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Gorenje Eco-innovation circle and new business models

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One of Leading European Manufacturers of Products for Home

CORE BUSINESS
Domestic Appliances
(MDA, SDA)

D COMPETENCE CENTR
Slovenia
Czech Republic
Sweden
Netherlands

NUMBER OF EMPLOYEES
11,000

OWN PRODUCTION
Slovenia
Serbia
Czech Republic

CONSOLIDATED REVENUE
EUR 1.258 billion

EXPORT
95%
of sales

GLOBAL PRESENCE
90 Countries Worldwide,
mostly in Europe (91%),
also in USA, Australia,
Near and Far East

MDA (major domestic appliances)
SDA (small domestic appliances)

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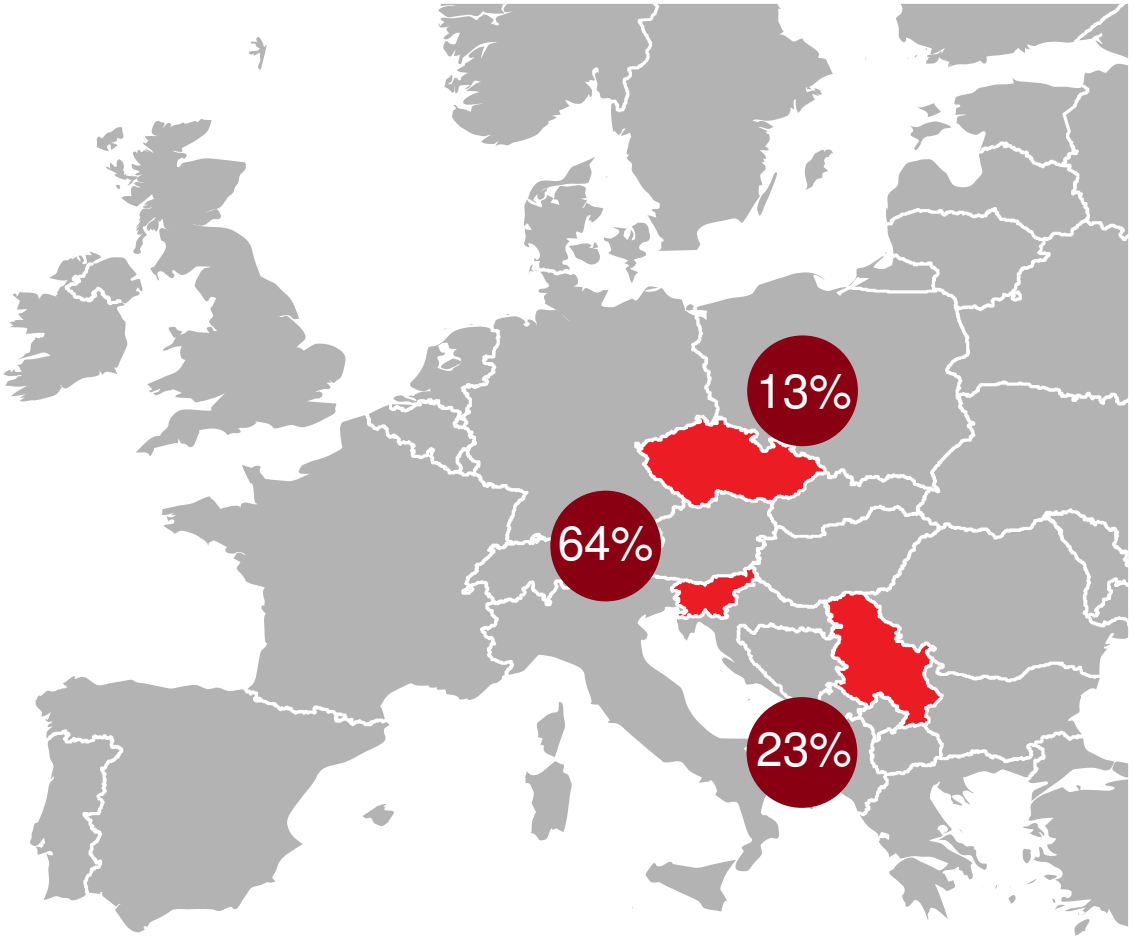
Production Facilities in 3 Countries

Slovenia, Velenje
High value-added products – cooking appliances, dishwashers, and advanced washing machines and dryers and niche refrigerators

Czech Republic, Mariánské údolí
Freestanding cookers

Serbia, Valjevo, Zaječar
Refrigerators and freezers, and lower segment washing machines and dryers



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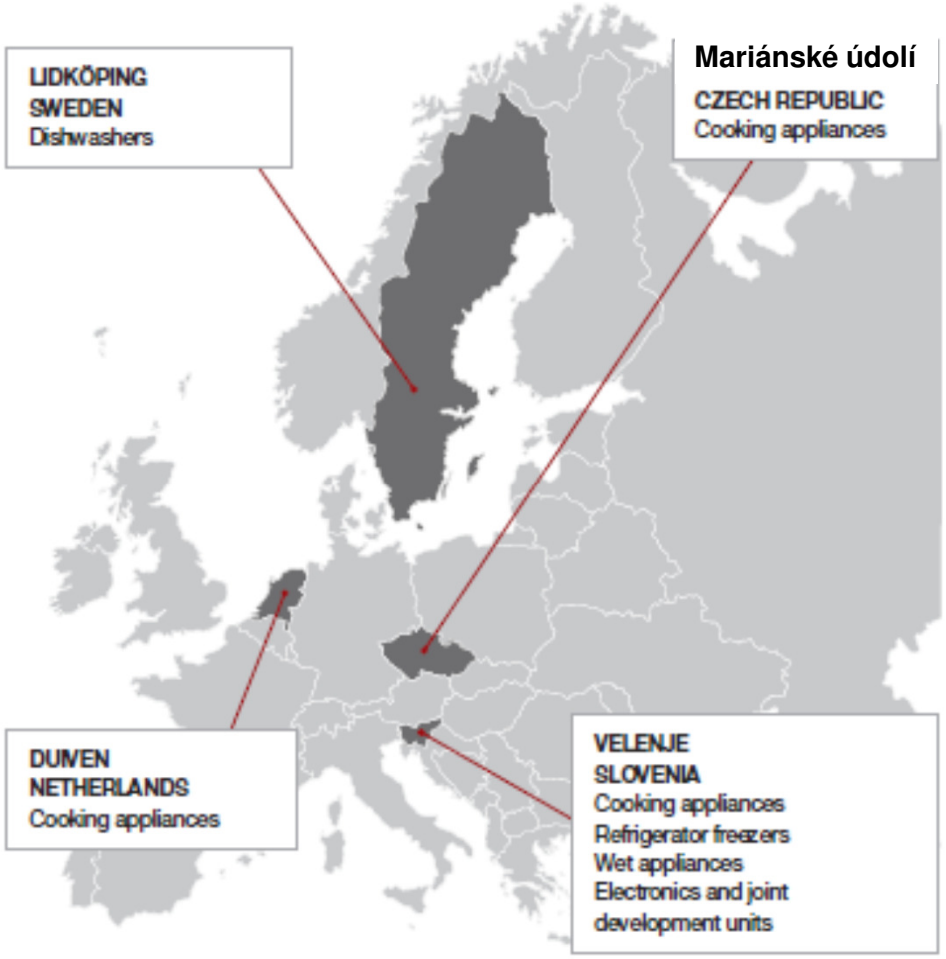
R&D Competence Centres

Firm Foundations for Future Development of the Gorenje Group

Cooperation with international institutions, knowledge and excellence centres.



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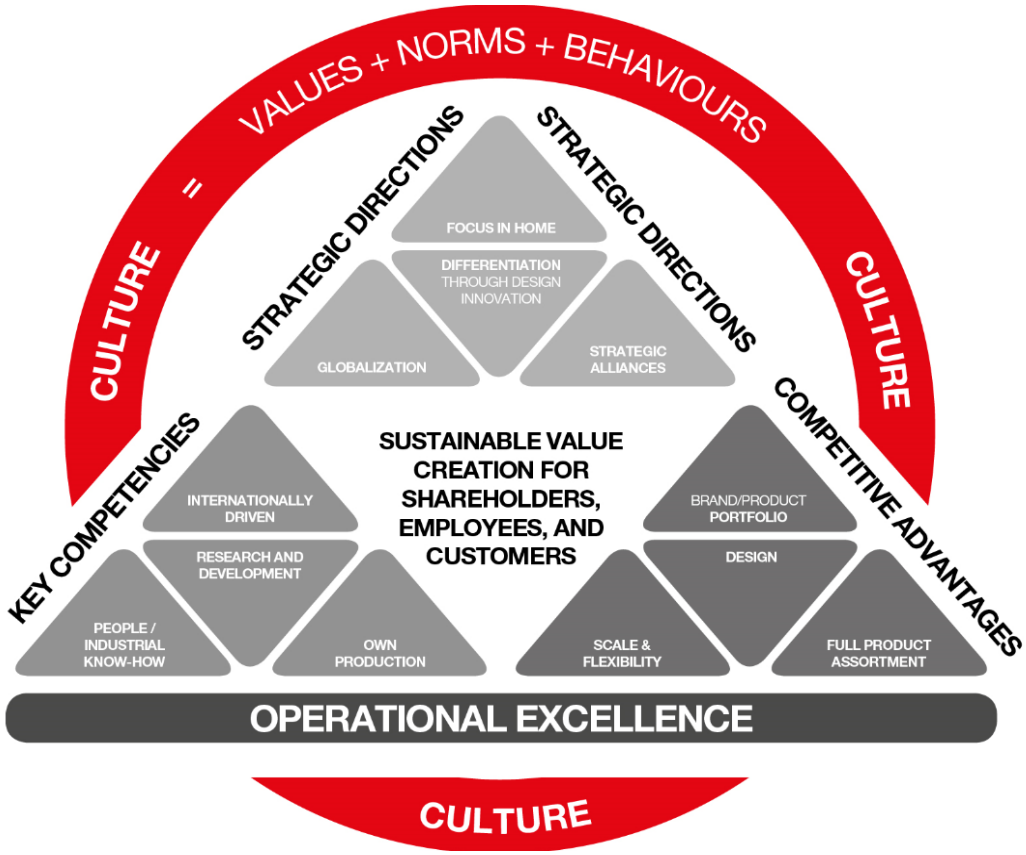
Business Model and the Importance of Corporate Culture



We are **responsible** to the people, customers, partners, employees, shareholders, society and the environment. We respect the commitment to efficiency and goal orientation.

We operate in a spirit of continuous **improvement**. Therefore, we support innovation, bringing up new ideas in all fields, open-mindedness and encourage **entrepreneurial thinking**.

We remain loyal to the key goal of our corporation: **creation of value** for the shareholders, employees, business partners, and the environment.

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Gorenje Eco-innovation circle

Resource Efficiency & Circular Economy

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Choice of input materials - 1st phase of eco-circle

Every Gorenje product

- meets all legal and environmental requirements.
- Already in the product design phase, we determine up to 80% of all its environmental impacts.

The composition of materials varies according to the type of appliance, but all are made

- from top quality, environmentally friendly and degradable materials.
- At the end of their life cycle, they are easily disassembled and recycled.

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Production of products - 2nd phase of eco-circle

Modernization of technological processes and equipment show a positive environmental trend.

Aspect	enota	1997	2017	Ratio 1997 / 2017
decrease in quantity of				
- hazardous waste	kg/pc	0,55	0,037	- 93,3 %
- waste for landfilling	kg/pc	1,14	0,005	- 99,6 %
rational use of energy products				
- water consumption	m^3/pc	0,56	0,094	- 83,2%
- electricity consumption	kWh/pc	21,41	22,87	+ 6,4 %
- consumption of compressed air	m^3/pc	21,37	13,32	- 37,7 %
- consumption of natural gas (excluding cogenerations)	kWh/pc	20,61	11,32	- 45,5 %

http://www.gorenjegroup.com/si/gorenje-group/trajnostni-razvoj

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Product usage – 3rd phase of eco-circle

From the broader environmental point of view, the Gorenje appliances:

- Are equipped with environmentally and health-friendly components, which can be almost completely recycled
- for their operation they consume less electricity, water and detergents than comparable products of competitors
- are among the most economical household appliances in the market because they reach and exceed the highest energy classes required by European standards
- the noise level of the operating devices is at the lowest level
- all technological development and improvements are tailored to the requirements of environmental protection and consideration of general social interests

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Recycling – 4th phase of eco-circle

Our products are designed and manufactured so that,

- they can be easily disassembled and recycled in their last lifetime.
- we incorporate as few variations as possible of the same material, which in the recycling process limits the need for separation.
- products consist of materials and components that can be recycled in at least 80 percent.

With recycling

- we reduce the amount of waste and the need for the production of basic materials (eg. metals), which requires enormous energy and causes the release of harmful substances.
- We reduce the consumption of natural resources, as waste parts of plastics and metals can be returned to various production processes.

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Electricity and water consumption, laundry washing in Gorenje washing machines

Energy and water usage per cycle. Program Cotton 60°C

	Poraba el.en (kWh)	Poraba vode (L)
1960-1969	2,5	187
1970-1979	1,8	150
1980-1989	1,3	116
1990-1999	1,14	56
2000-2007	1,02	49
2008-2015	0,80	42
2016-2018	0,65	37
	- 74%	- 80%

The drying machine in energy class A consumes 45% less electricity than that in energy class B, the appliance in class A + consumes 56% less than that in class B, and the dryer in the highest class A +++ is 69% less than the appliance in class B.

The average family carries about 300 washes a year, which is just under 6 cyles per week, consuming approximately 200 kWh of electricity and 10,000 liters of water.

In Slovenia, just for washing of laundry around 183 MWh of electricity and 8140 million liters of drinking water is used.

Multiple lifetime usage – ResCoM project

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- Gorenje just completed the EU project ResCoM - Resource Conservative Manufacturing - transforming waste into high value resource through closed-loop product systems (project EU's 7th Framework Program). The project is a respectable international consortium.
- The ResCom project aims to develop an innovative and practical framework, supported by Life Cycle Management Software to support the implementation of closed loop systems in the industry. Closed loop products have the potential to break down improvements in the efficiency of resource use. By using closed loop principles, companies will reduce material costs and consequently become more resilient to environmental impacts and will achieve greater profits;
- While the ResCom project continues into the Gorenje ReFu project - refurbished appliances. The goal of the project is to optimize the collection and processing of household appliances, i.e the management of waste electrical and electronic equipment in a circular economy. Thus, the renewal of spare parts, which is no longer available from suppliers, is already under way.
- Project also continues in H2020 project ReCiPSS for large scale demonstration of pay-per use washing machines

Decree on waste:
re-use is the process,
in which products or components thereof, other than waste, reused for the same purpose for which they were originally manufactured

WEEE Regulation:
the manufacturer of the WEEE reuse facility is a treatment provider that implements the preparation of WEEE for reuse

Centers for reuse:
WEEE - responsibility for safety of product ????

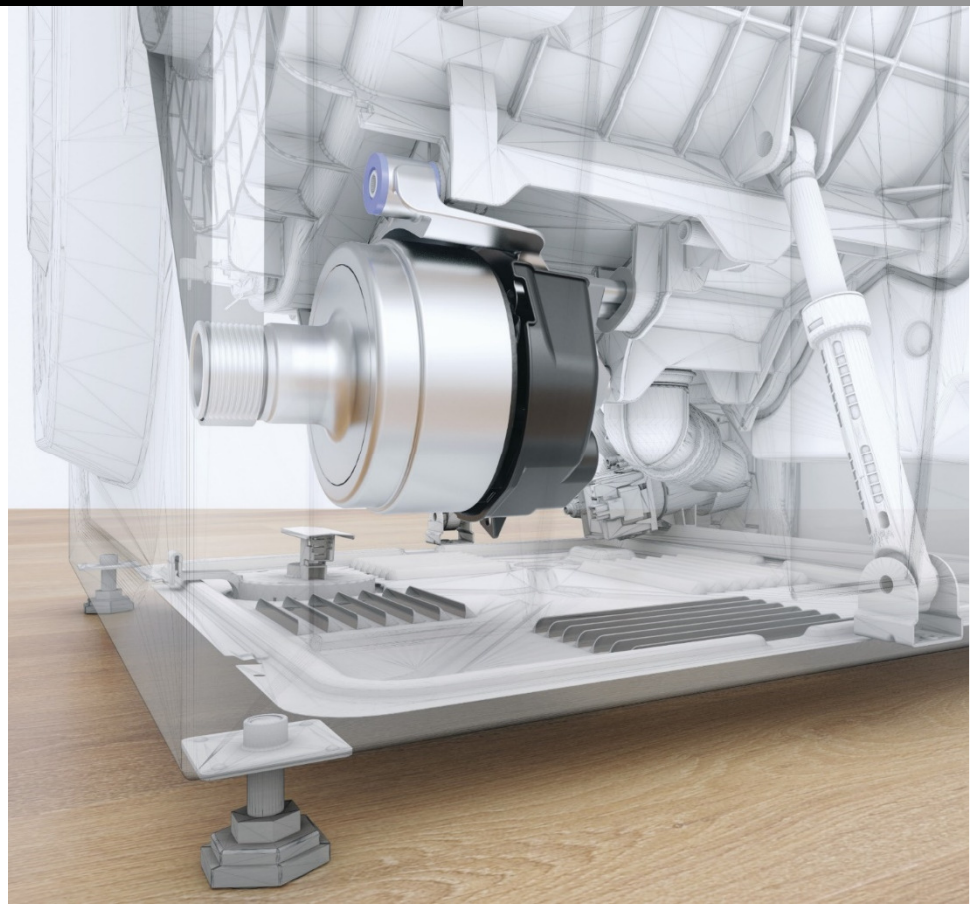
Sustainable machinery prolonging life cycles of washing machines

Available on **ESSENTIAL, ADVANCED** and **SUPERIOR LINES**

An extremely powerful and highly efficient motor designed to limit the wear and tear of mechanical stresses by excluding the use of outdated brushes.

- Energy efficiency up to A+++ (-50%)
- Long lasting products
- Silent motor
- Use of 10 years warranty
  (for inverter motor - to be defined for all markets prior to market launches)

HEALTHY AND EFFICIENT



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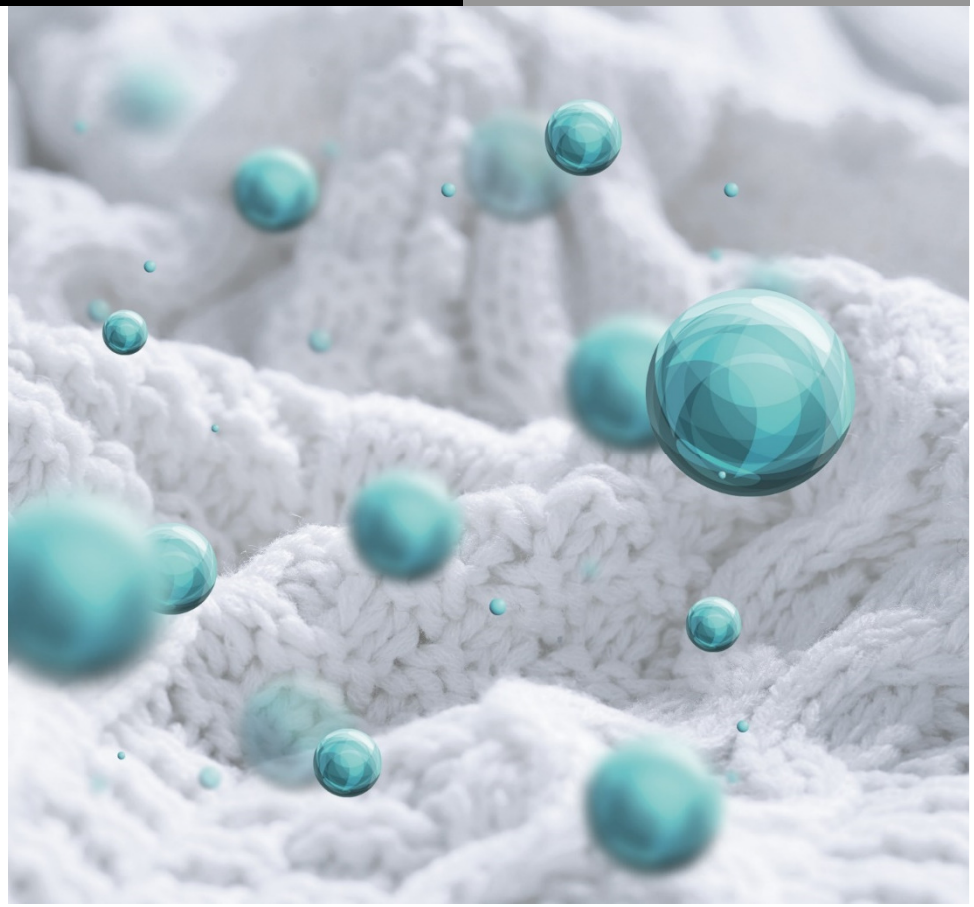
Perfect washing results with high energy efficiency

Available only in
SUPERIOR LINE

Gorenje innovates waters natural self-cleaning ability make their washing machines even better:

- Gorenje ionized air function increases the quantity of dissolved stains and dirt by 40%.
- Ionized bubbles elevate into the drum from the bottom allowing ionized air to come into direct contact with the laundry.
- Air full of negatively charged Ions effectively cleans the laundry, removing all impurities. Particularly effective in eliminating sweat and protein stains.

HEALTHY AND EFFICIENT



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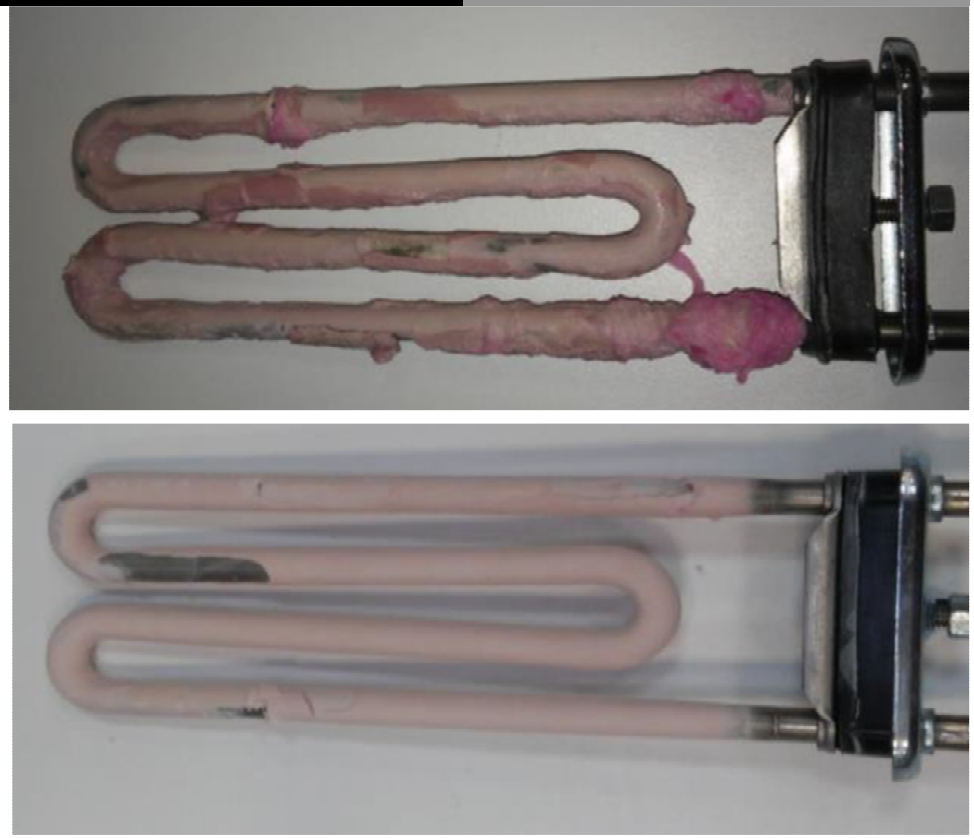
Perfect washing results with high energy efficiency

Available only in
SUPERIOR LINE

Gorenje's IONTECH not only simplifies the washing experience, but also prolongs the life-cycle of the washing machines by reducing lime scale deposits on its water heaters.

- Ionized air bubbles come into the tub from the lower side
- As the bubbles lift toward the surface, they collide with the heater of the washing water
- The bubles generate micro-vibrations which remove lime scale and prevent the formation of lime scale deposits before they finally solidify.

HEALTHY AND EFFICIENT



Comparison of heater with and without ionizer after 185 cycles.

Monitoring your carbon footprint

Function only available in **ADVANCED** and **SUPERIOR LINE**

EcoEye gives you feedback on energy and water consumption

- Depending of selected programs and additional functions EcoEye optimizes its features such as temperature, spin speed…
- With the help of EcoEye customers can save energy and water, economically benefitting and also supporting a global cause.
- As the laundry procces becomes more eco friendly, more tabs illuminate in compliance to the enviornmenal settings.

Visual rerpesentation of Energy and water consumption minimization

RELEVANT AND INTUITIVE

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Resource Efficiency & Circular Economy

The European Committee of Domestic Equipment Manufacturers (APPLiA) is in favour of further developing the efficient use of resources though sustainable consumption, production and the promotion of a sustainable industrial policy both within the EU and internationally.

Through producing innovative products that **cut energy and water use and improved end-of life recycling techniques**, the home appliance industry is already a proven driver of resource efficiency.

APPLiA recognises that the EU Resource Efficiency policy instruments go beyond eco-design, energy label and waste. The current debate focuses more and more on new concepts and proposals, such as environmental footprinting or the circular economy.

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Change of consumers habits as a major driver for change

Large shift in paradigm and customer behaviour trends:

OWN → **USE**

Examples of sharing economy in different industries:

Airbnb, Autolib' Paris, GoCar share,Uber, Zipcar, Philips lighting, city bicycles, mobile operators, La Machine du Voisin, ….

Not much OEM participating in this kind of initiatives.

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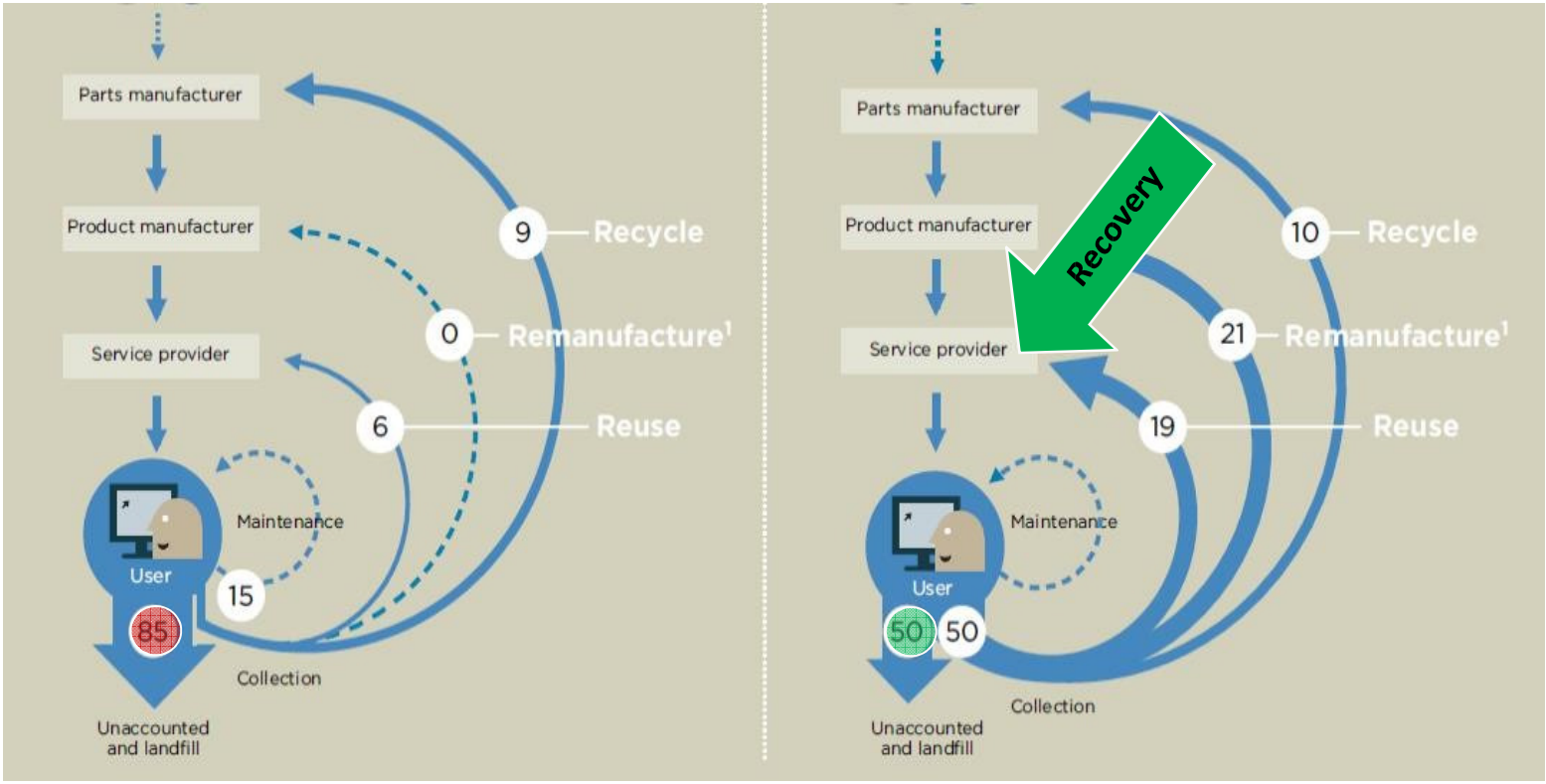
For Gorenje circular economy is not just recycling



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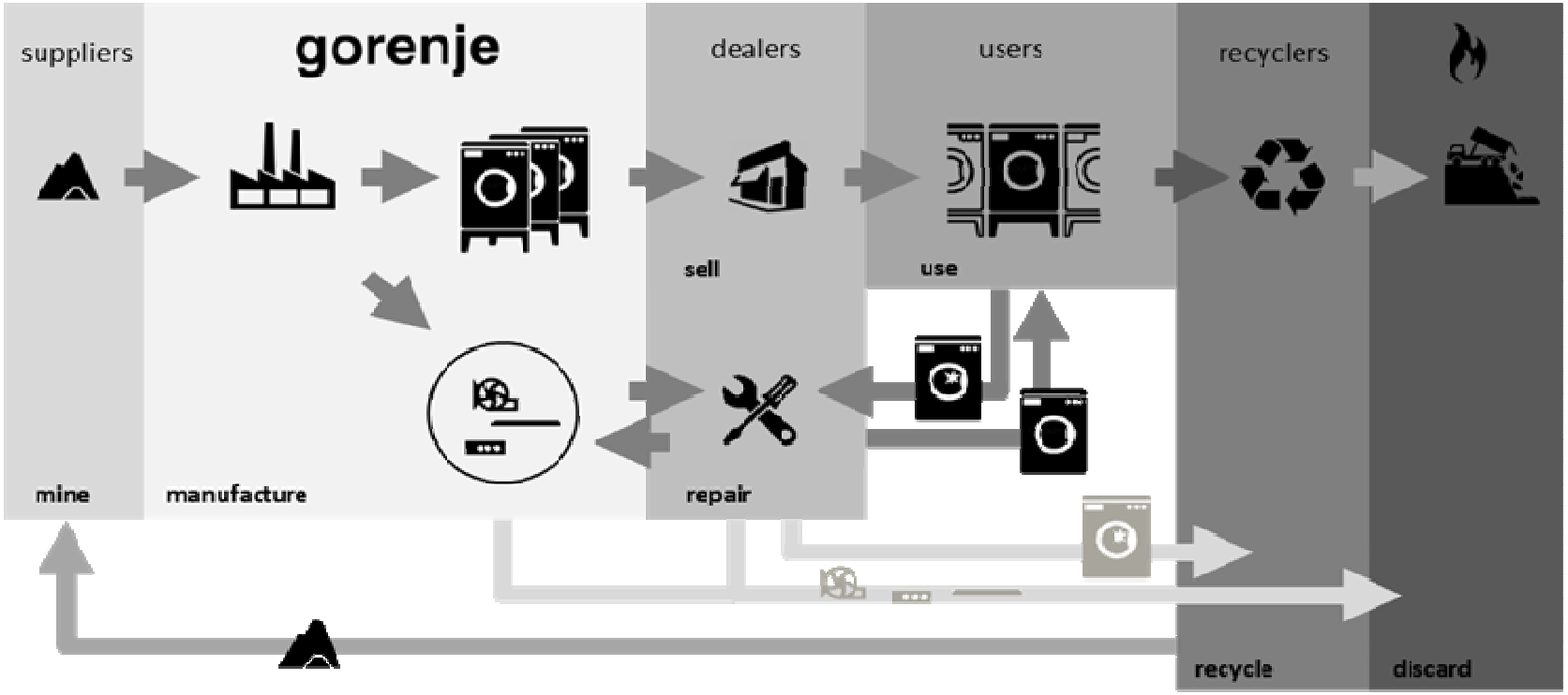
Scenario 1: Current state – Selling ASKC professional washing machine



The difficulty in this model is that the added value from recovered material flows away from OEM. The input recycled material is in many cases even more expensive than the virgin one. All this is not stimulating OEMs to use recycle material as input source.

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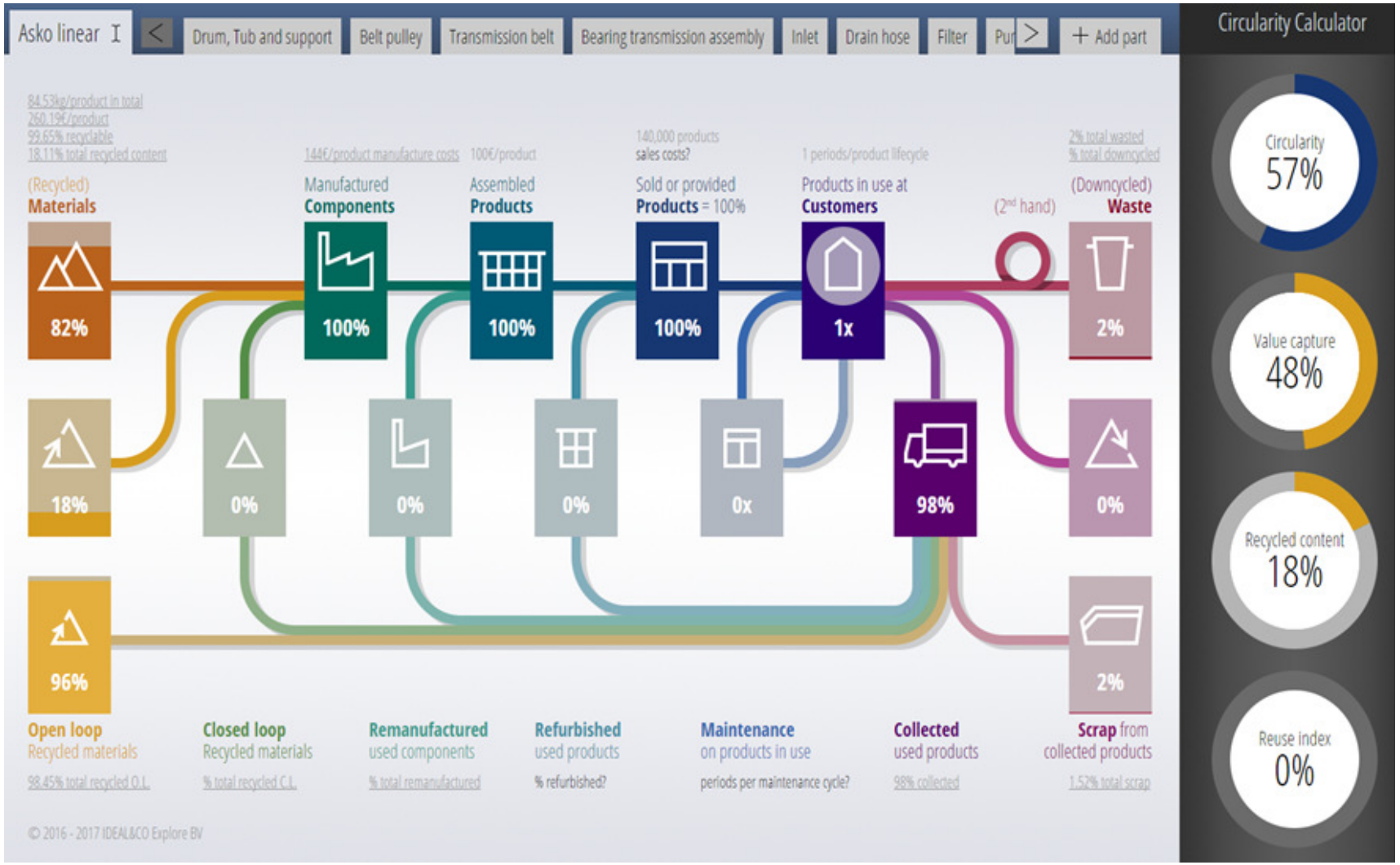
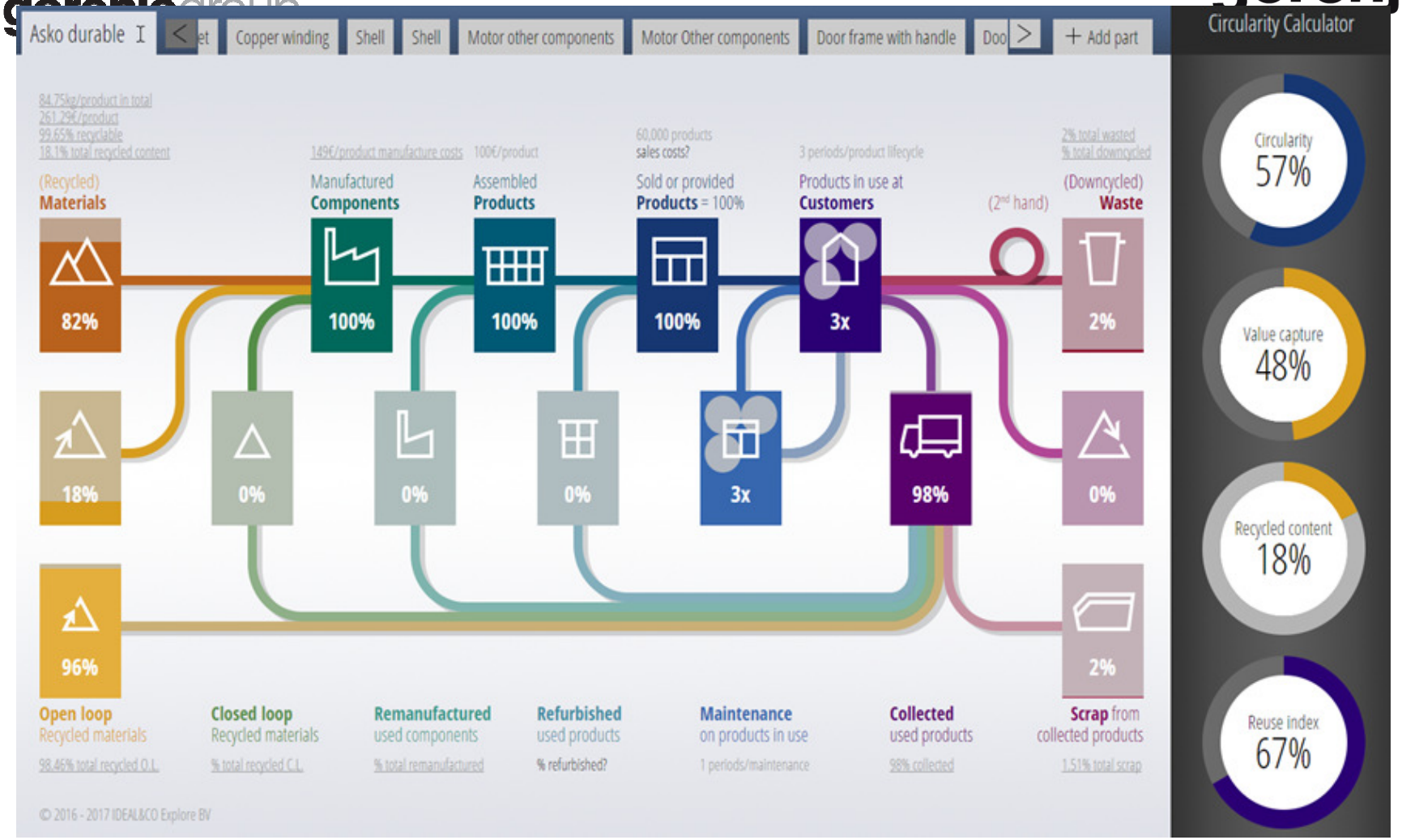


Current state – selling Gorenje/Asko with the current high degree of collection and recycling, in mass percent



Only reuse – 3 cascades

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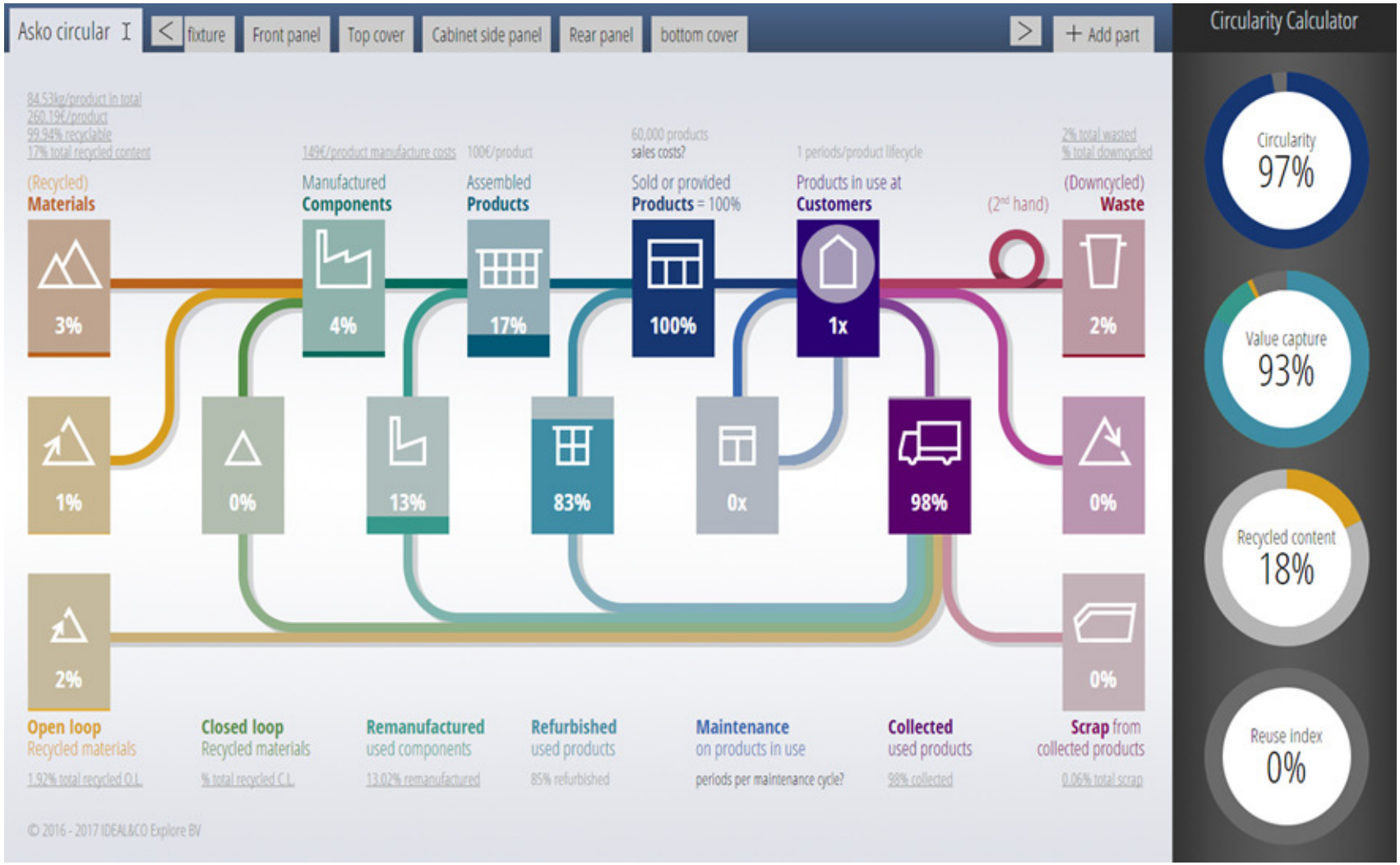

Circularity Calculator results for Scenario 3 – refurbishment of Asko, mass %

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There is a lot o potential in changing/adopting the new circular economy business models.

Benefits are multifold:

- From producer point of view (new markets and customers, higher added value, …)
- From Environment point of view (less waste, less pollution, less energy …)
- From Customer point of view (better quality, less worries, shorter wash cycles, ….)

- New research and innovation

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Environment point of view

BoM_1 Results

Product Name	Washing machine B2C		
Function delivered per use cycle:		2000	washing cycles
Cycles		3	n
Total function delivered		6000	washing cycles

BoM_1	Cumulative						Per use cycle	
	Energy (MJ)			CO2 (kg)			Energy (MJ) Total	CO2 (kg) Total
	Total	First production	Production after first	Total	First production	Production after first		
Material	**204837,6**	162489	42349	**12185,8**	9683,7	2502,1	**68279,2**	**4061,9**
Manufacture	**0,0**	0	0	**0,0**	0,0	0,0	**0,0**	**0,0**
Transport	**0,0**	0,00	0,00	**0,0**	0,00	0,00	**0,0**	**0,0**
Use	**0,0**	0,0	0	**0,0**	0,0	0,0	**0,0**	**0,0**
Disposal	**47,8**	42	5	**4,1**	3,6	0,5	**15,9**	**1,4**
EoL Potential	**-205127,3**	-162750	-42377	**-12207,2**	-9703,1	-2504,1	**-68375,8**	**-4069,1**
Total	**204885,5**	162531,0	42354,4	**12189,9**	9687,355	2502,6	**68295,2**	**4063,3**

Mass Balance	Cumulative kg	per cycle kg
First production	60,5	20,17
Produced after first	11,0	3,68
Reused mass	110,0	36,66
Virgin mass	53,6	17,88
Recycled mass	17,9	6,0

Nearly 6o percent saving of needed energy and material for production.

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 603843 - ResCom

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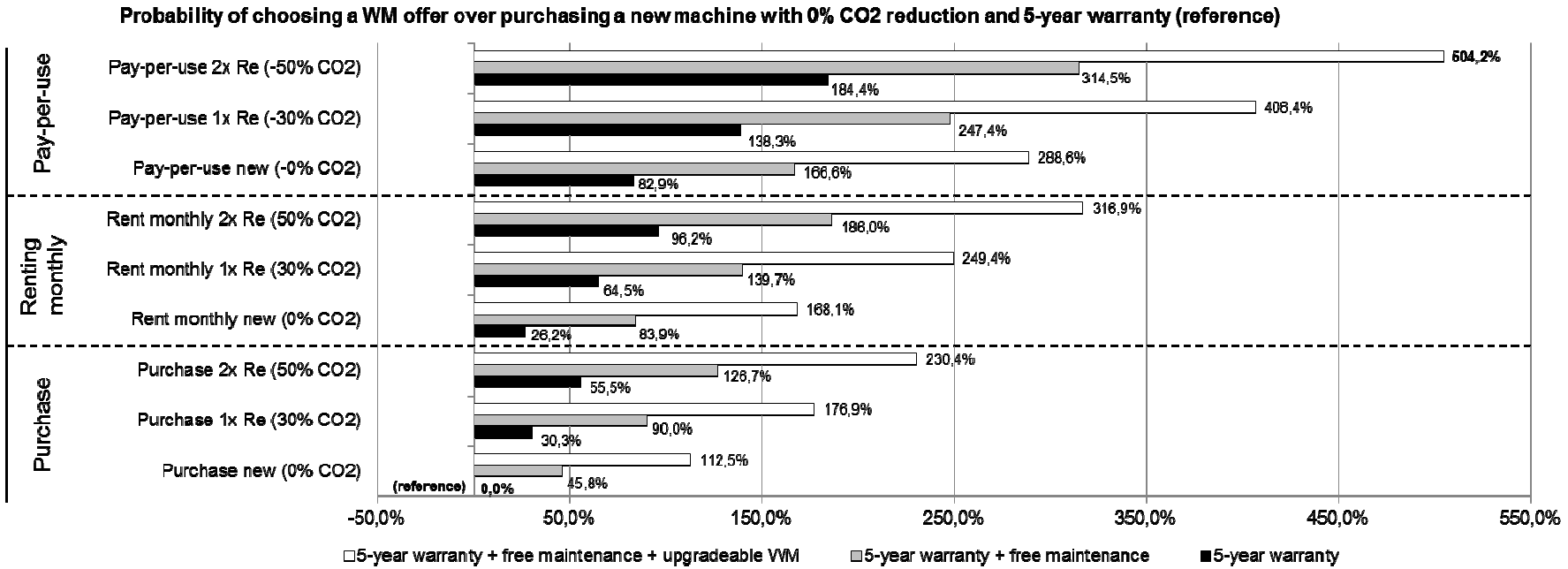
Demand estimation for different consumer options – Stockholm area



Customer choice probabilities for different washing machine options taking purchase of a new WM with a 5-year warranty as reference.

From paper submited to publication in Journal of Cleaner Production: A conjoint analysis of circular economy value propositions using washing machines in Stockholm; ***Authors:*** Michael Lieder, Farazee M.A. Asif, Amir Rashid, Aleš Mihelič, Simon Kotnik

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ReCiPSS project –main challenges

- It was difficult to find the viable (profitable) business model.
- Washing machine design modifications are necessary.
- Co-creation workshops with users.
- New mind set production optimization vs. longevity.
- Large scale demonstrator.
- Organization of novel back/forward logistic
- Dilemma about pricing models.
- ……

This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 776577 – ReCiPSS.

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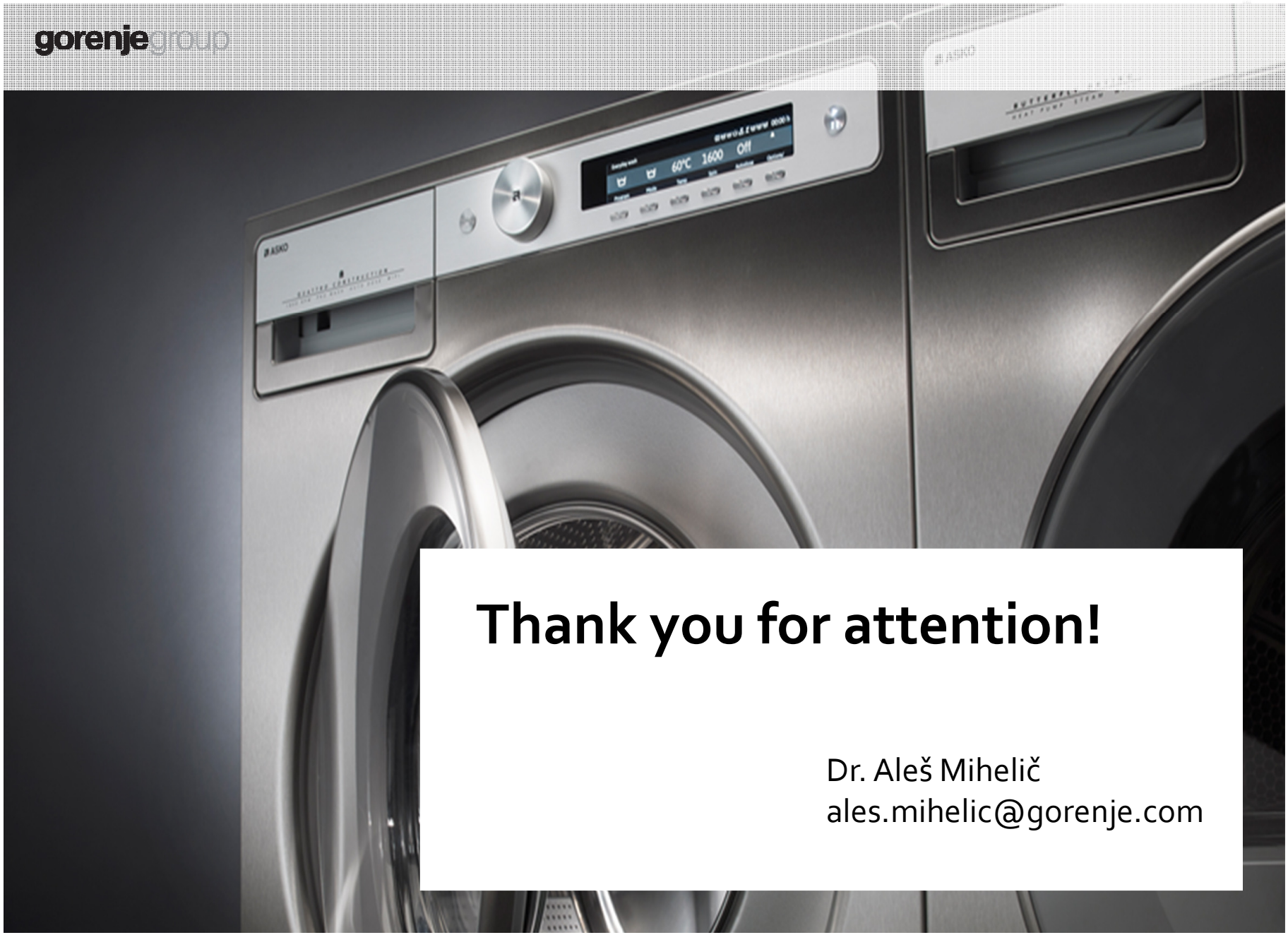
THE ENVIRONMENTAL (COST) EFFECTIVENESS OF A COMPANY IS NEVER FINISHED STORY



Thank you for attention!

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