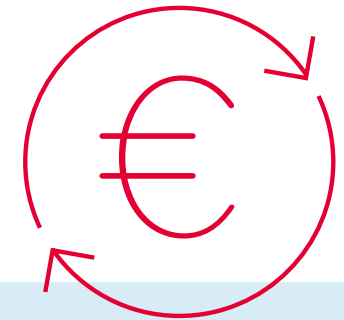
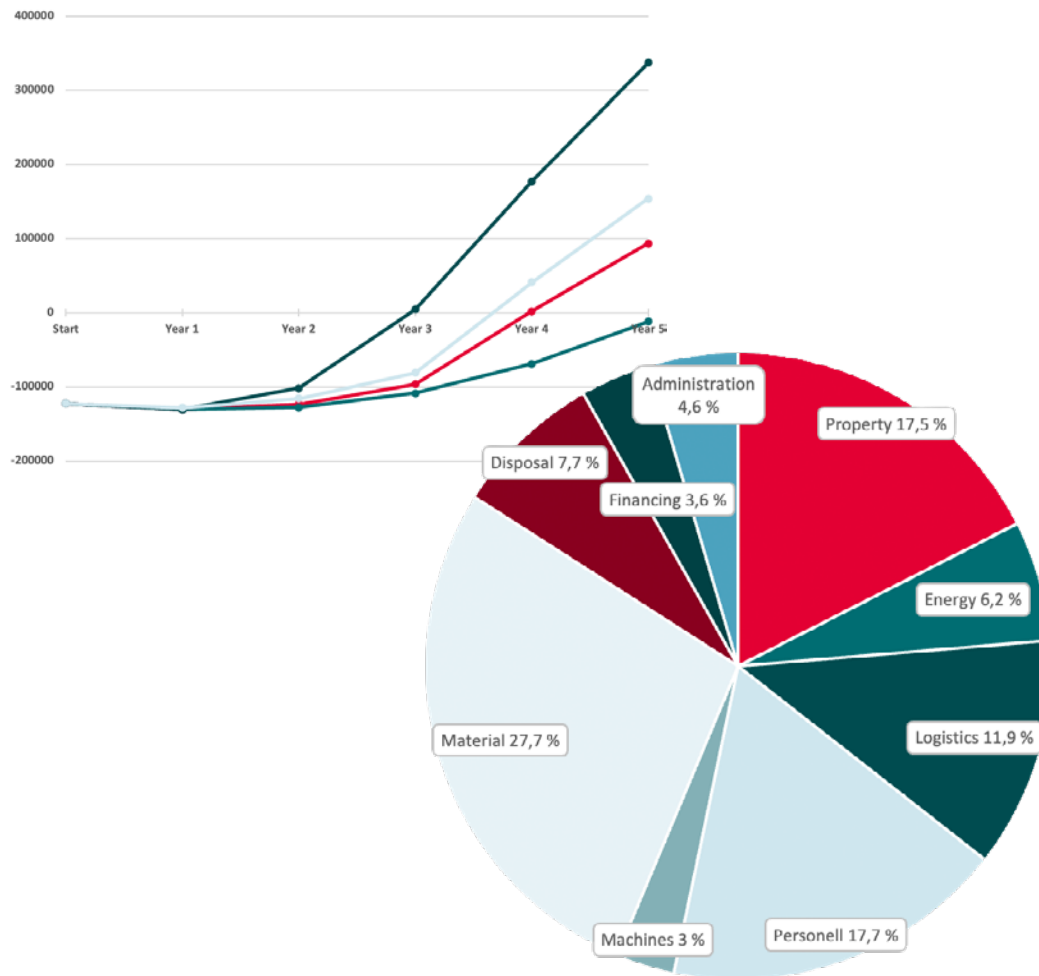


The Circular Economy Business Case Calculator

Calculating future-proof
business models



How can the Demand for Greater Sustainability be Turned into a Viable Business Model?



Many companies face the problem that the financial potential of circular business models (CBMs) is difficult to assess in advance. The Wuppertal Institute's new Circular Economy Business Case Calculator addresses this challenge by offering companies a sound solution for independently estimating the return on investment of circular approaches. Whether it's refurbishment, leasing, or repair services – this free online tool makes complex scenarios comparable and highlights the conditions under which the transition to a circular business model makes economic sense. This guide explains how the CE Business Case Calculator arrives at a well-founded assessment in just a few steps to calculate CBMs.

1. Economic Viability as the Foundation of the Circular Transformation

“Companies that repair, refurbish, or remanufacture used products gain clear economic and ecological advantages.”

Circular business models (CBMs) offer companies a threefold benefit: they lower dependencies on natural resources, offer significant economic potential, and increase the resilience of value chains. For example, a study commissioned by the Federation of German Industries (BDI) estimates that the annual gross value added generated by the circular economy could more than double from the current 60 billion euros to as much as 125 billion euros by 2045, reaching a cumulative total of up to 880 billion euros¹. However, companies that repair, refurbish, or remanufacture used products instead of producing new ones often gain clear advantages. They typically save significant amounts on raw material and procurement costs, reduce their dependence on volatile raw material markets, and position themselves early on to meet growing regulatory requirements. “R” strategies, such as repair, reuse, or remanufacturing, highlight concrete approaches for closing material loops and add profitability of after-sale-services and improved customer contact.

Despite this potential, however, the adoption of CBMs is still far below its potential. One reason for this lies in the many uncertainties associated with evaluating them. Circular strategies are often more complex from a business management perspective than those of the linear economy. It might be necessary to recover user goods through a complex “reverse” logistics process, and quality rates are often uncertain because not every returned item is usable. In addition, new process steps such as disassembly drive up costs. It can therefore be much more difficult to estimate in advance how much revenue can actually be generated with a refurbished or reused product. Existing analyses or tools usually calculate only total costs of capital or focus on environmental impacts, which is insufficient for calculating the economic uncertainties of circular business practices in granular detail. For many companies, this ultimately leaves the perceived uncertainties too high to venture into a possible circular future.

Founded in a research-based approach to develop your own CE Business Case

This is where the Circular Economy Business Case Calculator, developed by the Wuppertal Institute comes in. It enables companies to independently obtain an initial, well-founded assessment of the economic viability of their CBM. Based on embedded expert knowledge, it supports them in their decision-making. The tool is designed to be user-friendly and developed as an Excel tool, making it easy to use and ensuring that sensitive company data remains within the organization. The effort required has been kept as low as possible. The calculator asks targeted questions about relevant cost drivers in order to tailor the tool's utilization and its results to specific needs.

¹

Boston Consulting Group & Bundesverband der Deutschen Industrie (2026). Circular Economy: Chancen der Circular Economy für die deutsche Industrie.

2. The Calculation Logic: Costs and Revenues Along Material Flows

Currently, seven R-strategies, including various substrategies, can be modelled:

Reuse: Reuse of a discarded product by another user, provided the product is still in good condition and performs its original function.

Repair: Repair and maintenance of a defective product so that it can once again be used for its original purpose.

Refurbishment: Restoring an old product and updating it to a modern standard.

Remanufacturing: The use of parts from a discarded product to manufacture a new product with the same function.

Repurpose: The use of a discarded product or its components in a new product with a different function.

Recycling: Processing materials to recover materials of the same or lower quality.

Rethink (e.g. rental): Offering a product as a service in exchange for recurring payments.

Definitions of R-strategies based on Kirchherr, Reike, & Hekkert (2017), Resources, Conservation & Recycling, 127.

CBMs differ significantly from linear models in their cost structure, as they involve additional process steps, such as take-back, sorting, disassembly, or inspection, that risk being lost in broad cost categories. Hence, an aggregated view would hide where specific cost drivers and efficiency opportunities lie. The Calculator is therefore based on a material flow logic in which costs and

revenues are presented along individual process steps, e.g. from the return of the used product to its resale. Each circular strategy is modelled as a distinct sequence of process steps, which can be further tailored to the individual case through additional fine-tuning. Depending on the configuration, only the steps relevant to the specific business model are displayed. Figure 1 illustrates this logic:

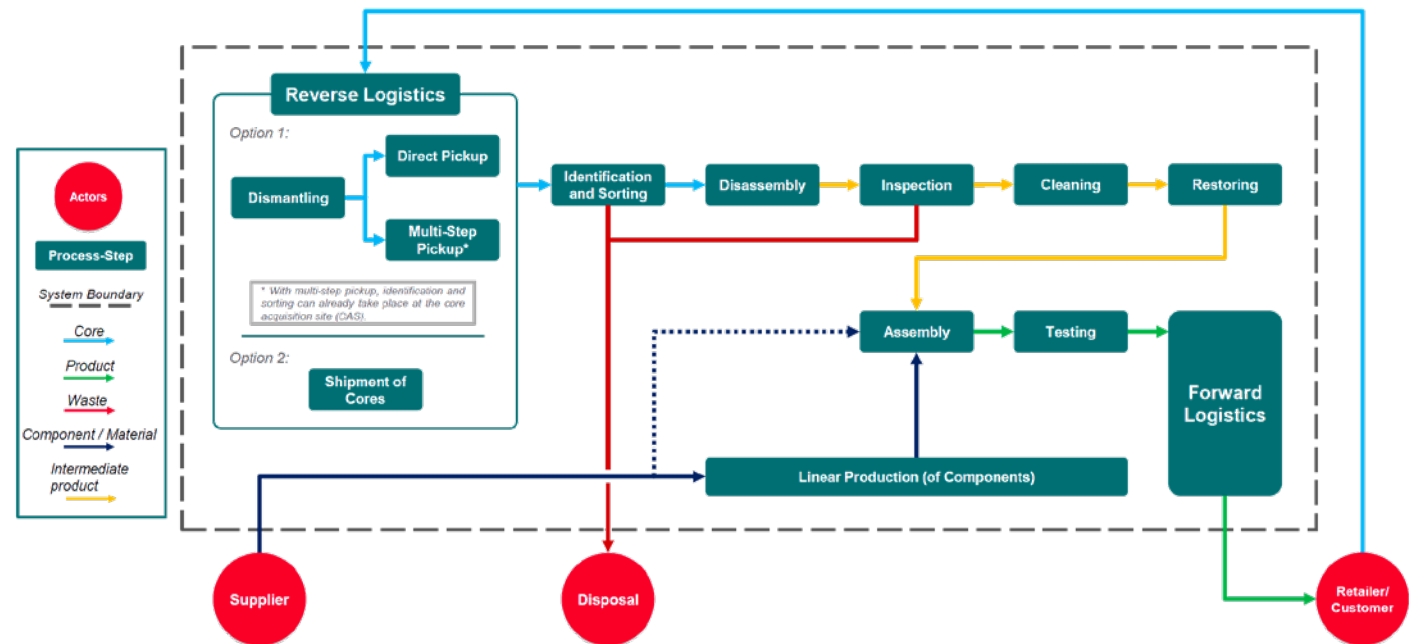


Figure 1: Exemplary Material Flow Logic of the R-Strategy (here: Refurbish)

3. The Process: Three Steps from Configuration to Results

The Calculator guides users through a three-step process, from configuration to data entry to automatically generated results.

1

Configuration

A short questionnaire about the business model, R-strategy and general information

2

Data Entry

Entry of basic data, revenue, capital and operational expenditures for each process step

3

Presentation of Results

Automatic calculation of key metrics and graphical comparison of scenarios



Example: refurbishment of office chairs

To demonstrate how the tool works, the steps are illustrated below using a made-up example. A company that sells office chairs wants to take back their used products, and then refurbish and resell them. First, old chairs must be picked up from the customer and transported to the processing facility as part of take-back logistics. There, it is inspected, sorted, disassembled into its individual parts, and each component is checked for condition and reusability. Reusable parts are cleaned, repaired if necessary, and reassembled into a “new” chair, which is then resold. Each of these steps incurs costs, such as for labour, machinery, materials, energy, or waste, which the Calculator breaks down to identify relevant cost drivers. Since it maps each step individually, it is ultimately possible to determine exactly whether it is, for example, the return logistics, disassembly, or repair that determines the profitability of the refurbished office chair, and thus also where adjustments would be most worthwhile.

Step 1 – configuration: describing the business model in just a few clicks

The first step is to define the basic features of the CBM. Based on predefined options, users can specify in just a few clicks what type of business case is being pursued, how reverse logistics might be structured, and what other framework conditions apply. For the office chair, this means specifically: The “R” strategy, Refurbish, is selected, and it is specified, for example, that one returned chair is required for every remanufactured chair, that the return logistics are organized in-house, and whether new investments are planned or if public funding will be utilized. Depending on the answers provided, the calculator automatically displays only those questions that are relevant for further planning.

Step 2 – date entry in four sections

In the second step, the specific data for the product is then entered, such as the cost of take back, the labour hours required for disassembly, or the resale price. In terms of content, the data entry is divided into four sections: general data, expected revenues, investments, and ongoing operating costs. In addition to the base case, up to three additional scenarios can be created, in which different assumptions can be made and developments simulated. For example, it would be possible to calculate how the office chair's profitability would change if return logistics costs increased, fewer chairs were returned than expected, or the sales market developed differently.

The Calculator provides particularly detailed information on operating costs: For each process step, labour and machine times as well as additional costs are recorded separately. The adjacent overview (Table 1) illustrates how data entry would look for the office chair example. Both labour and machine hours as well as material costs for spare parts are recorded per product. Expenses not accounted for elsewhere are treated as flat-rate annual costs. The three scenarios reflect different assumptions, such as higher labour intensity or functioning material costs for replacement parts. Because the calculator operates at this level of process granularity, it quickly becomes apparent how even small deviations in individual process steps affect overall profitability.

Cost Item	Base Case	Scenario 1	Scenario 2	Scenario 3
Manual Labor per Product	0.1h	0.1h	0.2h	0.2h
Automated Labor per Product	0.05 h	0.05 h	0.1h	0.1h
Spare Parts per Product	3 €	9 €	3 €	9 €
Other annual Costs	500 €	500 €	500 €	500 €

Table 1: **Cost Example for the “Assembly” Process Step**

Step 3 – evaluating the results and comparing scenarios

Once all relevant input fields have been filled in, the calculator automatically computes the following key investment metrics for the base case over the selected time horizon of up to five years, allowing for an immediate initial assessment of the business model's profitability:

In the analysis of results shown in Figure 2, all three key metrics are first presented side by side. The cash flow trend shows the year in which a business model begins to generate profits, while the margin breakdown details

the product's profitability at the unit cost level. The breakdown of total costs into CapEx, OpEx and financing costs as well as the additional differentiation of OpEx by process steps and cost categories, further reveal where the economic viability of a business model is primarily determined, and where adjustments would have the greatest impact. In this way, the Calculator provides a detailed analysis of whether, why, and at what point a business model becomes economically viable.

Metric	Meaning
Net Present Value (NPV)	The absolute economic value of the business model, discounted to the present, over the period under consideration.
Internal Rate of Return (IRR)	The interest rate at which the net present value of the cash flows is exactly zero.
Dynamic Payback Period	The point in time at which the discounted cash flows exceed the initial investment.

Table 2: **Investment Ratios used in the Calculation**

Core KPIs (before / after taxes)

Net Present Value

189.504 € / 93.325 €

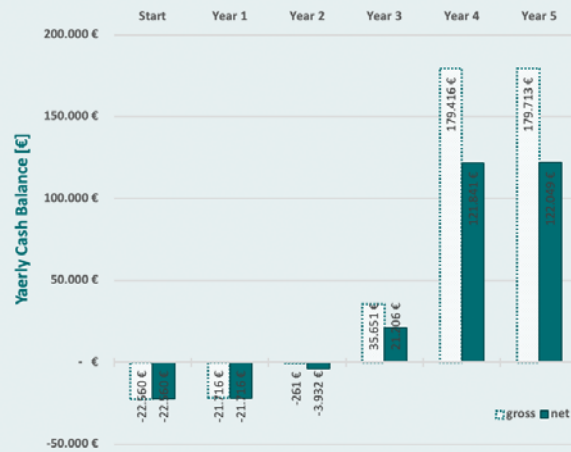
Internal Rate of Return

26,36% / 15,05%

Dynamic Payback Period

ca. 3,6 Years / ca. 4 Years

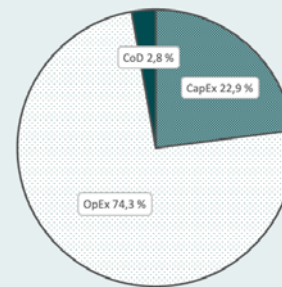
Cash Flow



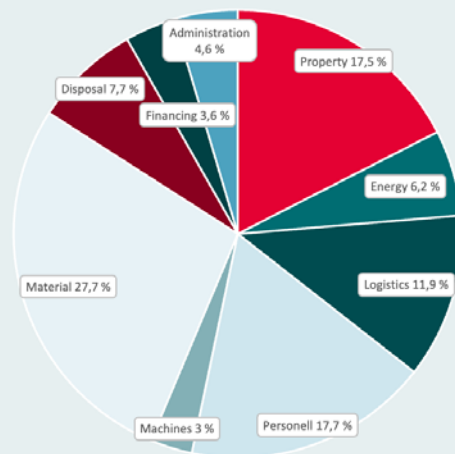
Margin Breakdown (first year | before taxes)

Ø Total Cost per Sales Unit	=	312,16 €
Net Price per Sales Unit	=	220,00 €
Ø Margin per Sales Unit	=	- 92,16 €

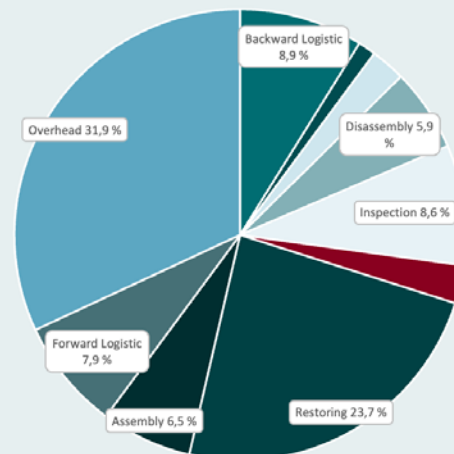
Total Cost - Overview



OpEx Breakdown - Cost Types



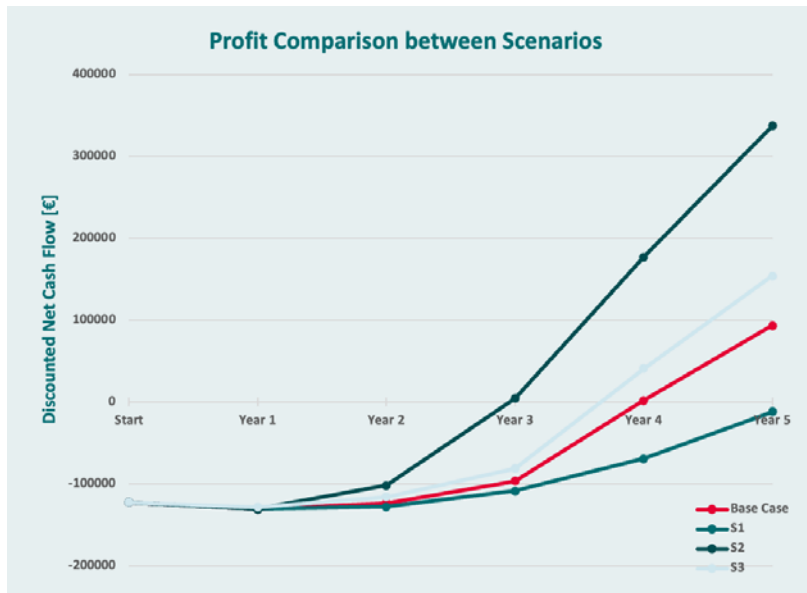
OpEx Breakdown - Process Steps



“The Calculator provides a detailed analysis of whether, why, and at what point a business model becomes economically viable.”

In addition to the detailed base-case analysis, the Calculator provides an optional comparison for the different scenarios, as shown in Figure 3. Since many CBMs are based on assumptions that can only be estimated under conditions of uncertainty (e.g., sales volumes, return rates, or logistics costs), a key advantage of this scenario comparison is that it directly illustrates how robust the modelled business case is to different developments and which assumptions have the greatest impact on the result.

Figure 2: Calculator Results Analysis



KPI Comparison

Net Present Value			
Base Case	S1	S2	S3
93.325 €	-113%	261%	65%

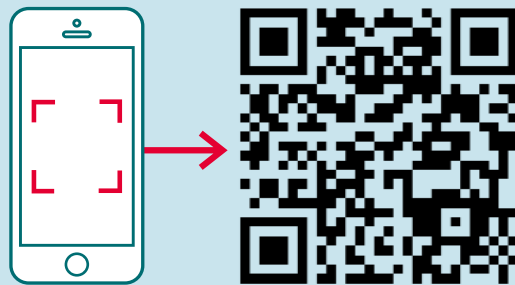
Internal Rate of Return			
Base Case	S1	S2	S3
15,05%	-116%	186%	53%

Dynamic Payback Period			
Base Case	S1	S2	S3
ca. 4 Years	/	-26%	-8%

Figure 3: Comparison of Scenarios in the Results Analysis

4. The Path to Your Own CE Business Case

Get the Tool



With its detailed economic feasibility assessment, the CE Business Case Calculator fills a gap that has so far prevented many companies from adopting CBMs. By focusing on actual material flows and linking them to established investment metrics, it provides an assessment framework that is both technically sound and practical, enabling companies to make well-informed decisions on their own with minimal effort, regardless of industry, company size, or product. The current version covers seven circular strategies and has been validated

with experts from academia and industry. The Calculator is undergoing continuous development: Plans for future versions include, among other things, an integrated sensitivity analysis, the mapping of chained R-strategies and additional business models, as well as an optional module for qualitative assessment (e.g., customer loyalty, reputational effects). In addition, a web app is in development. Feedback from practical application is encouraged and will be directly incorporated into the tool's further development.

5. Project, Funding and License

The CE Business Case Calculator was developed as part of the EU-funded R-evolve project, which supports the European furniture industry in its transition to a Circular Economy through new CBMs, design strategies, and the Digital Product Passport. This project was funded under the European Union's Horizon Europe research

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