

FWC ESPR – SR5

Professional Dishwashers

Stakeholder Interaction on revised Task 5, 6, 7

Oeko-Institut, Trinomics, Ecomatters, Fraunhofer IZM, Fraunhofer ISI, and VITO

Agenda



Agenda

10:30 – 11:00	Task 3, 4, 5, 6 – Key adjustments after stakeholder feedback <i>Kathrin Graulich – Senior Researcher – Oeko-Institut</i> <i>Martin Möller – Senior Researcher – Oeko-Institut</i>
11:00 – 12:00	Task 7 – Policy options / scenarios <i>Antoine Durand – Senior Researcher – Fraunhofer ISI</i>
12:00 – 12:20	Q&A
12:20 – 12:30	Next steps of the study End of the meeting <i>Kathrin Graulich – Senior Researcher – Oeko-Institut</i>

MEErP Task 3 Users

Main updates after review

Kathrin Graulich - Oeko-Institut



Key adjustments based on stakeholder feedback

■ BC1: Type of water connection

- Adjusted from 100% cold water => 20% cold water | 80 % cold & hot water

■ BC5 / BC6: Time in active mode

- Adjusted for from 8h => 3.5h / 4.5h; Time in ready to use mode increased accordingly
- => Overall effect on annual number of cleaned dishes and annual consumption values

■ Manual pre-rinse

- Two sensitivity analyses included for BC2 with reduced assumptions for the additional water consumption due to manual pre-rinsing:
 - a) taking aspect of manual dishwashing out of the formula;
 - b) based on actual water flow rate and share of 50% of all items
- Overall: contribution of the water consumption on the environmental impact of the use phase over the products' lifetime of the initial data less than 5 %; even if the share of pre-rinsing will be reduced according to the sensitivity analyses, there will be no relevant effect of the pre-rinsing in the overall impacts.

MEErP Task 3 - Users

Annual number of dishes washed

Dishwasher category	Number of cycles per day	Number of dishes (plates) per cycle	Working days per year	Typical workload of rack	Number of dishes or cycles per year
No 1 Undercounter water-change	7	50	200	75 %	52,500 dishes
No 2 Undercounter one-tank	55	18	300	80 %	237,600 dishes
No 3 Hood-type	110	18	300	80 %	475,200 dishes
No 4 Utensil/Pot	30	No information available	300	60 %	9,000 cycles
Dishwasher category	Number of dishes per hour	Time in active mode per day	Working days per year	Typical workload of basket/belt	Number of dishes per year
No 5 Conveyor-type one-tank	1,800	3h 30	330	80 %	1,663,200 dishes
No 6 Conveyor-type multi-tank	3,600	4h 30	330	80 %	4,276,800 dishes

MEErP Task 3 - Users

Energy, water and detergent consumption under ideal conditions

- **Annual** energy, water and detergent consumption of an average device under **ideal conditions**

Dishwasher category	Number of dishes or cycles per year	Energy consumption	Fresh water consumption	Rinse aid consumption	Detergent consumption
		kWh/year	litres/year	kg/year	kg/year
No 1 Undercounter water-change	70,000	1,540	24,500	28 (integrated detergent and rinse aid)	
No 2 Undercounter one-tank	297,000	5,940	49,510	15	149
No 3 Hood-type	594,000	11,880	77,220	23	232
No 4 Utensil/Pot	9,000 cycles	7,650	54,000	16	137
No 5 One-tank conveyor-type	2,079,000	41,580	249,480	75	674
No 6 Multi-tank conveyor-type	5,346,000	106,920	427,680	128	1,155

MEErP Task 3 - Users

Other parameters in real life practice (i.e. not “ideal”)

- Influence of manual pre-rinsing of wash ware**

Dishwasher category	Additional water consumption for pre-rinse and manual dishwashing (litres per 100 items)	Additional water consumption for pre-rinse (litres per year)
No 1 Undercounter water-change	81	21,263
No 2 Undercounter one-tank	86 => 73 42	102,168 => 86,724 49,896
No 3 Hood-type	21	49,896
No 4 Utensil/Pot	no information	no information
No 5 Conveyor-type one-tank	6	114,048
No 6 Conveyor-type multi-tank	6	228,096

MEErP Task 3 - Users

Other parameters in real life practice (i.e. not “ideal”)

- Influence of low power modes consumption

Dishwasher category		Time in low power modes in hours per day		Low-power mode consumption (range in kW)
	Average time switched on in hours per day	Ready to use mode	Left-on-mode	
No 1 Undercounter water-change	4	n.a.	2.6	0.01
No 2 Undercounter one-tank	10 14	6 12	n.a.	0.1-0.3
No 3 Hood-type	10 14	7 10	n.a.	0.2-0.45
No 4 Utensil / Pot	10 12	7 11	n.a.	0.1-1.00
No 5 One-tank conveyor-type	10 15	6.5 11.5	n.a.	0.8-2.1
No 6 Multi-tank conveyor-type	10 15	5.5 10.5	n.a.	1.5-2.2

MEErP Task 3 - Users

Summary: **Annual consumption parameters** per appliance under **real-life use** conditions
(brackets: 2011 data)

Dishwasher categories	Number of dishes or cycles per year	Annual energy consumption per appliance (kWh)	Annual water consumption per appliance (litres)	Annual detergent consumption per appliance (kg)	Annual rinse aid consumption per appliance (kg)
No 1 Undercounter water-change	52,500 (24,000)	1,503 (1,254)	43,990 (25,920)	31* (87)	
No 2 Undercounter one-tank	237,600 (237,600)	6,969 (5,253)	163,153 (55,822)	183 (188)	16
No 3 Hood-type	475,200 (345,600)	14,066 (8,258)	154,977 (86,650)	315 (292)	24
No 4 Utensil / Pot	9,000 cycles (9,000) cycles	12,115 (8,913)	116,700 (89,520)	324 (294)	17
No 5 One-tank conveyor-type	1,663,200 (1,515,900)	52,810 (37,703)	403,524 (255,686)	979 (865)	82
No 6 Multi-tank conveyor-type	4,276,800 (4,009,500)	128,257 (102,229)	763,752 (643,645)	1,765 (2,146)	141

MEErP Task 4 Technologies

Main updates after review

Martin Möller - Oeko-Institut



Key adjustments based on stakeholder feedback

- **Stakeholder information included in the report on limitations of following technologies initially considered as BAT:**
 - Water treatment / reverse osmosis
 - Steam heating
 - Enzymes
- **Packaging: consider Packaging & Packaging Waste Regulation (PPWR)
=> avoid double regulating**

MEErP Task 5 LCA & LCC of Base Cases

Kathrin Graulich – Oeko-Institut



Key adjustments based on stakeholder feedback

- **Manual pre-rinsing:**
 - MEERP Task 5 results in the report not updated (overall contributing to environmental impact of water over lifetime <5%), but explicitly specified that the water consumption includes pre-rinsing (still to be specified for BC5+BC6 as well => will be added in the final version of the report)
- **Electricity consumption:**
 - All BC updated as the initial results included the standby consumption twice
- **BC5 / BC6:**
 - Recalculation of LCA/LCC impacts based on revised inputs of duration in active mode / ready to use mode and resulting annual number of cleaned dishes
- No changes in the overall outcome / conclusions for this product category!

Summary results:

All base case results show similar trends

LCA results

- Majority (>90 %) of the lifetime impact is from the **use phase** followed by the raw materials production for most impact categories
- End-of-life modelling shows a credit for avoided impacts due to recyclability of certain raw materials such as stainless steel, galvanised steel, aluminium, electronics (printed wiring board)
- Use phase: Major contributor is **energy use** (mostly electricity) for most impact categories
- Production phase: Major contributor of raw materials are **electronics** (printed wiring board) and stainless steel; additional high contributing raw materials are polypropylene and copper depending on the impact category
- Impact is correlated to product resource consumption (energy, water, detergent, rinsing agent) and the capacity of the machines, with a higher impact over the full life cycle for the largest machines
- However, per cleaned dish, smaller machines have a higher environmental impact, due to a lower number of dishes handled

■ LCC results

- **Energy** use is the main cost driver for all Base Cases
- **Running costs** exceed initial purchase costs

■ LCA & LCC EU-27 level:

- Sales volume has a significant effect on stock-level impact, showing the highest effect for **BC2**, which has the highest sales volume and thereby stock accumulation

MEErP Task 6 LCA & LCC of Design options

Martin Möller – Oeko-Institut



Design options – Overview

- Overview of design options, including all options combined (DO-08)
 - Note for BC1, only DO-04 is included; for BC2, DO-02 is excluded; DO-05 and DO-06 are not further considered

Design option no.	Short title	Description of the design option – working hypothesis
DO-01	Exhaust heat recovery (regenerator)	Exhaust heat recovery captures waste heat from steam or hot exhaust gases to preheat incoming water. This design option can improve energy efficiency and kitchen air quality (through steam condensation). However, the system increases resource use during manufacturing as it requires additional materials such as a heat exchanger (recuperator), piping, and insulation.
DO-02	Exhaust air heat pump	The integration of a heat pump in a commercial dishwasher reclaims heat from exhaust air to preheat water. The design option can improve energy efficiency and enhance indoor air quality by reducing steam discharge. However, the system increases resource use during manufacturing as it requires additional materials like a compressor, evaporator, condenser, and refrigerant circuit.
DO-03	Automatic programme for load and soil recognition	An automatic load and soil detection programme adjusts water, energy and detergent use based on load size and soil level. This design option can improve energy efficiency and reduce water and detergent consumption. However, the system increases resource use during manufacturing as it requires additional materials such as sensors, control units, and software integration.
DO-04	Improved thermal insulation (double-walled design)	Improved thermal insulation through double wall design reduces heat loss by creating an insulating air gap between the inner and outer walls. This design option can improve energy efficiency and workplace comfort by minimising external heat radiation. However, the system increases the use of resources during manufacture as it requires additional materials such as stainless-steel sheets, insulation layers and sealing components.
DO-05	Further substitution of metals by polymers	Substitution of metal components with polymers (such as PP and ABS) reduces overall weight and <i>can improve durability</i> by providing superior chemical and corrosion resistance in harsh environments. This substitution offers environmental benefits, including a reduced carbon footprint due to the lower environmental impact of manufacturing polymer materials (compared to metals) and a <i>potentially longer service life</i> of the commercial dishwasher.

Design option no.	Short title	Description of the design option – working hypothesis
DO-06	Modular design and reuse of electronics	Modular design with replaceable electronic modules (e.g. control boards, power supplies) allows for targeted upgrades and repairs without replacing the entire dishwasher. This design option can reduce raw material consumption and the carbon footprint associated with manufacturing new electronics. In addition, standardised modules can simplify repairs and maintenance and potentially extend the life of the commercial dishwasher. However, initial implementation may require additional design effort and durable connectors to ensure long-term reliability.
DO-07	Energy recovery from drain water	A commercial dishwasher equipped with a drain water heat recovery system is designed to significantly reduce energy consumption by capturing thermal energy from hot wastewater. After each wash cycle, the hot drain water—often at temperatures around 60 °C—is routed through a heat exchanger, where it transfers its heat to the incoming cold freshwater supply. This process preheats the cold water (for example, from 15 °C up to approximately 40 °C) before it enters the dishwasher's internal heating system, thereby reducing the energy required to reach the necessary rinse temperature. This design option can reduce the energy needed to reach washing temperatures, thereby also cutting water heating costs.
DO-08	Combined options	This design option originally combined the features of all the aforementioned design options (DO-01 to DO-07). Following stakeholder feedback received in August 2025, it has been revised to comprise only DO-01, DO-03, DO-04 and DO-07.

Key adjustments based on stakeholder feedback

- **No further consideration of DO-05 and DO-06**
 - Further substitution of metals by polymers limited due to the demanding workload of commercial dishwashers as well as limited availability of polymer alternatives due to PFAS restrictions
 - Modular design and reuse of electronics not feasible due to aging of electronics during the long service life of commercial dishwashers
- **Rearrangement of DO-08**
 - Now only a combination of DO-01, DO-03, DO-04, and DO-07 due to the withdrawal of DO-05 and DO-06, and since combining DO-01 and DO-02 would not be reasonable
 - Bill of materials and purchase price adjusted accordingly
 - Energy savings reduced to 30 % for all the relevant Base Cases
 - Concerning the savings in water, detergent, and rinsing agent, the respective figures for DO-03 were applied
 - Concerning the service life the same period was assumed in all cases as for the respective Base Cases (representing a conservative assumption, as a slightly longer service life can be expected due to the consideration of DO-03)
- **Water savings of DO-03 was calculated based on the real water consumption without pre-rinsing**

Design options – input parameters (adjusted)

- Main input data changes:

Design option	Bill of Materials	Consumption	Lifetime	Purchase price
DO-01	More PP, cables, gaskets and electronics, inclusion of heat exchanger materials	14 % - 15 % less energy use	No change	15 % - 18 % more
DO-02	More PP, cables, gaskets, inclusion of heat exchanger materials	15 % less energy use	2 - 5 % shorter	63 % & 75 % more for BC3 + BC4 38 % more for BC5 + BC6
DO-03	More stainless steel, PP, ABS*, cables, cable sheaths, gaskets and electronics	12 % less energy, detergent and rinsing agent use; 5 - 11 % less water use	10 % longer	28 % more for BC3 + BC4 50 % more for BC5 + BC6
DO-04	More stainless steel	10 % - 12 % less energy use	No change	3 % - 5 % more
DO-05	More PP, PA, ABS*, PS and copper; less stainless steel	No changes	27 % shorter	2 % - 5 % less
DO-06	More ABS*, cables, cable sheath, electric contactor, gaskets, electronics	No changes	10 % longer	5 % - 8 % more
DO-07	No changes	5 % - 10 % less energy use	No change	10 % - 15 % more
DO-08	Less stainless steel, more PP, PA, cables, electronics, gaskets, heat exchanger materials	30 % less energy use	No change	56 % - 87 % more

MEErP Task 7 Scenarios

Antoine Durand – Fraunhofer ISI

Robin Barkhausen – Fraunhofer ISI



Policy Analysis

Opportunities: Use phase is dominant

- LCA: Contribution to the LCA impact (PEF single score) over the total lifetime of the product, on product level

Use phase	BC1	BC2	BC3	BC4	BC5	BC6
Energy consumption	73%	71%	77%	75%	77%	84%
Water consumption	12%	11%	6%	5%	4%	4%
Detergent and rinsing agent consumption	5%	8%	7%	8%	6%	5%
Total use phase	90%	90%	90%	87%	87%	93%

→ 87 % to 93 % of the lifecycle impact due to the use phase (71% to 84% due to the energy consumption)

- LCC: Relevance of the use phase in the LCC, at product level

Use phase	BC1	BC2	BC3	BC4	BC5	BC6
Energy consumption	42%	45%	52%	47%	64%	71%
Water consumption	8%	8%	4%	3%	4%	3%
Detergent and rinsing agent consumption	12%	21%	20%	21%	22%	19%
Total use phase	62%	73%	76%	72%	90%	94%

→ 62 % - 94 % of the LCC due to the use phase (42% to 71% due to the energy consumption)

Policy Analysis

Opportunities: Large improvement potentials

- Significant improvement potentials, on product level

Use phase	BC1	BC2	BC3	BC4	BC5	BC6
Energy consumption	-15%	-30%	-30%	-30%	-30%	-30%
Yearly life cycle costs	-6%	4%	-2%	4%	-32%	-41%
Single score	-6%	-19%	-20%	-17%	-21%	-24%

- LCC: Contribution of each BC to the achievable improvement of the whole market

	BC1	BC2	BC3	BC4	BC5	BC6	Total
Volume [1,000 units] in 2023	8.3	178.8	66.0	13.8	5.5	2.8	275.0
Improvement of the environmental impact of the market [single score]	4.67E+02	8.17E+04	6.00E+04	1.08E+04	2.48E+04	4.28E+04	2.21E+05
Contribution to the reduction of env. impact of the whole market [single score]	0%	37%	27%	5%	11%	19%	100%

→ BC 2 and BC 3 account for nearly two-thirds of the total improvement within the product group

→ BC 5 and BC 6 contribute approximately 30%

Policy Analysis

Barriers:

- **Only BC2 and BC3 are covered by a performance standard (EN IEC 63136:2019),** despite the mandate M/495 by the Commission to CENELEC and CEN to develop new performance standards for commercial dishwashers
- **Limited uptake of EN standard in the EU**
- **Testing results:** not comparable → requirements for a declaration programme are missing, to ensure comparability between competing products (models of the same category)
- **Reduced competitive pressure:** Due to the lack of comparable data on energy, water, detergent and rising agent consumption across products. Two key risks emerge:
 - Lack of transparency for high-performing products
 - Weak innovation incentives

Policy Analysis

ESPR Framework (Art. 5)



Source: https://environment.ec.europa.eu/events/information-session-new-ecodesign-sustainable-products-regulation-espr-2024-05-22_en

Policy Analysis

Potential policy: Scope

Definition of commercial dishwashers used in this study

‘Commercial dishwasher’ means a machine which cleans, rinses, and optionally dries wash ware like dishware, glassware, cutlery, and other utensils connected to the preparation, cooking, arrangement or serving of food (including drinks) by chemical, mechanical, and thermal means; which is connected to electric mains and which is designed to be used principally for commercial (non-household, non-industrial) purposes as stated by the manufacturer in the Declaration of Conformity (DoC).

The scope of a potential regulation would be aligned with this definition and would cover the six Base Cases analysed in MEeRP Tasks 5 and 6:

- BC1: Undercounter water-change dishwasher
- BC2: Undercounter one-tank dishwasher
- BC3: Hood-type dishwasher
- BC4: Utensil/pot dishwasher
- BC5: One-tank conveyor-type dishwasher
- BC6: Multi-tank conveyor-type dishwasher

BC1 – Test standard

- Currently: No performance standard available, as not enough CEN/CENELEC members volunteered for the M/495 standardisation work
- From a technical point of view, two approaches for testing BC1 products would be possible:
 1. Test method based on **EN 60436 “Electric dishwashers for household use – Methods for measuring the performance”**.
→ It is *unclear whether changes* to this standard would be required to test commercial dishwashers, and some stakeholders even suggested that EN 60436 could be used directly as these appliances operate in a similar way to typical household machines
 2. Test method based on **EN IEC 63136 “Electric dishwashers for commercial use – Test methods for measuring the performance”**, with some points modified to better reflect the typical use of BC1 appliances. This approach was supported by some stakeholders.
→ **This approach is suggested here**

BC1 – Test standard

Possible test method based on the EN 63136 standard (suggested by Miele)

Declaration programme:

- Test programme that cleans normally soiled wash ware. The programme must also fulfil the minimum hygiene requirements (see standard EN 17735).
- Connection to cold water
- Dishwasher with integrated water softening device (water softening cannot be deactivated)
- Testing the cleaning and resoiling performance in accordance with IEC 63136
- Requirements for the declaration programme:
 - Cleaning performance: $X_c \geq 95\%$ and
 - Resoiling performance: $X_r \leq 1$

BC1 – Test standard

Possible test method based on the EN 63136 standard (suggested by Miele)

- From a practical point of view: it would be easier for the standardisation body to **add a specific annex for BC1 in the EN IEC 63136** than to develop a new dedicated standard. However, the aforementioned test method would need to be checked and validated.
- If the process of covering BC1 with a harmonised standard takes too long, a fallback solution is possible under Article 42 of the ESPR.
This allows common specifications to be formulated in the implementing act because the conditions in points 1(a)(ii) and 1(b) are met.

BC1 – Performance requirements

Following performance per cycle of a machine has been reported by Miele:

- Water consumption: 13 l/cycle
- Energy consumption: 1.6 kWh/cycle
- Runtime (without drying): 16 min/cycle*

The figures provide an initial indication of potential performance requirements regarding water and energy consumption. Nevertheless, additional data is needed to elaborate robust requirements for a future regulation.

* According to Task 3, a typical programme takes 8 min for one cycle.

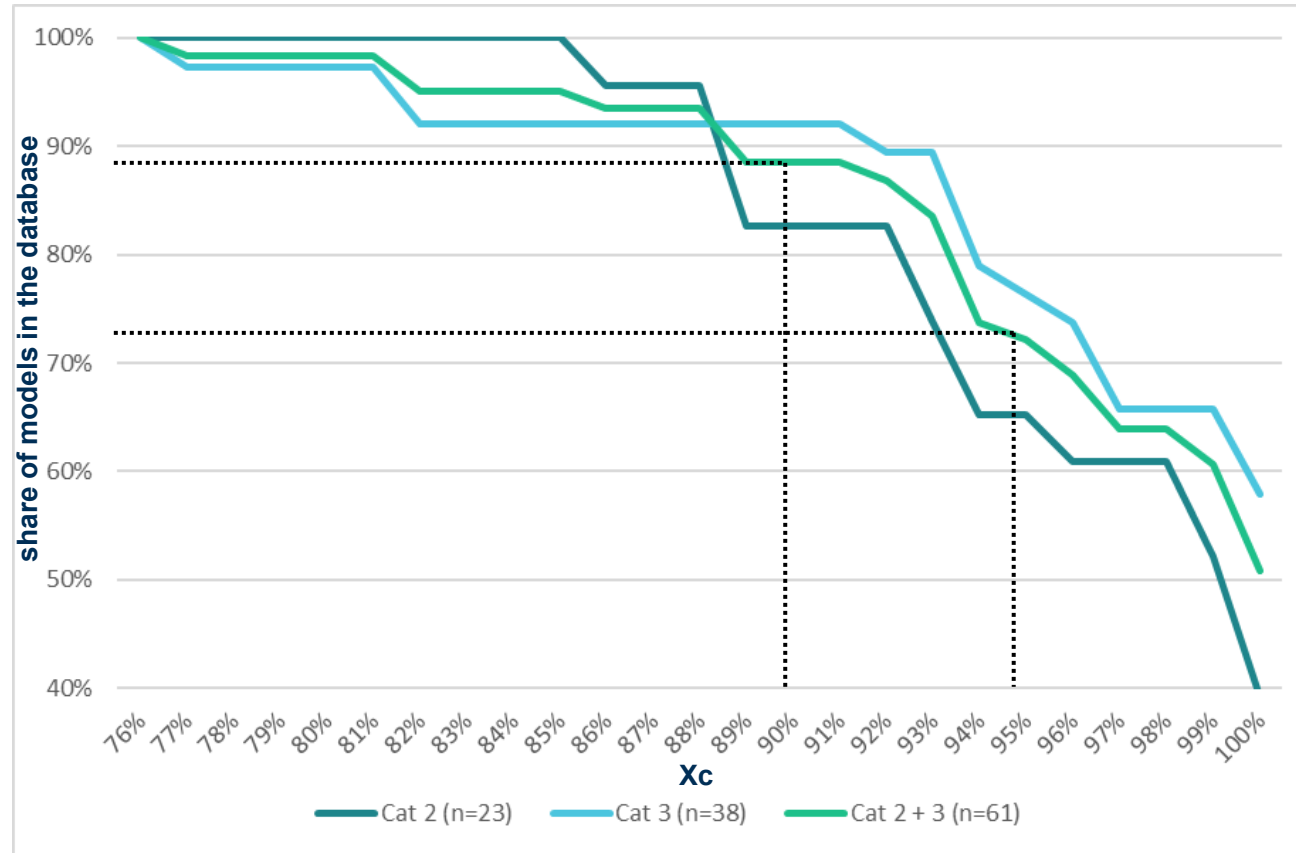
BC2&3 – Test standard

Current situation:

- EN IEC 63136 is already covering and used for BC2 and BC3 appliances.
- In addition to the test standard, a **declaration programme for the test should be specified in the regulation**. Suggested requirements for such a declaration programme are:
 - Cleaning performance: $X_c \geq 95\%$
 - Resoiling performance: $X_r \leq 1$
 - The programme must also fulfil the minimum hygiene requirements (see standard EN 17735).

Remark: data are available for some models on the Swiss market, since a national programme (Standardised Measure GG-02a) covers electric dishwashers for commercial use within the scope of standard IEC 63136:2019.

BC2&3 – Requirements for the declaration programme



- Resoiling performance: $X_r \leq 1$ (broad support among the stakeholders)
- Cleaning performance: $X_c \geq 95\%$: 72% of BC2&3 fulfil the criteria, even if not required for the Swiss programme

*Some stakeholders consider this requirement as too stringent.
Remark: 89% of the models in the Swiss product database reach $X_c \geq 90\%$*

BC2&3 – Energy consumption requirements

- More than 90 % of the products in the Swiss product database that meet:
 - cleaning requirements $\geq 95\%$ **and**
 - resoiling requirements ≤ 1
 consume less than **0.02 kWh per test dish**.
- When considering all products of the Swiss product database, the compliance rate falls to 52-55%.

BC		BC2			
Xc		$\geq 95\%$ (proposal for the declaration programme)			
		Considering all products fulfilling Xc and Xr requirements (n=13)		Considering all products in the database (n=23)	
Energy consumption per test dish [kWh/test dish]	Nr of models [-]	Share [%]	Cumulated share [%]	Share [%]	Cumulated share [%]
0.012	1	8%	8%	4%	4%
0.014	3	23%	31%	13%	17%
0.016	5	38%	69%	22%	39%
0.018	3	23%	92%	13%	52%
0.020	0	0%	92%	0%	52%
0.022	0	0%	92%	0%	52%
0.024	0	0%	92%	0%	52%
0.026	1	8%	100%	4%	57%
Total	13	100%		57%	
BC		BC3			
Xc		$\geq 95\%$ (proposal for the declaration programme)			
		Considering all products fulfilling Xc and Xr requirements (n=23)		Considering all products in the database (n=38)	
Energy consumption per test dish [kWh/test dish]	Nr of models [-]	Share [%]	Cumulated share [%]	Share [%]	Cumulated share [%]
0.012	1	4%	4%	3%	3%
0.014	0	0%	4%	0%	3%
0.016	4	17%	22%	11%	13%
0.018	7	30%	52%	18%	32%
0.020	9	39%	91%	24%	55%
0.022	2	9%	100%	5%	61%
0.024	0	0%	100%	0%	61%
0.026	0	0%	100%	0%	61%
Total	23	100%		61%	

BC2&3 – Water consumption requirements

- More than 90 % of the products in the Swiss product database that meet:
 - cleaning requirements $\geq 95\%$ and
 - resoiling requirements ≤ 1
 consume less than **0.15 litre per test dish**.
- When considering all products on the Swiss product database, the compliance rate falls to 52-61%.

BC		BC2			
Xc		$\geq 95\%$ (proposal for the declaration programme)			
		Considering all products fulfilling Xc and Xr requirements (n=13)		Considering all products in the database (n=23)	
Water consumption per test dish (L / test dish)	Nr of models [-]	Share [%]	Cumulated share [%]	Share [%]	Cumulated share [%]
0.080	0	0%	0%	0%	0%
0.090	1	8%	8%	4%	4%
0.100	3	23%	31%	13%	17%
0.110	2	15%	46%	9%	26%
0.120	4	31%	77%	17%	43%
0.130	0	0%	77%	0%	43%
0.140	0	0%	77%	0%	43%
0.150	2	15%	92%	9%	52%
0.160	0	0%	92%	0%	52%
0.170	0	0%	92%	0%	52%
0.180	0	0%	92%	0%	52%
0.190	1	8%	100%	4%	57%
0.200	0	0%	100%	0%	57%
Total	13	100%		57%	
BC		BC3			
Xc		$\geq 95\%$ (proposal for the declaration programme)			
		Considering all products fulfilling Xc and Xr requirements (n=23)		Considering all products in the database (n=38)	
Water consumption per test dish (L / test dish)	Nr of models [-]	Share [%]	Cumulated share [%]	Share [%]	Cumulated share [%]
0.080	1	4%	4%	3%	3%
0.090	0	0%	4%	0%	3%
0.100	11	48%	52%	29%	32%
0.110	2	9%	61%	5%	37%
0.120	7	30%	91%	18%	55%
0.130	0	0%	91%	0%	55%
0.140	2	9%	100%	5%	61%
0.150	0	0%	100%	0%	61%
0.160	0	0%	100%	0%	61%
0.170	0	0%	100%	0%	61%
0.180	0	0%	100%	0%	61%
0.190	0	0%	100%	0%	61%
0.200	0	0%	100%	0%	61%
Total	23	100%		61%	

34

BC2&3 – Energy and water consumption requirements combined

- Proposed requirements: **max 0.02 kWh and 0.15 l per test dish (tested in the declaration programme)**
- 64% of the models from the Swiss market database fulfilling $X_c \geq 95\%$ und $X_r \leq 1$ would comply (38% of all models from the Swiss market database)

Requirements		BC	$X_c \geq 0.95$ und $X_r \leq 1$		
Energy	Water		Nr of models complying	Considering all products fulfilling X_c and X_r requirements	Considering all products in the database
kWh/test dish	l/test dish		Nr of models [-]	Share (based on n=13)	Share (based on n=23)
0.020	0.150	2	11	85%	48%
0.023	0.175		12	92%	52%
0.026	0.200		12	92%	52%
kWh/test dish	l/test dish		Nr of models [-]	Share (based on n=23)	Share (based on n=38)
0.020	0.150	3	12	52%	32%
0.023	0.175		22	96%	58%
0.026	0.200		23	100%	61%
kWh/test dish	l/test dish		Nr of models [-]	Share (based on n=36)	Share (based on n=62)
0.020	0.150	2 and 3	23	64%	38%
0.023	0.175		34	94%	56%
0.026	0.200		35	97%	57%

- Level of requirements should be checked. Important remarks:
 - models from the Swiss market database might not reflect the EU market
 - but compliance rate might be underestimated, as no declaration programme was provided in Switzerland → performance of the models not optimised for the declaration programme
 - according to Task 6, BAT performance is cost efficient for each BC

BC4 – Test standard

Current situation:

- By definition: utensil/pot dishwashers are designed to clean a **wide range of wash ware**, such as heavily soiled black wash. These dishwashers also include a special type of dishwashers: the so-called “granulate dishwashers”.
- A **completely new test standard** (with new test dish and new test soiling) would have to be elaborated, tested and validated.

➔ Developing a test procedure for BC4 would be challenging, especially given that the market size is rather very limited.

➔ Accordingly, **this BC is not seen as a priority for standardisation works.**

BC5&6 – Test standard

Current situation:

- BC5 and BC6 are not yet covered by any EN standard that addresses the performance characteristics.
 - In addition, BC5 and BC6 have a modular design and are customised for each order. Nevertheless, it would be possible to develop a test procedure, although it would require considerable effort and time.
- ➔ it is not expected that such a test method could be developed and applied in time for the forthcoming regulation.

BC4, 5 and 6: Performance requirements

- For these three BCs: due to the lack of standard and data, an alternative approach will have to be chosen. Article 6(2) of the ESPR mentions the following:

“The performance requirements shall be based on the relevant product parameters referred to in Annex I and shall, as appropriate, include either or both of the following:

(a) minimum or maximum levels in relation to a specific product parameter or a combination thereof;

*(b) **non-quantitative requirements** that aim to improve performance in relation to one or more of such product parameters.”*

→ **Set mandatory requirements based on the analysis conducted in Task 6**

→ Following DOs have to be translated as non-quantitative requirements for the relevant BC

Design option no.	Short title	BC4	BC5	BC6	Additional information
DO-01	Exhaust heat recovery (regenerator)	Yes	Yes	Yes	
DO-02	Exhaust air heat pump	No	Yes	Yes	
DO-03	Automatic programme for load and soil recognition	Yes	Yes	Yes	
DO-04	Improved thermal insulation (double-walled design)	Yes	Yes	Yes	U-value (thermal transmittance) requirement to be formulated
DO-07	Energy recovery from drain water	No	Yes	Yes	

Information requirements

- For BC1, 2 and 3: the following information should be reported:

Measured data	Unit
Energy consumption for initial filling [1]	kWh
Water consumption for initial filling [1]	L
Initial filling time [1]	s
Water tank temperature when ready-to-use mode reached [1], [3], [5]	°C
Number of test dishes [2] per rack and cycle	-
Cleaning performance with the standard cleaning cycle	%
Resoiling performance in particles per test dish [2]	particles / test dish
Specific energy consumption per test dish [2]	kWh / test dish
Specific water consumption per test dish [2]	g / test dish
Specific detergent consumption per test dish [2],[3]	g / test dish
Specific rinsing agent consumption per test dish [2],[3]	g / test dish
Average cycle time	s
Power left-on mode [3],[4]	kW
Power ready-to-use mode [1]	kW

[1] only applicable to product with tank (not for Cat 1)

[2] test dish = plate (potentially except Cat 4)

[3] currently not part of the EN IEC 63136:2019

[4] only applicable to product without tank (Cat 1)

[5] added to better compare products as well as the tank performance

- For all products (BC1-6), following additional information would be required:
 - general information such as nominal capacity and noise level
 - SoCs

Label

- Given that commercial dishwashers are Business-to-Business (B2B) products purchased by professional customers who typically prioritise operating costs (directly linked to energy, detergent, and water consumption), it is assumed that robust information requirements alone would be sufficient to guide purchasers towards more sustainable choices.
- Consequently, no specific need for an additional label (such as an ESPR label or energy label) has been identified in this context.

Digital Product Passport

Why is a DPP required?

- Professional dishwashers are not covered by EPREL (EU Product Database for Energy Labelling) established under the Energy Labelling Framework Regulation (EU) 2017/1369
 - The exemption clause in ESPR Article 9(4)(b), which allows DPP exemptions for products already covered by EPREL, does not apply to professional laundry appliances
- ➔ **DPP is mandatory for this product group**

The way to a DPP:

- There is **no official or harmonised approach to elaborate on the DPP requirements**, yet; the harmonised methodology is expected to be delivered by the end of 2025 by the European Commission's Joint Research Centre (EC-JRC) under the service contract *Technical assistance in defining requirements for the inclusion of data and information in the Digital Product Passport (DPP)*.
- The **scope** covers both **technical aspects** (e.g. data carrier, layout, granularity, accessibility, governance, and update arrangements) and **information aspects** (e.g. sustainability-related data fields, access rights for different actors, and traceability requirements).
- From an **implementation perspective**:
 - It may not be necessary at this stage for every individual actor who puts a product on the market to build and maintain a fully independent DPP system or to deeply engage with every regulatory detail.
 - **DPP integration in this product group could be facilitated through third-party service providers or industry associations.**
 - Third-party providers already offer DPP-compliant services that can handle data storage, validation, and access rights in line with ESPR requirements. Alternatively, a centralised DPP platform could be hosted by sectoral industry associations, which are typically familiar with regulatory obligations and have both technical and organisational capacity for data management. This centralisation can streamline compliance, especially for small and medium-sized enterprises, and enhance interoperability across actors involved in the product life cycle.

Green Public Procurement (GPP)

- 24 % of the market share of commercial dishwashers are in the public sector (see estimate in Task 2)
- Accordingly, it is reasonable to assume that Green Public Procurement (GPP) could have a meaningful impact on the EU market for commercial dishwashers
- ESPR Article 65 (Green Public Procurement): "The minimum requirements shall be based on the **two highest performance classes, the highest scores** or, when not available, **on the best possible performance levels** as set out in the delegated act adopted pursuant to Article 4 applicable to the product groups in question"
- Setting mandatory GPP requirements close to the Best Available Techniques (BAT) level appears to be justified, as Task 6 indicated that the BAT level reduces the yearly life cycle cost (LCC) of the products.

Durability, reusability, upgradability and reparability

Spare parts:

- Maintenance and repair actions seem to be “business at usual” at commercial dishwashers (see Tasks 2 and 3)
- Few requirements suggested to make sure that all products on the market offer spare parts and allow easy repair and maintenance:
 - Maximum delivery time of spare parts [x] of **5 working days until the handover** of spare parts to an express logistics provider
 - For a **minimum period of 10 years** after placing the last unit of the model on the market
 - Information requirement: Provision of repair and maintenance information

Durability, reusability, upgradability and reparability

Most important priority parts in terms of necessary repairs / spare parts to be covered by requirements.

Category	Most important priority parts in terms of necessary repairs / spare parts
Category 1 Under-counter water-change	• Parts of the dosing system are maintenance parts. • Parts related to the water circulation system e.g. circulation pump, piping. • Electronics and dosing pumps.
Category 2 Under-counter one-tank	• Parts of the dosing system are maintenance parts. • Parts related to the water circulation system e.g. circulation pump, piping. • Electronics and dosing pumps. • Pumps, heating elements, chemical dispensers, printed circuit boards (PCBs) • Thermostats and temperature sensors
Category 3 Hood-type	• Parts of the dosing system are maintenance parts. • Parts related to the water circulation system e.g. circulation pump, piping. • Electronics and dosing pumps. • Pumps, heating elements, chemical dispensers, printed circuit boards (PCBs) • Boiler thermostats and boiler pressure switches.
Category 4 Utensil/Pot	• Parts of the dosing system are maintenance parts. • Parts related to the water circulation system e.g. circulation pump, piping. • Electronics and dosing pumps. • Pumps, heating elements, printed circuit boards (PCBs) • Pump contactors and boiler pressure switches.
Category 5 Conveyor-type one-tank and Category 6 Conveyor-type multi-tank	• Parts of the dosing system are maintenance parts. • Parts related to the water circulation system e.g. circulation pump, piping. • Electronics and dosing pumps. • Pumps, heating elements, printed circuit boards (PCBs) • Temperature sensors and boiler heating elements. • Conveyor belts, curtains

Critical Raw Materials

Design for recycling / Critical Raw Materials (CRM) → Permanent magnets

- Dishwashers already explicitly mentioned in the scope of Article 28 of the CRM Act Regulation (EU) 2024/1252:
 - Art. 28 (Recyclability of permanent magnets)
 - Art. 29 (Recycled content of permanent magnets)
- No need to regulate under ESPR → information from this ESPR preparatory study might provide useful information for the elaboration of the forthcoming Delegated Act in accordance with the CRM Act:

*Article 29, Point 3. “After the entry into force of the delegated act adopted pursuant to paragraph 2, and in any event by 31 December 2031, the Commission shall adopt **delegated acts supplementing this Regulation by laying down minimum shares** for neodymium, dysprosium, praseodymium, terbium, boron, samarium, nickel and cobalt recovered from post-consumer waste that must be present in the permanent magnet incorporated in the products referred to in paragraph 1.”*

Substance of Concerns

SoCs in ESPR Art. 2(27)

- a) Appears in the Regulation on the registration, evaluation, authorisation and restriction of chemicals (REACH) (EC No1907/2006)Annex XIV (**Substances of Very High Concern, SVHC**) Candidate List.
- b) Falls under one or more **hazard classes** in **Annex VI of the Classification, Labelling and Packaging of chemicals** (CLP) Regulation (EC No 1272/2008):
 - (i) carcinogenicity categories 1 and 2;
 - (ii) germ cell mutagenicity categories 1 and 2;
 - (iii) reproductive toxicity categories 1 and 2;
 - (iv) endocrine disruption for human health categories 1 and 2;
 - (v) endocrine disruption for the environment categories 1 and 2;
 - (vi) persistent, mobile and toxic or very persistent, very mobile properties;
 - (vii) persistent, bioaccumulative and toxic or very persistent, very bioaccumulative properties;
 - (viii) respiratory sensitisation category 1;
 - (ix) skin sensitisation category 1;
 - (x) hazardous to the aquatic environment — categories chronic 1 to 4;
 - (xi) hazardous to the ozone layer;
 - (xii) specific target organ toxicity — repeated exposure categories 1 and 2;
 - (xiii) specific target organ toxicity — single exposure categories 1 and 2.
- c) Is regulated as a **Persistent Organic Pollutant (POP)** (EU 2019/1021).
- d) **Negatively affects the reuse or recycling** of materials in the product.

Substance of Concerns

SoCs: Information requirements Art. 7(5)

Proposed to cover:

- Only Intentionally Added Substances (IAS)
- SoC present in the product (including its components and spare parts)
(e.g. part of the bill of materials)

Proposed to exclude:

- Non-Intentionally Added Substances (NIAS)
- Substances used in the lifecycle of the product but not present in the product itself

Exemptions:

- No specific information/views gathered on substance specific exemptions

Required to share information

- The exact **name** or numerical **identifier** of each substance, **location** within the product, the **concentration** (concentration range/maximum value), location in the product, clear instructions for safe use, and guidance on environmentally sound end-of-life treatment

Substance of Concerns

SoCs: Tracking thresholds for information requirements

Proposed tracking thresholds (derived from draft JRC guidance):

Art 2(27) SoC:

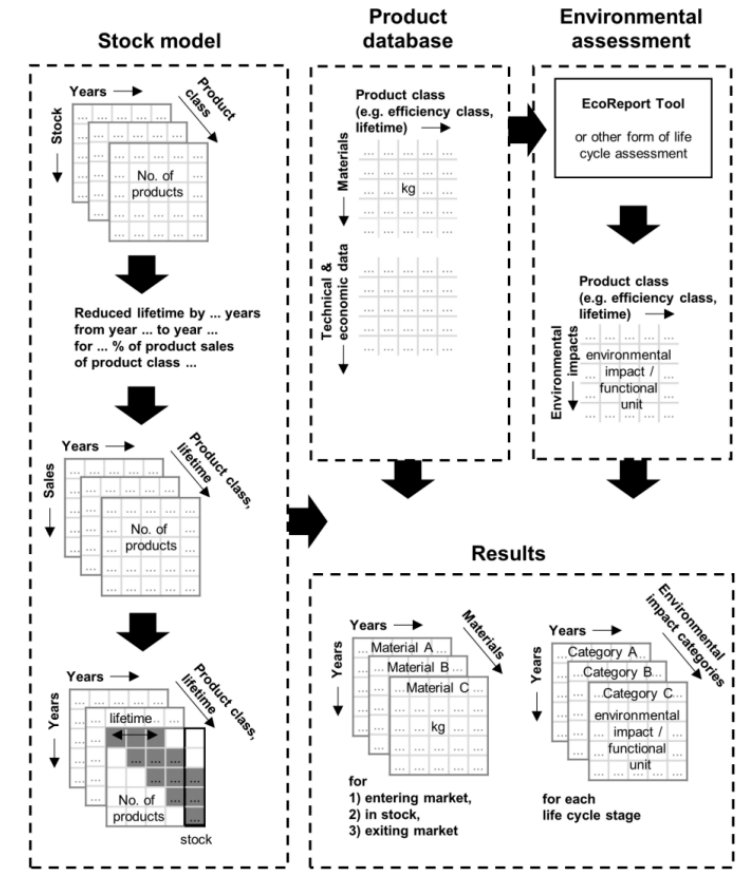
- a) REACH Annex XIV SHVC: 0.1 % weight (w)/weight (w)
- b) CLP hazard classes/categories:
 - UN Globally Harmonized System (GHS): generic contraction limits (GCL): 0.1 % w/w
 - CLP Annex I GCL: 1.0 % w/w or 0.1 % w/w depending on hazard class/category
- c) POP: 0.1 % w/w
- d) Negatively affects the reuse and recycling: 0.1 % w/w

In case of meeting multiple categories, the lowest threshold is followed

Scenario analysis

- BAT compared to BAU -> technical potential
- Roll-out in 2030
- Market growth assumptions (based on Task 2):
 - 2008-2023 → varying growth rates (Prodcum data)
 - > 2025 → moderate linear growth, with average increase of 1,5% per year
- Scenarios for prices development and greenhouse gas intensity of electricity mix based on EU reference scenario (PRIMES)
- Escalation rates:
 - costs of water (0.16%), electricity (1.62%), natural gas (2.15%) and detergent and rinsing agent (1.21%).
 - Investment costs for new products and repair costs are considered with an inflation rate of 2%.

scenario logic →



Scenario analysis

■ Sales:

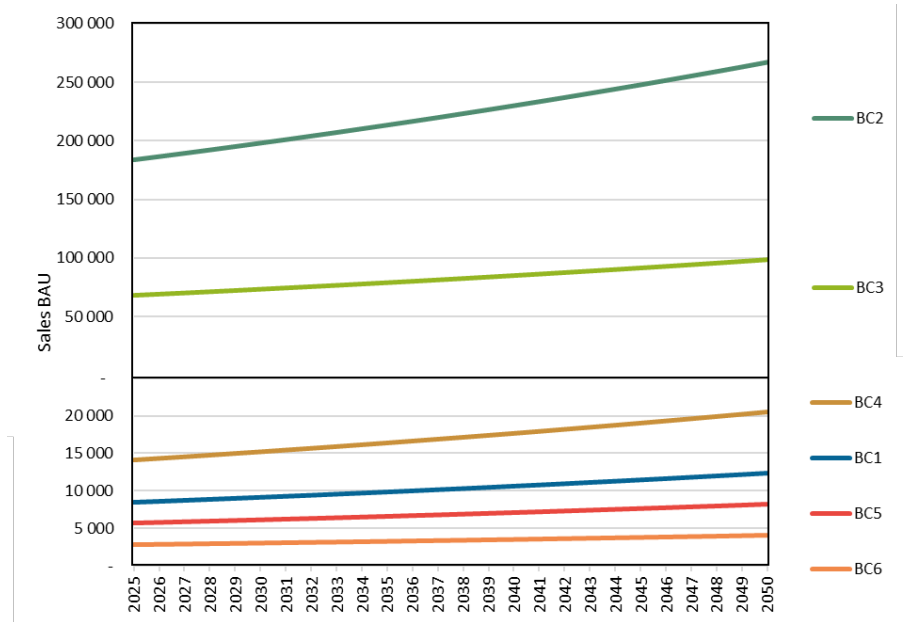
- raises from a total of **283k** dishwashers in 2025 to **411k** in 2050, dominated by **BC2** and **BC3**

BC2 = Undercounter water-change dishwasher

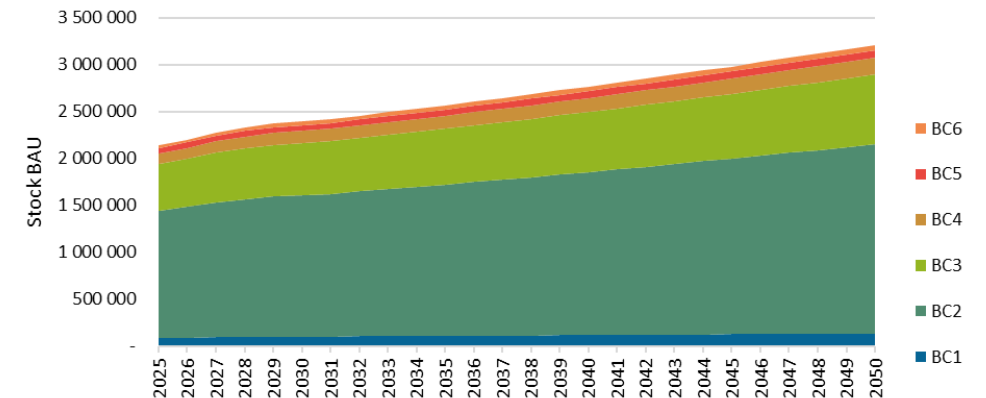
BC3 = Hood-type dishwashers

■ Stock

- raises from **2.1M** in **2025** to **3.2M** in **2050**, and is also dominated by **BC2** and **BC3**.
- total stock in 2050 is made up to **86%** from **BC2** and **BC3** (BC2: 2M, BC3: 0.74M).



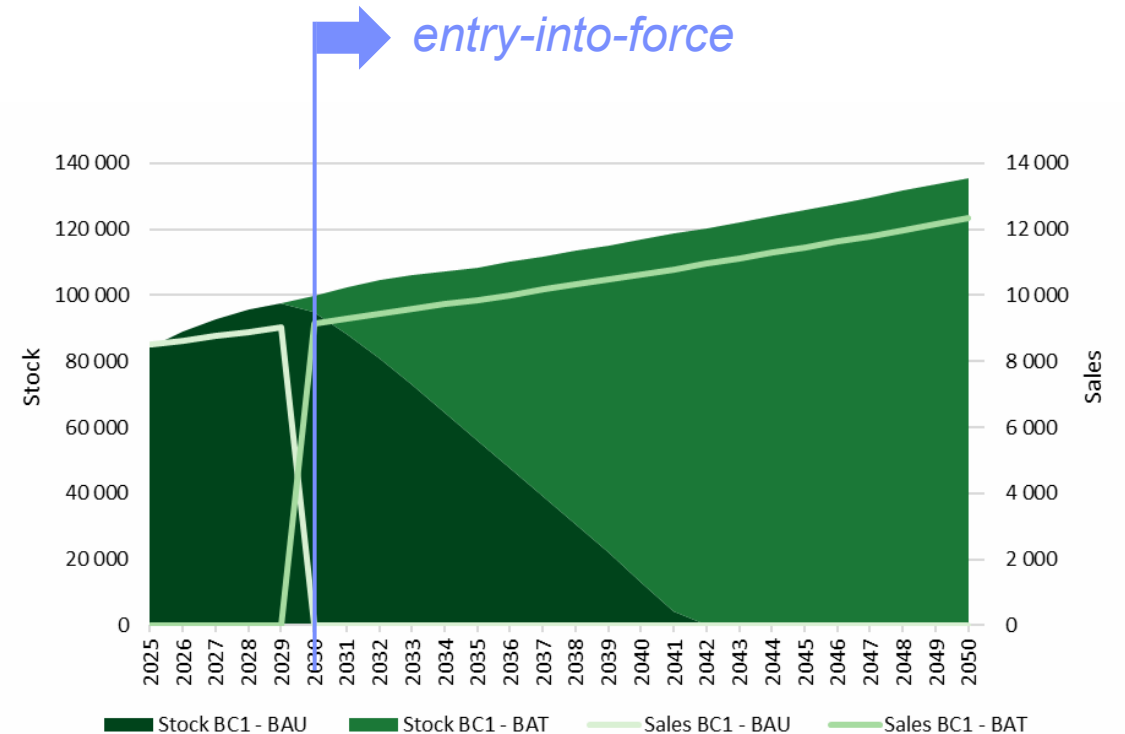
Sales in the BAU scenario



Calculated stock in the BAU scenario **vito.be**

Scenario analysis

- Change in stock:
 - As BAT products are introduced to the market, they **replace BAU sales from 2030 onwards** and induce a **transformation** in the stock that is **completed** in year **2042** (for BC1), when 100% of the BC1 market is made up of the BAT.



*Changes in the stock of the BAT scenario for BC1
due to BAU and BAT product sales*

Scenario analysis – summary of results (stock level)

		energy consumption (TWh)		emissions (Mt CO2)		auxiliary materials			costs (million Euro)							
		electricity	gas	electricity	gas	water (million m³)	detergent (kt)	rinsing agent (kt)	product price	repair	electricity	natural gas	water	detergent	Rinsing agent	Total costs
Total 2025	BAU	24,053	1,452	10,076	340	362	555	44	1,952	859	6,182	120	691	2,342	174	12,320
	BAT	24,053 (+0%)	1,452 (+0%)	10,076 (+0%)	340 (+0%)	362 (+0%)	555 (+0%)	44 (+0%)	1,952 (-0%)	859 (-0%)	6,182 (+0%)	120 (+0%)	691 (+0%)	2,342 (+0%)	174 (+0%)	12,320 (+0%)
Total 2035	BAU	29,464	1,880	5,846	440	437	675	54	2,762	1,215	9,295	193	849	3,212	238	17,764
	BAT	23,931 (-19%)	1,725 (-8%)	4,748 (-19%)	403 (-8%)	419 (-4%)	623 (-8%)	50 (-8%)	4,373 (+58%)	1,948 (+60%)	7,550 (-19%)	177 (-8%)	813 (-4%)	2,963 (-8%)	220 (-8%)	18,044 (+2%)
Total 2050	BAU	36,801	2,343	0	548	546	843	67	4,648	2,045	15,150	330	1,086	4,807	357	28,423
	BAT	25,821 (-30%)	1,901 (-19%)	0 (-30%)	445 (-19%)	511 (-7%)	742 (-12%)	59 (-12%)	7,358 (+58%)	3,277 (+60%)	10,629 (-30%)	268 (-19%)	1,015 (-7%)	4,230 (-12%)	314 (-12%)	27,091 (-5%)

Energy savings

- introduction of BAT products starts in 2030,
- 2025 to 2050: energy savings of 20.13% in electricity** from 2025 to 2050, equating to **160.26 TWh**.
- 2050: savings are 10.98 TWh for electricity and 0.44 TWh for gas.**

Greenhouse gas

- 2025 to 2050: emissions are reduced by 16.12 Mt CO2eq., a 12.5% decrease** compared to the BAU scenario.
- 2050: emissions are reduced by 0.10 Mt CO2eq. gas.**

Resource consumption

- 2050**
 - water savings accumulate to **36 million m³ (7% reduction)**
 - detergent savings reach **101 kt (12% reduction)**.
 - rinsing agent savings reach **8 kt (12% reduction)**.

Costs

- 2025 to 2050: BAT scenario leads to total savings of 57.84 billion Euro in electricity costs,**
- 2050: overall savings of 1.33 billion Euro** compared to BAU.
 - electricity savings: 4.52 billion Euro,
 - detergent savings: 0.58 billion Euro
 - water savings: 0.07 billion Euro
 - gas savings: 0.06 billion Euro
 - rinsing agent savings: 0.04 billion Euro
 - additional investment for higher product prices: 2.71 billion Euro
 - additional investments for repair: 1.23 billion Euro.

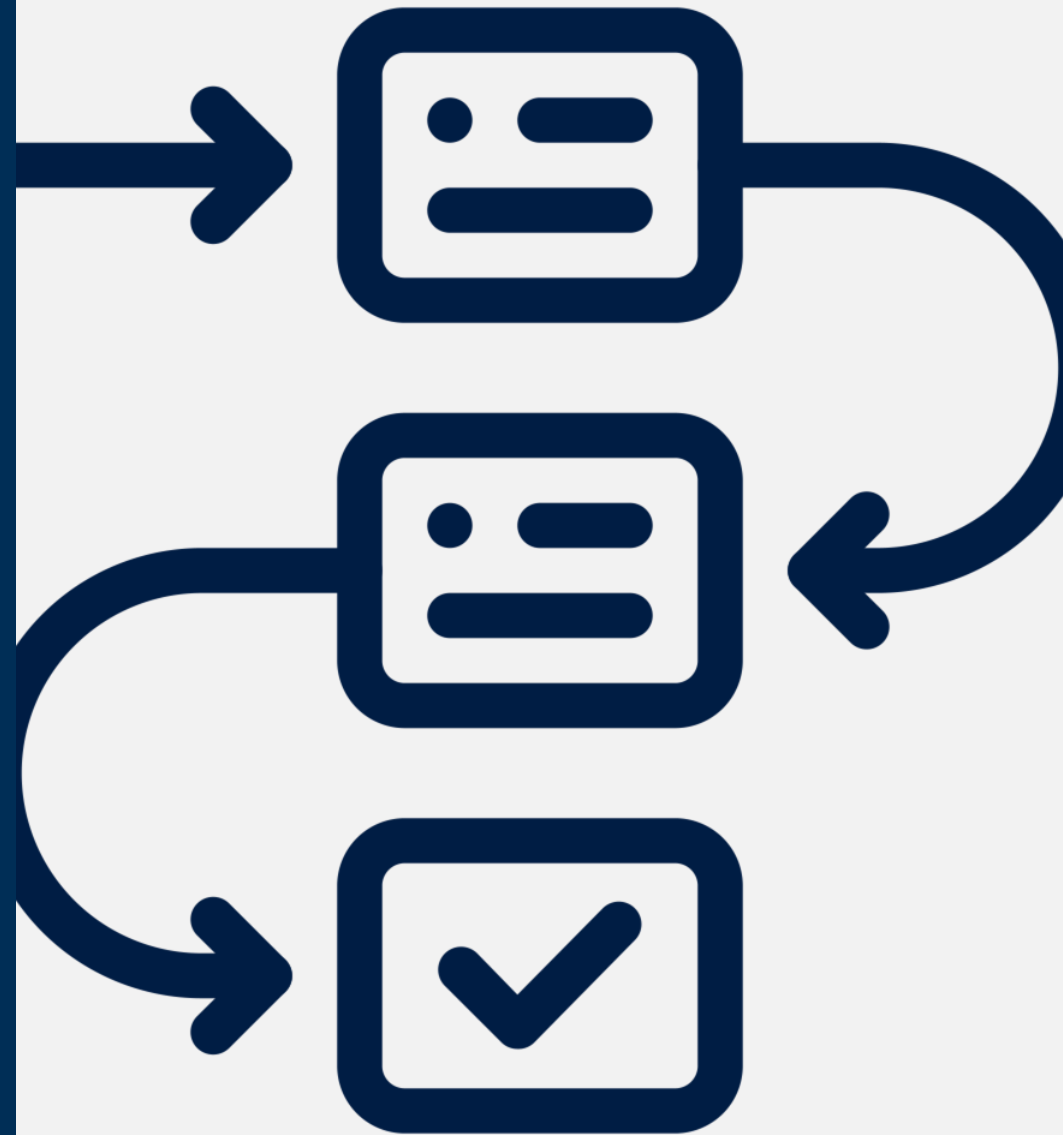
Sensitivity analysis:

- electricity price fluctuations significantly impact total costs,
- expenses for total accumulated electricity costs for the period from **2015 to 2050** ranging from **172.60 billion Euro** in a **low-price scenario** to **248.91 billion Euro** in a **high-price scenario**.

Overall: transitioning to BAT products supports both **environmental sustainability and economic benefits**.

Outlook: Next steps

Kathrin Graulich, Oeko-Institut



Next steps

- **Draft revised MEERP Task 1-7 report** available for download under <https://ecodesign-commdishwashers.eu/en/documents>
- **Stakeholder feedback to MEERP Task 7 report the latest by 24 November 2025:** Please send the [feedback template](#) (available on project website) back to ecodesign-commdishwashers@oeko.de.
- **Final MEERP Task 1-7 report** by end of December 2025
- **Stakeholder registration** still possible, please inform your network: <https://ecodesign-commdishwashers.eu/en/register>

Study schedule

Overall project duration: 04.06.2024 – 03.12.2026

Tasks	Project months from start																													
	Jun. 24	Jul. 24	Aug. 24	Sep. 24	Oct. 24	Nov. 24	Dec. 24	Jan. 25	Feb. 25	Mar. 25	Apr. 25	May 25	Jun. 25	Jul. 25	Aug. 25	Sep. 25	Oct. 25	Nov. 25	Dec. 25	Jan. 26	Feb. 26	Mar. 26	Apr. 26	May 26	Jun. 26	Jul. 26	Aug. 26	Sep. 26	Oct. 26	Nov. 26
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
T1 - IR & OP																														
Inception report preparation																														
Inception meeting	1																													
Online platform																														
T2 - PS - Phase 1																														
MEErP Task 1 Scope																														
MEErP Task 2 Markets																														
MEErP Task 3 Users																														
MEErP Task 4 Technologies																														
IA support for intervention logic*																														
1st STH meeting						2																								
T3 - PS -Phase 2																														
MEErP Task 5 LCA & LCC																														
MEErP Task 6 Design options																														
MEErP Task 7 Scenarios																														
2nd STH meeting																														
T4 - WD and IA support study																														
working documents																														
IA support																														
Technical assistance																														
T5 - STH feedback																														
STH consultation strategy																														
Data collection, synthesis &																														

**Thank you
very much for
your contribution!**

