# Introduction of an area-wide used-glass collection system in Bijelijna

https://thesrpskatimes.com/bijeljina-the-pearl-of-semberija-region-video/

# Waste management in Bosnia - Situation

- Landfill sites still prominent
- Waste separation not yet fully developed
- Starting to apply western systems
- MSW coverage equals 98%
- Used-glass only at 3%

# Why glass?

- Not properly accounted for
- Easy to handle
- Inert material
- Recyclable
- Holds a certain value

# Amount of used-glass in Bijelijna

| | |
|---|---|
| Collected in 2019 (from pubs, bars + 3% of the residential population) | 140 t |
| Zagreb share of glass waste | 4,2% |
| Total waste in Bijelijna | 30.000 t |
| By applying Croatian share | 1.300 t |

# Brijesnica

- Waste transported unseparated to landfill site „Brijesnica“
- In 2019 35.000 t
- Collection system would lead to 14.000 € in savings in comparison to the current situation

# The way to go

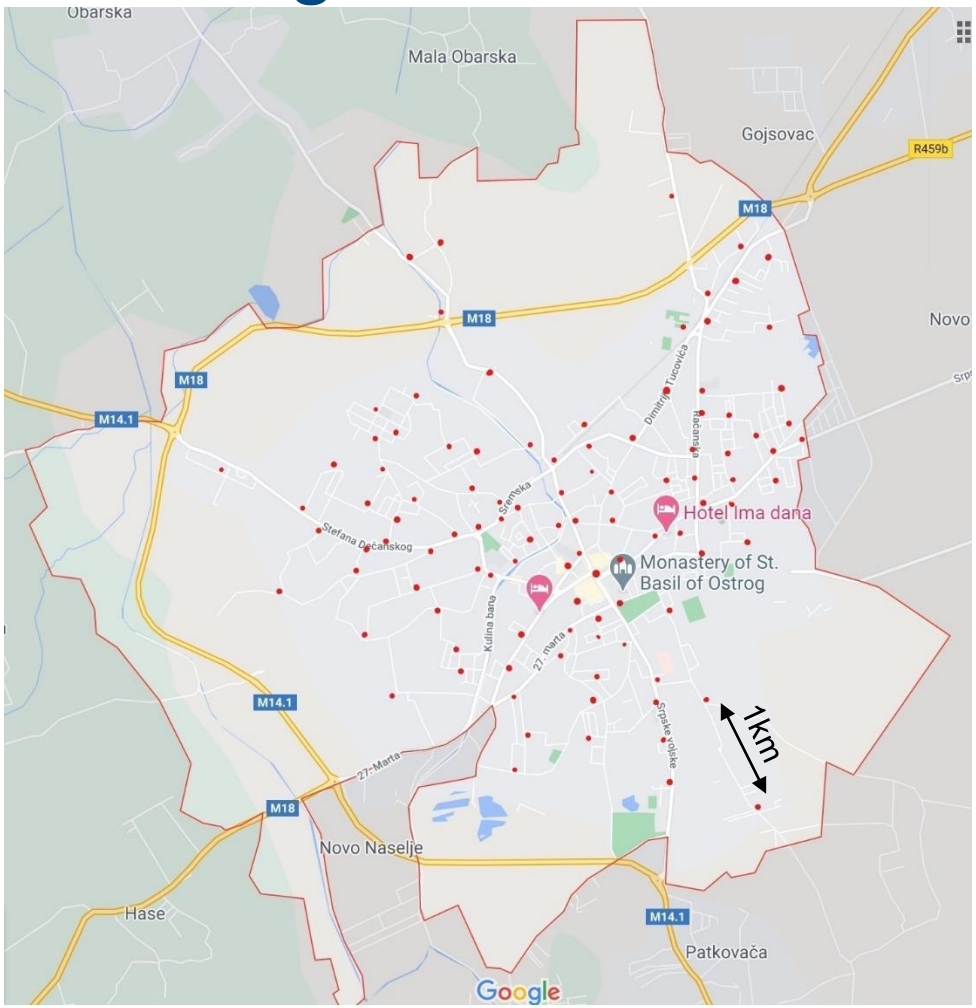
- At least 80% efficiency
- 1.010 t of glass waste
- Major key-points
  - Containers
  - Positioning
  - Collection vehicle
  - Human Resources

# Containers


- Bell containers 1,5 $m^3$
- 210 with separation
- 105 without
- 4 / 3 32 $m^3$ containers at central collection site

| | |
|---|---|
| **Cost per bell container** | **300 €** |
| **Cost per 32 m3 container** | **4.900 €** |
| **Service time** | **15 years** |
| **Interest on loan** | **3 % p/a** |

# Positioning




Distance between
the container positions:
urban up to 0,2 km
suburban up to 1 km

container
landfill site Brijesnica

# Collecting vehicle

| | |
|---|---|
| **Assumed purchase price** | **60.000 €** |
| **Service time** | **15 years** |
| **Interest on loan** | **3 % p/a** |
| **Yearly payment** | **5.000 €** |

# Human resources

- Two workers full-time

| | |
|---|---|
| **Mean monthly income** | **805 $ / 668 €** |
| **Ancillary labor cost** | **+30 %** |
| **Yearly wages payed** | **21.000 €** |

# **Scenario A with separation** (glass revenue: 25,- per t)

| | System with separation | | |
|---|---|---|---|
| | Income | Costs | % |
| **Glass collection** | | | |
| **income from glass** | **€ 25 216** | | **49%** |
| **Landill Savings** | | | |
| savings with new system | **€ 25 791** | | **51%** |
| **Sub-total income per year** | **€ 51 007** | | |
| | | | |
| **Bell containers** | | | |
| **cost for Bell containers per year** | | **€ 5 277** | **14,3%** |
| **Central collection site containers** | | | |
| **cost for large containers per year** | | **€ 2 298** | **6,2%** |
| **collecting vehicle** | | | |
| **cost for truck per year** | | **€ 5 026** | **13,6%** |
| **Human Resources** | | | |
| **cost for personell per year** | | **€ 20 846** | **56,6%** |
| **diesel and maintainance** | | | |
| **cost for gas and upkeep** | | **€ 3 401** | **9,2%** |
| **Sub total cost per year** | | **€ 36 848** | |
| | | | |
| **Grand total profit per year** | **€ 14 158** | | |

# **Scenario B without separation** (glass revenue: 20,- per t)

| | System without separation | | |
|---|---|---|---|
| | Income | Costs | % |
| **Glass collection** | | | |
| **income from glass** | € 20 173 | | 44% |
| **Landill Savings** | | | |
| savings with new system | € 25 791 | | 56% |
| **Sub-total income per year** | € 45 963 | | |
| | | | |
| **Bell containers** | | | |
| **cost for Bell containers per year** | | € 2 639 | 7,4% |
| **Central collection site containers** | | | |
| **cost for large containers per year** | | € 1 723 | 4,8% |
| **collecting vehicle** | | | |
| **cost for truck per year** | | € 5 026 | 14,1% |
| **Human Resources** | | | |
| **cost for personell per year** | | € 20 846 | 58,5% |
| **diesel and maintainance** | | | |
| **cost for gas and upkeep** | | € 5 410 | 15,2% |
| **Sub total cost per year** | | € 35 644 | |
| | | | |
| **Grand total profit per year** | € 10 319 | | |

# Final result

1. Separate collection of glass in Bijeljina is profitable
2. Differentiation into colours is even more profitable:
   - ✓ Due to a slightly higher revenue (25,-/20,-)
   - ✓ Due to less effort for collection (distance between container positions)

# Thank you for your attention!

**Questions?**
**Please indulge us!**

**The following sources have been used:**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