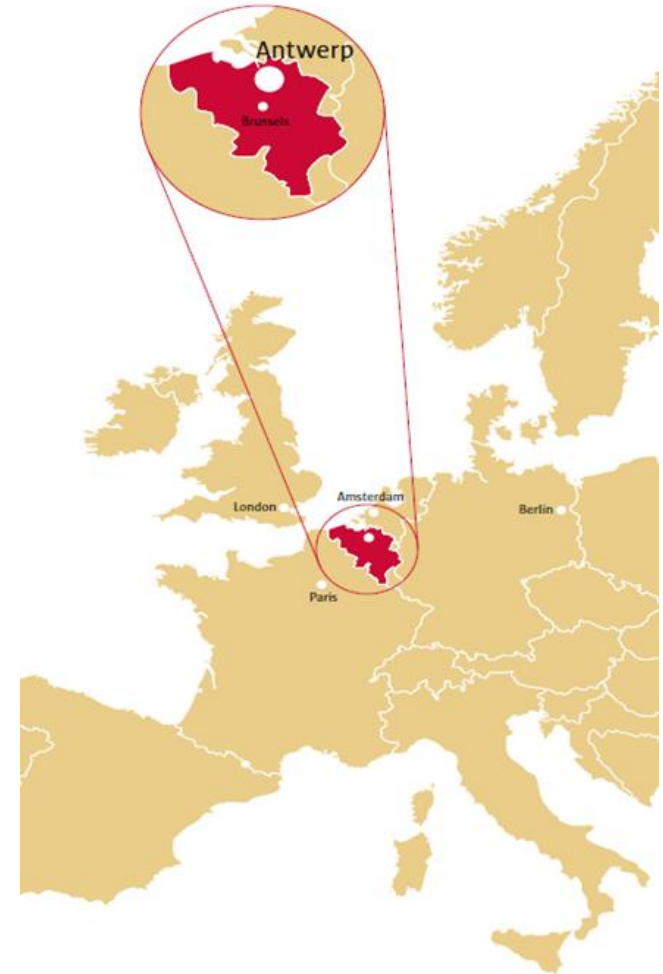
The image shows the interior of a large, historic railway station. The most prominent feature is the massive, arched glass and iron roof that allows natural light to fill the space. The architecture is ornate, with multiple levels of balconies, arches, and a central clock tower visible through the glass. The floor is made of polished, light-colored tiles that reflect the light. A few people are seen walking on the ground floor and on the stairs leading to upper levels. A blue rectangular overlay is positioned on the right side of the image, containing the text '1. General Figures' in white.

# 1. General Figures

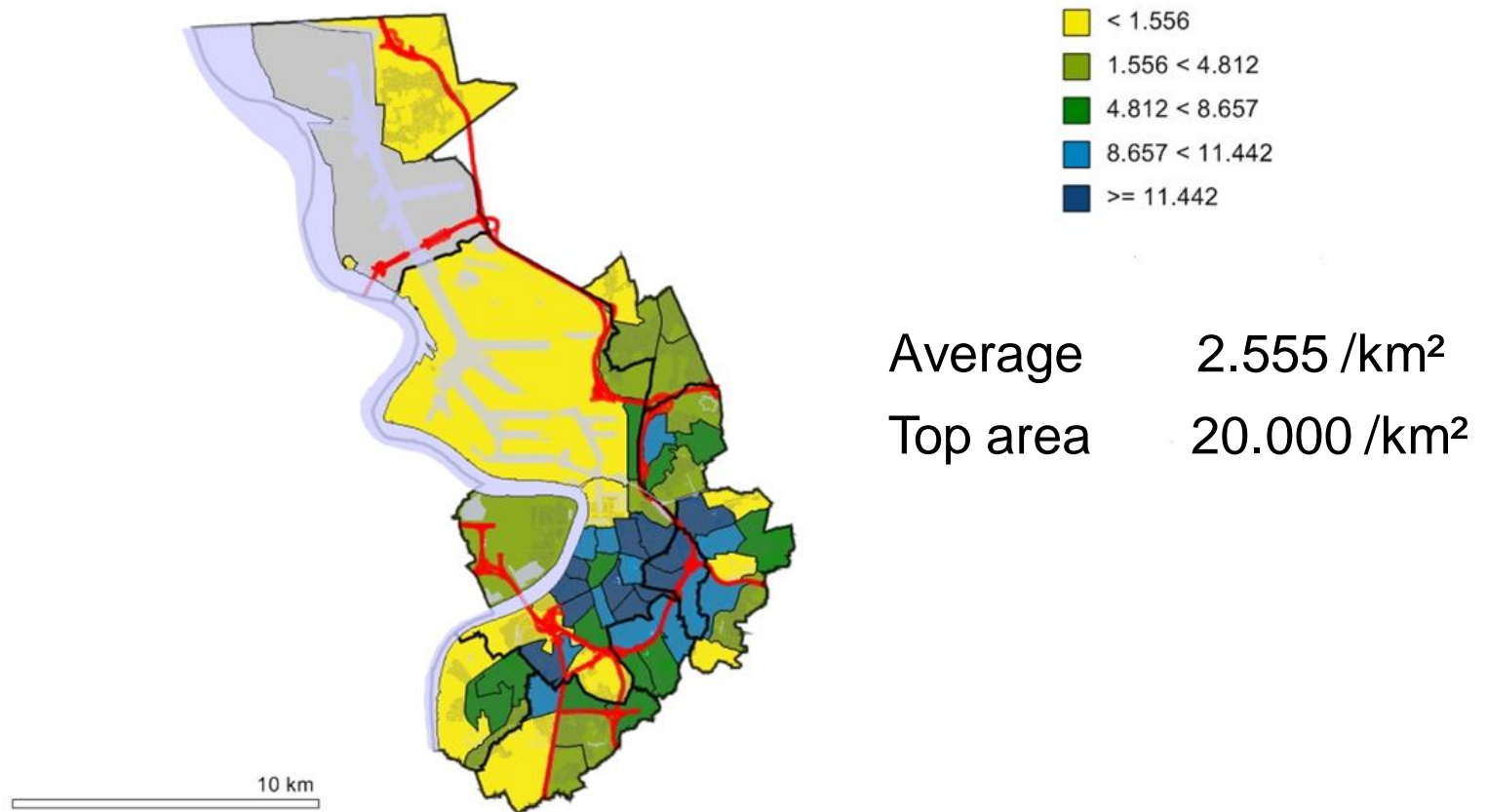


# City of Antwerp

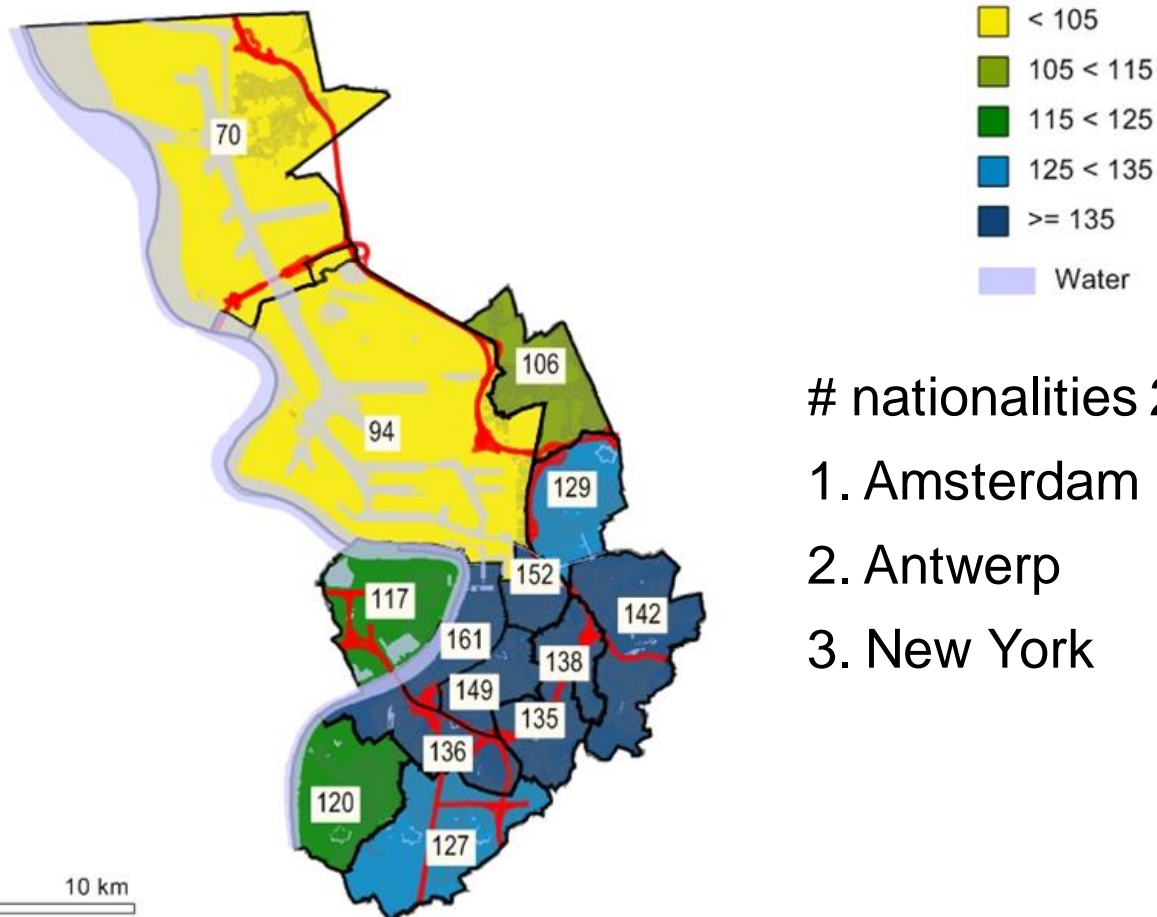
- A pocket-sized metropolis at the heart of Europe
- Second largest city in Belgium
- 522 000 inhabitants
- 239 720 households
- 40 000 students
- > 1 million tourists / year



# Population density



# Racial diversity



# nationalities 2nd place worldwide

1. Amsterdam = 177

2. Antwerp = 161

3. New York = 150



## 2. Municipal solid waste figures



# Selective waste collection



## Residual

- Weekly in all sectors



## VFG

- Weekly in all sectors



## PMD

- Weekly in centre
- Fortnightly in north and south



## Paper & cardboard

- Weekly in centre
- Fortnightly in north and south

28.193 ton

VFG (bio)



Subsoil waste collectors

685 ton



door to door

27.508 ton



13.950 ton

Glass



Subsoil waste collectors

213 ton



Street collectors  
(incl. recycle

13.737 ton

Paper  
Cardboard

26.856 ton



recycle centre

1.221 ton



door to door

25.135 ton



Subsoil waste  
collectors

500 ton

7.438 ton

Plastic/metal  
packaging



Subsoil waste  
collectors

239 ton



recycle centre

27 ton



door to door

7.172 ton



8.327 ton

Illegal  
dumping



4% illegal dumping,  
mixed with residual  
waste

3.674 ton



100% illegal dumping

2.268 ton



60% illegal  
dumping of  
household waste in  
public spaces

2.385 ton

98.094 ton

Residual  
waste



sweeping



subsoil waste  
collectors

1.967 ton



door to door

89.884 ton



illegal dumping

2.268 ton



litter bins

3.975 ton

13.066 ton

Bulky waste : total



door to door

1.462 ton



recycle centre

11.604 ton



5.951 ton

Bulky waste : incinerator



door to door

1.462 ton



recycle centre

4.489 ton

7.115 ton

Bulky waste : landfill



recycle centre

# Municipal solid waste figures

## Amounts of recyclable waste collected

• Biowaste	28.193 ton	54kg
• Metal/plastic packaging	7.438 ton	14kg
• Glass	13.950 ton	26kg
• Paper	26.856 ton	51kg
• <b>Subtotal Antwerp</b>	<b>76.437 ton</b>	<b>146 kg/inh.</b>

+ recupel (electro), battery, wood, metal, textile, hard plastic, garden waste, ...

• <b>Total</b>	<b>170.172 ton</b>	<b>326 Kg/inh.</b>
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Antwerp = 60 %

Average Flanders = 70%



# Municipal solid waste figures

Amounts of unsegregated and not recyclable waste collected

• Residual waste	98.094 ton	188 kg/inh.
Average Flanders		141 kg/inh.

• Bulky waste	13.066 ton	25 kg/inh.
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Total	111.160 ton	213kg/inh.
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Total waste	187.597 ton	539 kg/inh.
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Antwerp = 40%

Average Flanders = 30%

# Municipal solid waste figures

Amount of unsegregated and not recyclable waste collected (exc.construction waste)

• Residual waste	98.094 ton	88 %
• Bulky waste	13.066 ton	12 %
Total amount	111.160 ton	
• Incineration	104.045 ton	94 %
• Landfill	7.115 ton	6 %

# Municipal solid waste figures

Quantity of impurities %

Antwerp

- Metal/plastic packaging 26 %

Average Flanders

- Metal/plastic packaging 15 %





### 3. Historic evolution



# Historic evolution of separate collection

**<1998** no separate waste collection, only residual waste  
>90.000 ton landfill , today 7000

**Period 1998 – 2001** Separate collection VGF + Paper

**Since 2001** Separate collection VGF + Paper + PMD + Glass

**2018** Deposit fee? Plastic bottles and cans. Municipal waste collectors already representing 3 million out of 6 million put pressure, numbers are still increasing



## 4. Delivery system

# Delivery system

VGF



15 liter 0,2€

50 liter 0,4€



140 liter 0€

770 liter 0€

1100 liter 0€



30 liter 0€

# Delivery system

PMD (plastic / metal )

Cross = 50% Reduction of impurities



30 liter 0,125€

60 liter 0,25€



770 liter 150€

1100 liter 200€



30 liter 0,1€

60 liter 0,2€



# Delivery system

## Residual waste inhabitants



30 liter 0,5€  
60 liter 0,75€



240 liter 150€  
770 liter 450€  
1100 liter 600€



30 liter 0,3€  
60 liter 0,6€

*Lowest price in Flanders, others regions up to 4x (2,5€)  
It gives surely some waste tourism as sacks are available at shops*

# Delivery system

## Residual waste business



60 liter 1€



240 liter 200€

770 liter 655€

1100 liter 915€



30 liter 0,5€

60 liter 1 €

# Delivery system

Paper



free



Glass



free





## 5. Collection system



# Three collections sectors

1,000 employees

- Waste collection
- Sweeping
- Winter maintenance
- Weed control
- High pressure cleaning
- Litter bins

**4 key locations**

**9 recycling centres**



# Type and quantity of trucks

## 140 trucks

Separate waste collection , litter bins,  
illegal dumping (automatic lifting system)

- 19 ton , 7ton load capacity 40
- 19 ton , diftar bulky waste 4
- 26 ton , 11,5 load capacity 72



## Subsoil waste collectors

- 26 ton sideloader , 8 ton lc 5

Recycle centre, winter maintenance

- Container trucks 19



# Waste collection - core business

- Selective waste collection
- Emptying Underground Container Collection System
- Bulky waste collection
- Free clean-up collections of fly tipping (illegal dumping)
- Emptying litter bins
- Maintenance parks

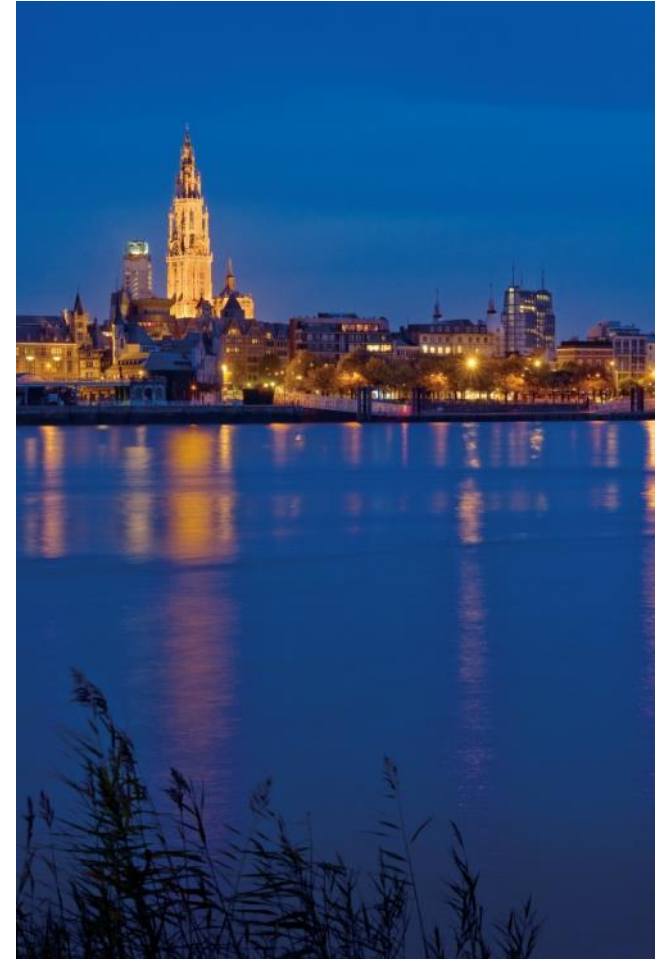
# Waste collection - night shifts (8%)

## Benefits

- Less impact on traffic
- Speedy collection and discard
- Forbear tourist & shopping areas during the day
- Efficient vehicles & infrastructure
- Efficient work force: higher collection freight

## Take into account

- Work force: amount of volunteers correlates to number of weeks
- Visibility / safety
- Noise : forbear residential areas



# Bulky waste collection

- Only burnable waste
- 4 specialised vehicles with weighing console
- Online appointments
- Payment by bank card or invoice (€ 10 extra)
- More expensive than discarding at a recycling centre (€ 0.3/KG)
- Illegal dumping weighed separately
- 4 social housing projects, costs included in rent
- Decrease since 01/01/2015



# Fly tipping

- 10 trucks collect illegal dumping every day
- 2,400 reports monthly (1400 centre sector)
- 97 % of all reports are collected within 24 hours
- approximately 8300 tons a year



# Litter bins




- 4,050 bins : molok 100l
  - *project sensors filling level height , smart cities, maintenance control*
- 125 Big Belly in 2017
- 16 collection trucks
  - 8 vehicles centre sector
  - 4 vehicles south sector
  - 4 vehicles north sector

# Recycle centre

- 9 recycle centres
- rubble 37,5 €/m<sup>3</sup>
- bulky waste 20€/m<sup>3</sup>
- 14 fractions ; 2017 (+ cork + hard plastics)
- 2018 extended with more little fractions (styrofoam, plastic wrap)
- 2018 pop up recycle centre







# Underground Collection System

# Underground Container Collection System

- Glass is already organised with collection systems
- Two types of containers (above and below ground)





# Underground Container Collection System

- Seven days a week
  - *24 hours*
  - *Operational from 7:00 until 22:00*
- Average waste production – conversion to KG – volume  
400 users a underground container residual waste



# How does it work?



**A** Nummer toegangspasje: 0156252

Bij storting contact opnemen met  
Tel.: 03/216.70.80  
E-mail: [service@kliko.be](mailto:service@kliko.be)

# How does it work?



1

Scan



2

Scan again



3

Container  
opens



4

Dispose waste



5

Close the lid



# Project scope

- Currently, a population equivalent of 15,000 inhabitants is serviced by 70 underground containers
- A budget of 22 million is provided in the multi-year planning this legislature
  - By 2019: completion of the left bank, the northern horn (Dam, Cadix, Montevideo); areas south of the central motorway, especially districts of Wilrijk and Berchem
  - A total of 320 additional underground containers will service a total population of approximately 90,000. At this time, roughly one in five citizens of Antwerp will use the underground container collection system

# Project scope

- Applied to city and 9 districts
- Replace door to door waste collection
- Reliable, less than 4 ‰ margin of error
- Normally all fractions in a UCC
- Distance
  - 75 % 150 meters to residual and VFG
  - 90 % 250 meters, paper & cardboard, PMD and glass
  - Approx. 400 users per UCC
- A-card (costumer loyalty card) logical choice



# Underground Container Collection System - advantages

- Innovative and logisticly logical choice
- No waste in the streets
  - *hygiene*
  - *perception*
- Cheaper
- Users can choose when to depose of their waste
- Glass collection container go underground
- Ergonomics workforce

# FAQ

- Litter: not affected by wind
- Noise: less than door to door
- Odor nuisance: controlled
- Elderly-less-mobile: health care
- Parking spaces: ‰ instead of %
- VFG in residential areas with gardens: seasonal



Next steps

# The best way to predict the future is to create it

- **In 2017**

- A city wide campaign against fly tipping (illegal dumping)
- Filling level high sensors in 4050 litter bins
- Further realisation of the underground container system
- Green events : reduce, reuse and recycle

- **By 2018**

- Returnable cans, part of waste problem is now part of solution

- **By 2019**

- Taking steps towards further realisation of the underground collection system

# START-UP AND AWARENESS RAISING CAMPAIGNS

- average annual cost: 250.000€
- campaign against litter (2016)





# START-UP AND AWARENESS RAISING CAMPAIGNS

- TrashTunes: jukebox bins (2016 - 2017)



# START-UP AND AWARENESS RAISING CAMPAIGNS

- campaign against illegal dumping in 5 areas in the city (2016)



# SWOT

## S

High recycling rate Antwerp >60%,  
Flanders >70%

Service: efficient and fast cleaning  
up illegal dumping, 97% < 24h

Facilities : subsoil waste collectors,  
4050 litter bins

Night shift : benefits

Cost : less than private  
outsourcing for waste collection  
(tax 21%)

## W

Feeling of impunity amongst  
citizens due to fast cleaning up  
illegal dumping

High service level and facilities  
leads to high expectations amongst  
citizens

Circular economy not yet  
integrated, only low scale projects

# SWOT

**T**

**Packaging and retail lobby thwart further deposit fee initiatives**

**VFG combination subsoil waste collectors** →

**O**

**EPR**

**Extended producers responsibility**

**Chopping, mulch, neighborhood composting**

**Joint venture : other inter municipal associations (price waste streams, logistics)**

**Deposit fee to decrease residual waste**



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