

**CIRCE 2020 PROJECT**  
**LOCAL REPORT FOR CIRCULAR ECONOMY CRITICAL FACTORS (D.T1.2.4)**

**PILOT AREA: WIELKOPOLSKA (PL)**

Prepared By: Aldona Konopczyńska, Marcin Konopczyński, Adam Nowicki
AM Trans Progres sp. z o.o. POLAND
Pilot Area: WIELKOPOLSKA (PL)
Date: 2018/05/14

**TABLE OF CONTENT**

<b>1.</b>	<b>ASSESSMENT OF CRITICAL FACTORS FOR MODELLING CLOSED-LOOP SYSTEMS IN THE SELECTED INDUSTRIAL PARK</b>	<b>3</b>
<b>1.1.</b>	<b>BASIC PILOT AREA CHARACTERIZATION</b>	<b>3</b>
<b>1.2.</b>	<b>CIRCULAR ECONOMY AWARENESS AND CURRENT PRACTICES</b>	<b>3</b>
<b>1.3.</b>	<b>SCOPE AND AVAILABILITY OF PRELIMINARY MODELING DATA</b>	<b>4</b>
<b>1.4.</b>	<b>CONCLUSIONS AND RECOMMENDATIONS FOR OVERCOMING BARRIERS IN OBTAINING DATA</b>	<b>5</b>
<b>2.</b>	<b>ASSESSMENT OF MARKET BARRIERS ANALYSIS FOR THE CREATION OF AN EFFICIENT MODEL OF INDUSTRIAL SYMBIOSIS</b>	<b>7</b>
<b>2.1.</b>	<b>LOCAL LEGISLATIVE ENVIRONMENT</b>	<b>7</b>
<b>2.2.</b>	<b>ASSESSMENT OF MARKET FACTORS</b>	<b>10</b>
<b>2.2.1.</b>	<b>Absence or Presence of Waste Types</b>	<b>10</b>
<b>2.2.2.</b>	<b>Demand for Critical Raw Materials</b>	<b>10</b>
<b>2.2.3.</b>	<b>Motivating Factors and Cooperation</b>	<b>11</b>
<b>2.2.4.</b>	<b>Availability of Infrastructure</b>	<b>11</b>
<b>2.3.</b>	<b>CONCLUSIONS AND RECOMMENDATIONS</b>	<b>12</b>
<b>3.</b>	<b>ASSESSMENT OF AVAILABILITY INDUSTRIAL &amp; WASTE MANAGEMENT INFORMATION</b>	<b>13</b>
<b>3.1.</b>	<b>ACCESSIBILITY OF WASTE GENERATION /MANAGEMENT INFORMATION</b>	<b>13</b>
<b>3.2.</b>	<b>RECOMMENDATIONS FOR INFORMATION EXCHANGE</b>	<b>13</b>
<b>4.</b>	<b>ASSESSMENT OF LIMITS TO ACCESS MATURE CLEANUP TECHS</b>	<b>15</b>
<b>4.1.</b>	<b>MAPPING WASTE MANAGEMENT TECHNOLOGIES IN THE ENVIRONMENT OF THE SELECTED PILOT AREA</b>	<b>15</b>
<b>4.2.</b>	<b>GAP ANALYSIS OF WASTE RECYCLING /MANAGEMENT TECHNOLOGIES</b>	<b>15</b>
<b>4.3.</b>	<b>RECOMMENDATIONS TO IMPROVE AVAILABILITY OF WASTE MANAGEMENT TECHNOLOGIES IN THE ENVIRONMENT OF THE PILOT AREA</b>	<b>16</b>
<b>5.</b>	<b>REFERENCES</b>	<b>17</b>

## 1. ASSESSMENT OF CRITICAL FACTORS FOR MODELLING CLOSED-LOOP SYSTEMS IN THE SELECTED INDUSTRIAL PARK

### 1.1. BASIC PILOT AREA CHARACTERIZATION

**Table 1: Pilot Area Description**

Name / Location Pilot Area: WIELKOPOLSKA (PL)	
Number of Enterprises in the Pilot Area:	
a) Up to employees 10 hired – 203 906	
b) 10 and more employees hired – 7 944	
Number of Manufacturing Enterprises in the Pilot Area: 23	
Number of Enterprises Involved in the Pilot Study include the following:	
SME- Small and Medium Sized entities:	16
Large-sized entities*:	7
Industrial Sectors: (17% manufacturing (non food), 17% food industry, 9% construction, 17% chemical, 13% energy, 9% plastic recyclers, 17% other)	

\* Large-size entities are companies: Employing more than 250 employees; OR Having an annual net revenue more than 50m euros, AND having an aggregate amount of the balance sheet more than 43m euros.

### 1.2. CIRCULAR ECONOMY AWARENESS AND CURRENT PRACTICES

**Table 2: Circular Economy Awareness & Current Practices in the Pilot Area**

	Pilot Area Aggregated Data (Please fill-in)
1. What percentage of the respondents have heard of the circular economy / closed loop economy?	100 %
2. What percentage of the respondents are:	
a) Purely in a linear system.	a) 12%
b) In a linear system with some elements of circularity within the manufacturing process.	b) 18%
c) In a linear system with some elements of circularity, occurring outside of the company facility (a waste material is sent to a recycling facility)	c) 64%
d) In a linear system with some elements of circularity, occurring outside of the company facility (a waste material is sent to another facility as a secondary raw material)	d) 6%

	Pilot Area Aggregated Data (Please fill-in)
e) In a circular system.	e) 0%
3. What percentage of the respondents apply eco-design directives?  Which of the following design features were applied? a) Reparability b) Upgradability c) Durability d) Recyclability of products	92 %  a) 13% b) 12% c) 0% d) 75%
4. What percentage of the respondents make an effort to reduce packaging waste?  If yes, how? a) Use bio-degradable materials b) Smart Design for overall reduction of materials c) Use of easily recyclable packaging	100 %  a) 36% b) 18% c) 46%

### 1.3. SCOPE AND AVAILABILITY OF PRELIMINARY MODELING DATA

**Table 3: Scope and Availability of Preliminary Modeling Data**

	Pilot Area Aggregated Data (Please fill-in)
What percentage of companies provided information regarding their primary material in-flows?	36 %
If information was not provided, what reason(s) were given for not providing the information?  a) No reason given b) Too much hassle (not interested in cooperating) c) Confidentiality and/or Business secret d) Other	a) 26% b) _____% c) 74% d) _____%
What percentage of companies provided information	

	Pilot Area Aggregated Data (Please fill-in)
<p>regarding waste generation (out-flows)?</p> <p>Of those that responded, generally speaking, how complete was the information?</p> <p>a) Complete</p> <p>b) Mostly complete</p> <p>c) Incomplete</p> <p>d) No information provided</p>	<p>96%</p> <p>a) _____%</p> <p>b) 100%</p> <p>c) _____%</p> <p>d) _____%</p>
<p>If information regarding was not provided, generally speaking, can the information be obtained through public records?</p>	<p>YES / NO</p> <p>Out-flows waste from enterprise are reported to the Marshal of the Region and published on the official web-site.</p> <p>In-flows are confidential.</p>

#### 1.4. CONCLUSIONS AND RECOMMENDATIONS FOR OVERCOMING BARRIERS IN OBTAINING DATA

The information and data was obtained from companies in Wielkopolska Region. The data came from companies that work in a certain organized structure and have procedures for waste management.

Small enterprises/ manufactures are not interested in sharing the information with the 3th parts and in participation in that kind of survey or project.

The main reasons of **refusal** to participation in the study were:

- Lack of time
- Low level of awareness /consciousness of UE strategy and the circular economy issue
- Lack of trust to the system
- Competition
- Control
- Confidentiality of the data

The main effort was made towards the companies that work in a certain organized structure and have procedures for waste management. That have good practice and experience form other projects or the one are the part of bigger international structure.

Those companies that seem to understand the idea of CE are more "openminded" to new ideas.

The lack of trust is difficult to cross, but we can limit it by providing good practice in acquisition and storage of the data.

This issue should be considered during the e-cloud implementation.

For ins. Liking of data

Unauthorized use etc.

We can use special unique code for each organization.

Firms do not want to share knowledge with others or their competitors  
Most of respondents asked the question: What is the benefit for my company?  
Are there any righties and duties considering the participation  
Who is going to manage the data?

## 2. ASSESSMENT OF MARKET BARRIERS ANALYSIS FOR THE CREATION OF AN EFFICIENT MODEL OF INDUSTRIAL SYMBIOSIS

### 2.1. LOCAL LEGISLATIVE ENVIRONMENT

**Table 4: Characteristics of Legislative Environment**

SECTOR <i>(eg. Waste, Use of specific recycled materials, Energy efficiency, Wastewater, Air emissions, Green taxes/refunds)</i>	LAW REFERENCE	TITLE OF LEGISLATION	RELEVANCY TO CIRCULAR ECONOMY	DOES THE LEGISLATION ENCOURAGE A CIRCULAR ECONOMY? (YES / NO)	DOES THE LEGISLATION CREATE A BARRIER TO A CIRCULAR ECONOMY? (YES / NO)
Environmental Protection Law	Dz.U. 2001 nr 62 poz. 627	The Act of the Protection of the Environment	Environment protection, prevention of degradation, waste selective collection, circulation, implementation of processes and technologies	YES	NO
Environmental Protection Law	Dz.U. 2007 nr 75 poz. 493	The Act on the Prevention of Damage to the Environment and its Remediation	Environment protection, prevention of degradation, waste selective collection, circulation, implementation of processes and	YES	NO

CIRCE 2020 PROJECT  
LOCAL REPORT FOR CIRCULAR ECONOMY CRITICAL FACTORS

SECTOR <i>(eg. Waste, Use of specific recycled materials, Energy efficiency, Wastewater, Air emissions, Green taxes/refunds)</i>	LAW REFERENCE	TITLE OF LEGISLATION	RELEVANCY TO CIRCULAR ECONOMY	DOES THE LEGISLATION ENCOURAGE A CIRCULAR ECONOMY? (YES / NO)	DOES THE LEGISLATION CREATE A BARRIER TO A CIRCULAR ECONOMY? (YES / NO)
			technologies		
Environmental Protection Law	Dz.U. 2004 nr 92 poz. 880	The Act on the Protection of Nature	Environment protection, prevention of degradation, prevention of raw materials	YES	NO
Wastewater	Dz.U. 2017 poz. 1566	The Water Law	Water management regulation, sustainability growth and circulation	YES	NO
Waste	Dz.U. 2013 poz. 21	The Act on Waste	Environment protection, prevention of degradation, waste and selective collection, circulation, implementation of processes and technologies	YES	NO
Air emissions	Dz.U. 2009 nr 130 poz. 1070	The Act on Greenhouse Gases and Emissions of other Substances Management System	Air emissions, low emissions management, reduction and prevention	YES	NO



*CIRCE 2020 PROJECT*  
**LOCAL REPORT FOR CIRCULAR ECONOMY CRITICAL FACTORS**

<b>SECTOR</b> <i>(eg. Waste, Use of specific recycled materials, Energy efficiency, Wastewater, Air emissions, Green taxes/refunds)</i>	<b>LAW REFERENCE</b>	<b>TITLE OF LEGISLATION</b>	<b>RELEVANCY TO CIRCULAR ECONOMY</b>	<b>DOES THE LEGISLATION ENCOURAGE A CIRCULAR ECONOMY? (YES / NO)</b>	<b>DOES THE LEGISLATION CREATE A BARRIER TO A CIRCULAR ECONOMY? (YES / NO)</b>
Air emissions, Green taxes	Dz.U. 2011 nr 122 poz. 695	The Act on the System of Trading in Greenhouse Gas Emission Allowances	Air emissions, low emissions management, reduction and prevention	YES	NO
Used electronic equipment	Dz.U. 2015 poz. 1688	The Act on Waste Electrical and Electronic Equipment	It makes selective collection of electronic wastes obligatory	YES	NO
Package	Dz.U. 2013 poz. 888	The Act on the Management of Packaging and Packaging Waste	It makes selective collection of packaging wastes obligatory	YES	NO
Product fee	Dz.U. 2001 nr 63 poz. 639	The Act on the Obligations of Entrepreneurs in the Management of Certain Waste and the Product Fee	It makes selective collection of packaging wastes obligatory	YES	NO

## **2.2. ASSESSMENT OF MARKET FACTORS**

### **2.2.1. Absence or Presence of Waste Types**

02 04 02	off-specification calcium carbonate - diatom soil from brewery process
02 07 02	wastes from spirits distillation - calcium from sugar plant
03 03 08	wastes from sorting of paper and cardboard destined for recycling
04 02 22	wastes from processed textile fibres - artificial leather
07 02 13	Plastic waste - multipolymer/multimaterial plastic waste
10 01 01	bottom ash, slag and boiler dust (excluding boiler dust mentioned in 10 01 04)
12 01 13	welding wastes - from automotive industry
15 01 02	plastic packaging - multipolymer/multimaterial plastic waste
15 01 06	mixed packaging - multipolymer/multimaterial plastic waste
16 01 19	Plastic - multipolymer/multimaterial plastic waste
17 02 03	Plastic - multipolymer/multimaterial plastic waste
17 03 80	tar paper / roofing felt - roofing left

There is demand for sorted waste, in very good quality, like:

- Polymers,
- Paper,
- Glass
- Metal – Al
- Bio mass fuel
- Solvents to technology line cleaning
- Big volume packages – big-bags, containers
- Rubble in building process

### **2.2.2. Demand for Critical Raw Materials**

Water.

Wielkopolska Region is the agricultural area. There is lack of raw material mined in the region. All raw material necessary to manufacturing have to be imported from other regions.

Carbon, steel, chemical streams are imported.

There is very low level of underground water. The water is the most tight of all raw material. 82% of the water used in Wielkopolska region goes to manufacturing processes.

Energy.

The energy management all over the Poland is based on carbon (ab. 90%). The energy plants are mostly outdated (more than 30 years old). But the main problem is transmission infrastructure. Growing up energy needs and going down efficiency of transmission is negative and important barrier of development. The biogas installation could be one of the solution.

### 2.2.3. Motivating Factors and Cooperation

**Table 5: Motivating Factors and Cooperation in the Pilot Area**

	Pilot Area Aggregated Data (Please fill-in)
1. What percentage of the respondents would benefit from the following: a) Reduced waste management cost b) Income from selling waste as a secondary raw material c) Obtaining raw materials (especially limitedly available materials) at a lower cost d) Minimizing costs related to green taxes e) Receiving state allowances/refunds related to circularity/sustainability f) Marketing benefits from green operation (eco-labeling)	a) 100% b) 100% c) 100% d) 100% e) 34% f) 15%
2. Assessment of Cooperation a) What percentage of the respondents would cooperate in a multi-company (industrial area wide) circular economy scheme b) What percentage of the respondents would be willing to sell or use a secondary raw material? c) What percentage of the respondents would be willing to sell or use waste heat or water? d) What percentage of the respondents feel that it would be feasible to find a cooperation partner(s) to work together toward closing material loops?	a) 93% b) 89% c) 100% d) 92%
3. What percentage of the respondents feel that questions of confidentiality and potential business secrets would make the sharing of information difficult?	100%

### 2.2.4. Availability of Infrastructure

**Errore. L'origine riferimento non è stata trovata.** Table shows all waste treatment systems used for waste recovery and waste neutralization; it reveals a complex system of waste management systems available in the Region.

Installation	Vol
Dismantling stations for end-of-life vehicles	122
Waste treatment plants for electronic and electrical equipment	10
Medical waste incinerators	1
Hazardous waste incinerators (incl. medical and veterinarian)	1
Waste treatment installations for paper	11
Waste treatment installations for used tires recycling	7
Waste treatment installations for plastics	136

Waste treatment installations for cullet	12
Waste treatment installations for ferrous and non-ferrous metals	32
Waste treatment installations for wood	5
Waste incinerators (excl. hazardous and municipal waste)	4
Waste-to-energy facilities (RDF) for non-municipal waste	8
Waste treatment installations for sewage sludge	11
Waste treatment installations for construction and demolition waste	58
Hazardous waste landfills	2
Non-hazardous and non-inert waste landfills (excl. municipal)	6
Inert waste landfills (excl. municipal)	1
<b>Total</b>	<b>427</b>

Samples of waste management installation:

Zakład Zagospodarowania Odpadów w Poznaniu Sp. z o.o. selective collection and treatment facility of household waste, selective collection of hazardous,

Presseko Sp. z o.o. w Bolechowie k/Poznania. Physical – chemical waste treatment center, wood waste fraction recycling center.

STENA Recykling Polska. Global player in waste management offered whole process of industrial waste management.

LS Plus Sp. z o.o. w Opalenicy. Industrial waste management center, offers alternative fuel production, and selective collected polymers regrinds.

Argenton Sp. z o.o. w Środzie Wlkp. Industrial waste treatment center offers recycling or final treatment of solvents, degreasers.

EkoGom Sp. z o.o. w Grodzisku Wlkp. Rubber waste and tires treatment center.

Wtórplast-Recykling Jerzy Jabłoński w Czapurach k/Poznania. Plastic waste sorting and recycling facility, offers regrinds, granulates of polymers.

### **2.3. CONCLUSIONS AND RECOMMENDATIONS**

There are barriers in legislative area. There is no obligatory level of industry waste reduction. That process is regulated by the market only. Some incentives or obligations could help to increase the level of recycling or recovery of waste.

The multimaterial waste are very big problem all over the industry. The problem constantly increases, because of marketing issues. The customer demands new and useful materials (light, strong, colorful, nice etc.). Problem concerns polymers, wood and furniture, paper, packaging, glass production.

The innovations that can bring the solution are expected in the Region.



### 3. ASSESSMENT OF AVAILABILITY INDUSTRIAL & WASTE MANAGEMENT INFORMATION

#### 3.1. ACCESSIBILITY OF WASTE GENERATION /MANAGEMENT INFORMATION

**Table 6: Availability of Waste Generation Information**

ORGANIZATION / DESCRIPTION	WHERE IS THE INFORMATION ACCESSIBLE? (Link, data request forms)	TYPE OF DATA AVAILABLE	DOES THE DATABASE ENCOURAGE WASTE EXCHANGE? YES/NO
Waste web stock	<a href="http://gielda-odpadow.pl/">http://gielda-odpadow.pl/</a>	Donors/recipient portal to match-make and reuse the waste	Yes
Plastic waste web stock	<a href="https://www.plastech.pl/oferty-b2b">https://www.plastech.pl/oferty-b2b</a>	Donors/recipient portal to match-make and reuse the plastic waste	Yes
Voivodship Marschal – authority of the region, responsible for waste management reporting	<a href="https://bip.umw.w.pl/">https://bip.umw.w.pl/</a>	Information of the production and treatment of industrial waste in the Region	No
Regional Inspection of Environment Protection	<a href="http://poznan.wios.gov.pl/">http://poznan.wios.gov.pl/</a>	Inspection and environment control authority	No

#### 3.2. RECOMMENDATIONS FOR INFORMATION EXCHANGE

One of the main reason of low level of information exchanging between waste generator and waste treatment process is lack of communication. Enterprises afraid to share the information because of:

- Lack of trust to the system
- Lack of trust to the potential business partners
- Competition
- Confidentiality of the data, concern know how, technology, patents
- Confidentiality of the data concern customers

There is big room to develop the tools that help to avoid the barriers given below and develop information exchange between waste generator and waste treatment process.

Exchange of information has to be voluntary. Created tools, must be prepared in the way, that allow the enterprises to use the tools on the level they accept. It cannot be revolution change. Small steps, that will build trust and loyalty between the users.

The e-platforms to buy/sell the products (ebay, allegro etc.) are more and more popular, that could be the hint to develop the way of information exchange.

#### 4. ASSESSMENT OF LIMITS TO ACCESS MATURE CLEANUP TECHS

##### 4.1. MAPPING WASTE MANAGEMENT TECHNOLOGIES IN THE ENVIRONMENT OF THE SELECTED PILOT AREA

Please provide a list of local practices or technologies which are available for reuse, recycling, or remanufacturing waste in your pilot area.

Plastics: recycling of PVC, LDPE, ABS, PP, PET

Metals: selective collection of metals, Al, Cu, Fe

Construction waste: concrete, rubble

Food waste: carcass, bones, food banks for expired products

Biomass: biomass energy plants, landfill biogas energy plant, sludge bio gas energy plant

Wood: wood waste recovery plant

Paper: selective collection of paper

Automotive: Dismantling stations for end-of-life vehicles

Road building: asphalt surface recovery

##### 4.2. GAP ANALYSIS OF WASTE RECYCLING /MANAGEMENT TECHNOLOGIES

**Table 7: Availability of Waste Management Practices/Technologies**

WASTE FLOWS	AVAILABLE PRACTICE(S)/TECHNOLOGY(S)		GAP ANALYSIS		
	Name of the Practice/ Technology	Description of the Practice/ Technology	DOES NOT EXIST	EXISTS but LACKING CAPACITY or LOCALLY NOT AVAILABLE	EXISTS and AVAILABLE FOR USE
Plastics	Recycling/converting	- sorting/cleaning - shredder - regrind - extrusion, regranulation, pulverization - foil bags production			x
Critical Raw Materials (eg. metals, minerals)	Recycling of Al,	- selective collection - aluminum smelter		x	
Construction Waste	Recovery of concrete	- selective collection, shredding,			x
Food Waste	Recovery of bone-meal	- selective collection, - recovery center			x



WASTE FLOWS	AVAILABLE PRACTICE(S)/TECHNOLOGY(S)		GAP ANALYSIS		
Biomass	Biogas installations	Exchanging green fraction into biogas			x
Wood	Wood recovery installation	Exchanging wood into the pellets fuel			x
Road building	Asphalt surface recovery	Recovery of asphalt surface to prepare new layer			x

**4.3. RECOMMENDATIONS TO IMPROVE AVAILABILITY OF WASTE MANAGEMENT TECHNOLOGIES IN THE ENVIRONMENT OF THE PILOT AREA**

1. Legislation, that allows to settle new installations in certain area.
2. Education of society, that increase awareness
3. Good practices sharing
4. Financial support for start-up,
5. Easy access to information about good practices and new technologies
6. Tax and fees incentives

**5. REFERENCES**

- [1] PL Parliament official web site [www.sejm.gov.pl](http://www.sejm.gov.pl)
- [2] Wielkopolska Region Marshall
- [3] Statistic Office
- [4] AM Trans Progres sp. z o.o. surveys
- [5] Environment Protection Program for Wielkopolska Region