



ROADMAP TOWARDS THE CIRCULAR ECONOMY IN SLOVENIA



REPUBLIKA SLOVENIJA
VLADA REPUBLIKE SLOVENIJE



REPUBLIKA SLOVENIJA
MINISTRSTVO ZA OKOLJE IN PROSTOR



Circular Change



KROŽNO GOSPODARSTVO
SLOVENIJE
CIRCULAR ECONOMY
OF SLOVENIA



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DRAWING THE ROADMAP

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 2050**¹ and **Slovenian Development Strategy 2030**² 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** 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.

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

NATIONAL AND GLOBAL CHALLENGES

The process of the Circular Transition is a systemic process. The interdependence of the various fields, sectors, regions, countries and continents represents a challenge that we, as a civilization, have never had to face before. **We require planetary perspective, global leadership and inclusive management.** We also need clearly-outlined national priorities and goals, which should be easily measurable and internationally comparable. We are in a phase of discovery, exploration and innovation. This is why **practice exchange is crucial** – both good and bad, accompanied by dialogue, a dialogue in which we truly hear each other, and not merely listen. The process of creation of this Roadmap was aimed at opening up a space for this kind of involvement and bonding of circular stakeholders.

On a global level, we are faced with limited natural resources and a growing population. How are we to preserve nature, the biological diversity and existence of all living creatures with our current, often extremely irresponsible methods of exploitation of natural resources? **The rules of good management** dictate that **resources should be retained within the manufacturing and consumption cycles for as long as possible to retain the value** of products, raw materials and material resources, and to minimize the production of waste. It is important that the products be designed

¹ <https://slovenija2050.si/>

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



with that in mind – how to retain value for as long as possible, so that they can be maintained, repaired, upgraded, modified and, in the final step, recycled. It is necessary to **alter the models of manufacturing and consumption**. It is also crucial that we **manage our land better, as currently, over 30% of it is in a state of degradation³, while at the same time, we discard one third of all the food that we produce⁴.**

INNOVATIVE, COMPETITIVE, CIRCULAR

With the understanding that there is no one single formula, we have **traced the priority areas for Slovenia's Circular Transition, based in part on extant examples of good practice, put together recommendations and, most importantly, we have sparked the first few fires of constructive dialogue** and started forming connections between the various stakeholders, since a transition is only possible if we work together and in unison. **Regional consultations and meetings with stakeholders have provided us with the core information for the creation of this Roadmap.** We have confirmed

that, by collaborating, we can reconcile and connect the nodes that can accelerate this transition. This means that we must know Slovenia intimately, understand what our competitive advantages are, what differentiates us from, for example, Finland or the Netherlands – countries that have served as models for the formation of this Roadmap. **What is our competitive advantage?** How is being “green” part of our DNA? Where can we serve as examples, what makes us harbingers of change? How can we evaluate the transition to a Circular Economy strategically and systemically, and how can we become part of the European and global contemporary trends?

In all this, the Government plays a crucial role – by taking concrete and effective cross-sectoral measures

it has the potential to support the key points that represent the potential for a Circular Slovenia on local, regional and national levels, and by reinforcing its involvement in the Strategy of Smart Specialization and the established Strategic Research and Innovation Partnerships, as well as to continue actively working on a comprehensive Slovenian circular transition in collaboration with Europe.

Regional consultations and meetings with stakeholders have provided us with the core information for the creation of this Roadmap.

THE UNIQUENESS OF THE SLOVENIAN CIRCULAR TRANSITION

We have based this 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

³ United Nations Convention to Combat Desertification, 2017

⁴ Food and Agriculture Organization of the United Nations, 2017



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 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 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.

This is our first step. **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.

The Roadmap Team



The Roadmap was commissioned by the Ministry of the Environment and Spatial Planning of the Republic of Slovenia. It was created as part of the activities of the Office of the Prime Minister of the Republic of Slovenia dr. Miro Cerar, the coordinator of the Partnership for Green Economy of Slovenia, with the goal of implementing the strategic orientation of the Government of the Republic of Slovenia to transition to a circular economy, adopted at a special government session, dedicated to circular economy in November 2016*. The government session was joined by dr. Janez Potočnik, the former European Commissioner for the Environment.

The leader of the interdepartmental group of the Partnership for Green Economy of Slovenia is Tadej Slapnik, Office of the Prime Minister. Janja Kreitmayer McKenzie MSc, Ministry of the Environment and Spatial Planning is the deputy leader. Group members are Lidija Stebernak, Ministry of the Environment and Spatial Planning, Uroš Vajgl, Ministry of Foreign Affairs, Aleš Cantarutti, Ministry of Economic Development and Technology, Tilen Božič, Ministry of Finance, Andreja Barle Lakota, PhD, Ministry of Education, Science and Sport, Tanja Bogataj MSc, Ministry of Public Administration, Klement Potisek MSc, Ministry of Infrastructure, Tanja Strniša MSc, Ministry of Agriculture, Forestry and Food, Peter Pogačar, Ministry of Labour, Family, Social Affairs and Equal Opportunities and Franc Matjaž Zupančič, Government Office for Development and European Cohesion Policy.

* http://www.vlada.si/medijsko_sredisce/porocila_za_javnost/porocilo_za_javnost/article/delovni_posvet_vlade_o_kroznem_gospodarstvu_58852/

I. INTRODUCTION





I. INTRODUCTION

No government is capable of carrying out the transition on its own.

The Roadmap towards the Circular Economy in Slovenia is understood as a process, rather than a one-off, finite document. It has been designed with the aim of **setting guidelines for Slovenia to allow for a controlled and expedient systemic transition into a Circular Economy.** In the narrowest sense, it is directed

at the Government of the Republic of Slovenia, but in a broader sense, it is also aimed at all the interested stakeholders that have proven themselves invaluable co-creators in the process of creating this document. They are the holders of numerous good practices that often go unnoticed or unsupported. **No government is capable of carrying out the transition on its own. Cities and local communities** play a crucial role in the transition – they are increasingly recognized as the central generators of circular change. In Slovenia, this

has been proven to be true by Ljubljana and Maribor. Affecting the behaviour of the citizens and changing their behavioural patterns and habits leads to the **formation of circular culture**, which is one of the key factors in enacting change⁵.

The goals of this Roadmap are:

- a. **Outline the potentials that establish Slovenia as the leader of the transition into the Circular Economy in Central and Eastern Europe**
- b. **Involve stakeholders to identify and connect circular practices**
- c. **Create recommendations for the Government of the Republic of Slovenia to facilitate a more efficient transition**
- d. **Identify circular opportunities for the strengthening of international economic competitiveness and quality of life for all**

In December 2015, the European Commission adopted a **Circular Economy Package**. The programme was ratified by the Commission in 2014, when it was presented by the then-commissioner for the Environment Dr Janez Potočnik. The newly appointed Commission withdrew the programme and re-introduced and accepted it after revisions in December 2015. The Package dictates the transition from a linear to a circular economic model to the members of the EU. It is estimated that the **transition to a Circular Economy can save the EU €600 billion by 2030 and create 170,000 new jobs by 2035⁶**. To this end, Europe is dedicating funding of over €650 million from the Horizon 2020 programme and €5.5 million from structural funds⁷.

How can Slovenia take advantage of the circular transition to strengthen international competitiveness and preserve the quality of life? To better define the factors for tracking the transition into a circular economy in EU Member States and to assess whether the measures taken are appropriate, the Commission's Action Plan

5 Represented by the model of the "Circular Triangle" - (Gicomelli media – Circular Change, 2017)

6 https://ec.europa.eu/commission/sites/beta-political/files/circular-economy-factsheet-general_en.pdf

7 http://europa.eu/rapid/press-release_IP-15-6203_sl.htm



We import 71% of raw materials consumed domestically.

for the Circular Economy proposed a simple and effective **framework for monitoring and defining indicators** that would include the key elements of the Circular Economy⁸. One of the key aspects is self-sufficiency in providing raw materials. Slovenia is at a disadvantage in this regard, since on average, we **import 71% of raw materials consumed domestically**⁹. Since we use these imported materials for

manufacturing our high-tech products, the international competitiveness of our economy also suffers from this import dependency.

The arguments for the necessity of a circular transition are clearly outlined in the Operational programme for the transition to a green economy¹⁰ and expressed with **clear goals**: (1) guaranteeing a

competitive economy, (2) products and services with high added value, (3) increasing energy self-sufficiency, (4) preserving and efficiently managing natural resources, (5) guaranteeing the quality of living and work environments. (6) development and marketing of local knowledge and services, (7) green jobs.

In the process of creating this Roadmap, we have employed various available resources. From guidelines found in EU documents to national documents, but

above all, we draw from the **concrete examples**¹¹ **presented in the reports of the Ellen MacArthur Foundation, the McKinsey and Systemiq Companies, the Circle Economy – The Circularity Gap Report**¹², **the Dutch, Finnish and Danish Roadmaps** and in various other documents. This allows us to form criteria for the inclusion of good practices, since the Roadmap is primarily based on the survey of concrete examples – from the ground up. Since **every country has its own specifics**, both in its natural resources, driving forces behind its economy, hubs of change and cultural models, we have to take that into consideration when planning for Slovenia's circular transition.

With this Roadmap, we enter into a structured dialogue with the stakeholders and the exchange of good practices. The preliminary process included **12 regional consultations**, organised in cooperation with the Office of the Prime Minister of Slovenia and Ministry of the Environment and Spatial Planning, which we then further expanded upon through dialogues with carefully chosen stakeholder representatives. **We have included the summaries of these consultations in the bigger picture of the concept of EU development, and by virtue of the information we gathered, we have mapped out the priority areas and guidelines for the circular transition of Slovenia.**

The goal of the authors of this document is to **continue updating the Roadmap** even after the process is formally concluded, to **form an action plan with the Government within the stakeholder dialogue** for the transition into a Circular Economy **and to continue establishing Slovenia as a Circular Economy role model for Europe.**

8 <http://ec.europa.eu/eurostat/web/circular-economy>

9 In 2015; Eurostat, 2017a

10 http://www.vlada.si/fileadmin/dokumenti/si/projekti/2016/zeleno/opzq_akcijski_nacrt_in_nacrt_aktivnosti.pdf

11 <https://media.sitra.fi/2017/02/24032659/Selvityksia121.pdf>

https://www.ellenmacarthurfoundation.org/assets/downloads/government/20151113_DenmarkCaseStudy.pdf

<https://www.circulaireconomie.nederland.nl/rijksbreed+programma+circulaire+economie/Programma+documenten/handlerdownloadfiles.ashx?idnv=806449>

<https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Sustainability%20and%20Resource%20Productivity/Our%20Insights/The%20circular%20economy%20Moving%20from%20theory%20to%20practice/The%20circular%20economy%20Moving%20from%20theory%20to%20practice.ashx>

12 <https://www.circularity-gap.world/report>

II.

THE TRANSITION TO A CIRCULAR ECONOMY AS A CIVILIZATIONAL NECESSITY





II. THE TRANSITION TO A CIRCULAR ECONOMY AS A CIVILIZATIONAL NECESSITY

A. THE POWER OF GLOBAL INTERDEPENDENCE

“The 21st century is characterized by an increasingly precarious present and an increasingly uncertain future. We are more connected than ever, more interdependent than ever. The world is becoming a global village. Our responsibilities as individuals and as a society towards the future, which must necessarily be a sustainable one, are many times greater than the responsibilities faced by our ancestors. Let us prove that we are capable of considerations and actions that involve not only our own immediate interests and benefits, but that we can also respect the responsibilities that we owe to the common good and to intergenerational equity.”

Dr. Janez Potočnik, Metina lista.¹³

The Circular Economy is a global challenge.

The Circular Economy is a global challenge. It can be understood as a new paradigm that seeks to answer the changes that characterize the 21st century – changes that prove, in a material sense, that the exploitation of natural resources in the ways that were seemingly still acceptable in the 20th century can't allow for the quality survival of humanity or the other living creatures on this planet. Now, more than ever, we feel a sense of **planetary interdependence**. The resources our planet offers are limited and the global economy (understood as the total sum of all national economic policies) is constantly exposed to change, while the growth of the population (and, in turn, of purchasing power) in the developing world, coupled with climate change and political factors, is triggering new migration flows – all of these factors influence Europe and affect Slovenia. **It is simply impossible in this day and age to develop national policies and decisions without considering the global picture.**

Several crossed planetary boundaries are proof that the economic development model of the developed world is unsustainable. Our actions have resulted in irreversible damage to the Earth's regenerative capabilities, greatly increasing the chances of sudden and unpredictable shifts in our habitats¹⁴. In light of the

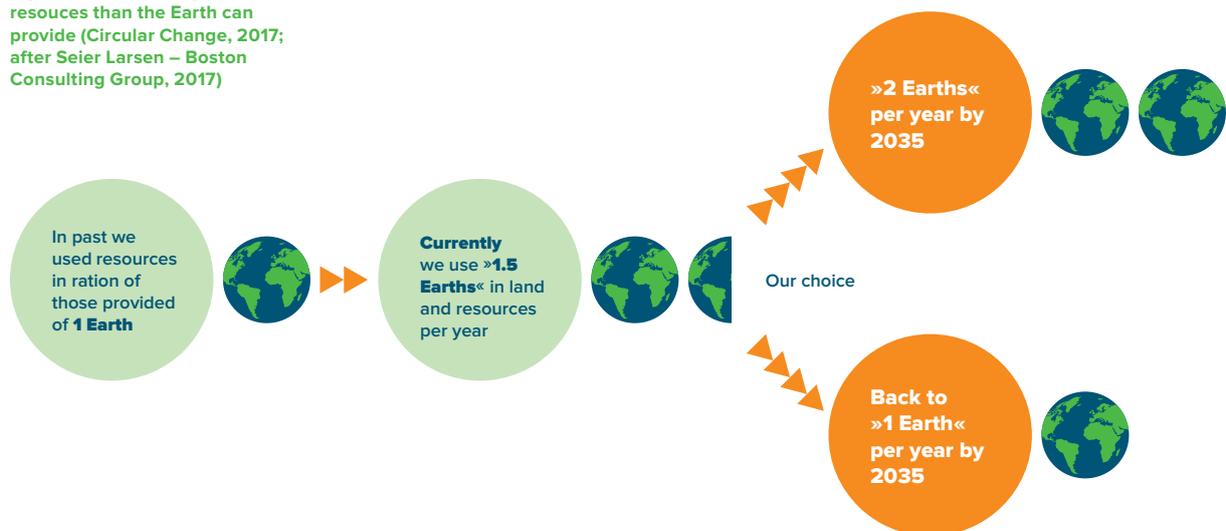
¹³ <https://metinalista.si/quo-vadis-cas-velikega-pospeska-in-vloga-virov/>

¹⁴ <http://www.stockholmresilience.org/research/planetary-boundaries.html>



aforementioned planetary interdependence, and despite the relative smallness of our country and economy, it is crucial that we are aware of the limits imposed by planetary boundaries.

Figure 1: We are using more resources than the Earth can provide (Circular Change, 2017; after Seier Larsen – Boston Consulting Group, 2017)



The limits we are encountering and the strains that we are exerting upon our natural resources show that, under the current economic model, **we will need another planet by the year 2035**¹⁵ if we do not radically change the way we manage natural resources. We need a **more responsible economic model**, one that will extend the life cycles of products and materials, preserve their value, affect competitiveness, encourage innovation and facilitate the creation of new jobs. With our Roadmap, we hope to contribute to this. To better illustrate the situation, we have included Figure

1; while this diagram is the subject of some debate in scientific circles, its immediacy can help us better understand the challenges that we are facing.

We have already crossed some of the boundaries and ventured beyond the zones of uncertainty.

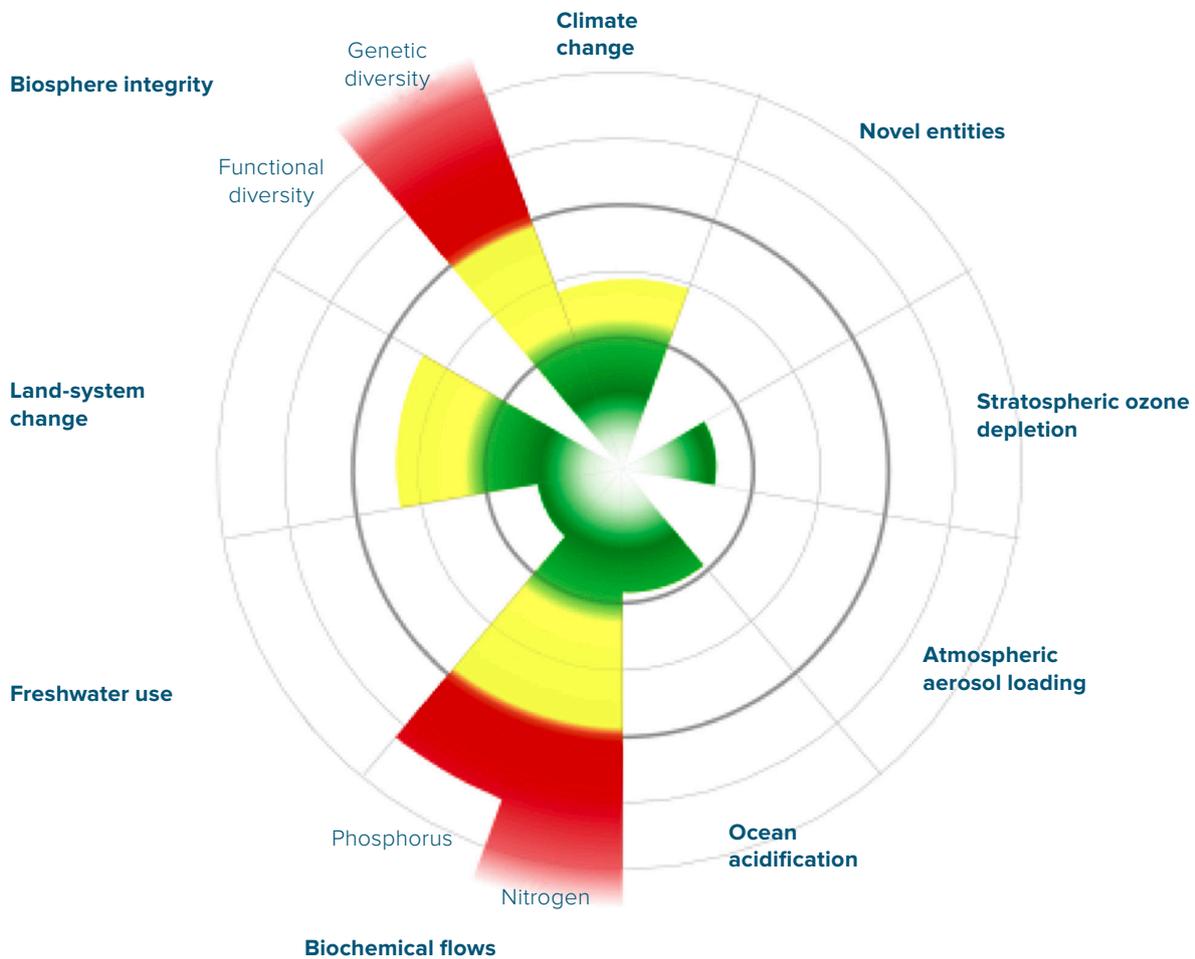
The following graph of planetary boundaries also shows that the current economic model is unsustainable and that humans, with their actions, have destabilized global ecosystems. **We have already crossed some of the boundaries and ventured beyond the zones of uncertainty.** Control variables show that we have crossed into alarming values concerning biosphere integrity – losing biodiversity,

as well as with biogeochemical flows – nitrogen and phosphorus (chemical fertilizer) levels. We are also within the zones of uncertainty when it comes to climate change and land-system changes.

¹⁵ Seier Larsen - Boston Consulting Group, 2017



Figure 2: Planetary Boundaries (Steffen et al., 2015)



- Beyond zone of uncertainty (high risk)
- In zone of uncertainty (increasing risk)
- Below boundary (safe)

We cannot ignore the **growth of the economy and consumption and the increased resource use connected with them** among the factors that cause the greatest amount of stress on the environment. According to the data gathered by the United Nations, the increase in global population is also causing an increase in the consumption levels of the middle class. If we take into account the fact that, so far, all forms of progress of society have taken a definite toll on the environment, the current rate of consumption is very alarming. The limits we are encountering and the strains that we are exerting upon our natural resources show that **the economic model that has been employed in the developed world simply cannot be copied by the developing world. The quality of life** that we are accustomed to in the developed world **is not maintainable under the current economic model and cannot be adopted by the developing world.** The countries of Europe are part of the developed world, and play a crucial role in the development of knowledge



and innovation. The responsibility to collaborate with other global economies in developing new, innovative solutions that will enable new forms of economy – of production and consumption – and a greater degree of product value retention is a challenge that demands better international collaboration in the transfer of knowledge and experience into practice. Thus, the new paradigm of the Circular Economy is based on the principles of collaboration and inclusion.

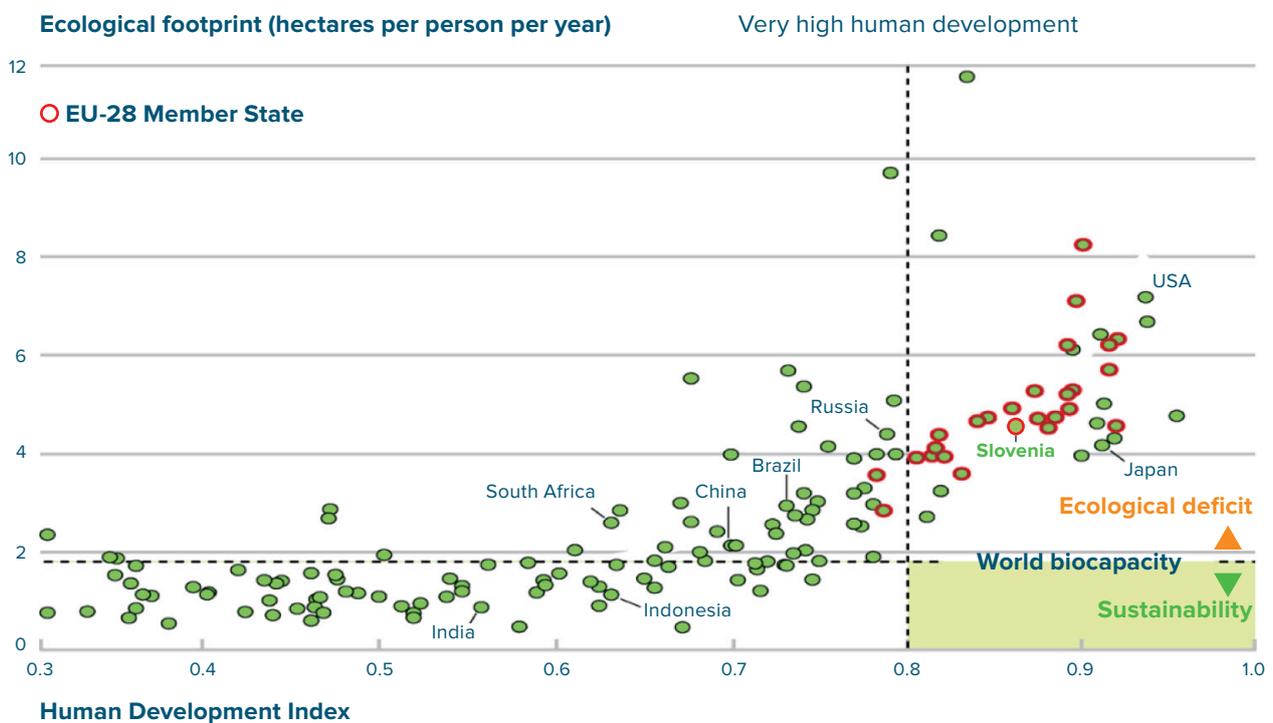


Figure 3: Unsustainable development trajectory (European Environmental Agency, 2015; after: Global Footprint Network, 2012; UNDP, 2014)

We need to find a **development model that will sever or separate economic growth from the exploitation of natural resources and negative effects on the environment**. The graph shown in Figure 3 shows the countries' ecological footprint on the vertical axis and their Human Development Index (HDI) on the horizontal axis. The HDI ranks the world's countries based on the average of three indicators: per capita income, life expectancy and education. As we can see from the graph, **no country so far has managed to enter the "green rectangle"**, where the ecological footprint is within the planetary boundaries and the HDI has surpassed the threshold of what is generally regarded as very high human development and quality of life. Human progress is still based on the exploitation of natural resources and has a negative effect on the environment. To develop a model of progress that can improve (or at the very least, maintain) our quality of life, it is crucial that we **consider economic, environmental and social factors** and encourage innovation and new solutions.



In order to become a society that understands how to deal with change, uncertainty and challenges, we want to create the conditions for and establish a systemic approach to sustainable development.

In accordance with the above detailed findings, which clearly show the need for a change in the current economic paradigm and call for a holistic, systemic approach to the development of our planet, the UN has adopted a set of 17 Sustainable Development Goals (SDGs) in September 2015. Slovenia is also ranked among the 193 countries that have committed to uphold the Agenda. **“In order to become a society that understands how to deal with change, uncertainty and challenges, we want to create the conditions for and establish a systemic approach to sustainable development”** is what we wrote in the Slovenian Development Strategy 2030¹⁶.

Figure 4: Sustainable development goals (United Nations, 2015)



This Roadmap has taken the sustainable development goals of the Agenda 2030 into consideration and is aware of the influences that one goal will have on the other, and vice versa. We realize that not all of the goals are simultaneously achievable, and that it is often the case that one goal is achieved to the detriment of another. Goal #12, responsible consumption and production, can be achieved by putting our efforts into changing the economic model, which is also a necessary systemic change for the realization of the other sustainable development goals. This has been our guideline in determining priority areas for the transition to a Circular Economy in Slovenia and in creating guidelines for future steps and activities.

¹⁶ http://www.vlada.si/fileadmin/dokumenti/si/projekti/2017/srs2030/Strategija_razvoja_Slovenije_2030.pdf



B. INTRODUCING THE CONCEPT OF CIRCULARITY

The concept of circularity can be introduced in various ways. When searching for a way to change the current economic paradigm, we always evaluate the solutions holistically – through the lens of **economic, environmental and social** perspectives. In this context, we see a need for a **new way of collaboration, involvement, exploration, learning and innovating.**

We should once again emphasize the importance of being oriented towards value retention/increase in the context of consumption and production for the transition from linear to circular economic models. To this end, the model of the Circular Economy turns to the very source of the issue – what materials or sources will be used and how to prevent or at least minimize their loss of value? It is necessary to promote the good management of existing supplies and to minimize our losses in the ending phase of a product's life cycle – to reintroduce it into the manufacturing or biological cycles.

How, then, should we **design products** to fit the above detailed criteria? **Circular (or Eco) design** follows the principles of circularity. **Modular product design** allows for easier **maintenance, repairs, restoration, processing and recycling.** The next challenge is to **change the patterns of consumption. The consumer transforms into a user, we move from products to services.** Every product should be in use for as long as possible – with the development of **digitalization** and easier data management, we can move to a **sharing economy** – where multiple users, aided by digital platforms or applications, can utilize the same product, such as vehicles, spaces, agricultural machinery, toys, etc.

Digitalization is a key enabler in the transition to a circular economy precisely because it allows for the collection of large amounts of data, which is then analysed and transformed into useful information that supports circular solutions. It is being introduced into fields such as comprehensive energy solutions, “smart” management of facilities, cities and rural areas, the internet of things, new forms of mobility, 3-D printing, agricultural digitalization and new models on numerous other fields. One of the challenges for the introduction of circular economic models is also the potential offered by **blockchain technologies**¹⁷. In 2018, this field has received much attention in Slovenia both in governmental as well as private channels.

An excellent tool for the visualization of the possibilities of **easier management of material flows** is the **Circular Economy System Diagram by the Ellen MacArthur Foundation.** The “butterfly” **illustrates a continuous flow of technical and biological material.** Unlike the linear economic model, which proposes the “take-make-dispose” step plan, the circular model emphasizes value retention of a product in the technological aspect and the reintroduction of biomaterials into the biosphere in the biological aspect.

¹⁷ Blockchain technology allows for the transfer of digital data without the possibility of copying or dissemination. The transactions are not monitored by any one central institution, but rather, by all of the users in a specific blockchain ecosystem. <https://novipodjetnik.si/blockchain-bitcoin-revolucija-kaj-je/>



PRINCIPLE

1

Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows
 ReSOLVE levers: regenerate, virtualise, exchange



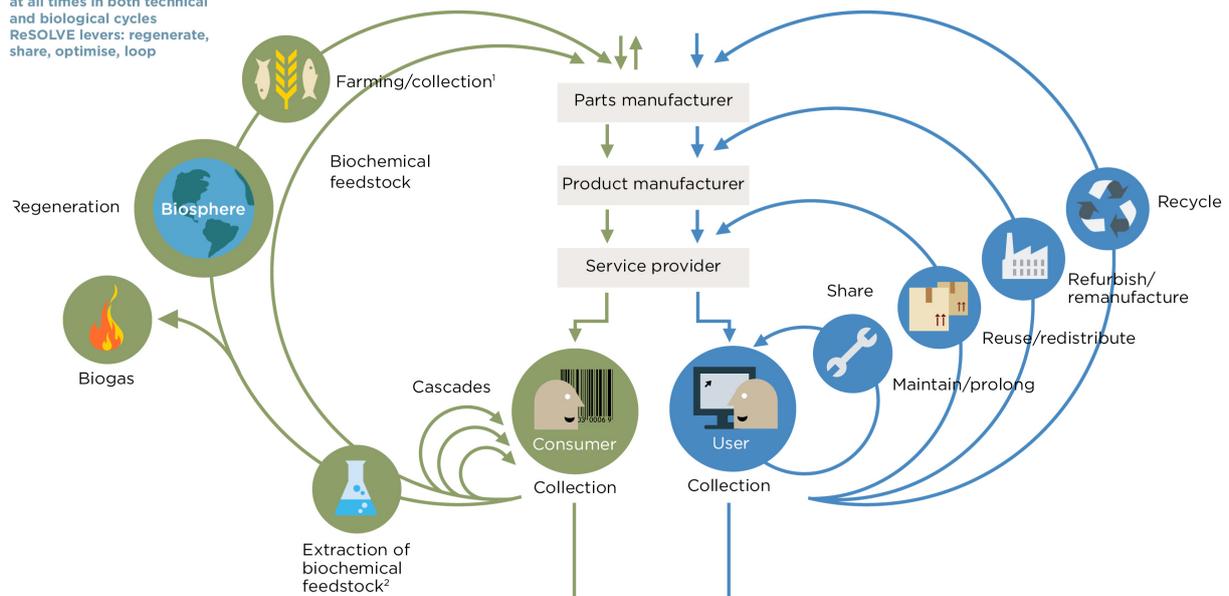
Renewables flow management

Stock management

PRINCIPLE

2

Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles
 ReSOLVE levers: regenerate, share, optimise, loop



PRINCIPLE

3

Foster system effectiveness by revealing and designing out negative externalities
 All ReSOLVE levers

Minimise systematic leakage and negative externalities

Figure 5: Outline of a circular economy (Ellen MacArthur Foundation, 2013)



The diagram shows the workings of the system containing the activities with which humans affects the ecosystem, and serves to even further emphasize the need to act in such a way as to prevent the endangering of the ecosystem.

Economic models that take planetary limitations into account can still promote growth and encourage competitiveness. What is required is a **change to the standards of success**. This **cannot continue to be solely the GDP**. We need to **account for natural resources** and to introduce new ways to measure the quality of life of all people.

We need to account for natural resources and to introduce new ways to measure the quality of life of all people.

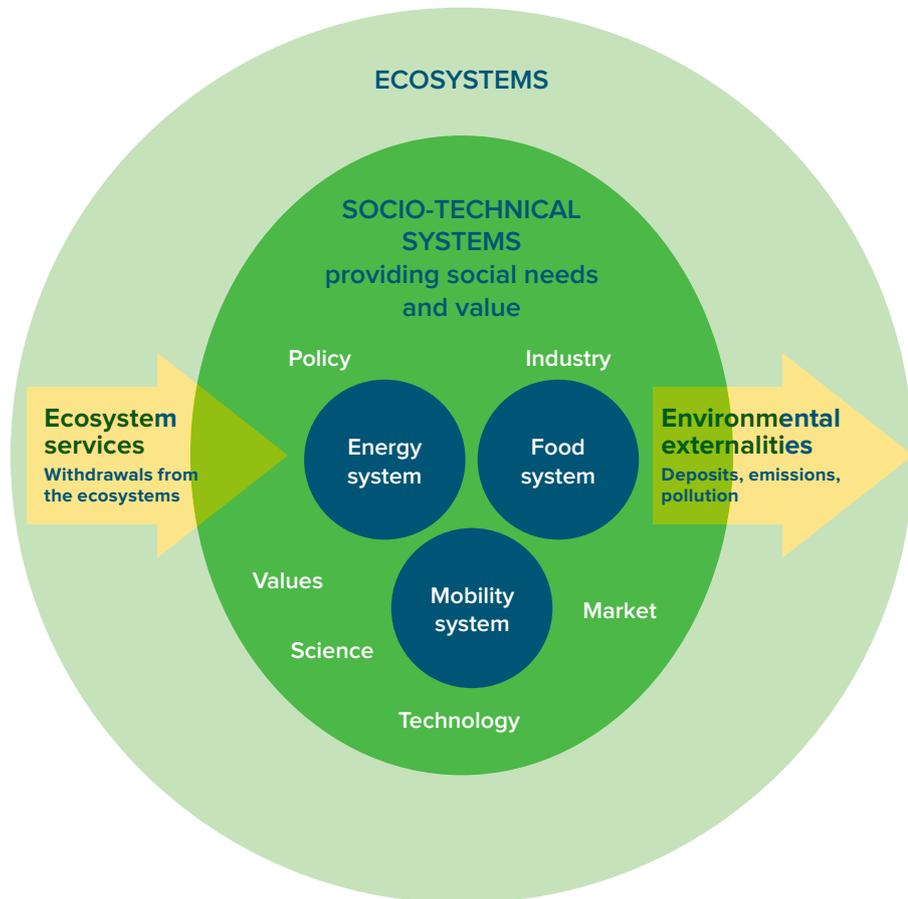
Figure 6 represents a model for **understanding and evaluating the entire ecosystem** so that, within the ambit of the socio-technological systems that are necessary for the operation of our society, **we can evaluate what part of the ecosystem we consume for it**. The current economic model ignores this tax, indeed, it never even measures it, which is why it remains hidden. We call these **environmental externalities** – the negative consequences of

economic activity on the environment and on the health of people, that is, consequences that affect society as a whole. For the time being, these costs do not represent a burden for the ones actually perpetrating the harmful activities, and thus, they do not directly influence economic competitiveness of companies or countries.

The true essence lies in finding a balance between the different policies, and not in solving the problems of one by ignoring the other. The current economic model, for example, allows for the **socialization of costs and privatization of profits**. This means, for example, that the medical costs for treating an illness caused by negative consequences on the environment burden the public health system (and, by extension, the taxpayers), while the company that caused the negative effect on the environment keeps their entire profit and is not involved in the restitution of damages to the environment.



Figure 6: Living well within ecological limits (adapted after: Bruyninx, EEA, 2014)



The next important step in the monitoring of circularity is appropriately selecting indicators. Monitoring the introduction of a circular economy and measuring its efficiency in practice is a challenge on all levels – in companies as well as in formulating European directives. For the purposes of this Roadmap, we have studied various indicators and developmental options based on their implementation¹⁸ and it has become clear that, due to the sheer scope of the circular transition, we will be only able to monitor its development by using a combination of different indicators.

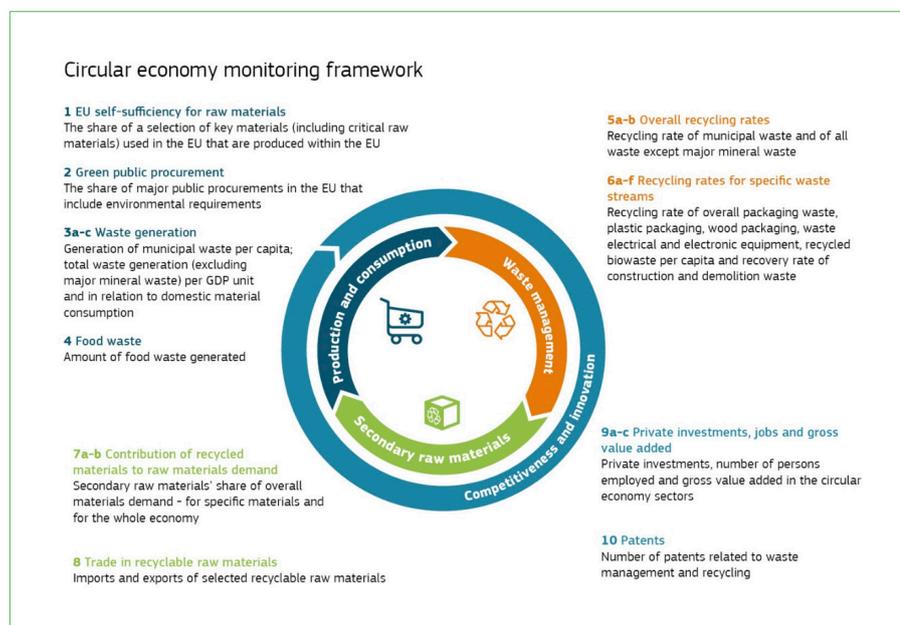
In January 2018, the European Commission proposed the **Monitoring Framework for the Circular Economy**¹⁹, with the goal to determine the factors for success in the Member States and to evaluate whether the implemented measures are suitable. The Framework is based on the existing indicators for the Resource Efficiency scoreboard and the Raw Materials scoreboard. The ten indicators included in this Framework are still mainly focused on material flows and recycling, and less so on eco design, changing business models, innovations... Nevertheless, we mention it in this Roadmap as one of the few binding methods of monitoring circular shifts in the EU.

¹⁸ Appendix C (of the extended version of the Roadmap)

¹⁹ <http://data.consilium.europa.eu/doc/document/ST-5478-2018-INIT/sl/pdf>



Figure 7: Circular economy monitoring framework (European Commission, 2018)



We also include here the non-binding goals presented in the Slovenian Development Strategy 2030, which are mainly focused on the effective use of natural sources and the use of renewable energy sources. They employ the indicator of **material productivity**, indicating the ratio between GDP and total domestic material consumption.

INDICATOR	Slovenia (2015)	Goal – Slovenia (2030)	EU (2015)
Material Productivity	1.79 PPP ²⁰ /kg	3.5 PPP/kg	2.19 PPP/kg
Share of Renewable Energy in Gross Final Energy Consumption	22%	27%	16.7%
GDP per Total Greenhouse Gas Emissions	2.9 PPP/kgCO ₂ equivalent	EU avg. in 2030	3.3 PPP/kg CO ₂ equivalent

Table 1: Goals for Slovenia from the Slovenian Development Strategy 2030 (Government Office for Development and European Cohesion Policy, 2017a)

20 PPP – GDP, standardized by a country's price level



- 21 https://eur-lex.europa.eu/resource.html?uri=cellar:50edd1fd-01ec-11e4-831f-01aa75ed71a1.0007.01/DOC_1&format=PDF
- 22 <https://slovenija2050.si/wp-content/uploads/2017/01/Vizija-Slovenije.pdf>
- 23 http://www.vlada.si/fileadmin/dokumenti/si/projekti/2017/srs2030/Strategija_razvoja_Slovenije_2030.pdf
- 24 http://www.mzz.gov.si/fileadmin/pageuploads/Zunanja_politika/ZDH/Politike_MRS/SDG/Spremenimo_svet_-_Agenda_za_trajnostni_razvoj_2030.doc
- 25 <https://www.stajerskagz.si/administracija/wp-content/uploads/2018/03/Akcijski-na%C4%8Drt-31-7-2017-SRIP-Kro%C5%BEno-gospodarstvo-WEB.pdf>
- 26 http://www.vlada.si/fileadmin/dokumenti/si/projekti/2016/zeleno/opzga-akcijski_nacrt_in_nacrt_aktivnosti.pdf
- 27 http://www.mko.gov.si/fileadmin/mko.gov.si/pageuploads/zakonodaja/varstvo_okolja/operativni_programi/op_komunalni_odpadki.pdf
- 28 http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/osnutki/npvo_2030.doc
- 29 http://www.eu-skladi.si/sl/dokumenpvoti/kljujni-dokumenti/op_slo_web.pdf
- 30 http://www.mzi.gov.si/fileadmin/mzi.gov.si/pageuploads/Kabinet_ministra/gradivozarazpravoEKS.docx
- 31 <https://www.sitra.fi/en/projects/leading-the-cycle-finnish-road-map-to-a-circular-economy-2016-2025/>
- 32 https://www.government.nl/binaries/government/documents/policy-notes/2016/09/14/a-circular-economy-in-the-netherlands-by-2050/17037+Circular+Economie_EN.PDF
- 33 https://www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation_PolicymakerToolkit.pdf
- 34 <https://circulareconomy.europa.eu/platform/>

C. OPPORTUNITIES FOR EUROPE, OPPORTUNITIES FOR SLOVENIA

We have based our recommendations for the transition of Slovenia to a circular economy **on a number of extant politics and legal bases. Among these are:** strategic documents for the country's development over the next ten years; goals of the stakeholders that are performing activities that facilitate the transition, reports by notable research institutions; roadmaps, models and knowledge by leading European countries on this field.

We would like to point out the following sources that we have used in constructing this Roadmap:

- **The Circular Economy Package**, published in July 2014 by the European Commission, along with the communication **Towards a Circular Economy: A zero waste programme for Europe**²¹
- **Closing the loop – an EU action plan for the Circular Economy**, from December 2015 – the basis for establishing the concept of a circular economy in the EU and in Slovenia
- **A Vision for Slovenia in 2050**²² **and the Slovenian Development Strategy 2030**²³ – these two documents express Slovenia's clear goal to become a society fostering "Quality of life for all" – in keeping with the Sustainable Development Goals²⁴
- **Slovenia's Smart Specialization Strategy** and the **Strategic Research and Innovation Partnership (SRIP)** based on it – with an emphasis on the **SRIP's Action plan for the Transition to a Circular Economy**²⁵
- **Framework Programme for the Transition to a Green Economy**²⁶, **Operative Programme for Municipal Waste Management**²⁷, **National Environmental Preservation Programme 2030**²⁸, **Operational Programme for the Implementation of European Cohesion Policy for 2014–2020**²⁹, **Slovenian Energy Concept**³⁰
- **Leading the cycle – the Finnish road map to a circular economy 2016-2025**³¹, **A Circular Economy in the Netherlands by 2050**³², **Ellen MacArthur Foundation: A Toolkit for Policymakers**³³

The activities in connection with the creation of this document have been coordinated with the **European Circular Economy Stakeholder Platform**³⁴ – a platform founded in November 2017 by the European Commission and the European Economic and Social Committee. It facilitates the involvement and monitoring of the EU Member states on the field of the Circular Economy.

The **SRIP Action plan (Strategic Research and Innovation Partnership) for a circular economy** is particularly important – it outlines the pillars that this Roadmap uses to determine potential and priority areas. At the same time, we should point out the potential for **horizontal integration of the SRIP for circular economy with the other SRIPs**.



To this end, the Roadmap can serve to shed light on certain aspects of the continued research and realization of Slovenia's Strategic Goals and the formulation of an action plan for the circular transition.

In documents outlining the **advantages of the transition to a Circular Economy for Europe**, the most frequently cited positive effects are: a more competitive economy, new jobs, a reduced dependency on imported materials, stronger economic and social stability, renewed innovation and new economic opportunities. **For the citizens**, the circular transition would also mean a **lower cost of living** (housing, mobility, food) and a **greater quality of life**.

Among the facilitators for realizing the outlined potentials, the ones commanding most attention are the aforementioned competitiveness and innovation stimulations, investments into research and development and the adjustment of educational systems to accommodate a need for new skills and knowledge.

The Circular Transition affects all of the systems that make a country/society.

According to Eurostat estimates, as of 2014, the transition to a circular economy means that the industry sectors significant to circular economy includes 3.9 million jobs, €141 billion in added value and €15 billion in private investments³⁵.

It is crucial for us to understand what elements we can transfer to a Slovenian level as opportunities that we want to take advantage of. **The Circular Transition affects all**

of the systems that make a country/society: households, the private and public sectors, cities, rural areas, etc.

This means that opportunities and challenges for Slovenia can manifest both in obvious, as well as less obvious, areas. Because we are **dependent on imported materials**, waste collection and recycling to close the material loop is certainly one of the key opportunities we have to reduce our dependency on imported materials and to retain value within our domestic economy. Slovenia's **results in collecting municipal waste are good**: in 2016, 67% of all municipal fractions were sorted³⁶. But we are less successful when it comes to recycling, as we rank below the European average: in 2015, we reached a 54% recycling rate³⁷. The problematic materials that we currently can't suitably sort or recycle, and in this way retain in cycles of use or processing, represent another opportunity for the strengthening of the domestic economy.

Another example can be found in **traditional industries**. The steel industry, for example, is an industry in which we achieve a recycling rate of almost 100%, and digitalization has already caused significant changes in the modes of commerce, reducing risk and solidifying the role of steel companies on the global market.

The next opportunity for advancing the Circular Transition is represented by **green public procurement**. By amending the legislation, it opens up the way to the "greenification" of the public sector, transitioning to circular products and services, acting as a stimulus for the economy and placing the public sector among the key agents of the circular transition.

³⁵ <http://ec.europa.eu/eurostat/web/circular-economy>

³⁶ Statistical Office, Republic of Slovenia, 2017

³⁷ EUROSTAT, 2017b



Green public procurement provides an excellent opportunity for pilot projects,

emphasizing the **principles of circularity**, such as eco design, repairs, renovation and remodelling, replacing products with services, reducing carbon footprints by involving local providers and shortening transport routes, employing renewable sources by means of the electrification of transport, minimizing the generation of waste (e.g. by tackling the issue of surplus food in public institutions), etc.

Slovenia is characterized by its strong **civic initiatives** that support the transition from linear to circular models by limiting consumption and moving from products to services. Numerous activities involve various stakeholders, introducing new solutions and concisely communicating and sharing them. They represent a key empowering element for the citizens on the way to a circular transition.

We also have admirable role models in **the Slovenian cities that chose to undertake the Circular Transition**. Cities (and other local communities) are uniquely influential stakeholders, and with their activities they can significantly expedite the shift towards a circular economy. They are environments suitable for testing pilot circular practices that can then be applied to other local communities. We have 212 municipalities in Slovenia, of which 11 have urban status. These 11 are home to approximately 30% of the entire Slovenian population. Ljubljana and Maribor have been gaining international visibility precisely by introducing the concept of circular cities, and to this end, they have also been very successful in securing EU funding. **Ljubljana**, the European Green Capital of 2016, host of the Eurocities international conference³⁸ on the subject of Circular Economy in 2018, and member of the Ellen MacArthur CE100 programme³⁹, is rapidly becoming a European and global role model thanks to its numerous successfully realized circular projects. **Maribor**, with the innovative Wcycle project, participation in European projects and an active role in the Urban Agenda⁴¹, proves that urban circular models can be realized relatively quickly with a clear and concise strategy and with the involvement of various stakeholders.

The **Municipality Associations** – SOS⁴², ZOS⁴³ in ZMOS⁴⁴ – also play active roles by applying the principles of circularity to tourism. They promote the creation of tourist offers that uphold the principles of circularity, allowing tourists to experience Slovenia as a green, sustainable destination.

With the signing of the **Smart Villages Declaration**⁴⁵ in April 2018 in Bled, a new European movement has been kick-started, reinforcing the role of rural areas and employing digitalization to promote a circular transition.

In all the aforementioned cases, the **collaboration between various sectors and stakeholders** is crucial for the development of circular opportunities: the government, private companies and the citizens. The latter group is the one that most significantly experiences and promotes circular changes – with their choices, decisions and values.

The transition to a Circular Economy is a complex, comprehensive and, most of all, a long-term process. To better understand this process, we employ the principle that we have named the **Circular Triangle**.

38 <http://www.eurocities.eu/>

39 <https://www.ellenmacarthurfoundation.org/ce100>

40 <http://www.wcycle-maribor.si/>

41 <https://ec.europa.eu/futurium/en/urban-agenda>

42 <https://skupnostobcin.si/>

43 <http://www.zdruzenjeobcin.si/>

44 <http://www.zmos.si/>

45 <http://bogovic.eu/bogovic-pametne-vasi-so-gibanje-za-pametno-evropo/>



D. THREE ASPECTS OF THE CIRCULAR TRANSITION: THE CIRCULAR TRIANGLE

The Roadmap's guidelines take into consideration the need for a systemic transition into a Circular Economy. This becomes possible if we succeed in connecting, if we successfully maintain the balance between the various politics and simultaneously rearrange our values in such a way as to promote the transition to new economic patterns and individual behaviour. Good leadership is crucial for this. It should incorporate and manage the different aspects of the transition and stay the course on the road to **transformation**, a road that is both **long-term and complex**. The aspects of the transition are interdependent, which is why **the ability**

to reconcile from the ground up, as well as top down approaches, is invaluable for the management of the circular transition. In the process of creating this Roadmap, we have had numerous opportunities to work "on site" and learn about and record good practices. At the same time, in the ambit of the Partnership for Action on Green Economy, we have had direct contact with government representatives from various sectors and spoke about some of the challenges for the Circular Transition that we have observed.

For a clearer representation of the **three key aspects of the Circular Transition, we have developed the model of the Circular Triangle**. With it, we wish to outline the three fundamental aspects that, only when they are reconciled and working in unison, allow for a **systemic Circular Transition**. Each of the fundamentals has a Core that serves as the main stimulus for change. We realize that each of the aspects of the transition is in itself very complex, which makes the systematization of fields that is represented by these three fundamentals rather problematic, and opens more questions and possibilities for further dialogue, which we wholeheartedly encourage.

The triangle is comprised of the following:

- **Circular Economy** – from linear to circular business models/companies
- **Circular Change** – comprehensive policies to support the transition/public sector
- **Circular Culture** – reflection on values and new narrative/citizens

The Roadmap's guidelines take into consideration the need for a systemic transition into a Circular Economy.



Figure 7: Circular Triangle (Adapted from: Gm – Circular Change, 2017)



1. Circular Economy – Companies as the Core – the transition from linear to circular economic models brings numerous changes that are reflected on various levels, which is why the transition is difficult, and generally only possible with the full support and trust of corporate leaderships in the validity and the justifications of the notion that the economic model needs to change. By collaborating with the stakeholders, the vision will lead to new value chains, which will in turn bring new risks, new circumstances and a renewed need to adapt. **By the end of the transition, everyone involved should have gained more than they would if there had been no collaboration.** Altered forms of collaboration can mean the involvement of new suppliers, the development of new technologies, the restructuring of organizational culture, forays into new markets, etc. To successfully handle such comprehensive changes, it is crucial to have an involved leadership, to be open-minded towards innovations and new knowledge, have a long-term goal mind-set and the adaptability and capability to weather mutable circumstances.

The transition from linear to circular models in companies can take many forms, such as:

- **Circular (Eco) Design** – designing products in a modular way, facilitating repairs, maintenance, modifications, restoration, dismantling, recycling, etc.
- **Transitioning from products to services** – the consumer becomes a user and pays for a service, while the ownership of the product remains with the manufacturer, enabling them to focus on more durable, longer-lasting products at a higher cost, with a longer life and designed according to the principles of circular design, so that the materials used can be employed as efficiently as possible, reducing the material costs and price risks.
- **Industrial symbiosis** – various stakeholders exchange between one another materials/raw materials that were once declared to be waste. This means that the amount of waste decreases, while the practical value of the materials increases.
- **Closing energy loops** – the energy surplus of one economic subject can be used as energy input by another, or perhaps it can be advantageously used within the same company. In this way, the effectiveness of energy use is greatly increased, the costs go down and the negative effects on the environment are decreased.

The business models that we call circular are numerous and very diverse. To facilitate a greater degree of clarity, the Roadmap uses a classification method that places the models in one of three categories: those that reduce the consumption of resources, those that focus on value retention and those that change consumption patterns (adapted from Rizos et al., 2017, in turn adapted by Širec et al., 2017). Naturally, many companies use a combination of these models and in this way, new practically proven models of value creation are constantly being created.



Changing patterns of consumption	Shift in consumption patterns	New ways of consuming, abandoning old consumption patterns thanks to digitalization, cultural changes, changes in the system of value, etc.
	Sharing models	Improving the effectiveness of product use, the products “circulate” between the users with the aid of technologies such as social networks.
	Products as services	Various approaches that bring the product to the user as a service, but not as an owned good: leases, time-sharing, joint ownership, etc.
Retention of material and product value	Processing, restoration and reusing products and components	Activities that guarantee that the product does not end on the scrap heap, but instead it lives on with a minimal drop in value, or, if possible, even an increase (upcycling).
	Extending the product's life	The products are designed to last longer and/or are easy to repair/reuse/modify
Reduced use of primary sources	Using renewable energy sources	Substituting fossil fuels with renewable energy sources
	Effective use of resources	Maximizing effectiveness by means of technical improvements, better business models, product designs, etc.
	Recycling	Using surplus materials in manufacturing processes that create new products/materials

Table 2: Business models in circular economy (Adapted from Širec et al., 2017; Rizos et al., 2017)



2. Circular Change – Public Sector as the Core – it is important that our policies for the circular transition be **coordinated and comprehensive**. It is a matter of interdependence between the various sectors, which is why the circular transition cannot be managed by a single ministry. Interdepartmental collaboration is crucial, as is considering the principles of circular economy when determining **all** policies. In Slovenia, a Circular Economy is already **specified as a goal in the Government's strategic and vision documents**, but we also require more comprehensive support with the appropriate indicators, systematic monitoring and yearly reports.



Comprehensive policies include:

- Upgrading national statistics and accounts,
- Introducing sustainability accounting
- Changing taxation policies,
- Measures in the field of the use of space,
- Changing subsidy policies,
- Adjusting investment policies,
- Restructuring the banking sector,
- Transitioning to green public procurement,
- Directing science and research, supporting innovations,
- Building a suitable infrastructure,
- Educating and raising awareness among stakeholders.

All of the above affects how the economy and the companies will react and how quickly the private sector (particularly SMEs) will choose to embark on the road towards a circular economy. It also relates to Circular Culture, placing priorities, values and choices on the side of the individuals, the citizens, and their attitude towards altering the existing patterns and habits.



3. Circular Culture – Citizens as the Core – we individuals, acting as responsible, active and engaged citizens, shape society as a whole with our systems of values, our choices, our decisions, our behaviour. It is crucial for the transition that the role of the consumer is abandoned in favour of the role of the user. We must consider what our needs and what our wants are and replace the need for possession with an open-mindedness towards sharing. We must improve our understanding of the repercussions that the choices that we make every day have, and strive to manage our resources better. The home, the household, is the basic cell in which we can enact circular principles and reinforce Circular Culture. The more aware individuals, households, regions, cities are, the stronger the message that we send to the economic and public sectors: we accept and support the circular transition.

Circular Culture is the aspect of the Circular Triangle that is most internalized by the people of Slovenia. “Green” and “sustainable” are values that are embedded in our system of values. We respect nature and feel an obligation towards it, which is why the principles of Circular Economy are familiar to us, and we have been upholding them in various fields for years. **When circular solutions are understood as ones that actually save us time and money** – by limiting a household's expenses and being locally available – we are quick to accept them. This we have proven with



our eagerness to accept services such as BicikeLJ, sorted waste collection in households, green public areas and urban gardens, numerous repair and rent shops, notable companies with a positive social footprint and more.

Due to Slovenia's easily manageable size and polycentrism, **collaboration and connections between various stakeholders in the community** have always been important aspects of our culture. Project teams are formed easily and quickly, activities coordinated effectively. Thanks to good examples of circular practices based on our circular culture, we are rapidly becoming a role model in our geo-political region and an inspiration for wider international collaboration, transfer of practice and knowledge and the actualization of systemic changes.

Creative Industries also play a crucial role in establishing Circular Culture. Innovation and creativity promote thinking outside of the box, which is very important in a Circular Economy, since it promotes the research and exploration of new modes of operation. The renowned and internationally acclaimed Slovenian creative power is a **trump card for Circular Culture and Circular Economy** that stood out in the preliminary regional conferences, manifesting in concrete creative practices carried out in the ambit of social entrepreneurship and NGOs.

We should point out once again that it is crucial for the understanding of the Circular Triangle that no matter which of the three aspects we focus on, we must always also take into account the other two.

We should point out once again that **it is crucial for the understanding of the Circular Triangle that no matter which of the three aspects we focus on, we must always also take into account the other two.** Systemic change is only possible if the activities of all three aspects are coordinated. The public sector, the business sector and the citizens form a **circle of interdependent stakeholders of Circular Change.**

III.

CIRCULAR POTENTIAL FOR SLOVENIA





III. CIRCULAR POTENTIAL FOR SLOVENIA

A. RECOGNISED PRIORITY AREAS

The question that Roadmap is looking to find an answer to is: **What opportunities does the circular economy bring to Slovenia?** The Roadmap is seen as a "living system", which is upgraded, updated, and adapted over time. **More importantly than the document itself, is a process** based on **the integration of the broadest pool of stakeholders** and the recognition of existing good practices, initiatives, as well as the obstacles that are detected in the transition to a circular economy. **During the first stage, the process is rounded off by those who have actively participated in the twelve regional consultations**, whereby, based on their cases, **we are building connections that should be transformed in as flexible, innovative and competitive circular models as possible.**

The **four priority areas that are presented** were created as a combination of summaries of the **field work approach**, available relevant **data and criteria**, and **comparable attempts to identify the areas** of countries that have already started their preparations for national roadmaps. They have been evaluated as those with which we can strengthen the efficiency of material and primary resources, increase the value of materials, products or services, develop circular business models, strengthen energy efficiency, close off material flows, prevent waste generation, integrate green public procurement, modify patterns of use and strengthen the circular culture.

We also took into account the **Strategic Research and Innovation Partnerships' (SRIP) Action Plan for the transition to a circular economy** which is coordinated and managed by the Chamber of Commerce and Industry of the Štajerska region of Slovenia. The main objectives of this plan are the improvement of the material productivity index and the establishment of five new value chains with closed material flows. The **six focal areas** in the Action Plan include the following: sustainable energy, biomass and alternative raw materials, secondary raw materials, functional materials, processes and technology, and circular business models (SRIP – Circular Economy, 2017). Each of the focal areas is indirectly included in the areas of the Roadmap.

The **priority areas** suggested in the Roadmap are placed within a broader framework⁴⁶ outlined by resources which we utilize within economic activities and which are retroactively influenced by our actions: e.g. soil, water, materials, air. **Humans interfere with the ecosystem** – i.e. we direct activities within a **circular triangle** – at the level of the economic field, the public domain and society as a whole. Within this context, we manage space, available natural resources and energy in the broadest sense. The areas that are highlighted in the Roadmap as priorities, of course, include all the aspects of the intervention in the ecosystem. The diagram below illustrates the interdependence of different areas and their involvement in the wider system which we have not broken down any further. In terms of such an outlined frame, we have established the following **four priority areas**:

46 Potočnik, 2017

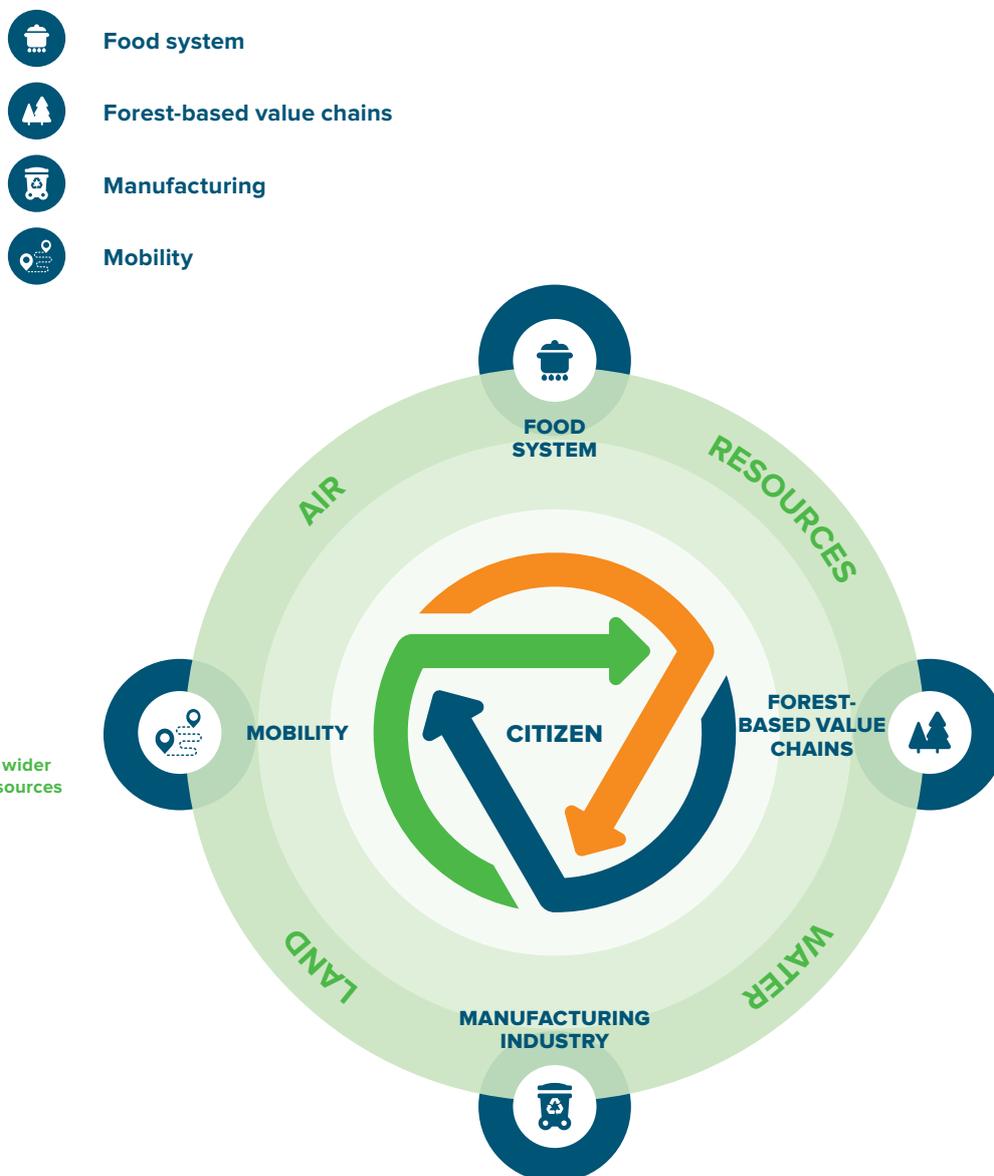


Figure 8: Positioning of priority areas within the wider framework of natural resources

The decision on priority areas was not taken with the intention of excluding any of the other activities and areas. On the contrary, it emphasizes the importance of bringing together actors, transferring knowledge and experience between them, as well as of creating the opportunity to position themselves as "circular breakthrough actors" both on a national and international level. Newly emerging value, partnership and cooperation chains exceed the established "silos" and "sectoral" approaches and are increasingly interdisciplinary. Therefore, when referring to areas, we also **want to primarily stimulate the reflection on where individual actors can seek synergies**, where good practices can be inter-industrially transposed and scaled, what has already worked well and what not, and how to create circular breakthroughs in advance.



B. POTENTIALS WITHIN PRIORITY AREAS



FOOD SYSTEM

The area includes: All stages of production, processing, transport, sale, consumption of food, and the collection and treatment of waste organic matter. In addition, it also ties in with sustainable tourism.

Why this priority: The challenge we are faced with is **how to manage the food system within the planetary boundaries**. Bearing in mind that already 60% of land is degraded or is not managed sustainably; it is precisely in the evaluation of an existing system that is heavily bound to artificial manure management, where opportunities are opened for new approaches both in land management as well as in interconnecting circular and bio-economics, in food production methods and the integration of digitalisation, with concern for the preservation of waters and other food-supply-related areas.

Food supply is a basic social function. The aim is to produce the best quality foods **on the available arable** (and others that are crucial for food supply) **land in an efficient and sustainable way**. Within the context of food systems, the concepts of self-sufficiency, sustainable and organic farming, intensive agriculture, livestock farming and fisheries are interlinked. This includes transport logistics, trade, regulation of exports and imports, food preparation and the issue of food waste, collection and treatment of organic matter, preserving the quality of soil and waters, etc.

How it can be measured: We monitor food production methods, the gross nitrogen balance surplus, the gross phosphorus balance surplus, the share of food supplies from local producers, the amount of waste food per capita, etc.

Strategic Research and Innovation Partnerships (SRIP): Sustainable Food Production, Sustainable Tourism

Examples of good practices: Lušt, Panvita, Fonda, Eurosad, Robin Food

Potentials: Within the context of the consultations, the potentials related to self-sufficiency and the possibility of local food production were repeatedly emphasized. The need for better integration of food producers and the integration of their products into the catering and tourism offer was also highlighted (including within the framework of public procurement). However, there exists a gap in education in the field of production and food preparation as well as between guidelines for reducing the amount of food waste and the management of waste organic matter.

Promising prospects:

- **Urban gardens** – the utilization of available areas in towns for kindergartens that are cultivated by the residents;



- **The promotion of self-sufficiency** – greater emphasis is put not only on cultivation but also on the trading of food in local environments in order to maximize the production of food without the need for additional wrapping, transport and intermediaries;
- **The zero mile offer** in restaurants and at public events – as an additional incentive for the inclusion of local suppliers by taking into account seasonality, while prioritizing quality foods;
- Implementation of the **zero waste** concept with the aim of discarding as little food as possible – there are different approaches to achieve this goal which include:
 - Customizing menus in public institutions;
 - Amending rules in respect of shelf life;
 - Installing compost containers;
 - Systematically reducing the amount of food waste through informing, education and integration of different stakeholders;
- **Ecological and sustainable agriculture** – providing more education, exchange of experiences in this field;
- **Concern for the conservation of soil and water quality** – the need to harmonize policies and subsidies, incentives for good governance and adequate response to changed climatic conditions (heavy rain, drought, hail, etc.);
- **Revitalisation of degraded land** – systematic "restoration" of land, their integration into spatial planning and local development policies;
- **Biobased economy** – biomass as a substitute for fossil fuels and the exploration of other (business) opportunities brought about by this field.



ROBIN FOOD

Robin Food is an entrepreneurial project created with the help of the Slovenian Enterprise Fund. The aim of the project is to reduce the amount of food waste. By reducing the amount of food waste, the vision of the founders is to make the food sector more environmentally and socially friendly. The project consists of for-profit and non-profit activities. The for-profit part is directed at stimulating the promotion of food circulation by in-store sales. The non-profit activity is focused on the organisation of food donations for humanitarian purposes using the already established distribution networks of partner organisations. At the Robin Food store you can buy excess food, food right before its expiry date, or food with damaged packaging at affordable prices. Thus, Robin Food opens an alternative sales channel

that ensures that a smaller amount of edible foods ends up as waste. At the same time, it helps people from vulnerable groups to be able to afford more favourable purchases of quality food.

During the Robin Food project, not even a 0.1% of the foodstuffs supplied by more than 30 Slovene partners were discarded. The total number of suppliers and sources of food already exceeds 100. In addition, Danone is also among the suppliers that support Robin Food as part of its own "Zero Waste 2020" project.

One of the activities of Robin Food was also the offer of unique, healthy and nutritional dishes that were prepared daily for the guests of their own restaurant, thereby raising awareness about the quality of foods available in Robin Food's product range.





THE LUŠT TOMATO



The Paradajz d.o.o. project was designed with the aim of reducing imports of low-quality tomatoes from abroad. Using state-of-the-art production technologies which, at the same time, also have minimal environmental impact, the company wanted to avoid highly intensive production in the country which is, in the Prekmurje region of Slovenia, heavily burdened by intensive conventional agriculture.

They developed their own, i.e. a biotechnical method of cultivating tomatoes which ranked them among the top 100 most innovative tomato growers in the world (according to the international Hortibiz magazine). Cultivation involves planting plants into a perfectly clean organic substrate (a mixture of peat and coconut fibres), while the greenhouses in which tomatoes ripen are heated by means

of geothermal energy from a nearby pump, and with heat pumps. The plants are watered with rainwater which is collected in a special pool throughout the total surface area of the 90,000m² greenhouse. Thus, they are not exposed to weather phenomena such as drought or rainfall, and the system at the same time allows reusable water from the drainage system. They tackled pest control in a natural way using the natural predators that do away with tomato pests, while not harming the tomato itself. Bumble-bees are used in pollination that are also living proof that they do not use toxic sprays in production. They developed their own recognizable LUŠT brand that generates very good tomato sales despite their slightly higher prices. They are available in recycled paper packaging which is recycled again after use.



FOREST-BASED VALUE CHAINS

The area includes: The forest is observed as a comprehensive ecosystem that needs to be managed as a whole. The field includes all stages of preservation, production, processing, transport, sale of wood, waste wood treatment, wood products, and more widely also the field of nanotechnology, tourism, construction (including high-rise buildings).

Why this priority: Slovenia is one of the most wooded countries in the world. **With 60% of the area covered with forests**, it ranks in the fourth place in Europe. Wood is one of the most "circular" materials, while the comprehensive management of forest value chains opens up many opportunities for **innovation in the field of materials**. Cross-sectoral integration and **interplay between bio-economy and the circular economy** offers new views on the value of forest systems.

The stakeholders of most of the Slovenian regions point out that the **opportunities in the development of wood chains are largely unused**, which is an additional reason for creating solutions that will contribute to increasing the added value and reducing the focus on wood as an export material only.

How it can be measured: We monitor the connection with the added value (from round timber to products), the share of CO₂-neutral fuel (chips, pellets, firewood) in the use of energy for heating, the share of renewable energy in the final energy consumption, the share of wooden buildings, the ratio of imports and exports of various forms of wood, etc.



Examples of good practices: Kočevski les regional wood processing centre, Šentrupert wood processing centre, Lumar, Riko, Tanin, Kos carpentry, CelCycle

Strategic Research and Innovation Partnerships (SRIP): Smart Buildings and Homes including the Wood Chain, Circular Economy

Potentials: For example, the “Les je lep” (Wood is Beautiful) program is one of the activities that have in recent years already stimulated the development of wood chains in Slovenia to some extent. The Strategic Research and Innovation Partnership's (SRIP) “Smart Buildings and Homes including the Wood Chain” was designed, the Slovenian Forest-Based Technology Platform is operating, and both groups offer an opportunity to upgrade knowledge and develop new projects. In this regard, the profession emphasizes that SMEs in particular are those who need assistance and encouragement in the development of projects and in the inclusion in European tenders. That is, there is a lack of connectivity between them and larger systems, the communication is not efficient enough, and promotional activities are poor.

Promising prospects:

- **Wooden construction** which goes beyond low-rise houses only – technologies for high-rise wooden buildings have been developed;
- **Buildings as material banks** – during the building design materials that will be included in the design of the building are already listed and integrated as modularly as possible so that the decomposition of the building is simple and the material is reusable to the greatest extent possible;
- **The revival of the furniture industry** – it has already been well developed in Slovenia and, after the crisis period, certain plants have been re-opened, while small entrepreneurs are still not integrated well into the emerging value chains and the entire wood processing system;
- **Reuse of timber and fixing of wood products** – opportunities in which new jobs can be created and the value preservation can be prolonged;
- **Inclusion in green procurement** in the field of wood is not intensive enough – there is a need to improve the dialogue with policy makers and procurement designers and jointly formulate concrete opportunities and list the existing good practices;
- **Connections with the paper industry**, cooperation in innovation – i.e. new materials, new manufacturing technologies, the development of nano-technologies;
- **Cascading use of woody biomass** – an opportunity to extract (nano-)cellulose that is useful for new materials, producing green chemicals;
- **Wood as an energy product** – focusing primarily on waste wood which could be sensibly used as an energy product at local level;
- **Innovative water treatment plants** – in practice, we already have functioning solutions that work perfectly and serve as an example for solving regional municipal challenges;
- **Wood-to-fuel processing** – a more detailed definition of when and where this is sensible to use, the design of a comprehensive planning involving different disciplines and the development of new knowledge.



CELCYCLE



Slovenia is one of the most wooded countries in Europe, and woody biomass is one of our key resources which can be used for much more than just energy consumption. The CELCYCLE project, coordinated by the Pulp and Paper Institute focuses on utilisation of biomass as a renewable raw material resource at an advanced level. It consists of 21 partners coming from the entire value chain, of which 12 companies operate in the field of paper, chemical, textile, wood and automotive industries, construction, engineering and energy, while nine are research organisations.

It represents a model example of the introduction of a circular economy, the partnership action involving a multitude of

stakeholders with the objective of efficient utilisation of local production resources and thereby the implementation of the circular bio-economy in Slovenia.

A comprehensive value chain for the cascading use of biomass has been established, and activities are carried out in several stages: i.e. the development of new bio products (nano-cellulose and green chemicals); advanced and multifunctional materials with integrated nano-cellulose (paper, cardboard, yarn); new products with bio-based components in branches such as automotive, construction and textile industries; the development of processes for the biological and mechanical processing of solid bio-waste and new systems for the use of biomass as an energy product.



THE MUNICIPALITY OF ŠENTRUPERT



The Municipality of Šentrupert, which received several awards for its innovation, has set a goal of becoming self-sufficient and as such capable of providing the people with vital resources and improving the quality of life. It recognised its potential in the field of circular and low-carbon economies, and in particular wood. Electrical power generators are driven by a wood-chip powered power plant where the generated waste heat is used for heating. In Šentrupert, about 65% of all heat and 40% of electricity are produced from the biomass, therefore reducing residents' bills by 15% to 20%. Local forest owners have the opportunity to sell their biomass in the local environment. In this way, financial resources remain in

the local environment which contributes to raising the population's standard of living. In addition, Šentrupert also boasts a wooden energy-efficient nursery school and the Land of Hayracks tourist attraction which has attracted more than 40,000 tourists from different parts of the world.

An innovative wastewater treatment plant operates in the municipality, the result of the Rusalac project. It purifies wastewater with the help of zerovalent iron nano-particles which additionally improves the purity of water. The water is then fed back into a return system for reuse. This way, as much as one third of the consumed water is purified and returned to the water supply network for reuse.



MANUFACTURING INDUSTRY

The area includes: Industrial enterprises that convert raw materials into products, semi-finished products and companies operating within their supply chains.

Why this priority: The manufacturing industry is **one of the main and most export-oriented sectors in the country**, while at the same time highly dependent on imports and one of the main consumers of materials, water and energy and one of the largest producers of waste products.

Circular business models and associated value chains can be perfectly implemented in manufacturing, starting with ecological design, implementation of new materials, energy efficiency, and the possibility of maintenance, repair, and restoration of products and, in the final stage, their recycling. **To maintain international competitiveness**, compliance with circular principles is becoming increasingly important, as many corporations favour suppliers that demonstrate innovation and efficiency at the level of circularity.

How it can be measured: We monitor material productivity – i.e. the number of symbioses or repair shops/re-use centres, number of green jobs, the amount of recycled raw materials at the industry input, the amount of recycled materials in input materials, the amount of modified business models (ranging from products to services or functions), green public procurement, use of renewable energy sources (RES), etc.

Strategic Research and Innovation Partnerships (SRIP): Factories of the Future, Product-based Material Development

Examples of good practices: Aquafil, Revoz, Talum, the SIJ Group, Iskraemeco, Benedetti Fashion

Potentials: Switching from products to services, from consumers to users, from ownership to sharing – all this can be promoted and implemented in the field of manufacturing. When we talk about the need **to change the way of production and consumption**, it is precisely the field of manufacturing industries where the effects can be most visible. In Slovenia, we have large and **world-renowned companies** that are recognisable by the transition from linear to circular business models, while there are many **smaller business entities** that have, due to their innovation, become pioneers of circular solutions. Many of these are not known to the wider public; therefore, the communication of good practices is of utmost importance for promoting a circular transition and learning from those who have already entered the path of transition.

Promising prospects:

- **Ecological design** – the design of products with the aim of easy maintenance and their retention in the use cycle for as long as possible, and to enable the easiest possible disassembly and recycling upon the end of their lifespan;
- **Industrial symbiosis** – we have good examples of connecting actors in the market, which, by mutual cooperation, optimize material flows (which are for some



represented by waste, while for others the input material or source);

- **The use of secondary sources** – a contribution to the preservation of the value of the materials that have entered the production cycle and thereby extending their shelf life;
- **The transition to RES** (renewable energy sources) – an integral part of the commitment to the transition to a low-carbon society which is an already well-established concept in Slovenia;
- **Innovative materials** – they contribute to fewer environmental burdens, better product characteristics and easier maintenance thereof;
- **Limiting the use of rare materials** – i.e. metals and minerals – is a major challenge for Slovenia and Europe whose import depends on them – what can substitute them, how can they be retained in the local environment even after the end of product use (e.g., electronic equipment and appliances);
- **Fair sourcing in supply chains** – good practices in Slovenia also set an example on an international level and they promote the traceability of the material origin and thus the possibility of selecting business partners following the principles of fair trade;
- **Reducing the use of plastics** (and its replacement) **and reducing the use of hazardous chemicals** – compliance with EU directives and implementation of concrete solutions in Slovenia, incentives for activities not only on the producers' side, but also by raising awareness of users and changing their shopping habits.



THE SIJ GROUP



The SIJ Group, Slovenian Steel Group d. o. o., is the largest Slovenian steel producer and one of our main exporters. Production is entirely based on the principles of circular economy. Steel scrap as a basic raw material is collected in own collection warehouses in Serbia, Croatia, Bosnia and Herzegovina, and Slovenia. With secondary raw materials collected in this manner, Slovenia produces superior niche steels. All metal by-products are separated and reused in the production of steel. Slag stands out among the by-products that are processed and used in asphalt mixtures in terms of volume. Average CO₂ emissions of the SIJ Group total 408 kg/t which is considerably lower compared to integral ironworks (1700 kg/t) and comparable steelworks (700 kg/t), but it is also worth noting that the SIJ company uses less industrial water as in other comparable steelworks.

SIJ is intensively devoted to the projects of taking advantage of useful (waste) heat for district heating. In 2016, the partners SIJ Metal Ravne, Petrol Energetika, the Jožef Stefan Institute and the Ravne na Koroškem Institute presented an integrated energy solution with an innovative and award-winning example of a transition to a circular economy. It is based on the exploitation of waste heat generated during metallurgical processes for district heating and hot water preparation in the area of Ravne na Koroškem. In 2016, approximately 21 per cent of all the heat required to heat the city was generated in this way, and the amount of greenhouse gases was reduced by 1,500 tonnes per year, and with this model they also reduced the on-site consumption of electricity.



AQUAFIL



Aquafil, an international group based in Italy, which has its own factories in Slovenia, is one of the leading European and global manufacturers of synthetic fibres for textile floor coverings and clothing (swimwear, sportswear, etc.). At the Ljubljana-based factory (AquafilSLO) they produce recycled raw material for the production of ECONYL® fibres from waste, including waste fishing nets, parts of textile floor coverings and industrial waste. ECONYL® is a 100% recycled nylon and is a global innovation. The fibres are comparable to nylon made from primary raw materials in terms of quality, and are used by leading global brands such as La Perla, Stella McCartney, Adidas, Speedo, Levi's and Gucci.

In addition to the development of technology and the construction of an industrial facility (more than €30 million has already been invested in it), Aquafil has invested a lot of effort and assets into the creation of a new supply chain, the search for appropriate waste streams, the establishment of

cooperation with aquaculture and fishery organisations, the organisation of the transport of waste materials from one country to another and the separation of different materials. Aquafil underlines that "in the circular economy, in addition to research and development, cooperation is also an essential factor. No one can become sustainable or circularly-oriented on their own; the whole value chain must think and act in harmony".

The Healthy Seas Project for the reduction of marine pollution with discarded fishing nets is included in the circular forms of cooperation. Another example is the cooperation between AquafilSLO in Ljubljana and the Atlantis Water City (BTC d.d.). The companies have set up a unique example of industrial symbiosis where excess heat generated during the ECONYL® process in Ljubljana acts as a source of heating for swimming pools, saunas and sanitary water in the Atlantis water park.



MOBILITY

The area includes: All systems that relate to the movement of people and freight: different modes of transport, ranging from public to private, infrastructure, mobility-related habits, etc. The Roadmap puts an emphasis on the mobility of people.

Why this priority: Mobility is also **one of the essential social functions** and a field which, due to the specificity of Slovenia (dispersed settlement), presents one of the key challenges for the transition to a circular economy. Slovenia as a transit country also faces the challenges of finding a solution to freight transport and the corresponding development of its infrastructure.

How it can be measured: We are monitoring mobility – passenger kilometres (regular public transport services by road, railway transport, air transport), the number of passenger vehicles used by natural persons per 1000 inhabitants, the number of passengers, the regular public transport services by road, regular urban public transport services, railway transport, air transport, port transport, the number of vehicles – passenger cars per 1000 inhabitants, the total use of shared transport, electrification of vehicles with a share of electric vehicles, kilometres of organised cycling routes, the use of bicycles



Strategic Research and Innovation Partnerships (SRIP): Mobility, Smart Cities and Communities

Examples: Avant2go, Goopti, prevozi.org, EDISON, Ecubes Arcola

Potentials: Due to geographical location and manageable size, Slovenia can become a **reference laboratory of green mobility** and the leading country in the demonstration and transfer of green mobility technologies to international markets. In addition to the strong representation of export companies, i.e. mainly suppliers to large (German and other) automotive companies, we have strong innovation potential in the field of the development of electric vehicles and support infrastructure, as well as the already established models of the distribution economy in mobility – from renting bicycles to electric cars and transport services.

Promising prospects:

- **Eco-mobility** – it is most comprehensively summarised by the Edison project which brings together several partners, offering innovative solutions that can become a pilot project for Europe;
- **Electrification of transport** – this is happening on the level of towns and cities, as well as in the connection between individual places in Slovenia by placing electric filling stations and promoting the use (rental) of electric vehicles;
- **Sharing of electric vehicles** – Ljubljana was the first city in Slovenia (and one of the first in Europe) where a network for the sharing of electric vehicles Avant2go was established;
- **Bio-gas as an alternative fuel** (also for goods transport) – this is one of the development directions of energy companies which is related to investments in the development of adequate infrastructure;
- **Other alternative fuels** – an example of the combination of combustion of hydrogen and other motor propulsion sources;
- **Public transport services** – the focus on the use of alternative energy sources such as bio-gas and electricity, focusing on increasing accessibility and greater flexibility of the public transport systems themselves;
- **The integration of towns and cities and rural areas** – mobility as a service that can be performed by volunteers, students and rural communities as a supplementary activity to provide better mobility with a smaller burden on the environment, fewer private car owners and greater use of electric vehicles;
- **Car sharing** – a well-developed network called prevozi.org that is already trusted by many users – accessibility and security;
- **Promoting cycling** – cycling routes spreading in towns are becoming part of Slovenia's tourism offer (tourist routes and connections); making cycling along with the expansion of bicycle rental networks, education and the inclusion of the youngest an important part of the transport culture in Slovenia.



AVANT2GO

Average passenger cars in Europe are standing in parking spaces 92% of the time, at the same time they represent a high cost and pollute the environment. Therefore, the change in mobility patterns is a key part of the circular economy. Avant2GO is the first Slovenian vehicle sharing system which includes only electric cars. The founders of Avantcar and the public and private partners want to contribute to reducing the cost of ownership of a car, thereby reducing the time spent searching for parking spaces and reducing noise pollution and greenhouse gas emissions in Slovenian towns and cities. Avant2GO allows you to rent electric cars using a mobile application. The user only pays the rental time of the vehicle. With the help of the application, the Avant2GO

members can use the vehicle at the marked charging points at several locations in Ljubljana, the Jože Pučnik Airport, Maribor, Kranj and Murska Sobota. The procedure is simple: using the application, they select the location of the electric vehicle; after logging in, they unlock the selected vehicle and are set to go; after use they leave the vehicle at a selected Avant2GO marked parking space; then rate the cleanliness of the vehicle using the application, and lock it. The system is safe, easy to use, and above all quick and efficient. It is possible to see an increasing number of cars carrying the Avant2GO logo on the roads which shows that the mobility revolution is starting to take place in Slovenia as well.



EDISON

In November 2017, a group of partners – companies, universities, institutes, municipalities and others – with the EDISON – Eco Driving Innovative SOLUTIONS and Networking project launched an ambitious idea of Slovenia's position as a reference country in the area of green mobility. The main goal is to make green mobility user-friendly and affordable. The project consists of four main pillars: the development of new and innovative green mobility solutions; the development of new personnel skills and competences; the demonstration of new technologies and introduction of new technologies on the

market. The model city of the project will be Koper with the introduction of Slovenian e-buses (VivoBus) and bicycles (Rog), the city car sharing and e-taxis (Europcar Slovenia) and the development of an application that will combine different aspects of usage and the provision of smart solutions for green mobility (Petrol and Abelium). Among the many technologies that will be developed, tested and presented within the project, is also the implementation of the technology of wireless induction charging, EDISON WINCI, which will replace the standard charging of electric cars via charging stations as a technology of the future.



IV.

WHAT NOW – RECOMMENDATIONS





IV. WHAT NOW – RECOMMENDATIONS

The recommendations that we present are a summary of the process that was conducted at the time the Roadmap was drafted in cooperation with various stakeholders and based on a recognised and **clearly stated common objective for Slovenia to continue the path of development towards the circular economy**. How fast we will progress on this path depends mainly on **how successfully we will overcome or eliminate the identified obstacles**.

The intertwining of all areas summarized by the Circular Triangle – the Circular Economy, Circular Culture and Circular Changes – calls for the promotion of cooperation and the bottom-up acquisition of ideas (the economic sector, citizens and NGOs, local communities) that can help the government to develop **an action plan for the Circular Transition of Slovenia**. The appointment of an expert council that would link government representatives and other stakeholders in the creation of an action plan (such a form of cooperation has already been used by many countries) would present a meaningful upgrade to the Roadmap and accelerate the recording and implementation of a targeted and measurable framework for the specification of priority circular activities.

The sensitivity of the involvement of various stakeholders has been confirmed within the framework of the functioning of the **Partnership for Green Economy** which is part of the activities of the **Prime Minister dr. Miro Cerar's Cabinet** and has managed to integrate about **3,000 stakeholders** in three years, while at the same time it involved inter-sectoral cooperation and harmonisation at government level that is also a necessary prerequisite for circular transition.

The **recommendations** that we have co-created with stakeholders in the dialogue at regional consultations and individual meetings which took place from October 2017 to March 2018 can act as a starting point for the record of the action plan for the transition to the circular economy of Slovenia. They are distributed in areas within a circular triangle that are interconnected and interdependent. The distribution is made on the basis of the key holders of an individual recommendation:



CIRCULAR CHANGE PUBLIC SECTOR AS THE CORE

1. **The circular economy as a strategic priority of Slovenia** – the Government has to consider the circular economy as a **horizontal link** between all areas – interdepartmental integration is not sufficiently active, the majority of activities are still linked to the Ministry of the Environment and Spatial Planning, while the extent of involvement of other ministries, notably the Ministry of Economic Development and Technology, the Ministry of Finance and the Ministry of Education, Science and Sport, is not sufficient.
2. **A more proactive fiscal policy** – the Ministry of Finance should be more flexible in adapting fiscal policies to promote the transition to circular business operations.
3. **Harmonisation of subsidy policies** – certain policies between individual sectors are non-harmonised and even contradictory, they do not promote circular management; therefore, conflicting policies need to be harmonised as soon as possible.
4. At the level of **Strategic Research and Innovation Partnerships (SRIP)**, there is not enough synergy for the circular transition – action plans and metrics for monitoring performance (and circularity) have not yet been synchronised. The role of a facilitator between individual Strategic Research and Innovation Partnerships (SRIPs) should be taken over by the SRIP Circular Economy network to actively guide harmonization and cooperation among Strategic Research and Innovation Partnerships' (SRIP) members.
5. **Green public procurement** – public institutions need to communicate the green procurement, the resulting opportunities and examples of consistent implementation in a more coherent manner, in particular on the level of public institutions. For an efficient execution of green public procurement, they should transfer good practices between various operators and respond more quickly to identified obstacles.
6. **Green jobs** – cooperation between different sectors should enable an effective policy for securing green jobs. A mechanism should be established to enable the involvement of competent individuals in scientific and research projects in the field of the circular economy.
7. **Emphasis on learning and consolidating good practices** – a dialogue between stakeholders and the strengthening of recognisability of good circular practices that set an example and promote a circular transition should be encouraged through inter-sectoral cooperation that is already underway on the level of the Partnership for the transition to the green economy.
8. **Methodology** – to enable monitoring of the efficiency of the transition from linear to circular business models. On a national level, it needs to be introduced and linked to the methodology used by the SRIP Circular Economy.



Representatives of the Government Office for Development and European Cohesion Policy should be involved in the preparation of an emerging framework for the monitoring of the circular economy at EU level in order to harmonize national and European circulation indicators.

9. **Promoting investments in circular business models** – concrete measures that direct domestic and foreign investors towards the circular economy, reward and promote long-term oriented investments in circular practices, include the existing ones and develop new financial instruments for efficient circular management must become a guidance for the Ministry of Finance and the Ministry of Economic Development and Technology.
10. **Circular Agricultural Policy** – the Ministry of Agriculture, Forestry and Food must develop clear guidelines and conditions for the development of agriculture in the direction of circular models, take into account the opportunities brought about by bio-economics and promote innovative approaches both in food production and in management of forest value chains.
11. **Incorporation of the circular economy throughout the entire educational vertical** – the Ministry of Education, Science and Sport is slowly upgrading existing programmes and establishing new ones that would speed up the circular transition. It should encourage faster introduction of complementary and additional content from the field of circular economy throughout the education system.
12. **Promotional activities of Slovenia** that are based on "green and digital" referentiality – greater attention and support should be given to individuals, companies, and other stakeholders who are circular breakthrough actors, and allocate them more systematically in the promotion and international connections of Slovenia.
13. **Economic diplomacy** – the consular corps must acquaint itself with the established international links in the field of the circular economy within the framework of the Ministry of Foreign Affairs and, on this basis, strengthen the business links and international competitiveness of Slovenian circular pioneers (Ellen MacArthur Foundation, WEF, ECESP, etc.).
14. **The Prime Minister dr. Miro Cerar's commitment to establish a circular hub (HUB)** – Slovenia is becoming a recognisable actor in the circular economy, and the Prime Minister dr. Miro Cerar committed himself within the framework of cooperation with the WEF (the PACE programme) to establish a regional circular hub in Slovenia. This should link the most active stakeholders (the governmental, private, non-governmental, academic) and formulate an action plan for an even stronger cooperation with international networks of circular economy and strengthen the role of Slovenia as a circular centre for SE Europe. The government must fulfil this commitment.



CIRCULAR ECONOMY COMPANIES AS THE CORE

15. **Ecological-design (circular design)** – more attention should be paid to raising awareness and education about eco-design. We must place this area appropriately in the business decision-making process and the broader concept of planning and managing circular changes.
16. **Incentive for creative industries** to engage in circular transformation – we need to strengthen the flow of information on business opportunities, educational programmes in the field of eco-design and systematically consolidate the creative role in the economy. An important role should be played by the Creative Industries Centre/Museum of Architecture and Design.
17. **Investing in research and development** with a clear goal – solutions for accelerating the circular transition (one of SRIP priorities). We must actively monitor the results and effects of investment in this area and adapt quickly to the emerging needs of cooperation between the economic and scientific research sphere.
18. **Promoting the preparation of circular economy projects** that will successfully apply for already available financial resources and for a new financial perspective – we need to invest more in informing, the connecting of potential partners, familiarizing with good practices and providing administrative support for the timely application of projects (potential on the side of SRIPs).
19. **Certification** – we need to assess which certificates bring added value, are internationally comparable and actually promote the transition to circular business. For their acquisition, we must carry out suitable education, encourage potential stakeholders to decide to get them, keep a record of certified providers in different areas ranging from certification of products and services, to management and management systems.
20. **Faster digitalization and the use of blockchain technologies** – to promote circular business and management models, digital solutions help to manage available data and connect different actors to use circular solutions. It is important to adapt business processes and the regulatory environment quickly enough.
21. **Sustainable or eco-tourism** as an opportunity for Slovenia – we need more targeted information and encouragement of tourism providers to get involved in education, certification and the creation of a comprehensive offer based on the principles of a circular economy. We need to strengthen the ability to connect various activities – food, accommodation, forest- and wood-based, entertainment, mobility, congress, sports, health resort activities, etc.
22. **The integration of the circular economy and bio-economy** – research and development must be focused on the search for new materials that are based on natural sources which will replace the existing ones that present a burden



for the environment. We need to improve economic management of biomass, increase the use of wood and its added value. Legislative frameworks and development policies need to be adapted accordingly.



CIRCULAR CULTURE CITIZENS AS THE CORE

23. **The role of towns, cities and local communities** – these are the central hubs for implementing the transition to a circular economy. We must pay attention to the integration of residents, citizens and their initiatives into development programmes. We need a more strategic and systematic approach to urban and rural development.
24. **Towns and cities as a site for testing and enforcing circular concepts** – in urban communities, we need to encourage the development of resource management centres. These are part of the larger functional areas that we need to shape by connecting several municipalities. This development is in line with the recommendations of the EU's Circular Economy Agenda.
25. **Scaling the established circular practices of citizens** – we need to provide incentives for their achievements, easier access to sources of financing for micro businesses and individuals, facilitate communication of their practices and provide support of transfer of existing good practices to other local environments.
26. **Promoting inter-sectoral cooperation** – field work with concrete circular pioneers is of utmost importance for a faster circular transition. We need to provide opportunities for presenting their practices, expanding their model of operation to new stakeholders thereby spreading circular value chains.
27. **Public private partnerships** – we need to strengthen the awareness of good practices in this field, as well as the benefits and pitfalls that this kind of cooperation brings. We need to consolidate understanding that such cooperation formulate projects that bring long-term benefits to all participants, and above all to citizens.

V.

CREATING THE ROADMAP





V. CREATING THE ROADMAP

During the period between September 2017 and April 2018, the project group for the preparation of the Roadmap:

- Organised and conducted 7 meetings in 12 regions of Slovenia and 7 interactive workshops;
- Listed almost 100 good practices from all over Slovenia;
- Conducted 19 structured interviews with key stakeholders from government departments, the economy, interest groups and experts from individual fields;
- Stimulated 3,000 stakeholders to take part – communication within the framework of the Partnership for Green Economy and the electronic newsletter;
- Presented the Roadmap at various events in 9 European countries – i.e. Austria, Spain, the Netherlands, Belgium, Greece, Switzerland, France, Serbia, Slovakia;
- Presented the process of drawing up the Roadmap at more than 15 different events in Slovenia;
- Regularly informed the public on the progress of the project on websites, social networks and the Partnership for Green Economy.



Figure 9: The process of creating the Signposts

VI. APPENDICES





VI. APPENDICES

A. REFERENCES AND SOURCES

B. IMPRINT

A. REFERENCES AND SOURCES

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B. IMPRINT

Following the example of related processes and documents, the initiative for the drawing up this publication was created within the framework of the Partnership for Green Economy which is headed by the State Secretary in the Office of the Prime Minister of the Republic of Slovenia dr. Miro Cerar, Tadej Slapnik, MSc.

Full title of the document: **Proposal for a uniform document on the potentials and opportunities for the transition to a circular economy in Slovenia**

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PHOTOGRAPHY:

The Circular Change Archive

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LJUBLJANA, 30 April 2018