Preparatory study of Ecodesign and Energy Labelling measures for High Pressure Cleaners

3rd TWG meeting
17 June 2019

The European Commission's science and knowledge service
Joint Research Centre

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Welcome and introduction

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Agenda - Morning

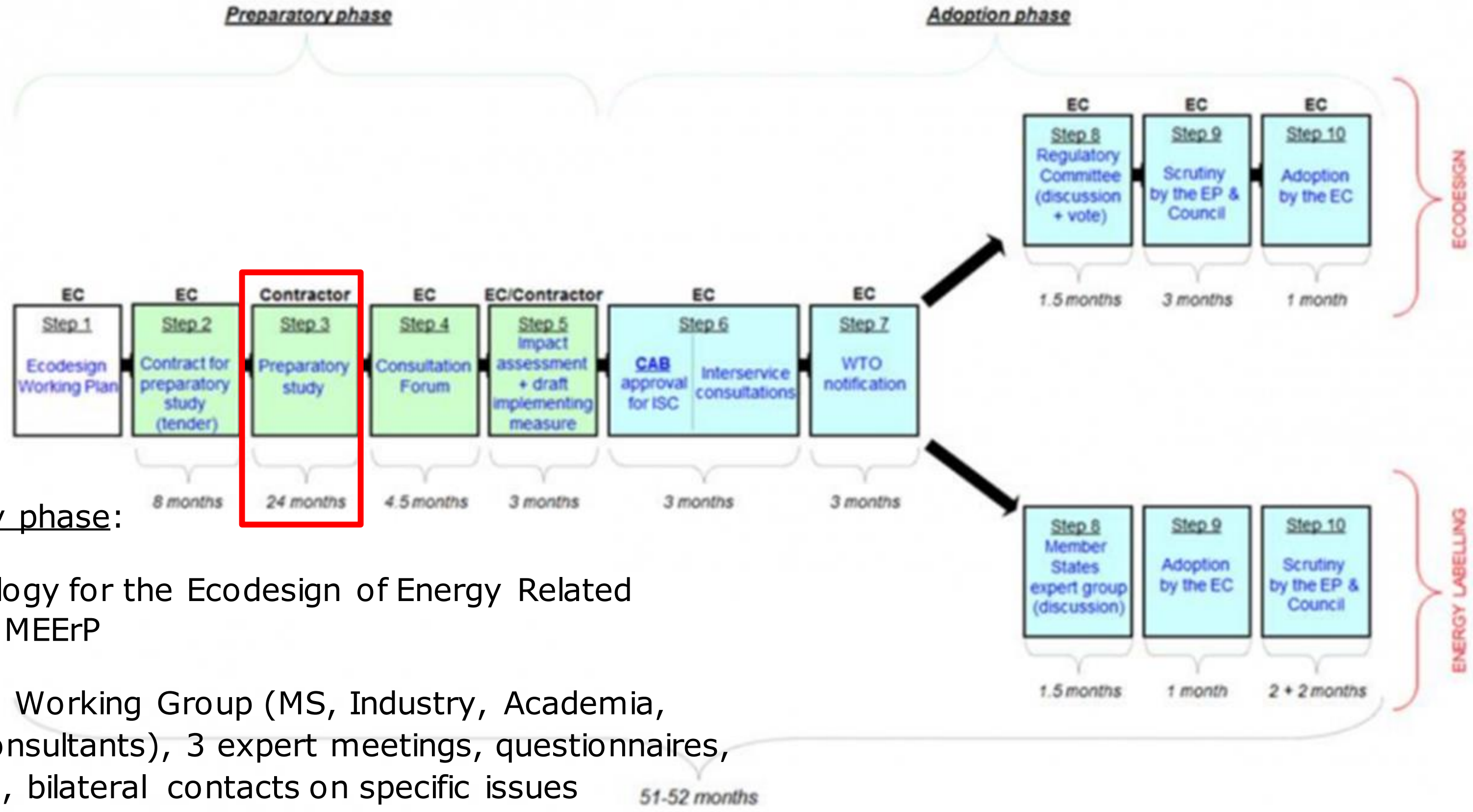
Welcome and introduction	09:30-09.45
Update 1) Timeline 2) Task 1 to 4 chapters of the preparatory study	09:45 – 10:15
Task 5: Environment and economics of base cases	10:15-11:15
Coffee break	11:15-11:30
Task 6: Environment and economics of design options	11:30-13:00
Lunch	13:00-14:00

Agenda - Afternoon

Task 7: Policy analysis and scenarios (I)	14:00-15:30
Coffee break	15.30 – 15.45
Task 7: Policy analysis and scenarios (II)	15.45-17.00
Conclusions, next steps and outlook – Wrap-up of the meeting	17.00-17.30
Close of the WG meeting	17.30

Update of timeline

Ecodesign & Energy Labelling process



Preparatory phase:

- Methodology for the Ecodesign of Energy Related Products MEErP
- Technical Working Group (MS, Industry, Academia, NGOs, consultants), 3 expert meetings, questionnaires, site visits, bilateral contacts on specific issues

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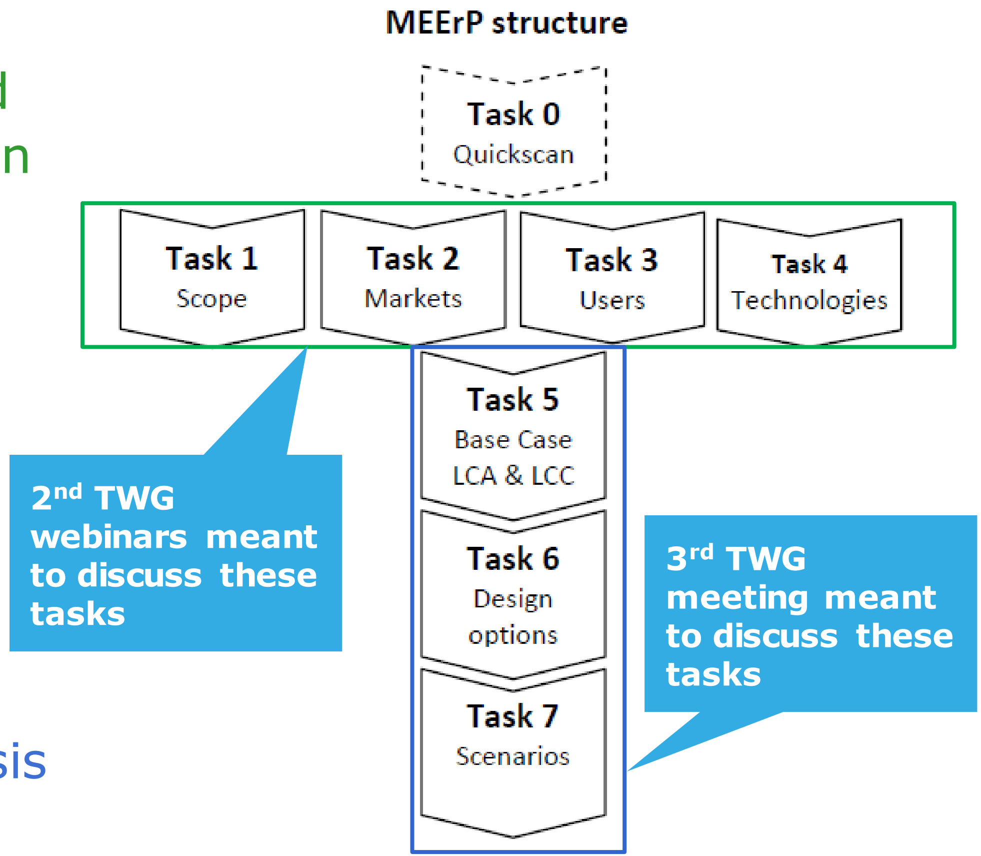
Preparatory phase

- Task 1: Product group def. and scope, standards and legislation
- Task 2: Market analysis
- Task 3: User behaviour and system aspects
- Task 4: Technologies
- Task 5: Environmental and economic assessment
- Task 6: Design options
- Task 7: Policy scenarios analysis



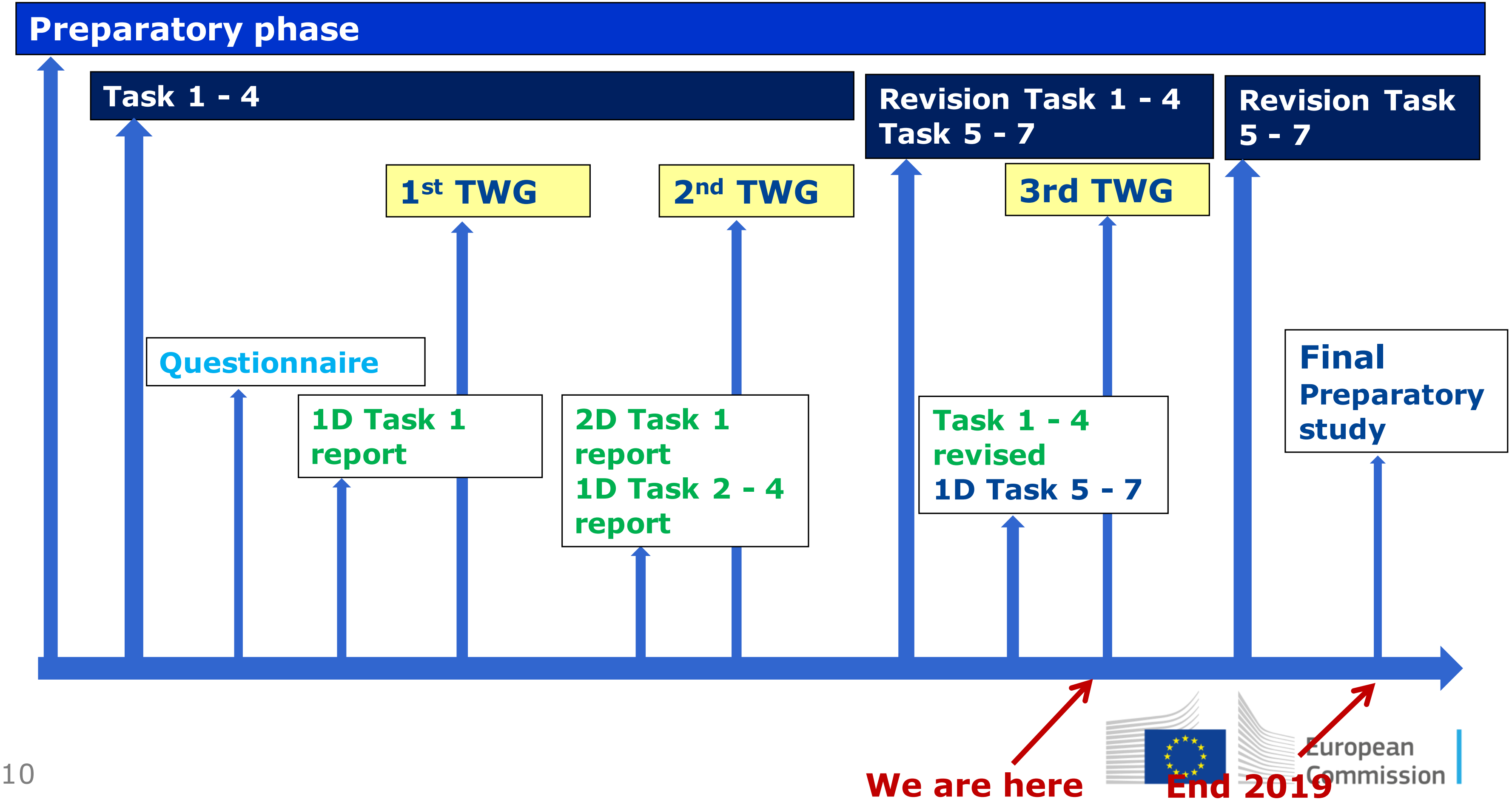
Preparatory phase

- Task 1: Product group def. and scope, standards and legislation
  - Definition product category and system boundaries
  - Test and calculation methods
  - EU and MS legislation + non-EU legislation
- Task 2: Market analysis
  - Market and stock data → needed to model the scenarios
  - Market segmentation, design and technological trends
  - Prices and rates to be used in LCC
- Task 3: User behaviour and system aspects
  - Barriers due to social, cultural or infrastructure factors
  - User-behaviour factors not represented in standards
- Task 4: Technologies
  - Technical analysis of current products in market
  - Best available and not available technologies (BAT, BNAT)

Preparatory phase

- Task 5: Environmental and economic assessment
  - Definition and description of 'base-case' → representative product category
  - Environmental and economic assessment → LCA and LCC
  - Built on the results of Task 1-4 and reference for Task 6-7
- Task 6: Design options
  - Design options + LCC/LCA → Least Life Cycle Cost (LLCC) and BAT
  - BAT = medium-term target for promotion measures
  - Between LLCC and BAT → product differentiation
- Task 7: Policy scenarios analysis
  - Suitable policy means to achieve the improvement potential
  - Scenarios quantifying the improvements vs Business-as-usual scenario
  - Estimates the impact on consumers and industry

Next steps



Preparatory phase
Task 1 - 4
Revision Task 1 - 4
Task 5 - 7
Revision Task
5 - 7
1st TWG
2nd TWG
3rd TWG
Questionnaire
1D Task 1
report
2D Task 1
report
1D Task 2 - 4
report
Task 1 - 4
revised
1D Task 5 - 7
Final
Preparatory
study
We are here
End 2019
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Update of Task 1 to 4 chapters of the preparatory study

Project website: http://susproc.jrc.ec.europa.eu/HighPressureCleaners/index.html

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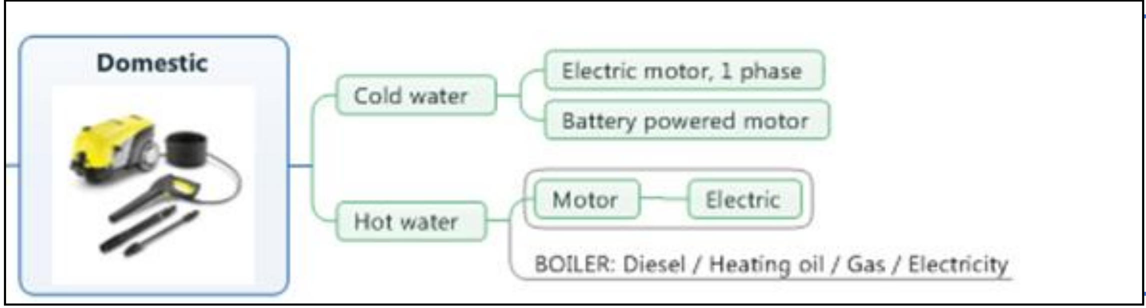
Definitions

- **“High pressure cleaner”** means a device that ejects water at high pressure (above 2.5 MPa and **below 35 MPa**) with the aim to remove dirt, dust, mould, etc. from a soiled surface or structure.
- **"Hot water high pressure cleaner"** means a high pressure cleaner that incorporates a water heater to raise the temperature of the input water.
- **“Domestic high pressure cleaner”** means a unit (cold or hot water) whose maximum power does not exceed 3.3 kW, single phase, and its intended use defined by the manufacturer is domestic.
- **“Professional high pressure cleaner”** means a unit (cold or hot water) whose power is equal to or above 2 kW, and its intended use defined by the manufacturer is professional or industrial. Units driven by internal combustion engines, single or three-phase electric and hydraulic or pneumatic motors are considered professional, and their intended use defined by the manufacturer is professional or industrial.

Intended use

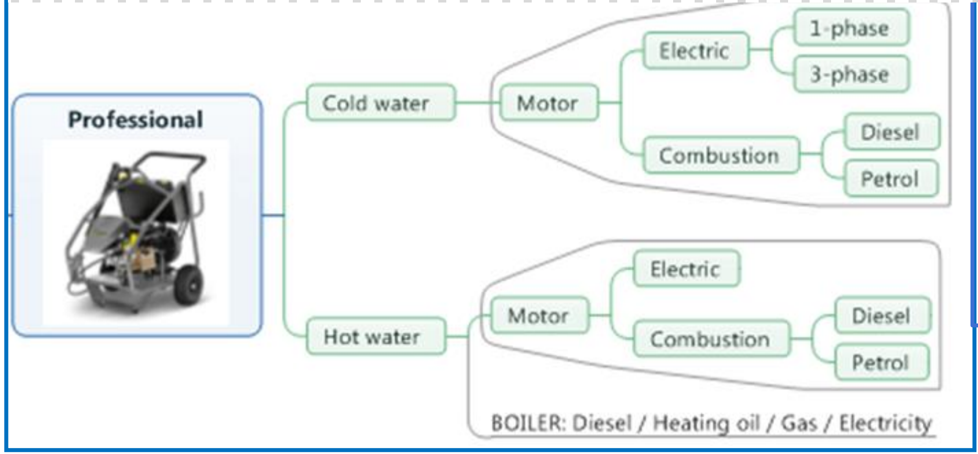
- Usage patterns are very different → **Professional products** are used much **more frequently than domestic ones**
  - **More robust in order to ensure sufficient endurance.**
  - **Designed to enable high reparability** (not the case for domestic products)
- **Intended application** (domestic or professional) is **crucial** in the design and manufacture of the HPCs

Product scope



- Power < 3.3 kW
- Hot and cold water
- **Intended use** defined by the manufacture is domestic

Overlapping between 2 – 3.3 kW → **intended use** determines the category → Any potential criteria on **durability** could be used to determine the boundary



- Power > 2 kW
- Hot and cold water
- **Intended use** defined by the manufacture is professional or industrial

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Frequency and time of use

Type of HPC	Stakeholder 1	Stakeholder 2	Stakeholder 3	Stakeholder 4	Stakeholder 5
Domestic HPC	12 uses/year, average duration of 10-30 minutes/use Totally: 2-6 hours/year	25 uses/year, average duration of 10-20 minutes/ time Totally: 4-8 hours/year	25 uses/year, average duration of 2 hours Totally: 50 hours/year	15 uses/year, average duration of 1 to 3 hours Totally: 15-45 hours/year	26 hours/year
Professional HPC	50-55 uses/year, average duration of 3 hours/use Totally: 150 hours/year	250 uses/year, average duration of 30 minutes/use Totally: 125 hours/year	100 uses/year, average duration of 2 hours/use Totally: 200 hours/year	No information	800/900 hours/year

Frequency and time of use

Type of HPC	Low usage scenario Annual usage in hours/year	High usage scenario Annual usage in hours/year
Domestic HPC	2-8, average: 5	2-50, average: 26
Professional HPC	100-200, average: 150	100-900, average: 500
Stationary HPC	100-200, average: 150	100-900, average: 500

- Task 5 to 7 analysis on energy, water and detergent consumption are based on the 'low usage scenario'.
- Task 7 provides an uncertainty range for the energy and water consumption during the use phase based on the "high usage scenario"

Task 5– Environment and economics of base cases

Project website: http://susproc.jrc.ec.europa.eu/HighPressureCleaners/index.html

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Aim and Base cases

Aim:

- Present per base case the results of the environmental impact assessment and the Life Cycle Costs (LCC) for consumer **per unit** and at **EU level**;
- Present the overall **energy-water** consumption during use phase and **Greenhouse Gas** (GHG) emission at EU level

**The calculations are made with the EC EcoModelling Framework Tool & the EcoReport Tool 2014 Version 3.0.*

Base Cases (BC) analysed:

BC1: Domestic HPC cold water electric motor

BC2: Professional HPC cold water electric motor 1 phase

BC3: Professional HPC cold water electric motor 3 phases

BC4: Professional HPC cold water combustion motor

BC5: Professional HPC hot water (fuel burner) electric motor 1 phase

BC6: Professional HPC hot water (fuel burner) electric motor 3 phases

BC1: Domestic HPC cold water electric motor

Life cycle environmental impact results of BC1

Life Cycle phases	Unit	PRODUCTION			DISTRIBUTION	USE	END-OF-LIFE		TOTAL
Resources Use and Emissions		Material	Manuf.	**Total**			Disposal	Recycl.	
Other Resources & Waste							debet	credit	
Total Energy (GER)	MJ	1 486	295	1 782	230	7 619	469	-310	**9 790**
of which, electricity (in primary MJ)	MJ	285	176	461	0	1 065	0	-45	**1 481**
Water (process)	ltr	41	3	44	0	26 574	0	-3	**26 615**
Water (cooling)	ltr	736	84	819	0	55	0	-48	**826**
Waste, non-haz./ landfill	g	6 578	917	7 495	166	8 029	1 779	-1 924	**15 545**
Waste, hazardous/ incinerated	g	45	0	45	3	165	0	-4	**209**
Emissions (Air)									
Greenhouse Gases in GWP100	kg CO2 eq.	74	16	91	16	333	2	-17	**424**
Acidification, emissions	g SO2 eq.	854	71	925	48	1 859	17	-235	**2 615**
Volatile Organic Compounds (VOC)	g	3	0	3	2	26	0	-1	**31**
Persistent Organic Pollutants (POP)	ng i-Teq	99	0	99	1	45	0	-31	**115**
Heavy Metals	mg Ni eq.	136	0	136	8	12	0	-40	**116**
PAHs	mg Ni eq.	286	0	286	7	18	0	-73	**238**
Particulate Matter (PM, dust)	g	79	11	91	342	40	4	-22	**456**
Emissions (Water)									
Heavy Metals	mg Hg/20	344	0	344	0	49	1	-90	**304**
Eutrophication	g PO4	3	0	4	0	10 714	3 478	0	**14 196**

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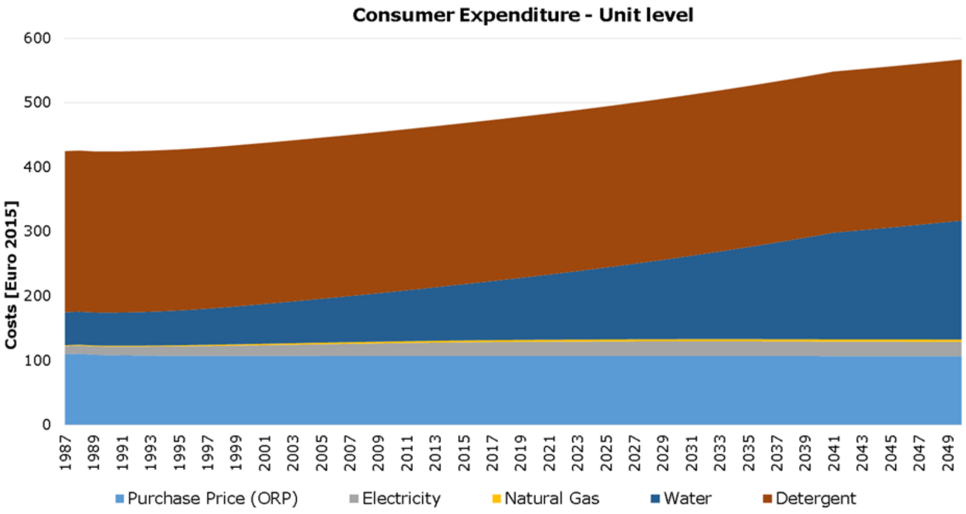
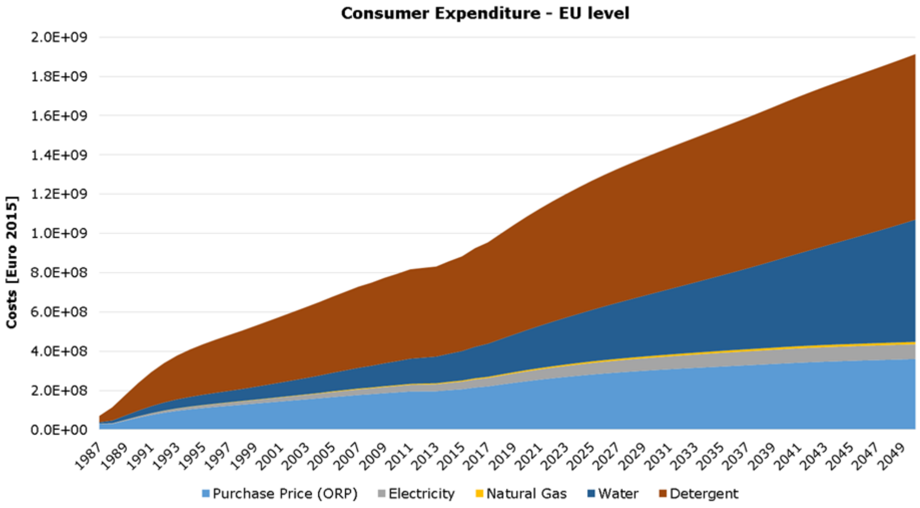
BC1: Domestic HPC cold water electric motor

Life Cycle Costing at unit level



Life Cycle Costing at unit level



- Water and detergent consumption are the main cost contributor areas.
- The overall LCC increases from nearly 470 EUR in 2017 to almost 570 EUR in 2050, mainly due to the increase over time of the water price.

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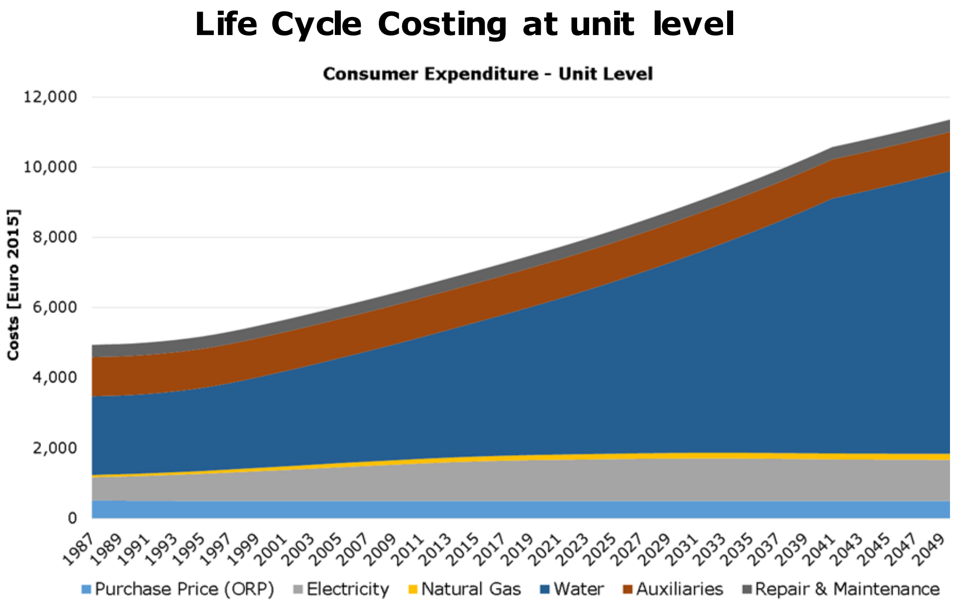
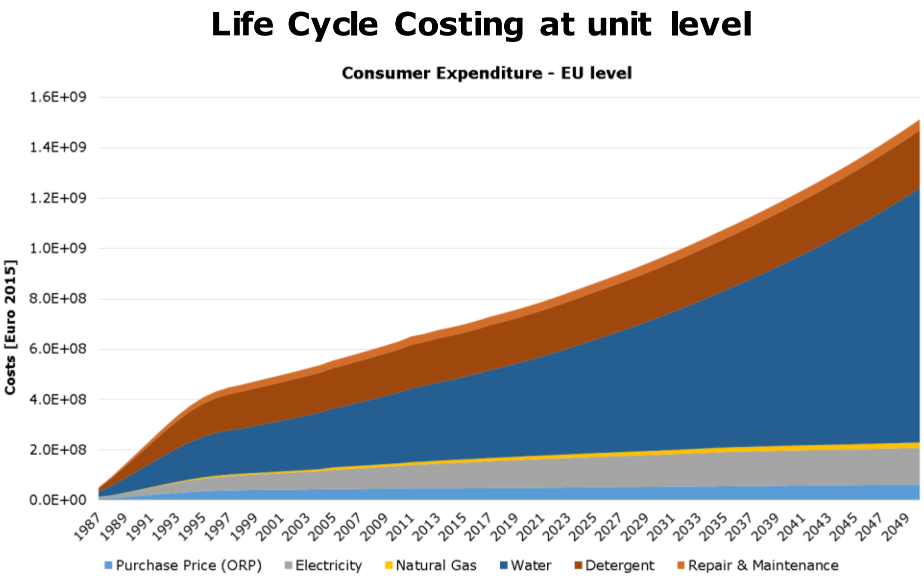
BC2: Professional HPC cold water electric motor 1 phase



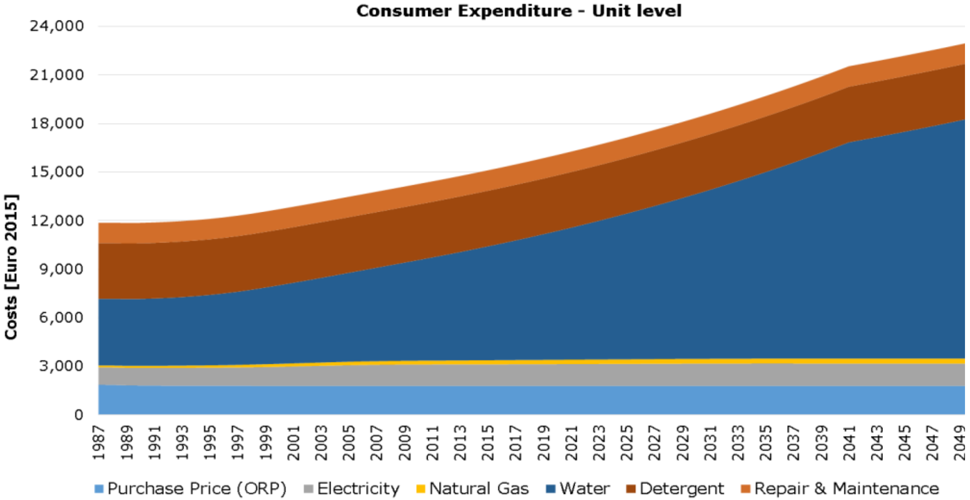


Compared with domestic HPC:

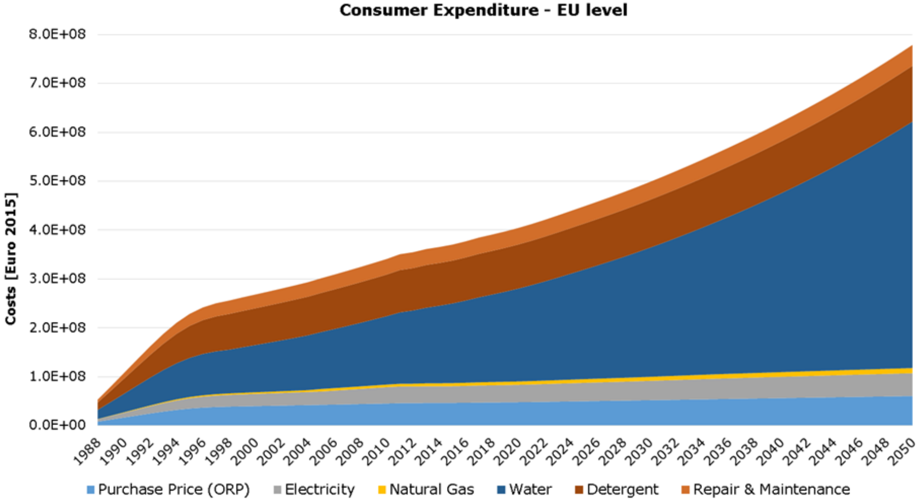
- Much lower importance of the purchase price (similarly for all professional HPC base cases) due to use pattern and longer lifetime.
- The costs are one order of magnitude higher, meaning that measures to reduce water &electricity would have a much larger impact at unit level.

BC3:Professional HPC cold water electric motor 3 phases

Life Cycle Costing at unit level



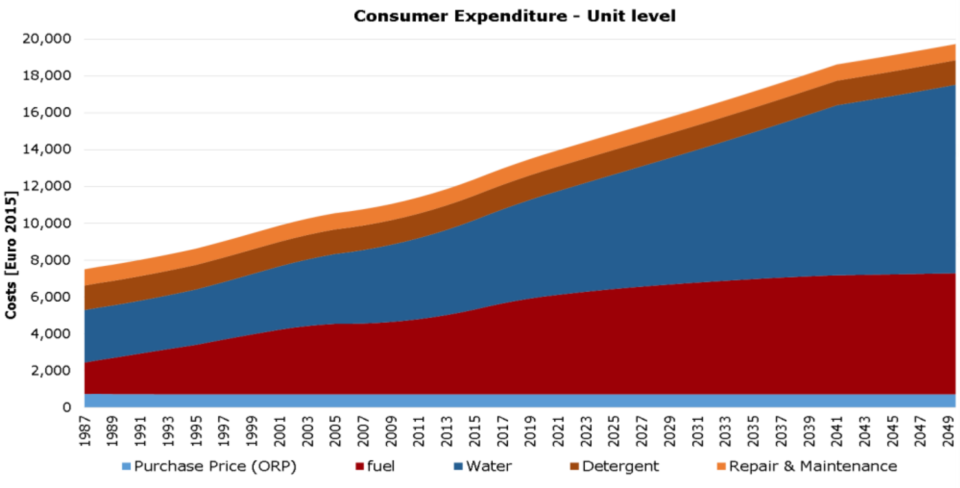
Life Cycle Costing at unit level



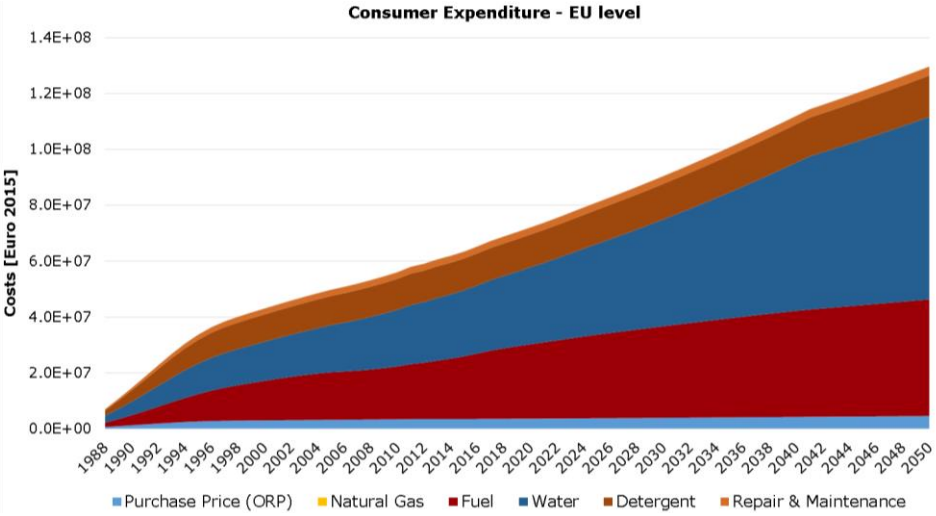
- Water, electricity and detergent consumption are the main cost contributor areas (similar for all BCs)

BC4: Professional HPC cold water combustion motor

Life Cycle Costing at unit level



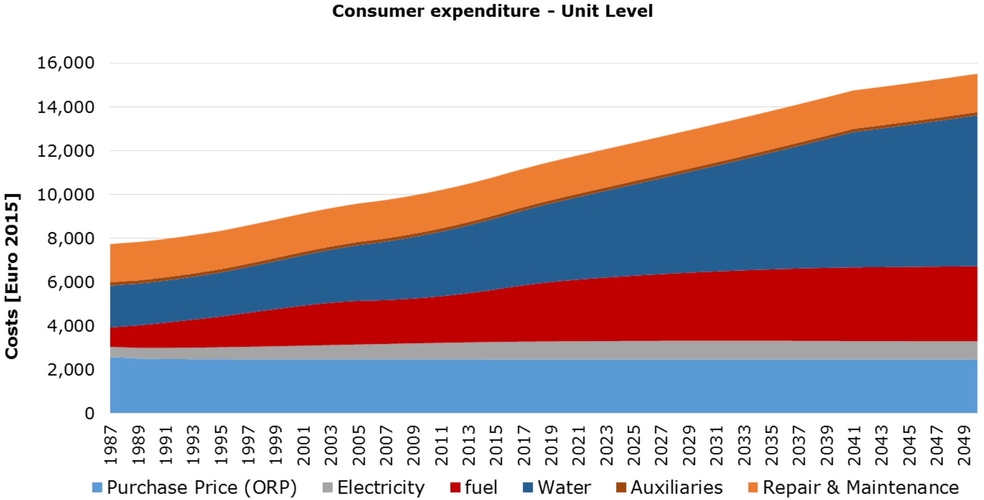
Life Cycle Costing at unit level



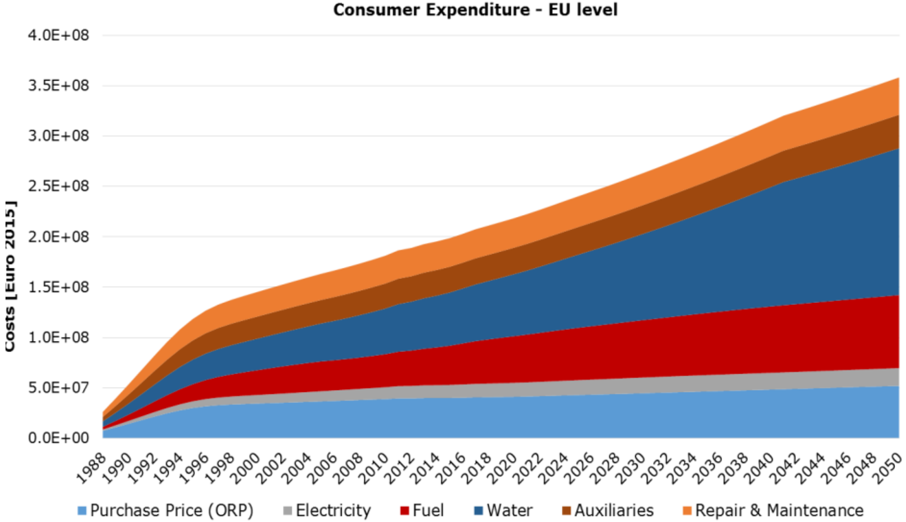
- Fuel consumption of the combustion engine has also a substantial cost and much higher than the electricity cost for the electric driven professional HPCs
- At EU level the LCC of BC5 are significantly lower than the rest of the BCs due to the much lower sales

BC5: Professional HPC hot water electric motor 1 phase

Life Cycle Costing at unit level



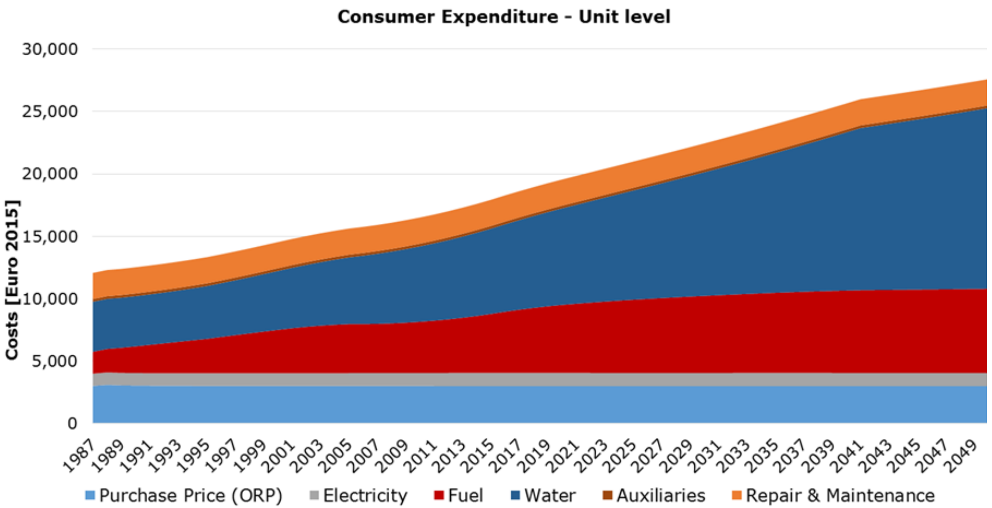
Life Cycle Costing at unit level



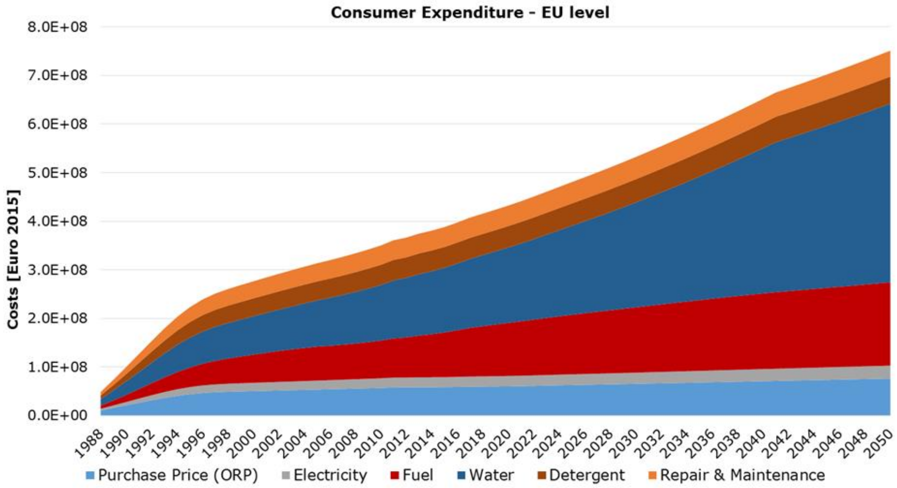
- Water consumption is the main part of the LCC during all the period.
- However, energy consumption (both fuel for the water heater and electricity for driving the HPC motor) is equally important from cost perspective

BC6: Professional HPC hot water electric motor 3 phases

Life Cycle Costing at unit level

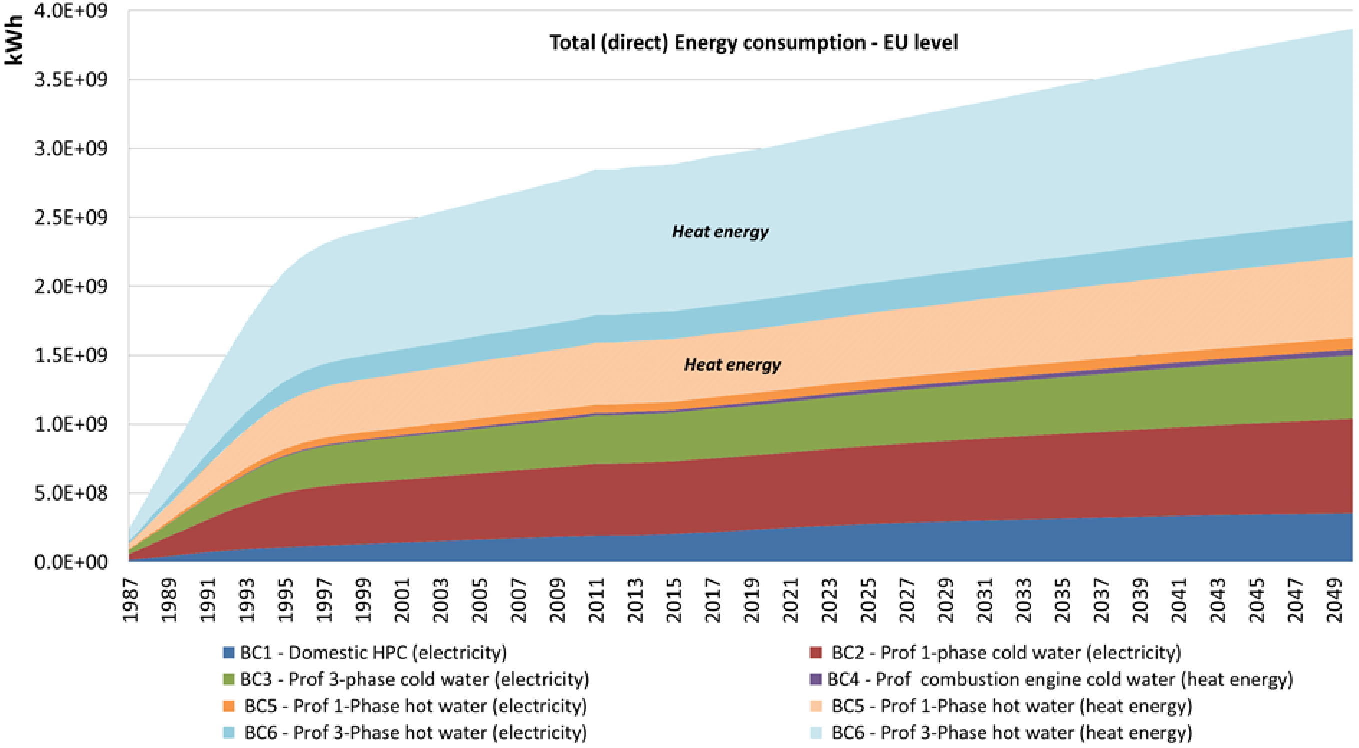


Life Cycle Costing at unit level



- Water consumption is the main part of the LCC during all the period.
- However, energy consumption (both fuel for the water heater and electricity for driving the HPC motor) is equally important from cost perspective

Total direct energy consumption at EU level (low usage scenario)



- 3.0 TWh in 2019 & 3.9 TWh in 2050
- The **heat energy** from liquid fuel used for hot water HPC & combustion engine represents **52%** of the total energy consumption
- Electricity consumption shares:

BC2 ~ 38.3% share
BC3 ~ 25.7% share
BC1 ~ 16.6% share
BC6 ~ 14.7% share
BC5 ~ 4.6% share
BC4 ~ 1% share

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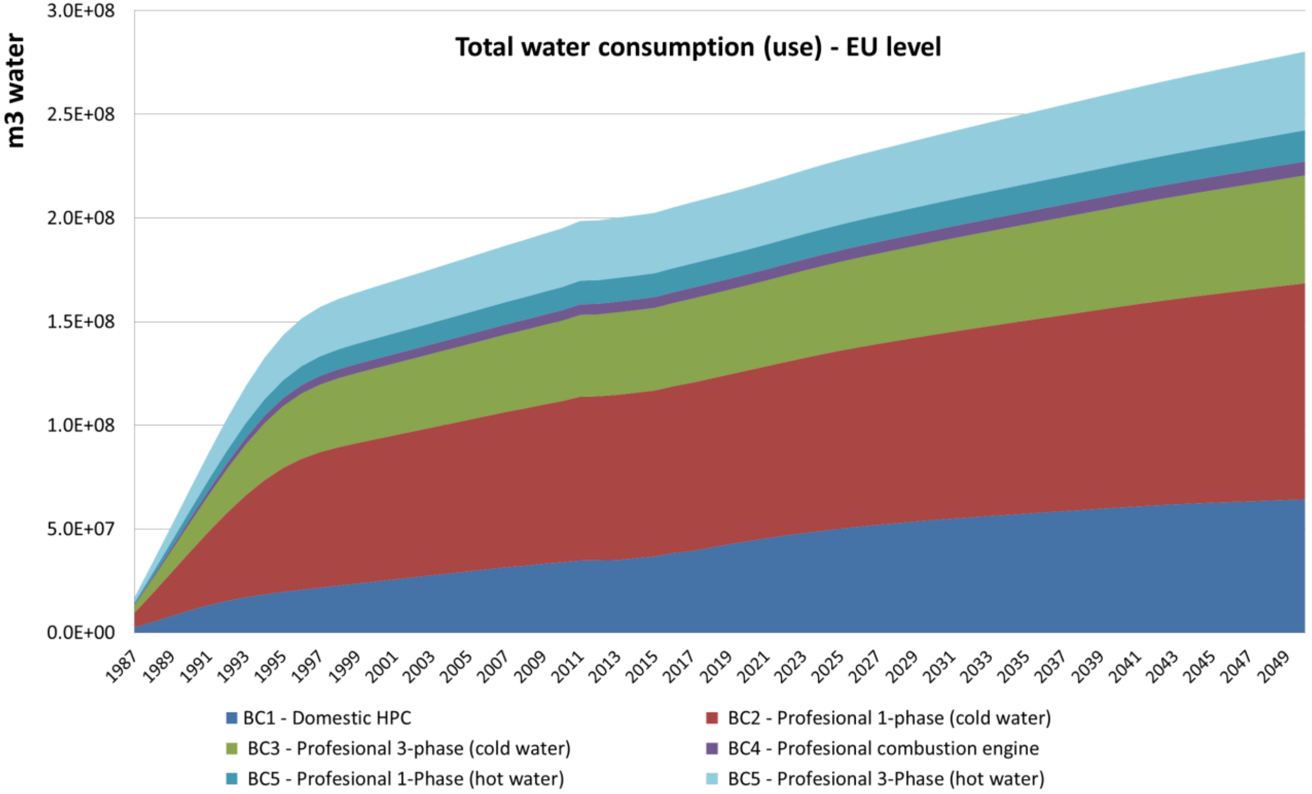
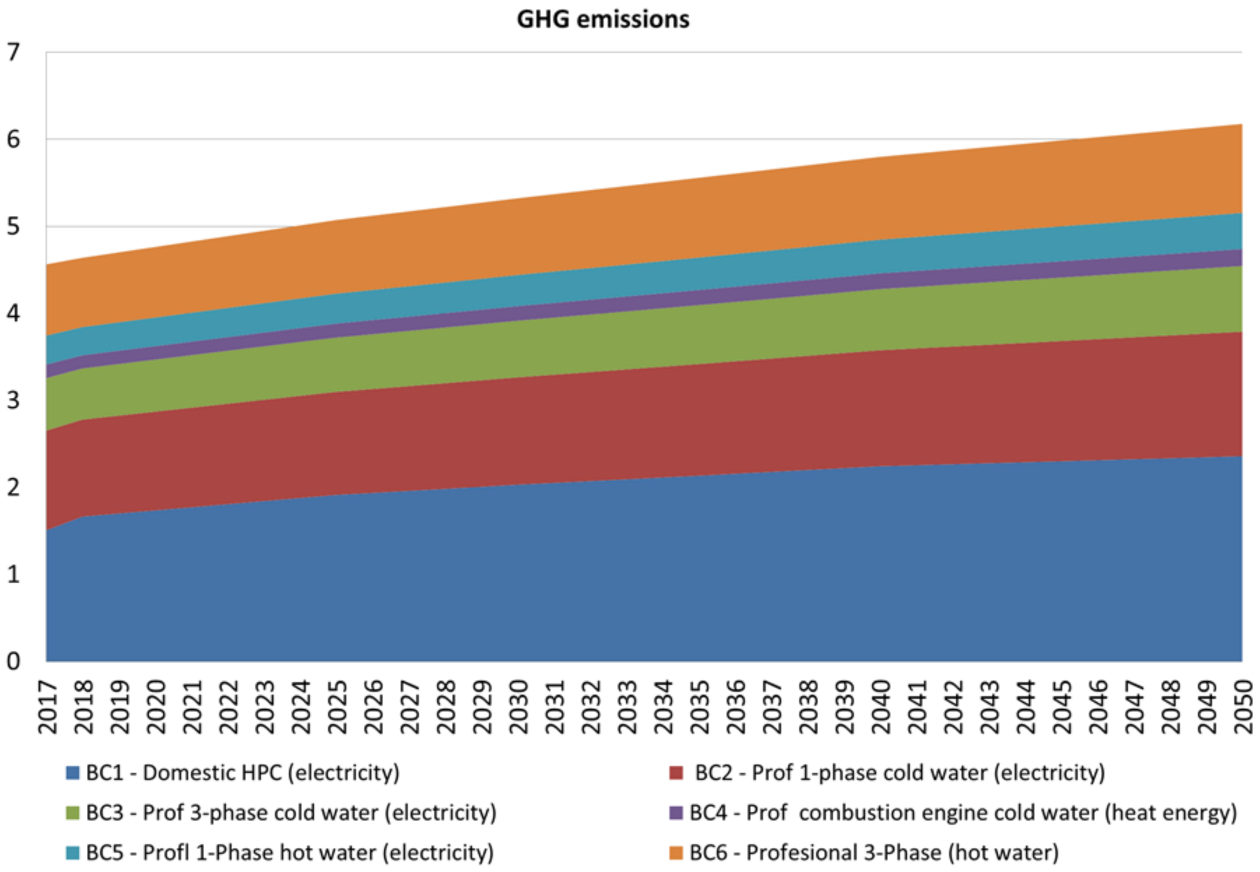
Total water direct consumption during use at EU level (Low usage scenario)



For 2019 ~ 212 million m^3
for 2030 ~ 239 million m^3
for 2050 ~ 280 million m^3

BC2 ~ 38.4% share
BC1 ~ 20.5% share
BC3 ~ 19.1% share
BC6 ~ 14% share
BC5 ~ 5.5% share
BC4 ~ 2.5% share

Greenhouse Gas (GHG) Emissions at EU level



- 2019 - 4.7 million tons of CO_2eq.
  2030 - 5.3 million tons of CO_2eq.
  2040- 5.8 million tons of CO_2eq
  2050 6.2 million tons of CO_2 eq
- BC1 (domestic HPC), represent nearly **36.2%** of the total GHG emissions. The main reason is the larger volumes of domestic HPC produced and sold per year compared to the rest of the BCs
- Shares of GHG emissions:
  BC2 ~ 23.9%
  BC6 ~ 17.1%
  BC3 ~ 12.6%
  BC 5 ~ 6.9%
  BC4 ~ 3.2%

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Conclusions of Task 5 and discussion

- Domestic HPC have the highest share in GHG emission mainly due to their production volumes

- The use phase clearly dominates the consumption of energy and water, and GHG emissions

- The use phase has a larger share in professional HPCs due to higher frequency of use. This suggests that measures aimed at reducing the energy and water consumption in the use phase will have a bigger impact in the professional units than in domestic units

- In terms of LCC, water represents the largest share in all base cases, and it is more dominant in the professional base cases.

- Detergents share an important part of LCC, though the figures heavily rely on assumptions that should be contrasted

- For hot water HPC fuel consumption is an important impact contributor both from LCA and LCC perspective

Task 6 – Environment and economics of design options

Project website: http://susproc.jrc.ec.europa.eu/HighPressureCleaners/index.html

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Identification of design options

- **D1: Improvement of nozzle design (BC1-BC6)**
  - ***Strength of the jet*** **→ determined by the *type of nozzle* → nozzle design has high impact of the cleaning performance.**
- **D2: Increase of electric motor-pump efficiency (BC1-BC3, BC5-BC6)**
- **D3: Increase of hot water fuel burner efficiency (BC5-BC6)**
- **D4: Improvement of durability (BC1)**

Improvement of nozzle design (BC1-BC6)

- HPCs with same cleaning quality and same efficiency level are analysed:
  - Efficiency as a proxy = Increase of pressure over the HPC multiplied with water flow divided with input power.
  - Difference in water/energy consumption between these HPCs is assumed to be due to the nozzle design
- Potential saving = calculated to be 21% for this dataset → reduced by 20% to take into account the uncertainty of the assumptions = rounded down to 15%.
- Improved nozzle design → retail cost impact of added **16 EUR for domestic and 24 EUR for professional:**
  - **Based on prices of spare parts and price differences of the models analysed.**

Improvement of electric motor-pump efficiency (BC1-BC6)

- Domestic HPCs use universal motors, which are cheap, and usually operate at low efficiencies (30%-50%)
- Professional HPCs use induction motors with higher efficiency levels (around 60%-75%)
- Proxy for the efficiency = Maximum working pressure (MPa) multiplied with maximum flow rate (litres/second) and divided by connection load (kW) for all domestic and professional HPCs

HPC type	Proxy efficiency of design option	Savings	Additional cost (manufacture)
Domestic	0.75	16%	4 EUR
Professional 1 phase	0.75	6%	+25%
Professional 3 phase	0.8	12%	+25%

Improvement of hot water fuel burner efficiency

- Requirements on maximum thermal losses for hot water fuel burner as defined by the EN IEC 62885-5:2018

Net power of heater P (kW)	Max. thermal loss qA (%)
$4 \leq P \leq 25$	11
$25 > P \leq 50$	10
$P > 50$	9

- Saving calculated as the increase in thermal efficiency from 80% to 91%
- Additional manufacture cost of this design option would be 190 EUR, according to stakeholders

Improvement of durability

- Minimum lifetime → lifetime is according to a defined test method based on a certain number and duration of usage cycles
  - *Minimum lifetime of design option = 6 years*
- Impact and costs have been assessed for domestic HPCs exclusively, but the policy measure should cover all HPCs, as all professional HPC units should already fulfil this minimum performance requirement.
- Comparing retail prices of domestic 1 phase HPCs with prices of professional 1 phase cold water HPCs within the same range of rated flow and working pressure.
  - *Main difference in component quality and durability → price difference can be thereby estimated as the added cost for durability.*
- Additional cost of 25 EUR per unit at the retail price level for increasing the minimum lifetime performance from 2 to 6 years

Improvement of reparability and recyclability

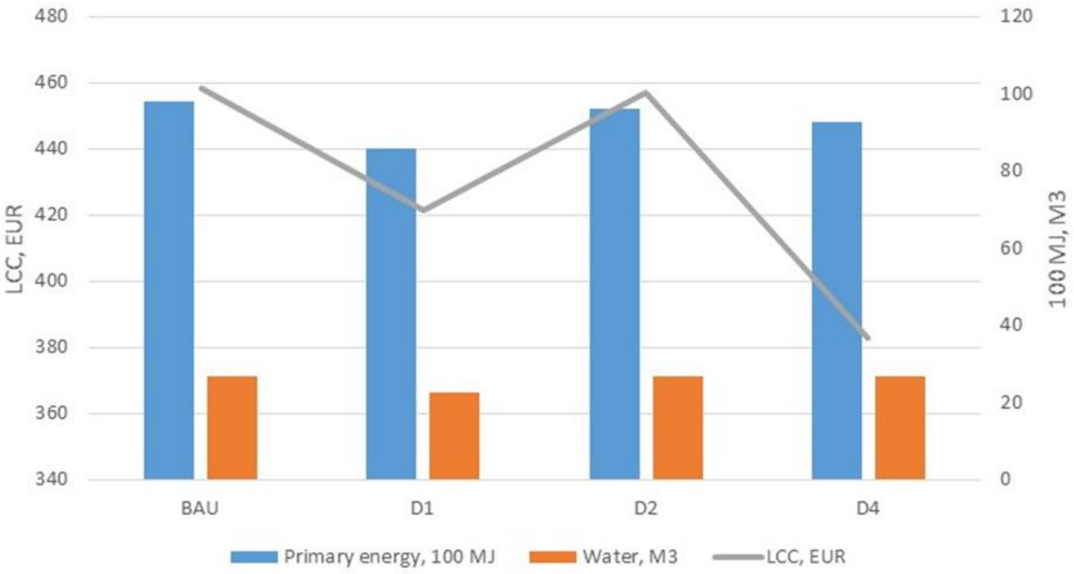
Reparability

- The option consists of increasing the lifetime of HPCs by improving the reparability potentials of the ones that are difficult to repair through:
    - *i) Non-destructive access (disassembly) to critical components such as the motor-pump*
    - *ii) Assuring the availability of spare parts*
    - *iii) repair and maintenance information/manuals provided by the manufacturer for each model*

Recyclability

- The design option consists of increasing the recyclability by setting requirements to dismantling (see above) for material recovery and recycling

Domestic HPC cold water



D1: Improvement of nozzle design (BC1-BC6)
D2: Increase of electric motor-pump efficiency (BC1-BC3, BC5-BC6)
D3: Increase of hot water fuel burner efficiency (BC5-BC6)
D4: Improvement of durability (BC1)

- LLCC = D4 → resulting in 16.5% less LCC compared BAU → manufacture cost represents a high share of the life cycle cost of domestic HPCs
- D1→ most balanced results in terms of impacts (12% less energy and 15% less water consumption) and life cycle costs (8% less LCC).

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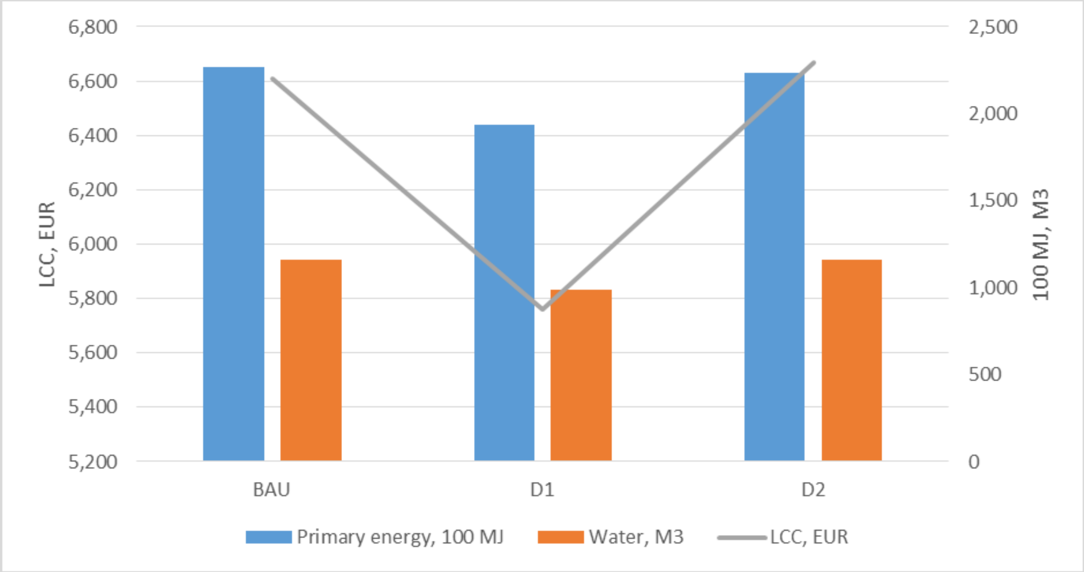
Professional HPC cold water electric motor 1 phase



D1: Improvement of nozzle design (BC1-BC6)
D2: Increase of electric motor-pump efficiency (BC1-BC3, BC5-BC6)
D3: Increase of hot water fuel burner efficiency (BC5-BC6)
D4: Improvement of durability (BC1)

- LLCC = D1 → 13% less LCC compared BAU + lowest energy (15% reduction) and water consumption (13% reduction)
  - higher share of the use phase in life cycle of professional products
- D2 → increase of LCC (0.9%) and reduction of primary energy of (1.2%).

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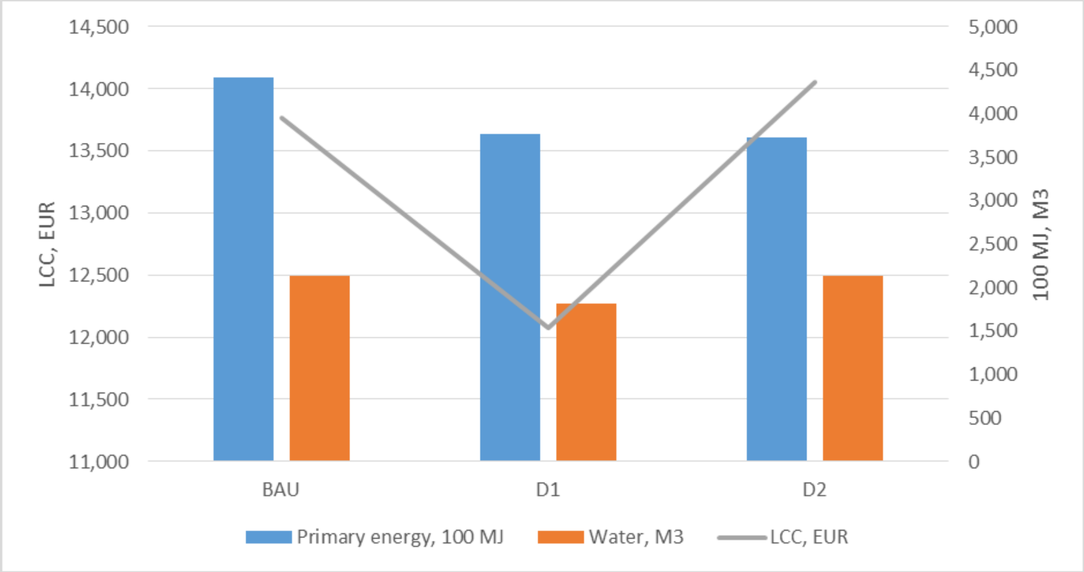
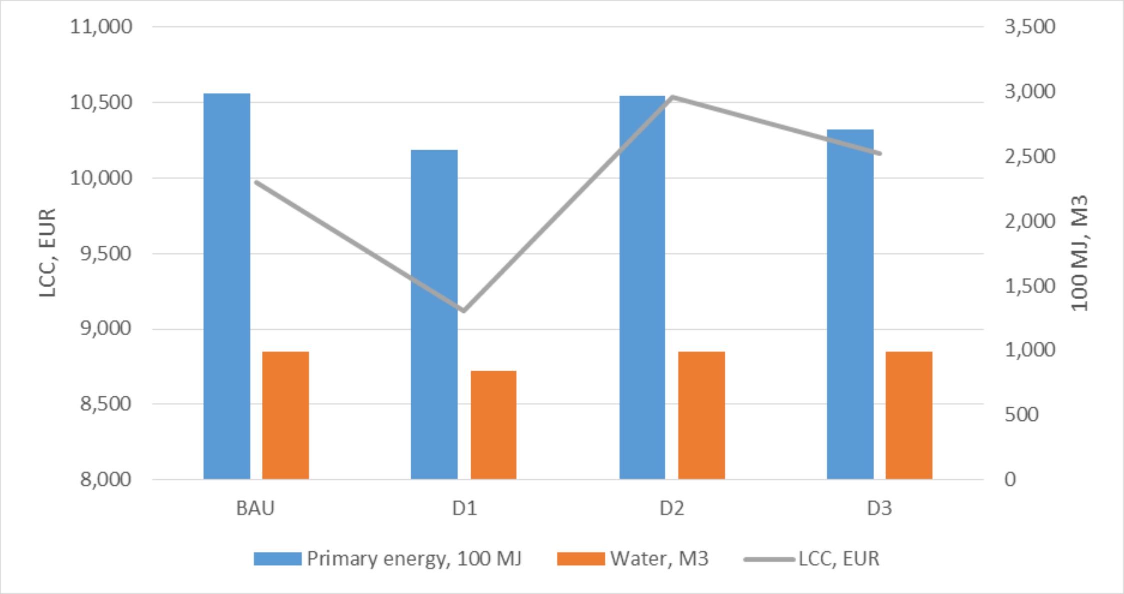
Professional HPC cold water electric motor 3 phase



D1: Improvement of nozzle design (BC1-BC6)
D2: Increase of electric motor-pump efficiency (BC1-BC3, BC5-BC6)
D3: Increase of hot water fuel burner efficiency (BC5-BC6)
D4: Improvement of durability (BC1)

- Similar pattern to BC2, though LCC and energy and water consumption are larger → larger machines.
- D1 would result in a LCC saving of 12% and the energy and water consumption would be reduced by 15%.
- D2 would increase the LCC by 2% and decrease the energy 15%.

Professional HPC hot water electric motor 1 phase



D1: Improvement of nozzle design (BC1-BC6)
D2: Increase of electric motor-pump efficiency (BC1-BC3, BC5-BC6)
D3: Increase of hot water fuel burner efficiency (BC5-BC6)
D4: Improvement of durability (BC1)

- D1 → LCC saving of 10% / energy and water consumption would be reduced by 15%.

  D2 → less significant reduction in the energy consumption, compared to cold water machines (0.7% reduction)

  D3 → in larger energy savings (9% reduction) compared to D2.
- LCC is increased by both design options: D2 results in 5% higher LCC, and D3 in 2%

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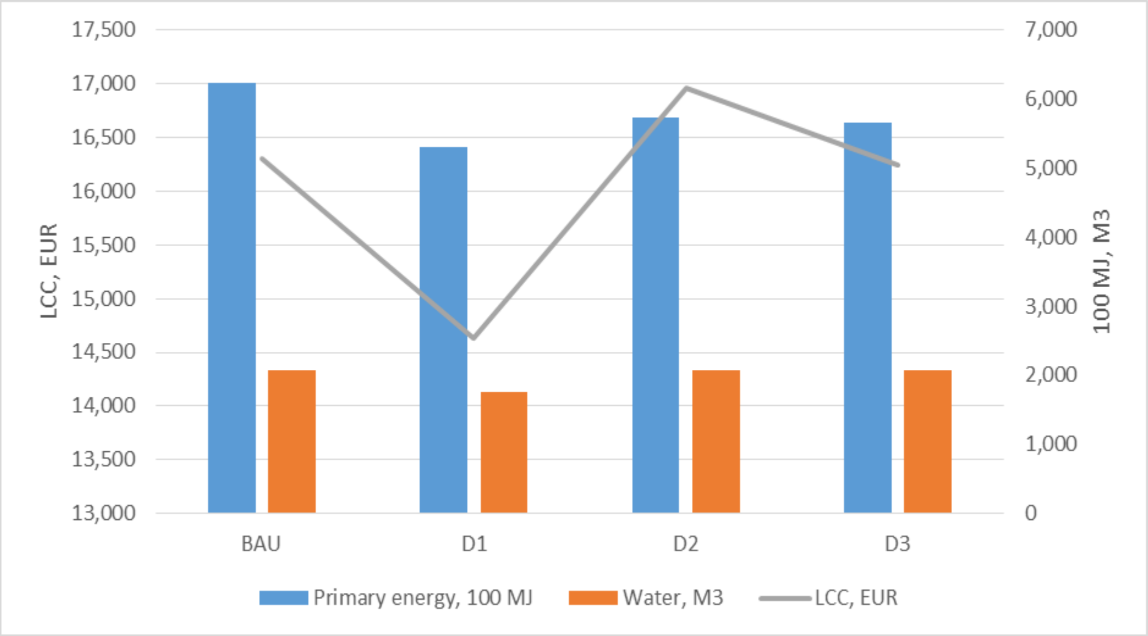
Professional HPC hot water electric motor 3 phase



- D1 would result in a LCC saving of 10% and the energy and water consumption would be reduced by 15%.
- D2 would increase the LCC by 4% and decrease the energy 8%.
- D3 would result in LCC 0.3% less than BAU, and 9% less energy.

Questions and discussion

- Do you have technical data that would improve our assumptions made on impact and cost?

- Any other comments are very welcome!

Task 7- Policy analysis and scenarios

Project website: http://susproc.jrc.ec.europa.eu/HighPressureCleaners/index.html

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Policy measures

- **Increase of electric motor-pump efficiency**
- **Increase of hot water fuel burner efficiency**
- **Ecodesign or Energy labelling based on cleaning performance**
- **Improvement of durability**
- **Improvement of reparability**

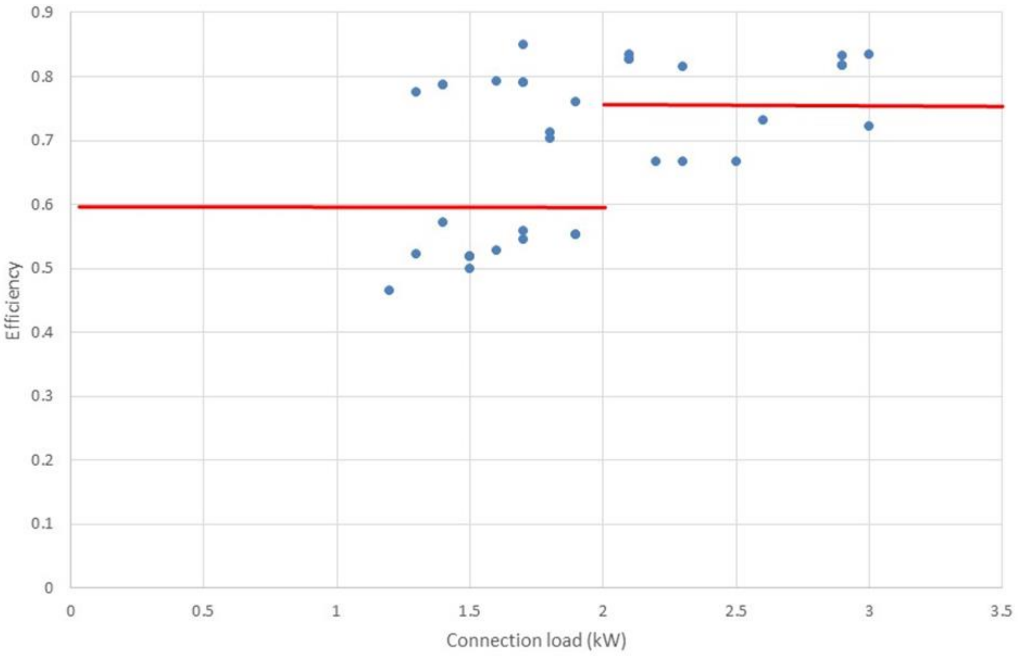
The proposed effective date is January 2025, assuming publication beginning of 2022 and a transition period for compliance.

Increase of electric motor-pump efficiency

- For both **domestic and professional**
- An ecodesign measure is already in place for certain types of electric motors → revision to be finalised.
    - Motors that are completely integrated into a product are covered by efficiency requirements

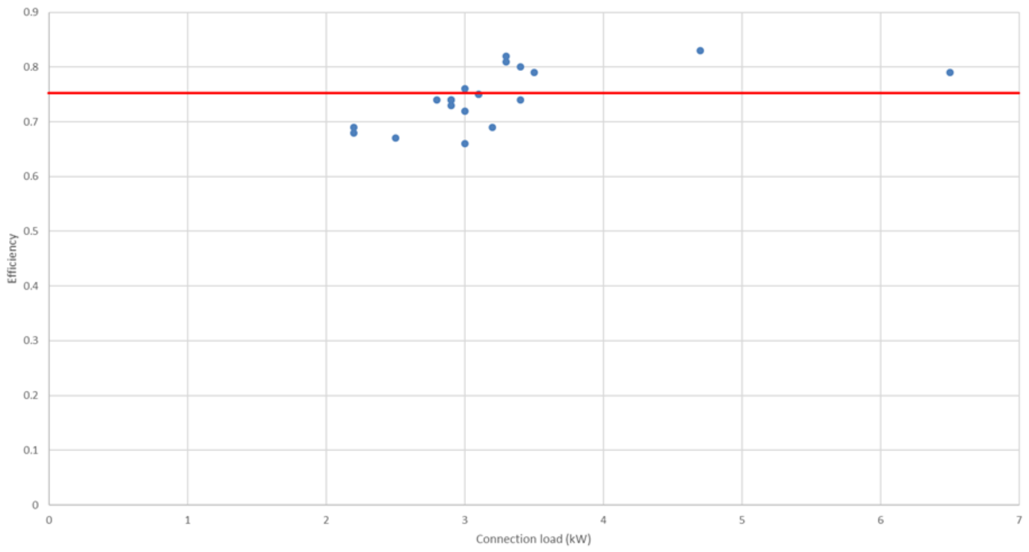
- Proposal based on **efficiency proxy** = *(Pressure x flow) / Power*
- **Transitional test method** needs to be developed and published around the same time as the publication date.

Increase of electric motor-pump efficiency
Domestic



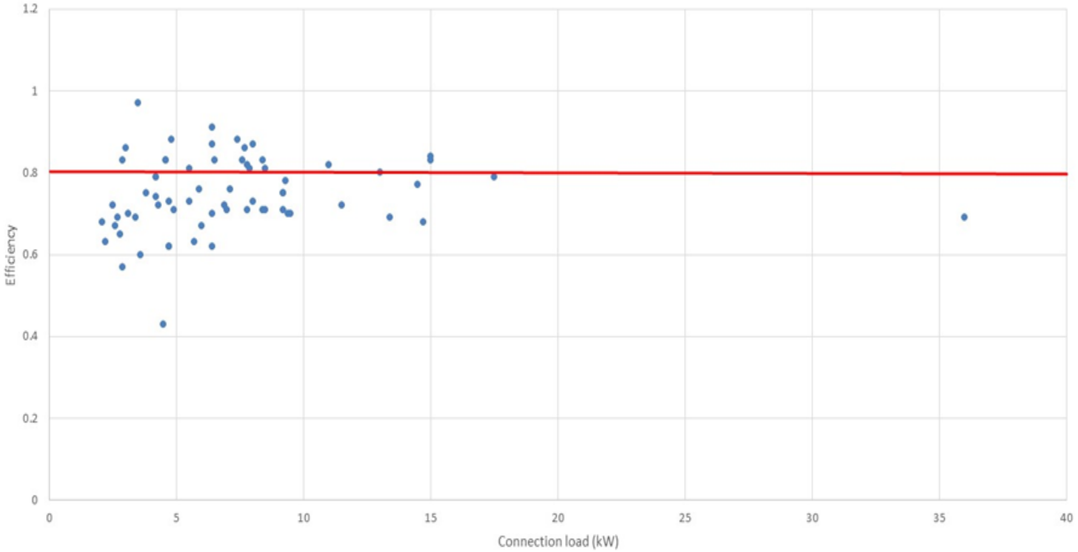
HPC type	Threshold proxy efficiency	Savings
Domestic < 2 kW	0.6	11%
Domestic > 2 kW	0.75	16%

Increase of electric motor-pump efficiency Professional 1 phase



Threshold proxy efficiency	Savings
0.75	6%

Increase of electric motor-pump efficiency Professional 3 phase



Threshold proxy efficiency	Savings
0.8	12%

Increase of hot water fuel burner efficiency

- **Minimum efficiency** requirement of the **hot water fuel burner** efficiency used for HPCs → in line with the EN IEC 62885-5:2018 (based on exhaust thermal losses)

Net power of heater P (kW)	Max. thermal loss qA (%)
4 ≤ P ≤ 25	11
25 > P ≤ 50	10
P > 50	9

- The test method is the one of the EN IEC 62885-5:20187.

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Improvement of durability

- **Minimum lifetime performance** → **90 hours** corresponding to 8 years of use assuming around 1 hour of use per month
- Test method should be developed, where the test is based on a certain number and duration of usage cycles:
  - Eg: With a test of 40 min → HPC should operate for at least 200 cycles with pressurized water flowing, without motor or pump or nozzle breakage and without water leakages.
- Other option may be an adaption of the endurance tests currently in place within safety requirements

Improvement of reparability

- **Disassembly requirements** → main components of an HPC **easily accessible** in a non-destructive way, allowing professionals and/or end-users to replace them according to instruction described in the repair-maintenance manual provided by the manufacturer and the spare parts that would be available.
- **Availability of spare parts** → professional repairers and for some of the spare parts also end-users should be able to get **spare parts** to for a **minimum period of 10 years** after the last unit of the model is placed on the market.
- **Repair and maintenance information** → HPC manufacturer or importer or authorised representative shall provide access and **manuals for repair and maintenance** to professionals' personnel; as well as all relevant information **to end-users** for repair and maintenance operations by themselves for the failures that do not entail potential health and safety issues.

Ecodesign or Energy labelling based on cleaning performance

- **Improvement of nozzle design** → **LLCC** in all base cases → reduction of water and energy consumption + LCC
- It would require a cleaning performance measurement method.
  - There are **no harmonised methods available** capturing main usage situations.
  - The industry stakeholders have informed that such method would be **difficult to develop**, since there is a **wide variety of surfaces and soils** that the test should be able to represent.
- Test method should be developed by the **European Committee for Standardization**
  - *possibly in response to a standardisation request that may encompass all the relevant test methods for this product group.*

Policy options

	Scenario 1	Scenario 2	Scenario 3
Domestic + Professional HPC	Energy Labelling and/or Ecodesign criteria based on cleaning performance (to be considered for the revision) [1, 2] Motor-Pump efficiency Ecodesign criteria [3]	Energy Labelling and/or Ecodesign criteria based on cleaning performance , [2] (to be considered for the revision) [1, 2]	
Hot water HPC	Fuel burner efficiency Ecodesign requirement [4]	Fuel burner efficiency Ecodesign requirement [4]	Fuel burner efficiency Ecodesig requirement [4]
Domestic & Professional HPC	Durability requirements ED Threshold: 90hours as minimum lifetime performance Method: 200 cycles[5]	Durability requirements ED Threshold: 90hours as minimum lifetime performance Method: 200 cycles[5]	Durability requirements ED Threshold: 90hours as minimur lifetime performance Method: 200 cycles[5]
Domestic & Professional HPC	Reparability requirements [6]	Reparability requirements [6]	Reparability requirements [6]

** options indicated in green can be taken up in the regulation directly, those in orange can be considered in its revision.*

Modelling the effect of durability and repairability requirements

The **repairability** lifetime pathway scenario and the new average lifetime for the domestic HPC

Lifetime Pathways

Technical product lifetime: 9.52 years

New Appliance

Failure: 100.00% [%]

- Repaired: 60.00% [%]
- Not Repaired: 40.00% [%]

			Lifetime [years]	Contribution [years]
Life extension				
Refurbished	30.00%	[%]		
extension of lifetime	60.00%	[%]	15.23	2.74
Repair	50.00%	[%]		
extension of lifetime	40.00%	[%]	13.33	4.00
No life extension	20.00%	[%]	8.00	0.96
Lifetime distribution (from technical product lifetime)				
< 6 years	28.44%	[%]	4.00	0.45
6 - 11 years	33.86%	[%]	9.00	1.22
> 11 years	33.64%	[%]	12.00	1.61

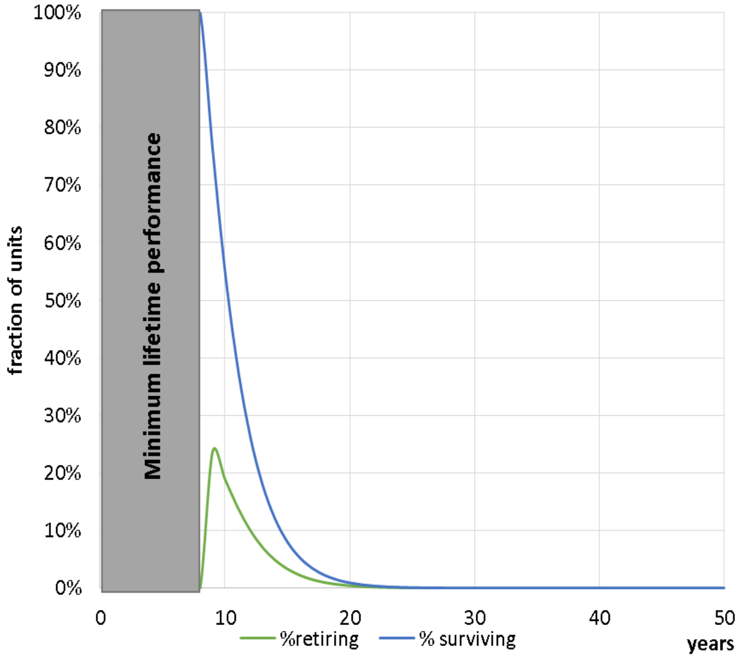
Lifetime Pathways: 10.99

Lifetime distribution

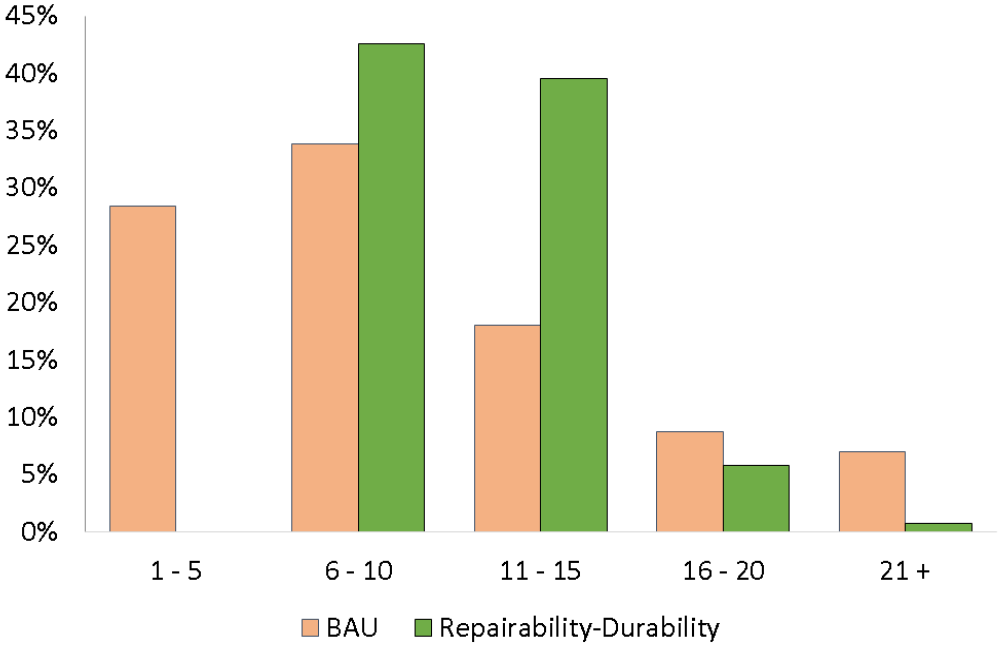
Durability assures a minimum lifetime performance of 90hours ~ at least 8 years of normal use
=> 8 years "delay factor

Modelling the effect of durability and repairability requirements

The new Weibull lifetime distribution for domestic HPC due to the repairability & durability requirements

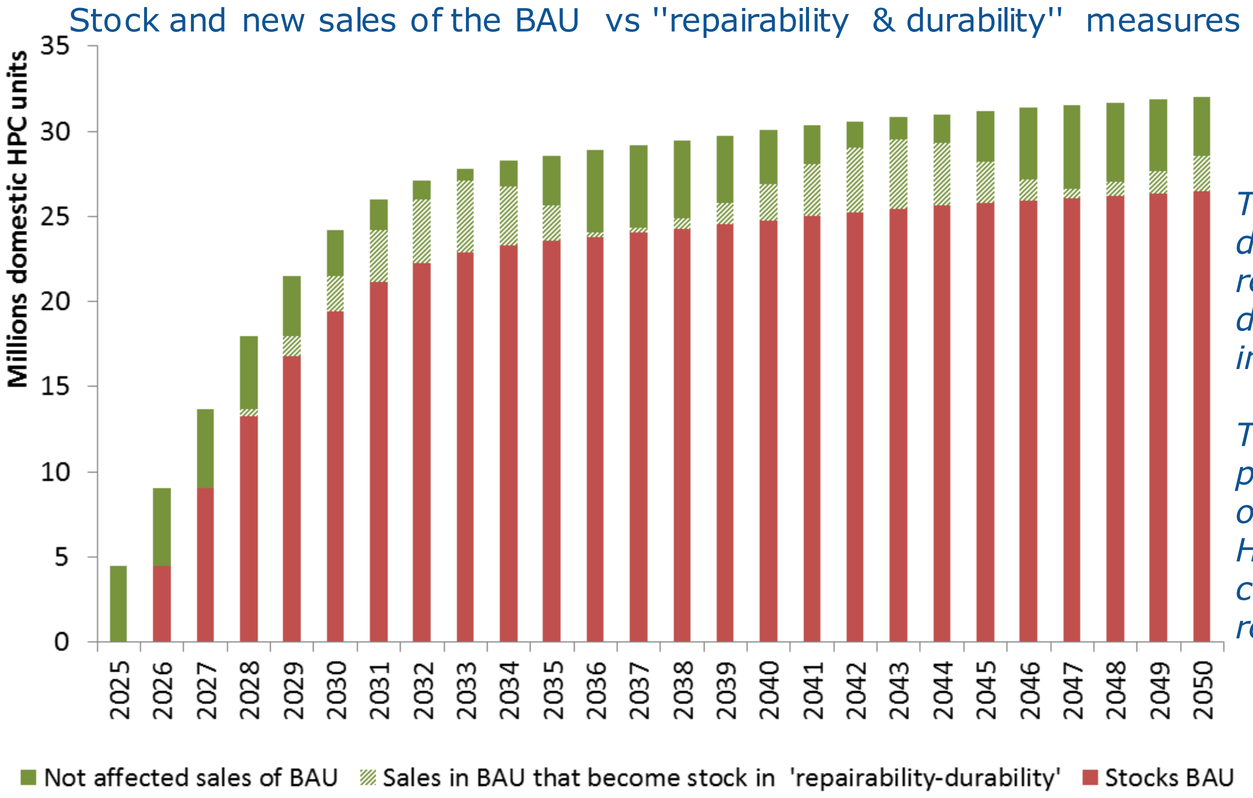


% of retiring domestic HPCs for BAU and with the combination of repairability and durability measures.



- The average lifetime of the 'repairability-durability' scenario will be increased from 9.5 of the BAU to 11 years with a different distribution

Modelling the effect of durability and repairability requirements



The impact of the combination of durability and reparability requirements has been analysed for domestic HPCs only, as the main impact will be achieved for these.

The requirements are however proposed to cover all HPCs in scope of the regulation to ensure that no HPCs will be a grey area and all comply with the minimum Ecodesign requirements.

Policy options

	Scenario 1	Scenario 2	Scenario 3
Domestic + Professional HPC	Energy Labelling and/or Ecodesign criteria based on cleaning performance (to be considered for the revision) [1, 2] Motor-Pump efficiency Ecodesign criteria [3]	Energy Labelling and/or Ecodesign criteria based on cleaning performance , [2] (to be considered for the revision) [1, 2]	
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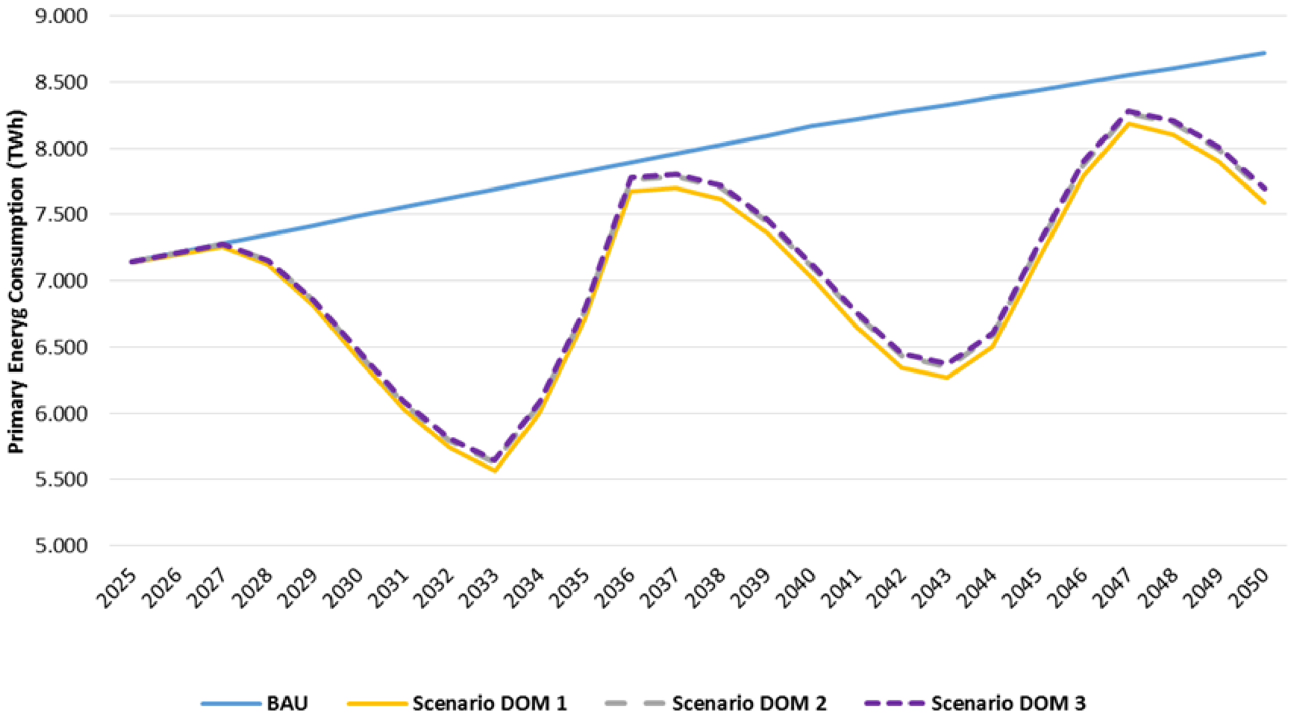
** options indicated in green can be taken up in the regulation directly, those in orange can be considered in its revision.*

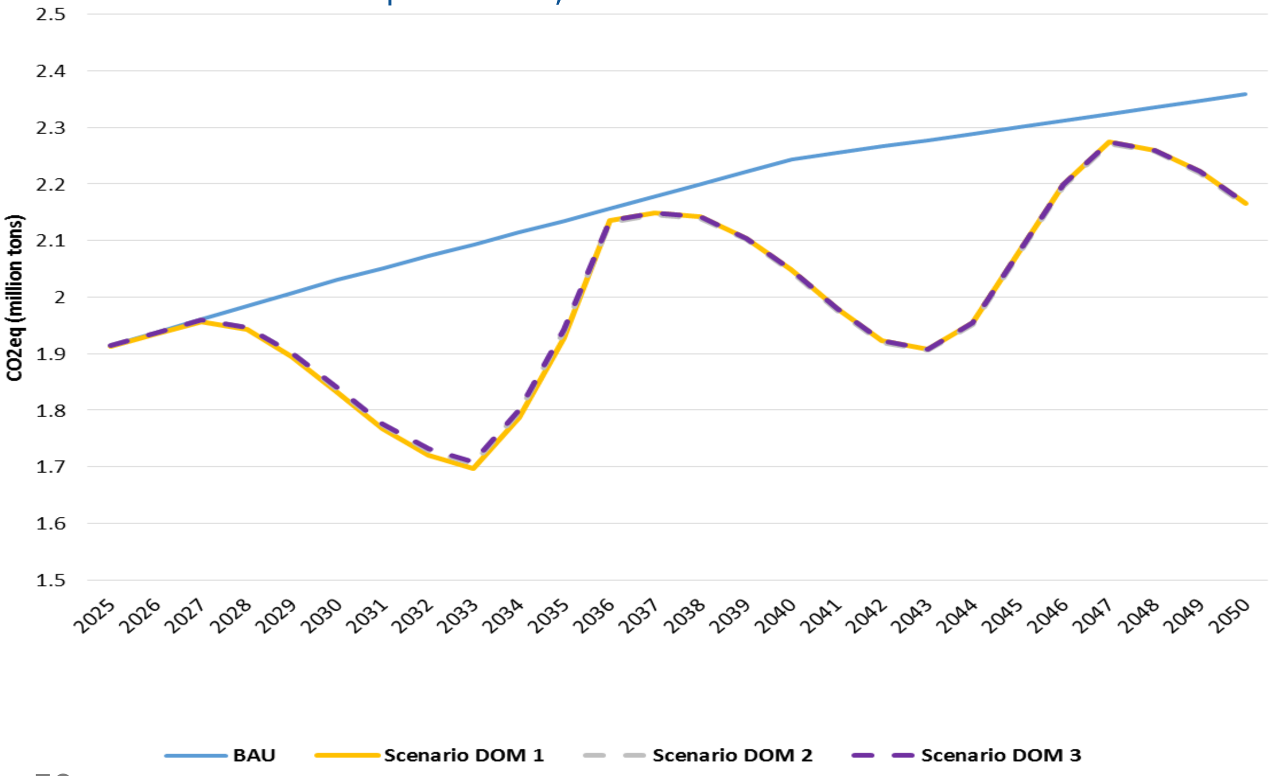
Analysis and comparison of environmental impacts of policy scenarios – Domestic HPC

Total primary energy demand of the domestic HPCs for BAU vs the policy scenarios



Analysis and comparison of environmental impacts of policy scenarios – Domestic HPC

GHG emissions for production, use and end-of-life of the domestic HPCs for BAU and the policy scenarios



Analysis and comparison of environmental impacts of policy scenarios – Domestic HPC

- Primary energy savings for scenarios DOM 1-3 vs BAU scenario (TWh / as % of BAU)

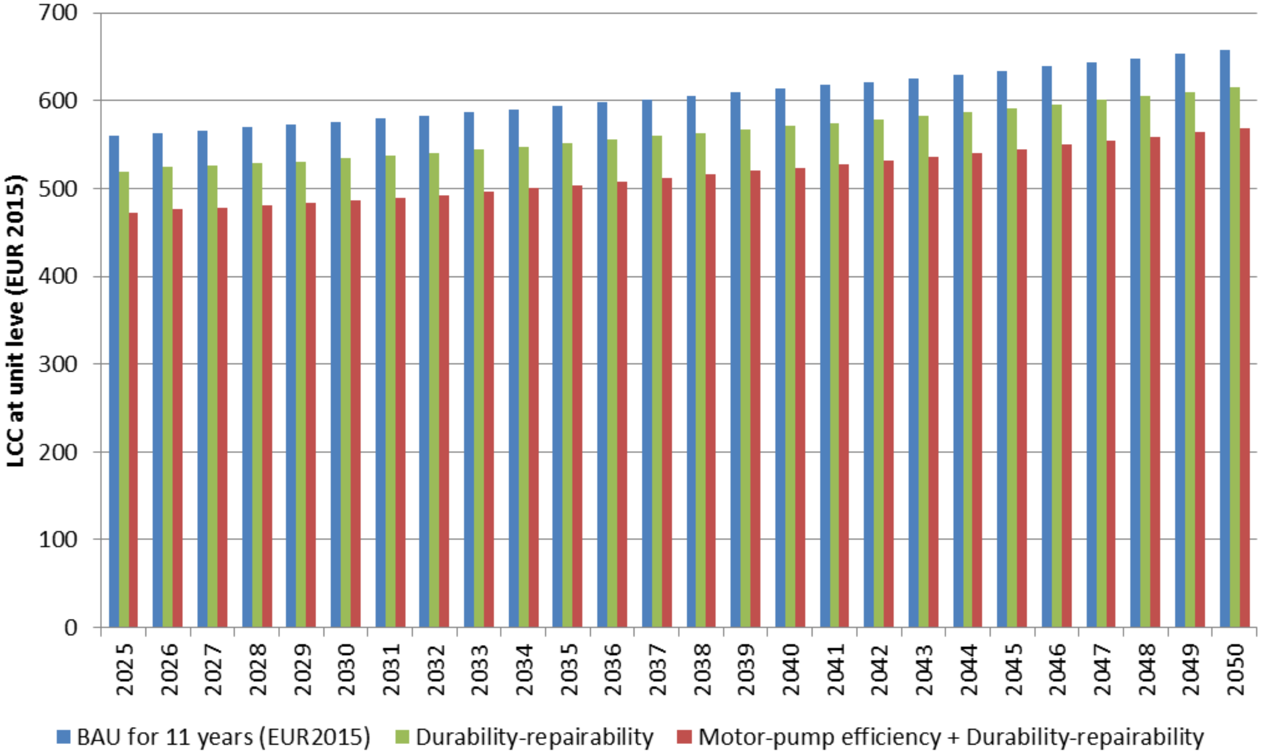
	2030	2040	2050	Cumulative (2025 - 2050)
Scenario DOM 1	1.08 / 14.4%	1.14 / 14.0%	1.13 / 13.0%	25.30
Scenario DOM 2	1.04 / 13.9%	1.06 / 12.9%	1.04 / 12.0%	23.54
Scenario DOM 3	1.02 / 13.7%	1.04 / 12.7%	1.03 / 11.8%	23.18

- COeq savings scenarios DOM 1-3 vs BAU (Mton / as % of BAU)

	2030	2040	2050	Cumulative (2025 - 2050)
Scenario DOM 1	0.20 / 9.9%	0.20 / 8.7%	0.19 / 8.2%	4.45
Scenario DOM 2	0.20 / 9.6%	0.20 / 8.8%	0.20 / 8.3%	4.42
Scenario DOM 3	0.19 / 9.5%	0.20 / 8.7%	0.19 / 8.2%	4.37

Impacts on end-users - Domestic HPC

Evolution of BC1 LCC at unit level for BAU, Motor-pump efficiency and Durability reparability policy options.



- Durability and repairability requirements would reduce the LCC around 8-9% compared to BAU. This policy option would probably impact the sales of domestic units
- Combined with the Motor-pump efficiency requirements could potentially decrease the LCC up to 14-16% compared to BAU
- The policy option based on cleaning performance has not been modelled due to high uncertainty linked to the lack of data & standard

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Conclusions of Task 7 and discussion

Domestic HPC

- Policy option with the largest saving potential → Durability and reparability.
    - *Development of a test method or the adaptation of the endurance test within the safety standards.*
    - *Longer lifetime of HPCs may cause a reduction in the sales of new units → could affect the employment in the manufacture and retail sub-sectors.*
    - *Justify a higher purchase price for products, compensating for the reduced revenues of manufacturers.*
    - *The reparability requirements could increase the employment in the repair or service sub-sectors.*
- Policy options motor-pump efficiency and ecodesign or energy labelling based on cleaning performance could deliver 2 TWh of cumulative savings in 2050.
    - *Motor-pump efficiency would require a test method to measure flow, pressure and input power → feasible to develop a transitional method until a cleaning performance standard to measure the efficiency at product level is in place → more complicated test method that needs to be developed, possibly in response to a standardisation request.*
- Scenario 1 will potentially provide the largest energy and GHG savings, while the life cycle cost would also be reduced.
- **Which policy option you consider better and why?**
- **Modelling of water savings: average performance and best products performance on water consumption per cleaning cycle?**

Modelling professional scenarios

- Energy Labelling and/or Ecodesign criteria based on cleaning performance Efficiency → variation in energy consumption in domestic units is allocated in similar shares among the effect of the motor-pump efficiency and the effect of the nozzle design
  - This option would add the same the effect of Motor-pump efficiency criteria when they are combined in Scenario 1 → double savings of Motor-pump efficiency criteria in Scenario 2
  - **Highlight that this assumption is very uncertain and the results of the modelling must be taken into account with caution**
- Motor-pump efficiency criteria for domestic and professional HPCs → assumed that non-compliant units represent 50% of the market
- Fuel burner efficiency requirement → it is assumed that the average fuel burner efficiency of non-compliant burners is 80% and that non-compliant burners represent 30% of the market.

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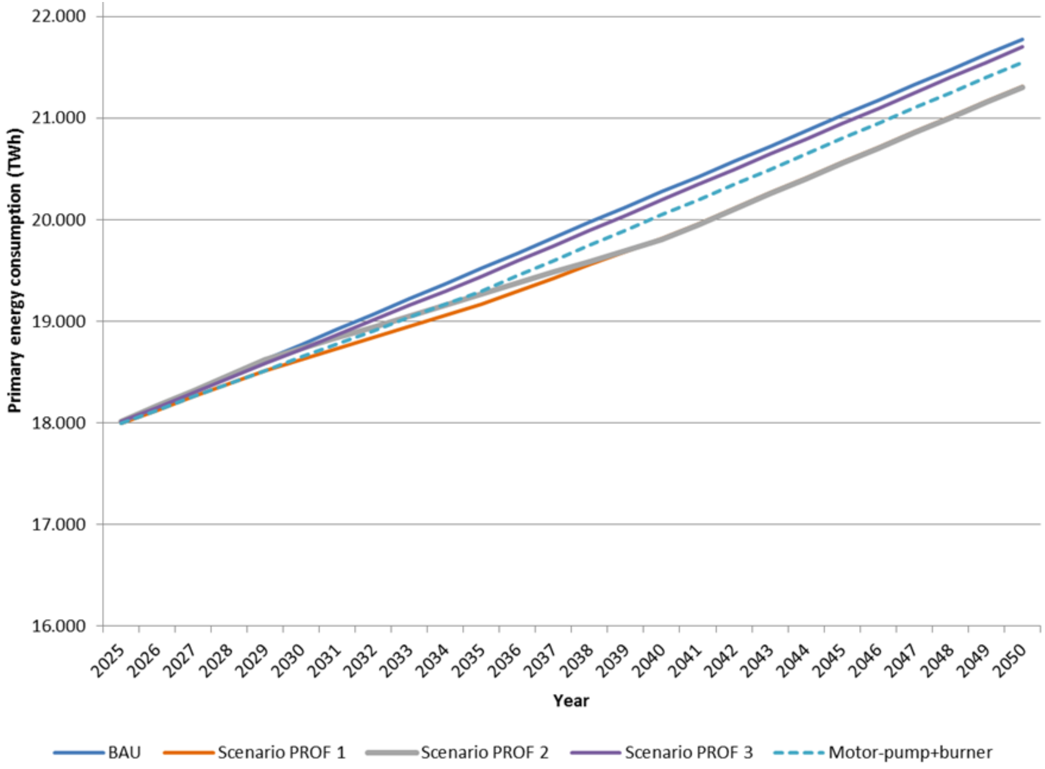
Analysis and comparison of environmental impacts of policy scenarios – Professional HPC

Total primary energy demand for the professional HPCs for BAU versus the different policy scenarios



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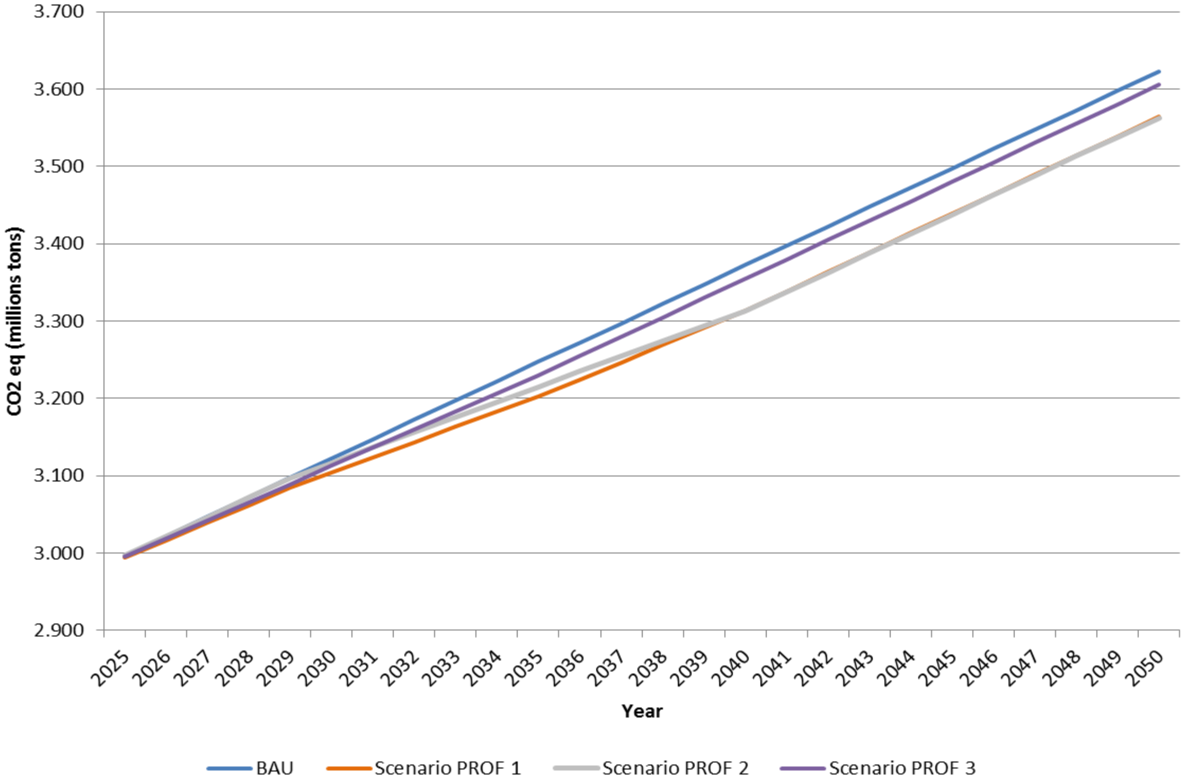
Analysis and comparison of environmental impacts of policy scenarios – Professional HPC

Total GHG emissions of the professional HPCs for BAU versus the different policy scenarios.



Analysis and comparison of environmental impacts of policy scenarios – Professional HPC

Primary energy savings scenarios PROF 1 and PROF 2 vs BAU scenario (TWh / as % of BAU)

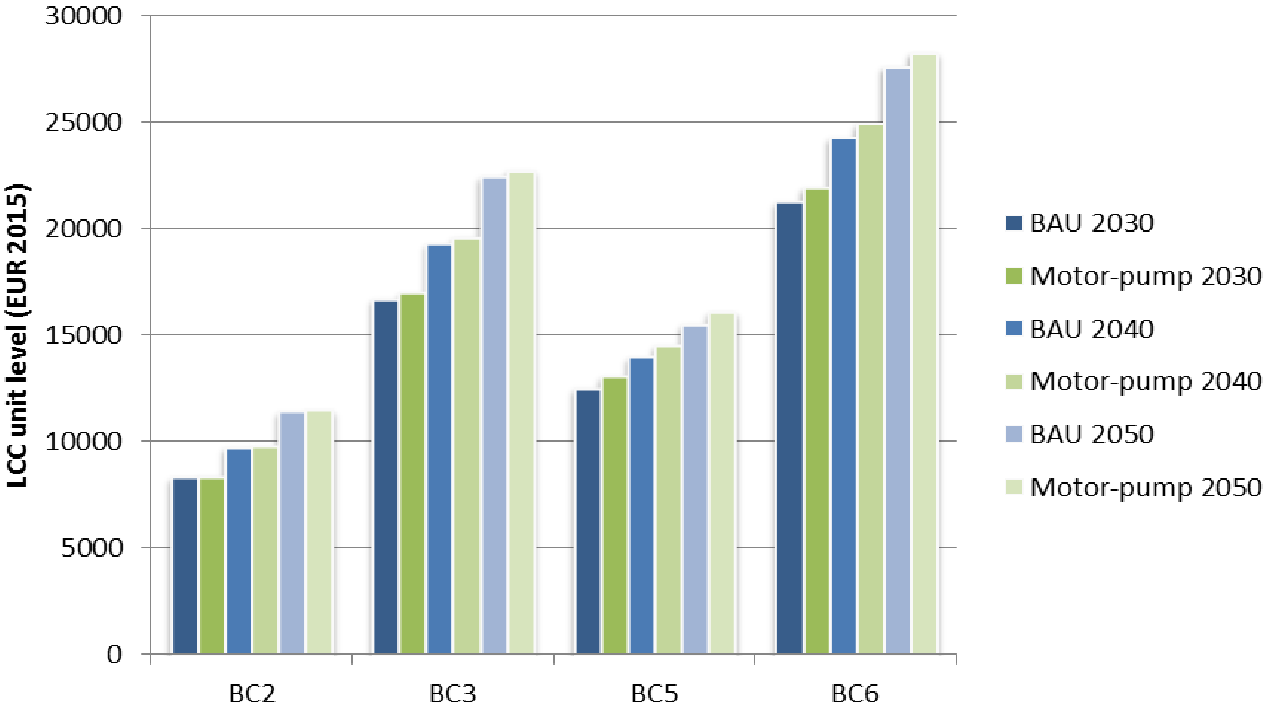
	2030	2040	2050	Cumulative (2025 - 2050)
Scenario PROF 1	0.14 / 0.8%	0.46 / 2.23%	0.46 / 2.12%	8.5
Scenario PROF 2	0.04 / 0.22%	0.47 / 2.32%	0.47 / 2.17%	7.5
Scenario PROF 3	0.04 / 0.22%	0.08 / 0.40%	0.08 / 0.36%	1.7

CO2eq savings scenarios PROF 1 and PROF 2 vs BAU scenario (Mton CO2eq / as % of BAU)

	2030	2040	2050	Cumulative (2025 - 2050)
Scenario PROF 1	0.02 / 0.58%	0.06 / 1.74%	0.06 / 1.62%	1.08
Scenario PROF 2	0.005 / 0.30%	0.06 / 1.78%	0.06 / 1.66%	0.95
Scenario PROF 3	0.009 / 0.3%	0.018 / 0.52%	0.018 / 0.50%	0.37

Impacts on end-users – Professional HPC

Evolution of LCC at unit level of professional cases for BAU and Motor-pump efficiency policy option



- The motor-pump efficiency requirements would have a significant impact for industry. According to stakeholders, the additional manufacture cost of improving the efficiency of induction motors can be estimated as 20% to 30% of the unit cost.
- *All cases could result in increase of LCC*

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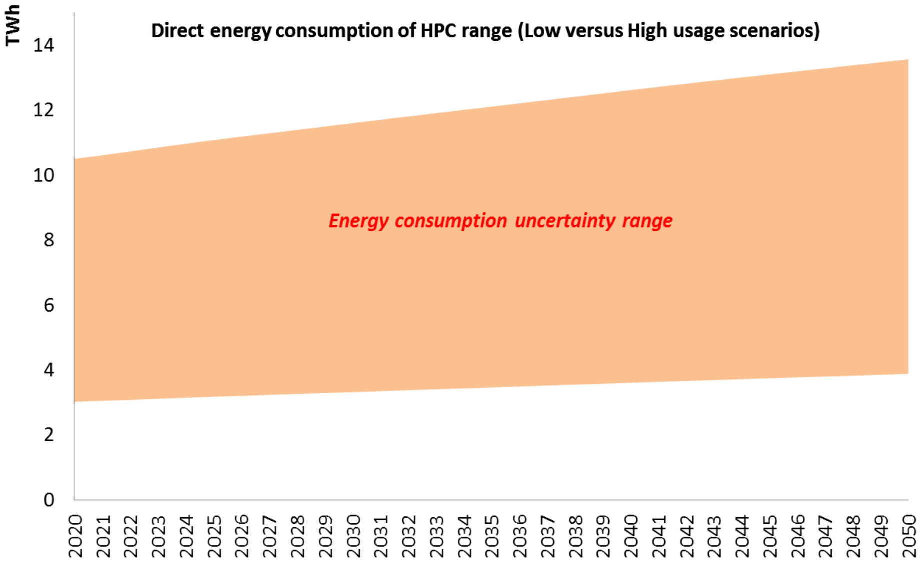
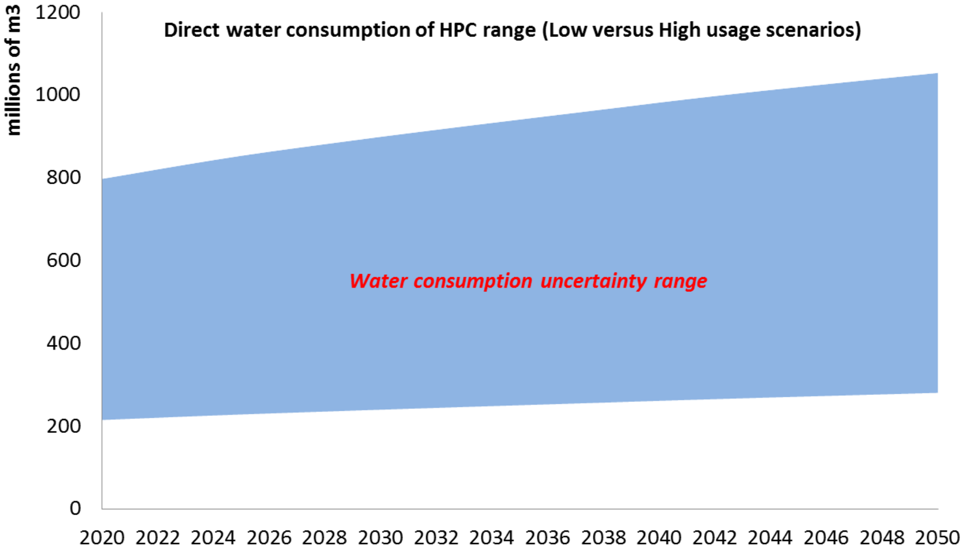
Sensitivity analysis on the use pattern (low vs high usage scenarios)





Sensitivity analysis on market (low vs high usage scenarios)

The main parameter that can affect the results of the professional scenarios is the market share of non-compliant products (new sales) with the proposed threshold for motor-pump efficiency

	Primary energy cumulative savings (2025 – 2050)		
	25% market share	50% market share (assumption in modelling)	75% market share
Scenario PROF 1	4.3 (-52%)	8.5	12.7 (+49%)
Scenario PROF 2	3.8 (-49%)	7.5	11.3 (+34%)

These results indicate that there is a significant uncertainty of +/-50%, which needs to be considered.

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Conclusions of Task 7 and discussion

Professional HPC

- Largest savings → combination of ecodesign or energy labelling based on cleaning performance and motor-pump requirements.
  - *Water savings have not been modelled due to lack of data on market performance*
- Scenario PROF 1 would represent an interim solution that would bring energy savings while the cleaning performance test method in under development.
  - *It would require an additional manufacture cost for improving the motor-pump efficiency that would affect manufacturers and end users*
  - *Savings by means of reduced energy use for the end users.*
  - *Additional environmental benefits of this policy option represent 1 TWh cumulative savings.*
- Scenario 1 may increase the life cycle cost at unit level between 1% and 4% → potentially provide the largest energy and GHG savings, hence it may offset the additional manufacture cost.
- **Which policy option you consider better and why?**
- **Modelling of water savings: : average performance and best products performance on water consumption per cleaning cycle?**

Next steps

Using the BATIS system
Please use it to provide comments!

European Commission

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Wednesday, 23 January 2019 4:22 PM

European Commission > EU Science Hub > BATIS > Z_Product Policy: High Pressure Cleaners > Overview

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Overview - 118 - Z_Product Policy: High Pressure Cleaners (EDENL-HPC) - Open for comments

- Short Title: **Z_Product Policy: High Pressure Cleaners**
- Full Name: **Eu Ecodesign and Energy Label for High Pressure Cleaners**
- Description: **Revision of EDENL-HPC**
- Kick-off meeting minutes:
- Latest Release: **1 (D1) - Open for comments** (Deadline for comments: **24/02/2019 23:59:59**)
- Latest Revision: **3** (**Checked-in** by 'Rick Nowfer' on 13/12/2018)

Deadline for comments 18 August

Production Status

→ Work started → **Formal draft** → Final draft → Published

Latest Documents

Status	Release	Revision	Creation Date	HTML	PDF	Word	IMAGES
Released	-	3	13/12/2018	-	-		-
Formal draft	1	3	13/12/2018				

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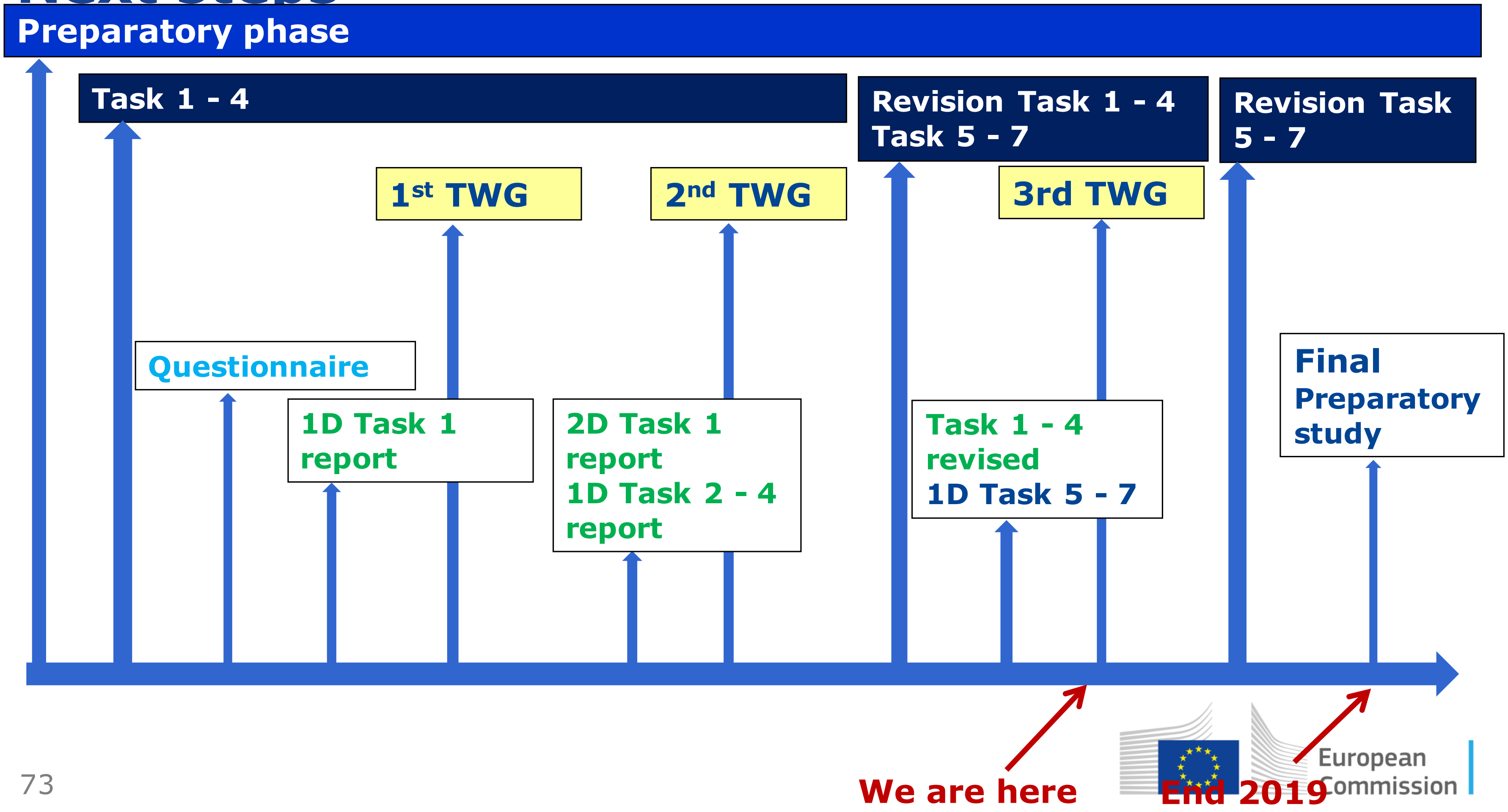

Preparatory phase
Task 1 - 4
Revision Task 1 - 4
Task 5 - 7
Revision Task
5 - 7
1st TWG
2nd TWG
3rd TWG
Questionnaire
1D Task 1
report
2D Task 1
report
1D Task 2 - 4
report
Task 1 - 4
revised
1D Task 5 - 7
Final
Preparatory
study
We are here
End 2019

Thank you!

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Commission