Republic of Slovenia, Municipality Maribor

Project Wcycle

Transition of Urban Region into Circular Economy

Project meeting Interreg Europe project CircE
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WHO AND WHERE WE ARE

• Maribor is the capital of the province of Styria and the second largest city in the country with 115,000 inhabitants
• It is a pleasant small 850 year old university town set in the beautiful surroundings of Pohorje hills on one side and the wine hills on the other, divided by the river Drava
• It is the economic and cultural center of northeastern Slovenia with rich industrial history
• The city lies at the junction of the motorway network, has main rail links, has its own airport and is only 250 km away from the sea
• It offers a diverse and high-quality tourist services, a clean environment and the highest quality of natural water
PROJECT WCYCLE

WHAT IS THE WCYCLE PROJECT

- The project Wcycle is the strategic developmental model of the City of Maribor as an urban center in the field of integrated management of all generated waste, surplus energy and wastewater based on the policy of circular economy as material, energy and water strategy of using processed waste, energy and treated water as new sources.

APPROACH TO THE PROJECT

- Defining the strategy's baseline
- Defining the project's baseline
- Determining the project objectives
- Designing the organizational model
- Design and implementation of processes
STRATEGIC BASELINES

EU LEVEL

• Closing the loop - An EU action plan for the Circular Economy s svežnjem ukrepov to develop a sustainable, low carbon, resource efficient and competitive economy, dec. 2015

NATIONAL LEVEL

• Smart Specialization Strategy, jul. 2015
• Framework program for the transition to a green economy, okt. 2015
• Waste management program and waste prevention program of Republic of Slovenia, jun. 2016

LOCAL LEVEL

• Waste management strategy in MO Maribor, mar. 2015
PROJECT BASELINES

• The city does not have a landfill site and does not want to have one, also does not want to dispose waste of by incineration
• In the process of recovery are to be included all types of waste resulting from the population, utilities, construction, industry, agriculture and water management
• The advantage of processing is the material recovery - recycling, followed by use in energy and, as a last, production of new composites
• Recovery operators for specific project pillars are the companies owned by the municipality, which are already carrying out public services, the responsible for softer contents (sharing, repair, reuse, self-supply) is the municipality
• New recovery capacities are planned preferentially planned in the areas of degraded municipal land with the aim for their sustainable management and revitalization
PROJECT OBJECTIVES

STRATEGIC OBJECTIVES OF THE PROJECT

• Reducing environmental burden
• Reducing the use of natural resources
• Increasing the use of recovered materials, energy and water
• Creating new mostly green jobs
• Creating added value and economic growth
• Use of new technologies, and our own research and development
HORIZONTAL ORGANIZATIONAL PROJECT MODEL

• Recovery operators for specific project pillars – project circles are the companies owned mostly by the municipality, which are already carrying out public services for the citizens

• The municipality is responsible for softer contents (sharing, repair, reuse, self-supply)

• The priority is primarily the cooperation of companies mostly owned by the municipality each within its own circle with the aim of achieving the project objectives

• The responsible for each project circle additionally carry out free market services, all with the aim of improving public services for the citizens
Project Wcycle

- The priority is material flow
- The priority is the flow of energy and water
- Unified flow of ideas
- Economically and with nature
- People for People
- For citizens, the market, for tomorrow
- ........

LEGEND:

PS - PUBLIC SERVICES  MATERIAL WASTE FLOW
CS - COMMERCIAL ACTIVITY  ENERGY FROM WASTE
                 RECYCLED WASTE WATER
VERTICAL ORGANIZATIONAL MODEL OF THE PROJECT

- **Service pillars** carry out waste, energy and water recovery services by selected pillars of their formation and with selected recovery operations.
- **Combining the processing** of waste, surplus energy and recycled water is especially emphasized with the aim of achieving maximal technical, technological and economic benefits.
- **Wcycle Institute** is a highly professional project core for implementation of research and development, introduction of selected technologies and the use of integrated IT tool for information and supervision.
- **OPTcycle** carries out highly professional services of service and maintenance for project needs, for functioning of its subsystems and improving efficiency.
Project Wcycle

Wcycle Maribor

- Wcycle Institute: Technology, research, development
- OPTcycle: Service, maintenance, optimization

Pillars of services for processing waste, energy, water

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2</th>
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<tbody>
<tr>
<td>P1 – Population, utilities, services</td>
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<td>P2 – Construction, industry, soil</td>
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<td>P3 – Heat, cooling, electricity, gas</td>
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<td>P4 – Transport, tourism, services</td>
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<td>P5 – Cleaning water, recycled wastewater</td>
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<td>P6 – Share, reuse, refurbish</td>
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Waste heat, water → Raw materials, materials

Waste → Energy, water, services
PRESENTATION OF THE PHASE 1 LOCATION

• For the implementation of the project the city of Maribor has two available degraded locations in total the of 20 ha

• On location A, in the area of 5.0, in Phase 1 the construction of the facility for processing of mixed municipal waste is being implemented, furthermore the construction of other necessary facilities for recycling of municipal waste is planned

• On location B in Phase 1, in the area of 10 ha, the construction of other facilities for treatment of municipal waste, C&D waste, water and industrial waste is planned for producing new materials, composites and soils

• On location B, in the area of 5.0 ha, the implementation of activities of removal existing municipal waste landfill by a process of so-called "mining of waste is planned
ESTIMATES AND PLANS FOR PHASE 1

- The planning of processing quantities will be subject to planned processing capacity of technological equipment made for an urban area with 150,000 inhabitants and the treatment of up to 200,000 tones of waste per year in the area.

- The assessment of investment funds needed to implement the project for the first three pillars and circles, respectively, for Phase 1 of the project without the real-estate investment is estimated in total of EUR 30,0 million, for both Phases in total of EUR 50,0 million.

- Method of financing: own funds, bank loans, public-private partnerships, european development funds.

- Time plan foresees the construction and launch of Phase 1 of the project in the year 2017-2018, and for Phases 2 by 2020.
DESIGN AND PROCESS IMPLEMENTATION

For research and development in the field of process and information technologies and organizational procedures companies predominantly owned by the municipality

- Snaga, company for waste management and other municipal services, d.o.o.
- Energetika Maribor, public company, d.o.o.
- Nigrad, utility company, d.d.
- Mariborski vodovod, public company, d.d.
- Marprom, public company for urban transport, d.o.o.

established the Wcycle Institute Maribor; and today under the umbrella of the Institute the companies are preparing 18 projects for implementation in the field of circular economy on the basis of approved process design, with the aim to realize them until the end of 2020.

Some important priority development projects:
1 - Municipal waste / Process part

**Input materials:**
- Mixed municipal waste
- Bulky waste

**Mechanical sorting**

**Three types of outputs**
- **Recyclates** – neposredna predaja v predelavu
direct handover for processing (different types of metals, various types of plastic, paper)
- **Light fraction (LF)** – into further recovery process
- **Heavy fraction (TF)** – into further recovery process
Municipal waste is the most heterogeneous and diversified material source;
For circular economy the key is the optimization from source (households) to further use (recovery);
Logistics covers ecological and economic optimization of separate collection combination at the source and pre-processing in order to obtain materials for direct submission for recycling;
"Natural" connection between the source (households), processors and producers - new info flows
2 - Fillers and Composites / Process part

**Input materials:**
- Heavy fraction from sorting plant
- Construction waste
- Industrial waste
- Remainders from recycling of CDW

**Recovery procedures (R)**

**Output fractions:**
- fillers
- composites
2 - Fillers and Composites / Business Model

**Input Materials:**
Materials considered as waste will be the source for secondary raw materials, and will be taken from polluters at a cost for them, which will provide a source of income.

**Exclusion of mineral raw materials**

**Output Materials:**
Secondary raw materials produced through recovery processes, which will be marketed and will provide a source of income.

**IT Technologies**
- R&D Department
  - (system optimisation, researching and optimizing products, design, recovery processes, novel technologies etc.)
- Management & Legal
  - (optimisation of business model, marketing legal support, new policies and legislation, administrative and certification procedures)

**BIM**
- IT Department
  - (creation, operation and optimisation of online platforms, BIM)

**IT platform**
- Production Department
  - (production of secondary raw materials)

**CinderOSS**
- (one-stop-shop service)

**Construction Industry**
- C&D waste
- Excavated Materials
- Municipal Services & Industry
  - Fraction from MSW, Sewage Sludge, Industrial Waster

**Production processes**

**Extraction of Critical Raw**
3 - Energy use / Process part

**Input variables:**
- Excess heat from urban and production processes
- Non-contaminated biomass
- Energy sources from pyrolytic processes
- Biogas from fermentation

**Processes of energy utilization**

**Outputs:**
- Heat
- Electricity
3 - Energy use / Biomass concept

[Diagram showing district heating, heat storage, high-temperature heat pump, and cogeneration systems connected to energy facilities and landfill gas.]
4 –
Return line for recycled water / spatial concept

5 implementation phases

6 commercial connections
- business districts
- industrial zones

4 urban connections
- greenhouses
- urban gardens
- energy plants
- snowmaking

X other connections
- ........
CONCLUSION

• Waste management due to new requirements of environmental legislation and the lack of appropriate solutions is becoming a major global business opportunity

• The city of Maribor is setting high goals in the area of processing waste from all sources of their generation, which it wishes to achieve through the construction and operation of the pilot center for processing waste Wcycle Maribor

• Production operating companies for different service pillars are the companies mainly owned by the Municipality, which are the blood vessels of the city and which are obliged to carry out their public services for citizens and to provide the highest quality conditions of their residence and living in an urban area in general
GREENCYCLE at a glance

Strategic framework for circular economy
• We will develop a circular economy system for partner cities, building on available practices and existing low-carbon strategies.
• The project will provide implementation strategies and establish cross-sectoral cooperation and governance.

Toolbox for circular economy deployment
• We will develop a toolbox for the implementation of circular economy strategies.
• The toolbox will be tested by pilot project implementation in all partner cities.

Establishment of transnational circular economy marketplace – cooperation platform
• We will establish a transnational cooperation platform to provide marketplace for specific circular economy outputs and to provide cooperation platform for local and regional governments of AS presenting governance systems, best practices etc.

Testing the pilots
• Each municipality of the pilot-cities will implement its own pilot according to the needs and with help of the developed toolbox.
• The 5 pilot cities are: Freiburg, Goetzis, Maribor, Pays Viennois and Trento
Connecting
\[1 + 1 + 1 \geq 3\ldots\]