

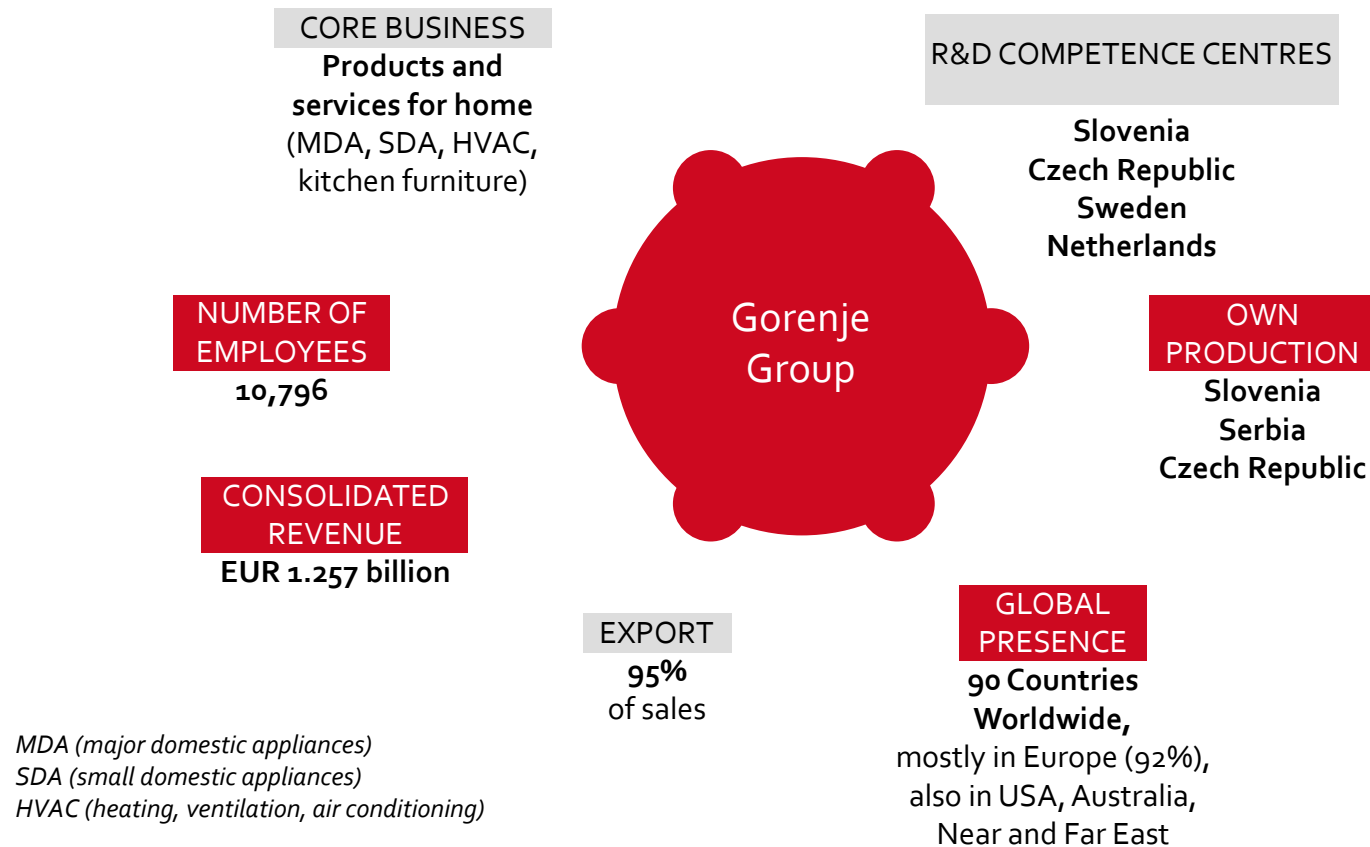
# How to initiate “circular economy” thinking in the process of innovation creation - case study of Gorenje's project RESCOM

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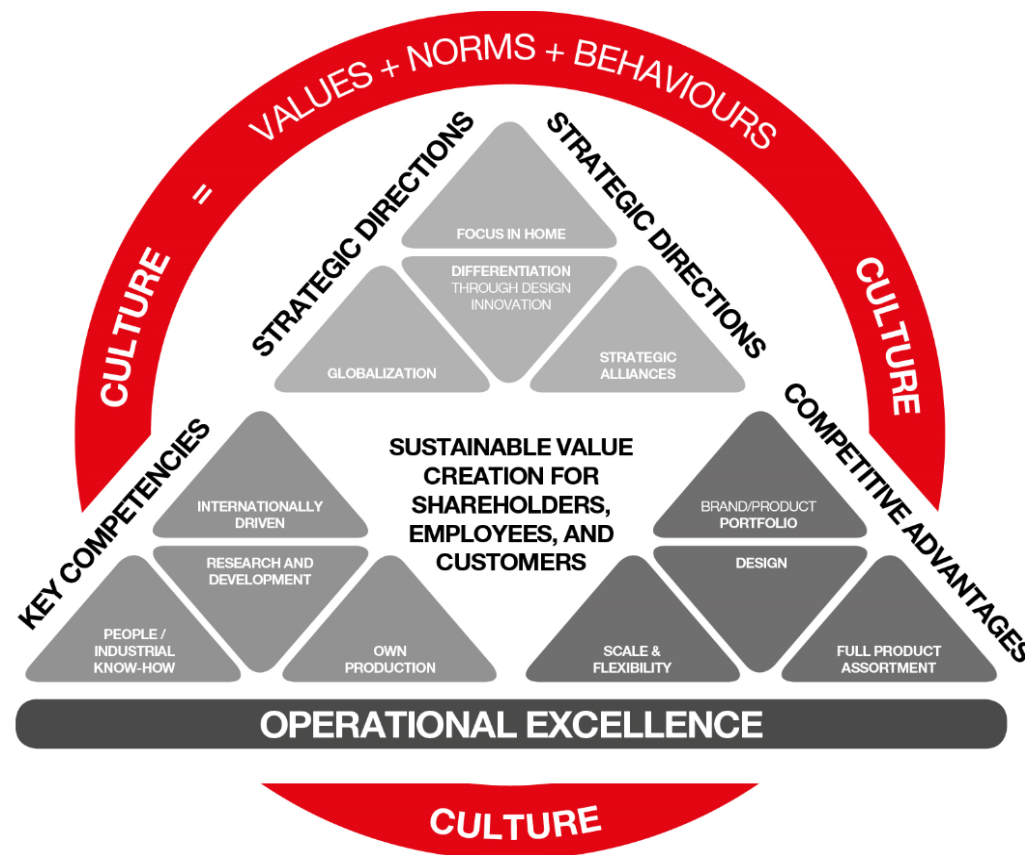
Innovation Leader, R&D Competence centre Laundry Care

Brdo, September 2017

# One of Leading European Manufacturers of Products for Home



# Business Model and the Importance of Corporate Culture



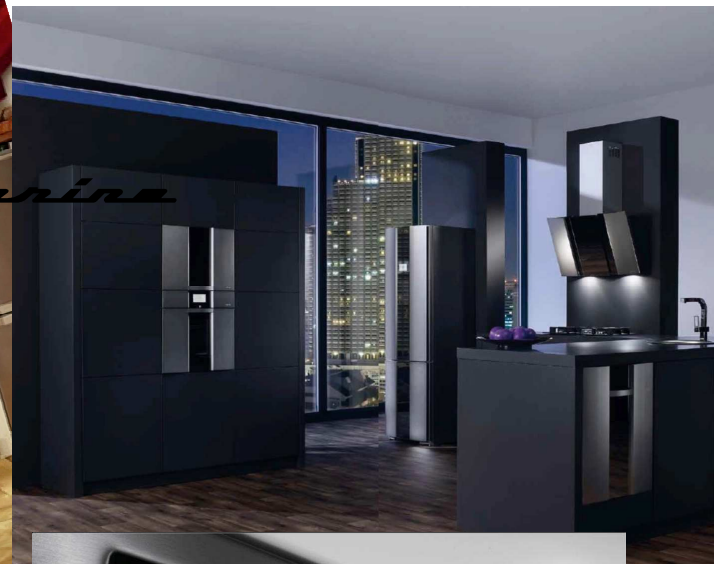
We are **responsible** to the people, customers, partners, employees, shareholders, society and the environment. We respect the commitment to efficiency and goal orientation.

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.



**gorenje**group



## Change of consumers habits as a major driver for change

Large shift in paradigm and customer behaviour trends:



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.**

## Resource Efficiency & Circular Economy

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

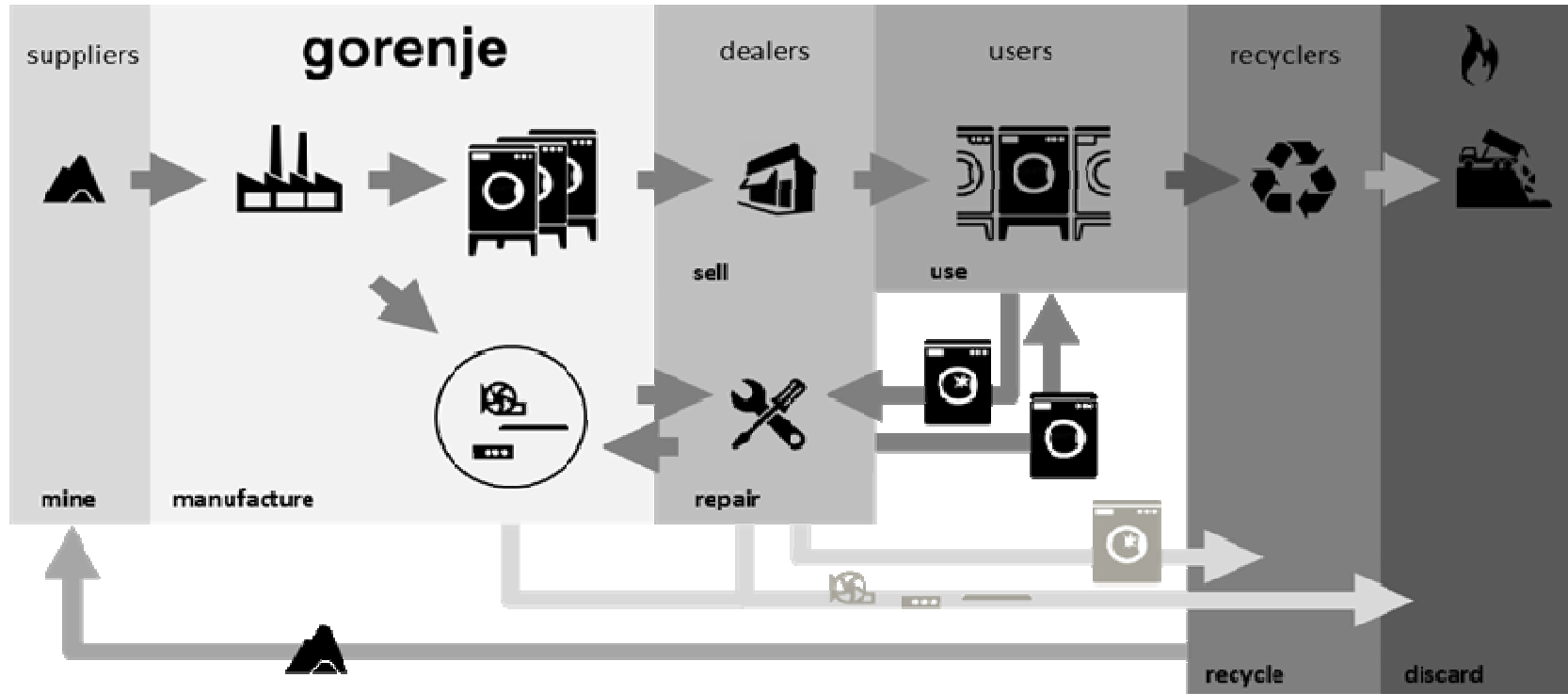
Through producing innovative products that **cut energy and water use and improved end-of life recycling techniques**, the home appliance industry is already a proven driver of resource efficiency.

CECED 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.

## Resource Efficiency & Circular Economy

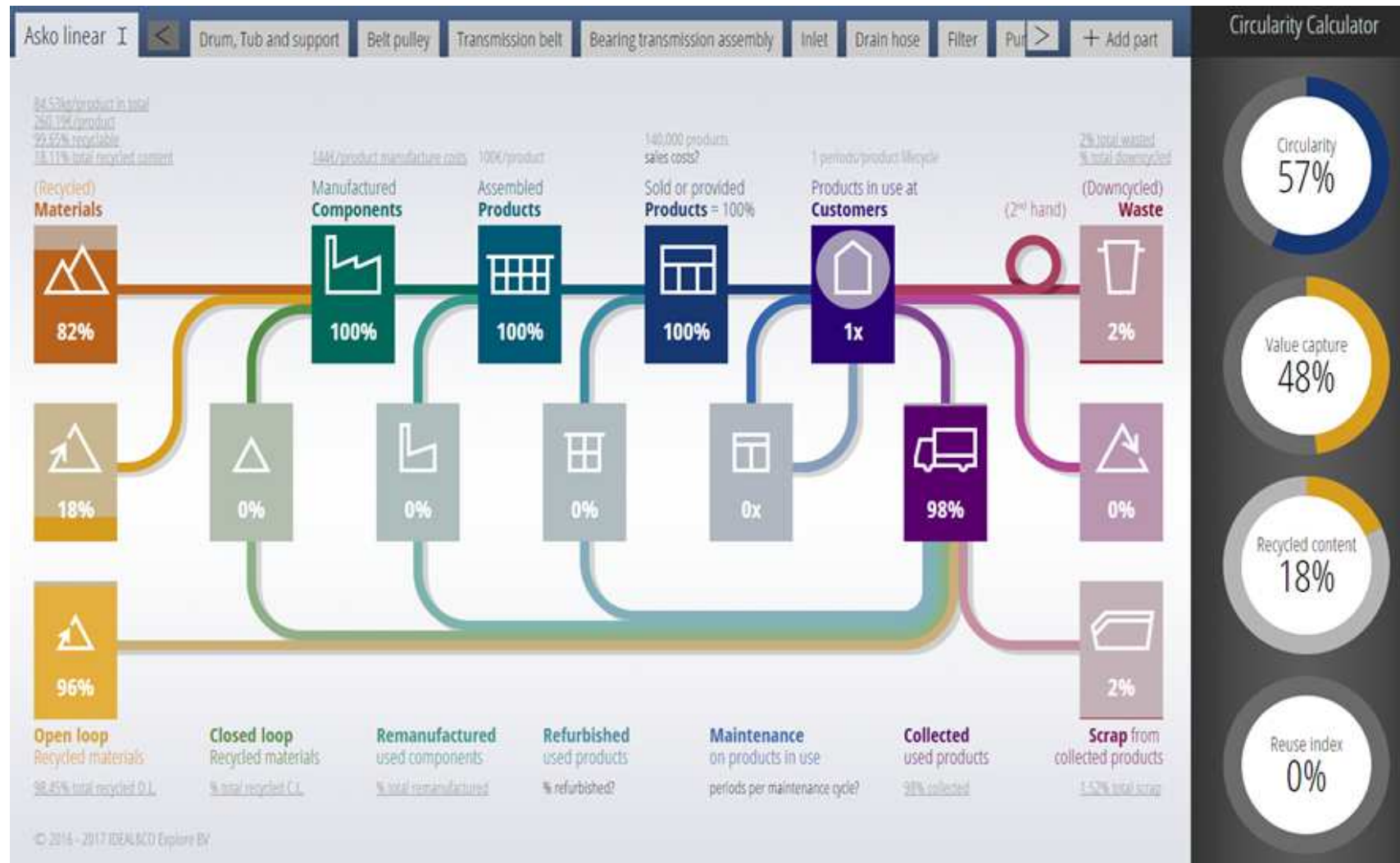


## Scenario 1: Current state – Selling ASKO professional washing machine

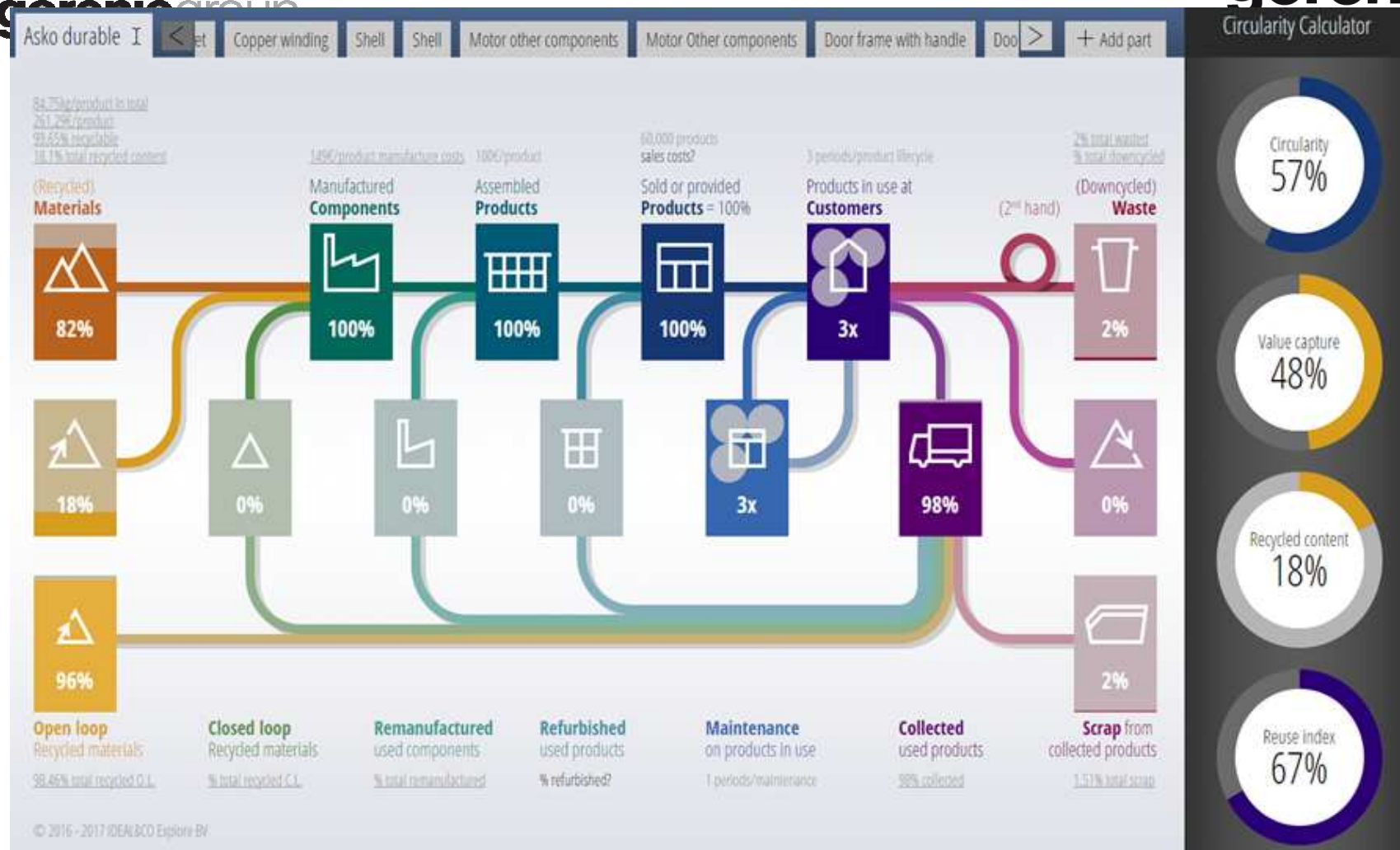


The difficulty in this model is that the added value from recovered material flows away from OEM. The input recycled material is in many cases even more expensive than the virgin one. All this is not stimulating OEMs to use recycle material as input source.

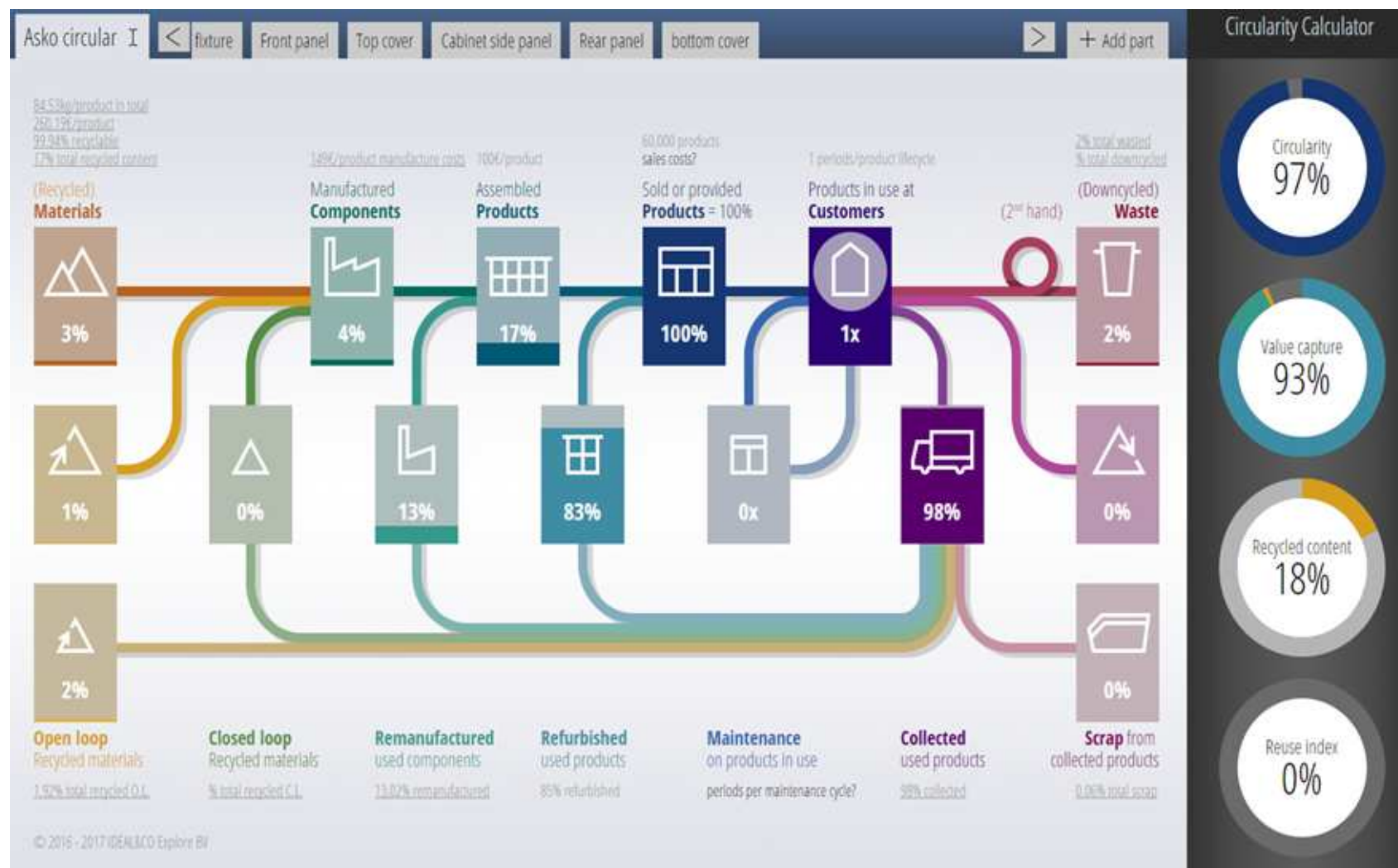




Current state – selling Gorenje/Asko with the current high degree of collection and recycling, in mass percent

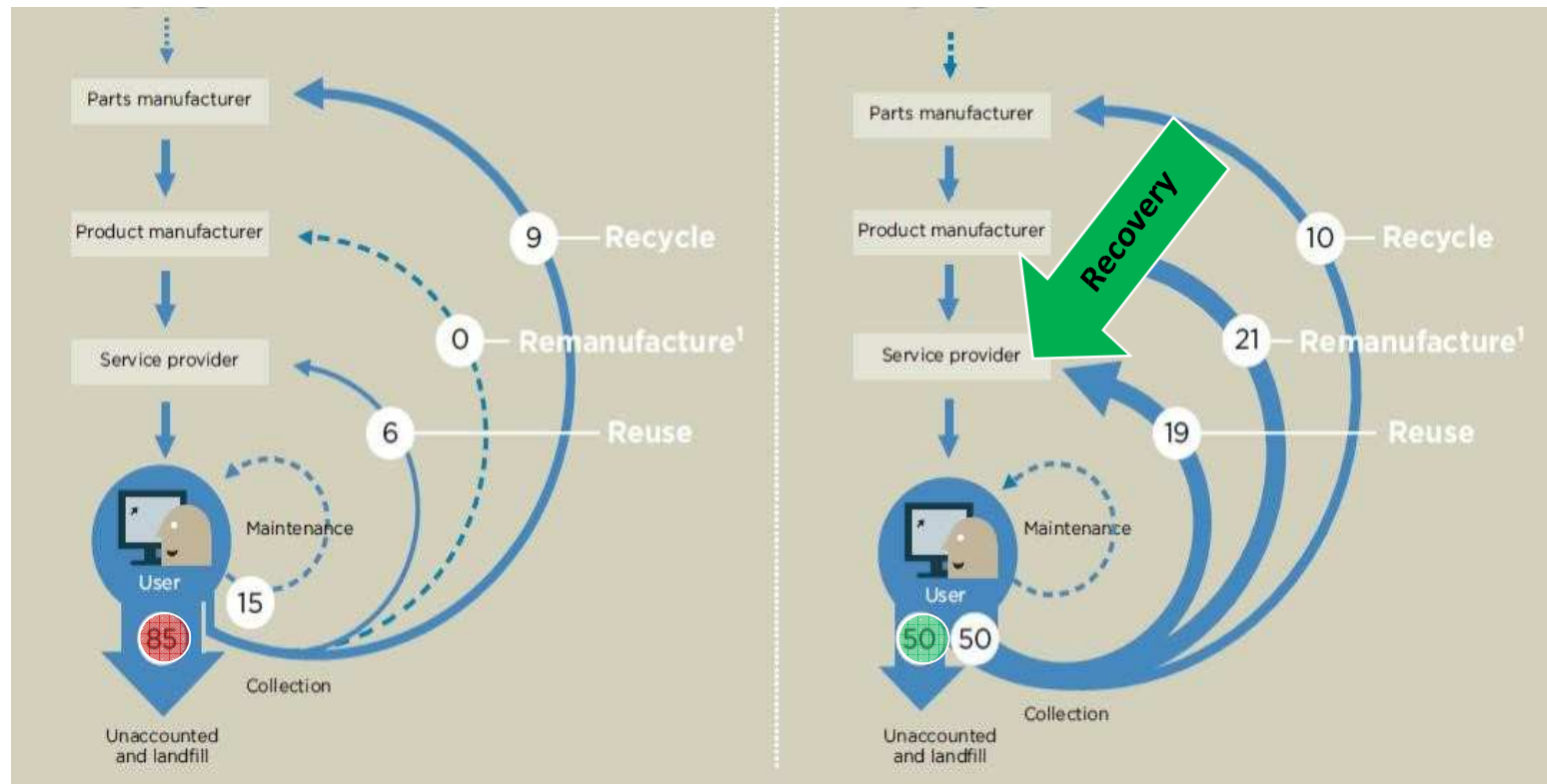


Only reuse – 3 cascades



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

# For Gorenje circular economy is not just recycling



# Gorenje vision of future

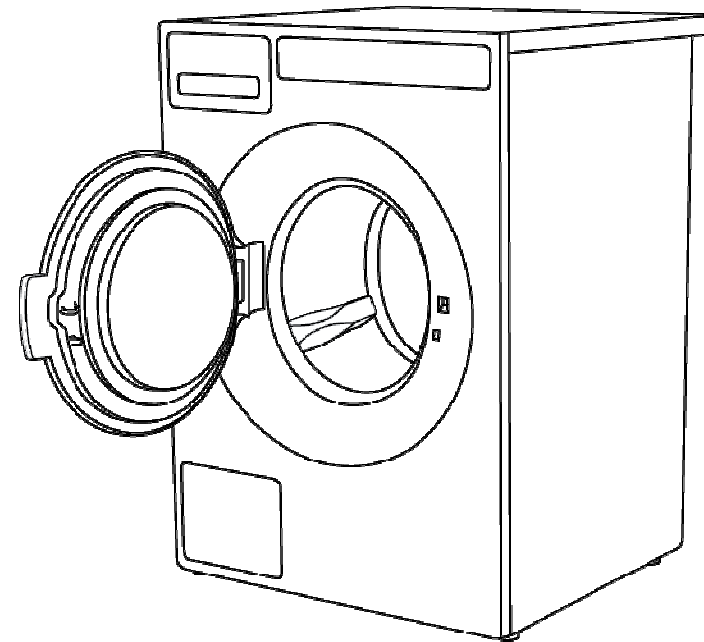


## In a close future: a day in the life(cycle) of a washing machine

Marta and Alex are the proud owners of a new ASKO WM85.C washing machine, the latest premium model from Gorenje. **This new model came with integrated sensors that monitor in real-time the washing machine operating condition.**

Marta was quite surprised when her local reseller offered a new type of contract where she would not have to pay for the washing machine upfront, **but instead would be charged per use** over the lifetime of the machine.

Alex also understood that the washing machine would be **connected directly to the cloud, collecting data in order to optimize the energy consumption of the washing cycles, and sending alerts directly to the manufacturer if a component is about to fail or to decrease the performance of the machine.**



Although Marta and Alex were a bit doubtful at the beginning, the reseller showed them that the cost would be lower for the household over the lifetime of the washing machine, and that it would also be much better for the environment.

In fact, after using the washing machine for 5 years, Marta and Alex were pleased to observe that their electricity bill has slightly decreased, and the machine did not break down a single time (the reseller sent a maintenance person to pre-emptively replace some components in the machine).

However, the mighty ASKO WM85.C has reached the end of its (first) lifecycle and is now collected by the reseller. **Instead of being disassembled** for recycling, the washing machine **goes through a thorough maintenance check** at a local remanufacturing center, where **some components are remanufactured and reinserted in the machine**, while only a few are replaced with new ones.

Once the washing machine has passed the quality control checks, it is now ready for a second life under a new denomination. The **washing machine is now leased/sold as an ASKO WM85.R economy model to a different market segment.**

It will follow a similar 5-year lifecycle to the previous one, until reaching the end of its (second) lifecycle and being remanufactured into an **ASKO WM85.R2 budget model awaiting a final 5-year lifecycle.**

**Over its three lifecycles, the washing machine will have saved 146kg of materials and 21 kWh of production energy costs, plus 18 kWh of usage energy costs for a total saving of 2.5 tons kg of CO<sub>2eq</sub>.**

At the beginning Gorenje will be able to sell 10,000 of these pay-per-use contracts, therefore generating an astounding 25,000 tons of CO<sub>2eq</sub> savings and reducing landfill by 1,460 tons.

## **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



## 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

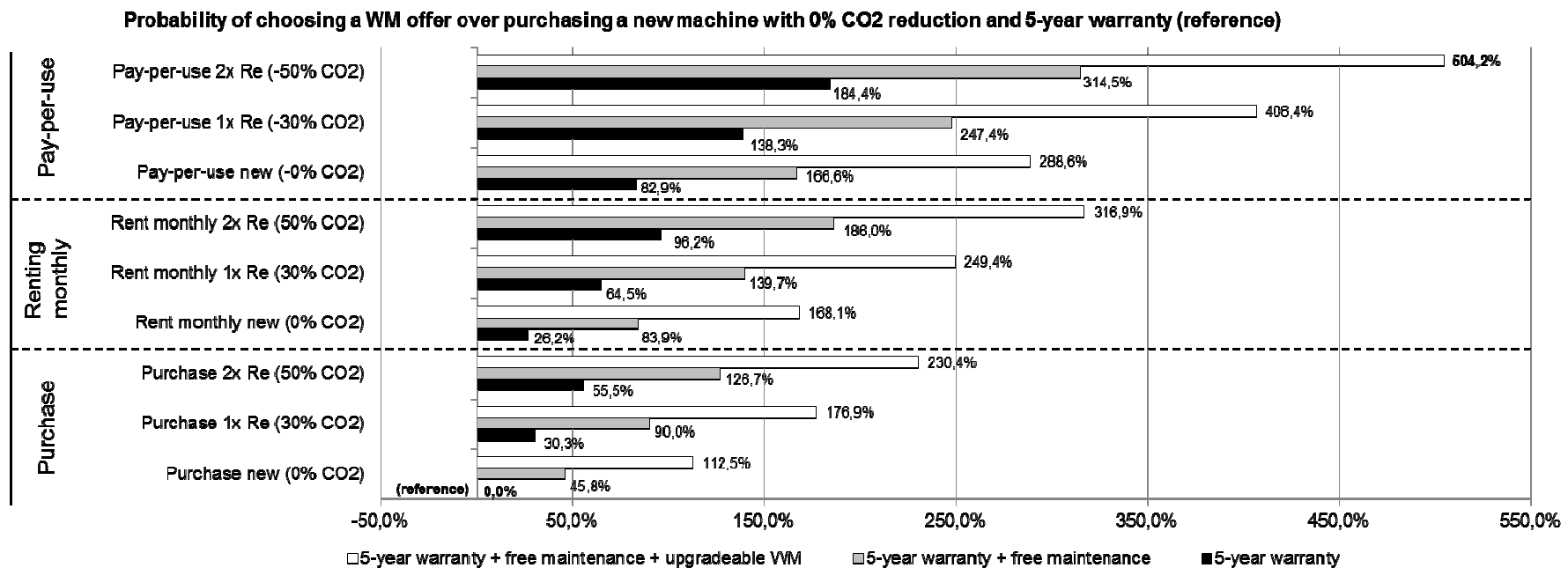
Mass Balance	Cumulative kg	per cycle kg
First production	60,5	20,17
Produced after first	11,0	3,68
Reused mass	110,0	36,66
Virgin mass	53,6	17,88
Recycled mass	17,9	6,0

Nearly 60 percent saving of needed energy and material for production.



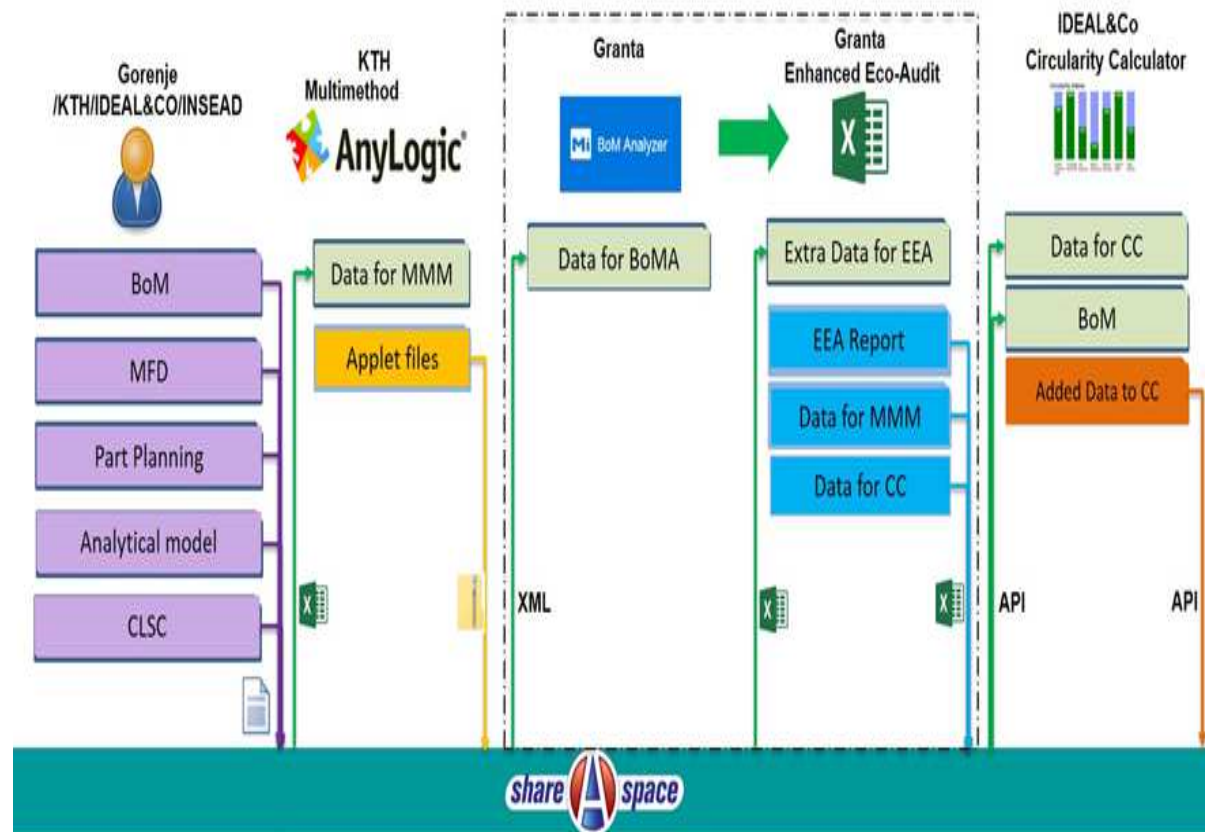
*This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 603843 - ResCom*

## 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.

## Overview of the Gorenje virtual model in the ResCoM collaborative software platform



- Circular Pathfinder
- Analytical Tool
- Circularity Calculator
- MI:BoM Analyzer (Eco Audit Reports)
- Multiple Lifecycle Product Design
- Multimethod Simulation Tool
- Part Planning
- Reman Design Checklist
- Upgrade Forecast

Layout of tools and data sharing on the ResCoM collaborative SW platform

# ReCiPSS

## Resource-efficient Circular Product-Service Systems

Large scale demonstration project submitted to last CIRC-01 call for White goods Demonstrator by Gorenje and our partners to further test and demonstrate service/function-oriented proposition to white goods costumers.

- The demonstrator will address the shortcomings of previous pay per use white goods attempts
- Low-cost remote monitoring based on novel IoT technologies for tracking usage (for billing purposes) as well as to monitor component health (for preventive maintenance purpose) and studying user interaction and behaviour dependent on information supply and billing.
- The project foresees the possibility that each machine can go up to 5-year service/function contracts three times during its lifetime which means that one washing machine can serve up to three different customers in cascade.
- Innovative customer segmentation model and usage “cascade”, with refined business propositions for the different customer segments.
- Setup of necessary refurbish facilities to carry out the update and repair activities
- Deployment of “smart washing machines” that can communicate to IT-platforms throughout different phases of their lifecycles
- Solve the issues with all non-technical barriers and legal issues for service based business models in target EU countries



# Thank you for attention!

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