

Material-as-a-service company (MASCO)

Leverage financing of circular building materials:
an innovative approach to sustainable construction

JANUARY 2024

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The Circular Buildings Coalition (CBC) is a collaboration that convenes industry leaders who aim to accelerate the deployment of circular solutions as a way of securing a global built environment operating within planetary boundaries while ensuring a just transition. The CBC is an initiative of Metabolic, WorldGBC, WBCSD, EMF, Circle Economy and Arup. The CBC is funded by Laudes Foundation.

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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	3
2. WHAT IS THE ISSUE?	4
3. PROPOSED SOLUTION	6
3.1 Business model of circular discount with a material-as-a-service-company (MASCO)	7
3.1.1 Scenario's for the business model involving a MASCO	9
3.2 Analytics: the methodology of the Circular Value Index	10
3.2.1 Residual value	12
3.2.2 Cost of reuse	13
3.2.3 Risks involved	14
3.3 How to evaluate the Circular Value Index	15
4. FEASABILITY ANALYSES	18
4.1 Social	19
4.2 Economic	19
4.3 Policy & Legal	20
4.4 Cultural	21
4.5 Technical	21
4.6 Practical	21
5. CONCLUSION	22
APPENDIX: GLOSSARY & ENDNOTES	24

EXECUTIVE SUMMARY

1.

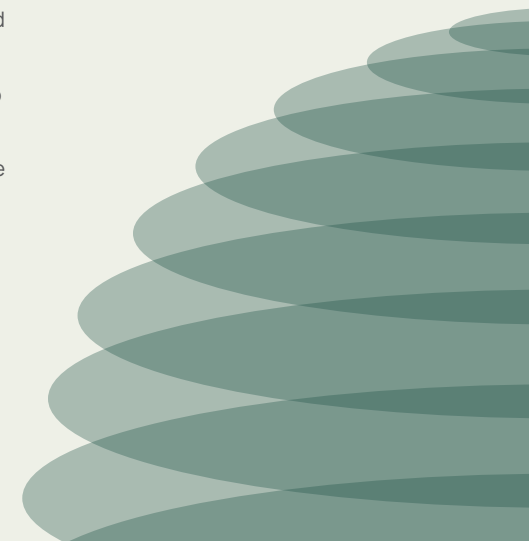
This white paper examines how circular valuable materials can provide an attractive investment opportunity.

The white paper introduces a project by the Circular Value Institute, a pioneering initiative by a Flemish consortium that promises to reshape the landscape of the built environment. A material-as-a-service company (MASCO) is spearheading this venture with a vision to revolutionise the traditional linear business model by introducing a circular paradigm. The project's core innovation lies in the development of a sophisticated circular business model coupled with a unique circular discount mechanism.

At the heart of the MASCO's approach is the Circular Value Index, a ground-breaking methodology created to evaluate the viability of the business model applied to a certain product. The index serves as a compass guiding the decision-making process to determine a product's suitability for integration into the circular business model.

The MASCO can also unlock green funds for materials high in circular value, and create much-needed financial leverage for accelerated growth of circularity in the built environment.

The Circular Value Institute's commitment extends beyond conceptualisation, aiming to support a broader vision of a circular economy by empowering businesses worldwide to adopt sustainable practices. This project is a step toward a more environmentally conscious and economically viable future, where the intricate balance between innovation, entrepreneurship and sustainability is achieved.



WHAT IS THE ISSUE?

2.

IMPACT OF CONSTRUCTION IS ENORMOUS, ACTION IS TAKEN TOO SLOWLY

Construction materials, from their initial sourcing to their end-of-life phase, exert a significant environmental burden on our planet. About 50% of all global raw materials are used in the construction sector, and approximately 33% of waste and material flows generated in Europe originate from construction activities.¹ Additionally, the built environment is responsible for up to 36% of the European Union's carbon emissions.² Not only are there greenhouse gases emitted in the use of buildings, but emissions are also embedded in construction materials.³ As the EU aims to achieve climate neutrality by 2050 and aims to reduce greenhouse gas emissions by at least 55% by 2030, it is imperative that we take action now.⁴

IT ALL STARTS WITH DESIGN

According to the European Environment Agency, one of the most important objectives to achieve this goal is the reduction of material consumption by mainly **using products complying with design-for-disassembly principles, maximising the recycled content of renovation materials and maximising reuse** (see their impact in Figure 1).⁵

The implementation of these design strategies is decided in the design phase. This is not surprising, as research shows that decisions made during the design phase have a substantial impact on a product's longevity, composition, reparability and eventual fate: up to 80% of a product's environmental footprint is determined during its design stage.⁶

CIRCULAR VALUE AND CIRCULAR BUSINESS MODELS GO HAND IN HAND

If we want to reduce material use and greenhouse gas emissions, we need to focus on using materials in products with a high circular value, combined with a circular business model to guarantee the reuse of materials and products.

"If we could build an economy that would use things, rather than use them up, we could build a future that really could work in the long term."

— Ellen MacArthur, Founder of the Ellen MacArthur Foundation

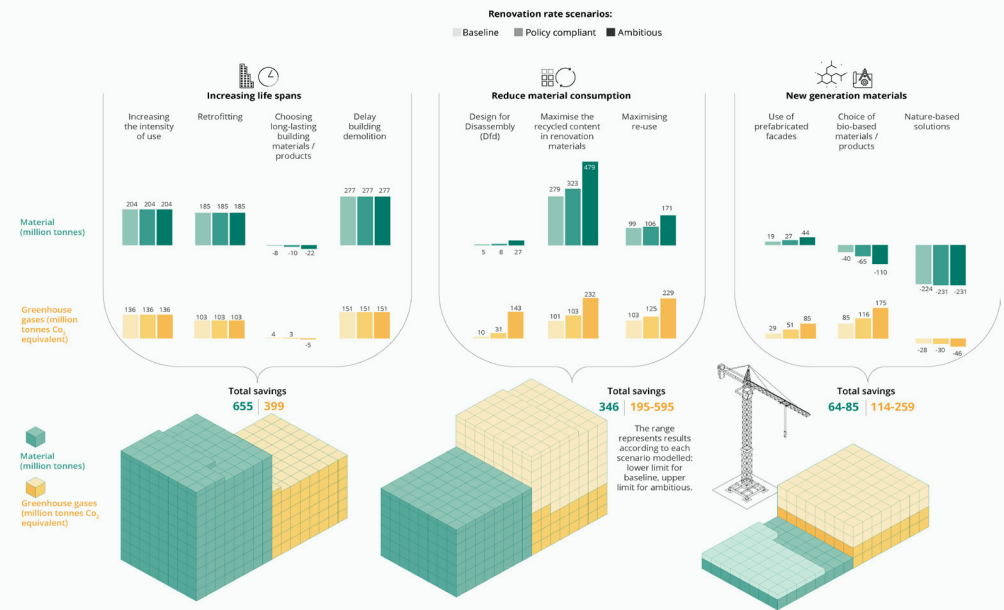


Figure 1: Cumulative savings of materials and GHG emissions for each circular renovation action from 2022 to 2057

WHY, THEN, ARE CIRCULAR PRODUCTS NOT THE NORM (YET)?

Circular products are optimised to be used in a circular economy, resulting in a product with higher circular value: throughout the technical lifetime of the product, costs will be minimised due to faster assembly and disassembly, guaranteed upgradability, easier maintenance and other factors. Additional revenue can be generated by repeatedly reselling the material for multiple use cycles. This has the potential to be an ideal solution for mitigating the environmental impact of the construction sector.

There are several barriers to consider:



LACK OF KNOWLEDGE ABOUT CIRCULARITY AND CIRCULAR VALUE

The limited knowledge about circularity within the building sector⁸ and the financial sector⁹ poses a challenge to the widespread adaptation of circular materials. There is not only a need to raise awareness within the building and finance sectors, but also a need for interdisciplinary and transdisciplinary development of knowledge to realise new (combined) theories, models and methods.¹⁰ It is vital to create a shared understanding of the circular economy, its metrics and its terminology. The concept of circular value can unlock a broader interest and understanding.



URGENT NEED FOR FINANCING FOR CIRCULAR PRODUCTS AND COMPANIES

Large enterprises can rely on internal financing (retained earnings) to fund their transition to a circular model. Young and fast-growing companies, on the other hand, are more reliant on external financing for growth.¹¹ Circular businesses or projects are considered to be more complex, less bankable and higher in risk compared to standard investment deals, resulting in a higher premium on the provided capital.¹² It would be beneficial if more financiers and investors acquired a deeper understanding of circular models so they can accurately assess the circular business model and recognise its long-term economic potential.¹³



NO INCENTIVE TO RETAIN PRODUCTS AT THEIR HIGHEST VALUE

To genuinely establish a circular economy, we must ensure that products are effectively collected and prepared for reuse at the end of the use period. This can be achieved by methods such as retaining material ownership during the use phase or implementing a buyback programme. In 2024, 90% of materials are wasted, lost or remain unavailable as they are locked into long-lasting stock such as buildings and machinery.¹⁴ It is crucial to ensure that materials have a high recovery rate and are repurposed in their most valuable form: repair/maintain > reuse/redistribute > refurbish > remanufacture > recycle (see Figure 2).¹⁵



THE CONTEXT OF A LINEAR ECONOMY: SYSTEMIC CHANGE OF THE TRADITIONAL LINEAR CONSTRUCTION SECTOR IS NEEDED

The transition to the circular economy requires systemic change, taking in a range of aspects such as material use, product design, business and marketing models, consumer behaviour, ownership rights and price mechanisms.¹⁶ Systemic change is difficult to achieve and takes a long time.¹⁷ As the implementation of circular business models is urgently needed, it is essential to recognise that these models must function within the context of a linear economy.

Some product-as-a-service solutions exist in the context of the built environment, such as those for lighting (e.g. ETAP Lighting¹⁸) and energy (e.g. Wattson¹⁹). However, it is crucial to note that these as-a-service models predominantly constitute operational costs (operational expenditure, OPEX*) (terms marked with an asterisk are those included in the Glossary [Appendix 1]). In certain instances, clients specifically seek investment opportunities (capital expenditure, CAPEX*) instead. This consideration is particularly relevant for entities such as governments, which typically allocate a CAPEX budget and may face constraints in adapting this budget to monthly instalments.

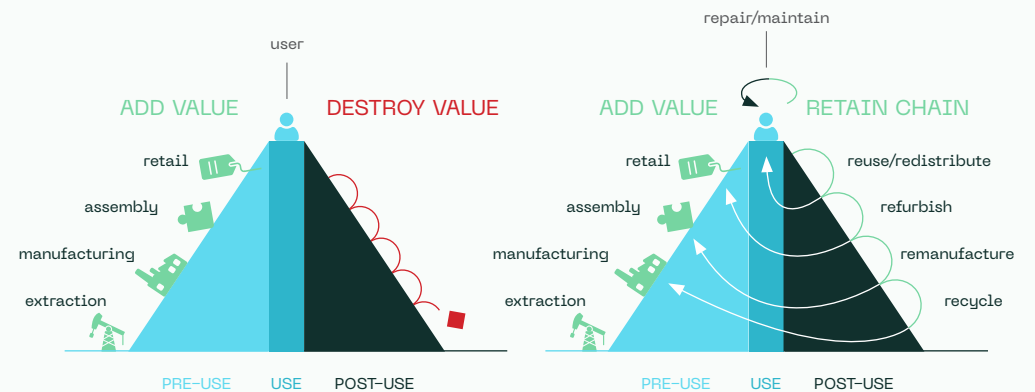


Figure 2: Value hill²⁰

PROPOSED SOLUTION

3.

The development and introduction of circular materials within the built environment presents significant challenges. As a response to these challenges, the Circular Value Institute proposes a new business model whereby a new type of investment company is added to the traditional value chain: a material-as-a-service company (MASCO).

This innovative approach involves the MASCO making an initial investment in materials with substantial circular value (see step 1 in Figure 3). This value is to be evaluated using the methodology of the Circular Value Index. In exchange, the MASCO gains the right to repurchase the material for a predetermined price from the user at the end of the (predefined) use period (see step 2 in Figure 3).

Focusing on material producers with specific knowledge of circular materials and establishing a specialised company within the finance industry will make it possible to fast-track the transition as it avoids the need to wait for the critical mass of the industry to understand and adapt to the circular economy.

The MASCO will use the methodology of the Circular Value Index as a framework for evaluating circular products. This straightforward approach relies on well-established, quantifiable factors that promote the implementation of design strategies for circularity, such as design for repair, design for disassembly and design for standardisation.

By making the transition to the circular economy actionable, the MASCO can serve as a pioneering example for other companies within the finance industry. This leadership can inspire and drive a collective focus on the circular built environment among industry peers.

Pooling various circular producers in a single MASCO offers multiple benefits, including shared knowledge regarding drafting project structures, contracts and similar tasks. This approach not only ensures the MASCO can attract sufficient funds by aggregating a diverse array of investment opportunities, but it also mitigates risk for investors. The collaborative engagement with multiple circular producers enhances risk diversification and increases the financial robustness of the MASCO.

The next chapter examines the establishment of the MASCO system for the initial demonstrator case in Belgium. Various factors are subject to consideration, leading to possible variations for other MASCOs, based on material, producer, local laws and culture. While diverse adaptations are conceivable, the fundamental principle of valorising the circular value of a product will remain a constant, applied across all future MASCO implementations.

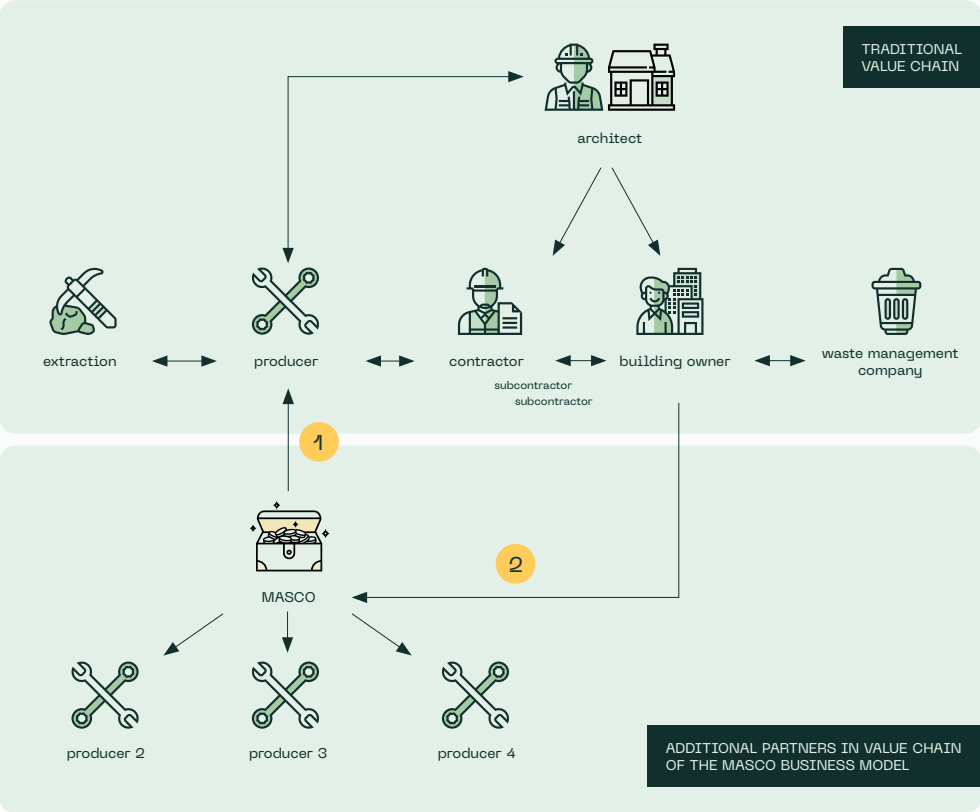


Figure 3: Value chain of the business model involving a MASCO

Business model of circular discount with a material-as-a-service-company (MASCO)

3.1

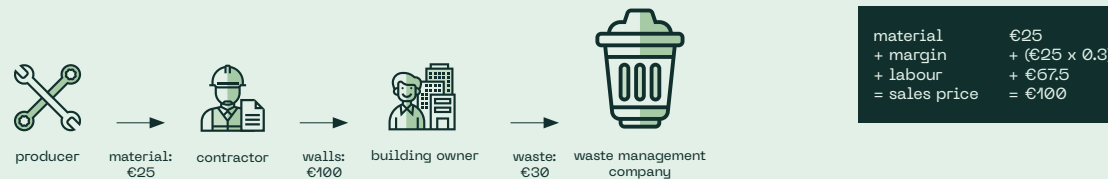


Figure 4: Value chain for traditional products sold in a linear economy

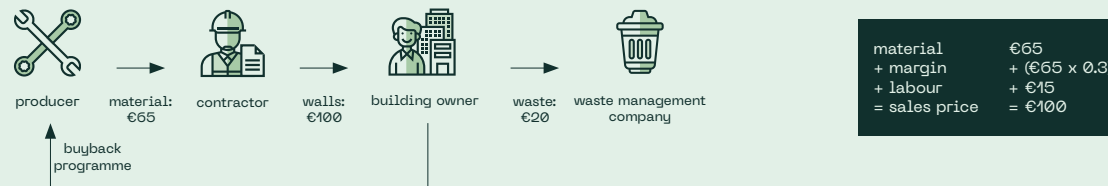


Figure 5: Value chain for products high in circular value

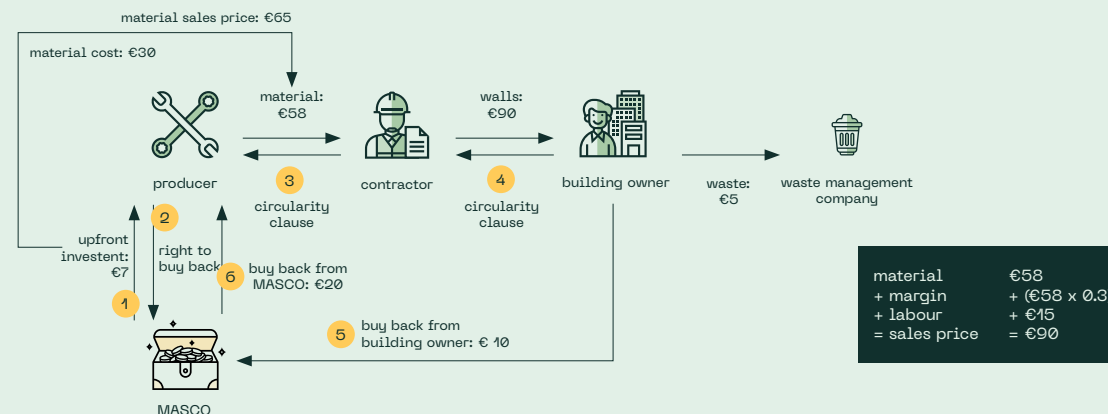


Figure 6: Value chain for circular products using the MASCO business model

Figure 4 shows the value chain for 'business as usual' products, sold through the conventional supply chain within the built environment (traditionally a linear economy model). Figure 5 shows the value chain for products high in circular value, sold within the traditional business model as seen in Figure 4. Optimised for use in the circular economy, these products present a different material-to-labour ratio compared to conventional products. They leverage advanced materials or design, which results in higher material costs, but these are offset by lower labour expenses due to a streamlined installation processes (see also Figure 17 on page 18). The result is that both types of products have the same sales price for the building owner (in this example, the price is €100). This implies that there is no financial incentive for the building owner to favour the product with the higher circular value. There is a buyback programme* in place, but we know by experience that there is little interest in what should happen to each individual material at the end of the use cycle.²¹

Figure 6 presents the proposed business model with a circular discount and a material-as-a-service-company added to the value chain. It is operated as follows: the MASCO provides an investment to the producer (1), which is used to offer a (circular) discount to the end customer (through the contractor). In exchange, the MASCO receives the right to buy the product back after the use period (2). This right is contractually stipulated in the circularity clause appended to the sales contract (3). This clause applies to each subsequent sales contract (e.g. with subcontractors, with the building owner (4) and with any subsequent owners). The use period is defined in this circularity clause.

At the end of the use period, the material is sold by the building owner to the MASCO (5), which sells it back to the producer (6). Ideally, the producer buys the material from the MASCO for a lower price compared to the production cost of new material.

After quality control, repair and, if needed, remanufacturing, the producer resells the product to another client. This cycle can be continued over and over again.

Applying this system addresses the above mentioned obstacles to implementing the circular economy (see page 4):



A KNOWLEDGE HUB FOR CIRCULARITY AND CIRCULAR VALUE

Incorporating an additional company – the MASCO – into the value chain offers several advantages. The MASCO can act as a hub for expertise in analysing and financing circular businesses, including contractual agreements, business model analysis and investor searches, eliminating the necessity for an additional in-house department.



ACCESS TO FINANCE

Simultaneously, the MASCO provides access to financing to numerous producers of materials with high circular value. By expanding the MASCO's access to various suppliers, risk is diversified across these participants. As a result, the MASCO's performance is no longer tied to the business fortunes of a single supplier, ensuring financial robustness.



INCENTIVE TO RETAIN PRODUCTS AT THEIR HIGHEST VALUE

The business model of creating a circular discount by adding a MASCO to the value chain effectively turns our value chain into a value loop,* optimising yields from resources in use and fostering system effectiveness. The incentives for each stakeholder are described to the right. It is in the interest of the MASCO to focus on products with a high circular value and maintain this value at an optimal level. This involves implementing digital monitoring, ensuring transparency and establishing efficient logistics.



IN ALIGNMENT WITH THE CONTEXT OF A LINEAR ECONOMY

In this proposal, we have opted for a model that facilitates the transfer of ownership, as this best aligns with the current linear context. This approach allows us to seamlessly operate within the current legal framework of the EU, ensuring compliance with consumer protection laws and avoiding a potential undermining of any regulations. It additionally enables businesses to align their circular ambitions with their ability to account for expenses, optimising for the distinction between capital expenditure (CAPEX*) and operational expenditure (OPEX*).

Advantages for each stakeholder



The producer has the opportunity to buy the products back at the end of the use cycle for a lower cost compared to the costs of the newly produced material. As a product with a high circular value can be sold for a lower price than traditional materials due to the circular discount, the producer will have the opportunity to accelerate the growth of the company.



Because they are working with high-value material, which requires less labour, **the contractor** will be able to sell (at a margin) and install material faster compared to traditional material that is low in circular value.



The building owner will have a lower initial investment, making the circular material much more attractive compared to the traditional material. At the end of the use period, the building owner is incentivised to sell the product back to the MASCO and return it to the producer (see Figure 7). The building owner is responsible for demounting and transporting the product to the supplier, so the buyback price received by the building owner should, at an absolute minimum, cover these costs.



The business model with circular discount and a MASCO offers a viable investment opportunity for **the financial sector** (private equity, impact investors, banks). If the product design is well adapted to be used in the circular economy (that is, if the product is high in circular value), the model could be highly profitable. The Circular Value Index can be used to make an objective analysis of the viability of the circular business model for a material high in circular value. This methodology is explained further in this white paper.



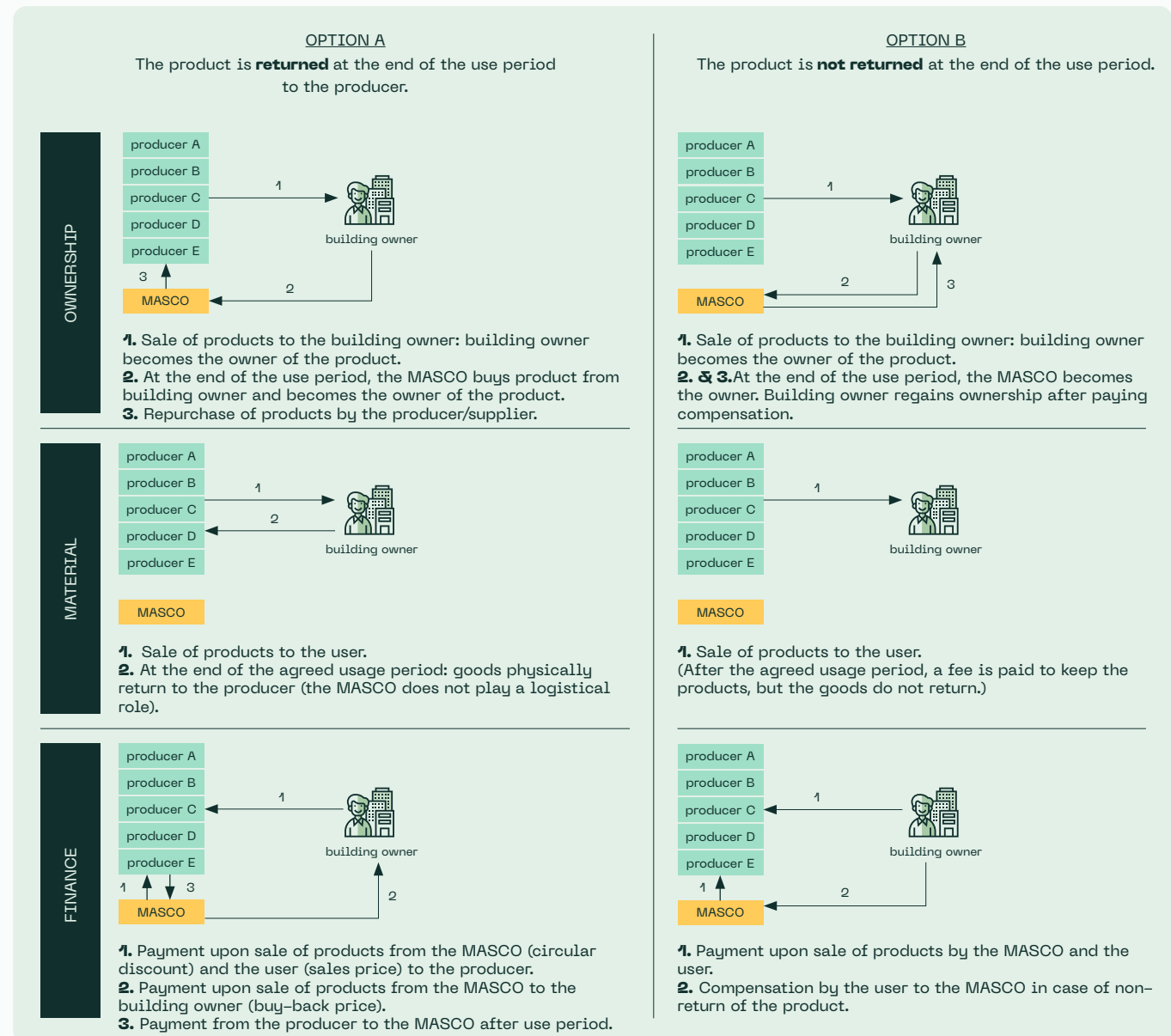
Scenarios for the business model involving a MASCO

As this proposed business model is new and only has been applied on a small scale, it cannot be claimed to be a final version. There is room for negotiation of the terms, and variety between different MASCOs is possible, similar to the subtle differences between banks.

As we set out to launch a MASCO in Belgium and test the business model, we have determined some terms for the launch:

- The MASCO is purely a financial institution: it will not be involved in the operations or logistics of executing the model.
 - The building owner is responsible for demounting and transporting the items.
 - The use period of a product will be determined at the initial point of sale and is part of the circular clause to the sales contract.
 - The building owner has the option to return the product after the use period (option A in Figure 7), or to retain the materials after the use period by reimbursing the MASCO with a fee that consists, at a minimum, of the circular discount plus interest and the additional costs as described in the circularity clause of the sales contract. This is option B in Figure 7.
- As the MASCO represents an innovative approach to funding and providing support for circular material producers, it is important to identify various layers of the MASCO business model: the flow of ownership, the flow of materials and the flow of finance. These are presented schematically in Figure 7.

Figure 7: Schematic representation of the flow of ownership, material and finance if the product is returned (option A) or retained (option B) after the predefined use period.



Analytics: the methodology of the Circular Value Index

3.2

How will the MASCO select the right material producers to invest in? There is a need for a standardised methodology to determine the viability of a circular business case. Our recommendation involves an objective evaluation centred on the circular value of a product. This chapter outlines the concept of circular value and details the process of conducting the analysis.

The significant advantage that sets circular materials apart from traditional materials is the inherent residual value of the material. This entails the ability to recover and reuse the materials (by the same user or by another user). This means the material remains on the peak of 'Value Hill', where the product maintains its most valuable form (see Figure 2, page 4). When producers recover these products as they are high in circular value, they can resell them to another user.

Doing this, however, requires additional expenses, including the costs associated with the collection, refurbishment, quality assurance, cleaning, repair and transportation of items. To ensure the sustained circulation of these products within the circular economy, the system must reward reusing materials. In other words, the cost of reusing the items must be lower than their residual worth.

The following formula represents this crucial ratio:

Cost of reuse < residual value

As we use the Circular Value Index to evaluate the economic viability of a business model, it is imperative to consider the risks involved.

All these factors come together in the following formula:

$$\text{Circular Value Index} = \frac{\text{residual value}}{\text{cost of reuse}} \times \text{risk}$$

The Circular Value Index will fluctuate over time. For instance, the resource price may vary between the beginning and end of a product's use period. Alternatively, the residual value might be initially calculated based on the material price, yet the second-hand value could surpass it by the end of the use period. Ensuring a stable residual value can be achieved by establishing a predetermined take-back price with the producer at the beginning of the use period as a component of the circularity clause formulated by the MASCO in the circular discount business model.

The circular value index will be highly dependent on the specific project. As the costs associated with sales, transportation, storage etc. are project-specific, applying them to a product requires constraining the scope of the projects under evaluation – for instance by considering parameters such as transportation within a 50-kilometre radius and storage for a maximum duration of six months.

In conclusion, there will not be one single value for each product: to conduct the analysis, we need to apply scenario thinking:* describe a range of projects and calculate the Circular Value Index for each project. Project cost will vary in terms of transport (e.g. use in the same building, use in the same city, use in the same country), repair (e.g. repair needed for 20% vs 40% of returned material), quality checks (e.g. a fixed rate for testing, vs a rate related to the amount of material in the project). This analysis will provide insights into the evolution of the Circular Value Index across various scenarios, offering a perspective on the financial viability of each. Based on this assessment, we can strategically select scenarios in which the circular business model proves to be financially feasible. These selected scenarios will serve as the foundation for determining the scope of the MASCO's investment opportunities (translated to the scope of the Special Purpose Entities (SPEs), as outlined on page 16).

EXAMPLE: reuse of a kitchen

A particular second-hand kitchen can be sold for €1,500. No repairs are needed, but there is an additional cost of €1,280 for demounting the kitchen (an hourly rate of €40 paid to two people for two days). There is a risk that the style of the kitchen will be less popular after the first use period as trends and tastes evolve, so a risk factor of 30% is added.

$$\text{circular value index} = \frac{\text{residual value}}{\text{cost of reuse}} \times \text{risk} = \frac{€1,500}{€1,280} \times 0.7 = 0.82$$

What about other types of value?

As outlined in the Cloverleaf Business Model Canvas (see Figure 8), the capacity to deliver value extends across three distinct value spheres: the social, the environmental and the economic sphere. While our aspiration is to create a positive impact encompassing all three spheres, we prioritise economic viability to ensure the success of our business model within the prevailing linear-economy context, which places a significant emphasis on profit maximisation.



STAKEHOLDER	SOCIAL	ENVIRONMENTAL	ECONOMIC
PRODUCER OF CIRCULAR MATERIALS	Creating purposeful employment	Reducing carbon footprint of the product through distribution of the used carbon across different use periods	Accelerating the expansion of producers through external capital infusion
CONTRACTOR	Generating additional employment opportunities, e.g. in deconstruction of materials, logistics and quality control	Enabling reuse through selective disassembly of products and materials	Generating supplementary income through the process of deconstruction
OWNER/USER	Building affordable sustainable housing	Lowering the carbon footprint of the building/project through reuse of products and materials	Minimising the total cost of ownership for owner/user; shifting part of the expenses from CAPEX to OPEX
INVESTOR	Establishing a regional network of circular production entities	Incorporating a financial incentive to maintain materials within the closed-loop system	Facilitating opportunities for investment in financially lucrative green initiatives

Figure 9: Value created by applying the business model including a MASCO.

MATERIALS USED IN THE EXAMPLES
ON PAGES 11-13 & 16

Clay roof tiles

Clay roof tiles are roofing materials made from natural clay, typically through a process of moulding, drying and firing in a kiln. They have been used for centuries and are known for their durability, aesthetic appeal and ability to withstand various weather conditions.

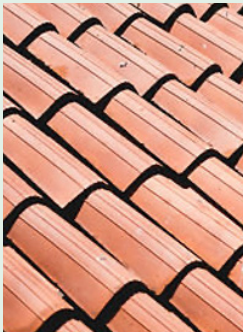


Figure 10: Clay roof tiles

JUUNOO – AcouClick

AcouClick is a demountable wall that, at the end of its lifecycle, is not demolished but disassembled and re-used in another space or project. The partition consists of a metal frame with insulation and a finishing layer, which can be customised. Typically, decorative panels are chosen for this; they are designed to interlock and are thus reusable.



Figure 11: AcouClick

Owens Corning – Foamglas

Cellular glass is a lightweight, rigid and durable insulation material composed of millions of hermetically sealed glass cells. This insulation material delivers an exceptional combination of properties, including non-flammability, high compressive strength, water and vapor tightness and long-lasting thermal performance.



Figure 12: Foamglas

Residual value

The residual value is the established maximum achievable price for an item in the current market conditions. Material lost during demounting or deemed unfit for reuse should be deducted from the total residual value. There are multiple prices that can be considered, and they will all fluctuate over time:

● PRICE DERIVED FROM EMOTIONAL VALUE

Items with a special story or significant personal history will often carry a high emotional value. For instance, a wedding ring that is a family heirloom, a rare and coveted Lego set, or a dress worn by a film star. Typically, these items will be reused in their current condition or, in some cases, stored to preserve their value. The emotional price will be applied, for instance, when working with materials or elements of historical artifacts: imagine the tip of the Eiffel Tower being for sale.

● SECOND-HAND PRICE

The price paid by a subsequent user to acquire an item. These items will usually be reused in their current condition. An example for the application of this price is the sale of reclaimed wooden beams.

● BUYBACK PRICE

The buyback price can be case-specific or predetermined, possibly linked to a defined period of use. It is typically offered by the original seller, but may originate from a supplier or a third party. The primary goal is to facilitate the reuse, either in whole or part, of items in their current state, achieved through actions such as extracting functional components or refurbishing/remanufacturing to restore the product to a like-new condition.

● RESOURCE PRICE

The cost of the valuable materials of which the product is composed. Typically, these materials will be recovered and recycled after their initial use phase. An example of this is copper wiring used as part of a building's electrical system.

Circular Value Index

=

residual value

cost of reuse

x

risk

=

maximum of

emotional price

2nd-hand price

buyback price

resource price

- losses

sum of costs of

demounting

repair

quality

sales (2nd vs 1st life)

transport (2nd vs 1st life)

storage (2nd vs 1st life)

disposal

x

risk link to

regulatory issues

toxicity

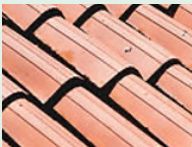
trends

producer

custom

technology

EXAMPLE: CALCULATION OF THE CIRCULAR VALUE INDEX

		
Clay roof tiles	AcouClick	Foamglas
END-OF-LIFE SCENARIO	Demounting and reuse of 80% of the tiles by another user at another location (50 km away)	When roof needs replacement, only the roofing needs to be replaced: insulation can be reused, additional insulation may be needed due to stricter regulations.
DIMENSIONS	roof of 100 m²	1000 m²
EMOTIONAL PRICE	€0 (no emotional value)	€0 (no emotional value)
SECOND-HAND PRICE	€1,800/project second-hand price: €20/m² ²³ - 20% loss from damaged goods	€0/m² (no second-hand market for these items at the moment)
BUYBACK PRICE	€0 (no buyback programme currently available)	€0 (no buyback programme currently available)
RESOURCE PRICE	€0 (no current market to recycle ceramic tiles)	€34,092/project (in terms of quality, the material in place is identical to new material; 10% loss due to disassembly; new material price: €37.88/m²)

Cost of reuse

The cost of reutilisation comprises a wide range of expenditures linked to the execution of a circular business model. These expenses may include, but are not restricted to:

- DEMOUNTING**
 Costs related to demounting, gathering and collecting materials or products.
- REPAIR**
 Costs incurred in repairing any damaged or worn components to ensure their quality and functionality. Also includes costs associated with cleaning and preparing items for reuse.
- QUALITY ASSURANCE**
 Cost of verifying the quality and condition of reused materials or products.
- SALES (2ND LIFE VS 1ST LIFE)**
 Overhead costs such as management, documentation and administrative tasks associated with the reuse process. We only consider the costs incurred in addition to the initial sales costs of the same item as part of its initial use period.
- TRANSPORTATION (2ND LIFE VS 1ST LIFE)**
 The cost of moving items to their next destination within the circular system. We only consider the additional costs in relation to the initial sales cost of the same item as part of its initial use period. For example, if free transport up to 50km is included with the sale of a new item, and the transport between the first and the second user is less than 50km, this cost should not be considered. However, if the product is first transported to a storage facility, the extra cost should be considered in the analysis.
- STORAGE COSTS (2ND LIFE VS 1ST LIFE)**
 Costs related to storing items between cycles of use/ reuse. We only consider the costs incurred in addition to the initial sales cost of the same item before its initial use period.
- DISPOSAL**
 Costs related to partly or entirely disposing of the material, for example disposing of a part of the product that is not fit for reuse and will be replaced.

Circular Value Index

=

residual value

cost of reuse

x

risk

=

maximum of

emotional price

2nd-hand price

buyback price

resource price

- losses

x

risk link to

regulatory issues

toxicity

trends

producer

custom

technology

sum of costs of

demounting

repair

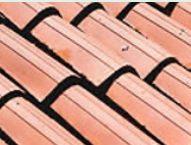
quality

sales (2nd vs 1st life)

transport (2nd vs 1st life)

storage (2nd vs 1st life)

disposal

	 Clay roof tiles	 AcouClick	 Foamglas
DEMOUNT-ING	€2,900/project labour cost: €29/m ² ²⁷	€480 €12.50/running metre; 40 running metres	€0 (no demounting nec- essary)
REPAIR	€0 (no refurbishment, repair or cleaning)	€0 (no refurbishment, repair or cleaning)	€4,500/project (combination of visual quality control and repair where needed; €4.5/m ²)
QUALITY	€500/project (fixed fee for each project, not related to the volume)	€0 (visual-only quality control during disman- tling)	€0 (included in repair cost)
SALES (2ND VS. 1ST LIFE)	€0 (equal administra- tion cost for 1st and 2nd sale)	€0 (no 2nd sale, use by the same user)	€0 (no 2nd sale, use by the same user)
TRANSPORTA- TION (2ND VS 1ST LIFE)	€0 (transport is equal for 1st and 2nd sale)	€0 (no transportation needed)	€0 (no transportation needed)
STORAGE (2ND VS 1ST LIFE)	€0 (no storage be- tween uses)	€0 (no storage needed)	€0 (no storage needed)
DISPOSAL	€158/project 20% of material is not fit for reuse, so must be disposed of: disposal fee = €0.2/kg ²⁵ ; weight = 39.5kg/ m ² ²⁶	€108/project 33% insulation 33% finishing plates 50% plinths total weight: 540 kg; disposal fee = €0.2/ kg ²⁸	€750/project (disposal fee: 0.75/ m2)

Risks involved

When assessing a business model's profitability, it is crucial to vigilantly monitor risks such as fluctuating residual value, market dynamics, regulatory changes and producer's financial stability. Acknowledging the impact fluctuations may have, we adopt a prudent approach: to ensure resilience against adverse conditions, we apply a ≤ 1 risk factor, verifying viability in a worst-case scenario, as this is what is of interest to the financial sector.

REGULATORY CHALLENGES

Evolving regulations and policies related to sustainability, recycling and environmental standards can pose compliance challenges in later use periods.

TOXICITY AND HEALTH CONCERNS

Over time, insights into or perceptions of material toxicity can evolve as additional information becomes available about the effects of materials or products. A prominent historical example is asbestos, which was once considered an acceptable building material until its harmful effects became evident after years of use.

FLUCTUATING MARKET DEMAND

Changes in consumer preferences or market trends can impact the demand for products and services, including circular ones.

FINANCIAL STABILITY OF THE PRODUCER

If the producer provides a buyback offer, it is essential to assess the producer's financial stability to ensure their capability to fulfil this offer after the use period.

CUSTOMISATION OF THE PRODUCT

A product that is tailored to a specific user or situation poses a challenge in identifying subsequent users who can effectively utilise the product, introducing a potential risk in its long-term circulation within the circular economy.

TECHNOLOGICAL OBSOLETENESS

A technology, device or system becomes outdated or is no longer competitive due to advancements in technology. Technological obsolescence can render a product, service or system less effective, limiting its functionality or compatibility with contemporary tools and solutions.

Circular Value Index

=

residual value

cost of reuse

x

risk

=

maximum of

emotional price

2nd-hand price

buyback price

resource price

- losses

x

sum of costs of

demounting

repair

quality

sales (2nd vs 1st life)

transport (2nd vs 1st life)

storage (2nd vs 1st life)

disposal

x

risk link to

regulatory issues

toxicity

trends

producer

custom

technology

Clay roof tiles

AcouClick

Foamglas

REGULATORY CHALLENGES	1 (no regulatory changes on the horizon, unchanged for years)	1 (no regulatory changes on the horizon, use by the same user, same location)	1 (regulations regarding insulation might become stricter; more material may need to be added)
TOXICITY AND HEALTH CONCERNS	1 (no health concerns, has been on the market for a long time)	1 (no health concerns)	1 (no health concerns)
FLUCTUATING MARKET DEMAND	1 (use of ceramic roof tiles has been steady over the years)	1 (reused by the same user)	1 (reused by the same user)
PRODUCER STABILITY	1 (producer is not involved in end-of-life scenario)	1 (producer is not involved in end-of-life scenario)	1 (producer is not involved in end-of-life scenario)
PRODUCT CUSTOMISATION	1 (no customisation of the product)	1 (no customisation – same location i.e. same ceiling height)	1 (customisation to the roof, used at the same location)
TECHNOLOGICAL OBSOLETENESS	1 (no technology involved)	1 (no technology involved)	1 (no technology involved)
CIRCULAR VALUE INDEX	$= \frac{\text{residual value}}{\text{cost of reuse}} \times \text{risk}$ $= \frac{€1,800}{(€2,900 + €500 + €158)} \times 1$ $= 0.5$	$= \frac{\text{residual value}}{\text{cost of reuse}} \times \text{risk}$ $= \frac{€11,929}{(€480 + €108)} \times 1$ $= 20.3$	$= \frac{\text{residual value}}{\text{cost of reuse}} \times \text{risk}$ $= \frac{€34,092}{(€4,500 + €750)} \times 1$ $= 6.5$

14

How to evaluate the Circular Value Index

3.3

All these elements converge in the circular value formula. The higher the Circular Value Index, the more economically appealing and viable the circular business model.

$$\text{Circular Value Index} = \frac{\text{residual value}}{\text{cost of reuse}} \times \text{risk} = \frac{\text{maximum of } \left(\begin{array}{l} \text{emotional price} \\ \text{2nd-hand price} \\ \text{buyback price} \\ \text{resource price} \end{array} \right) - \text{losses}}{\text{sum of costs of } \left(\begin{array}{l} \text{dismounting} \\ \text{repair} \\ \text{quality} \\ \text{sales (2nd vs 1st life)} \\ \text{transport (2nd vs 1st life)} \\ \text{storage (2nd vs 1st life)} \\ \text{disposal} \end{array} \right)} \times \text{risk link to } \left(\begin{array}{l} \text{regulatory issues} \\ \text{toxicity} \\ \text{trends} \\ \text{producer} \\ \text{custom} \\ \text{technology} \end{array} \right)$$

TARGET VALUE OF THE CIRCULAR VALUE INDEX

In our experience, products with a Circular Value Index greater than 1 present compelling business cases for internal capital initiation. However, to apply the MASCO business model, a higher Circular Value Index is required, given that the sale and repurchase of products with a high circular value must generate revenue for the MASCO as the investing party. Hence, we handle a minimum Circular Value Index of 3 for this purpose.

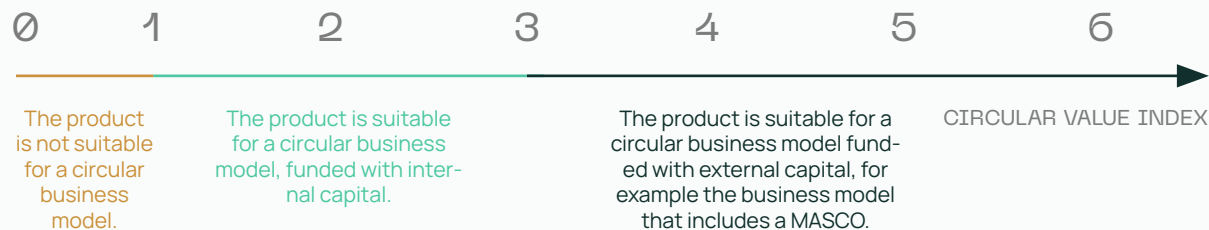


Figure 13: Target value for the Circular Value Index

It is important to emphasise that this methodology should be used to evaluate if a circular business model is interesting for the product at hand, not to evaluate the circularity of the product itself.

Clay roofing tiles (see pages 11-13) are a good example for this. These tiles may qualify as a circular product due to their durability and high potential for dismounting and reuse. However, reusing these items might not lead to a viable business model when sold on the second-hand market. The cost associated with dismounting, quality checks and preparing the tiles for reuse surpasses the second-hand value of the product, resulting in a circular value lower than 1, making it commercially uninteresting to pursue a circular business approach for these particular items.

The scenarios described for the other examples prove to be viable as a business model:

AcouClick interior walls are dismounted and reinstalled at the same location. This scenario has great potential for business viability with a Circular Value Index of 20.3.

Foamglas' business proposition is to reuse the material in the same location when the roof needs replacement. Additional insulation material (Foamglas) is needed, but can be added to the existing layer, as the material retains its thermal insulation properties. This scenario results in a Circular Value Index of 6.5.

KEEP AN EYE ON THE USE PERIOD

When selecting products that are eligible for the business model involving a MASCO, it is essential to not just consider the Circular Value Index, but also take into account the product's use period. Only when the use period ends can the product be repurchased from the user and resold to the producer, making this point in time the sole opportunity for the MASCO to generate revenue.

Traditional investors typically operate with a payback period of three to five years, which is short compared to the average usage lifespan of products and materials in the built environment. However, a MASCO is a specialised company with a long-term vision and does not have to take into account these short investment periods.

The MASCO will expect a certain (annual) rate of return on investment. This means that the longer the money is invested, the more the MASCO will expect to earn. With every year added to the investment duration, the targeted yield will become higher.

This yield comprises the buyback price from the MASCO to the producer (3), minus the upfront investment (1) and the buyback price from the MASCO to the building owner (2). So when extending the duration of the investment, either the circular discount or the buyback price to the owner of the product will be lower (to the disadvantage of the building owner), or the sales price to the producer will go up (to the disadvantage of the producer, who prefers the sourced material to be competitive in price compared to the new material).

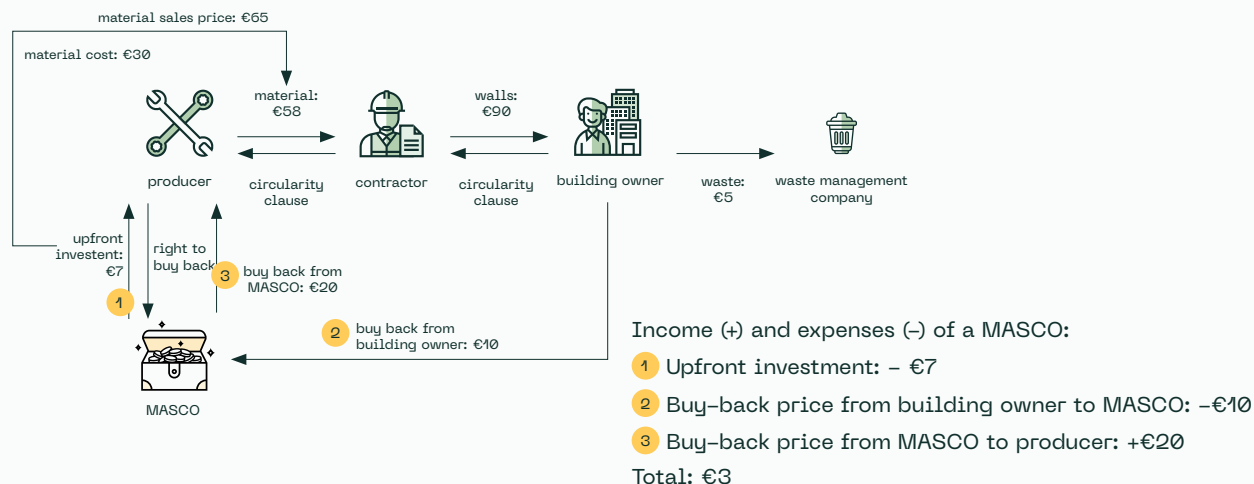


Figure 14: Value chain for circular product with MASCO business model

FIND YOUR NICHE

The use period of a product will depend not only on the product itself but also on the targeted market. Façade bricks used in a residential home could be used for more than 60 years, while in commercial buildings they may be replaced every 30 years as part of the maintenance plan. Interior walls in residential homes could be used for as long as the home is used, but these same walls could be replaced in office buildings after their seven-year lease is up. So it is not just key to look for products with a high circular value, but it is also essential to combine them with an attractive use period (e.g. investment period).

HOW TO MAXIMISE THE CIRCULAR VALUE INDEX

When a product's Circular Value Index is insufficient for integration into a circular business model, the methodology can function as a guide for enhancing and optimising the product to align with circular principles. Strategies to elevate the circular value index may include:

- **INCREASE RESIDUAL VALUE:** Explore ways to enhance the value of the product in its secondary life to maximise its residual worth, such as designing for emotional bonding or designing for durability.
- **STREAMLINE RESIDUAL VALUE ACQUISITION:** Reduce any losses incurred in obtaining the residual value, for instance by minimising costs associated with finding a buyer or repurposing the product.
- **LOWER THE COST OF REUSE:** Identify opportunities to reduce the expenses associated with the reuse and refurbishment processes. Examples are design optimisation for repair and designing for disassembly.
- **MITIGATE RISKS:** Implement measures to minimise or manage the risks as described in the formula. Measures to achieve this include working with standardised products and designing for timelessness.

SPECIFIC PROJECT VALUE

When collecting the figures for calculating the Circular Value Index of a specific project, it is also interesting to analyse the specific project value (SPV):

Specific Project Value = (residual value – cost of reuse) x risk

This SPV will provide an insight in the yield (in €) of a specific project, using the same information as is used to calculate the Circular Value Index.

RINGFENCE THE RISKS OF THE PROJECT

Even if the MASCO focusses on material high in circular value, and with an acceptable use period (lead time for the investment), there are still risks that need to be managed. A supplier could have ceased to exist after the use period, or costs for reuse could be higher than anticipated. In order to ringfence these risks, the MASCO will have different 'sub-companies': special purpose entities (SPEs).^{*} Each SPE will have a certain focus: one specific product by one specific producer, limited in region (e.g. to the Benelux) and with a maximum use period (e.g. seven years), a time limitation of projects to be added to the SPE (e.g. projects being sold within three years after the launch of the SPE), a minimum sales volume (e.g. projects costing a minimum of €50,000). This also means that there is a separate investment opportunity for each SPE, with a clear start and end date. This is a construction commonly used for energy-as-a-service companies, where there is a risk linked to each specific project.

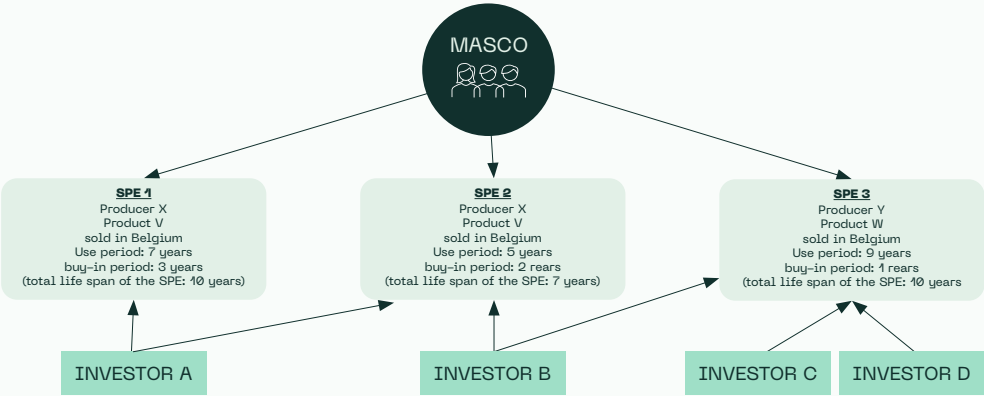


Figure 15: Schematic representation of the MASCO with SPEs

EXAMPLE: CALCULATION OF THE SPECIFIC PROJECT VALUE (SPV)

Calculating the SPV of the three examples presented on pages 11-14:



Clay roof tiles

Specific Project Value
= (residual value – cost of reuse) x risk
= (€1,800 – (€2,900 + €500 + €158)) x 1
= – €1758



AcouClick

Specific Project Value
= (residual value – cost of reuse) x risk
= (€11,929 – (€480 + €108)) x 1
= €11,341



Foamglas

Specific Project Value
= (residual value – cost of reuse) x risk
= (€34,092 – (€4500 + €750)) x 1
= €28,842

To evaluate the specific project value, it must always be compared with the 'business-as-usual' scenario. For example, the reuse of clay roof tiles results in a negative specific project value, so it seems like a commercially uninteresting model, as it costs money (€1,758 will be spent). However, this amount is much lower than the amount that would be spent on the same project in the linear model, e.g. discarding all old materials and replacing them with all-new roof tiles.

FEASIBILITY ANALYSES

4

Strengths



Producer

- faster growth rates
- decouple turnover from material use



Building owner

- easier, circular disposing of material
- optimisation CAPEX-OPEX



Contractor

- high value material & low labour intensity => increased sales volume of higher-priced material (per hour of labour)
- possible frontrunner advantage



MASCO

- new niche in the financial market (blue ocean^{29*})
- answers to the need for green investment opportunities
- making circularity bankable



Producer

- bigger margin once business model with circular discount is financed internally (without MASCO)
- incentive for product optimisation for the circular economy



Building owner

- work towards affordable housing (even with rising material prices)
- information needed for reporting to BREEAM, taxonomy and other certificates can be provided by MASCO



Contractor

- cooperation/joint venture between MASCO and contractor to become a full-service company



MASCO

- cooperation/joint venture between MASCO and contractor to become a full-service company

Opportunities

Weaknesses



Producer

- part of the profit goes to MASCO
- additional administration, for example relating to traceability



Building owner

- additional administration, for example relating to the traceability of contracts - difficulty aligning the real use period with the theoretical use period
- when material is not returned after the agreed-upon period of use, paying back the circular discount + interest can be costly (the longer the use period, the costlier it gets)



Contractor

- new products, uncertainty regarding the liability of the contractor
- different way of working in a change-averse sector
- additional administration, for example around the circularity clause



MASCO

- the shorter the use period, the more lucrative the investment (the preferred circular strategy is to extend the product's use period)
- extended duration of the investment
- ongoing credit checks of suppliers and end users is needed



Producer

- if the material is not returned, the resource price could rise sharply and exceed the buyback price
- this will slow down growth of the company



Building owner

- no circularity in procurement (yet)



Contractor



MASCO

- different legal framework for each country
- fluctuating CVI due to fluctuating costs (including labour costs and material costs)
- if the producer has ample internal funds or a proven viable business model, they will opt for cost-effective internal funding or seek financing from entities such as banks

Threats

Figure 16: SWOT analysis of the business model of the circular discount with a MASCO

Social

Implementing the circular discount business model through a MASCO not only generates shareholder value but also contributes to societal benefits. This includes creating meaningful employment opportunities, addressing affordable housing challenges amidst rising material costs and fostering a robust local network dedicated to advancing the transition towards a circular economy (see Figures 8 and 9, page 10).

Economic

The economic feasibility of the MASCO project will be different for each stakeholder.

For **producers**, the feasibility is contingent upon their willingness to innovate by developing new products or redesigning existing ones to align with a future in the circular economy. This initiative will enable them to achieve a greater yield from the used materials, thereby decoupling income generation from material usage.

For **contractors**, economic viability hinges on their readiness to adapt to the evolving market. The income of the contractor comprises a percentage of the sold material as well as the labour costs. The business model with the circular discount from a MASCO will decrease the material cost, consequently reducing the contractor's share of the material sold. However, this is a false impression: as the used material has an optimised design for the circular economy, the ratio of income will change. The share of the material will become higher and the share of labour will decrease. This means contractors will sell more and higher-priced material for each hour worked.

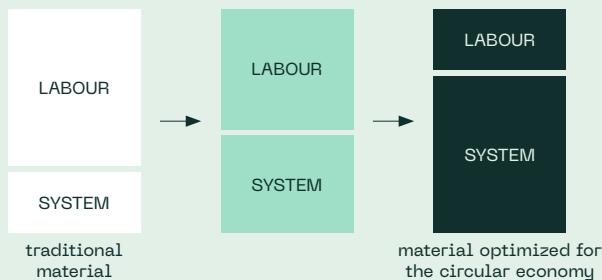


Figure 17: Changing ratio of material optimised for the circular economy

In general, there will also be additional work for a contractor at the end of the use stage: the gentle dismantling and sorting process will demand more time compared to current demolition techniques.

For **building owners**, the MASCO business model with the circular discount offers an opportunity to optimise CAPEX/OPEX expenses.* On the one hand, they own the material, meaning this expense can be depreciated.* At the same time, the products are offered with an economic advantage (compared to the linear system, see page 6), enabling them to optimise the value of their investment. The downside is that if the material is not returned, the circular discount plus annual interest must be repaid to the MASCO. This could lead to items being more expensive than the initial purchase. However, payment is deferred until the end of the use period, providing a more distributed cost structure.

For **investors**, the economic feasibility and viability is crucial. Key elements to consider in this evaluation are:

● THE MASCO WILL HAVE TO BE ORGANISED IN SUCH A WAY THAT IT IS A FINANCIALLY ROBUST COMPANY. THIS IS ACHIEVED THROUGH THE FOLLOWING MEASURES:

- **Selection of multiple materials and producers:** Engaging multiple producers helps distribute the risk associated with potential collaboration disruptions, such as bankruptcy or alternative capital accumulation methods. How many producers are necessary will depend on the expenses of the MASCO, for example payroll costs, operational costs, profit motive and the project size in each SPE (see Figure 15 on page 16).
- **Company structure must keep the risks ringfenced:** When initiating a project in collaboration with a supplier, a Special Purpose Entity (SPE) will be instituted (see page 16). Notably, each SPE will be operated and managed by MASCO employees, who will be specifically assigned to tasks pertaining to business development, legal affairs and financial management.

● MATERIAL WITH A CIRCULAR VALUE INDEX > 3:

Based on our current tests, we can deduce that the Circular Value Index of a product (within the selected scenarios, see page 9) must exceed 3 to ensure the viability of the business model with a circular discount, including a MASCO. Further development of the analysis of the index is needed.

● LENGTH OF THE USE PERIOD:

The longer money is tied up in an investment, the higher the expectations are regarding the investment's yield. To ensure the system's effectiveness (that is, to keep all stakeholders motivated by providing sufficient benefits), it's essential to maintain the investor's expected return on investment (ROI) at an acceptable level, thus making sure the use period of the product is limited (see page 16). In the built environment, the use period is linked to the layer of the building as described by the concept of the 'shearing layers' by Brand (see Figure 18).³⁰ This results in a variable economic feasibility of the MASCO business model, depending on which layer the materials are used in. It is preferable to work with material used in one of the following four layers: 'stuff', 'space plan', 'services' and 'skin'.

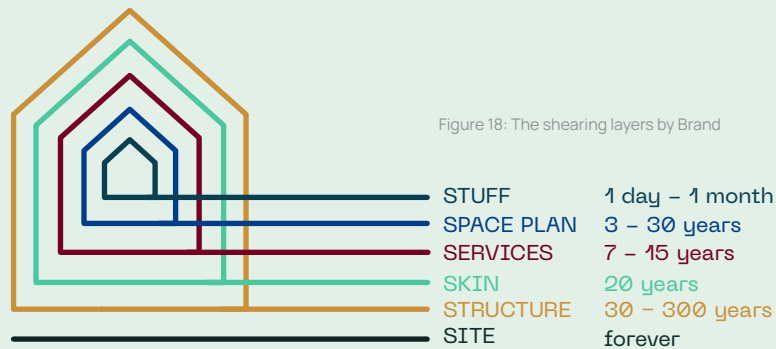


Figure 18: The shearing layers by Brand

● KEY COSTS FOR FOUNDING A MASCO:

The primary financial considerations associated with the project involve securing the start-up capital for both MASCO and its subsidiary SPEs, along with venture capital sourced externally for the SPEs.

Policy & legal

The MASCO system has specifically been designed to operate within the current linear context, including current policies, and to constitute a game-changer that accelerates the circular transition. In terms of legally underpinning the business model, research has been conducted on the possibilities of making this circular business model with a MASCO contractually sound. The findings are documented in a paper: 'The Circular Sales Model – Outcomes of a theoretical and practical approach to circular construction materials'.³¹ This paper particularly discusses financing options for the development of a circular sales model, which is a novelty.

After all, traditional circular models constitute less of a challenge in that respect. In the rental and service model, traditional financing methods can be applied at first, since the producer remains owner of the leased products. However, this rental model is not applicable if the products are incorporated in an immovable property. The building lease model presents a solution for this challenge. In the building lease model, the producer is the holder of a building lease, which allows them to maintain their ownership rights of the products, circumventing the problems caused by incorporation of the product in an immovable property. There are even possibilities for mortgage financing, given that the building right is considered real property. Thus, in both the rental model and the building lease model, the circular products may still serve as a collateral on behalf of the producer. In the circular sales model, however, where goods are sold with a discount as an incentive, the sold goods leave the balance sheet of the producer-seller. After selling the product, one is no longer that product's owner. Consequently, the sold goods cannot serve as collateral. The paper researches how this challenge may be tackled.

To render the circular sales model more financially robust, two concepts are discussed:

- **Assignment of receivables:** The producer can transfer the conditional receivable for the discount to a third-party financier in exchange for payment. The pledge right securing the receivable is automatically transferred along with the receivable itself. The third-party financier thus enjoys the same security as the original producer-seller, provided that this transfer is registered in the pledge register.
- **Transfer of debt:** Producers can also transfer their obligation towards the buyer – to repurchase the sold product after a specified period of time and for a specified price – to a third-party financier. The decision of the third-party financier to take over this debt is related to the product's Circular Value Index, indicating the circularity of the product. A score higher than 1 can incentivise the third-party financier to fulfil the purchase promise, since this allows the third-party financier to obtain the product at a lower price than its value, facilitating circular activities and generating a considerable profit after a resale. In the long run, third-party financiers could even act as MASCOs themselves, serving as a material bank involved in various materials – a concept originating from urban mining but also applicable in this context. Further research is warranted in this regard.

In practice, all components of this research come together in the circularity clause, which can be added to the sales contract. This clause has been specifically constructed to align with current Belgian law, making it automatically fit within the broader regulations of the European Union. Consequently, this clause can be used as a basis that can be adapted to fit the local and national legal frameworks of the other EU member states.

Cultural

In Belgium's built environment, ownership culture prevails, especially for outer building layers. Inner layers, however, see a rise in pay-per-use* or lease models.* Pay-per-use may not suit low-maintenance items with longer use periods, and traditionally-minded customers resist leasing when extending to outer layers. The MASCO system enables users to own the item while actively encouraging the return of the material to the loop after its use period through the implementation of a financial incentive for this return.

Another cultural aspect of the built environment is that it is largely a linear system: after the use period, the material will be demolished and/or discarded. The MASCO system nudges the sector towards a much-needed culture of gentle dismantling, material harvesting and sorting.

Technical

As the business model with circular discount through a MASCO is set up, there will be a need to track extra information:

- The **producer** will need to trace where the material is allocated, and the expected date of return.
- The **MASCO** will need a system to handle all contacts and contracts. They will also want to implement a system for stringent and ongoing credit checks of both suppliers and end users (to whom the MASCO is effectively extending a credit line).
- The **building owner** will need a system to manage all material contracts. This holds an opportunity for the MASCO to develop a system for managing the contracts.

Practical

To achieve meaningful impact, our aim is to develop a MASCO capable of providing comprehensive building outfitting. This includes, for instance, offering office furniture, lighting and flooring. The objective is to create a holistic solution that aligns with the circular principles we advocate. The aim is to create a system in which items are consistently returned and delivered, aligning with market demand and supply – a fundamental principle of the circular economy. The MASCO strives to boost the market share of circular materials with a high circular value, emphasising the necessity of a substantial volume of material circulating in the market for true circularity.



Once the items are returned to the producer, the producer assumes responsibility for quality control, storage and other related activities. The details of these operational procedures will need to be developed as part of the establishment of the MASCO.

At present, the primary practical concern revolves around the deconstruction and return of products. The building owner bears the responsibility for returning the products to the supplier (see page 8). There is a risk that owners might be taken by surprise by the request to return their products, perhaps because they don't remember the details of the arrangement after a long period of time. In such instances, there could be a resistance to returning items to the producer. To address this issue, we incorporate a financial incentive in the form of the MASCO buying back the items. The payment made by the MASCO to (re)purchase the material can be utilised to compensate a contractor for the deconstruction and logistics associated with returning the items. Additionally, when the user decides not to return the items, the circular discount (+ interest) needs to be refunded to the MASCO. Despite this system, there remains a risk of owners being hesitant to organise the practical side of the deconstruction and logistics needed for the item's return. This holds an opportunity for the MASCO to partner with or incorporate a contractor to handle such practical matters.

As we need to keep the cost of reuse as low as possible (see page 9), we need to create a local network of manufacturers and users (the ultimate goal is to have them in every city). Once the business model has been validated, it will most likely attract interest from other investment firms, who will create new MASCOs. Ultimately, this could give rise to a sector akin to banking, complete with competitors and local branches.

Conclusion

In conclusion, the MASCO project's transformative potential marks a significant milestone in the pursuit of a sustainable and circular economy. This endeavour will not only redefine the traditional linear approach to material management, but through the creation of an attractive investment opportunity it will also lay the groundwork for a future where circularity is not just a concept but a tangible reality.

Throughout the project, we diligently work to develop and implement a circular business model that extends beyond rhetoric. The introduction of a circular discount mechanism adds a layer of financial incentive, encouraging businesses and building owners to actively participate in the circular economy, whilst creating dark green investment opportunities, and fostering a mindset shift within the building sector, the financial community and beyond. This innovative model creates a symbiotic relationship between economic viability and ecological responsibility, showcasing the potential for businesses to thrive while minimising their environmental footprint. The Circular Value Institute will inspire businesses to rethink their approaches and prioritise the adoption of circular practices.

We wish to lead by example, by founding the first material-as-a-service company and implementing the business model of the circular discount. By putting this system to the test, we aim to provide a blueprint for other companies and industries looking to embrace sustainable practices and contribute to the global imperative of environmental stewardship.

**"The goods of today
are the resources of tomorrow,
at yesterday's prices."**

— Walter R. Stahel, Product-Life Institute³²



To advance our project in the next phase, it is crucial to carry out additional research and development efforts aimed at thoroughly testing the model. Concurrently, we must focus on disseminating comprehensive knowledge to material producers (in the built environment and beyond), to the financial sector and to governments (national, EU and global). To achieve this, we will focus on building an international network of experts. This approach will not only refine our understanding but also facilitate broader adoption. Our commitment to ongoing refinement and knowledge dissemination will ensure the sustained success and impact of our initiative.

In essence, the MASCO project is a testament to the power of collaboration, innovation and a shared commitment to building a more resilient and sustainable future. As we move forward, let this project be a beacon of inspiration for businesses worldwide, signalling that the transition to a circular economy is not just an aspiration but an achievable reality – one that promises long-term economic prosperity, environmental stewardship and a legacy of responsible business practices for generations to come.



THE CIRCULAR
VALUE INSTITUTE

APPENDIX 1: GLOSSARY

* BLUE OCEAN:	a 'blue ocean' represents an untapped, uncontested market space where competition is minimal or non-existent. This is in contrast to a 'red ocean', which symbolises a saturated market with fierce competition.
* BUYBACK PROGRAMME:	also known as a product take-back or repurchase programme, this is a strategy where a manufacturer or retailer agrees to purchase used products or materials from consumers or businesses. The aim is often to recover valuable resources, reduce waste and promote sustainability. Customers return their used items to the manufacturer or retailer, and in return, they may receive a partial refund, credit or some other form of compensation.
* CAPEX:	Capital expenditure, often abbreviated as CAPEX, refers to the funds that a company or other organisation invests in acquiring, upgrading or maintaining physical assets with the aim of improving its long-term capacity or efficiency. These expenditures are typically associated with assets that have a use phase extending beyond the current fiscal year.
* DEPRECIATED:	the accounting method of allocating the cost of a long-term asset over its useful life. In financial accounting, assets such as buildings, machinery and vehicles are typically considered to have a limited lifespan. Depreciation is used to spread the cost of these assets over their estimated useful life, allowing businesses to match the cost of the asset with the revenue it generates over time.
* LEASE BUSINESS MODEL:	a model allowing a customer to use a product or asset for a specified period in exchange for regular payments. Instead of purchasing the item outright, the customer enters into a lease agreement with the lessor (the entity that owns the asset) to gain access to the asset for a defined duration. Leasing is prevalent in various industries, from real estate and automobiles to equipment and technology.
* OPEX:	Operational expenditure, commonly referred to as OPEX, encompasses the day-to-day expenses that a business incurs in its normal course of operations to generate revenue. These costs are not directly tied to the creation of long-term assets and are typically incurred on a recurring basis.
* PAY-PER-USE BUSINESS MODEL:	a pricing strategy in which customers pay for the actual usage or consumption of a product or service rather than making a one-time purchase. In this model, the cost is directly tied to the extent or duration of usage, providing a more flexible and often cost-effective approach for both businesses and consumers.
* SCENARIO THINKING:	also known as scenario planning or scenario analysis, this is a strategic planning method that involves considering multiple possible future scenarios or situations to better prepare for uncertainties. Instead of relying on a single, fixed forecast, scenario thinking explores a range of plausible outcomes.
* SPECIAL PURPOSE ENTITY (SPE):	a legal entity created for a specific, often narrow and well-defined purpose. SPEs are commonly used in various financial and business transactions to isolate financial risk, protect assets or achieve specific goals. They are typically separate from the sponsoring or initiating company and have their own legal status.
* VALUE LOOP:	a concept often associated with circular-economy principles, which represents a continuous cycle of value creation within a system. In a value loop, products or materials are designed, produced, used, and then recovered or recycled to create new products or materials. The aim is to minimise waste, promote sustainability and retain resources within the economic system for as long as possible.



APPENDIX 2: ENDNOTES

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