

BIBLIOTECA DEGLI OGGETTI - BOCCONI

ONE-PAGER LCA REPORT

THE PROJECT

In 2025, BOCCONI introduced a new service for its students: the Library of Things. This initiative allows students to borrow items such as board games, electrical devices, promoting lending instead of ownership. A Life Cycle Assessment (LCA) was conducted selecting 3 representative products for the service about to be launched: a multi-cable charger, a hairdryer, and a Bluetooth speaker. The study followed the Environmental Footprint (EF) 3.1 methodology and applied a cradle-to-grave system boundary.

The climate change impact of the lending service for each product was assessed as follows:

- **Multi-cable charger:** 0.05 kg CO₂-equivalents per use, assuming a 2-year lifetime and 6 uses per month.
- **Hairdryer:** 0.95 kg CO₂-equivalents per use, based on a 10-year lifetime with 1 use per month.
- **Bluetooth speaker:** 0.06 kg CO₂-equivalents per use, based on a 3.3-year lifetime and 2 uses per month.

The results indicate that for the charger and the speaker, the majority of the impact (62.5% and 54,6% respectively) is associated with the manufacturing phase. In contrast, for the hairdryer, approximately 95% of the impact arises during the use phase, due to its energy consumption.

The analysis also highlights an important trend: the lower the usage rate relative to the product's lifespan and material degradation, the higher the environmental impact per use and the greater the loss of potential utility. Conversely, frequently used items do not necessarily reduce environmental impact, as the use-phase emissions remain constant, and there is an added impact from storage infrastructure, such as lockers. Based on the current evaluation, the most suitable items for inclusion in the Library of Things, among those analyzed, are the hairdryer and the Bluetooth speaker.

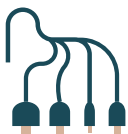
PROJECT PARTNERS

MUSA Spoke 5 Bocconi researchers:
project initiator and coordinator

Leila Bologna:
Developer of the library of things' software

WIB Machines:
Smart lockers supplier

FUNCTIONAL UNITS



Functional Unit:
1 Multi-cable charger

HOW MUCH
0,065 Kg

HOW WELL
The product is designed for charging electronic devices

HOW LONG
144 uses of the object in BOCCONI's BdO (6 uses a month for 2 years)



Functional Unit:
1 Hairdryer

HOW MUCH
0,63 Kg

HOW WELL
The product is designed for drying hair

HOW LONG
120 uses of the object in BOCCONI's BdO (1 use a month for 10 years)



Functional Unit:
1 Bluetooth speaker

HOW MUCH
0,49 Kg

HOW WELL
The product is designed for amplifying music

HOW LONG
79,2 uses of the object in BOCCONI's BdO (2 uses a month for 3,3 years)

METHODOLOGICAL ELEMENTS

System Boundary:
From cradle to grave

Impact Categories:
Climate Change

Methods:
EF 3.1

Background Datasets:
Ecoinvent ver 3.10

POSSIBLE IMPROVEMENTS

MATERIAL QUALITY

Choosing refurbished products could lower the impact of the overall lending service of the product

END OF LIFE

Consider to send the product to the producer, in order to recover materials

ELECTRIC ENERGY

Educate user to use less the product, in order to save electric energy during the use phase.

ELECTRIC ENERGY

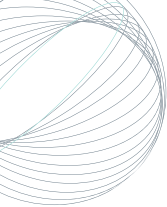
Choose a hairdryer that consumes less energy during its use phase

USE PHASE

Advertise more the service, inviting students to use BOCCONI's BdO service (lowering the impact per use of each object)

CHOICE OF PRODUCTS

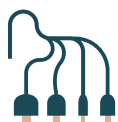
Prefer non frequently used items, to improve the environmental impact of the service



BIBLIOTECA DEGLI OGGETTI - BOCCONI

ONE-PAGER LCA REPORT - MULTI-CABLE CHARGER

FUNCTIONAL UNIT



Functional Unit:
1 Multi-cable
charger

HOW MUCH
0,065 Kg

HOW WELL
The product is
designed for charging
electronic devices

HOW LONG
144 uses of the object in
BOCCONI's BdO
(6 uses a month for 2 years)

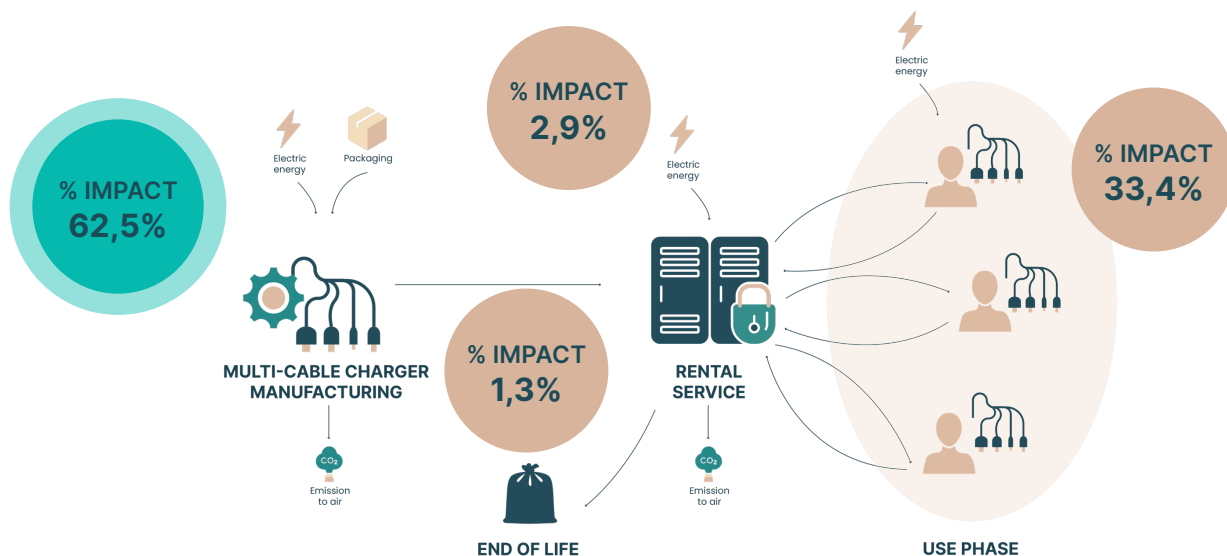
METHODOLOGICAL ELEMENTS

System Boundary:
From cradle to grave

Impact Categories:
Climate Change

Methods:
EF 3.1

Background Datasets:
Ecoinvent ver 3.10



LCA RESULTS (KIMPI - KEY IMPACT INDICATORS) AND HOTSPOTS

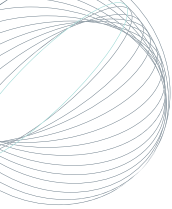
KIMPI	UOM	CHARGER MANUFACTURING	LENDING SERVICE	USE PHASE	END OF LIFE	TOTAL
RAW MATERIALS	%	61,7%	2,9%			64,6%
CHEMICALS	%					
PACKAGING	%	0,8%				0,8%
ALLOCATED WATER	%					
THERMAL ENERGY	%					
ELECTRIC ENERGY	%			32,9%		32,9%
TRANSPORTS	%			0,5%	0,2%	0,7%
EMISSIONS TO AIR	%					
EMISSIONS TO WATER	%					
WASTE PRODUCED	%			0,2%	1,1%	1,1%
WASTEWATER	%					
TOTAL	%	62,5%	2,9%	33,4%	1,3%	

This impact distribution is based on the assumption that the entire use phase spans 2 years.

0,05
KgCO₂,eq/unit
per use

6 uses
X
1 month
X
2 years

A 3rd party has not reviewed this result according to ISO 14040 and 14044 standards. It should therefore not be used for public disclosure of comparative assertions



BIBLIOTECA DEGLI OGGETTI - BOCCONI

ONE-PAGER LCA REPORT - HAIRDRYER

FUNCTIONAL UNIT



Functional Unit:
1 Hairdryer

HOW MUCH
0,63 Kg

HOW WELL
The product is designed for drying hair

HOW LONG
120 uses of the object in BOCCONI's BdO (1 use a month for 10 years)

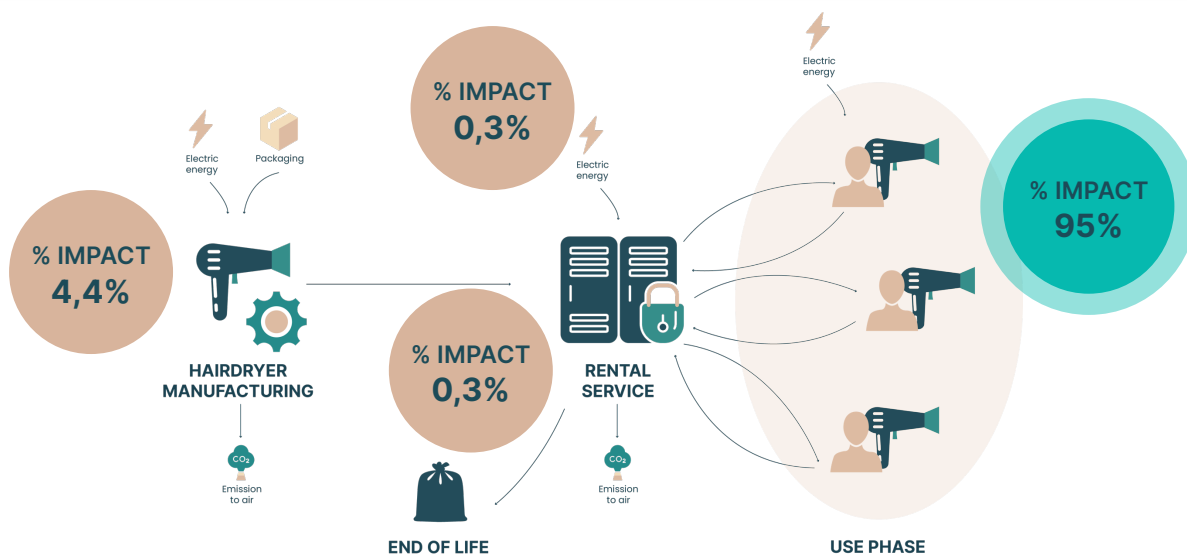
METHODOLOGICAL ELEMENTS

System Boundary:
From cradle to grave

Impact Categories:
Climate Change

Methods:
EF 3.1

Background Datasets:
Ecoinvent ver 3.10



LCA RESULTS (KIMPI - KEY IMPACT INDICATORS) AND HOTSPOTS

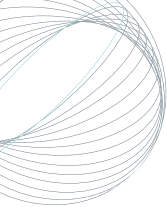
KIMPI	UOM	HAIRDRYER MANUFACTURING	LENDING SERVICE	USE PHASE	END OF LIFE	TOTAL
RAW MATERIALS	%	4,3%	0,3%			4,5%
CHEMICALS	%					
PACKAGING	%	0,2%				0,2%
ALLOCATED WATER	%					
THERMAL ENERGY	%					
ELECTRIC ENERGY	%					
TRANSPORTS	%			94,9%		94,9%
EMISSIONS TO AIR	%			0,1%		0,1%
EMISSIONS TO WATER	%					
WASTE PRODUCED	%				0,3%	0,3%
WASTEWATER	%					
TOTAL	%	4,4%	0,3%	95%	0,3%	

This impact distribution is based on the assumption that the entire use phase spans 10 years.

0,95
KgCO₂eq/unit
per use

1 use
X
1 month
X
10 years

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BIBLIOTECA DEGLI OGGETTI - BOCCONI

ONE-PAGER LCA REPORT - BLUETOOTH SPEAKER

FUNCTIONAL UNIT



Functional Unit:
1 Bluetooth speaker

HOW MUCH
0,49 Kg

HOW WELL
The product is designed for amplifying music

HOW LONG
79,2 uses of the object in BOCCONI's BdO (2 uses a month for 3,3 years)

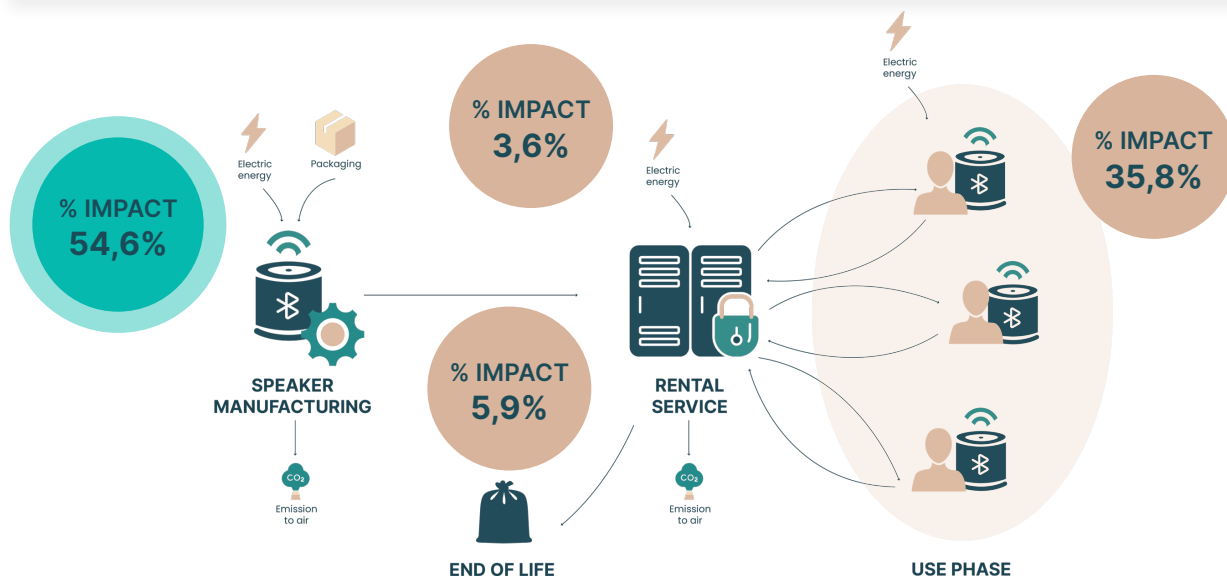
METHODOLOGICAL ELEMENTS

System Boundary:
From cradle to grave

Impact Categories:
Climate Change

Methods:
EF 3.1

Background Datasets:
Ecoinvent ver 3.10



LCA RESULTS (KIMPI - KEY IMPACT INDICATORS) AND HOTSPOTS

KIMPI	UOM	SPEAKER MANUFACTURING	LENDING SERVICE	USE PHASE	END OF LIFE	TOTAL
RAW MATERIALS	%	53,2%	3,6%			56,8%
CHEMICALS	%					
PACKAGING	%	1,4%				1,4%
ALLOCATED WATER	%					
THERMAL ENERGY	%					
ELECTRIC ENERGY	%			33,1%		33,1%
TRANSPORTS	%			2,7%	0,1%	2,8%
EMISSIONS TO AIR	%					
EMISSIONS TO WATER	%					
WASTE PRODUCED	%				5,8%	5,8%
WASTEWATER	%					
TOTAL	%	54,6%	3,6%	35,8%	5,9%	

This impact distribution is based on the assumption that the entire use phase spans 3,3 years.

0,06
KgCO₂eq/unit
per use

2 uses
X
1 month
X
3,3 years

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