# Optimizing the separate waste collection in the Győr region

CHALLENGES: seperate waste collection optimization MATHEMATICAL AND COMPUTATIONAL METHODS

#### PRODUCTIVE SECTOR: logistic

### • The problem is formulated as a mixed integer linear programming problem.

- Data processing was done by Python.
- OpenStreetMap was used to produce the time and distance matrices..
- The mathematical models were formulated in GAMS and solved by CPLEX.

#### CHALLENGES AND GOALS

PROBLEM

overtime

determined.

DESCRIPTION

GYHG collects the separate

waste in the Győr region. A

weekly plan of the garbage

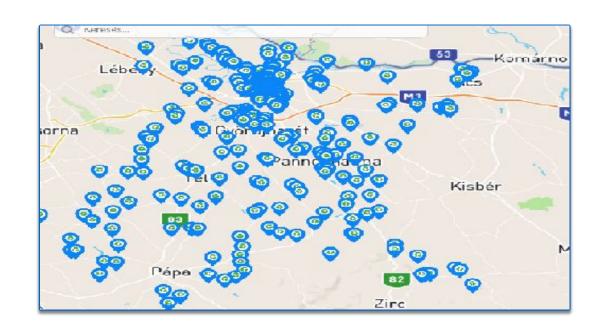
trucks that yields no working

has

to

he

Determine the optimal routes of the trucks and .find out whether the current fleet size is sufficient to operate the waste collection without working overtime.



Location of the separate waste collection islands.

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### **Results and Benefits**

- Optimal routes of the trucks were determined.
- We have proved that the current fleet size is not sufficient to opearate the system without working overtime.
- A new weekly plan with 2 extra vehicles is introduced.

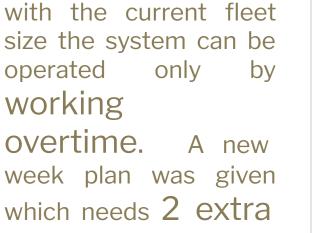
Benefits:

- Cost reduction.
- Supporting the work of the decision makers.

,	<u>Monday</u>	<u>Tuesday</u>	<u>Wedn</u> .	Thursd.	<u>Friday</u>	Saturd.	Sunday
Vehicle1	plastic4	plastic1	paper1	plastic4	plastic1	plastic4	m3/m4
Vehicle2	paper4	plastic2	paper2	paper4	plastic2	paper4	
Vehicle3	plastic5	plastic3	paper3	plastic5	plastic3	plastic5	
Vehicle4	paper5	m-gy1	m-gy2	paper5	m1/m2	paper5	

A new weekly plan to collect paper, plastic a and metal.

SZÉCHENYI



We have proved that

vehicles.



