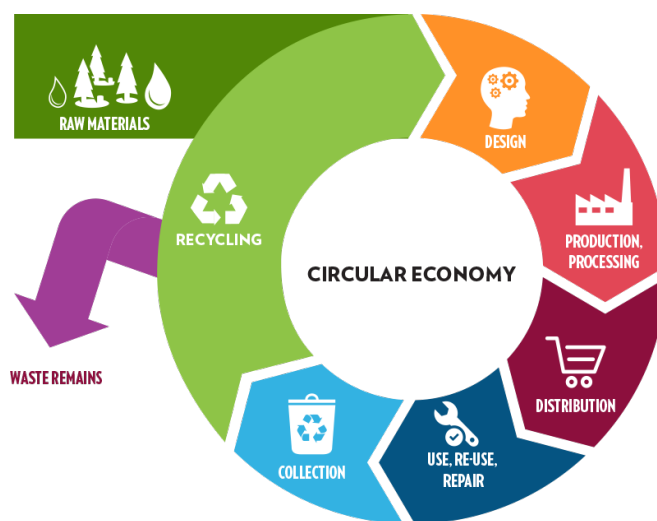


Circular Innovation and Resilient City Labs in the Adrion Region

Design waste management model of
Circular Innovation and Resilient City Lab -
CIRCLab SA-ŠA



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List of Abbreviations & Acronyms

BMC	Business Model Canvas
BMs	Business Models
CDW	Construction and Demolition Waste
CE	Circular Economy
CEAP	Circular Economy Action Plan
CEBMs	Circular Economy Business Models
CH	Channels
CIRCLab	Circular Innovation Resilient Cities Labs
CM	The Community Manager
CR	Customer Relationships
CS	Cost Structure
CS	Customer Segments
EAP	Environmental Action Plan
EC	European Commission
ENoLL	European Network of Living Labs
EU	European Union
IM	The Innovation Manager
JMD	Joint Ministerial Decision
KA	Key Activities
KP	Key Partnerships
KR	Key Resources
MS	Member State
RS	Revenue Streams
TSC	The Technical & Scientific Committee
VP	Value Proposition
WEEE	Waste Electrical and Electronic Equipment

0 Introduction

In 2014, around 4.6 million tons of waste were generated in Slovenia, of which slightly less than 2.8 million tons (59 percent) were generated in production activities, almost 1.4 million tons (29 percent) in service activities, and households however, they generated a little over half a million tons (12 percent) of all types of waste. 19 percent of all municipal waste was generated, just under 900,000 tons.

The amount of hazardous waste generated in 2014 was around 147,000 tons. Most hazardous waste was generated in manufacturing (51 percent) and 2 percent in households.

More than half a million tons of municipal waste were collected separately. In the last twelve years, the share of separately collected municipal waste ranged from 8.6 percent in 2002 to 64.7 percent in 2014, which means that Slovenia has made great progress in separate waste collection.

In 2002, almost 200,000 tons of waste were exported, and in 2014 about 680,000 tons, which means an increase in exports in this period by more than three times. Imports of waste increased by more than five times compared to 2002.

Slovenia generated the most construction waste and excavations (24 percent), followed by municipal waste (19 percent; of which 25 percent was packaging waste), waste from thermal processes (17 percent), and waste from waste treatment plants (15 percent). , wastes from wood treatment and processing, paper and leather production (7 per cent), shaping and surface treatment (7 per cent) and wastes from inorganic and organic processes and paints (7 per cent).

Around 283,000 tons of all types of waste were disposed of in landfills, which is almost three and a half times less than in 2002. 23 percent of the generated municipal waste was disposed of.

In Slovenia, waste disposal has decreased by 75 percent since 2006 (from 1,137,087 tons to 282,989 tons in 2014), namely at municipal utilities by 66 percent (from 840,338 tons to 282,989 tons in 2014) and at industrial by 91 percent (from 292,749 tons to 26,342 tons in 2014).

The number of landfills where waste was disposed of in an individual year also decreased significantly - in the period from 2006 to 2014 by 68 percent (from 60 to 19), namely the number of "municipal" landfills by 72 percent (from 43 to 12) and industrial by almost 59 percent (from 17 to 7).

Thus, Slovenia has made good progress in waste management in separate waste collection, reduction of waste disposal and increase in waste processing.

Slightly more than 3 million tons of waste were recycled (without backfilling and preparation for recovery or disposal), which represents 75 percent of all waste generated. About 7 percent of the waste was disposed of. In 2014, 49 percent of municipal waste was recycled.

The Waste Management Program and the Waste Prevention Program are combined in this document into an operational program, as an instrument of the Government of the Republic of Slovenia for fulfilling waste prevention, ensuring prescribed waste management and achieving waste management goals for 2020 and 2030 respectively.

1 Legal framework on solid waste management and circular economy in Slovenia

List of legal framework

1. **Environmental Protection Act / Zakon o varstvu okolja** (Uradni list RS, št. 39/06 – UPB, 49/06 – ZMetD, 66/06 – odl. US, 33/07 – ZPNačrt, 57/08 – ZFO-1A, 70/08, 108/09, 108/09 – ZPNačrt-A, 48/12, 57/12, 92/13, 56/15 in 102/15).
2. **Waste Regulation / Uredba o odpadkih** (Uradni list RS, št. 37/15 in 69/15)
3. **Regulations governing in detail the treatment of waste or shipments of waste / Predpisi, ki podrobneje urejajo obdelavo odpadkov ali pošiljke odpadkov:**
 - Uredba o odlagališčih odpadkov (Uradni list RS, št. 10/14, 54/15 in 36/16);
 - Uredba o emisiji snovi pri odvajanju izcedne vode iz odlagališč odpadkov (Uradni list RS, št. 62/08);
 - Uredba o sežigalnicah odpadkov in napravah za sosežig odpadkov (Uradni list RS, št. 8/16);
 - Uredba o izvajanju Uredbe (ES) št. 1013/2006 o pošiljkah odpadkov (Uradni list RS, št. 71/07);
 - Uredba o predelavi biološko razgradljivih odpadkov in uporabi komposta ali digestata (Uradni list RS, št. 99/13 in 56/15);
 - Uredba o obremenjevanju tal z vnašanjem odpadkov (Uradni list RS, št. 34/08 in 61/11);
 - Uredba o uporabi blata iz komunalnih čistilnih naprav v kmetijstvu (Uradni list RS, št. 62/08);
 - Uredba o predelavi nenevarnih odpadkov v trdno gorivo in njegovi uporabi (Uradni list RS, št. 96/14).
4. **Regulations that regulate the management of individual types of waste in more detail / Predpisi, ki podrobneje urejajo ravnanja s posameznimi vrstami odpadkov:**
 - Uredba o odpadnih oljih (Uradni list RS, št. 24/12);-
 - Uredba o ravnanju z biološko razgradljivimi kuhinjskimi odpadki in zelenim vrtnim odpadkom (Uradni list RS, št. 39/10);
 - Uredba o ravnanju z odpadnimi jedilnimi olji in mastmi (Uradni list RS, št. 70/08);
 - Uredba o ravnanju z odpadki, ki nastajajo pri opravljanju zdravstvene in veterinarske dejavnosti ter z njima povezanih raziskavah (Uradni list RS, št. 89/08);
 - Uredba o ravnanju z amalgamskimi odpadki, ki nastanejo pri opravljanju zdravstvene dejavnosti in z njo povezanih raziskavah (Uradni list RS, št. 89/08);
 - Uredba o ravnanju z odpadki, ki nastanejo pri gradbenih delih (Uradni list RS, št. 34/08);
 - Uredba o ravnanju z odpadki, ki vsebujejo azbest (Uradni list RS, št. 34/08);
 - Uredba o pogojih, pod katerimi se lahko pri rekonstrukciji ali odstranitvi objektov in pri vzdrževalnih delih na objektih, instalacijah ali napravah odstranjujejo materiali, ki vsebujejo azbest (Uradni list RS, št. 60/06);

- Uredba o ravnanju z odpadki iz rudarskih in drugih dejavnosti izkoriščanja mineralnih surovin (Uradni list RS, št. 43/08 in 30/11);
- Uredba o emisiji snovi in odstranjevanju odpadkov iz proizvodnje titanovega dioksida (Uradni list RS, št. 64/14);
- Uredba o odstranjevanju polikloriranih bifenilov in polikloriranih terfenilov (Uradni list RS, št. 34/08 in 9/09);
- Uredba o izvajanju Uredbe Evropskega parlamenta in Sveta ES o obstojnih organskih onesnaževalih (Uradni list RS, št. 4/05);
- Uredba o izvajanju Uredbe (ES) o prepovedi izvoza kovinskega živega srebra in nekaterih spojin in zmesi živega srebra ter varnem skladiščenju kovinskega živega srebra (Uradni list RS, št. 95/10).

5. Regulations governing compulsory public utility services / Predpisi, ki urejajo obvezne gospodarske javne službe:

- Odredba o ravnanju z ločeno zbranimi frakcijami pri opravljanju javne službe ravnanja s komunalnimi odpadki (Uradni list RS, št. 21/01 in 41/04 - ZVO-1);
- Uredba o načinu opravljanja obvezne državne gospodarske javne službe sežiganja komunalnih odpadkov (Uradni list RS, št. 123/04, 106/05 in 6/16);
- Uredba o načinu, predmetu in pogojih opravljanja obvezne državne gospodarske javne službe sežiganja komunalnih odpadkov na območju občin Savinjske regije (Uradni list RS, št. 109/05, 62/08 in 6/16);
- Uredba o metodologiji za oblikovanje cen storitev obveznih občinskih gospodarskih javnih služb varstva okolja (Uradni list RS, št. 87/12 in 109/12).

6. Regulations governing in more detail the extended liability of producers / Predpisi, ki podrobneje urejajo razširjeno odgovornost proizvajalcev:

- Uredba o ravnanju z embalažo in odpadno embalažo (Uradni list RS, št. 84/06, 106/06, 110/07, 67/11, 68/11 - popr., 18/14, 57/15 in 103/15);
- Uredba o odpadni električni in elektronski opremi (Uradni list RS, št. 55/15);
- Uredba o ravnanju z baterijami in akumulatorji ter odpadnimi baterijami in akumulatorji (Uradni list RS, št. 3/10, 64/12, 93/12 in 103/15);
- Uredba o izrabljenih vozilih (Uradni list RS, št. 32/11, 45/11 - popr. in 26/12);
- Uredba o ravnanju z izrabljenimi gumami (Uradni list RS, št. 63/09);
- Uredba o ravnanju z odpadnimi nagrobnimi svečami (Uradni list RS, št. 78/08);
- Uredba o ravnanju z odpadnimi zdravili (Uradni list RS, št. 105/08);
- Uredba o ravnanju z odpadnimi fitofarmaceutskimi sredstvi, ki vsebujejo nevarne snovi (Uradni list RS, št. 116/06).

7. Regulations governing the environmental tax for environmental pollution / Predpisi, ki urejajo okoljsko dajatev za onesnaževanje okolja:

- Uredba o okoljski dajatvi za onesnaževanje okolja zaradi odlaganja odpadkov na odlagališčih (Uradni list RS, št. 14/14);
- Uredba o okoljski dajatvi za onesnaževanje okolja zaradi nastajanja odpadne embalaže (Uradni list RS, št. 32/06, 65/06, 78/08 in 19/10).

8. Other regulations affecting the waste management system / Drugi predpisi, ki vplivajo na sistem ravnanja z odpadki:

- Uredba o preprečevanju in zmanjševanju emisije delcev iz gradbišč (Uradni list RS, št. 21/11);

- Uredba o varstvu voda pred onesnaževanjem z nitrati iz kmetijskih virov (Uradni list RS, št. 113/09, 5/13 in 22/15);
- Uredba o emisiji snovi in toplote pri odvajanju odpadnih voda v vode in javno kanalizacijo (Uradni list RS, št. 64/12, 64/14 in 98/15).

9. Regulations on waste no longer in force / Predpisi o odpadkih, ki ne veljajo več:

- Pravilnik o ravnanju z odpadki (Uradni list RS, št. 84/98, 45/00, 20/01, 13/03, 41/04 – ZVO-1 in 34/08), ne velja od 22. 4. 2008;
- Uredba o odlaganju odpadkov na odlagališčih (Uradni list RS, št. 32/06, 98/07, 62/08, 53/09 in 61/11), ne velja od 30. 7. 2011;
- Uredba o odlaganju odpadkov na odlagališčih (Uradni list RS, št. 61/11, 108/13 in 10/14), ne velja od 22.2.2014;
- Uredba o odpadkih (Uradni list RS, št. 103/11), ne velja od 30. 5. 2015;
- Pravilnik o obratovalnem monitoringu onesnaževanja podzemne vode (Uradni list RS, št. 49/06, 114/09 in 53/15); ne velja od 1. 8. 2015, uporaba pa je delno podaljšana;
- Uredba o ravnanju z odpadno električno in elektronsko opremo (Uradni list RS, št. 107/06, 100/10 in 55/15), ne velja od 8. 8. 2015;
- Uredba o sežiganju odpadkov (Uradni list RS, št. 68/08 in 41/09), ne velja od 20. 2. 2016;
- Uredba o emisiji snovi v zrak iz sežigalnic odpadkov in pri sosežigu odpadkov (Uradni list RS, št. 50/01, 56/02, 84/02, 41/04 - ZVO-1 in 76/10), ne velja od 20. 2. 2016.

10. Other regulations and non-legislative acts / Drugi predpisi in nezakonodajni akti:

- Zakon o dohodnini (Uradni list RS, št.13/11 - UPB, 9/12 - odl. US, 24/12, 30/12, 40/12 - ZUJF, 75/12, 94/12, 52/13 - odl. US, 96/13, 29/14 - odl. US, 50/14, 23/15 in 55/15);
- Zakon o državni statistiki (Uradni list RS, št. 45/95 in 9/01);
- Zakon o gospodarskih javnih službah (Uradni list RS, št.32/93, 30/98 - ZZLPPO, 127/06 - ZJZP, 38/10 - ZUKN in 57/11 - ORZGJS40);
- Zakon o kemikalijah (Uradni list RS, št. 110/03 - UPB, 47/04 - ZdZPZ, 61/06 - ZBioP, 16/08, 9/11 in 83/12 - ZFfS-1);
- Zakon o lokalni samoupravi (Uradni list RS, št. 94/07 - UPB, 76/08, 79/09, 51/10, 40/12 - ZUJF in 14/15 - ZUUJFO);
- Zakon o prostovoljstvu (Uradni list RS, št. 10/11, 16/11 - popr. in 82/15);
- Uredba o zelenem javnem naročanju (Uradni list RS, št. 102/11, 18/12, 24/12, 64/12, 2/13, 89/14 in 91/15 – ZJN-3);
- Strategija pametne specializacije: Slovenska strategija pametne specializacije – S4 (objavljena na spletnih straneh www.svrk.gov.si in www.eu-skladi.si).

1.1 Circular economy principles and key terms

About 7 years ago, Slovenia began its activities of introducing and getting to know the concept of the circular economy. Thus, in 2015, the government made some commitments to encourage development in this direction.

SLOVENIA AND THE CIRCULAR ECONOMY

The Circular Economy is one of Slovenia's strategic development priorities. It is closely tied to the Sustainable Development Goals (SDG's) and included in key national documents such as A Vision for Slovenia in 2050¹ and Slovenian Development Strategy 2030² as well as in Slovenia's Smart Specialisation Strategy. The strategy's main goal is improved quality of life for everyone.

The involvement of multiple stakeholders with the goal of facilitating the transition from a linear to a circular economy has been going on since 2016, starting with the Partnership for Slovenia's Green Economy project, taking place under the patronage of the Prime Minister dr. Miro Cerar and uniting over 3000 partners. The Republic of Slovenia is also a member of the CE100 Ellen MacArthur Programme, a leading global foundation in the field of Circular Economy. We realize that the transition from a linear to a circular economic model is not a choice, but a necessity. In that context, the Roadmap towards a Circular Economy in Slovenia was created and represents a process of identification and collection of a wide array of circular practices and initiatives, allowing us to map out activities that should be directed by the Government and carried out by the stakeholders. The aim of this Roadmap is to navigate us towards this goal and to make the obstacles on the way less daunting. So the intention to develop a circular lab in Savinjska region to follow just this goal.

We realize that the transition from a linear to a circular economic model is not a choice, but a necessity.

We have based our national roadmap on the so-called "Circular Triangle". The triangle unites three inseparable elements – Circular Economy (business models), Circular Change (government policies) and Circular Culture (citizens). These three aspects are interdependent and are at the core of systemic change. We especially emphasize the importance of Circular Culture, since without reconsidering our values, creating new narratives and changing our behavioural patterns, we cannot hope for a change in the economic models, or corresponding shifts on a governmental level. Circular Culture is the aspect that seems to hide the greatest transformative capital for Slovenia.

In the creation of this our roadmap, we were able to tap into a great asset: the 2014 "European Circular Economy Package," was an initiative by the then Commissioner for the Environment, Dr Janez Potočnik. With him as part of the roadmap team, we have been involved in the latest debates and have been introduced to reports and achievements in the field of the Circular Economy not only from Europe, but from all over the world. When operating within the

¹ <https://slovenija2050.si/>

² http://www.svrk.gov.si/fileadmin/svrk.gov.si/pageuploads/Osnutek_SRS2030_-_javno_posvetovanje.pdf

macro-regional concept of EU development, it is wise to use every tool at our disposal, including our ties to negotiation and decision-making circles on a European level.

The Roadmap shows the way, it opens up a space for debate and for more detailed definitions of priority areas and activities, which, if given appropriate support, transdisciplinary collaboration and suitable regulations, will draw the circular maps of our country and our planet.

2 National strategy and policies for waste management

2.1 National Waste Management Plan

WASTE MANAGEMENT PROGRAM and WASTE PREVENTION PROGRAM OF THE REPUBLIC OF SLOVENIA (in accordance with the requirements of the Decree on Waste, the Decree on the Management of Packaging and Packaging Waste and the Decree on Landfills)

https://www.gov.si/assets/ministrstva/MOP-programi/op_odpadki.pdf

SUMMARY

The main purpose of the operational program is that by implementing this program Slovenia follows the strategic guidelines of European policies, which, while emphasizing waste prevention, give priority to waste preparation for reuse and recycling over energy recovery of waste, and waste recovery to waste disposal if and where this represents the best option from the point of view of environmental protection, taking into account technical feasibility and economic feasibility.

With the 7th EAP, the EU is committed to stepping up efforts to safeguard our natural capital, promote low-carbon growth through resource efficiency and innovation, and protect human health and well-being while respecting the natural limitations of our planet. Particular emphasis among the priority objectives is also on turning waste into a resource through greater prevention, reuse and recycling, and the abandonment of wasteful and harmful practices such as landfilling.

By 2020, in accordance with current regulations, it is necessary to provide preparation for reuse and recycling of at least 50 percent by weight for at least waste paper, metals, plastics and glass from municipal waste, and preparation for reuse, recycling and material recovery for at least 70 percent of the mass of non-hazardous construction and demolition waste, excluding natural waste materials, and achieve that in 2020 less than 35 percent of biodegradable components of municipal waste will be disposed of at all landfills in Slovenia compared to the amount of biodegradable components disposed of in 1995. show that Slovenia is meeting the prescribed requirements or is well on its way to meeting them by 2020.

The European Commission adopted a new ambitious package of measures in December 2015, including most of the amendments on waste, in order to help European businesses and consumers transition to a more circular and thus more competitive economy in which resources are used more sustainably. The measures are intended to help "close the loop" of product life cycles and bring benefits to both the environment and the economy.

The package also brings amended legislative proposals on waste with ambitious targets: the EU's overall target by 2030 is 65% recycling of municipal waste, 75% recycling of packaging waste and a binding target to reduce landfill waste to a maximum of 10% municipal waste.

In order to achieve these goals, it will be necessary to take several measures and ensure a clear and stable regulatory environment, adequate data capture and analysis, reporting, renewal of environmental taxes, provide a dedicated financial source by enforcing the polluter pays principle, redefine the principle of extended producer responsibility take an initiative on raising awareness of waste prevention, product reuse and the benefits of recycling.

The goals in the part of the Waste Management Program are divided into general and specific goals that we want to achieve with this program. The general objectives include the prevention of waste and the prevention of illegal waste management, especially dumping into the environment. Specific objectives and measures to achieve these objectives relate to municipal waste, industrial waste and waste from other activities, as well as construction waste, excavations and mining waste.

In order to achieve the overall goals, the waste management program defines 31 measures or a total of 49 sub-measures that require the participation of other departments, especially MGRT, MAFF, MH and MPA.

Objectives of the Waste Management Program and the Waste Prevention Program of the Republic of Slovenia

I. General goals:

1. Prevent or reduce the adverse effects of waste generation and management
2. In order to achieve a recycling society with a high level of efficiency in the use of natural resources, ensure that waste management is given the priority order of waste prevention and management in accordance with the waste management hierarchy laid down in the regulation governing waste:
 - direct the collected waste to recycling,
 - waste that cannot be recycled and exceeds the prescribed requirements for landfilling, is directed to recovery into solid fuel or heat treatment, preferably using energy,
 - prohibit the incineration of untreated mixed municipal waste,
 - reduce waste disposal exclusively to those that cannot be recycled or processed into solid fuel or heat treated.
 - At the same time, it is necessary to ensure proper keeping of records, reports, tracking and analysis of waste management data, taking into account:
 - upgrade of records from the register of environmental protection and waste information system (issued certificates and permits, reporting on waste generation, processing and disposal): monitoring, control and analysis of data and reports of taxpayers and holders of common systems.
3. Ensure Slovenia's independence in waste disposal and processing of mixed municipal waste, taking into account the possibility of cooperation with other Member States due to the need for specialized facilities for the disposal of certain types of waste.

II. Special goals:

1. Specific objectives related to municipal waste.
2. Specific objectives related to waste from industry and other activities.

3. Specific objectives related to construction waste and excavation and mining waste.

In addition to the Waste Management Program, the Operational Program also includes the Waste Prevention Program, which deals with waste prevention in companies, households and the public sector and the following waste streams: construction waste, waste lightweight plastic bags, bulky waste, food waste, textile waste and clothing.

The measures of the waste prevention program are based on assessments of scenarios for the development of significant waste streams from the waste management program and recycling targets.

The prevention program contains the following 8 long-term goals and 34 measures.

- I. Construction waste prevention
- II. Waste prevention in companies
- III. Household waste prevention
- IV. Household waste prevention-plastic bags
- V. Prevention of food waste
- VI. Prevention of bulky waste
- VII. Public Sector Waste Prevention (MESP)

It is important that the program achieves the goals we have set for ourselves, so that this program can be an important and effective contribution to environmental protection. Plans and programs must be regularly reviewed and evaluated at least every 6 years in accordance with applicable law. Given that the targets set for 2020 are approaching, the assessment of the status of targets, measures and forecast trends for the next period will be evaluated for the next year on the basis of ARSO data and their analyzes.

2.2 Regional Waste Management Plan

Will be added later in the process

2.3 Local Waste Management Plan

Local municipalities of Velenje, Šoštanj and Šmartno ob Paki have waste collection and management regulated in such a way that a concession has been granted to private company PUP-Saubermacher for the collection of comunal waste and transport of part of this waste to the regional center CERO Celje, where they hand over mixed waste and bulky waste and biodegradable waste for further treatment within the MBO and composting plant and disposal. The light fraction from MBO goes to co-incineration in the heating plant in Celje.

MOV website, published in the Official Gazette: <https://www.velenje.si/e-obcina/uradni-vestniki-mov>

A waste management concession has been granted to PUP Saubermacher, d.o.o. (collection, handling of municipal waste within Collection point Velenje and delivery of mixed municipal, bulky and bio waste for processing in RCERO Celje (concession granted by SIMBIO d.o.o.)

The legislative concession for PUP Saubermacher is covered by the Ordinance on Public-Private Partnership in the Field of Waste Management (Official Gazette of the Municipality of Velenje, No. 11/2008, 12/2008, 20/2009 and 21/2009;

Technical Rules for Waste Management in the Municipality of Velenje Velenje, the Municipality of Šoštanj and the Municipality of Šmartno ob Paki 20/2009 and the Concession for Treatment and Disposal: Ordinance on the concession for the provision of local public utility services for the disposal of residues from processing or disposal of municipal waste for the Municipality of Velenje, Official Gazette MOV, No. 12/2009
<http://arhiva.velenje.si/vestniki/2009/vestnik%2012g-2009.pdf>

The new technical rules were adopted in 2018 "Technical rules on municipal waste management in the Municipality of Velenje, the Municipality of Šoštanj and the Municipality of Šmartno ob Paki"

<http://arhiva.velenje.si/vestniki/2018/Vestnik%2011-2018%20objava.pdf>

Ordinances are published in the Official Gazette by year on the MOV website

The key document is the Ordinance on Public-Private Partnerships in the Field of Waste Management, Official Gazette of the Ministry of the Environment, No. 11/2008, which is available at http://arhiva.velenje.si/vestniki/2008/Vestnik_11-2008.pdf

2.4 Financial/Investment Opportunities

Waste Economic incentives for waste management of packaging waste include the cost of recycling already in the new product. The waste therefore has a specific value (deposit), which is obtained if the waste is returned to the seller or an authorized waste collector who has a contract with the seller (producer).

There are also other funding frameworks:

- **ECO FUND** (Slovenian Environmental Public Fund) provides loans for the installation or reconstruction of systems, technological procedures and devices for separate collection, treatment, recovery and reuse of waste,
- **LAS** (Local Action Group): within the Strategy, the Environmental Protection and Nature Conservation is defined as one of the key objectives, within which applicants

are provided with funds for activities focusing on raising awareness of separate waste collection and sustainable waste management.

- **Slovenian Regional Development Fund**
- **Communal Chamber**
- **Utility companies**

Broader regulatory actions would be needed to increase the involvement of the industry into solving the waste problem and stimulation circular economy.

3 Technological barriers

We have relatively well managed collection of waste, but the collected waste is piling up because of lack of capacities for the end part of recycling. This is partly due to regulatory deficiencies (government is expected to try to better regulate this issue in the future) but also due to physical limitations of waste recycling factories.

One offered solution for diminishing the stockpiles of waste is burning waste for fuel in the existing capacities, but the problem here is adequate filtering of dangerous particles and the need to reach higher temperatures which can only be provided at specific locations that can't process the available quantity of waste. At the moment there is an issue of co-burning waste with coal in the local Coal-fueled energy plant Šoštanj. They are experimenting with co-burning but the issue once again remains the dangerous particles released into the air, since the filtering system of the plant isn't specifically built for burning waste.

The existing system of separate waste collection has many shortcomings, as it is not consistent in separating waste with regard to the possibility of recycling. Containers for separating waste could in principle be eliminated, as they serve nothing but the mediator in this case, the packaging companies. Separation could be just as adequately if not more efficiently achieved by modern technologies of separation of waste at the waste treatment centers (if we observe data about structure of mixed waste in presented by sorting analysis data in chapter 1.3 we can see that a significant part of the waste remains unsorted despite efforts for separation at the source, not to mention it needs to be sorted into further categories anyway). If we manage to reach a change in the collection of packaging in Slovenia, we also need to consider carefully procedures of recording the quantities of waste for reporting and thus meeting the objectives of the Waste Regulation. The system of separate waste collection, which must be designed primarily as an aid to facilitate recycling, should be designed in a meaningful way, especially from an economic point of view. From a technological point of view, care must be taken to ensure that the same container does not contain waste that could cause ecological, health or technological problems in recycling. For example, if infectious waste were to be found among waste glass (medical waste), or if a car battery full of sulfuric acid were to be found among textile waste, this would cause considerable difficulties in further handling procedures and problems would arise.

There are also risks connected to sanitary conditions of warehouses for waste and appropriate measures in case of fire. The latter has been confirmed as a huge risk in recent years with several fires breaking out in waste collection warehouses which can be especially dangerous for warehouses collecting hazardous waste.

4 Needs analysis for the Region of Savinjsko-Šaleška region

By increasing accessibility of waste collection locations, awareness-raising of general population and proper sorting methods waste management managers achieved their goals at the start of the collection chain but that was limited in the continuation of the chain by

technical limitations (capacities of waste management centers and their technology, specifically in the part of re-cycling and preparing for re-use) and on the other hand there is a problem with the set pricing policy and logistics established by legislation. When municipalities are tied to a regional center, they are long-term dependent on waste management companies, no longer have a direct influence on management policy and a very limited role in pricing policy, which they can minimally regulate within the standard of care.

When setting up the existing concept, there was no real idea of what the actual material flows mean when introduced and considered more consistent separate collection at source. The Decree on the Management of Packaging Waste, by enforcing extended responsibility for municipal packaging and the scheme of packaging companies, which consequently arose from market pressures, does not ensure normal operation for sorting plants, which in Slovenia are at a relatively low technological level. This leads to transnational movement of waste which prevents the policy of shortening the transport chain and localization of circle economy. It also increases dependency on external factors beyond local environments and national control. The problem is increasing which can be shown in the chart below:

The main problems in local environment (Municipality of Velenje) as well as regionally (Eastern Cohesion Region/Savinjska Statistical Region) and Slovenia are the end part of the recycling chain, due to limited capacities for transforming specific waste into materials. The issue is currently partly solved by exporting waste bus as was learnt from experience this can't be a long-term solution – this makes Slovenia dependent on changes in other countries regulations and policies.

5 Profile of the CIRCLab SA-ŠA

5.1 Implementation of the Joint Model

The development and implementation of CIRCLab SA-ŠA will be made first with mapping of stakeholders and setting strong core of the CIRCLab primary stakeholders. With workshops and events, we will promote and practically support the concept of circularity to develop secondary group of stakeholders that will help design and develop the business model of CIRCLab.

One of the aspects that we will follow with CIRCLab is the concept of living laboratory. We believe the promotion and implementation of the CIRCLab needs to be achieved with new solutions focused approach that will dynamically address the wide range of focus groups and give them the information on circular concept of thinking and living.

With already established facilities of core stakeholder we will develop physical space to establish the CIRCLab, which will consist of event area, coworking office area and maker space area. This will help develop vibrant ecosystem of business, public and private coexistence of supporters and stakeholders of CIRCLab.

5.2 Organisational Structure

5.2.1 Description of positions and roles

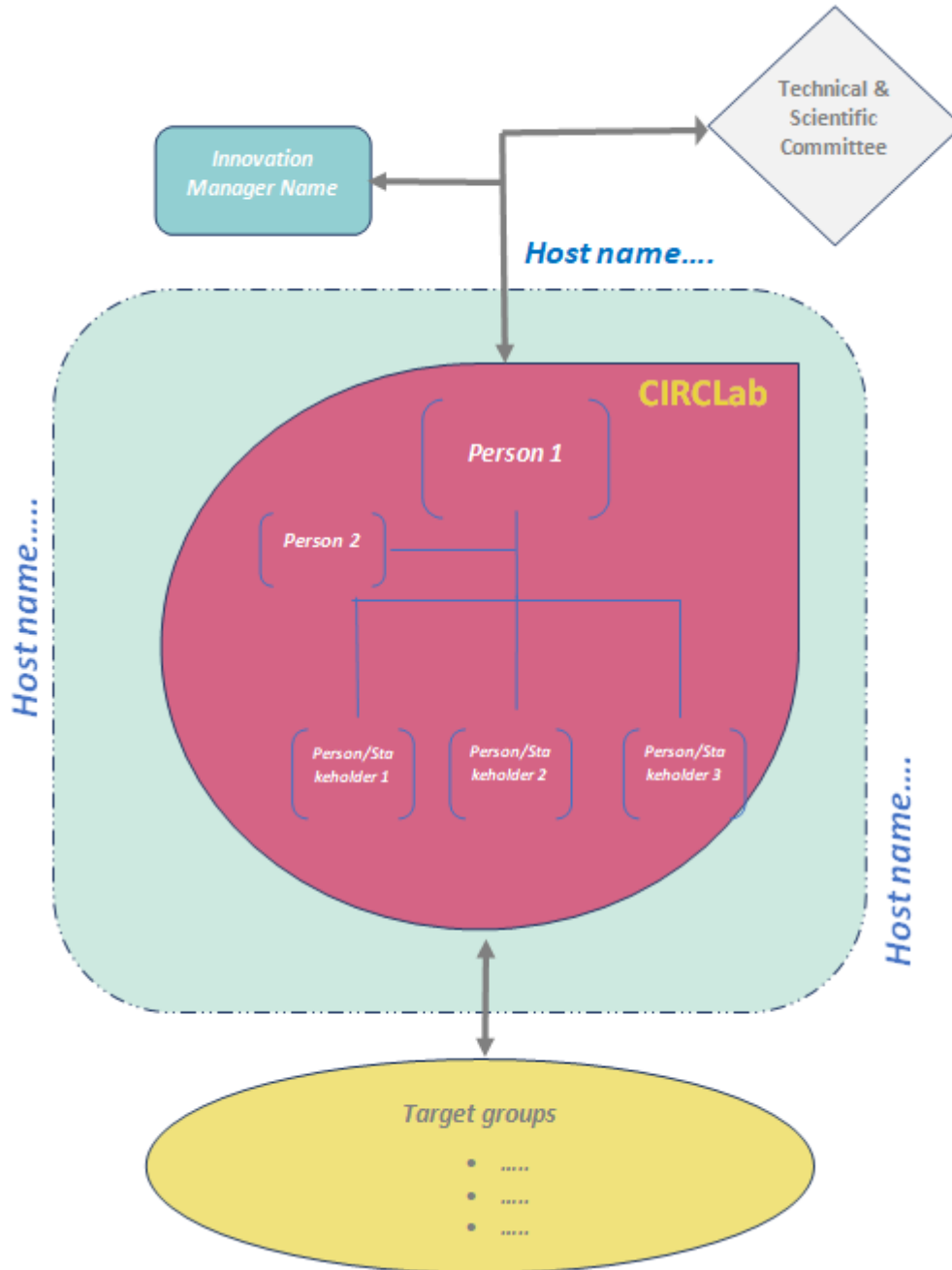
With our partner of local group of social innovation entrepreneurs, we will develop a founding conditions for establishment of CIRCLab.

Host: Društvo Pristop, so.p.

Community manager: Franci Pečnik, Društvo Pristop, so.p.

Host members: Šolski center Velenje, RACEKOGO, d.o.o., Zavod ŽIVIM, ZEOS, d.o.o.

5.2.2 Organisational Plan



5.3 CIRCLab Identity – Strategy formulation

- The main goal of the CIRCLab SA-ŠA is establish a living lab that will be user-centred research and open innovation platform. That will connect stakeholders of diverse background (slovenian business subjects, educational and research institutions (RDI), non-governmental organisations and other interested parties, in collaboration with the state). We will map the existing landscape of common needs for such a platform in the region and develop ground to plan activities.
- **Objectives and activities in 2021 and 2022:**
 - Mapping of stakeholders
 - Public event of CIRCLab - press conference
 - Workshop 1 - coworking
 - Workshop 2 - making
 - Workshop 3 - marketing
 - Circular conference
 - Days of Circularity - youth
 - Days of Circularity - citizens
 - Days of Circularity - elderly
 - Days of Circularity - entrepreneurs and craftmans
 - Days of Circularity - public sector and NGOs
 - Pop up Maker space
 - Pop up Circular lab
 - Pop up Circular CORPs
- **Stakeholder mapping**
 - Občina Šoštanj
 - Center ponovne uporabe
 - ZEOS, d.o.o.
 - SKAZA, d.o.o.
 - Občina Velenje
 - Društvo Pristop, so.p.
 - Zavod ŽIV!M
 - Šolski center Velenje
 - Turna, d.o.o.
 - SAŠA Inkubator
 - Podjetniški klub Šaleške
 - SRIP krožno MB
 - Circular change
 - 3ZEN
 - Zavod KNOF

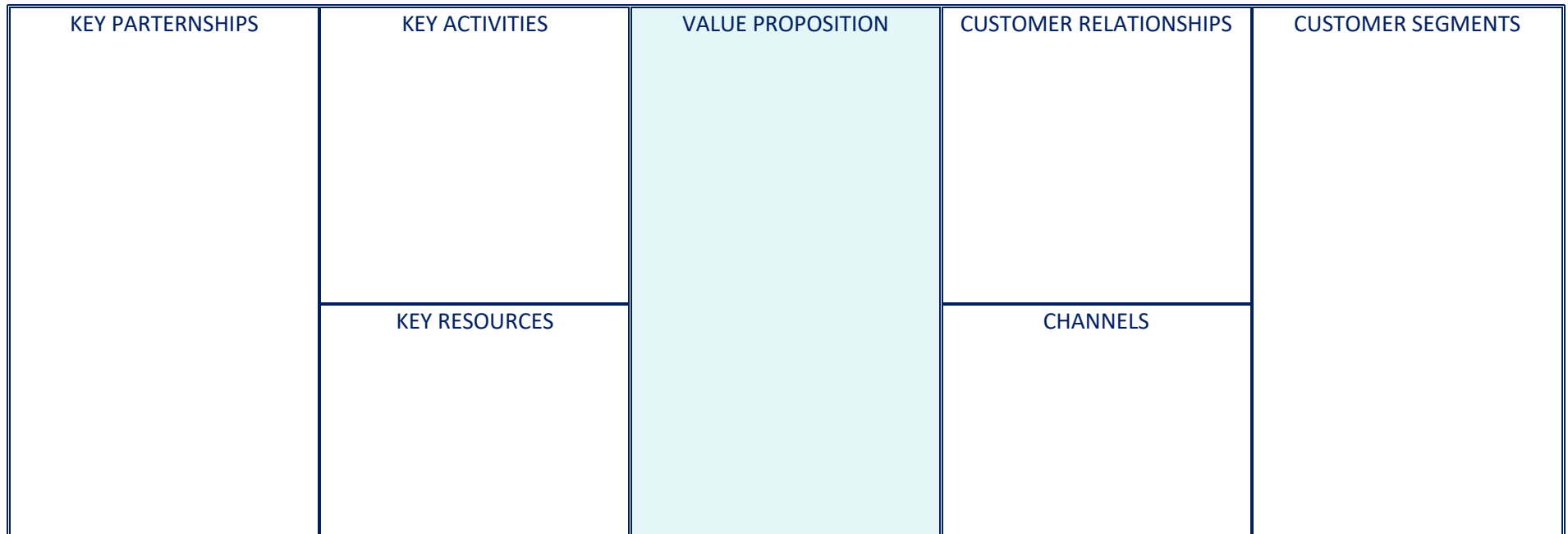
- ZSES
- TEŠ
- Naš Čas
- VTV
- SA-ŠA ORA
- RACEKOGO, d.o.o.
- KOCEROD d.o.o.

● **CIRCLab objectives and Stakeholders involved**

Stakeholder Name	Contact person details	Power/Influence (when applicable)	Key interest/Impact (when applicable)	Communication type	Frequency of communication
Občina Šoštanj	Tjaša Rehar		Support and promote circular economy and business models	email, telephone	monthly
Center ponovne uporabe			Support and implement circular bussiness models, network for other stakeholders of CIRCLab	email, telephone	monthly
ZEOS, d.o.o.	Emil Šehič	X	Support and implement circular bussiness models, network for other stakeholders of CIRCLab	email, telephone	weekly
SKAZA, d.o.o.	Janja Burkelc		Support and implement circular bussiness models, network for other stakeholders of CIRCLab	email, telephone, video conference	monthly
Občina Velenje	Mirjana Britovšek		Support and promote circular economy and business models	email, telephone	monthly
Društvo Pristop	Franci Pečnik	X	Develope, research and manage the solutions for activities of CIRCLab	email, telephone, video conference	weekly
Zavod ŽIVIM	Darja Pečnik		Support and implement circular bussiness models, network for other stakeholders of CIRCLab	email, telephone, video conference	monthly

Šolski center Velenje - ŠCV	Igor Doler	X	Develop, research and manage the solutions for activities of CIRCLab	email, telephone, video conference	weekly
Podjetniški klub	Vlado Pogač		Support and promote circular economy and business models	email, telephone, video conference	monthly
Turna, d.o.o.	Aleš Plešnik		Support and implement circular bussiness models, network for other stakeholders of CIRCLab	email, telephone, video conference	monthly
SAŠA ORA	Biljana Škarja		Support and promote circular economy and business models	email, telephone, video conference	monthly
RACEKOGO, d.o.o.	Luka Zajec	X	Develop, research and manage the solutions for activities of CIRCLab	email, telephone, video conference	weekly

Circular Model Canvas (based on the objectives of the Lab investigation of the new business models, how and which new circular business models could be implemented, key resources needed, benefits etc.)



COSTS

IMPACTS (REVENUES)

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5.4 CIRCLab Planning and Implementing Activities

A/A	Name of the action	Brief description	Subtasks undertaken	Responsible person	Others involved	Start of subtask	End of subtask	Expected outcome	Comments	Monitoring (relevant indicator, frequency)
	Mapping of stakeholders	Preparation of materials for CIRCLab Visiting potential stakeholders Process of acceptance and roles in CIRCLab								
	Public event of CIRCLab - press conference	Kick-off of the CIRCLab								
	Workshop 1 - coworking	Development of CIRCLab - workshop for designing the operational plan to work on activities of CIRCLab Roles and expectations SWOT analysis Business plan of CIRCLab								

	Workshop 2 - making	Development of CIRCLab - workshop for designing of living lab facility of "maker space" or practical aspect of CIRCLab								
	Workshop 3 - marketing	Development of CIRCLab - workshop on development of marketing strategy to develop CIRCLab in the region								
	Circular conference	Promotion and stakeholders mapping State of the art in Circular Economy Networking for CIRCLab Presenting outcomes from workshop 1,2,3 - Development phase								
	Days of Circularity - youth	Event for young circular chnagemaker - promotion of circular economy, skills in theory of CE, skills in practical process of CE (maker space workshop sessions)								
	Days of Circularity - citizens									



Days of Circularity - elderly										
Days of Circularity - entrepreneurs and craftmans										
Days of Circularity - public sector and NGOs										
Pop up Maker space	Event to prototype the idea od a Maker space in the proposed space									
Pop up Circular lab	Event to prototype the idea of netwokring in CIRCLab i(n the proposed space)									
Pop up Circular CORPs	Event to prototype the idea of netwokring in CIRCLab for industry and companies and corporations									

Time Plan

	Name	Responsible Person	Start	End	Dur	2020*			2021*														
						M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15			
Action 1																							
Subtask 1						■																	
Subtask 2						■	■																
Subtask 3							■																
Subtask 4																							
Action 2																							
Subtask 1							■	■	■	■													
Subtask 2								■	■	■	■	■	■	■	■	■	■	■	■	■			
Subtask 3									■	■	■	■	■	■	■	■	■	■	■	■			
Subtask 4																					■		
Action 3																							
Subtask 1							■	■	■	■													
Subtask 2								■	■	■	■	■	■	■	■	■	■	■	■	■			
Subtask 3																					■		
Subtask 4																					■		

5.5 CIRCLab Monitoring

- Description of the indicators for monitoring the progress of the lab will be indicated later in the process.

6 References

Ellen MacArthur Foundation. (2013a). Towards the Circular Economy. Economic and Business Rationale for an Accelerated Transition. Retrieved February 10, 2020, from: <https://tinyurl.com/hzfrxvb>.

WASTE MANAGEMENT PROGRAM and WASTE PREVENTION PROGRAM OF THE REPUBLIC OF SLOVENIA, from:

7 Annex