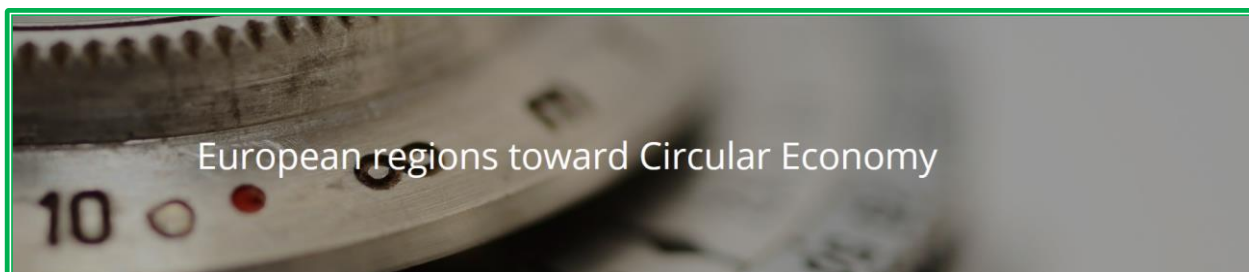


"Circe - European regions toward Circular Economy"

INTERREG Europe Project



Priority Opportunities

Project Partner 1 – Lombardy Region

| | |
|---|----|
| 1. Executive summary..... | 1 |
| 2. Prioritization | 1 |
| 3. Opportunities ranking..... | 2 |
| 4. The Stakeholders | 6 |
| Annex 1 – Weights..... | 1 |
| Annex 2 _ Biomass..... | 2 |
| Annex 3 – Built Environment..... | 6 |
| Annex 4 - Food waste | 12 |
| Annex 5 - Plastics..... | 17 |
| Annex 6 - Textile | 22 |
| Annex 7 - WEEE | 28 |
| Annex 8 – Rankings graphs per sector..... | 32 |

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1. Executive summary

This document provides an overview of the process used by Lombardy Region to prioritise opportunities identified through the CircE project and their final rankings per sector.

2. Prioritization

How we used the Criteria tree

As described extensively in the Synoptic report on Prioritization, the general structure of the criteria tree was shared in the steering group organized in Nijmegen during the meeting held from the 13th to the 15th of June 2018. After that, some PPs asked for minor changes, so the final structure of criteria tree was defined only in July 2018. This final version is the one used by Lombardy Region.

How we defined the weights

After having defined the final and shared version of the criteria tree, the weights definition issue had to be tackled first.

Lombardy Region faces two possibilities. The first one implies the involvement of SHs in the definition of the weights associated to the criteria, while the second one considers the involvement of SHs only in a second step, for the validation of the ranking got by applying the AHP.

The first possibility seemed to be very challenging, since the involvement of many SHs of different sectors would have implied a long process, considering moreover the need to find an agreement on the weights. This would not have been compatible with the time scale of the project. Therefore, Lombardy region chose the second possibility, deciding to define the weights internally, without involving SHs.

The weights definition was done by 4 members of the Lombardy team.

Each one of the four member of the CircE Lombardy team made by themselves the pairwise comparison, comparing each criteria with the others of the same group.

After that, the four different results were compared among the members of the team, discussing the different opinions, and reaching an agreement in order to align the values of the pairwise comparisons. Therefore, the final result is not obtained with a simple average, but through the dialogue. The methodology is actually not a black box that gives automatically a result, but it is a way to guide and stimulate a discussion in order to find an agreement.

After the discussion, the adjusted four responses were given to the technical assistance that calculated the final weights.

Just to sum up the final results of the overall weights identification, considering the Global Desirability Values obtained, the highest values are those related to the environmental issues that, considering the Lombardy context, are indeed very important.

The final values of the weights are reported in Annex 1.

How we got the final priority ranking

Once having obtained the values of the weights, all the opportunities identified (55, considering also the cross-regional ones) were assessed under those criteria.

More in detail, the final priorities ranking for the opportunities was achieved through inputting for each of the combinations among opportunities and criteria a score from 1-5 (1 being least desirable and 5 being the most desirable).

The total evaluations to be performed were 825 (55 opportunities per 15 criteria).

Also for this part of the work, Lombardy team decided not to involve directly the Stakeholders, considering the significant number of evaluations to be performed.

Therefore, this evaluation was repeated within the internal staff of the Lombardy region team (the same 4 employees that had evaluated the criteria through the pairwise comparison).

Then, since the discussion of all the 825 values among the four different member of the Lombardy CircE team would have been a strong effort, first of all the standard deviations among the four different response were calculated: the standard deviation showed that there was a very close alignment on many weights.

For the cases where the standard deviation was above a fixed threshold, the members of the team, through a discussion, found a shared value, in order to ensure, even if not an aligned response, at least a low standard deviation.

Then the final value was defined calculating the average.

The total ranking of the opportunities was split into different rankings for each of the sector considered.

The final ranking of opportunities was then presented to SHs at the plenary meeting on the 27th of September.

Then, specific meetings with SHs, one for each sector, were held in order to validate the final ranking. Even though in many cases SHs confirm the order of the opportunities, in some cases SHs thought that the ranking should be significantly different.

Therefore, we decide to keep as final result two separate rankings in order to save the different information which these differences implied as explained below (chapter 3).

3. Opportunities ranking

As described above, in the end two rankings per sector were obtained: one ranking produced by the Lombardy Region team scores; one ranking deriving from the discussion with SHs of the Lombardy Regions team's ranking (the SHs had in some cases different opinions with respect to the position of specific opportunities in the ranking).

Assuming that different positions in the ranking imply different perceptions of the impact of opportunities, we argued that into these differences useful information could be embedded and that it would be worthwhile to explore them.

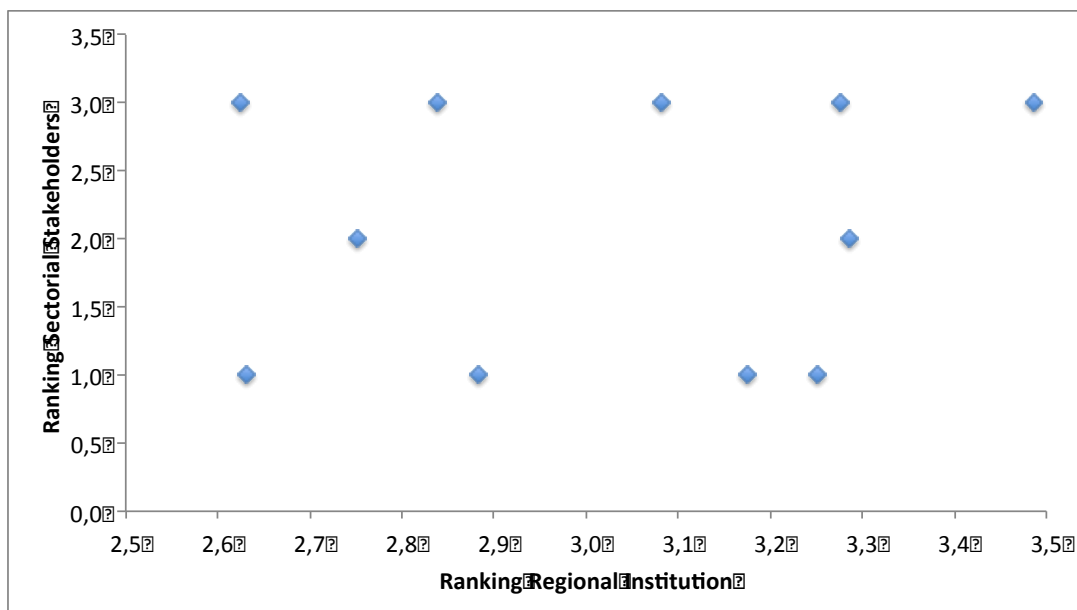
Therefore, with the support of STIIMA-CNR, we designed a specific tool to support this analysis.

The priority ranking map

The priority ranking map is a tool to:

- cluster the ranked initiatives in the different sectors with respect to the perception of their relevance by sector-specific stakeholders and the regional institution;
- support the identification of specific implementation actions with reference to the position of the initiatives within the map.

The image below shows the distribution of different opportunities in the Chart, depending on the score expressed by the regional institution (X) and the stakeholders (Y).

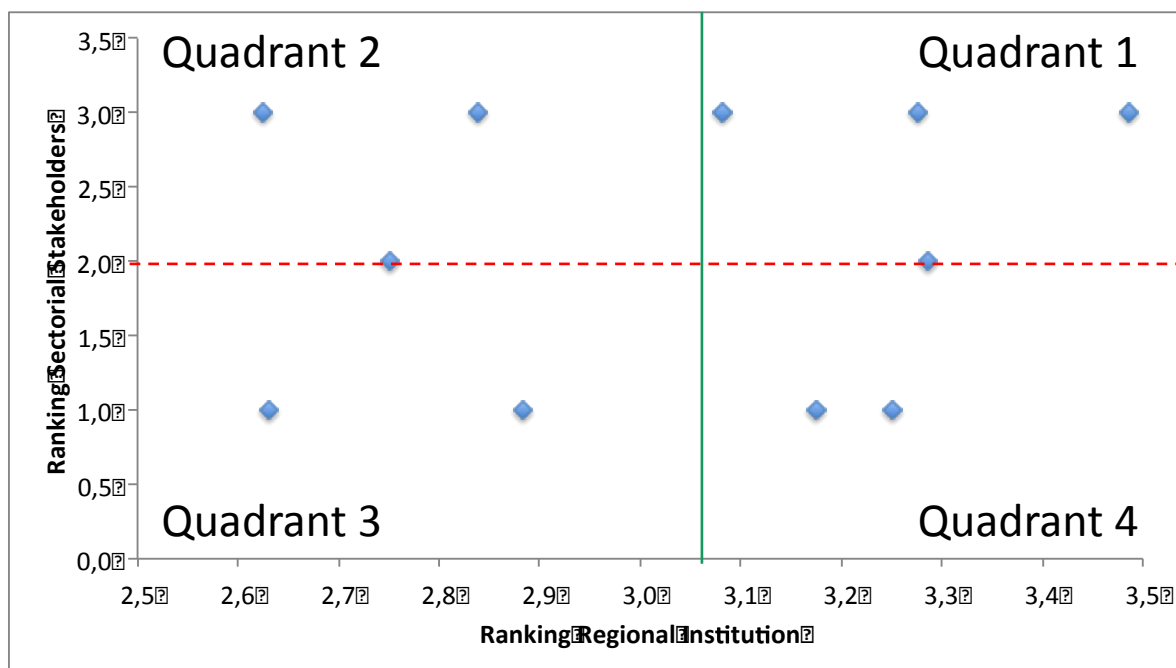


Therefore, the method foresees to locate the initiatives on the map by considering the ranking score of the regional institution and the sectorial stakeholders.

Then, the methodology foresees to find the median:

- of the set of ranking scores for each sector provided by the sectorial stakeholders;
- of the set of ranking scores for the entire set of sectors provided by the regional institution judges (provided, for all the sectors considered, by the same team).

Such an approach identifies 4 clusters in the 4 quadrant of the map, as shown below.



Meaning of the different Quadrants

The fact that an opportunity belongs to a Quadrant implies specific peculiarities of that opportunity, in terms of status, strategy and policy options or actions feasible.

Quadrant 1

Status: The opportunity is perceived as a high-impact action both by the regional institution and the sectorial stakeholders.

Strategy: It is of high priority and should be supported since it is of interest for the eco-system.

Action 1: Medium-level public support should be provided to these opportunities, as they are already perceived as relevant by the private sector.

Action 2: Effort shall be spent to remove the implementation barriers.

Quadrant 2

Status: The opportunity is perceived as a high-impact action by the sectorial stakeholders and as low impact action by the regional institution.

Strategy: The level of formalization of the expected impacts (especially environmental and social) of the opportunity seems improvable, as the benefits at eco-system level are not clear to the public institution.

Action 1: Effort should be spent in supporting technical consulting services to improve the level of maturity of the opportunity and the appreciation of its potential by authorities and decision-makers.

Quadrant 3

Status: The opportunity is perceived as a low-impact action both by the regional institution and the sectorial stakeholders.

Strategy: It is not of high priority and should be supported only if surplus resources are available.

Action 1: Leave the action behind.

Quadrant 4

Status: The opportunity is perceived as a high-impact action by the regional institution and as low impact action by the sectorial stakeholders.

Strategy: The opportunity can bring high benefits to the regional eco-system, therefore it should be supported, after it is accepted by the stakeholders, and included in the regional strategic development actions.

Action 1: Effort should be spent in supporting awareness increase activity focused on the benefits of the initiative.

Action 2: Effort should be spent in supporting networking with other stakeholders that could support the implementation of the opportunity.

Action 3: opportunity for new incentives and legislations that can boost the implementation of the activity should be investigated.

Action 4: In general, as this is perceived as a high risk activity by the sectorial stakeholders, high public support should be invested.

Further Analysis

The considerations above suit a general analysis of all the sectors. They can be enhanced, further developed and customised once applied to specific sectors.

Related Annex

In Annexes from 2 to 7 the tables per sector are reported. The column “Quadrant” (beside the two rankings columns) contains the quadrant, which the opportunity belongs to.

In Annex 8 graphs matching the scores (Lombardy Team's ones and SHs' ones) per sector are reported. The labels of the dots report the value on of the scores of the single opportunity, in order to allow its identification.

4. The Stakeholders

The Stakeholders took part in the Opportunity ranking process as described above.

The use of the approach proposed in chapter 3 allowed us to keep two different rankings and to value the SHs' point of view, concerning the priorities and the meaning of the different positions in the ranking of the opportunities.

Therefore, the SHs' and the Lombardy team's point of view concerning each opportunity allowed us to furtherly clarify the specific approach in order to support each opportunity, as explained above.

Moreover, during the sectorial meetings to discuss the rankings, important considerations emerged, which were quite interesting to further shape the previously done barriers analysis and the policy options.

Annex 1 – Weights

| Level | Kind of impact | | Weight | | |
|---------|----------------|---------------------|--|----------------|-------------|
| | | | Local weight | Global weights | |
| Level 1 | Strategic | | 0,1683 | 0,1683 | |
| | Economic | | 0,2883 | 0,2883 | |
| | Social | | 0,2134 | 0,2134 | |
| | Environmental | | 0,3299 | 0,3299 | |
| Level 2 | Strategic | | Replicability | 0,3 | 0,05049 |
| | | | Time-scale | 0,2728 | 0,04591224 |
| | | | Coherence with RIS3 | 0,1153 | 0,01940499 |
| | | | Contribution to the Local Eco-System Development | 0,1959 | 0,03296997 |
| | | | Contribution to the legislation targets | 0,1159 | 0,01950597 |
| | Economic | | Profit | 0,6667 | 0,19220961 |
| | | | Payback Time | 0,3333 | 0,09609039 |
| | Social | | New Skills | 0,2927 | 0,06246218 |
| | | | Public awareness | 0,2125 | 0,0453475 |
| | | | Social Inclusion | 0,1903 | 0,04061002 |
| | | | Job Creation | 0,3045 | 0,0649803 |
| | Environmental | | Emissions Saved | 0,5119 | 0,16887581 |
| | | | Energy Efficiency | 0,1222 | 0,04031378 |
| | | | Resource Efficiency | 0,3659 | 0,12071041 |
| Level 3 | Environmental | Resource Efficiency | Total Resource Volume Saved | 0,734 | 0,088601441 |
| | | | Strategic Resources Saved | 0,266 | 0,032108969 |

Annex 2 _ Biomass

| ID | Name | Description | AHP ranking | SH ranking (3 max, 1 min) | Quadrant |
|-------------|--|---|-------------|---------------------------|----------|
| VC03Biomass | Developing multi-regional pilot innovation facilities | Several initiatives have been launched at European level to support industry in the transition to more sustainable circular economy businesses. However, innovations and demonstrators developed within projects find significant barriers in achieving the market as companies see circular economy as a high risk investment area. The major barrier is the lack of infrastructures or platforms that can incorporate these innovative technologies and services within integrated pilot plants to show-case to industry the developed technologies in real industrial environments and to boost their private exploitation and replication at industrial scale. Such infrastructures should act as "technology gateways" that any business sector can use. Enhanced support should be dedicated to the building and operation of multi-regional Pilot Facilities which will substantially improve sustainable innovation capacity of Europe. The development strategy should ground on the Smart Specialization Strategies of the Regions and regional best practices, thus exploiting the local eco-systems to achieve extended impact at European level This concept is a crucial element in dealing with societal challenges as the development of a sustainable, innovative and knowledge-based economy in Europe, creating jobs and meeting climate change targets. | 3,5 | 3,0 | 1 |
| VC04Biomass | New business models for bioeconomy start-ups | The bio-economy sector is populated by large companies that exploit economy of scale to reduce the impact of their high cost infrastructure and stay competitive on the market. However, several innovative business opportunities are emerging in small medium enterprises and local business stakeholders that could be enhanced through innovative business models in order to reach the market. This opportunity aims to develop new business models in biomass and, more in general in | 3,3 | 3,0 | 1 |

| | | | | | |
|-------------|--|--|------------|------------|----------|
| | | bioeconomy, to encourage and improve the creation of innovative start-ups in this field. Such business models should create the economic and financial preconditions for these business opportunities to emerge with sustainable and credible growth patterns. | | | |
| VC02Biomass | Local production – consumption chains of biomass | Supporting the development of a local circular value-chain, from production to consumption, could reduce the logistics costs in the biomass sector and become a promising strategy, especially for biomass from forest resources and agricultural production waste. For example, in the wood sector, a smart use of forest resources could enhance local economies by enabling use both in the industrial and manufacturing sectors as well as in energy production. However, enhanced knowledge of the specific production-consumption capabilities at local level, aiming at the establishment of a stable local value-chain, should be gained at regional level. | 3,1 | 3,0 | 1 |
| VC03Other | Enhance the role of customers towards circular economy | Customers need to become more and more aware of their power to influence the way companies design, produce and distribute their products. Large public institutions can play an important role in this transition by becoming themselves conscious customers of green products and thus influencing the manufacturers' attitude towards circular economy. | 3,3 | 2,0 | 1 |
| PP01_S5_020 | Increase the networking of Small and Medium entities | An existing barrier towards the creation of a stable circular bio-economy sector in the region is the high fragmentation of competences and technical capabilities and the lack of interaction between the local SMEs. For example, focusing on agri-biomass, SMEs need to understand the importance of creating networks, in order to grasp large-scale business opportunities together and become competitive in the global market. The objective of this action is to gather the attention of SMEs through communication and active involvement campaigns and to demonstrate the benefits and the sustainability of a collaborative networked business approach, on the medium-long term. At a regional level, this could lead to the creation of a stable SMEs regional network, able to align the activities and strategic objectives towards the target goal of becoming a circular bio-economy Region. | 2,8 | 3,0 | 2 |
| PP01_S5_021 | Enhance the role of clusters in the regional eco-system | Every region should strongly promote the role of the regional clusters as intermediaries favouring an interaction among the Regional offices, the | 2,6 | 3,0 | 2 |

| | | | | | |
|-------------|--|--|------------|------------|----------|
| | | companies and the Universities operating in the same sector of the cluster, in order to create research and innovation projects and sustainable paths to scale-up innovative solutions and to promote the creation of networks in the area of circular economy. | | | |
| VC02Other | Development of circular economy metrics | <p>Circular economy is recent a paradigm that has not been properly formalized yet both at scientific and industrial levels. With the goal to state baseline industrial situations with respect to circular economy, to fix target objectives, and to quantitatively track progresses towards these objectives a comprehensive metrics, including a set of multi-dimensional Key Performance Indicators (KPIs), should be developed. Such metrics should also support the comparison among circular initiatives in different sectors. The objective is the creation of metrics to track baseline situations and track progresses and impacts achieved at systemic level by circular economy initiatives.</p> <p>This solution would make it possible to report achievements and express desiderata that can enlight the need for future actions, in a comprehensive and comparable manner. Although an initial attempt has been made, through the Monitoring Framework – COM (2018) 29 Final of the European Commission, further actions are needed to bring these indicators in operation at Regional level and to make them accepted and shared by the stakeholders.</p> | 2,8 | 2,0 | 2 |
| VC01TOther | Inter-regional waste management protocols | <p>Trans-regional transportation and exchange of waste could become a relevant circular economy enabler if properly regulated and managed. This opportunity aims to develop safe and conscious inter-regional waste management protocols. In particular, these protocols shall be focused on the enhancement, both in terms of quality and traceability, of the procedures of waste management, from collection to recycling in every sector. The development of IT waste management platforms in a Zero Waste perspective could support the transparent implementation of such protocols.</p> | 3,3 | 1,0 | 4 |
| PP01_S5_033 | Implementation of a multi-user web platform for value-chain integration | <p>Information sharing among different stakeholders of the value-chain is one of the most promising enablers for emerging circular economy business models. A cross-sectorial web platform should be implemented for the creation of a virtual market containing the description, the volumes and the geographical localization of the waste materials coming</p> | 3,2 | 1,0 | 4 |

| | | | | | |
|-------------|--|---|------------|------------|----------|
| | | from different sectors (for example, from construction and to textile to other sectors). The platform should be multi-users, in the sense that multiple stakeholders should provide and retrieve information, in different stages of the value-chains. For example, plant managers may provide data related to processing capabilities, product designer may retrieve data about material characteristics, recyclers may retrieve data about products to be processed. In the Lombardy Region, ANCE Lombardia (construction sector), ANPAR (recycling sector) and Centrocot (textile sector) are independently setting up or already testing similar digital platforms. | | | |
| PP01_S5_034 | Standardization of waste management procedures from collection to recycling | The development of common rules and standard procedures for waste management, from collection to recycling of end of life products, can support a more efficient and effective recovery and recycling of goods across all sectors. | 2,6 | 1,0 | 3 |

Annex 3 – Built Environment

| ID | Name | Description | AHP ranking | SH ranking (3 max, 1 min) | Quadrant |
|-------------|--|---|-------------|---------------------------|----------|
| PP01_New_4 | Increase the quality of recycled aggregates (and of all the materials used in building) | A major challenge for unlocking the massive re-use of post-use materials in the built environment sector is the achievement of high quality standards of the recovered recyclates. Actions targeted to increase the quality of the produced aggregates, in order to increase their use in different sectors, supporting the development of homogenous input flows in the recycling plants and the use of the best available technology for plant design and installation should be supported. This objective can be achieved by innovative material inspection and quality control methodologies, innovative identification and sorting technologies, more effective material separation practices and strategies to select high quality and re-usable materials in the construction industry. | 3,4 | 3,0 | 1 |
| PP01_S5_009 | Implementation of a multi-user web platform for value-chain integration | Information sharing among different stakeholders of the value-chain is one of the most promising enablers for emerging circular economy business models. A cross-sectorial web platform should be implemented for the creation of a virtual market containing the description, the volumes and the geographical localization of the waste materials coming from different sectors (for example, from construction and to textile to other sectors). The platform should be multi-users, in the sense that multiple stakeholders should provide and retrieve information, in different stages of the value-chains. For example, plant managers may provide data related to processing capabilities, product designer may retrieve data about material characteristics, recyclers may retrieve data | 3,7 | 2,5 | 1 |

| | | | | | |
|-------------|--|---|------------|---------------|----------|
| | | about products to be processed. In the Lombardy Region, ANCE Lombardia (construction sector), ANPAR (recycling sector) and Centrocot (textile sector) are independently setting up or already testing similar digital platforms. | | | |
| PP01_S5_011 | Increase the quantity of secondary raw materials use in the built environment | The growth of secondary raw materials use in the built environment is an important opportunity that can be boosted in particular by increasing the percentage of recycled materials in the construction of new infrastructure (e.g. binder, milled material, aggregates, concrete). In order to develop this opportunity an important policy option is to stimulate the regional authorities towards the development of new technical specifications and legislations targeted incentivizing material re-use in construction. More concretely, in this context the relevance acquired by the MEC (Minimum Environmental Criteria) in Green Public Procurement policies seems to be a real opportunity. The challenge is to increase the MEC relevance (currently compulsory, but no fees or penalties are foreseen in case these principles are not adopted) and the percentage of recycled materials through mandatory laws for the private sector. | 3,4 | 3,0 | 1 |
| PP01_S5_012 | Reuse of built environment waste materials | In Lombardy, particular attention is placed on the reuse of building components of particular value, namely historical or architectural (as bricks, tiles, ornamental stones, wrought iron, beams), aiming at extending their life-time and preserve their conditions. An alternative destination and application should be thought also for other waste materials coming from the built environment, thus providing an effective solution to the associated problem of disposal of these materials (avoiding landfilling and the related issues), targeting the goal of "zero-waste" in building and construction. | 3,3 | 1-n.d. | 4 |
| PP01_S5_008 | Selective demolition | A major opportunity for increasing the capability of re-using waste materials in building demolitions originates from the idea of selectively disassembling homogeneous building components before size reduction and sorting. Indeed, once materials are mixed in traditional demolition, the challenge to identify and sort them before re-use arises, which is cause of loss of quality and purity of the recyclates, ultimately affecting their re-use potentials. To overcome this problem, the selective disassembly of buildings should be implemented to facilitate the reuse or | 3,2 | 2,0 | 4 |

| | | | | | |
|-------------|--|--|------------|------------|----------|
| | | <p>recycling of valuable materials such as wood, structural brick, and high functional finished components like windows, doors, cabinets, and decorative materials. However, selective disassembly is more expensive than traditional processes. Therefore, the economic and financial conditions as well as the proper support technologies for selective demolition should be properly investigated and fine tuned.</p> <p>This Opportunity is also a tool to support Opportunity PP01_New_4.</p> | | | |
| PP01_S5_006 | Waste recovery from renovation activities | <p>In Italy the building renovation-refurbishing activities are usually more frequent than the demolition activities. In particular, the main practice is the micro-renovation, defined as the renovation activities on small buildings or on small parts of them. The high number of these micro-demolition produces high amount of waste, with low quality. Thus it is of paramount importance to focus on the improvement of these practices, boosting the development of a stable network for collecting, processing and re-using materials from renovation activities. Such activities are usually spread on the regional territory, more difficult to monitor than building demolition, and require specific protocols to be turned into valuable secondary material sources.</p> | 3,1 | 3,0 | 1 |
| PP01_S5_005 | Reverse logistics in built environment | <p>This opportunity aims at establishing a network to support the return of homogeneous waste coming from the demolition to the producer through a selective process.</p> <p>When a product normally moves through the forward supply chain network, the aim is to reach the distributor or the final customer. A reverse logistic should be design to transfer post-use components and materials for the purpose of capturing value, or proper disposal. In the reverse logistic the manufacturing firm should then organize the shipping of the waste, testing, dismantling, repairing, recycling or disposing the product. In order to avoid the delivery of inert waste in landfill, a solution could be to set up a CLSC (Closed-Loop Supply Chain). Building materials would be extended after the end of life of the building itself by keeping them in the loop through systematical extraction, purification and repurposing. They will be reused in some parts of other buildings or they will be inserted in the secondary material markets. This procedure might</p> | 3,1 | 2,5 | 1 |

| | | | | | |
|-------------|--|---|------------|------------|----------|
| | | include reusing the extracted items directly or after different levels of recovery processes. | | | |
| PP01_S5_013 | Certification for sustainable buildings and infrastructures | Inspired by existing standards for the energy classification of buildings, this opportunity aims at promoting the use of standard and certification protocols for a new building classification based on sustainability. Different degrees of certifications can be reached depending on the environmental footprint of the building and infrastructures. A fundamental feature of building footprint should be related to the adopted materials. In this direction, the percentage of recycled materials used during their construction (e.g. containing recycled and manufactured aggregates, fly ashes) should reduce the value of the building environmental footprint. This certification could boost the use of recycled materials and aggregates in the construction sector. | 3,1 | 2,8 | 1 |
| PP01_New_5 | Environmental certification of products | This opportunity aims at offering verified, transparent and comparable environmental information about a product sold to the market, both concerning technical aspects and the environmental sustainability. Such information shall be useful for enhancing the capability of properly treating or disposing these products at the end-of-life. Moreover, it should be integrated into proper eco-design legislation to motivate manufacturers to increase the environmental performance of their products. | 3,7 | 2,8 | 1 |
| PP01_S5_007 | Increase the (quality of the) regeneration of (target) city areas and thus increase the recovery of construction and demolition waste | An important element for achieving Circular Economy principles in the construction sector is the development of standardization policies targeting urban regeneration. The standardization policies on urban regeneration will address the recovery of city areas and, in parallel, the recover of important quantities of construction and demolition waste. The Lombardy Region has launched a working group to implement it. Such concept should be further boosted through the promotion and implementation of live demonstration and pilot projects proving the benefits of this approach in specific urban areas under renovation. | 3,0 | 2,8 | 2 |
| PP01_S5_010 | Enhance (the quality and traceability of) the procedure of waste management, from | This opportunity can be significantly supported through the implementation of the EU Protocol for built environment, in particular working for the best transposition and effective use in each European contest (country), with specific and effective, sound and coherent links with the national and regional laws, in order to make it really operational. | 3,0 | 2,5 | 2 |

| | | | | | |
|-----------|---|--|------------|------------|----------|
| | collection to recycling in built environment | <p>This Protocol complies with the Construction 2020 strategy, as well as the Communication on Resource Efficiency Opportunities in the Building Sector. The Protocol consists of 5 components (the first three are based on the C&D waste management chain and two are of a horizontal nature).</p> <ul style="list-style-type: none"> a. Waste identification, source separation and collection; b. Waste logistics; c. Waste processing; d. Quality management; e. Policy and framework conditions. <p>Widespread the protocol at a national scale is an opportunity. This Protocol has been developed for application in all 28 EU countries and has the following target groups of stakeholders.</p> | | | |
| VC03Other | Enhance the role of customers towards circular economy | <p>Customers need to become more and more aware of their power to influence the way companies design, produce and distribute their products. Large public institutions can play an important role in this transition by becoming themselves conscious customers of green products and thus influencing the manufacturers' attitude towards circular economy.</p> | 3,3 | 3,0 | 1 |
| VC01Other | Inter-regional waste management protocols | <p>Trans-regional transportation and exchange of waste could become a relevant circular economy enabler if properly regulated and managed. This opportunity aims to develop safe and conscious inter-regional waste management protocols. In particular, these protocols shall be focused on the enhancement, both in terms of quality and traceability, of the procedures of waste management, from collection to recycling in every sector. The development of IT waste management platforms in a Zero Waste perspective could support the transparent implementation of such protocols.</p> <p>As an example, traceability is fundamental for textile, concerning for example the chemicals used during production.</p> <p>The product passport in the textile already exists, and is related to ECOTEX. ECOTEX is a textile international standard for companies created by companies themselves.</p> <p>ECOPASSPORT is the quality certification aimed at evaluating the sustainability of the value chain.</p> | 3,3 | 1,5 | 4 |

| | | | | | |
|-------------|--|---|-----|-----|---|
| PP01_S5_020 | Increase the networking of Small and Medium entities | <p>An existing barrier towards the creation of a stable circular economy sector in the region is the high fragmentation of competences and technical capabilities and the lack of interaction between the local SMEs. The objective of this action is to gather the attention of SMEs through communication and active involvement campaigns and to demonstrate the benefits and the sustainability of a collaborative networked business approach, on the medium-long term.</p> <p>At a regional level, this could lead to the creation of a stable SMEs regional network, able to align the activities and strategic objectives towards the target goal of becoming a circular economy Region.</p> | 2,8 | 2,2 | 3 |
| VC02Other | Development of circular economy metrics | <p>Circular economy is recent a paradigm that has not been properly formalized yet both at scientific and industrial levels. With the goal to state baseline industrial situations with respect to circular economy, to fix target objectives, and to quantitatively track progresses towards these objectives a comprehensive metrics, including a set of multi-dimensional Key Performance Indicators (KPIs), should be developed. Such metrics should also support the comparison among circular initiatives in different sectors. The objective is the creation of metrics to track baseline situations and track progresses and impacts achieved at systemic level by circular economy initiatives.</p> <p>This solution would make it possible to report achievements and express desiderata that can enlight the need for future actions, in a comprehensive and comparable manner. Although an initial attempt has been made, through the Monitoring Framework – COM (2018) 29 Final of the European Commission, further actions are needed to bring these indicators in operation at Regional level and to make them accepted and shared by the stakeholders.</p> <p>"</p> | 2,8 | 2,2 | 3 |
| PP01_S5_021 | Enhance the role of clusters in the regional eco-system | <p>Every region should strongly promote the role of the regional clusters as intermediaries favouring an interaction among the Regional offices, the companies and the Universities operating in the same sector of the cluster, in order to create research and innovation projects and sustainable paths to scale-up innovative solutions and to promote the creation of networks in the area of circular economy.</p> | 2,6 | 1,0 | 3 |

Annex 4 - Food waste

| ID | Name | Description | AHP ranking | SH ranking (3 max, 1 min) | Quadrant |
|------------|---|---|-------------|---------------------------|----------|
| PP01_New_1 | Integration of agro-food industry, biotechnological industry and green chemistry | <p>The food supply chains are large in volumes, significant in economic and environmental terms and central to the management of many biological materials. They currently generate significant amounts of waste and are associated to high environmental impacts. The waste streams are generated during harvesting, storage and transport prior to primary processing (primary stream), during primary processing within the agro-food industry (secondary stream) and during production or consumption by end users (tertiary stream). This is recognized as a priority sector where accelerating the circular economy would be beneficial and where EU policy has a particular role to play.</p> <p>This include also the idea of valorising food and beverage industry wastewaters based on the outcomes of the EU H2020 Saltgae project involving partner Regions in CIRCE (e.g. Lombardy, Slovenia). To do so, novel R&D and industrial collaborations will be identified within these Regions, starting from Saltgae partners, to ensure further scaling up and future potential industrial implementation of Saltgae outcomes.</p> | 3,3 | 3 | 1 |
| VC03Other | Enhance the role of customers towards circular economy | <p>Customers need to become more and more aware of their power to influence the way companies design, produce and distribute their products. Large public institutions can play an important role in this transition by becoming themselves conscious customers of green products and thus influencing the manufacturers' attitude towards circular economy.</p> | 3,3 | 3 | 1 |

| | | | | | |
|-------------|--|--|------------|----------|----------|
| PP01_S5_033 | Implementation of a multi-user web platform for value-chain integration | Information sharing among different stakeholders of the value-chain is one of the most promising enablers for emerging circular economy business models. A cross-sectorial web platform should be implemented for the creation of a virtual market containing the description, the volumes and the geographical localization of the waste materials coming from different sectors (for example, from construction and to textile to other sectors). The platform should be multi-users, in the sense that multiple stakeholders should provide and retrieve information, in different stages of the value-chains. For example, plant managers may provide data related to processing capabilities, product designer may retrieve data about material characteristics, recyclers may retrieve data about products to be processed. In the Lombardy Region, ANCE Lombardia (construction sector), ANPAR (recycling sector) and Centrocot (textile sector) are independently setting up or already testing similar digital platforms. | 3,2 | 3 | 1 |
| VC01Food | Smart Packaging | The development of smart packaging and labelling could make it possible to increase the traceability of food packaging, to achieve a more controlled and safe value chain, and the reduction of waste, thus positively influencing both producers and customers. However, since the cost of smart packaging may be higher than the cost of traditional packaging solutions, the development of new legislations and incentives aiming at promoting these innovative packaging design solutions should be envisaged. | 3,1 | 3 | 2 |
| PP01_New_2 | Improve the effectiveness of food waste reduction programs in companies | This opportunity aims at developing inter-regional food waste management protocols to obtain the standardization on waste management from collection to recycling and improving the effectiveness of food waste avoidance programs in companies. | 3,0 | 3 | 2 |
| PP01_New_3 | Increase the networking among stakeholders | An existing barrier towards the creation of a sustainable and circular food sector in the region is the high fragmentation of competences and technical capabilities and the lack of interaction between the local stakeholders. Local actors need to understand the importance of creating networks, in order to grasp business opportunities together and contribute to the development of circular initiatives in the sector. The objective of this opportunity is to encourage the creation of a stable | 2,8 | 3 | 2 |

| | | | | | |
|-------------|---|--|------------|----------|----------|
| | | network of stakeholders within the food value chain. This will be possible identifying complementarities among different realities in the value-chain, creating synergies along the value chain and promoting the innovation and best practice exchange. | | | |
| VC02Other | Development of circular economy metrics | <p>Circular economy is recent a paradigm that has not been properly formalized yet both at scientific and industrial levels. With the goal to state baseline industrial situations with respect to circular economy, to fix target objectives, and to quantitatively track progresses towards these objectives a comprehensive metrics, including a set of multi-dimensional Key Performance Indicators (KPIs), should be developed. Such metrics should also support the comparison among circular initiatives in different sectors. The objective is the creation of metrics to track baseline situations and track progresses and impacts achieved at systemic level by circular economy initiatives.</p> <p>This solution would make it possible to report achievements and express desiderata that can enlight the need for future actions, in a comprehensive and comparable manner. Although an initial attempt has been made, through the Monitoring Framework – COM (2018) 29 Final of the European Commission, further actions are needed to bring these indicators in operation at Regional level and to make them accepted and shared by the stakeholders.</p> | 2,8 | 3 | 2 |
| PP01_S5_001 | Enhance the territorial network for the recovery and re-distribution of food waste | <p>The objective is to enhance the development of a network of territorial stakeholders (GDO outlets, shops, distributors, canteens) for reducing food waste.</p> <p>For example, Banco alimentare della Lombardia manages a hub for collecting and recovering surpluses in delimited territories in Lombardy, redistributing them to charitable structures in the same territory. The benefits of the network are:</p> <ol style="list-style-type: none"> 1) to ensure a better dietary mix for the assisted person; 2) to maximize the collection from mid / small groups leveraging on the local presence; 3) to optimize the recovery of fresh food and cooked meals by improving the efficiency through the creation of local food bank warehouses; 4) to activate networks of relationships on the territory that can create links and implications in terms of inclusion and social cohesion. | 2,7 | 3 | 2 |

| | | | | | |
|-------------|--|--|------------|----------|----------|
| | | Such a virtuous approach should be further supported at larger scale, promoting the development of new pilot applications in areas currently not covered by this service and establishing links with relevant stakeholders distributed on the regional territory. | | | |
| PP01_S5_002 | Increase the performance of school canteens on food waste | Food waste in schools is a significant challenge that should be addressed to reduce food waste in the Region. This opportunity aims at extending the scope of Siticibo Ristorazione in School canteens, best practice of Lombardy Region, through the full deployment of the program, also including the collection of cooked meals in addition to bread and fruit already recovered. The most significant policy option include the development of specific legislations fixing targets to the amount of food waste. Further actions should aim at improving the availability of infrastructures to manage fresh food in this context, to boost the development of technological solutions for higher food traceability and to develop pilot applications in specific educational contexts. | 2,5 | 3 | 2 |
| VC02Food | Promote local and urban food growing | Moving food production closer to the consumption areas is a virtuous practice that has the benefits of reducing logistics costs and environmental impacts, at the same time posing lower requirements on packaging performance and increasing the traceability of the food chain. For these reasons, it is becoming more and more attractive for citizens, especially in high density urban areas. As a consequence, if properly implemented, this opportunity will make it possible to reduce CO2 emissions and packaging material use, thus leading to a reduced amount of packaging waste. Furthermore, it is expected that the short value chain can reduce food waste, because food is consumed more directly, a better prediction of demand is possible and overproduction is avoided. However, actions are needed to further boost this practice, such as the creation of specific markets for distributing urbanely grown food, the development of specific campaigns for consumers' awareness creation and the support to urban food growing areas. | 2,9 | 2 | 3 |

| | | | | | |
|-------------|---|---|-----|---|---|
| PP01_S5_031 | Improve reverse logistics efficiency in every sector | The idea of further developing and making more efficient the logistics chain from the end-of-life product collection to the repair/remanufacturing/recycling of components could be widespread and applied to products and goods in all sectors. An opportunity comes from the synergic exploitation of forward and reverse logistics chains and from the enhancement of the strategic role of retailers in the reverse logistics, which provide a direct contact to customers but is currently mainly unexploited. | 2,9 | 1 | 3 |
|-------------|---|---|-----|---|---|

Annex 5 - Plastics

| ID | Name | Description | AHP ranking | SH ranking (3 max, 1 min) | Quadrant |
|-------------|--|--|-------------|---------------------------|----------|
| PP01_S5_022 | Increase the percentage of recycled plastics into new products | Closed loop plastics recycling has been successfully implemented in several sectors (e.g. automotive, electronics and white goods) by re-using industrial plastic scrap from injection moulding or forming processes. However, there is potential to properly extend this approach also to post-use plastics, already in the market. This opportunity can be exploited by collaborating with plastics industries to have a percentage of recycled material inside new plastic products that is higher than the current value, thus significantly reducing virgin plastic production. | 2,9 | 3,0 | 2 |
| PP01_S5_034 | Enhance (the quality and traceability of) the procedure of waste management, from collection to recycling in every sector (see opportunity n° 10) | This opportunity, coming from a cross-sectorial analysis, aims to build a common protocol on waste management from collection to recycling of end of life products, enabling a more efficient recover and recycling of goods. These protocols can be thought in two directions: towards citizens and towards companies and institutions, to support to build awareness and credibility and achieve long-term sustainability of the system. | 2,6 | 3,0 | 2 |
| PP01_S5_036 | Increase the percentage of secondary raw materials used in the production of goods | This objective of this opportunity is to enhance and increase the use of secondary raw materials in the production of plastic goods. A particular focus should be placed to the development of sustainable certification protocols applicable to the re-usable materials as well as to the final products. This would increase the customer acceptance towards product re-using plastics, thus extending the market attractiveness of this approach. | 3,1 | 2,0 | 1 |
| PP01_S5_032 | Standardization of waste management procedures from | The development of common rules and standard procedures for waste management, from collection to recycling of end of life products, can | 2,7 | 2,0 | 2 |

| | | | | | |
|-------------|--|---|------------|------------|----------|
| | collection to recycling (see opportunity n° 7) | support a more efficient and effective recovery and recycling of goods across all sectors. | | | |
| VC03Other | Enhance the role of customers towards circular economy | Customers need to become more and more aware of their power to influence the way companies design, produce and distribute their products. Large public institutions can play an important role in this transition by becoming themselves conscious customers of green products and thus influencing the manufacturers' attitude towards circular economy. | 3,3 | 2,0 | 1 |
| VC01Other | Inter-regional waste management protocols | Trans-regional transportation and exchange of waste could become a relevant circular economy enabler if properly regulated and managed. This opportunity aims to develop safe and conscious inter-regional waste management protocols. In particular, these protocols shall be focused on the enhancement, both in terms of quality and traceability, of the procedures of waste management, from collection to recycling in every sector. The development of IT waste management platforms in a Zero Waste perspective could support the transparent implementation of such protocols. As an example, traceability is fundamental for textile, concerning for example the chemicals used during production. The product passport in the textile already exists, and is related to ECOTEX. ECOTEX is a textile international standard for companies created by companies themselves. ECOPASSPORT is the quality certification aimed at evaluating the sustainability of the value chain. | 3,3 | 2,0 | 1 |
| PP01_S5_033 | Implementation of a multi-user web platform for value-chain integration | Information sharing among different stakeholders of the value-chain is one of the most promising enablers for emerging circular economy business models. A cross-sectorial web platform should be implemented for the creation of a virtual market containing the description, the volumes and the geographical localization of the waste materials coming from different sectors (for example, from construction and to textile to other sectors). The platform should be multi-users, in the sense that multiple stakeholders should provide and retrieve information, in different stages of the value-chains. For example, plant managers may provide data related to processing capabilities, product designer may retrieve data about material characteristics, recyclers may retrieve data | 3,2 | 1,0 | 4 |

| | | | | | |
|-------------|---|--|------------|------------|----------|
| | | about products to be processed. In the Lombardy Region, ANCE Lombardia (construction sector), ANPAR (recycling sector) and Centrocot (textile sector) are independently setting up or already testing similar digital platforms. | | | |
| PP01_S5_020 | Increase the networking of Small and Medium entities | <p>An existing barrier towards the creation of a stable circular bio-economy sector in the region is the high fragmentation of competences and technical capabilities and the lack of interaction between the local SMEs. For example, focusing on agri-biomass, SMEs need to understand the importance of creating networks, in order to grasp large-scale business opportunities together and become competitive in the global market. The objective of this action is to gather the attention of SMEs through communication and active involvement campaigns and to demonstrate the benefits and the sustainability of a collaborative networked business approach, on the medium-long term.</p> <p>At a regional level, this could lead to the creation of a stable SMEs regional network, able to align the activities and strategic objectives towards the target goal of becoming a circular bio-economy Region.</p> | 2,8 | 1,0 | 3 |
| VC02Other | Development of circular economy metrics | <p>Circular economy is recent a paradigm that has not been properly formalized yet both at scientific and industrial levels. With the goal to state baseline industrial situations with respect to circular economy, to fix target objectives, and to quantitatively track progresses towards these objectives a comprehensive metrics, including a set of multi-dimensional Key Performance Indicators (KPIs), should be developed. Such metrics should also support the comparison among circular initiatives in different sectors. The objective is the creation of metrics to track baseline situations and track progresses and impacts achieved at systemic level by circular economy initiatives.</p> <p>This solution would make it possible to report achievements and express desiderata that can enlight the need for future actions, in a comprehensive and comparable manner. Although an initial attempt has been made, through the Monitoring Framework – COM (2018) 29 Final of the European Commission, further actions are needed to bring these indicators in operation at Regional level and to make them accepted and shared by the stakeholders.</p> | 2,8 | 2,0 | 2 |

| | | | | | |
|-------------|--|---|------------|------------|----------|
| PP01_S5_021 | Enhance the role of clusters in the regional eco-system (see opportunity n° 21) | Every region should strongly promote the role of the regional clusters as intermediaries favouring an interaction among the Regional offices, the companies and the Universities operating in the same sector of the cluster, in order to create research and innovation projects and sustainable paths to scale-up innovative solutions and to promote the creation of networks in the area of circular economy. | 2,6 | 1,0 | 3 |
| PP01_S5_031 | Improve reverse logistics efficiency in every sector (see opportunity n° 5) | The idea of further developing and making more efficient the logistics chain from the end-of-life product collection to the repair/remanufacturing/recycling of components could be widespread and applied to products and goods in all sectors. An opportunity comes from the synergic exploitation of forward and reverse logistics chains and from the enhancement of the strategic role of retailers in the reverse logistics, which provide a direct contact to customers but is currently mainly unexploited. | 2,9 | 1,0 | 3 |
| PP01_S5_023 | Increase the production of sustainable and biodegradable plastics | Increasing the production of more sustainable and biodegradable plastics, not based on petroleum and non-renewable natural resources, can limit the environmental burden of traditional plastics, being in turn beneficial for the human health, the marine species survival, and to the ocean. | 3,3 | 1,0 | 4 |

Annex 6 - Textile

| ID | Name | Description | AHP ranking | SH ranking (3 max, 1 min) | Quadrant |
|-------------|--|--|-------------|---------------------------|----------|
| PP01_S5_009 | Implementation of a multi-user web platform for value-chain integration | Information sharing among different stakeholders of the value-chain is one of the most promising enablers for emerging circular economy business models. A cross-sectorial web platform should be implemented for the creation of a virtual market containing the description, the volumes and the geographical localization of the waste materials coming from different sectors (for example, from construction and from textile to other sectors). The platform should be multi-users, in the sense that multiple stakeholders should provide and retrieve information, in different stages of the value-chains. For example, plant managers may provide data related to processing capabilities, product designers may retrieve data about material characteristics, recyclers may retrieve data about products to be processed. In the Lombardy Region, ANCE Lombardia (construction sector), ANPAR (recycling sector) and the partnership Centrocot (textile sector) - UNIVA (association of industries from different sectors) are independently setting up or already testing similar digital platforms. | 3,7 | 3,7 | 1 |
| PP01_S5_015 | Increase the percentage of recycled materials | Legislation can have an important role in motivating manufacturers to design their product integrating higher fractions or recycled materials, without compromising in performance. The challenge is to design targeted and well-accepted laws aiming at increasing the percentage of recycled materials used in products, thus increasing circular economy opportunities. A potential opportunity, already well investigated, is to boost the Minimal Environmental Criteria principle in Green Public | 3,4 | 3,4 | 1 |

| | | | | | |
|--------------|--|--|------------|------------|----------|
| | | Procurement. Other opportunities come from eco-design directive, currently under development at EU level. | | | |
| PP01_S5_016 | Reuse of textiles in other sectors | Material re-use is a promising circular economy alternative that could be more widely exploited for the waste materials coming from the textile sector. A relevant example is the reuse of wasted textiles as secondary raw materials in the built environment sector, becoming an insulator material to be used during the construction of buildings. Since the built environment sector is a high volume sector, such an approach may significantly decrease the un-processed waste produced by the textile industry. | 3,2 | 3,2 | 1 |
| PP01_S5_018 | Influencing fashion designer in the use of secondary raw materials (textiles) | Inducing fashion designers to make clothes including recovered textiles is an opportunity that could be better exploited. Although several fashion brands and fashion designers are becoming more sensitive to sustainability issues, the use of waste textiles into the design of new collections remains limited. Possible actions include the design of specific incentives, the promotion of sustainability-oriented marketing initiatives and awareness creation initiatives targeted to consumers, thus leading to a more sustainable sector and to a lower production of wasted textiles. | 3,2 | 3,2 | 1 |
| VC02 Textile | Support for new circular textile start-ups | Through a careful and continue cross-regional value chain analysis, potential synergies among different sectors may arise, especially targeting start-ups. Indeed, start-ups are at the core of the innovation eco-system of a Region. Thanks to their light and dynamic structures and the less established brand vision, start-ups can experiment innovative circular business cases and expand them in line with the company growth strategy. An opportunity comes from the extension of the Advance London program good practice (established by LWARB) to other Countries to support young start-ups. Lombardy region shows a real interest on this possibility. | 3,2 | 3,2 | 1 |
| VC01Textile | Sustainable textile manufacturing | The objective of this opportunity is to invest in textile SMEs implementing innovative circular economy solutions, both in terms of sustainable technologies for textile manufacture and processes for large scale re-use of fibers. This will increase recyclability rates of textile materials and, in turn, will create a market for recycled fibers, yarns and manufactured clothes. | 3,1 | 3,1 | 1 |

| | | | | | |
|-------------|---|--|------------|------------|----------|
| VC03Textile | Reduction of waste due to structural degradation of textile materials during the production, use and maintenance phases (along the value chain). | Innovative procedures and technologies should be designed and tested to enable a considerable reduction of waste caused by structural deterioration of textile products and materials during production, use and maintenance phases, along the value chain. This waste is segregated by the product throughout its life-time and it is irreversibly lost in the environment, posing serious challenges. A major objective should be, for example, the mitigation of microplastics impact caused by textile washing processes. | 3,1 | 3,1 | 1 |
| PP01_S5_014 | Increase the recovery of waste clothes | The Lombardy Region produces 13-15 kg per year per person of wasted clothes, but only 2-3 kg are actually recovered. If properly exploited, this material availability opportunity can be exploited to develop new concepts of sustainable clothes made of recycled textile. For example, textile materials can be reused and inserted into new clothes, thus reducing the amount of generated clothes waste and virgin material usage, at the same time. | 3,1 | 3,1 | 1 |
| VC05Textile | Citizen education on textile recovery through the introduction of separate collection | Starting from different good practices regarding second-hand clothes (as "La Terza Piuma" in Lombardy region or "Humana" in Catalonia region) and taking inspiration from different campaigns (such as the "Love Your Clothes" campaign in LWARB region), targeted to textile users, and citizens in general, it is possible to favour the development of an efficient separate collection schema for textiles. This would be a pre-requisite for an efficient treatment of textiles targeted to their re-use. | 3 | 3 | 3 |
| PP01_S5_019 | Greater involvement of fashion companies | Fashion brands can develop a specific survey for their suppliers in order to clarify their environmental and social performance on relevant circular economy topics, such as resource saving, transport impact reduction, packaging reduction, short value chain introduction, clear labelling and origin of the clothes, sharing the sustainability principles and visions with their customers, directly at the retail points. This would be a first step towards the improvement of the percentage of recycled materials into new clothes, making the sustainability their first brand paradigm. In order to trigger high response rate to these initiatives, specific awarding methods targeted to conscious customers who provide their feedback could be designed. | 2,9 | 2,9 | 3 |
| PP01_S5_017 | Increase second-hand clothes collection and redistribution | In textile clothing two types of waste streams are significant, including clothes that lost their original functionality, due to extensive use, as well | 2,9 | 2,9 | 3 |

| | | | | | |
|-------------|---|--|------------|------------|----------|
| | | as clothes that are “unsold items” and become waste due to obsolescence and market reasons. From both streams, an increased amount of textile waste could be redistributed and used in second-hand collection channels. The objective of this opportunity is to increase the reuse of clothes that are still wearable, by donating them to poor people or by reinserting them in the redistribution cycle, with the possibility to increase their attractiveness through the possibility of a redesign of the clothes. | | | |
| VC04Textile | Standardization of waste management from collection to recycling | Starting from the Cross-cutting project ECAP (European Clothing Action Plan) the need of a standardization of waste management from collection to recycling emerges. This action could enhance and increase the recovery of waste clothes. | 2,7 | 2,7 | 3 |
| PP01_S5_031 | Improve reverse logistics efficiency in every sector (see opportunity n° 5) | The idea of further developing and making more efficient the logistics chain from the end-of-life product collection to the repair/remanufacturing/recycling of components could be widespread and applied to products and goods in all sectors. An opportunity comes from the synergic exploitation of forward and reverse logistics chains and from the enhancement of the strategic role of retailers in the reverse logistics, which provide a direct contact to customers but is currently mainly unexploited. | 2,9 | 2,9 | 3 |
| PP01_S5_032 | Standardization of waste management procedures from collection to recycling (see opportunity n° 7) | The development of common rules and standard procedures for waste management, from collection to recycling of end of life products, can support a more efficient and effective recovery and recycling of goods across all sectors. | 2,7 | 2,7 | 3 |
| VC03Other | Enhance the role of customers towards circular economy | Customers need to become more and more aware of their power to influence the way companies design, produce and distribute their products. Large public institutions can play an important role in this transition by becoming themselves conscious customers of green products and thus influencing the manufacturers' attitude towards circular economy. | 3,3 | 3,3 | 1 |
| VC01TOther | Inter-regional waste management protocols | Trans-regional transportation and exchange of waste could become a relevant circular economy enabler if properly regulated and managed. This opportunity aims to develop safe and conscious inter-regional waste management protocols. In particular, these protocols shall be focused on | 3,3 | 3,3 | 1 |

| | | | | | |
|-------------|--|--|------------|------------|----------|
| | | <p>the enhancement, both in terms of quality and traceability, of the procedures of waste management, from collection to recycling in every sector. The development of IT waste management platforms in a Zero Waste perspective could support the transparent implementation of such protocols.</p> <p>As an example, traceability is fundamental for textile, concerning for example the chemicals used during production.</p> <p>The product passport in the textile already exists, and is related to OEKO-TEX. OEKO-TEX is a textile international standard for companies created by companies themselves.</p> <p>ECOPASSPORT is the quality certification (related to chemicals) aimed at evaluating the sustainability of the value chain.</p> | | | |
| PP01_S5_020 | Increase the networking of Small and Medium Enterprises | <p>The objective is to increase the attention of small and medium enterprises towards circular economy, through communication and active involvement campaigns, to create a stable regional network (ecosystem), that can cooperate in the direction of developing circular economy EU regions. The SMEs need to understand the added value of creating networks among them, sharing opportunities, objectives and risks, in order to gain resilience and grasp more significant business opportunities without increasing operational costs.</p> | 2,8 | 2,8 | 3 |
| VC02Other | Development of circular economy metrics | <p>Circular economy is recent a paradigm that has not been properly formalized yet both at scientific and industrial levels. With the goal to state baseline industrial situations with respect to circular economy, to fix target objectives, and to quantitatively track progresses towards these objectives a comprehensive metrics, including a set of multi-dimensional Key Performance Indicators (KPIs), should be developed. Such metrics should also support the comparison among circular initiatives in different sectors. The objective is the creation of metrics to track baseline situations and track progresses and impacts achieved at systemic level by circular economy initiatives.</p> <p>This solution would make it possible to report achievements and express desiderata that can enlight the need for future actions, in a comprehensive and comparable manner. Although an initial attempt has been made, through the Monitoring Framework – COM (2018) 29 Final of the European Commission, further actions are needed to bring these</p> | 2,8 | 2,8 | 3 |

| | | | | | |
|-------------|--|--|------------|------------|----------|
| | | indicators in operation at Regional level and to make them accepted and shared by the stakeholders. " | | | |
| PP01_S5_034 | Enhance (the quality and traceability of) the procedure of waste management, from collection to recycling in every sector (see opportunity n° 10) | This opportunity, coming from a cross-sectorial analysis, aims to build a common protocol on waste management from collection to recycling of end of life products, enabling a more efficient recover and recycling of goods. These protocols can be thought in two directions: towards citizens and towards companies and institutions. This would enable to support building awareness and credibility and achieve long-term sustainability of the circular system. | 2,6 | 2,6 | 3 |
| PP01_S5_038 | Enhance the role of clusters in the regional eco-system (see opportunity n° 21) | Every region should strongly promote the role of the regional clusters as intermediaries favouring an interaction among the Regional offices, the companies and the Universities operating in the same sector of the cluster, in order to create research and innovation projects and sustainable paths to scale-up innovative solutions and to promote the creation of networks in the area of circular economy. | 2,6 | 2,6 | 3 |

Annex 7 - WEEE

| ID | Name | Description | AHP ranking | SH ranking (3 max, 1 min) | Quadrant |
|-------------|--|--|-------------|---------------------------|----------|
| VC03Other | Enhance the role of customers towards circular economy | Customers need to become more and more aware of their power to influence the way companies design, produce and distribute their products. Large public institutions can play an important role in this transition by becoming themselves conscious customers of green products and thus influencing the manufacturers' attitude towards circular economy. | 3,3 | 3 | 1 |
| PP01_S5_029 | Increase the percentage of materials (eg rare elements metals...) recovered from WEEE | Waste from Electric and Electronic Equipment (WEEE) is the fastest growing waste stream in EU, with 5% increase per year. Electronic waste can represent a very important source of key- metals for advanced technological products. WEEE are complex products where a multitude of metallic and non-metallic materials are mixed to provide the required functionality to the product. For example, PCBs (Printed Circuit Boards) are called "urban mineral resources" since 25%-40% in weight of their composition is made of valuable metals such as copper, tin, nickel, gold and silver. Moreover, small quantities of critical metals such as indium, palladium, ruthenium, gallium, tantalum and platinum are present. However, such materials are found in small concentration within the overall electronic product but in high concentration within specific electronic components. This makes recycling extremely challenging thus calling for a new generation of highly selective and smart WEEE recycling technologies. This opportunity aims to support and improve current technologies and to develop new technologies and processes to increase the percentage of materials recovered from Waste from Electric and Electronic Equipment, with particular focus on precious metals and rare earths. | 3,1 | 3 | 1 |

| | | | | | |
|-------------|---|---|------------|----------|----------|
| PP01_S5_036 | Increase the percentage of secondary raw materials used in the production of EEE goods | New electronic products are rarely designed considering the option of embedding recycled materials to reduce the environmental footprint of the product. However, this option would be technically applicable, especially to those structural and aesthetical components that are less subject to technological innovation cycles. With a proper re-design of the product, secondary materials such as plastics and aluminum could potentially be re-used in new electronic products. The objective of this opportunity, coming from a cross-sectorial analysis, is to enhance and increase the use of secondary raw materials in the production of electric and electronic equipment. A key tool in this opportunity is the ability to certify the secondary material and the final good properties and functional requirements. | 3,1 | 3 | 1 |
| PP01_S5_020 | Increase the networking of Small and Medium entities | An existing barrier towards the creation of a stable circular economy sector in the region is the high fragmentation of competences and technical capabilities and the lack of interaction between the local SMEs. The objective of this action is to gather the attention of SMEs through communication and active involvement campaigns and to demonstrate the benefits and the sustainability of a collaborative networked business approach, on the medium-long term. At a regional level, this could lead to the creation of a stable SMEs regional network, able to align the activities and strategic objectives towards the target goal of becoming a circular economy Region. | 2,8 | 3 | 2 |
| PP01_New_6 | Boost EEE maintenance, repair, reuse and remanufacturing economy | Currently applied WEEE end-of-life treatment practices primarily aim at recovering valuable materials with destructive processes. While this makes it possible to avoid material landfill and to enable the gathering of residual material value, it prevents from reusing functions from the post-use products. However, depending on the condition of the post-use electronic product, more valuable end-of-life practices aiming at recovering, re-using and upgrading the product functions through remanufacturing could be technically feasible. This opportunity explores the potentials of applying new circular economy options to the WEEE sector. In particular, the focus is on the enhancement of maintenance, repair, reuse and remanufacturing of electric and electronic equipment, enabling a closed loop framework. Technical challenges related to the flexibility of demanufacturing and remanufacturing processes as well as | 3,3 | 2 | 4 |

| | | | | | |
|-------------|--|---|------------|----------|----------|
| | | non-technical challenges, such as the customer acceptance and the legislation barriers need to be addressed. | | | |
| VC01WEEE | Creation of a common vision of the sector circularity | <p>The WEEE sector is currently characterized by high fragmentation, lack of information sharing among producers and recyclers, and limited systemic vision of the circularity potentials in the local eco-system. A common vision of the circularity of the electronics sector, the building of a shared scenario, and the sharing of objectives among the involved stakeholders would be fundamental to achieve long term target performance in this sector and to support financing the most valuable projects enabling the transition to this shared vision.</p> <p>The vision should support the identification of sustainable pathways to stimulate the recovery of the entire set of substances found in WEEE.</p> | 2,7 | 3 | 2 |
| VC01TOther | Inter-regional waste management protocols | <p>Trans-regional transportation and exchange of waste could become a relevant circular economy enabler if properly regulated and managed. This opportunity aims to develop safe and conscious inter-regional waste management protocols. In particular, these protocols shall be focused on the enhancement, both in terms of quality and traceability, of the procedures of waste management, from collection to recycling in every sector. The development of IT waste management platforms in a Zero Waste perspective could support the transparent implementation of such protocols.</p> | 3,3 | 2 | 4 |
| PP01_S5_033 | Implementation of a web platform | <p>Information sharing among different stakeholders of the value-chain is one of the most promising enablers for emerging circular economy business models. A cross-sectorial web platform should be implemented for the creation of a virtual market containing the description, the volumes and the geographical localization of the waste materials coming from different sectors (for example, from construction and to textile to other sectors). The platform should be multi-users, in the sense that multiple stakeholders should provide and retrieve information, in different stages of the value-chains. For example, plant managers may provide data related to processing capabilities, product designer may retrieve data about material characteristics, recyclers may retrieve data about products to be processed. In the Lombardy Region, ANCE Lombardia (construction sector), ANPAR (recycling sector) and Centrocot</p> | 3,2 | 1 | 4 |

| | | | | | |
|-----------|---|--|------------|----------|----------|
| | | (textile sector) are independently setting up or already testing similar digital platforms. | | | |
| VC02Other | Creation of circular economy metrics | <p>Circular economy is recent a paradigm that has not been properly formalized yet both at scientific and industrial levels. With the goal to state baseline industrial situations with respect to circular economy, to fix target objectives, and to quantitatively track progresses towards these objectives a comprehensive metrics, including a set of multi-dimensional Key Performance Indicators (KPIs), should be developed. Such metrics should also support the comparison among circular initiatives in different sectors. The objective is the creation of metrics to track baseline situations and track progresses and impacts achieved at systemic level by circular economy initiatives.</p> <p>This solution would make it possible to report achievements and express desiderata that can enlight the need for future actions, in a comprehensive and comparable manner. Although an initial attempt has been made, through the Monitoring Framework – COM (2018) 29 Final of the European Commission, further actions are needed to bring these indicators in operation at Regional level and to make them accepted and shared by the stakeholders.</p> | 2,8 | 1 | 3 |

Annex 8 – Rankings graphs per sector

