Experiene Exchange Workshop Nr.4 | 16. March 2022

Pilot implementation in the Košice region

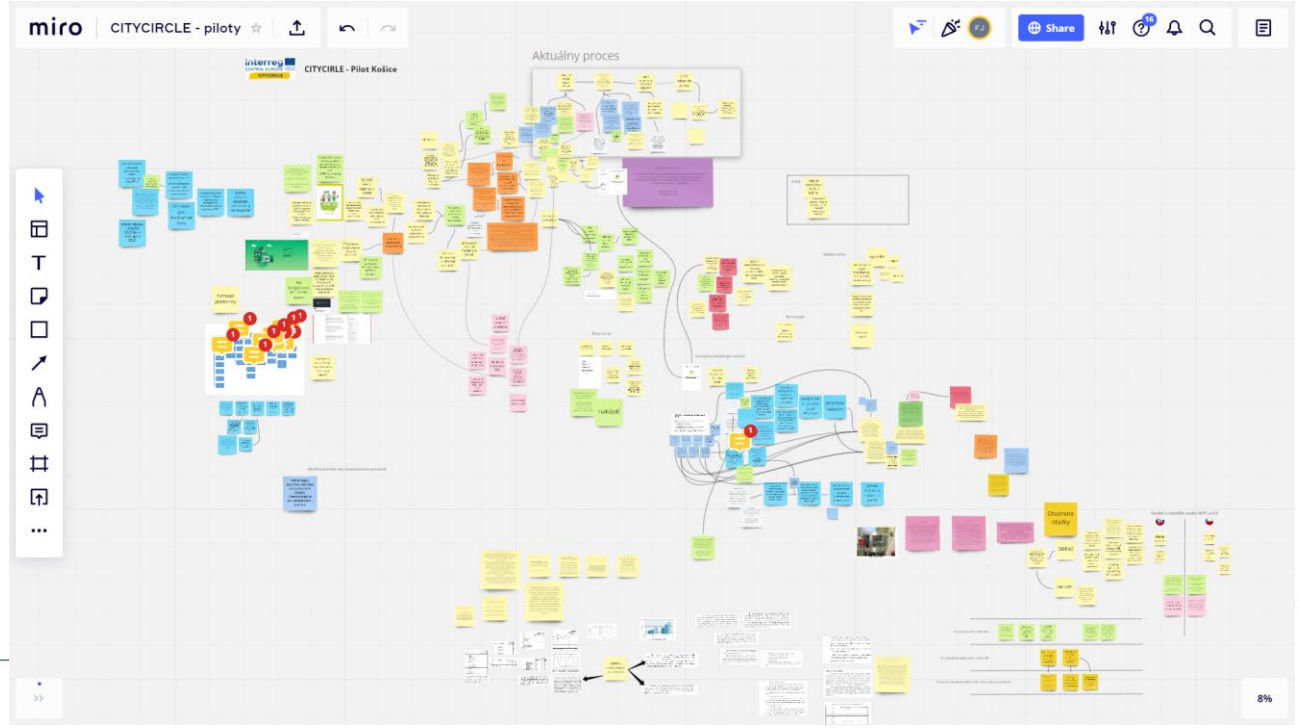
Jozef Bľanda | EGTC Via Carpatia

CONTENT

- Pilot introduction
- Pilot aims
- Methodology of the Pilot
- Raising awareness
- Lessons learnt
- Pilot assets
- Follow-up actions

PILOT INTRODUCTION

- TUKE and EGTC discussions of the pilot implementation
- the Miro platform
- brainstorming of possibilities of pilot implementation



PILOT INTRODUCTION

- sharing materials, documents and best practices to study the topic of the circular economy

- understanding the topic and all relevant aspects of circular economy:

  - Waste legal framework
  - Current waste processes at schools
  - Food legal framework
  - Possibilities for school on creating revenues from waste
  - Circular technologies for food waste and their efficiency
  - Similar initiatives in Slovakia
  - Methodology for measuring waste creation.

- confirmation of concept of the pilot

PILOT INTRODUCTION

- Identification of relevant stakeholders involved in the pilot implementation
  - the survey among all relevant stakeholders (high schools)
  - questionaire survey

- Selected schools:
  - Spojená škola (United school) in Košice
  - Štefan Moyses Grammar School in Moldava nad Bodvou
  - Stredná priemyselná škola technická (Secondary Technical Industrial School) in Spišská Nová Ves

- Meetings with representatives of selected schools were organized
  - getting acquainted with the school environment
  - waste management system

PILOT AIMS

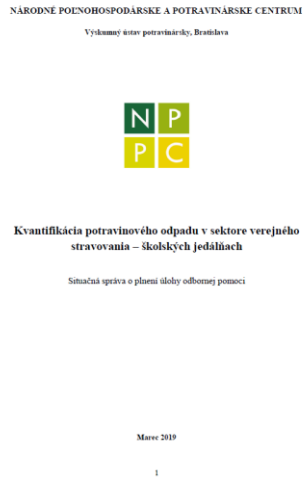
- The main aim of the pilot:
  - to map and analyze the generation of waste in schools in the Košice region

- Particular aims:
  - measure and analyze individual types of biological waste that is generated in school canteens
  - measure and analyze individual types of waste generated in school classrooms
  - measure and analyze the amount of compost that is generated by the electric composter
  - elaboration recommendations and guideline for schools in the field of waste management at schools

METHODOLOGY OF THE PILOT

- National Agricultural and Food Centre

- Quantification of food waste in the sector of public catering – school canteens (Polovka M. et al., 2019)



NÁRODNÉ POĽNOHOSPODÁRSKE A POTRAVINÁRSKE CENTRUM

Výskumný ústav potravinársky, Bratislava

Kvantifikácia potravinového odpadu v sektore verejného stravovania – školských jedálňach

Situačná správa o plnení úlohy odbornej pomoci

Marec 2019

1

Tabuľka 6. Štruktúra odpadu zo surovín použitých na prípravu obedov v sledovanom období – II. zisťovanie.

a) Nejedlý odpad

	1. Mlieko a mliečne výrobky	2. Tuky a oleje	3. Zmrzlina, sorbet	4. Ovocie	5. Zelenina	6. Orechy a semená	7. Cukrovinky	8. Cereálie a cereálne produkty	9. Pekárske výrobky	10. Mäso a mäsové výrobky	11. Ryby a produkty z rýb	12. Vajcia a produkty z vajec	13. Sladidlá vrátane medu	14. Suš. koreniny a polievkové zmesi	15. Nápoje, okrem mliečnych	16. Polotovary	Spolu
Škola A	0.00	0.00	0.00	0.39	121.24	0.00	0.00	0.00	0.00	0.00	0.00	3.05	0.00	0.00	0.00	0.00	**124.68**
Škola B	0.00	0.00	0.00	14.60	205.42	0.00	0.00	0.00	0.00	0.00	0.00	4.27	0.00	0.00	0.00	0.00	**224.29**
Škola C	0.00	0.00	0.00	0.00	6.26	0.00	0.00	0.00	0.00	0.00	0.00	5.36	0.00	0.00	0.00	0.00	**11.62**
Spolu	**0.00**	**0.00**	**0.00**	**14.99**	**332.92**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**12.67**	**0.00**	**0.00**	**0.00**	**0.00**	**360.58**

b) Tekutý odpad

	1. Mlieko a mliečne výrobky	2. Tuky a oleje	3. Zmrzlina, sorbet	4. Ovocie	5. Zelenina	6. Orechy a semená	7. Cukrovinky	8. Cereálie a cereálne produkty	9. Pekárske výrobky	10. Mäso a mäsové výrobky	11. Ryby a produkty z rýb	12. Vajcia a produkty z vajec	13. Sladidlá vrátane medu	14. Suš. koreniny a polievkové zmesi	15. Nápoje, okrem mliečnych	16. Polotovary	Spolu
Škola A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Škola B	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00
Škola C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spolu	**0.00**	**4.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**4.00**

METHODOLOGY OF THE PILOT

- survey among schools within the Košice region
  - information about the process of waste flow and the process of waste separation
  - their opinions and experiences in this topic

- selection schools involved on the pilot
  - 3 schools were selected
  - composter operation
  - interest in the issue of waste separation

- elaboration of methodology of waste measurement for school staff

METHODOLOGY OF THE PILOT

- The detailed process of implementation of the pilot was agreed

Interreg CENTRAL EUROPE CITYCIRCLE

Metodická príručka pre kvantifikáciu kuchynského odpadu v školských jedálňach

Stredná priemyselná škola technická, Hviezdoslavova 6,
052 01 Spišská Nová Ves

August 2021

Meranie biologického odpadu v školských zariadeniach- školských kuchyniach

Obdobie merania a kvantifikácie biologického odpadu v školskom zariadení je navrhované na 1 krát 1 mesiac merania (tam, kde to možnosti školskej kuchyne dovoľujú sa odporúča meranie vykonať v 2 mesačných obdobiach).

Potrebné náležitosti na efektívne meranie a kvantifikáciu biologického odpadu v školskom zariadení:

- **Váhy na meranie surovín** a zvyškov z nedojedených obedov, nevydaných obedov a prípadných zvyškov z desiat, olovrantov a obsahov z triedenia košov v triedach umiestnené v blízkosti kuchyne/skladu surovín/ inom hygienicky vhodnom mieste
- **Kuchynské váhy** na meranie vydávaného jedla podľa zostaveného týždenného jedálnička, ktorý kvantifikuje zložky a hmotnosti jednotlivých zložiek obeda (prípadne i desiaty a olovrantu, ak školské zariadenie je spojeného typu škôl s materskou alebo základnou školou)
- **Nádoby na zber a váženie odpadu z jednotlivých surovín (5 položiek surovín) - budú potrebné buď menšie nádoby/vedierka alebo plastové vrecká,** kam bude odpad dávaný, následne zvážený, zapísaný do príslušného listu a presypaný **do 1 zbernej nádoby** označenej **„odpad zo surovín"** prípadne tekutý osobitne. Olej osobitne.
- **Nádoby/kontajnery s označením jednotlivých položiek meraného kuchynského odpadu**- 1. **polievka** 2. **bielkoviny**- mäso, ryby, vajíčka, tofu, 3. **ostatné**- cestoviny, ryža, zemiaky, šalát, kompót, varená zelenina, dezert, miešané jedlá 4. **ovocie**; 5. **pečivo ,6. nápoj** umiestnené v kuchyni pri okienku príjmu tácok so zvyškami nezjedeného obeda, desiaty či olovrantu z jedného dňa,
- **Listy pre zapisovanie** merania surovín, odpadu zo surovín, pripravených hotových jedál a vydaných jedál, odpadu z hotových vydaných jedál – 3 listov na každý deň merania, cca 90 listov na mesiac merania
- **Zaškolený personál kuchyne**, ktorý meranie vykonáva (osobitne pre časť prípravy jedál - kuchárky+ pomocná sila a osobitne pre odpad vracajúci sa z nezjedených jedál- pomocná sila) v zmysle zákonných požiadaviek a hygienických noriem (kuchárky nemôžu prichádzať do styku s odpadom z nejedených hotových jedál)

Metodika merania je založená na nasledovných princípoch a postupoch:

1. Monitoruje sa **celý kolobeh potravín v školskom stravovaní vo vzťahu k príprave obedu,** – t.j. od surovín až po neskonzumované zvyšky hotových jedál počas každého pracovného dňa počas zvoleného obdobia).

2. Súčasťou evidencie toku surovín a pripravovaných hotových jedál **sú jedálne/normovacie hárky na každý monitorovaný deň.** Jedálne lístky zostavuje vedúca školskej kuchyne na týždennej báze s uvedením hmotností jednotlivých zložiek podľa noriem platných pre školské stravovanie). Nákup surovín je vykonávaný na základe zostaveného týždenného jedálneho lístka a počtu prihlásených stravníkov raz za týždeň (alebo iný interval) a ich využitie na prípravu obeda vychádza z počtu

METHODOLOGY OF THE PILOT

Explanation and training of school kitchen staff regarding the practical application of the methodology

METHODOLOGY OF THE PILOT

The system of implantation the pilot:

- measuring the amount of produced biodegradable kitchen waste
- the measuring was held 1,5 month
- waste is classified into categories (waste from bread, dairy products, fruits, vegetables, meat, eggshells, ...
- the analysation the waste produced in classes and amount of compost produced at school using an electric composter
- the measurement was performed on a daily basis
- the data obtained were recorded in the reports
- obtained data weresummarized and the final report was elaborated
- the general conclusions and recommendations for other schools will be summarized

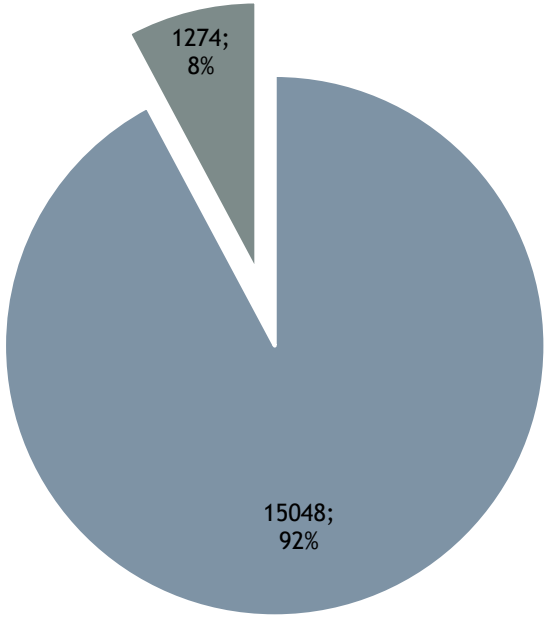
PILOT RESULTS

Numbers of served lunches:

Week	SNV		Moldava		Košice	
	Date	N	Date	N	Date	N
I.	13.9.2021 - 17.9.2021	**259**	3.9.2021	**65**	20.9.2021 - 24.9.2021	**145**
II.	20.9.2021 - 24.9.2021	**317**	6.9.2021 - 10.9.2021	**87**	27.9.2021 - 1.10.2021	**144**
III.	27.9.2021 - 1.10.2021	**344**	13.9.2021 - 17.9.2021	**48**	4.10.2021 - 8.10.2021	**137**
IV.	4.10.2021 - 8.10.2021	**318**	20.9.2021 - 24.9.2021	**84**	11.10.2021 - 15.10.2021	**135**
V.	11.10.2021 - 15.10.2021	**335**	27.9.2021 - 1.10.2021	**85**	18.10.2021 - 22.10.2021	**143**
VI.	18.10.2021 - 22.10.2021	**298**	4.10.2021 - 8.10.2021	**86**	25.20.2021 - 28.10.2021	**99**
VII.	25.10.2021 - 27.10.2021	**334**	11.10.2021 - 15.10.2021	**88**	-	**-**

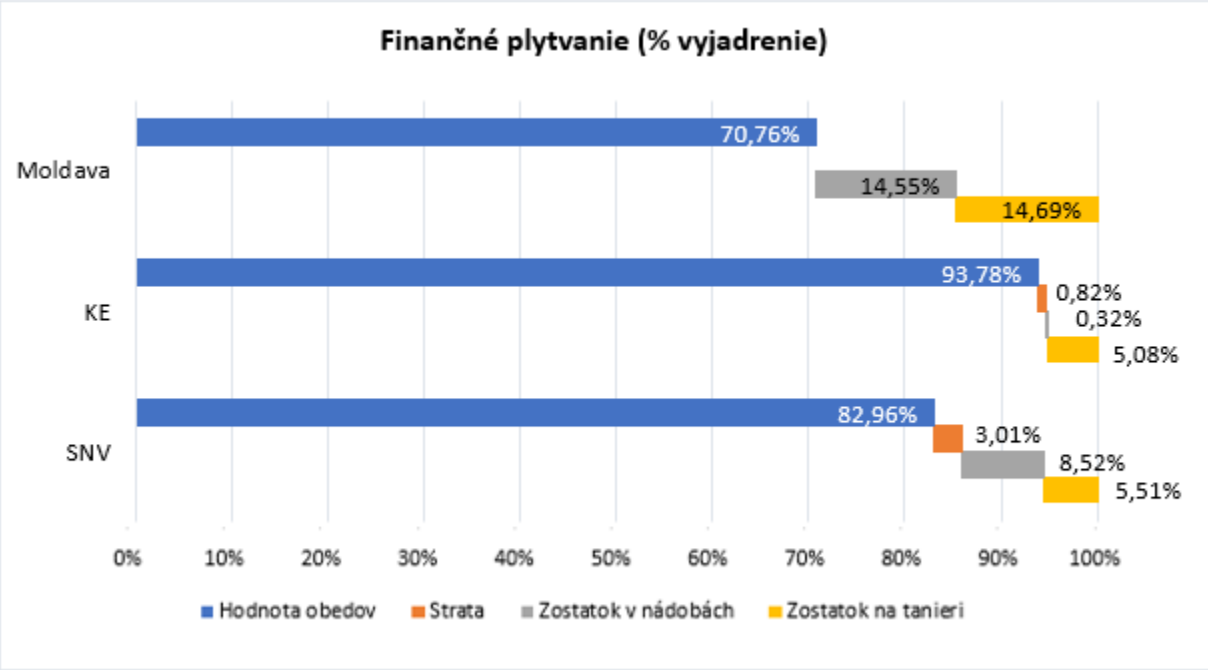
PILOT RESULTS

The total number of served and non-serving lunches:



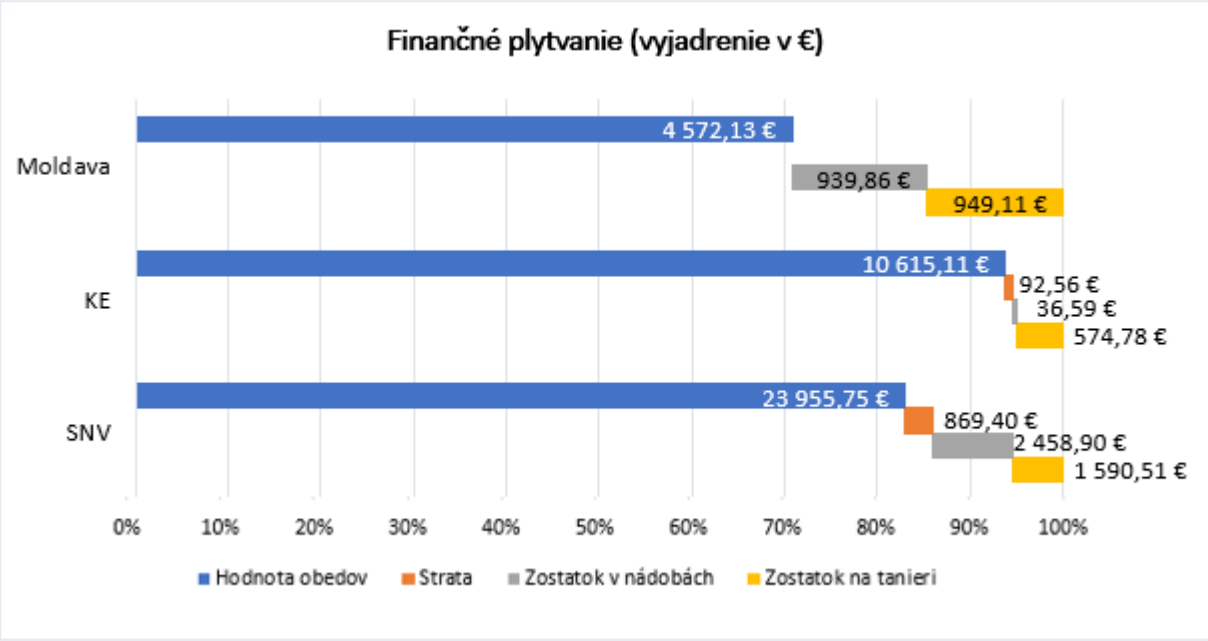
PILOT RESULTS

Financial expression of food waste (in %):



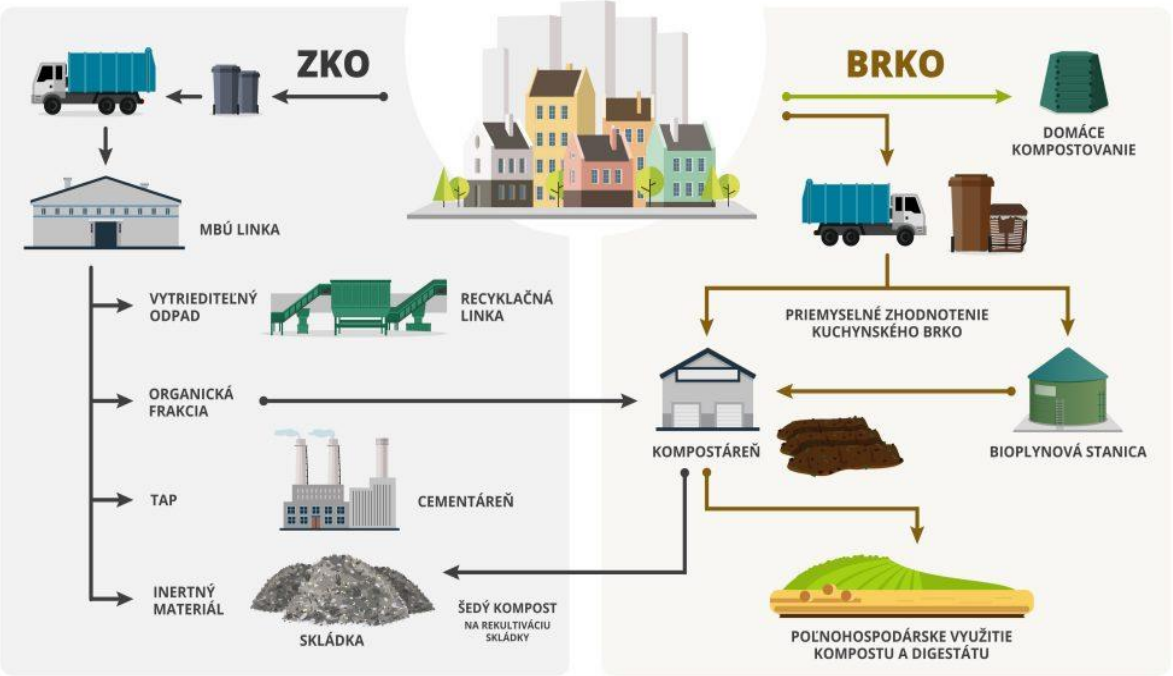
PILOT RESULTS

Financial expression of food waste (in €):



PILOT RESULTS

Effective ways of waste management in schools :



PILOT RESULTS

Waste management options for individual schools:

- The school can hand over kitchen and restaurant biowaste to an authorized organization
- Self-processing on school premises
- Utilization of raw material waste (fruit, vegetable, potato, egg shells) in bioeconomic
- However, based on the results of the analysis, the use of GG electric composters in schools seems to be the most suitable and economical way.

GG 02	
ODPAD:	0 - 6 kg / denne
SPOTREBA:	60 - 90 kWh / mesiac
ROZMERY:	401 x 400 x 790 mm
VÁHA:	27 kg

GG 10	
ODPAD:	0 - 30 kg / denne
SPOTREBA:	227 - 907 kWh / mesiac
ROZMERY:	1160 x 620 x 1030 mm
ROZMERY (DEODORIZER):	410 x 580 x 980 mm
VÁHA:	286 kg

GG 30	
ODPAD:	0 - 100 kg / denne
SPOTREBA:	700 - 1100 kWh / mesiac
ROZMERY:	1960 x 870 x 1250 mm
ROZMERY (DEODORIZER):	510 x 800 x 1300 mm
VÁHA:	580 kg

VYŠŠIE PROFESIONÁLNE RADY: GG 50 (0-150 kg BRKaRO* denne) GG 100 (0-300 kg BRKaRO* denne) GG 300 (0-1000 kg BRKaRO* denne) GG 500 (0-1500 kg BRKaRO* denne)

*BRKaRO - biologicky rozložiteľný kuchynský a reštauračný odpad

RAISING AWARENESS

Educational activities in schools - “enviro days” in schools:

1. Practical part
2. Theoretical part
3. Document screening
4. Environmental quiz

- information in the field of circlular economy, waste management, separation and recycling and so on
- September, 2021

RAISING AWARENESS

“enviro days” in schools

RAISING AWARENESS

"enviro days" in schools

RAISING AWARENESS

Official ceremony:

- September 20, 2021, Spojená školy (United school) in Košice
- handover of bins for separate waste collection and electric composter to schools
- ceremonial opening of the garden being built and at Sojená škola (United school) in Košice
- the manifest supporting circular economy was signed by representatives of:
  - Košice self-governing region
  - EGTC Via Carpatia
  - Technical University of Košice
  - organisation Priatelia Zeme
  - 3 schools involved in the pilot

RAISING AWARENESS

Official ceremony:

RAISING AWARENESS

Official ceremony:

RAISING AWARENESS

Official ceremony:

RAISING AWARENESS

Information seminars in the filed od circular economy

- A total of 4 information seminars were held on selected primary and secondary schools in gthe Košice region:
  - Sándor Márai Grammar School and Primary School in Košice (14.02.2022)
  - Secondary Technical Industrial School in Spišská Nová Ves (15.02.2022)
  - Spojená škola, Opatovská cesta in Košice (16/02/2022)
  - Business Academy, Polar 1 in Košice (17.02.2022)

- Topics:
  - circular economy, sustainable development, ecology and waste separation for primary and secondary school students were organized

- Graduates of these seminars and courses will use the acquired knowledge in practice and will help not only their surroundings, but also the whole society on the path to circular economy

RAISING AWARENESS

RAISING AWARENESS

Participation in International academic conference

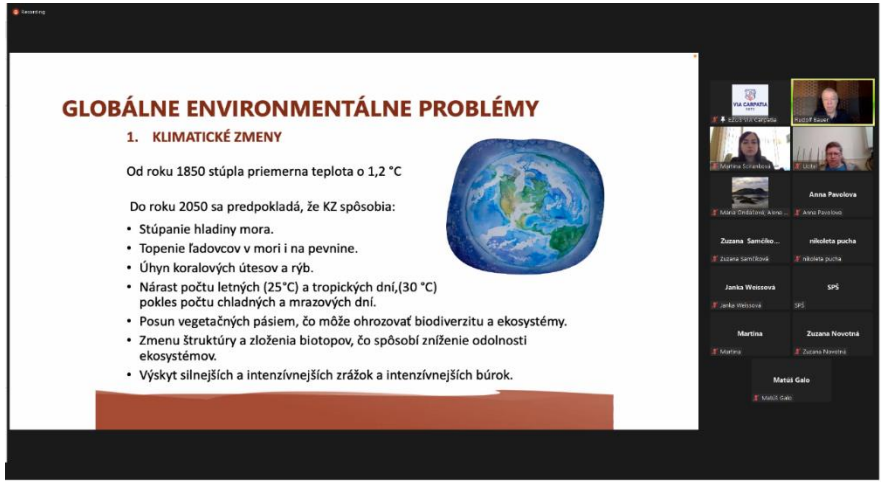
RAISING AWARENESS

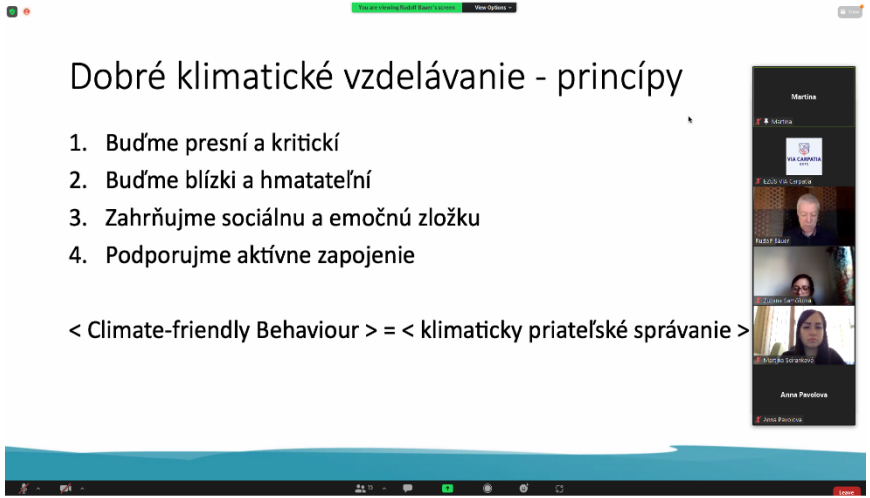
Visual educational elements in school

RAISING AWARENESS

Training courses for teachers

- The aim: to introduce the topic of circular economy and approach to teaching subjects related to the circular economy





RAISING AWARENESS

Installation of electric composter

- Business Academy, Polar 1 in Košice
- electric composter for processing biological kitchen waste

LESSONS LEARNT

During the previous process of preparation of the pilot, several important pieces of knowledge have been gained:

- analysis of possibilities and options to measure waste at schools need to be evaluated
- national legislation dealing with the topic must be understood
- personal contact and good relationships with representatives of all relevant stakeholders need to be built
- activities and interest from schools is important
- cooperation with professionals in the field of environmental education is very important
- intensive and clear communication with schools and staff involved in the pilot is very important

PILOT ASSETS

- Bins for separate waste collection
  - A total of 30 sets of containers were purchased, this equipment help schools in waste separation and analysation particular waste components
- Electric composter
  - The composter is designed for the processing of kitchen biological waste, it helps us to analyse the amount of the amount of bio-waste managed in schools
- Visual educational elements
  - The purpose of these elements is to educate student of primary and secondary schools in the Košice region
- Methodology for quantification of kitchen waste in school canteens
  - The methodology was designed to help kitchen staff to measure and record the amount of kitchen waste that is generated in schools´ canteens
- The Manifest supporting circular economy
  - The manifest was was signed by representatives of Košice self-governing region, EGTC Via Carpatia, Faculty of the economics of the Technical University of Košice, organisation Priatelia Zeme and high schools involved in the pilot. By signing this manifest, these institutions have declared that they want to adhere to the principles of the circular economy.
- Knowledge gained during project implementation
  - Representatived and staff of EGTC Via Carpatia and TUKE gained important knowledge and experince in the field of circular economy. These knowledge will be used in another activities and project focused now only on circular economy. It will secure better implementation of further activities and achieving positive impact in implementation of circular economy in the region.

FOLLOW-UP ACTIONS

- Communication with schools selected to be part of the pilot
  - Meetings and discussions with representatives of selected schools will be scheduled. The aim of these meetings is to discuss the process of collecting data and information from measuring the waste productions at schools after the end of the project
- Collecting data from measurement
  - Data from all involved schools will be collected and summarized
- Analysation and evaluation of collected data
  - All obtained data will be analysed, and the most important finding will be summarized. The aim is to elaborate the final report with suggestions and recommendations for other schools in the field of waste management
- Maintenance of developed ICT platform
  - The platform will be maintained in order to support circular economy in the region
- Educational activities
  - Educational courses and seminars will be held in the region in order to present results achieved in the project
- Using gained information and expertise
  - Knowledge and experience gained during the project implementation will be used in another activities and project focused now only on circular economy
- Preparation of another project
  - Another projects in the field of the circular economy will be prepared. Project CITYCIRCLE provided important information and experience in the field of circular economy that created the quality base for implementation of another projects

THANK YOU...

VIA CARPATIA
EGTC

Jozef Bľanda
EGTC Via Carpatia

jozef.blanda@viacarpatia.eu

+421 907 812 961