CircLean: proposed reporting indicators

1.1 Purpose of the present document

This document presents proposals regarding the main features of the reporting indicators for the CircLean project, as designed by the project team at the end of Year 1 of the project and amended in the Kick-off Meeting of the Task Force 2 in charge of the definition of the Reporting Indicators, which took place on 06 May 2021. It was adopted following the second meeting the Task Force on 17 June 2021.

1.2 General principles of the reporting indicators

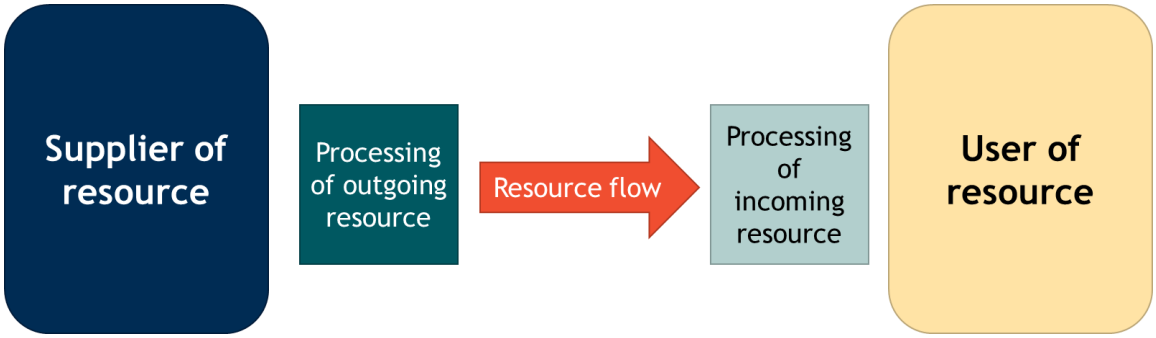
The reporting indicators are meant to measure the level of achievement of private companies regarding Industrial Symbiosis. They are designed to be valid across the European Union and to be implemented in the CircLean network and tool to build the reporting.

The reporting methodology being proposed relies on the following principles:

- A distinction between:
  - Incoming flows; and
  - Outgoing flows;
- A logic inherited from the EMAS[1] reporting principles, whereby:
  - The raw data input contains:
    - Flows involved in Industrial Symbiosis transactions, in absolute units; and
    - Reference total flows with which to compare, in absolute units;
  - Derived indicators are computed based on this raw data;
- A minimisation of data input by companies;
- A capacity to consolidate data, to enable reporting by local / regional authorities or at the level of a multi-site company.

The reporting methodology is based on a reference scenario outlined in the Figure 1 below.

Figure 1 Reference scenario of an Industrial Symbiosis transaction



[1] Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)

This reporting methodology would benefit from being aligned with the requirements of the future Directive on Corporate Sustainability Reporting[2], the standard for which is scheduled to be delivered in autumn 2022. This will deserve, if necessary, an update of the present document.

1.3 Incoming flows. Environmental indicators

The tables below list the data input by the user, and the frequency of this data input. The general aim is to reduce the data input to a minimum, and to avoid any additional work regarding unit conversion.

Table 1 describes the one-off entries, to be performed once only, and then only when an update is necessary. Table 2 describes the periodic entries, to be performed at each reporting period. Table 3 concludes with the means by which derived indicators are computed.

Table 1 One-off data input for incoming flows

Data input	Frequency of data input	Metric

Nature of the resource	Once per resource type	Selection within closed list (to be further defined with ISL). Types of resource are differentiated per order of magnitude of environmental impact:
		• Electricity
		• Heat
		• Water
		• Metals:
		  ○ Steel
		  ○ Aluminium
		  ○ Copper
		  ○ Zinc
		  ○ other
		• Plastics
		• Rubber:
		  ○ Artificial
		  ○ Natural (latex)
		• Glass
		  ○ Intact containers
		  ○ Broken glass (flat & hollow)
		• Paper & cardboard
		• Wood
		• Textiles & leather:
		  ○ Polyester and other synthetic fibres
		  ○ Cotton
		  ○ Other plant-originated fibres (flax, hemp,...)
		  ○ Wool and other animal-originated fibres
		  ○ Mix of natural and synthetic fibres

[2] Proposal for a Directive as regards corporate sustainability reporting COM/2021/189 final, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0189

Data input	Frequency of data input	Metric
		○ Leather & fur ○ Foam • Construction materials: ○ Gravel & sand ○ Concrete ○ Plaster ○ Ceramics (bricks, roof or floor tiles...) • Inorganic chemicals • Organic chemicals • Computing power • Finished products • other, please specify
Measurement unit for the resource	Once per resource type (can be revised by the user)	Selection within closed list, adapted for each type of resource (standard metric units – e.g. J, non-standard metric units – e.g. kWh, imperial units, ...)
Quality of the resource	Once per resource type (can be revised by the user)	According to the nature of the resource, the user should state: • whether the relevant standard or metric defining the quality of the resource should complied with; • if so, and in the case the standard defines several quality grades for the resource, the quality grade of the resource being requested. The following EU and global standards bearing on secondary raw materials should be used to specify the quality of the resource being requested: • **Recycled paper standard**: EN 643:2014: European list of standard grades of paper and board for recycling[3] • **Recycled plastics standard**: EN 15347[4] for the Characterization of plastics waste and EN 15343 for Plastics recycling traceability and assessment of conformity and recycled content[5] • **Plastics — Wood-plastic recycled composites** (WPRC): ISO 20819-1:2020[6] and ISO 20819-2[7] • **Wood residue and post-consumer wood** — Classification, Part 1: Vocabulary: ISO 17300-1[8] • **Textiles recycling**: Recycled claim standard (RCS) of Textiles exchange (international

[3] https://www.en-standard.eu/bs-en-643-2014-paper-and-board-european-list-of-standard-grades-of-paper-and-board-for-recycling/
[4] https://www.en-standard.eu/bs-en-15347-2007-plastics-recycled-plastics-characterization-of-plastics-waste/
[5] https://www.en-standard.eu/bs-en-15343-2007-plastics-recycled-plastics-plastics-recycling-traceability-and-assessment-of-conformity-and-recycled-content/
[6] https://www.iso.org/standard/77445.html
[7] https://www.iso.org/standard/78317.html
[8] https://www.iso.org/standard/65044.html

Data input	Frequency of data input	Metric
		voluntary standard) that sets standards that provide assurance for the quality of recycled textiles in final products • **Recycling of scrap consisting of non-ferrous materials**: EN 13920-8:2003[9], which specifies the requirements for aluminium-containing shredded material mixed with other metals and non-metallic components (rubber, plastic, glass etc) • **EU-27 Steel Scrap Specification**[10] by European Ferrous Recovery and Recycling Federation that determines environmental, health and safety requirements for steel scrap and other metallic minerals such as Copper, Tin, Lead, Chromium, Nickel..etc. to be processed in a safe way for workers and the environment. • **Waste tyres: DD CEN/TS 14243:2010**[11] for the materials produced from end-of-life tyres. It provides information on the categories of materials produced from end-of-life tyres based on their dimension(s) or impurities. • **Feed Water, Boiler Water and Steam Quality for Industrial Plants:** VGB-S-010-T-00;2011-12.EN standard for the Feed Water, Boiler Water and Steam Quality for Power Plants / Industrial Plants[12]. It covers all pressure ranges applied to boilers generating heat, steam and/or electricity for different industries. • **Electric power:** Council of European Energy Regulators on the quality of electricity supplied (6th benchmarking report)[13]. It covers indicators including interruption frequencies, voltage quality verification for electricity customers, which can be used by plants that receive electricity as input as a result of industrial symbiosis. Also, BS EN 50160:2010+A3:2019 for voltage quality of electricity supplied by public electricity networks.

[9] https://www.en-standard.eu/bs-en-13920-8-2003-aluminium-and-aluminium-alloys-scrap-scrap-consisting-of-non-ferrous-materials-from-shredding-processes-destined-to-aluminium-separation-processes/
[10] https://www.euric-aisbl.eu/facts-figures/standards-specifications#:~:text=EU%2D27%20Steel%20Scrap%20Specification,material%20for%20the%20steel%20industry .
[11] https://www.en-standard.eu/dd-cen-ts-14243-2010-materials-produced-from-end-of-life-tyres-specification-of-categories-based-on-their-dimension-s-and-impurities-and-methods-for-determining-their-dimension-s-and-impurities/ ç
[12] https://www.vgb.org/vgbmultimedia/VGB+S_010+e+Content-p-6324.pdf
[13] https://www.ceer.eu/documents/104400/-/-/d064733a-9614-e320-a068-2086ed27be7f and https://www.ceer.eu/documents/104400/-/-/484ca68c-2966-2bfa-f591-0f3a1eaf1f52

Data input	Frequency of data input	Metric
		• **Computing power:** ISO/IEC 19086-1:2016 Information technology and Cloud computing — Service level agreement (SLA) framework[14] **:** Cloud Service Level Agreement Standardisation Guidelines[15] for contracts between cloud service providers and cloud service customers In addition to these standards on the quality of flows of materials or power, the following taxonomy is suggested, as an anticipation of future standards, to describe the condition of functional systems: • Directly useable as a system; • Needing repair to operate as a system; • Not repairable as a system - components or modules re-useable or repairable; • No component or module re-useable or repairable - fit for material recovery; • No material fit for recovery - fit for energy recovery only. These metrics on the quality of the resource will be complemented as further standards are developed at EU or global level.
Measurement unit for the travel distance	Once per resource type (can be revised by the user)	Selection within closed list: • metres • kilometres • miles
Monetary unit	Once (can be revised by the user)	Selection within closed list: • Local currency unit • EUR • USD
Travel distance for the resource, when sourced from primary raw materials	Once per resource type (can be revised by the user)	Number of distance units
Travel distance for the resource, when sourced from Industrial Symbiosis transaction	Once per Industrial Symbiosis transaction	Number of distance units
Average unit price for the resource, when sourced from primary raw	Once per resource type (can be revised by the user)	Number of monetary units

[14] https://www.iso.org/standard/67545.html
[15] https://ec.europa.eu/digital-single-market/en/news/cloud-service-level-agreement-standardisation-guidelines

Data input	Frequency of data input	Metric
materials, per measurement unit specified above		
Average unit price for the resource, when sourced from Industrial Symbiosis transactions, per measurement unit specified above	Once per resource type (can be revised by the user)	Number of monetary units
Duration of the reporting period	Once (can be revised by the user)	Selection within closed list: • Month • Quarter • Year

Table 2 Periodic data input for incoming flows

Data input	Frequency of data input	Metric
Total incoming flow for the resource over the last reporting period, all sources	Once per reporting period	Volume, expressed in the measurement unit specified above
Incoming flow for the resource over the last reporting period, originated from an Industrial Symbiosis transaction	Once per reporting period	Volume, expressed in the measurement unit specified above

Based on this data input, the following **derived indicators** can be computed.

Table 3 Derived indicators for incoming flows

Data input by the user	Data provided by the tool	Derived indicator
(For all resource flows) • Nature of the resource • Measurement unit for the resource • Measurement unit for the distance • Travel distance when sourced from primary raw materials • Travel distance when sourced from Industrial Symbiosis • Duration of the reporting period	• Nature of the primary raw material that the resource substitutes for • CO_{2eq} content of resource per kg when sourced from primary raw materials • CO_{2eq} content per tonne.km • *(other data needed by the Circular Footprint Formula of PEF?)*	• GHG emissions savings over the last reporting period •

• Incoming flow from Industrial Symbiosis		
(for all energy flows) • Measurement unit • Total incoming flow • Incoming flow from Industrial Symbiosis	(none)	• Energy savings over the last reporting period • Fraction of energy input sourced from Industrial Symbiosis transactions
(For all resource flows) • Total incoming flow • Incoming flow from Industrial Symbiosis	(none)	Fraction of resource input sourced from Industrial Symbiosis transactions
(for water flows) • Total incoming flow • Incoming flow from Industrial Symbiosis	(none)	Fraction of water input sourced from Industrial Symbiosis transactions
(for all material flows, excluding construction materials) • Measurement unit • Total incoming flow • Incoming flow from Industrial Symbiosis	(none)	Fraction of material input (excluding construction materials) sourced from Industrial Symbiosis transactions
(for all construction materials) • Measurement unit • Total incoming flow • Incoming flow from Industrial Symbiosis	(none)	Fraction of construction materials sourced from Industrial Symbiosis transactions

1.4 Outgoing flows. Environmental indicators

The table below lists the data input by the user, and the frequency of this data input. The general aim is to reduce the data input to a minimum, and to avoid any additional work regarding unit conversion.

Table 4 describes the one-off entries, to be performed once only, and then only when an update is necessary. Table 5 describes the periodic entries, to be performed at each reporting period. Table 6 concludes with the means by which derived indicators are computed.

Table 4 One-off data input for outgoing flows

Data input	Frequency of data input	Metric
Nature of the resource	Once per resource type	Selection within closed list (to be further defined with ISL). Types of resource are differentiated per order of magnitude of environmental impact: • Electric energy • Heat • Water • Non-hazardous waste (mixed)

Data input	Frequency of data input	Metric

		• Hazardous waste (mixed)
		• Waste of Electric & Electronic Equipment (WEEE)
		• Metals:
		  ○ Steel
		  ○ Aluminium
		  ○ Copper
		  ○ Zinc
		  ○ other
		• Plastics
		• Rubber:
		  ○ Artificial
		  ○ Natural (latex)
		• Glass
		  ○ Intact containers
		  ○ Broken glass (flat & hollow)
		• Paper & cardboard
		• Wood
		• Textiles & leather:
		  ○ Polyester and other synthetic fibres
		  ○ Cotton
		  ○ Other plant-originated fibres (flax, hemp,...)
		  ○ Wool and other animal-originated fibres
		  ○ Mix of natural and synthetic fibres
		  ○ Leather & fur
		  ○ Foam
		• Construction materials:
		  ○ Gravel & sand
		  ○ Concrete
		  ○ Plaster
		  ○ Ceramics (bricks, roof or floor tiles...)
		• Inorganic chemicals
		• Organic chemicals
		• other, please specify

Measurement unit for the resource	Once per resource type (can be revised by the user)	Selection within closed list, adapted for each type of resource (standard metric units – e.g. J, non-standard metric units – e.g. kWh, imperial units, ...)
Quality of the resource	Once per resource type (can be revised by the user)	According to the nature of the resource, the supplier should state:

Data input	Frequency of data input	Metric
		• whether the relevant standard or metric defining the quality of the resource is complied with; • if so, and in the case the standard defines several quality grades for the resource, the quality grade of the resource being supplied. The EU and global standards to be used are the same as above (Table 1 One-off data input for incoming flows).
Monetary unit	*Identical to data for "incoming flows"*	
Nature of the waste management process by the corresponsding authority	Once per resource type (can be revised by the user)	Selection within closed list: • landfilling • incineration without energy recovery • incineration with energy recovery • recycling
Average waste management fee per measurement unit specified above	Once per resource type (can be revised by the user)	Number of monetary units
Average unit price for the resource, when sold via an Industrial Symbiosis transaction, per measurement unit specified above	Once per resource type (can be revised by the user)	• Number of monetary units
Duration of the reporting period	*Identical to data for "incoming flows"*	

Table 5 Periodic data input for ougoing flows

Data input	Frequency of data input	Metric
Total outgoing flow for the resource over the last reporting period, all sources	Once per reporting period	Volume, expressed in the measurement unit specified above
Outoging flow for the resource over the last reporting period, transferred via an Industrial Symbiosis transaction	Once per reporting period	Volume, expressed in the measurement unit specified above

Based on this data input, the following **derived indicators** can be computed.

Table 6 Derived indicators for outgoing flows

Data input by the user	Data provided by the tool	Derived indicator
(For all resource flows) • Measurement unit • Nature of the waste management process • Duration of the reporting period • Outgoing flow via Industrial Symbiosis over the last reporting period	• Toxic emissions (per pollutant: SOx, PM, NOx, VOC/THC), per volume unit of resource being incinerated • Residual toxic emissions from water treatment, per volume of wastewater being treated	• Waste processing avoided • Landfilling avoided • Toxic emissions avoided (per pollutant) in air and water over the last reporting period
(For all resource flows) • Total outgoing flow • **Quality of secondary resource** • Outgoing flow via Industrial Symbiosis	(none)	• Fraction of resource output re-used via Industrial Symbiosis transactions • Conformity indicator to the quality standard of output materials that will be exchanged to be used as secondary raw material to the applicable standard (to the extent possible)
(for all energy flows) • Measurement unit • Total outgoing flow • Outgoing flow via Industrial Symbiosis	(none)	Fraction of energy output re-used via Industrial Symbiosis transactions
(for water flows) • Total outgoing flow • Outgoing flow via Industrial Symbiosis	(none)	Fraction of water output re-used via Industrial Symbiosis transactions
(for all material flows, excluding construction materials) • Measurement unit • Total outgoing flow • Outgoing flow via Industrial Symbiosis	(none)	Fraction of material output (excluding construction materials) re-used via Industrial Symbiosis transactions
(for all construction materials) • Measurement unit • Total outgoing flow • Outgoing flow via Industrial Symbiosis	(none)	Fraction of construction materials output re-used via Industrial Symbiosis transactions

1.5 Economic & social indicators

Economic & Social indicators refer to:

- Employment;
- Value added;
- Profitability of investment in Industrial Symbiosis projects.

The generation of these indicators only requires one-off data input by the company, as described in Table 7 below.

Table 7 One-off data input for economic & social indicators

Data input	Frequency of data input	Metric
Staff permanently employed in the processing of incoming flows of resources obtained from Industrial Symbiosis	Once per resource type (can be revised by the user)	Full-time equivalents
Staff permanently employed in the processing of outgoing flows of resources delivered via Industrial Symbiosis	Once per resource type (can be revised by the user)	Full-time equivalents
Gross investment performed in the company to enable the processing of incoming flows of resources obtained from Industrial Symbiosis	Once per investment project	Number of monetary units
Gross investment performed in the company to enable the processing of outgoing flows of resources delivered via Industrial Symbiosis	Once per investment project	Number of monetary units
Date of commissioning of the investment company	Once per investment project	Month + year
Expected operational lifetime of the assets built during the investment project	Once per investment project	Years

Based on this one-off data input and on the data input for the incoming and outgoing resource flows above, the derived indicators of Table 8 below can be generated.

Table 8 Derived economic & social indicators

Data input by the user	Data provided by the tool	Derived indicator
(For all incoming resource flows) • Measurement unit • Monetary unit	(none)	Cost savings on procurement due to incoming flows obtained via Industrial Symbiosis over the last reporting period

Data input by the user	Data provided by the tool	Derived indicator
• Duration of the reporting period • Incoming flow from Industrial Symbiosis over the last reporting period • Unit price when sourced from primary raw materials • Unit price when sourced from Industrial Symbiosis		
(For all outgoing resource flows) • Measurement unit • Monetary unit • Duration of the reporting period • Outgoing flow via Industrial Symbiosis over the last reporting period • Waste management fee • Unit price when sold via Industrial Symbiosis	(none)	Economic benefits from Industrial Symbiosis outgoing flows over the last reporting period: • Saved waste management fees • Turnover from the sale of outgoing resource flows
• **Cost savings on procurement due to incoming flows obtained via Industrial Symbiosis over the last reporting period** • **Economic benefits from Industrial Symbiosis outgoing flows over the last reporting period**	(none)	Value added due to Industrial Symbiosis over the last reporting period
• **Value added due to Industrial Symbiosis over the last reporting period**	• Value added per full-time equivalent worker in the sector[16] and in the size band of the company[17]	Potential for additional employment due to Industrial Symbiosis, in full-time equivalents
• **Value added due to Industrial Symbiosis over the last reporting period** • **Staff permanently employed in the**	• Average full labour cost per full-time equivalent of the sector[18] and in the size band of the company[19]	Internal Rate of Return of the investment project

[16] Obtained e.g. from Eurostat database "Annual detailed enterprise statistics for industry (NACE Rev. 2, B-E)[sbs_na_ind_r2]".
[17] Obtained e.g. from Eurostat database "Industry by employment size class (NACE Rev. 2, B-E)[sbs_sc_ind_r2]"
[18] Ibid.
[19] Ibid.

Data input by the user	Data provided by the tool	Derived indicator
processing of incoming flows of resources obtained from Industrial Symbiosis • Staff permanently employed in the processing of outgoing flows of resources delivered via Industrial Symbiosis • Investment performed in the project to enable the processing of incoming flows of resources obtained from Industrial Symbiosis • Investment performed in the project to enable the processing of outgoing flows of resources delivered via Industrial Symbiosis • Date of commissioning of the investment project • Expected operational lifetime of the assets built during the investment project		