Jun 10 - Written By James Goddin

A free Calculator for the Materials Circularity Indicator

In previous blog posts, we've discussed the initial development of the Materials Circularity Indicator (MCI) with the Ellen MacArthur Foundation that was published back in 2015 and also the 2019 update of the methodology to include biological material flows.

I recently had the pleasure of presenting on the background to this approach during the SpinUp Innovation Summit, and if you missed my session, you can find my video below.

To help you get started using the Material Circularity Indicator, I've put together a simple tool to calculate MCI for a basic product - this is the same calculator I use in the video and I'll be adding some economic and environmental calculations to this shortly, I would be interested to hear though what additions you would find useful, leave a comment below and we'll see what we can do for the next version.

You'll find detailed instructions below to guide you through using the calculator.

Hoskins
Adventures in the Circular Economy

Utility based on (Select):	Longevity	
This product lasts:	3	Years
Typical product lasts:	2	Years

			Input Materials			Output Materials		MCI
Component Name	Each (kg)	Quantity	Material Type	Source	% Regenerative	Collection Rate	Destination	
Pen Tube	0.0040	1	Plastics	Reuse		50%	Reuse	0.9
Ink Tube	0.0020	1	Plastics	Reuse		50%	Reuse	0.9
Metal Nib	0.0002	1	Metals	Reuse		50%	Reuse	0.9
Lid	0.0010	1	Bioplastic	Biological	100%	100%	Recycle	0.4

Product Mass (kg):		**0.0072**						**0.8**

Recycling Efficiency:

Material Type	Default	Custom
Bioplastic	0%	
Composites	0%	
Electronics	10%	
Metals	45%	
Natural Material	0%	
Plastics	22%	

How to use the tool:

The calculator is quite basic and makes several simple assumptions, outlined in the instructions - please contact us if you need a more detailed calculation as we are developing versions that can handle more complex scenarios. You will find the tool already pre-populated with the example we use in the video. Please feel free to delete this data and apply your own.

You can also download a copy of the tool to use offline here - as with all downloads, please take sensible precautions:

Download Calculator for Local Use

Utility Based On:

A vital part of the circular economy is making products last longer or enabling higher utilisation, reducing the need for a more significant number of products on the market.

Part of the MCI score comprises an indication of how long the product lasts (in years) or how heavily the product is used (in the functional unit relevant to your product, this could be words written, passenger miles driven, etc.).

Typically we use one or the other, and this is compared against a benchmark product for that category - usually the incumbent linear solution.

At the top of the calculator, you can specify which approach you want to use and how your circular product performs against the relevant benchmark.

The Bill of Materials:

This version of the tool can include products of up to twenty separate components.

You can list these in the columns on the left, giving each the name, weight and specifying the quantity in the product. Please contact us if you would like to analyse larger products.

Input Materials:

Here you can specify the type of material for each component.

- The options include:
  - ○ Bioplastics
  - ○ Composites

- ○ Electronics
- ○ Metals
- ○ Natural Materials
- ○ Plastics

- The material type enables the calculator to select the correct recycling efficiency applicable to your component - default values are provided but can also be customised using the table at the bottom of the calculator. An example of when this might be appropriate is when considering cardboard, which is a natural material with a typically very high recycling rate.
- The source of the material. The options include Reuse, Remanufacturing (Reman), Recycle, Biological (for natural materials) or Virgin sources.
- For biological materials, you can also specify how much of the content comes from a regeneratively managed source - see our previous blog post on natural materials for an explanation.

Output Materials:

For MCI, we are also concerned about where the material in the product goes after each use. Here, you can specify:

- How much of each component is collected from the user. You can't assume circularity for materials you can't account for, products that are not returned are considered to be lost from the circular system.
- The destination of each component returned. Options include Reuse, Remanufacturing, Recycling, Compost, Energy Recovery and Landfill. Naturally, composting applies to biological materials alone. Energy recovery is only applicable as a circular option for regeneratively sourced biological materials under a particular set of circumstances that are laid out in the methodology - see this post for further details. If you select composting or energy recovery for the incorrect material, this will be classed as linear and reflected in your result.

Material Circularity Indicator - MCI:

The calculator provides the MCI result for each component as well as for the product overall. This enables you to identify which parts contribute most to your overall MCI and where the most significant opportunities for improvement are.

Free Tool • Calculator • Circular Economy Metrics • Material Circularity Indicator

Comments (0)

Newest First Subscribe via e-mail

Preview **Post Comment...**

Circular Metrics for Bio-materials ›