wbcsd

CIRCULAR TRANSITION INDICATORS

Proposed metrics for business, by business.

July 2019

DRAFT FOR PUBLIC CONSULTATION

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Foreword

We have all spoken extensively about the need to accelerate the circular economy. Acceleration being the change in speed over time. Speed, distance over time.

But how do we know if we're accelerating if we don't have a common methodology for measuring distance? This distance, our transition towards a circular economy, is critical in understanding where we are today and monitoring our future progress.

Beginning in 2017, WBCSD began work on the Circular Metrics - Landscape Analysis that would be published in May 2018. This document would serve as the foundation for the WBCSD Factor10 Working Group, dedicated to developing a harmonized methodology to measure, calculate and monitor a company's performance in the circular economy.

Since June 2018, this Working Group of over two dozen companies has drafted, commented, pilot tested, reviewed, redrafted and refined the enclosed methodology. *Circular Transition Indicators: proposed metrics for business, by business (July 2019)* is the latest output of the Working Group, providing an opportunity for you to read and share your feedback.

We invite all interested to comment and feedback on the proposed metrics. The period for **public consultation will be open until August 31 2019.** Feedback can be provided through the online feedback form at the link here: www.surveymonkey.com/r/circular_transition_indicators

We are also pleased to offer four webinars throughout August to present the Circular Transition Indicators. Additionally, these webinars will provide an opportunity to ask questions and discuss the framework with the WBCSD team. Registration for any one of the webinars can be done at the link here: https://wbcsd.zoom.us/j/438528787

After the feedback period, the Working Group will consider and process all feedback towards the next stage in the project. The final methodology and implementation tool (in development) will be published in January 2020.

We'll only reach our shared destination of the SDGs or Paris Agreement by moving towards a circular economy. We hope the proposed Circular Transition Indicators serve as that measuring stick that illustrates how close to our destination we are today.

Thank you for considering our invitation and for your time, should you choose to review and share your feedback.

Brendan Edgerton

Director of Circular Economy
World Business Council for Sustainable Development (WBCSD)

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Circular Transition Indicators

Today the world is 9% circular.[1] It's clear that this is not sustainable; and the urgency to step away from our take-make-waste economic model is growing. If we continue this wasteful trend, we will need more than 1.7 planets to meet the world's natural resource needs by 2030,[2] making the achievement of the SDG's and Paris Agreement virtually impossible. Where some see waste, we see value, opportunity and a business case to use resources for as long as they can last.

As the pressure to shift from linear to more circular ways of doing business increases, the good news is that the opportunity to improve stands at 91%. The momentum to transition is growing and both the private and public sectors are beginning to set ambitious circular targets. A clear example is the Dutch government-wide program to develop a circular economy by 2050.[3] Transparency and alignment are critical to establishing a common language across industries and governments.

For this reason, some 25 global companies that are members of WBCSD came together to jointly develop Circular Transition Indicators to help them, and other organizations, identify circular opportunities and linear risks, to determine their circular priorities and targets.

This framework is based on an assessment of material flows within company boundaries, combined with additional indicators on resource efficiency and the value added by circular business. Through this lens, the framework can guide your organization in gaining concrete insights into how it can accelerate the transition to a circular economy and the opportunities in doing so.

Circular economy business case

Linear business models may be profitable in the short run, but over time, they will face market, operational, legal and business risks.[4] At the heart of the business case for circularity sits the opportunity for organizations to create more value by being smarter with resources. Through circular business models, organizations can accelerate growth, enhance competitiveness and mitigate risk.[5]

Transition

While a circular economy is an economic model that provides opportunities for organizations across industries, the transition to a circular economy is not straight forward.

Business models must change, strategies must adapt, skills must evolve and policies need to be flexible. This makes it difficult to plan for and set clear targets for a controlled transformation. To understand their starting point and allow for the setting of targets based on clear key performance indicators (KPIs), organizations need a system of metrics that can guide their decision-making when adopting circularity in their corporate strategy.

One common approach

No organization can establish the transition to a circular economy on its own. The circular economy is a larger industry and value chain effort. To transform, organizations must speak the same language, regardless of size, sector or value chain position. Having a common approach to measuring and monitoring circularity performance is essential. This will allow value chains to become value cycles, working to achieve a shared vision.

This framework aims to provide broadly accepted guidance on measuring circularity at the organization level. The intention is to build upon existing protocols and standards; it complements assessments and tools used by organizations today.

Circular economy definition

The circular economy is an economic model that is regenerative by design.

The goal is to retain the value of the circulating resources, products, parts and materials by creating a system with innovative business models that allow for long life, optimal (re)use, renewability, refurbishment, remanufacturing and recycling. By applying these principles, organizations can collaborate to design out waste, increase resource productivity and maintain resource use within planetary boundaries.

Use of the framework

This methodology offers organizations insights into their circularity performance, allowing them to:

- **Identify circular opportunities and linear risks** with the aim of improving longevity and resilience
- **Set a baseline and monitor progress** on the circular transition by helping organizations understand where they are in the transition to a circular economy
- **Respond to customer and investor inquiries**
- **Start value chain conversations** on shared circular priorities.

The framework was developed as an inward-facing tool for organizations to gain insights into their circularity, with the aim of improving organization longevity and resilience. As such it is not suitable for:

- **Determining full sustainability performance**. For this, the scope of the methodology is too narrow and specifically focused on circularity. The sustainability impact of an organization on other environmental and social aspects depends on more factors than circularity performance in isolation.
- **Comparing industries, organizations or products**. While the private sector is encouraged to come together in a pre-competitive environment to share best practices and jointly move the circular economy forward by looking at shared circularity challenges, each organization's journey to circularity is unique. Comparisons can therefore only be done in a meaningful context and in careful consideration.
- **Non-sustainability marketing and promotional materials**. Circularity is an important and necessary pathway to a more sustainable system. However, its influence on an organization's sustainability performance depends on the larger context of other sustainability indicators. Organizations are discouraged from communicating the results of the framework externally unless they present them in the appropriate context.[6]

Framework principles

Simplicity

Be as simple as possible within the context of the circular economy.

Consistency

Use one common cross-industry language and provide consistent insights into circular opportunities and linear risks regardless of organization size, sector or value chain position.

Completeness and flexibility

Offer a complete set of metrics for any organization, regardless of size, sector or value chain position, with the flexibility of accommodating for the most relevant insight needs of the high diversity of businesses.

Complementary

Given that circularity is one pathway to more sustainable production and consumption, assessments should **never** take place in isolation and should **always** complement other existing sustainability and business metrics.

Neutrality

Refrain from generally prioritizing specific materials over one another insofar as they all contribute to the circular economy.

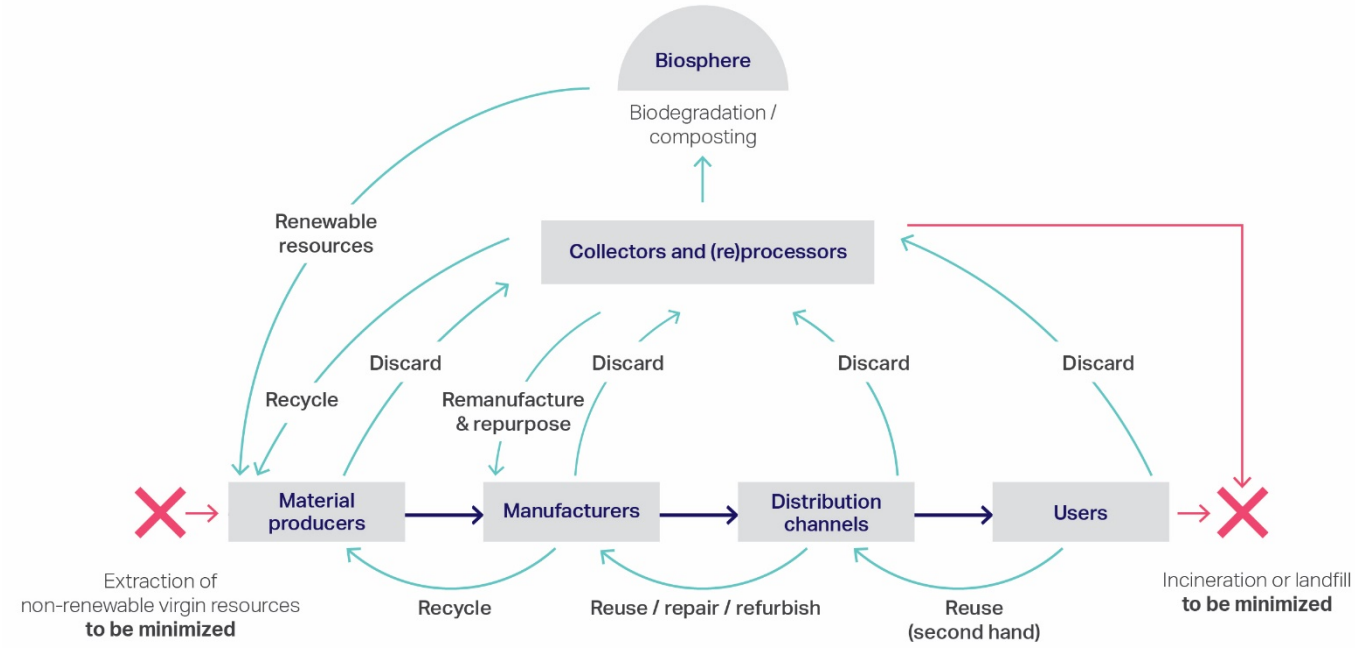
A value chain effort

The circular economy is inclusive and collaborative. Many players are involved throughout the value chain to ensure a continuous material stream that flows back into the value chain after a product's technical lifetime, extending the material economic lifetime.

This means that to perform this assessment, in addition to the internal data on material flows that you will need from within your organization, you will probably also have to reach out to your value chain partners. This framework can provide a starting point in this cross-value-chain conversation, working to achieve a collective increase in circularity through shared goals and interests.

Figure 2 shows how to determine the position of the organization assessed. The further your organization is from the red arrows, the more difficult it can be to obtain information. Organization may require information and transparency from suppliers and customers or to consider moving business activities up or down in the supply chain to gain more control and information.

Figure 2. Systematic and simplified representation of the value chain recovery system



Methodology logic

The assessment of Circular Transition Indicators takes place based on material flows* through the company. By analyzing these flows, they determine the ability of the company to ensure both resource extraction and material waste are reduced to a minimum.

It entails the assessment of the flows within the organization's boundaries at three key intervention points:

Inflow

How circular are the materials the organization sources?

Outflow – recovery potential

How does the organization design and process its materials to ensure they can later be recovered, from a **technical** perspective (for example by designing for disassembly or recyclability)?

Outflow – actual recovery

How much actual material recovery** does the organization ensure through different mechanisms it has in place (business models, mandatory and voluntary recovery schemes, contracts, etc.) after materials leave the facility, either as product, by-product or waste stream?

The results of this assessment will tell how capable an organization is of closing the loop of material flows.

***NOTE | Material flows**

"Material flows" can include nutrients, compounds, materials, parts, components or even products (depending on the organization). For the sake of readability, this report refers to all of these as "material flows" or "flows"

****NOTE | Recovery**

"Recovery" throughout this document refers to the technically feasible and economically viable recovery of nutrients, compounds, materials, parts, components or even products (depending on the organization) at the same level of functional equivalence through reuse, repair, refurbish, repurpose, remanufacture, recycle or biodegrade.

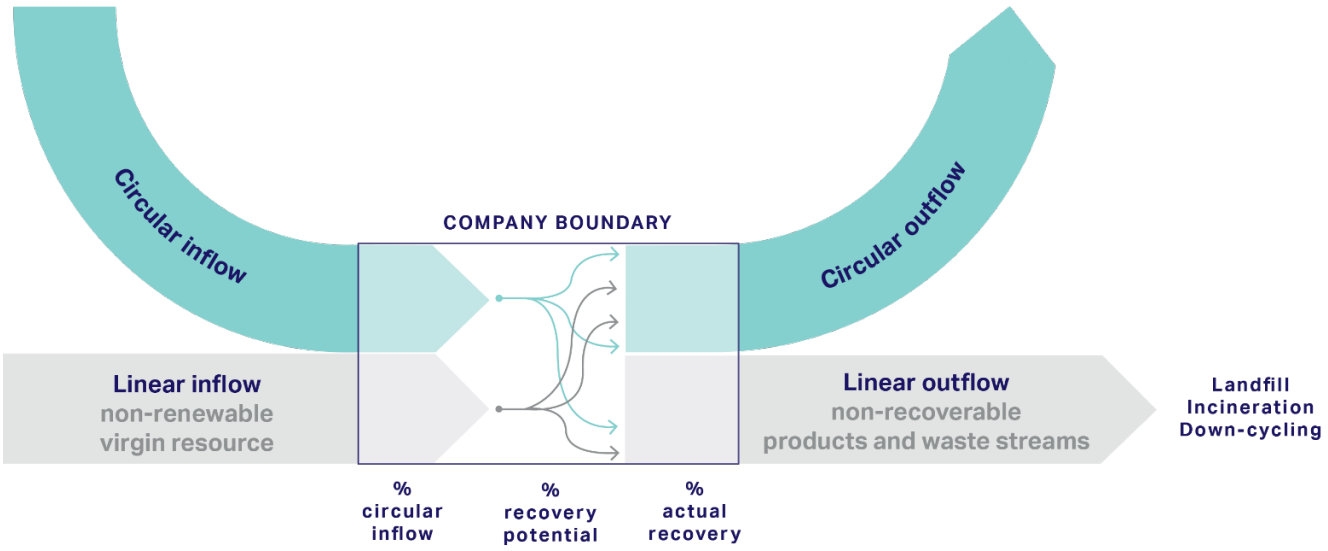


Figure 3. Schematic illustration of flows

The Circular Transition Indicators

Any organization, regardless of size, sector or position in the value chain, can use this framework. As such, the selection of indicators relevant for any particular business will vary. The framework therefore provides a menu of indicators for which some modules contain optional indicators.

Close the loop	Optimize the loop	Value the loop
% circular inflow % circular outflow % water circularity % renewable energy	% critical material Additional indicators to be added as soon as they are confirmed	Indicators in development and to be added as soon as they are confirmed

Assessments start with the completion of the full "Close the loop" module, after which organizations can include indicators from "Optimize the loop" and "Value the loop" if it helps them answer questions from the scoping phase.

As the development of this framework is still ongoing, we have not yet fully developed all indicators for this comment period. For completeness, we mention them here as planned elements of the framework.

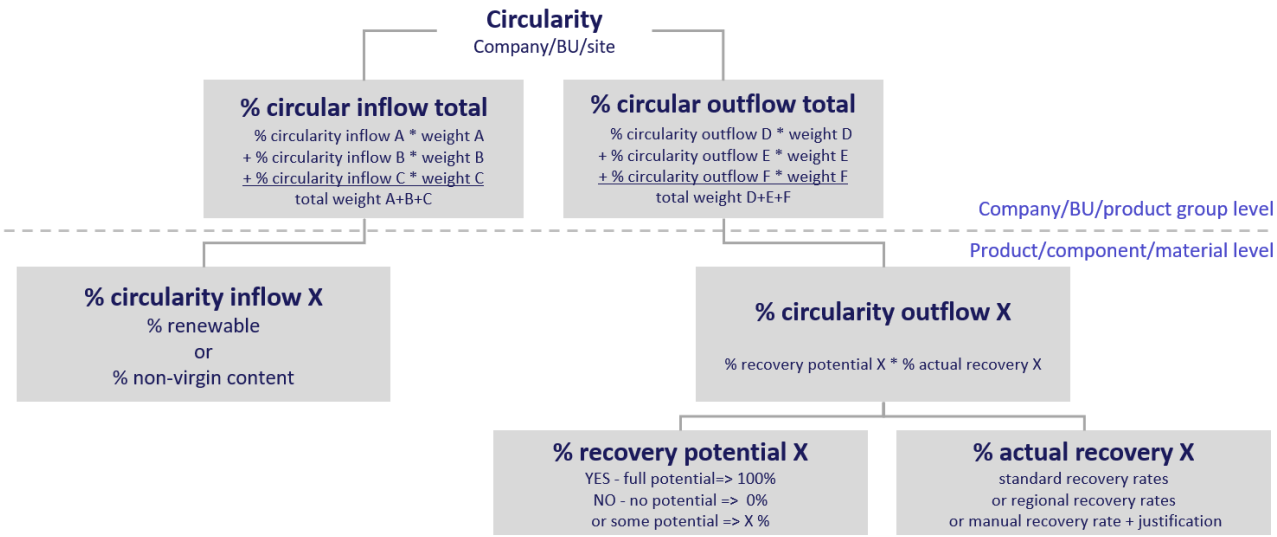
NOTE | More information

For more detailed and specific information on the indicators, the *User Manual* outlines the exact calculation, step by step, starting on page 11.

1. Close the loop

This module calculates to what extent the organization is capable of guaranteeing material flows that loop back into the value chain after a product's technical lifetime.

An organization's **circularity** performance is the average between **% circular inflow** and **% circular outflow** as outlined in the formula structure below.



In addition to material flows, the circularity of water is an important element of the circular economy. Key characteristics identified for **water circularity** beyond quantitative data are quality and regional water stress levels. We expect the exact formula to follow soon.

% water circularity
formula to be confirmed

The circular economy includes the transition to renewable energy sources. As most organizations already have metrics in place to measure renewable energy used for business operations, this framework considers energy separately for which organizations can use this existing data. The **% renewable energy** is calculated as follows:

$$\textbf{\% renewable energy} = \frac{\text{renewable energy (annual consumption)}}{\text{total energy (annual consumption)}} \times 100\%$$

2. Optimize the loop

Aside from ensuring that materials loop back into the system, this module helps with insights on resource use efficiency.

The first indicator is **% critical inflow,** which brings insight into the share of the linear inflow that is considered critical or scarce. This helps to set priorities as to which material flows to focus on first and to monitor the level of dependency on critical resource flows. The calculation is:

$$\textbf{\% critical inflow} = \frac{\text{mass of inflow defined as critical}}{\text{total mass of linear inflow}} \times 100\%$$

We expect more indicators in this module to follow soon.

3. Value the loop

Indicators in this module help to understand the added business or macro-economic value of an organization's circular materials flows.

We are in the process of developing indicators in this module and will share them when confirmed.

The process

The framework outlines seven process steps:

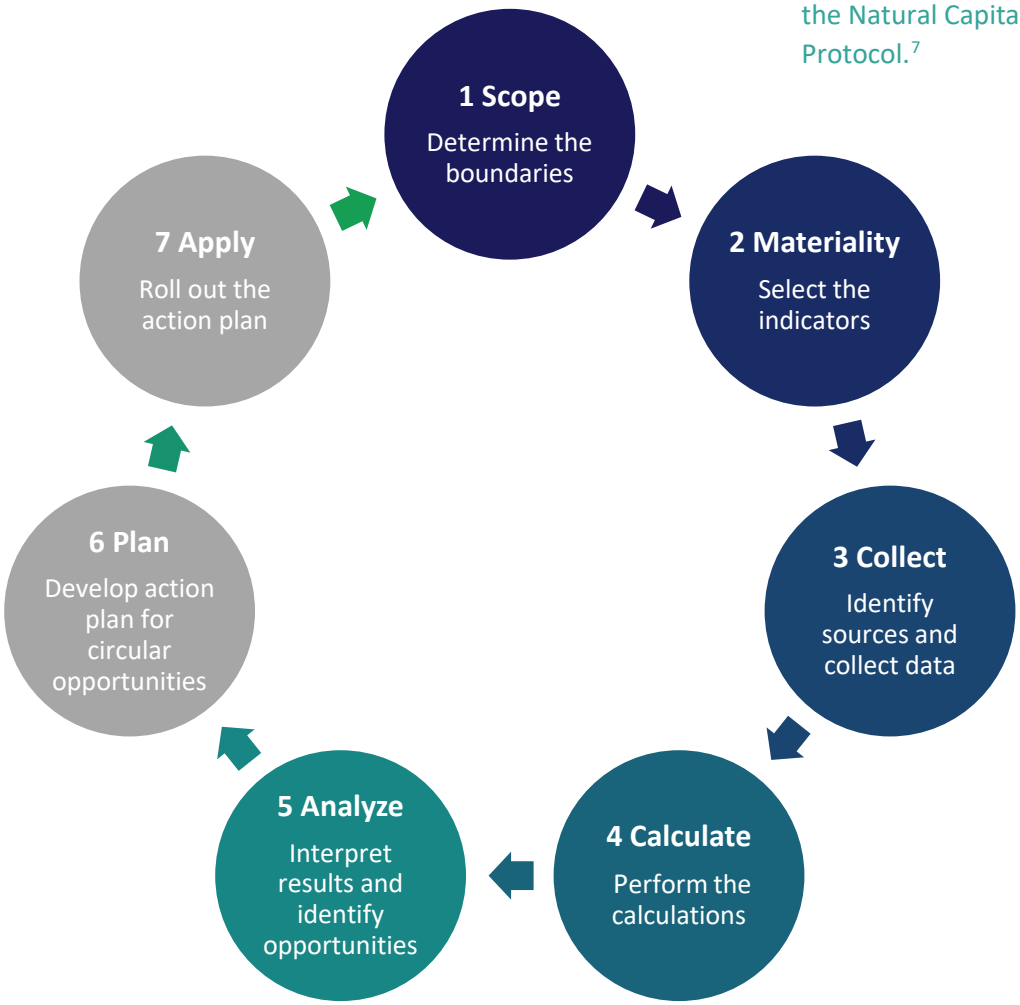


Figure 4. The process cycle

These seven steps cover one assessment cycle. Running the assessment for the first time will be informative and an interesting exercise. However, repeating it in an (annual) cycle brings out the framework's planning and monitoring potential.

Certain indicators will in fact be based on a year-on-year score in order to compare the trend over several cycles. This means organizations cannot calculate it the first time, as the first time will set the baseline.

NOTE | Compatibility

This process step approach is in alignment and compatible with other industry frameworks, like the Natural Capital Protocol.[7]

NOTE | Plan and apply

We are still developing the last two steps of this framework.

This version of the framework therefore covers *Scope, Materiality, Collect, Calculate and Analyze.*

CIRCULAR TRANSITION INDICATORS

USER MANUAL

Scope | Determine the boundaries

Before choosing indicators from the indicator menu, it's recommended to plan your circularity assessment. This will ensure you invest your time in finding the right data sets for the right reasons, that you know what insights you're looking for in the outcome of the assessment and how you can take them forward.

Starting question: **Why do we want to do this assessment?**

For example, you could write a short paragraph answering sub-questions such as:

- Why is circularity important for the organization?
- What questions do we want to answer by doing this assessment?
- Who is the audience of the assessment's outcome and insights?
- What do we want this audience to do with these insights and information?
- What questions do they want us to answer?

After getting clarity on the intent for the assessment, the three main considerations for scoping are:

1. **What level of the business do we assess?**
   You can assess the full organization, but also specific parts of the organization, such as a business unit, production facility or product line.
2. **What is the timeframe?**
   A yearly timeframe consistent with annual financial cycles will be a natural choice. However, it could be useful to use a production cycle or another more meaningful timeframe. Give this consideration some serious thought and choose something that makes sense for your specific business.
3. **What do we specifically include and exclude?**
   For most organizations, it will be extremely difficult to get all data on 100% of all material streams. This means that you might not include some flows in the assessments or that you may have to use proxies and assumptions. The organization is free to set these proxies, assumptions and excluded streams, but it's recommended to have them as clearly as possible before starting the assessment.

EXAMPLE | Excluded flows

In addition to production materials, many production organizations also source operational materials (e.g., office supplies). However, the relative mass of these material flows as compared to their production materials may be negligible. In this case it could make sense for the organization to not include these relatively small flows in the assessment.

Materiality | Select the indicators

Once your organization has a clear idea of why it wants to do the assessment, the framework offers a few different indicators that can help the company answer the questions from the scoping step.

Close the loop

Since the methodology to calculate the organization's ability to close material loop sits at the heart of the framework, organizations start with the assessment of their circular performance. The indicators included are:

- % circular inflow
- % circular outflow
- % water circularity
- % renewable energy.

Optimize the loop

This set of indicators is a monitoring tool to support organizations in driving further resource efficiency beyond ensuring material loops. The currently confirmed indicator is:

- % Critical materials

As we are still developing this module, we will add more indicators in the future.

Value the loop

This module helps your organization gain insights into the value the circular business creates. It provides insights into the correlation between circularity performance and other business and transition indicators.

We will add these specific indicators as soon as we have confirmed them.

While selecting your indicators of focus, it is recommended to consider each indicator carefully and document why you have chosen to assess each one, as well as why you have excluded any. The questions answered in the scoping phase will help to direct the organization's focus.

EXAMPLE | Question 1

How can two business units learn from each other's circularity performance?

Running the assessment for both business units can help compare them and allow for the replication of best practices across units.

EXAMPLE | Question 2

How can we present the circular business performance to our CFO?

The indicators in "value the loop" can help determine financial and economic performance for circular business, enabling communication with internal stakeholders.

EXAMPLE | Question 3

Which materials could provide a starting point for our circular procurement strategy?

"% critical materials" gives an indication of which materials the organization could prioritize to reduce its supply risks.

NOTE | Questions?

Does your organization have questions that these indicators do not help answer? Don't hesitate to contact the WBCSD Circular Metrics team to explore if additional indicator development could be beneficial.

Collect | Identify sources and collect data

The collection of data sets is likely to be the most labor-intensive part of the process. Some data points might be relatively easy to obtain, while others will require collaborating with other departments within the organization. As mentioned, it is likely that organization will even have to connect with value chain partners to gather the relevant data, especially on inflow and actual outflow recovery numbers.

The following is a list of required data sets for the different indicator modules.

Close the loop

% circular inflow (per material flow)

- % of renewable content or % non-virgin content
- Weight of material inflows

% circular outflow (per material flow)

- % of material recovery potential
- Weight of material outflows
- Material recovery rates
- Regional material recovery rates
- Sector-specific material recovery rates
- Material recovery rates from own buyback contract, partnership system, collection and recovery programs, etc. (if applicable)

% water circularity

- Amount of water withdrawn at different quality levels
- Amount of water discharged at different quality levels
- Water stress level at location of water withdrawal and discharge

% renewable energy

- Renewable energy (annual consumption)
- Total energy used (annual consumption)

Optimize the loop

Critical materials

- Classification of flows as “critical materials”

Value the loop

We are still building the indicator module and required data points.

We will soon provide further development updates.

NOTE | Documentation

When collecting data, it is recommended to keep relevant documentation of sources and provide justification. Not only will this help retrieve data in upcoming cycles, it also enhances the robustness of the assessment results.

NOTE | Online tool

In the coming months, WBCSD will develop a tool to help collect data from within and outside the organization that should make this step a lot less intense. We will eventually integrate external data, such as material recovery rates, into this tool, ensuring organizations’ calculations refer to the same reference rates.

We will include the above-mentioned source documentation in the tool.

Calculate | Perform the calculations

Close the loop

Figure 5 shows the high-level methodology to calculate circularity.

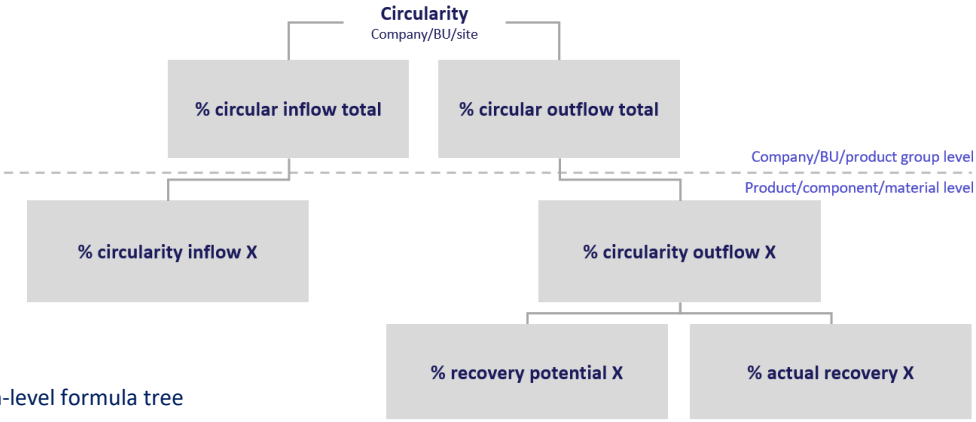
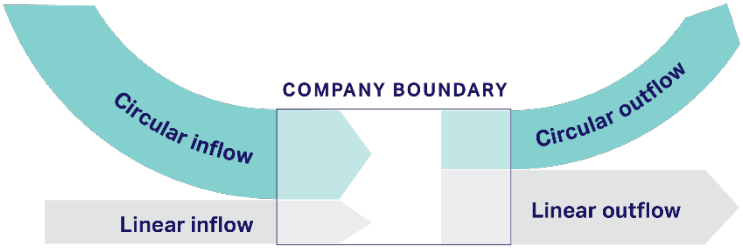


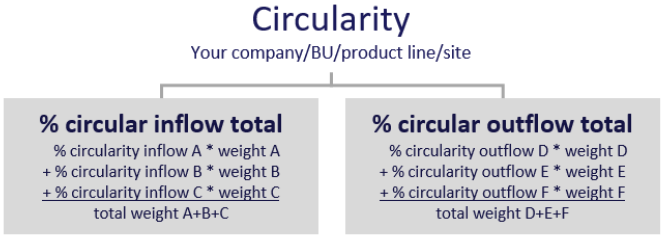
Figure 5: High-level formula tree

An organization's overall circularity performance represents the balance between linear and circular material flows (see figure 6) and consists of two main flows through the organization, *the circular inflow* and *the circular outflow*. Even though no official definition exists for these terms, the framework uses them descriptively.

The overall circularity performance is the average between the two.



Both the *% circular inflow* and the *% circular outflow* are made up of the weighted average of the materials individual *% circularity*. This means you need to assess the *% circularity* at a material level.



NOTE | Material flows

"Material flow" throughout this document can include nutrients, compounds, materials, parts, components or even products (depending on the organization).

Water

Water is a very specific resource. Organizations can use it for different purposes; and due to its weight and quantities used, water can distort the outcome of the assessment. Water is therefore not included in overall performance; rather, it has its own indicator.

% circular inflow

How circular are the materials you source?

This formula assesses the total circularity of inflowing materials:

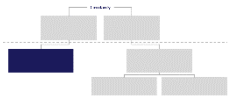
% circular inflow total

(% circularity inflow A * weight A
+ % circularity inflow B * weight B
+ % circularity inflow C * weight C) / total weight of all inflow (A+B+C)

This means that % circularity of inflow needs to be determined on a material level.

The classification of inflowing materials is:

- **Virgin – non-renewable (linear)**



This inflow has neither been previously used or consumed (primary) nor is it renewable. For these materials

% circularity inflow P = 0%

- **Virgin – renewable (circular)**

Renewable inflow is circular if it is a sustainably managed resource that is replenished or regrown after extraction.

Inflow can consist either fully or partially of renewable content, in this case:

% circularity inflow Q = % renewable content Q

- **Non-virgin or secondary (circular)**

Inflow is also circular if it is previously recovered non-virgin or secondary (reused, refurbished, remanufactured or recycled).

Inflow can consist either fully or partially of renewable content, in this case:

% circularity inflow R = % recovered content R

In some cases, inflow can be both renewable and non-virgin. In such cases, you should only count the inflow in one of those categories to prevent double counting.

EXAMPLE | Classification

Depending on the organization and its position in the value chain, it can be more complicated to determine the amount of either of the three streams. The most important distinction here is to separate circular from linear flows.

Waste management

Mixed incoming waste streams can flow into the organization, unidentifiable, whether it is renewable or secondary. By default, however, this incoming waste will not be virgin; therefore, in this case you can safely assume it is *non-virgin or secondary.* As long as you have identified the linear flows (like process materials), you can assume the rest of the total is circular.

Material production

For material producers, it can be much easier to identify *virgin renewable* and *secondary* inflows. In this case you can assume the rest of the total is linear.

Alternative calculation method % circular inflow

In addition to the bottom-up calculation of % circular inflow, the framework offers a top-down calculation for the % circular inflow, which may be easier for some organizations to use.

% circular inflow

$$\frac{\text{(weight of renewable inflow + weight of non-virgin inflow)}}{\text{total weight of all inflow}} \times 100\%$$

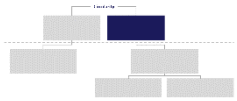
The required data set is the same and the outcome of the two approaches should be the same as well.

% circular outflow

Similar to the calculation of the total % circular inflow, this formula assesses the total circularity of outflowing materials:

% circular outflow total

$$\frac{\text{\% circularity outflow D * weight D} + \text{\% circularity outflow E * weight E} + \text{\% circularity outflow F * weight F}}{\text{total weight of all outflow (D+E+F)}}$$



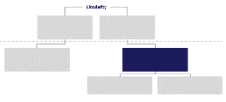
This means that also the outflow % circularity needs to be determined on a material stream level.

% circular outflow of a material stream reflects the combined capability of your organization to:

1. Design and treat materials in a way that they can be recovered on a technical, material level at end of life. This is the ***% recovery potential***.
2. Guarantee that materials that leave the organization do actually find their way back into the value chain (either the same or a different value chain). This is the ***% actual recovery***.

% circularity outflow X

% recovery potential X * % actual recovery X



If EITHER the materials are not treated in such a way that they have any technical recovery potential OR the company is not able to ensure materials are brought back into the value chain after a product's technical lifetime, the outflow is considered not circular.

NOTE | Included outflow

Flows to consider as outflow include sold product (including packaging), by-product and waste, either in solid, liquid or evaporated form.

EXAMPLE | High potential, low actual recovery

Old IT equipment can often be partially dismantled, meaning they can have high recovery potential. But their incineration (either with or without energy recovery) destroys the materials. They lose their value and potential for reuse, refurbishment or recycling and will therefore score 0% in actual recovery, resulting in 0% circular outflow.

% recovery potential

The *% recovery potential* reflects the capability of your organization to design or treat its materials to ensure it **can** bring the materials back into the value chain after the technical lifetime of the products, **on a technical, material level.**

For most flows, the typical categorization is

YES – or *full potential* – resulting in 100% recovery potential

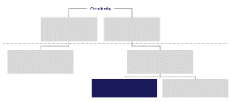
Or

NO – there is no potential – resulting in 0% recovery potential.

For material streams that consider compounds, components, parts or products, the organization will have to determine the level of recovery potential. The determination process will depend very much on the flows identified, for which guidance is too detailed for this report. Should you require support in determining this for your organization, please contact the WBCSD for additional guidance.

% recovery potential X

YES - full potential= 100%
NO - no potential = 0%
or some potential = X %



Biological cycle

Any nutrient that the biosphere can safely and fully absorb and that can be food for new growth of natural renewable materials has 100% recovery potential.

Any substances that nature cannot absorb or that are toxic (solid, liquid or evaporated) have 0% recovery potential (unless they are recoverable in the technical cycle).

EXAMPLE | Panels

Construction panels produced by gluing metal and plastic sheets together will have no recovery potential, since after the product's technical lifetime it is not possible to separate and recover these materials, resulting in 0% recovery potential.

In comparison, panels connected with screws or rivets could have 100% potential, since it is possible to separate and recover both materials (depending on the individual material characteristics) and even potentially reuse or recycle the screws and rivets.

Questions?

Should you require help in your assessment of material flow recovery potential, contact the WBCSD Circular Metrics team for help with specific guidance.

% actual recovery

The *% actual recovery* captures the amount of materials actually recovered after they leave the organization's boundaries. Recovery is not the same as collection. After collection, materials can still end up in landfill or incinerated.

This is why this indicator is not based on estimates but requires actual data. If your organization keeps control and tracks its product flows after they leave your facility, this data should be available within the organization. For transparency purposes, when using internal recovery data for the calculation, ensure it is properly justifiable.

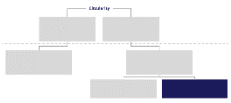
In case your organization does not keep track of its outgoing flows, it can refer to standard available recovery rates available for a wide range of materials.

Recovery data for materials can be very dependent on region or sector. For an accurate view it is recommended to consider default rates for the product/material based on the geographic scope of sales/use, as well as sector-specific data, where available.

In case no data is available for your particular flow AND you don't keep track of where it goes and its recovery, the *actual recovery* is 0%.

% actual recovery X

standard recovery rates
or regional/sector recovery rates
or manual recovery rate + justification



Biological cycle

Biological outflow that enters the biosphere (through air, water or ground) can be considered as *recovered* only if it will function as a nutrient in the biosphere and if the cycle will take it up.

EXAMPLE | Fashion

Some clothing brands collect old garments with the ambition to recycle them. This framework only considers the actual fabric and fibers that find their way back into another used garment, accessory, household cloth, etc. as *recovered.*

EXAMPLE | Selling light

In addition to lightbulbs, Philips also sells light as a service. In a maintenance contract, Philips retains ownership of the light fixtures. This way they are in full control of their outflow and the data on repaired and reused material is available internally.

EXAMPLE | T-shirt

When a biodegradable product (like a cotton t-shirt with no toxic dyes) ends in a landfill, the landfill soup contaminates it and it can no longer serve as nutrients in the biosphere. Although it had a recovery potential of 100%, it is considered linear outflow.

Recovery hierarchy

At this time, the methodology for calculating circularity does not distinguish between types of recovery strategies used (reuse, repair, refurbish, repurpose, remanufacture, recycle or biodegrade). They all contribute at the same weight to an organization's circularity performance.

However, tighter loops (as shown in figure 7) are more efficient forms of recovery and allow materials to maintain their inherent value better than larger loops. In the future, there are possibilities to expand the methodology to include this additional dimension. As such, you should keep track of the different recovery forms for the material streams included in the assessment.

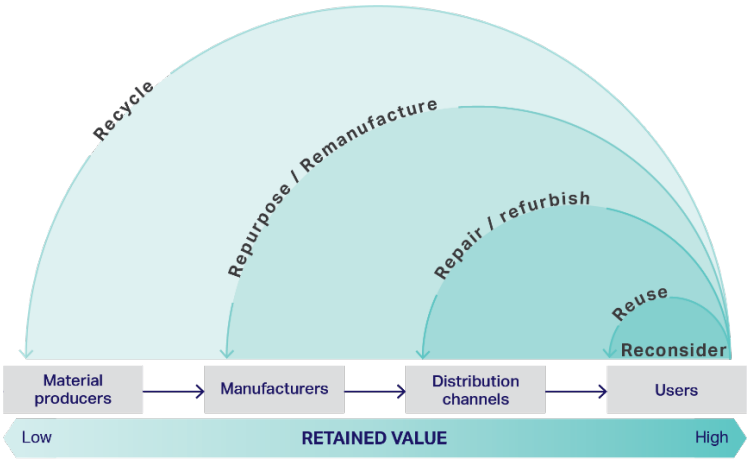


Figure 7: Tightness of the loop

Cascading

Recovery goes beyond giving a material a second life. The current criterion for a circular flow is that the organization can technically bring it back to the state of inflow where it entered the organization (whether it is a material/part/product or something else) at the same functional equivalence. This same functional equivalence means that the organization can use it for a different purpose but with similar function.

As this criterion may be difficult to interpret for certain cases, the following is a suggested guidance principle: consider what happens after this material's second life. When used for a different purpose, a material is circular if you can reuse it in a third life. If you cannot recover it after its second life, it is probably not circular.

You should not consider materials turned into energy through incineration as circular in this framework as they do not return at the same functional equivalence and will have no life after incineration.

EXAMPLE | Plastic

If a high-grade plastic in small IT equipment is not reusable in the same product but is reusable in the housing of household appliances and can loop back multiple times as recycled content, it is circular since this is the same functional equivalent.

EXAMPLE | Rubber

Ground-up tires used in playground floor tiles are considered circular when, after their life as playground flooring, could be used again, either as new playground flooring or something else.

% water circularity

Water is a finite yet vital resource not only for organizations but also communities that depend on water availability for their survival. It is critical to use it responsibly and to apply circular principles where possible.

The water cycle shows clear parallels with the "close the loop" calculation for materials. A facility withdraws water from a basin (inflow), uses and treats it for different purposes (determining its recovery potential) and discharges it back to the basin, either in a way that it can be re-used again or is lost (actual recovery).

When it comes to circularity, looking at water from a strictly **quantitative** perspective is not enough to draw meaningful insights. This is why this framework dedicates a specific indicator to the circularity of water.

Water quality at point of withdrawal and discharge can vary greatly and therefore is an important consideration.

Additionally, water stress levels are regional; whether water supply and discharge are critical for your organization and its surrounding stakeholders depends to a high degree on the organization's location.

Leveraging existing developments

Many organizations have developed approaches to assess water circularity in the past and various industries are currently using them, such as the Ellen MacArthur Water and Circular Economy White Paper (Draft),[8] ISO 14046[9] and Veolia WIIX.[10]

We evaluated existing water assessment frameworks and propose to leverage existing methodologies that strike the right balance between ease of use AND meaningful level of detail. We are still exploring the issue and will share more details when we have confirmed our direction.

WBCSD Water program

Although WBCSD is currently decommissioning its Global Water Tool,[11] its Water program is considering the development of a new water tool over the course of 2019-2020. We are closely following this development as the outcome has the potential to complement or be part of the Circular Transition Indicator Framework in the future.

NOTE| Water use cases

Organizations can use water for different purposes internally:

1. As an ingredient, in which case it shows up on an organization's or product's bill of materials.
2. As a process material for cooling, washing or other.

Only in the first case, where water is an ingredient of your product, or is the actual core product of your organization (e.g., utility sector), can you include it in the calculation for the main circularity performance.

% renewable energy

For the circular economy to work, we need to limit extracting (fossil) resources to generate energy and shift to renewable energy sources.

Because material flows cannot capture energy, for this framework organizations measure energy used for business operations separately.

The formula for the % renewable energy is

% renewable energy

$$\frac{\text{renewable energy (annual consumption)}}{\text{total energy (annual consumption)}} \times 100\%$$

Energy is renewable if it is:

- Solar energy
- Wind energy
- Water energy
- Geothermal energy
- Tidal energy.

In addition, you can classify energy as renewable if it comes from sustainably managed bio-based resources (demonstrated by certification) harvested at a lower rate than at which natural growth/replenishment occurs and from residues and/or by-products.

As a generally accepted principle, energy recovered from waste through incineration is 50% renewable.[12]

Measurement expresses the energy content and includes all the energy carriers that flow into the organization (including, but not limited to, gas, electricity and fuels).

NOTE | Waste to energy

Although energy from incineration is considered as 50% renewable, the materials incinerated for energy production **are not** considered as circular outflow in the context of this framework.

Optimize the loop

Critical materials

This additional indicator provides a first impression of the percentage of inflow that could be at risk by making an initial distinction between critical and non-critical materials. The first step is to identify, within the defined *linear* inflow, what mass of the total linear inflow is critical. Critical materials are prone to becoming scarce in the near future and are difficult to substitute without hampering functionality. Several institutions have identified scare and/or critical raw materials. For example, the European Union (EU) lists 27 raw materials as critical.[13] In addition, the United States has developed a list of 35 mineral commodities deemed critical to US national security and the economy.[14] Other authorities may be developing or have already published comparable lists of critical or scarce resources. A sourcing organization's region should determine the source (EU, US or other) in order to define critical inflow. The formula is:

$$\textbf{\% critical inflow} = \frac{\text{mass of inflow defined as critical}}{\text{total mass of linear inflow}} \times 100\%$$

We are still developing the rest of this module and expect updates to follow soon.

Valuing the loop

This set of indicators helps organizations gain insights into how successful they are at value creation through their circular business. It supports the establishment of a variety of indicators that we will share as soon as we have confirmed them.

We are still developing this module and expect updates to follow soon.

Analyze | Interpret results and identify opportunities

Interpretation of results

Running the assessment is great, but now that you have the results, what should you do with them?

Interpreting the results from the assessment is crucial in forming an understanding of where your organization is at in its journey to a circular economy.

Although we are still developing this step, it can help to start by answering the following questions regarding the different indicator outcomes:

Overall organization circularity performance

- Is the result what you expected? If no, what was different? Why is it different?
- How is the overall circularity performance divided between in- and outflow?
- Why is that and what does that say about where the organization is at in its transition to a more circular organization?

% circular inflow

- Is the result higher or lower than you expected?
- What are the external factors that influence your % circular inflow?
- What are the internal factors that influence your organization' % circular inflow?
- Which inflow materials have a high circularity %?
- Which inflow materials have a low circularity %?
- Which materials are high in weight contributions?

% circular outflow

- Is the result higher or lower than you expected?
- Which outflow materials have a high circularity %?
- Which outflow materials have a low circularity %?
- Which materials are high in weight contributions?

- What can you learn from the balance in recovery potential versus actual recovery? What do you already do well and where is improvement needed?
- Do you have flows with a high level of recovery potential that got canceled out by a low % of actual recovery and vice versa?
- For your % actual recovery data, did you rely on any given rates for public recovery or did you have additional data specifically for your organization/value chain?

% circular water

- Is water circularity material for your operations?
- What conclusions can you draw from the outcome of the water assessment?

% renewable energy

- Is the % renewable energy a surprise to your organization?
- Is this an area that your organization wants to focus on in its transformation to the circular economy?

These questions are meant as a starting point for the analysis.

We will share more information as soon as we have developed this process step further.

Plan | Develop an action plan for circular opportunities

We are still developing this section and expect updates to follow over the next couple of months.

Apply | Roll out the action plan

We are still developing this section and expect updates to follow over the next couple of months.

Definitions

biodegradable outflow

Outflow that microorganisms can decompose and reduced to organic or inorganic molecules that living systems can use further.[15] Follow Organization for Economic Co-operation and Development (OECD) testing methods for biodegradability.[16]

circular inflow

Inflow that is:

- Renewable inflow (see definition) and used at a rate in line with natural cycles of renewability

OR

- Non-virgin.

circular outflow

Outflow that is:

- Designed and treated in a manner that ensures products and materials have a full recovery potential and extend their economic lifetime after their technical lifetime

AND

- Demonstrably recovered.

inflow

Resources that enter the organization, including materials, parts or products (depending on an organization's position within the supply chain). Not included are water and energy (carriers), which are part of the specific water and energy formulas.

linear inflow

Virgin, non-renewable resources

linear outflow

Outflow that is not classifiable as circular. This means that the outflow:

- Is not circular in design/consists of materials treated in a manner that they have no recovery potential

OR

- Not demonstrably, actually recovered and flowing back into the (same or different) value chain.

The exposure to the effects of linear business practices – use scarce and non-renewable resources, prioritize sales of new products, fail to collaborate and fail to innovate or adapt – which will negatively impact an organization's ability to continue as a going concern.[17]	linear risk
Inflow not previously used or consumed and recovered (secondary), for example, recycled materials, second-hand products or refurbished parts.	non-virgin inflow
Resources that leave the organization, including materials, parts, products, by-products and waste streams (depending on an organization's position within the supply chain).	outflow
Sustainably managed resources (most often demonstrated by internationally recognized certification schemes)[18] that, after extraction, return to their previous stock levels by natural growth or replenishment processes at a rate in line with use cycles. Therefore, they are replenished/regrown at a faster rate than harvested/extracted.[19]	renewable inflow
Inflow not previously used or consumed (primary).	virgin inflow

Frequently asked questions

Where do I find data on my actual recovery?

Can a service organization use the framework?

Do innovation projects count in my circularity performance?

How does circularity performance apply to different types of organizations?

If my product helps my clients to be more circular, can I include that in my flows?

What other tools and indicators are there? Have you done a landscape analysis?

Do we need one common cross-industry framework?

What is the business case for the circular economy?

Can I get a label or a certification by using this framework?

Can I use this framework for a circularity assessment of a product?

Can I use this framework for a circularity assessment of a project?

What about materials that are only in limited amount available in recovered (secondary) form?

Answers

Where do I find data on my actual recovery?

To get an accurate view of where your product goes, deeper down the value chain, it is probably necessary to reach out beyond organization boundaries to get data from your clients.

Percentages reflect the product weight reused, refurbished, remanufactured or recycled at the same or higher quality, or composted. This is likely to be a *lower* percentage than the percentage outflow collected for one or more of these purposes (collection rates can be significantly higher than the final recovered products, parts or materials obtained from it).

Potential information sources for an organization's reuse, refurbishment, remanufacturing and recycling outflow are:

- Value chain partners providing verified data on the recovery of the outflow (reflecting recovery and not collection) – for example, the creation of a specific partnership for recovery;
- The verified reports of waste-recovery companies (reflecting recovery and not collection) – for example, known streams derived from the organization;
- Collection and recycling rates of compliance schemes for waste streams covered under extended producer responsibility legislation;
- Verified data from authorized, contracted or associated service partners, distributors and networks on repair and refurbishment volumes, as well as trade-in or take-back partners;
- Public recovery databases (reflecting recovery and not collection) in the countries or regions where the outflow enters the market (ratios apply or weights from different markets) – in cases where an organization cannot obtain any specific data.

Can a service organization use the framework?

Yes, any organization can use the framework. Even though you might not have manufacturing materials flowing through your organization, you can still choose to be more circular in your operational streams. Think of office supplies, food or even real estate. Corporate consumers can represent a significant part of clients in many sectors, so this framework should definitely be helpful in identifying where your opportunities are. If you are planning to do a pilot project for a service organization, please get in touch, we'd be happy to support and hear about the challenges you run into in using the methodology.

Do innovation projects count in my circularity performance?

As long as the material flows can represent the innovation project, it should be possible to include it in the assessment. If the project does not include material flows, the circularity performance will not reflect it.

If my product helps my clients to be more circular, can I include that in my flows?

If your supplies result in a justifiable increased rate of actual recovered materials that loop back into the value chain, your outflow numbers will reflect this.

However, if your supplies help to extend your customers' product lifetime without any chance of material recovery, the circularity performance will not reflect this. Materials do have to close the loop in order to count as circular.

How does circularity performance apply to different types of businesses?

Material producers

Material producers are at the start of the supply chain. Procurement focuses on raw materials; the choice of material is critical, and manufacturers can increase circular inflow by increasing the percentage of secondary materials or renewable materials. Although some material producers might be able to apply product-as-a-service models, it is more challenging for them to adopt such models than it is for product manufacturers (as they are already closer to the user), for example. Options to improve circular outflow include investigating the opportunity for buyback contracts and exploring collaboration with other parties to improve open-loop recycling. Design is key and should focus on creating a recyclable or recoverable (at same or higher quality) material or a biodegradable material.

Manufacturers

Product manufacturers procure materials (part producers) and/or parts (end-product producers). By procuring non-virgin inflow such as refurbished parts or recycled content or by procuring renewable content, manufacturers can improve their circular inflow. To increase the percentage of circular outflow, the organization can adopt new business models, such as product-as-a-service, in which the organization maintains ownership. Design is critical to the product manufacturer's circular outflow. The manufacturer needs to design the product for disassembly and recycling or to be biodegradable to ensure future looping (in that case biodegradable materials should also be separable from non-biodegradable parts).

Distribution
Parties in distribution, such as retailers, link producers and users. If product manufacturers adopt business models such as product-as-a-service, manufacturers might sell their service to users directly and retailers might be at risk. However, retailers can also adopt a facilitating position. Retailers can use circular procurement to improve the percentage of circular business and influence manufacturers to improve their design. These requirements can focus on renewable products or non-virgin products (for example second-hand or refurbished products). Organizations can improve the percentage of circular outflow by adopting new business models, such as product-as-a-service or buyback contracts. Other options include collaborating with other parties or educating users (as retailers are likely to be closer to users) to improve open-loop recovery.

Collectors and (re)processors
Waste stream collectors and (re)processors play a role in ensuring that all upstream organizations apply circularity strategies (see figure 2). The performance on the indicator is likely to be relatively high as the inflow of virgin non-renewable materials will be low.

Service providers
Similar to retailers, service providers can focus on procurement to influence circular inflow. As service providers already have a service-based business model for their main products, the opportunity for improvement is likely to be at the operational level rather than in the core business.

Financiers
The largest opportunity for creating a circular economy impact for financiers is through investments. The FinanCE Working Group recently launched the *Circular Economy Finance Guidelines,*[20] through which banks, investors and other financiers are showing growing interest in investing in the circular economy. It states that "[t]he Circular Economy Finance Guidelines apply to all equity and debt products… In case the instrument is not ring-fenced (e.g. general lending or an equity stake at company level) it can be classified as circular economy finance if: 1. the company in total can be classified as a circular company." In other words, the financing needs to be related to either a specific circular project or to a circular organization. The latter requires measuring to what extent the organization is circular. Therefore, it can be relevant for financiers to assess the organizations they are investing in using the circular metrics framework. Investing in organizations that have a higher percentage of circularity can provide opportunities and limit

linear risks. Traditional risk assessments might not always account for linear risk, as described in the FinanCE Working Group's *Money makes the world go* report.[21] According to the same report, financiers could have more resilient long-term investments if they consider these linear risks.

What other tools and indicators are there? Have you done a landscape analysis?

A landscape analysis of existing circular metrics and key performance indicators (KPIs) was the starting point for the development of this framework. Various sustainability indicators relate to circularity (for example, metrics on energy, water and waste); however, these are not specific. In addition to sustainability indicators that touch upon circularity, in recent years organizations have developed some specific metrics for circularity.

Most of the indicators specifically designed to measure circularity are either on a regional or country level (national import and export mass balances used by governments) or on a product (or sum of products) level (for example the Ellen MacArthur Foundation's material circularity indicator[22] or Cradle to Cradle Product certification[23]). Measurement on a country or regional level is relevant for policy-makers and measurement on a product level is interesting from a customer (and organization) perspective. Based on the landscape analysis, we identified a need to support business leadership by providing insight into the implementation of circularity in business. This could allow organizations to gain more control over the pace of circular business practice implementation to ensure business resilience and longevity in a changing economy.

The development of the framework presented in this report aims to contribute to the circular metrics and measurement debate by providing broadly accepted guidance on measuring circularity at the organization level, which has received limited focus so far. The intention is to build upon previous work done and by no means to replace or disregard any previous efforts made in the area of metrics and measurement.

Do we need one common cross industry framework?

Business needs a common language on circularity to ensure consistency between sectors and along the value chain. Therefore, the aim of this framework is to provide a basis of metrics that are widely applicable to a broad array of organizations, regardless of the sector or position in the value chain. This might

evolve in the future towards additional position-specific metrics for sectors or value chains.

Although collaboration along and between value chains is extremely important, this framework focusses on measurement on an organization level. The framework recognizes and distinguishes the decisions and changes that an organization can make on its own versus those for which it depends on other parties. When parties in a value chain depend on each other for procurement information, this creates data and information flows along the value chain.

An organization may use circular metrics to monitor progress over time or to compare the progress of different business units or departments. If the main objective is to assess or compare circularity between different products, we recommend other product-related indicators.[24]

What is the business case for the circular economy?

Linear business models might be profitable in the short run but over time they will face market, operational, legal and business risks.[25] Increasing resource prices and price volatility can threaten the future profitability of today's business practices. Circular economy policy packages can influence pending legislation and future customer demand, affecting businesses and markets. In the linear model, economic value *goes to waste* at the end of product use, which results in material and economic losses. An opportunity lies in capturing that value by creating additional life cycles at the end of initial product use. Circular business models decouple consumption from the exhausting of resources, reintroduce resources back into economic cycles and explore the temporary use of resources to provide access to a certain function. Businesses can increase revenues and reduce related costs by adding as much value as possible (through increases in use rates and functionality) and preventing the *destruction* of the added value built up along the value chain after the use phase (by retaining functionality through reuse, remanufacturing and recycling).

Can I get a label or a certification by using this framework?

At this point in time, the framework was developed for internal insight generation, to feed into better strategic decision-making for organizations. Additionally, it is a proposal for one common language and approach to how to assess circularity for organizations across sectors and value chains. Although the calculation approach could form the basis for a disclosure method in the future, in eyes of the developers it is more important to get the broader private sector to adopt a standard methodology for calculation before aiming to standardize it.

Can I use this framework for a circularity assessment of a product?

The framework was designed to assess circularity on a company, business unit or production site level. Companies may also assess and individual product using this framework in order to determine which products have a positive or negative affect on the organization's overall performance. However, if the main objective is to assess or compare circularity between different products other product-related indicators, like life cycle assessments (LCA), are recommended.

Can I use this framework for a circularity assessment of a project?

Although, the methodology was not developed with project assessment in mind, pilots have shown that the framework can be helpful in systematically assessing circularity of material flows. While certain terminology could leave some space for interpretation, we invite companies to try if there is interest to do so.
Should you require help in a circularity assessment for your project, contact the WBCSD Circular Metrics team for help with specific guidance.

What about materials that are only in limited amount available in recovered (secondary) form?

The framework can help identify for which material streams the % circularity is high or low. A low % circularity for a material does not necessarily mean however, that it can be increased substantially be the next cycle.

Steel for example is 100% recoverable and has high recycling rates for industries like automotive and packaging. However, due to the large amount of steel that is used in stock in society (e.g. in buildings and infrastructure), the amount of steel that is available for recovery is limited.

As a consequence, increasing the amount of recovered steel in the company's inflow may be a longer-term strategy in its transition to a circular economy.

This example illustrates the value of the framework is not necessarily in the calculation itself, but more importantly in the analysis of the results of the calculation. Only in context of the material flow characteristics, limitations and possibilities can the results of the assessment help in prioritizing focus areas.

Endnotes

[1] Based on Circular Economy's 2018 *Circularity Gap Report*, which states that only 9.1% of the world's current economy is circular (for more information, see www.circularity-gap.world/).
[2] Based on the WWF *Living Planet Report 2012*. Available at d2ouvy59p0dg6k.cloudfront.net/downloads/lpr_living_planet_report_2012.pdf.
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[4] Circle Economy, PGGM, KPMG, European Bank for Reconstruction and Development (EBRD) and WBCSD (2018). *Linear Risks*. Available at docs.wbcsd.org/2018/06/linear_risk_report.pdf.
[5] WBCSD (2017). *8 business cases for the circular economy*. Available at www.wbcsd.org/Programs/Circular-Economy/Factor-10/Resources/8-Business-Cases-to-the-Circular-Economy.
[6] We consider the following to be an appropriate context:

- The company also shares all framework indicators to give the reader a comprehensive view of the company's circularity performance;
- The company clearly states that the "Circular Transition Indicators are not a sustainability assessment and that results should not be used for comparing companies or industries"; and
- An independent third party assures the results.

[7] Natural Capital Coalition.2016."Natural Capital Protocol". Available at: www.naturalcapitalcoalition.org
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[15] This definition is based on the definition from the Cradle to Cradle Products Innovation Institute (2016). *Cradle to Cradle Certified – Product Standard*. Available at s3.amazonaws.com/c2c-website/resources/certification/standard/STD_C2CCertified_ProductStandard_V3.1_060518.pdf.
[16] For an overview of the OECD testing methods, refer to Organisation for Economic Co-operation and Development (2017). *OECD Guidelines for the Testing of Chemicals, Section 3*. Available at www.oecd-ilibrary.org/environment/oecd-guidelines-for-the-testing-of-chemicals-section-3-degradation-and-accumulation_2074577x.
[17] Circle Economy, PGGM, KPMG, European Bank for Reconstruction and Development (EBRD) and WBCSD (2018). *Linear Risks*. Available at docs.wbcsd.org/2018/06/linear_risk_report.pdf.
[18]For example, Forest Stewardship Council (FSC) and Roundtable on Sustainable Palm Oil (RSPO) certifications.
[19] Definition is based on the definition of the Organisation for Economic Co-operation and Development (OECD). Available at stats.oecd.org/glossary/detail.asp?ID=2290.
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[24] Companies can use life-cycle assessment (LCA) based methodologies to assess and compare products.
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Factor10 members

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World Business Council for Sustainable Development (WBCSD)

WBCSD is a global, CEO-led organization of over 200 leading businesses working together to accelerate the transition to a sustainable world. We help make our member companies more successful and sustainable by focusing on the maximum positive impact for shareholders, the environment and societies.

Our member companies come from all business sectors and all major economies, representing a combined revenue of more than $8.5 trillion and 19 million employees. Our Global Network of almost 70 national business councils gives our members unparalleled reach across the globe. WBCSD is uniquely positioned to work with member companies along and across value chains to deliver impactful business solutions to the most challenging sustainability issues.

Together, we are the leading voice of business for sustainability: united by our vision of a world where more than nine billion people are all living well and within the boundaries of our planet, by 2050. www.wbcsd.org

Factor10

The future of business is circular and there is no room for waste in it. Factor 10, WBCSD's circular economy program, aims to bring circularity into the heart of business leadership and practice. Our goal is to build a critical mass of engagement within and across business to move the circular economy to deliver and scale solutions needed to build a sustainable world.

To reach Vision 2050, in which not a particle of waste exists, eco-efficiency of materials must improve by a factor of 10. The Factor10 Institute previously referenced this target in 1994 when it called for a ten-fold improvement in resource efficiency. Learn more about Factor10 at https://www.wbcsd.org/Programs/Energy-Circular-Economy/Factor-10

Disclaimer

This report is released in the name of WBCSD. Like other reports, it is the result of collaborative efforts by WBCSD staff and experts from member companies. Factor10 Circular Metrics work stream participants reviewed drafts, ensuring that the document broadly represents the majority of Factor10 members. It does not mean, however, that every member company of WBCSD agrees with every word. Please note that the data published in the report are as of October 2018.

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