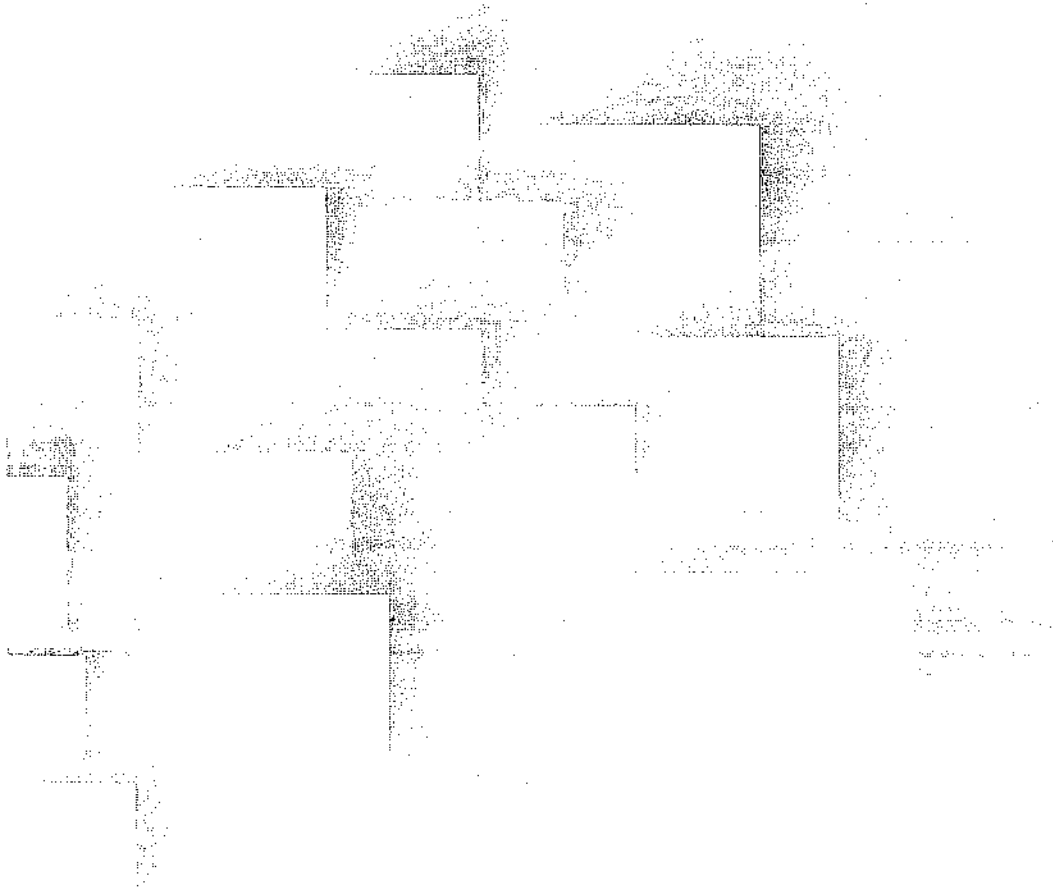


# APPLICATION FORM

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Interreg CENTRAL EUROPE - Call 2

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**CE1125 CIRCE Version: 1**

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## SECTION A - Project overview

### A.1 Project identification

<i>Programme priority</i>		3. Cooperating on natural and cultural resources for sustainable growth in CENTRAL EUROPE
<i>Programme priority specific objective</i>		3.1 To improve integrated environmental management capacities for the protection and sustainable use of natural heritage and resources
<i>Project acronym</i>		CIRCE
<i>Project title</i>		Expansion of the CIRcular Economy concept in the Central Europe local productive districts
<i>Project Index number</i>		CE1125
<i>Name of the lead partner organisation/original language</i>		ARPA VENETO - Agenzia Regionale per la Prevenzione e Protezione Ambientale del Veneto
<i>Name of the lead partner organisation/English</i>		ARPAV - Regional Agency for Environmental Protection and Prevention of Veneto
<i>Project duration</i>	<i>Start date</i>	01.07.2017
36 months	<i>End date</i>	30.06.2020

### A.2 Project summary

*Please give a short overview of the project and describe in the style of a press release (please cover all the points below)*

- *the common challenge of the programme area you are jointly tackling in your project*
- *the main objective of the project and the expected change your project will make to the current situation*
- *the outputs of the project and who will benefit from them*
- *the project approach you plan to take and its transnational character*
- *what is innovative about it*
- *the transnational added value of the project*

Transition towards circular economy, core priority of EU 2020 Strategy, is particularly relevant for CE industrial areas due to outstanding use of primary natural resources in various production stages (processing, packaging, transportation). However, recycling rates in CIRCE Countries (AT30%; IT21%; PL18%; HU18%) are still far from Directive targets (reduction to 35% by 2016) and 1 of the reason is that reuse of by-products is often left to companies' individual initiatives: i.e the 5 CIRCE industrial pilot areas (central Veneto-IT; Mid Tyrol-AT; Budaörs-HU; Poznan-PL; Split-HR) are characterized by numerous business organizational models (clusters&districts) but the same cross-value relationships are not fully exploited for waste valorisation&reduction of primary natural resources. CIRCE main objective -in line with CE Priority 3.1 & new EU Action Plan for CircEcon- is to facilitate a larger uptake of integrated environmental management approach in 5 specific CE industrial areas by changing patterns from single&sporadic company recycling interventions to integrated redesign of industrial interactions based on the circular economy. Final goal is introduce innovative cross-value chain waste governance models & transnational analytic tools to improve capacities of concerned waste public-private sector to reduce dependencies from primary natural resources within industrial processing. 4 multiutilities, 3 sectorial agencies & 1 R&D centre concerned in CIRCE implement 5 pilot actions (across 10 material flows & 50 companies), using common analytic tools (Material Flow Analysis, LCA, LCC & clean-up technology E-CLOUD ) to close some loops actually open in the pilot areas & to provide robust evidences about environmental & economic benefits from shifting to enhanced industrial symbiosis. 5 Regional ActionPlans to expand secondary raw materials markets in pilot regions & 1 transnational strategy for new CE practitioners delivered to address sustainability & large replication

## A.4 Project outputs

<i>Programme output indicator</i>	<i>Project output indicator target</i>	<i>Measurement Unit</i>	<i>Project output quantification (target)</i>	<i>Project output number</i>	<i>Project output (title)</i>			
S.O.3.1 - Number of strategies and action plans developed and/or implemented for the protection and sustainable use of natural heritage and resources	17,00	Number	5,00	Output O.T1.3.1	Local plans for the prioritization of interventions			
			5,00	Output O.T2.4.1	Circular economy business models supporting cross value chain by-products remanufacturing			
			5,00	Output O.T3.2.1	Regional Action Plan (RAP) to expand & uptake secondary raw materials markets in the pilot regions			
			1,00	Output O.T4.1.1	Transnational Position Paper for standardization of secondary raw materials physiognomies			
			1,00	Output O.T4.4.1	Follow-up joint operative proposal to integrate circular economy model in transboundary-value chains			
			1,00	Output O.T1.2.1	Tutorial for future application of the Material Flow Analysis for replication purposes			
			1,00	Output O.T2.1.1	CIRCE e-cloud gathering top BATs & market ready clean-up techs & organizational practices			
			2,00	Output O.T2.3.1	LCA & LCC tools to estimate industrial ecology benefits & economic-convenience of new inds-symbiosis			
			S.O.3.1 - Number of tools developed and/or implemented for					

the protection and sustainable use of natural heritage and resources	5,00	Number	1,00	Output O.T4.3.1	Wikis web-platform for transnational interoperability & transferability
S.O.3.1 - Number of pilot actions implemented for the protection and sustainable use of natural heritage and resources	10,00	Number	10,00	Output O.T3.1.1	Pilot actions to test the business model and quality standards verifications
S.O.3.1 - Number of trainings implemented on the protection and sustainable use of natural heritage and resources	14,00	Number	1,00	Output O.T1.1.1	Transnational joint training to introduce one common Material Flow Analysis investigation methodology
			2,00	Output O.T2.2.1	Transnat. trainings to design environmental & economic scenarios supporting industrial closed loops
			6,00	Output O.T3.3.1	Trainings for practitioners for mutual learning about challenges&constraints experienced in pilot act
			5,00	Output O.T4.2.1	Knowledge vouchering & external trainings to encourage the uptake of circular economy model

## SECTION B - Partners

### Partner list

Number	Partner name in English	Country	Abbreviation	Role	Associated to (in case of AP)
1	ARPAV - Regional Agency for Environmental Protection and Prevention of Veneto	IT	ARPAV	LP	
2	ETRA spa	IT	ETRA spa	PP	
3	AM TRANS PROGRES Co. Ltd.	PL	AMTP	PP	
4	IFKA Public Benefit Non-Profit Ltd. for the Development of Industry	HU	IFKA	PP	
5	Bay Zoltán Nonprofit Ltd. for Applied Research	HU	BZN	PP	
6	Waste Management Association Mid-Tyrol	AT	ATM	PP	
7	Public Institution RERA SD for Coordination and Development of Split Dalmatia County	HR	RERA	PP	
8	Cistoca Cetinske krajine Ltd.	HR	CIST	PP	
9	Italian Composting and Biogas Association	IT		AP	ETRA spa
10	Association for Nature, Environment and Sustainable Development Sunce	HR		AP	Public Institution RERA SD for Coordination and Development of Split Dalmatia County
11	Veneto Region - Environment Department	IT		AP	ARPAV - Regional Agency for Environmental Protection and Prevention of Veneto
12	NATIONAL CONSORTIUM FOR THE MANAGEMENT OF WEEE & WBA	IT		AP	ARPAV - Regional Agency for Environmental Protection and Prevention of Veneto

### B.1 Lead partner

Project partner number	1
Partner role in the project	LP
Name of organisation in original language	ARPA VENETO - Agenzia Regionale per la Prevenzione e Protezione Ambientale del Veneto
Name of organisation in English	ARPAV - Regional Agency for Environmental Protection and Prevention of Veneto
Abbreviation of organisation	ARPAV

## SECTION C - Project description

### C.1 Project relevance

*What are the territorial challenges that will be tackled by the project?*

*Please describe the relevance of your project for the programme area in terms of common challenges and/or joint assets addressed. Please specify the situation for the territories participating in the project.*

Circular economy concept is rapidly capturing attention across policymakers & business organizations as way of decoupling growth from resource: purpose is shifting industrial process from linear (open loop) systems, in which resource & capital transit through chains to become waste, to a closed loop system where waste & discarded materials become inputs for new production processes. Transition towards circular economy pivotal in Europe2020, acknowledged in new EU Action Plan for Circular Economy, COM(2015) 614, that pushes towards a more homogeneous normative framework, better knowledge of waste-flows & quality standards for secondary raw materials as pathway for creating dynamic markets. This challenge is particularly relevant for CE industrial areas combining numerous production stages (processing, packaging, transportation) where recycling rates in CIRCE Countries (AT30%; IT21%; PL18%; HU18%) are still far from Landfill Directive targets (reduction to 35% by 2016). Indeed, the 5 CIRCE industr-pilot areas (central Veneto-IT; Mid Tyrol-AT; Budaörs-HU; Poznan-PL; Split-HR) are characterized by numerous business organizational models (clusters & districts) but the same cross-value relationships are not fully exploited for waste valorisation & reduction of primary natural resources. While sporadic cases of circular business are emerging (ie: plastic, chemicals), the challenge in these 5 areas is to spark structural closed loop systems approach through a public-led waste governance, raise awareness among multiutilities, improve access to waste-flows info & provide tailored analytics (LCA, LCC, Tech-brokerage>WPT2) & pilot actions (WPT3) to estimate effective ENV/€ trade-off. However, transaction costs of shifting the status quo are extremely high: no single entity can make this happen on its own. So, CIRCE business model, based on cooperation of 4 multiutilities, 3 sectorial agencies & 1 R&D centre provides tools & governance to enhance industrial symbiosis in CE industrial areas

*What is the project's approach in addressing these common challenges and/or joint assets and what is innovative about this approach?*

*Please describe new or innovative solutions that will be developed during the project and/or existing solutions that will be adopted and implemented during the project lifetime. Please explain how far the approach goes beyond existing practice in the sector and/or participating regions.*

PA, business org & ENV agencies regularly deal with environmental impacts of industrial activities as excessive use of natural resources & p waste disposal constrains. In 5 CIRCE regions there are several policies & regulations concerning environmental & waste management but a real industrial ecology model, tackling the issue in multidisciplinary way as "territorial ecosystem" (including environment & natural capital, economic upgrades & clean-BAT) & considering the possible interdependencies among companies within a productive site is still weak. Thus CIRCE adopted a novel circular economy business model (AT2.4) that changes patterns from single-company recycling to integrated redesign of industrial interactions to make supply chain more sustainable & innovative in reusing natural resources & remanufacturing. Upon M-scale analysis of the physical flows (Material Flow Analysis meth), PPs explore potential cross-value chain interdependencies between companies located in pilot areas: use of LCA & LCC tools (AT2.2-3) & TRM assessments of cost/benefits of clean-up techs help estimating industrial ecology benefits & economic-convenience to run new industrial symbiosis. Pilot actions (AT3.2 across 10 material flows & 50 companies) to close some loops actually open in the pilot areas (from "oldies" PET, glass & steel to "high potential" polymers, WEEE, rare-materials, food waste) provides robust evidences about environmental & economic benefits & offer data about cost/benefits transaction costs to elaborate 5 Regional Action Plans to expand secondary raw materials markets in pilot regions (AT3.3). According to ENV/€ data (pilot actions), policy follow-up (RAP) & EC recommendations (Action Plan COM(2015) 614), transferability in CE space of CIRCE circular economy business model focuses on 1 Position paper for standardization (AT4.2) for more by-products harmonized rules looking at EU & Central Europe specificity & AT4.3 knowledge vouchering offered to new 5 multiutilities in CE

*Why is transnational cooperation needed to achieve the project's objectives and results?*

*Please explain why the project goals cannot be efficiently reached acting only on a national/regional/ local level and/or describe what benefits the project partners/target groups/project area gain in taking a transnational approach.*

Accelerating scale-up of circular economy model in 5 CE areas concerned by CIRCE requires collaboration across different waste public utilities, industries, R&D centres to devise standards & mechanisms for remanufacturing, managing raw material streams & detecting the BAT options. No single entity can make this happen on its own, as costs & timing prevent effective implementation. Solution for these obstacles, detected in all CIRCE areas, is the application of 1 shared circular economy business model in the 5 pilot areas through a large-transnational approach based on a common pool of analytic tools to better understand linear lock-in factors & predict ENV/€ scenarios. Beside capitalization of results under LIFE-CTE-FP7, 1 common MFA - Material Flow Analysis (by Wuppertal Institute, trasnat trainings in D1.3.1) is applied by PPs to map out physical flows concerning quantity-quality and traceability of raw material, waste a& by-products generated during production process. Estimation of industrial ecology benefits & economic-convenience of new industrial symbiosis is made by application of (a) 1 common LCA method which combines baselines sets by PEF (Product Environmental Footprint, trasnat trainings in D2.2.2) requirements set by European Commission in 2015 (b) 1 LCC econometric model (trasnat trainings in D2.3.2) to estimate potential of economic exploitation of by-products validated by EIT KIC Raw Material. CIRCE e-cloud gathers top BATs & market ready clean-up techs & organizative practices (especially in reverse cycle capabilities) & Technology Readiness Methodology (AT2.1) help mutual tracking of optimal clean techs & prototypes to support the switch to circular economy models in each pilot area. Joint Terms of Reference (D3.2.6) summarizing cost/benefit pricing, target customers, operat.aspects, env-benefit) of Pilot Actions & D3.1.5 [Intercompany] Knowledge Exchange & Transformation training helps replication by practitioners, along with Position Paper (WPT4)

<b>Expected project results</b>
<i>What are the project's main results and how do they contribute to the programme result indicator? Please describe the change the project expects to achieve at the territorial level.</i>
In line with CE Programme goal to reduce the pressure on primary resources & environment by win-win strategies, the CIRCE main results are: #5 M-scale analysis of the physical flows at local industrial system level based on MFA - Material Flow Analysis (by Wuppertal Institute) concerning quantity-quality and traceability of raw material, waste a& by-products generated during production process; Pools of analytics consisting in #1 CIRCE e-cloud gathering top BATs & market ready clean-up techs & organizative practices and #1 LCA & #1 LCC tools to estimate industrial ecology benefits & economic-convenience of new industrial symbiosis, leading to #5 Report of PEF-compliance environmental scenarios & #5 Report of mid-term economic scenarios to check profitability of new by-products markets. # 1 circular economy business model adapted in 5 pilot areas & #5 Pilot actions terms of Reference (2 waste flows*area & 50 donors&recipients companies involved) to verify the business model and ENV/€ profitability .#5 Regional Action Plan to expand secondary raw materials markets in pilot regions to enhance standards, practices &organizative models in the perspective of upscaling the business models to local-wide industrial organizations. As part of CE transferability strategy, #1 Position paper for standardization for more by-products harmonized rules looking at EU & Central Europe specificity & #5 knowledge vouchering offered to new 5 multi-utilities in CE

<b>Project specific objectives</b>	
<i>Which are the specific objectives the project aims to achieve? Define max. 3 specific objectives of the project.</i>	
<b>Title of specific objective</b>	<b>Please shortly explain each of the defined specific objectives</b>
Demonstrate, through pilot actions - the environmental & economic convenience to redesign industrial interactions characterized by analytics-based & integrated circular economy business model	Test in environment the circular economy business model designed in AT2.4 to close some loops actually open in the pilot areas (from "oldies" PET, glass&steel to the "high potential" polymers,WEEE,rare-materials,food waste) through secondary raw materials remanufacturing. Results of PAs give robust evidences about environmental & economic benefits of transition to circular economy model that have been estimated in WPT2 by LCA-LCC & E-CLOUD analytics. In WPT3, min. 2 waste flows*area & 50 companies (between donors&recipients) are concerned in the pilots to shift patterns to cross value chain & enhanced secondary raw material markets , offering a pool of closed loop options highly transferable to other Central Europe industrial backgrounds
Use cost/benefits transaction-costs calculated in the 5 industrial symbiosis pilot actions to elaborate 5 Regional Action Plan to expand secondary raw materials markets in the pilot regions	Upon Pilot Action Cost/benefits ToR, 5 RAP designed for policymakers (AT3.3) to enhance standards, practices & organizative models to expand secondary raw materials markets in the perspective of upscaling the business models to local-wide industrial organizations. Each RAP supported by a dashboard of thematic initiatives coherent with NAT/REG-OPs & ESI 2014-2020 for uptake of integrated approach to waste valorisation & subsidize born of new industrial symbiosis on the base of CIRCE lesson learnt. RAP elaborated with permanent consultation forum of key-stakeholders in each pilot site (AT.1.1) to support mutual ownership&acceptance & with S3 managers to make symbiosis & remanufacturing a driver for longstanding impacts in reg-economic strateg
Foster transferability&expansion of CIRCE circular economy business model in CE space to address standardization of secondary raw-materials physiognomies & encourage new multiutilities practitioners	Based on data (pilot actions), policy follow-up (RAP) & EC recommendations (Action Plan COM(2015) 614), 1 Position paper for standardization (AT4.2) proposes more harmonized rules to determine when a secondary raw material should no longer be legally considered as 'waste' looking at EU & Central Europe specificity, by clarifying existing rules on 'end-of-waste' to provide operators with more certainty at level playing field. From pragmatic viewpoint, knowledge vouchering is provided to new 5 multiutilities in CE space (AT4.3, consisting in technical screenings - simplified M-scale analysis&scenarios by using CIRCE tools) to encourage the uptake of circular economy model to let emerge possible cross-value interdependencies and ENV/€ benefits

**WP type: Thematic work package (maximum 4 work packages)**

WP Nr	WP title	WP start date (month)	WP end date (month)	
T1	Mapping the physical primary&secondary raw material flows within a specific local production system	07.2017	06.2020	
<b>Partner</b>				
<b>Partner's Involvement</b>				
1	ARPAV - Regional Agency for Environmental Protection and Prevention of Veneto, LP, ARPAV			
2	ETRA spa, PP, ETRA spa			
3	AM TRANS PROGRES Co. Ltd., PP, AMTP			
4	IFKA Public Benefit Non-Profit Ltd. for the Development of Industry, PP, IFKA			
5	Bay Zoltán Nonprofit Ltd. for Applied Research, PP, BZN			
6	Waste Management Association Mid-Tyrol, PP, ATM			
7	Public Institution RERA SD for Coordination and Development of Split Dalmatia County, PP, RERA			
8	Cistoca Cetinske krajine Ltd., PP, CIST			
<b>Summary</b>				
<p>Provide a well-written summary of what will be done in this work package. Please explain what you want to achieve (outputs), why those outputs are relevant for reaching the project specific objectives and how you plan to get there (activities and deliverables). Please also describe how partners will be involved.</p> <p>If applicable, please indicate whether any pilot investment is foreseen. Any pilot investment has to be linked to a pilot action of the work package:</p> <ul style="list-style-type: none"> <li>• Smaller pilot investments ( below EUR 15.000 total cost) should be described within this work package.</li> <li>• In case of pilot investments exceeding EUR 15.000 total cost a separate "investment specification" has to be filled in and the link has to be described in this summary.</li> </ul>				
<p>WPT1 scope is to map out quantity-quality and traceability of raw material, waste &amp; by-products generated during production process currently managed in each pilot site as driver to identify products &amp; relevant waste productions fitting to remanufacturing. This goal is supported by permanent consultation (D1.1.3) of key-stakeholders in each pilot site (business agents, trade associations, public utilities, local authorities, env-control authorities) &amp; relies on capitalization (D1.2.1-2) of LIFE-ISIM-TCC &amp; EUR-IS EIT Climate-KIC, where main provisions about industrial symbiosis governance models &amp; trends in EU regions are examined. Intracomparison among pilot areas is conducted by all PPs through reports on environmental &amp; legal analysis constrains (D1.2.3 emphasizing diversity in rules on waste-to-landfill vs by-products-to-remanufacturing) &amp; D1.2.4 enabling &amp; critical factors defining mutual relationships in pilot areas. IFKA produces 1 point-zero report (D1.2.5) that benchmarks state of local industrial symbiosis vs EU provisions of EU Action Plan. Physical primary&amp;secondary raw material flows in each industrial system is implemented in M-scale analysis (AT.1.3) carried out in each by all PPs. ETRA specialist team sets a methodology based on MFA - Material Flow Analysis (Wuppertal inst) explained to PPS in a Transnational training (D1.3.1) with PPs' industrial ecology experts. Profiling of quantity of industrial waste &amp; traceability of by-products done in each area is resulting in in-depth mapping of all physical flows concerning quantity-quality &amp; traceability of raw material, waste &amp; by-products used during production process (D1.3.4): based on such analytic references , in AT.1.4 1 local plans for prioritization of interventions identifies pool of products &amp; relevant waste productions suitable to encourage new productive models based on a circular economy. Options scouted with S3 managers considering poss. longstanding impacts for regional economic strategy</p>				



### Project outputs

Please describe in more detail the **outputs of the project** that will be the outcome of the activities carried out in this work package. Explain which activities will be taken to achieve an output.

Each output should be linked to a programme output indicator (please ensure that it has the same measurement unit). In case of investment specification, the investment as such is to be defined as output and linked to the category "Investment" as included in the list of output indicators.

Output title	Please provide a brief description of the project output	Programme output indicator to which the output will contribute	Quantification / target	Delivery date
<b>Output O.T1.1</b>	Transnational joint training to introduce one common Material Flow Analysis investigation methodology	S.O.3.1 - Number of trainings implemented on the protection and sustainable use of natural heritage and resources	1,00	12.2017
<b>Output O.T1.2</b>	Tutorial for future application of the Material Flow Analysis for replication purposes	S.O.3.1 - Number of tools developed and/or implemented for the protection and sustainable use of natural heritage and resources	1,00	06.2018
<b>Output O.T1.3</b>	Local plans for the prioritization of interventions	S.O.3.1 - Number of strategies and action plans developed and/or implemented for the protection and sustainable use of natural heritage and resources	5,00	09.2018

### Target groups

Who will use the outputs of this work package or the investment?	<ul style="list-style-type: none"> <li>• Regional public authority</li> <li>• National public authority</li> <li>• Sectoral agency</li> <li>• Infrastructure and (public) service provider</li> <li>• Higher education and research</li> <li>• Business support organisation</li> </ul>
How will you involve those target groups (and other stakeholders) in the development of the outputs of this work package or the implementation of the investment?	D1.1.3 : permanent consultation forum of key-stakeholders concerned in waste management in each pilot site to provide recommendations about CIRCE analytic methodologies, to estimate the environmental & economic trade off and design one circular economy business model to enhance industrial symbiosis in the pilot areas. S3 managers involved in D1.4.1 to drive the choice of the pool of by-products to be remanufactured considering the longstanding impacts for regional economic strategy

**Sustainability and transferability of work package outputs  
(not applicable for investment specification)**

<p><b>Sustainability (institutional, financial and political)</b> How will the work package outputs be further used by project partners once the project has ended? Please describe concrete measures (including e.g. institutional structures, financial resources, policy improvements etc.) taken during and after project implementation to ensure the sustainability of the project outputs. If relevant, please explain who will be responsible and/or the owner of the outputs.</p>	<p>D1.4.2-Local plans for the prioritization of interventions &amp; D1.3.4-M-scale analysis of the physical flows at local industrial system level are conceived to be exploitable beyond project duration since it provides scientifically-sounding (MFA - Material Flow Analysis by Wuppertal Institute) indications of relevant by products suitable to encourage new productive models based on a circular economy business model, contributing to a coherent application of EU Action Plan 614/2015</p>
<p><b>Transferability (linked to the WP Communication)</b> Which work package outputs will be transferred to which additional target audiences during project lifetime and beyond? Why are these outputs the most relevant ones to be transferred? Please describe the additional target audiences (e.g. other organisations/regions/countries outside of the current partnership) and ensure links to the strategy of the communication work package.</p>	<p>In D1.3.5 tutorial for future application of the MFA for replication purposes to initiates practitioners (waste utility &amp; industrial ecology experts) to perform material flow analysis moving from single production unit to multi-production units applied to territorial-based according to the CIRCE approach. It contains basics of MFA parameters, technical sheet for data collections and guidelines for results interpretation. To be used in WPT4 as part of replic strategy for new CE multi-utilities</p>

Activity A.T1.1	Activity title Project operative strategy & preparation of industrial symbiosis favorable territorial background	Start date 07.2017	End date 06.2020	
<b>Deliverables for activity A.T1.1</b>				
Deliverable D.T1.1.1	Deliverable title Project operative strategy to implement CIRCE & rules for engagement of the target groups	Description of deliverable ARPAV&ETRA proposes op. strategy to implement CIRCE across various WPs based on existing approaches to run M-scale analysis of the physical flows, LCA software&dataset & rules for target groups engagement. Strategy discussed during kick off mtg	Delivery month 10.2017	Quantification/target 1,00
Deliverable D.T1.1.2	Deliverable title Project operative KPI & peer review	Description of deliverable KPI defined for environmental impact & remanufacturing economic convenience. Degree of green-innovation based on INNOVATION UNION SCOREBOARD 2015 to evaluate impact of WPT3pilots & interim verification of WPs targets . Final peer review foreseen.	Delivery month 06.2020	Quantification/target 2,00

<b>Deliverable D.T1.1.3</b>	<i>Deliverable title</i> Permanent consultation forum of keystakeholders in each area to help setting & ownership of strategies	<i>Description of deliverable</i> Task force of key-stakeholders concerned in waste management in pilot area: business agents, trade ass., public utilities, local authorities, control authorities. Forum supports project action throughout 36M with specific technical & awareness activities	<i>Delivery month</i> 06.2020	<i>Quantification/target</i> 5,00
<b>Activity A.T1.2</b>	<i>Activity title</i> <b>Preliminary gap analysis vs EU Action Plan quality goals, capitalization and point-zero</b>	<i>Start date</i> <b>10.2017</b>	<i>End date</i> <b>04.2018</b>	
<b>Deliverables for activity A.T1.2</b>				
<b>Deliverable D.T1.2.1</b>	<i>Deliverable title</i> Screening survey by IFKA of the most relevant best practices about industrial symbiosis	<i>Description of deliverable</i> Overview of state-of-the-art in current closed-loop design, identifying key methodological gaps & critical success in industrial symbiosis & waste governance practices to shape CIRCE methodology. Capitalization of results under LIFE-CTE-FP7-EIT-Climate KIC	<i>Delivery month</i> 03.2018	<i>Quantification/target</i> 1,00
<b>Deliverable D.T1.2.2</b>	<i>Deliverable title</i> Capitalization seminar in Budapest to analyze industrial symbiosis successful case studies	<i>Description of deliverable</i> Organized by IFKA beside 1SC mtg with some waste-utilities already implementing industrial waste symbiosis: SNAGA Ljubljana, ARGE Styria, MUNICH invited to exchange approaches & sign agreement of cooperation in the perspective of transferability TWP4	<i>Delivery month</i> 03.2018	<i>Quantification/target</i> 1,00
<b>Deliverable D.T1.2.3</b>	<i>Deliverable title</i> Joint report about environmental and legal analysis constrains in secondary raw material treatment	<i>Description of deliverable</i> Environmental & legal analysis regulation/constrains in waste management and by-products processing in each CE Country involved in the project. Gaps compared to EU quality goals of EU Action Plan for circular economy. 5 individual analysis gathered by IFKA	<i>Delivery month</i> 01.2018	<i>Quantification/target</i> 1,00

<b>Deliverable D.T1.2.4</b>	<i>Deliverable title</i> Local Reports on enabling & critical factors defining mutual relationships in the pilot areas	<i>Description of deliverable</i> Critical factors for modelling closed-loop systems in pilot areas; market barriers analysis to creation of efficient model of industrial symbiosis; limits to access to industrial&waste management info (statistics); limits to access mature cleanup techs	<i>Delivery month</i> 02.2018	<i>Quantification/target</i> 5,00
<b>Deliverable D.T1.2.5</b>	<i>Deliverable title</i> Joint point-zero report of local industrial symbiosis vs EU provisions by Action Plan on Circular Ec	<i>Description of deliverable</i> Benchmarked state of local industrial symbiosis in all project areas (including diversity in rules on waste-to-landfill vs by-products-to-remanufacturing) vs quality standards of Action Plan COM(2015) 614. Individual contributions gathered in 1 joint repo	<i>Delivery month</i> 04.2018	<i>Quantification/target</i> 1,00
<b>Activity A.T1.3</b>	<i>Activity title</i> M-scale analysis of the physical flows at local industrial system level	<i>Start date</i> 10.2017	<i>End date</i> 06.2020	
<b>Deliverables for activity A.T1.3</b>				
<b>Deliverable D.T1.3.1</b>	<i>Deliverable title</i> Transnational joint training to introduce 1 CIRCE Material Flow Analysis investigation methodology	<i>Description of deliverable</i> Organized by ETRA with PPs' industrial ecology experts to explain method to apply local-based material flows analysis based on existing MFA - Material Flow Analysis (by Wuppertal Inst.) proposed by ETRA. Technical sheet for data collections & Guidelines	<i>Delivery month</i> 12.2017	<i>Quantification/target</i> 1,00
<b>Deliverable D.T1.3.2</b>	<i>Deliverable title</i> Report of the quantity of industrial waste in the CIRCE pilot areas	<i>Description of deliverable</i> Profiling & traceability in each area of the quantity of industrial waste produced and processed within the pilot industrial areas: data collection, systematization in each area and 1 final technical scheme provided*area	<i>Delivery month</i> 05.2018	<i>Quantification/target</i> 5,00
<b>Deliverable D.T1.3.3</b>	<i>Deliverable title</i> Report of the present destinations of industrial waste	<i>Description of deliverable</i> Profiling & traceability in each area of the destinations of industrial waste produced within the pilot industrial ecosystem: data collection (on statistic based or - if not available - with specific companies surveys) and systematization	<i>Delivery month</i> 05.2018	<i>Quantification/target</i> 5,00

<b>Deliverable D.T1.3.4</b>	<i>Deliverable title</i> M-scale analysis of the physical flows at local industrial system level	<i>Description of deliverable</i> In each area results of waste screening (D2.3.2) & destinations (D2.3.3) is represented in one in-depth mapping of all physical flows concerning quantity-quality and traceability of raw material, waste & by-products generated during production process	<i>Delivery month</i> 06.2018	<i>Quantification/target</i> 5,00
<b>Deliverable D.T1.3.5</b>	<i>Deliverable title</i> Tutorial for future application of Material Flow Analysis for replication purposes (on line guide)	<i>Description of deliverable</i> Tutorial in EN elaborated by ETRA to initiate practitioners (waste utility companies & industrial ecology experts) to perform MFA moving from single production unit to multi-production units applied to territorial-based according to the CIRCE approach	<i>Delivery month</i> 06.2020	<i>Quantification/target</i> 1,00
<b>Deliverable D.T1.3.6</b>	<i>Deliverable title</i> Report on validation of the tutorial functionalities	<i>Description of deliverable</i> Being used for transferability of the CIRCE MFA as preliminary step for practitioners, the tutorial (DT1.3.5) is validated and upgraded during the pilots (WPT3). Afterward, a report on validation (tech paper, available on line too) is provided by ETRA	<i>Delivery month</i> 06.2020	<i>Quantification/target</i> 1,00
<b>Activity A.T1.4</b>	<i>Activity title</i> <b>Prioritization of interventions and identification of most promising by-products physical flows</b>	<i>Start date</i> 06.2018	<i>End date</i> 09.2018	
<b>Deliverables for activity A.T1.4</b>				
<b>Deliverable D.T1.4.1</b>	<i>Deliverable title</i> Meeting report with S3 managers in the 5 pilot regions	<i>Description of deliverable</i> Linkages with cluster managers, waste company & S3 adm. to drive the choice of the pool of by-products to be remanufactured considering the longstanding impacts for reg.economic strategy . Products poss chosen consistent with Action Plan COM(2015) 614	<i>Delivery month</i> 06.2018	<i>Quantification/target</i> 5,00
<b>Deliverable D.T1.4.2</b>	<i>Deliverable title</i> Local plans to prioritize interventions in the 5 pilot areas as driver for business plan in O.T2.4	<i>Description of deliverable</i> In each area (5), identification of pool of products & relevant waste productions suitable to encourage new productive models based on circular economy; choice based on (1) intra-area comparability (2) relevance for economic tissue (S3-oriented sectors)	<i>Delivery month</i> 09.2018	<i>Quantification/target</i> 5,00

**WP type: Thematic work package (maximum 4 work packages)**

WP Nr	WP title	WP start date (month)	WP end date (month)	
T2	Profiling cross-value chain industrial symbiosis business model	01.2018	05.2019	
<b>Partner</b>				
WP responsible partner	AM TRANS PROGRES Co. Ltd.			
<b>Partner's involvement</b>				
1	ARPAV - Regional Agency for Environmental Protection and Prevention of Veneto, LP, ARPAV			
2	ETRA spa, PP, ETRA spa			
3	AM TRANS PROGRES Co. Ltd., PP, AMTP			
4	IFKA Public Benefit Non-Profit Ltd. for the Development of Industry, PP, IFKA			
5	Bay Zoltán Nonprofit Ltd. for Applied Research, PP, BZN			
6	Waste Management Association Mid-Tyrol, PP, ATM			
7	Public Institution RERA SD for Coordination and Development of Split Dalmatia County, PP, RERA			
8	Cistoca Cetinske krajine Ltd., PP, CIST			
<b>Summary</b>				
<p>Provide a well-written summary of what will be done in this work package. Please explain what you want to achieve (outputs), why those outputs are relevant for reaching the project specific objectives and how you plan to get there (activities and deliverables). Please also describe how partners will be involved.</p> <p>If applicable, please indicate whether any pilot investment is foreseen. Any pilot investment has to be linked to a pilot action of the work package:</p> <ul style="list-style-type: none"> <li>• Smaller pilot investments (below EUR 15,000 total cost) should be described within this work package.</li> <li>• In case of pilot investments exceeding EUR 15,000 total cost a separate "Investment specification" has to be filled in and the link has to be described in this summary.</li> </ul>				
<p>WPT2 scope (resp: ATM) is the elaboration of 1 business strategy model - scaled down in each pilot area &amp; based on interpolation of technological, environmental &amp; economic drivers - establishing cross-value chain connections between "waste donors &amp; recipients" companies. # TECH-DRIVERS (AT2.1): To help closing the loops, the CIRCE E-CLOUD (portal-tool, ATM) contains the most promising policies &amp; technologies able to meet the local requirements. E-CLOUD shaped on the basis of (a) market ready clean up techs &amp; managerial processes available in project areas (b) newly concepts &amp; prototypes based on EU-wide brokerage deriving by HORIZON-FP7-KIC projects &amp; R&amp;D public&amp;private LABs &amp; near-to-market R&amp;D (TRL&gt;7). To assess effectiveness of such techs &amp; self-assess sustainability from economic view point, BZN sets up a shared TECHNOLOGY RATING METHODOLOGY (D2.1.4). # ENV- DRIVERS (AT2.2): to determine ecological &amp; environmental impact (energy, natural resources savings) in local industrial supply chain due to introduction of secondary raw material markets for class of products chosen in AT1.4, all PPs apply a methods (resp: ETRA) based on LCA standards &amp; PEF (Product Environmental Footprint) requirements set by EC in 2015. # ECONOMIC- DRIVERS (AT2.3): all areas apply LCC econometric model within a territorial domain (RESP: BZN inspired to KIC raw material) to helps PPs to estimate cross-value economic benefits from introducing lower cost remanufactured products. Drivers interpolation processed in 1 MATRIX D2.4.1 of concrete circular economy matchmakings within each ind-area, whilst analysis &amp; interpretation helps identifying promising "donors" vs "recipient" pool of companies interactions in each pilot areas to make cross-chain in industrial symbiosis frame. Accordingly, 5 business models addressed to waste utility &amp; PA in each area, and highly representative of CE economic chains interdependences, represent the basis for the implementation of the pilot action (WPT3)</p>				

**Project outputs**

Please describe in more detail the **outputs of the project** that will be the outcome of the activities carried out in this work package. Explain which activities will be taken to achieve an output.


Each output should be linked to a programme output indicator (please ensure that it has the same measurement unit).

In case of investment specification, the investment as such is to be defined as output and linked to the category "investment" as included in the list of output indicators.

Output title	Please provide a brief description of the project output	Programme output indicator to which the output will contribute	Quantification / target	Delivery date
Output O.T2.1	CIRCE e-cloud gathering top BATs & market ready clean-up techs & organizational practices	S.O.3.1 - Number of tools developed and/or implemented for the protection and sustainable use of natural heritage and resources	1,00	12.2018
Output O.T2.2	Transnat. trainings to design environmental & economic scenarios supporting industrial closed loops	S.O.3.1 - Number of trainings implemented on the protection and sustainable use of natural heritage and resources	2,00	10.2018
Output O.T2.3	LCA & LCC tools to estimate industrial ecology benefits & economic convenience of new inds-symbiosis	S.O.3.1 - Number of tools developed and/or implemented for the protection and sustainable use of natural heritage and resources	2,00	03.2019
Output O.T2.4	Circular economy business models supporting cross value chain by-products remanufacturing	S.O.3.1 - Number of strategies and action plans developed and/or implemented for the protection and sustainable use of natural heritage and resources	5,00	04.2019

<b>Target groups</b>	
Who will use the outputs of this work package or the investment?	<ul style="list-style-type: none"> <li>• Regional public authority</li> <li>• Sectoral agency</li> <li>• Infrastructure and (public) service provider</li> <li>• Interest groups including NGOs</li> <li>• Higher education and research</li> </ul>
How will you involve those target groups (and other stakeholders) in the development of the outputs of this work package or the implementation of the investment?	TG of WPT2 are mostly expert teams: for Scouting at European level over prototype solutions (deriving by HORIZON and FP7 projects & R&D public&private LABs) is consulted the EIT KIC Raw Materials. Involvement of LCA teams & LCC teams assured by 1 LCA team & transnational training for the application of LCA methodology (resp: ETRA) & 1 transnational training to apply econometric model (resp: BZN)

<b>Sustainability and transferability of work package outputs (not applicable for investment specification)</b>	
<p><b>Sustainability (institutional, financial and political)</b> How will the work package outputs be further used by project partners once the project has ended?</p> <p>Please describe concrete measures (including e.g. institutional structures, financial resources, policy improvements etc.) taken during and after project implementation to ensure the sustainability of the project outputs. If relevant, please explain who will be responsible and/or the owner of the outputs.</p>	<p>Durability is based on legitimization &amp; reliability of the data from economic and environmental scenarios. About #Economic scenarios (D2.3.3), LCC are based on market projection and data are referred to EIT KIC Raw Materials dataset. About #Environmental scenarios (D2.2.3) LCA is implemented according to Product Environmental Footprint products-benchmark deriving from 1st &amp; waves of pilots implemented in 2014-15 by the EC in the frame of Single Market for Green Products initiative</p>
<p><b>Transferability (linked to the WP Communication)</b> Which work package outputs will be transferred to which additional target audiences during project lifetime and beyond? Why are these outputs the most relevant ones to be transferred?</p> <p>Please describe the additional target audiences (e.g. other organisations/regions/countries outside of the current partnership) and ensure links to the strategy of the communication work package.</p>	<p># E-CLOUD (D2.1.3) containing best BAT, clean-up techs &amp; best governance practices to facilitate creation of by-products markets powered also after CIRCE as tool for uptake &amp; transferability; # LCA &amp; LCC to estimate industrial ecology benefits &amp; economic-convenience of new industrial symbiosis supported by tutorials (D2.2.4 &amp; D2.3.4) to helps practitioners to estimate integrated env-planning &amp; cost-efficient organization/cleanup-tech options. To be applied in WPT4 to 5 new waste utilities</p>

Activity title	Start date	End date	
<b>Activity A.T2.1</b> Scout clean-up technologies and organizative models to support the switch to circular economy models	01.2018	12.2018	
<b>Deliverables for activity A.T2.1</b>			
<b>Deliverable D.T2.1.1</b>	<p><b>Deliverable title</b> Survey on market ready clean up techs &amp; managerial processes available in the project areas</p>	<p><b>Description of deliverable</b> Brokerage for Identification of technical and management solutions available in the project areas on the ready to use clean-up technologies. The 5 contributions from each area (individual report) are gathered in 1 single technical report</p>	<p><b>Delivery month</b> 06.2018</p> <p><b>Quantification/target</b> 1,00</p>



<b>Deliverable D.T2.1.2</b>	<i>Deliverable title</i> Report over newly concepts & prototypes based on EU-wide brokerage	<i>Description of deliverable</i> Scouting at European level over prototype solutions (deriving by HORIZON and FP7 projects & R&D public&private LABs) and near-to-market R&D (TRL>7) that shall be tested in the CIRCE testbed areas. Resp is BZN being member of IET KIC Raw Material	<i>Delivery month</i> 06.2018	<i>Quantification/target</i> 1,00
<b>Deliverable D.T2.1.3</b>	<i>Deliverable title</i> CIRCE e-cloud gathering top BATs & market ready clean-up techs & organizative practices & manual	<i>Description of deliverable</i> 1 CIRCE e-cloud by ATM with top BATs & market ready clean-up techs & organizative practices able to meet pilot areas' local requirements & facilitate by-products valorization. This portal powered also after CIRCE as tool for uptake & transferability	<i>Delivery month</i> 12.2018	<i>Quantification/target</i> 1,00
<b>Deliverable D.T2.1.4</b>	<i>Deliverable title</i> Shared technology rating methodology (TRM) to check out readiness of new techs and processes	<i>Description of deliverable</i> TRM based on intern-standards to assess effectiveness of clean-up options showcased in E-CLOUD & asses self-sustainability from economic point of view according to features of industrial areas (type of by-products, volume, tech readiness level). By BZN	<i>Delivery month</i> 12.2018	<i>Quantification/target</i> 1,00
<b>Activity A.T2.2</b>	<i>Activity title</i> Design of PEF-compliance environmental based on LCA tools to estimate industrial ecology benefits	<i>Start date</i> 03.2018	<i>End date</i> 03.2019	
<b>Deliverables for activity A.T2.2</b>				
<b>Deliverable D.T2.2.1</b>	<i>Deliverable title</i> Guidelines for adaptation of LCA methodology to estimate ecological impact (based on D.T2.2.5)	<i>Description of deliverable</i> Based on LCA standards+PEF requirements, guidelines for application are designed by ETRA to determine ecological & envl impact in local industrial supply chain due to introduction of secondary raw material markets for class of products chosen in AT1.4	<i>Delivery month</i> 07.2018	<i>Quantification/target</i> 1,00

<b>Deliverable D.T2.2.2</b>	<i>Deliverable title</i> LCA team & transnational training for the application of LCA methodology	<i>Description of deliverable</i> Creation of 1 international pool of LCA experts after PP's appointment & organization of 1 initial training by ETRA to provide guidelines to execute PEF compliance analysis according to operational methodology for each of the products & MFA chosen	<i>Delivery month</i> 07.2018	<i>Quantification/target</i> 1,00
<b>Deliverable D.T2.2.3</b>	<i>Deliverable title</i> Report of PEF-compliance environmental scenarios by using LCA tools	<i>Description of deliverable</i> Analysis on life-cycle of industrial processes in 5 local production system by LCA tools. Execution of 1 case study*sector identified & design of mid-term env-scenarios to validate potential ENV-impact of remanufacturing options	<i>Delivery month</i> 03.2019	<i>Quantification/target</i> 5,00
<b>Deliverable D.T2.2.4</b>	<i>Deliverable title</i> Tutorial for future application of PEF-based methodology in industrial areas for replication purpose	<i>Description of deliverable</i> Tutorials delivered by ETRA to helps new practitioners to estimate integrated environmental planning & prescreening of environmental and ecological benefits due to introduction/enhancement of industrial symbiosis. Used also for transferability (WPT4)	<i>Delivery month</i> 03.2019	<i>Quantification/target</i> 1,00
<b>Deliverable D.T2.2.5</b>	<i>Deliverable title</i> Conceptualization of PEF requirements as preliminary part of the guidelines	<i>Description of deliverable</i> Conceptualization of PEF requirements focused on waste manufacturing phase as propaedeutic phase to generate the guidelines for adaptation of LCA methodology to estimate ecological impact (introductory part of D.T2.2.1)	<i>Delivery month</i> 04.2018	<i>Quantification/target</i> 1,00
<b>Activity A.T2.3</b>	<i>Activity title</i> <b>Design of economic scenarios about self-sustainability of new secondary raw materials markets</b>	<i>Start date</i> 03.2018	<i>End date</i> 03.2019	
<b>Deliverables for activity A.T2.3</b>				
<b>Deliverable D.T2.3.1</b>	<i>Deliverable title</i> One LCC econometric model to calculate economic impact of an identified circular economy process	<i>Description of deliverable</i> BZN provides Life Cycle Cost meth. to calculate the economic impact of an identified circular economy opportunity (such as remanufacturing or sharing of assets) for a specific sub-sector or product category and scale it up to the whole sector.	<i>Delivery month</i> 07.2018	<i>Quantification/target</i> 1,00

<b>Deliverable D.T2.3.2</b>	<i>Deliverable title</i> 1 transnational training to apply econometric model	<i>Description of deliverable</i> 1 transnational training organized by BZN to explain how to apply the econometric model within a territorial domain to generate cross-value economic benefits from introducing lower cost remanufactured products. Report published	<i>Delivery month</i> 09.2018	<i>Quantification/target</i> 1,00
<b>Deliverable D.T2.3.3</b>	<i>Deliverable title</i> Report of mid-term economic scenarios to check profitability of new by-products markets	<i>Description of deliverable</i> A key factor in creating a dynamic market for secondary raw materials is sufficient demand (market) driven by use of recycled materials in products (volumes) & infrastructure. This is estimated by all PP by applying LCC to design mid-term € scenarios	<i>Delivery month</i> 03.2019	<i>Quantification/target</i> 5,00
<b>Deliverable D.T2.3.4</b>	<i>Deliverable title</i> Tutorial for future application of the LCC methodology in industrial areas for replication purpose	<i>Description of deliverable</i> Tutorials delivered by BZN to helps practitioners to estimate cost-efficient organization/cleanup-tech options & basic assessment of benefits / profitability of closed-loop product design in terms of economic impact. Used also for transferability (WPT4)	<i>Delivery month</i> 03.2019	<i>Quantification/target</i> 1,00
<b>Activity A.T2.4</b>	<i>Activity title</i> <b>Circular economy business models supporting cross value chain by-products remanufacturing</b>	<i>Start date</i> 02.2019	<i>End date</i> 05.2019	
<b>Deliverables for activity A.T2.4</b>				
<b>Deliverable D.T2.4.1</b>	<i>Deliverable title</i> MATRIX of concrete circular economy matchmakings within each industrial area	<i>Description of deliverable</i> According to the D1.4.2 (plan for prioritization) + economic & environmental scenarios + available/cost-effective technologies that might be introduced / optimized, each PP elaborate 1 MATRIX of concrete circular economy matchmakings in each industrial area	<i>Delivery month</i> 04.2019	<i>Quantification/target</i> 5,00
<b>Deliverable D.T2.4.2</b>	<i>Deliverable title</i> Analysis & interpretation and interpolation of remanufacturing donors & recipient companies	<i>Description of deliverable</i> Once profiled the matchmaking, experts map out promising "donors" vs "recipient" pool of companies interactions in each pilot areas that have characteristics for cross-chain & cross-sector collaboration to kick off secondary raw material exchanges	<i>Delivery month</i> 05.2019	<i>Quantification/target</i> 5,00

<p><b>Deliverable D.T2.4.3</b></p>	<p><i>Deliverable title</i> Design of the circular economy business model as driver for the pilot tests (AT3.2) for each area</p>	<p><i>Description of deliverable</i> BM characterized by A) quantification of cut from use of raw materials, B) a reduced dependence from natural resources, C) cost/effective tech &amp; attitude to investment of the business sector D) fulfilment of loc/nat waste regulation. 1*area developed</p>	<p><i>Delivery month</i> 05.2019</p>	<p><i>Quantification/target</i> 5,00</p>
<p><b>Deliverable D.T2.4.4</b></p>	<p><i>Deliverable title</i> Validation meeting by the key-stakeholders in each pilot site by involving local &amp; regional PAs</p>	<p><i>Description of deliverable</i> Since drivers to design the circular economy business model (AT2.1-2.2-2.3) have environmental &amp; economic implications, 1 validation meeting with loc/reg competent policymakers/environmental/business authorities is organized to gain legitimization</p>	<p><i>Delivery month</i> 05.2019</p>	<p><i>Quantification/target</i> 5,00</p>