

MEErP preparatory study on taps and showers

1st TWG meeting – Sevilla, 29 October 2013

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*Serving society
Stimulating innovation
Supporting legislation*





Objectives

Developing an **evidence base** to prepare the potential integrated implementation of SPP for taps and showers.

MEErP compliant and representative Technical, Economic, Environmental analyses

Independent, neutral, science-based **research** with strong **stakeholder** involvement (Technical Working Groups)

Preparing the **ground for decisions** on appropriate SPP tool mix

Study overview

Task 1: Product group definition 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

Milestones

Jan 2013, Start of works

Jun 2013, KO meeting with stakeholders: *official launch of the study*

Oct 2013, 1st TWG meeting: *finding consensus and discussing on potential outcomes*

Feb/Mar 2014, 2nd TWG meeting: *presentation of preliminary outcomes*

Jun/Jul 2014, Final report

Information collection

- Literature
- May 2013, 1st Questionnaire: 15 replies, partial update
- Jul 2013, 2nd Questionnaire: 10 replies, supplementary information
- Participation in meetings and further interaction with stakeholders

Processing updated and new information on

1. Scope and definitions: *incl. standards and legislation*
2. Market: *Prodcom statistics and data from industry (ref. to 2012, trends and forecasts)*
3. Users and system aspects: *user behaviour, heating systems, water supply and wastewater collection and treatment*
4. Technologies: *BAT for water and energy savings, BoMs for design options + additional input for the Ecoreport tool*

Estimation of water and energy consumption and saving potential in the EU

Identification of technical options for further analyses



Next steps:

Deadline for comments: **10 November at the latest**

2nd TWG meeting (Brussels, 2nd half of Mar 2014)

Completion of the final report (Jul 2014)

Consultation process for the implementation of SPP (tbd)

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TASK 1: SCOPE

- Product definitions and classifications
- Measurements methods and standards
- Legislation, voluntary agreements and labels
- Potential barriers to producers

Product definitions and classification

- The **initial scope** of this preparatory study covers **taps and showers** used to **derive urban water** with a **quality** that fits for **human use** and a **desired temperature**.
- **Urban uses** include **personal hygiene, cleaning, cooking** and **drinking** and other uses in urban applications.
- These can take place in **domestic** and **non-domestic applications**
- **Non-domestic applications** include premises such as **restaurants, shops, hotels, schools, sport centres, hospitals, office** and **public buildings**

Technical definition and classification

- A **tap** is a **valve** controlling the **release of water**

Feature	Options
Type	<ul style="list-style-type: none"> • Pillar / Mixer
Mixing valve	<ul style="list-style-type: none"> • Mechanical valve (Single / Double lever) • Thermostatic
Number of outlets	<ul style="list-style-type: none"> • 1 to 2
Flow rate	<ul style="list-style-type: none"> • Fixed / Controllable
Flow stop	<ul style="list-style-type: none"> • Manual / Automatic
Temperature	<ul style="list-style-type: none"> • Fixed / Controllable
Installation	<ul style="list-style-type: none"> • Kitchen sink • Wash basin • Bathtub • Bidet • Outdoor

- A **shower** is a **system composed** of
 - a **mixing valve** (e.g. mechanical or thermostatic)
 - a **water outlet** (e.g. showerhead, hand shower, shower handset, shower plates connected to the **mixing valve** through **flexible hoses or tubes (columns or panels** in the most expensive models)

Feature	Options
Type of shower outlet	• Fixed / Movable
Outlet holder	• Fixed / Slide bar
Mixing valve	<ul style="list-style-type: none"> • Mechanical valve (Single / Double lever) • Thermostatic valve • Automatic valve
Mixer used also for bathtub tap	• Yes / Not
Flow rate	• Fixed / Controllable
Flow stop	• Manual / Automatic
Temperature	• Fixed / Controllable
Installation	<ul style="list-style-type: none"> • Shower cabin • Bathtub • Outdoor • Public shared environments
Additional features	<ul style="list-style-type: none"> • Wellness and luxury showers • Massage outlets

Main functions of taps and showers are related to: **quality, safety, flow rate and temperature control and comfort**

Functionality of taps

- Delivering water without impairing its hygienic and organoleptic quality and affecting the safety of users and buildings
- Allowing the user to control the flow rate
- Allowing the user to control the temperature

Functionality of showers

- Delivering water without impairing its hygienic and organoleptic quality and affecting the safety of users and buildings
- Providing an effective and comfortable rinsing performance

Additional functions

Classifications according to EU trade statistics

PRODCOM / CN

- Differentiation between mixing valves (28.14.12.33 / 8481 80 11) and other valves (28.14.12.35 / 8481 80 19).
- No information about the use of the product
- According to information collected during the Kick Off Meeting ⇒ **showers are in the same categories of relevance for taps**
- **Pillar taps are not included**

NACE more aggregated

Definitions and classifications according to:

International standards (e.g. EN 200, EN 1112, EN 13904, BS 6100-7)

Labelling schemes (e.g. EU Ecolabel for sanitary tapware)

Products not relevant for water/energy saving

Based on discussion with stakeholders

Product	Market significance	Technical comment
Bathtub taps	They are mandatory in Portugal (one per dwelling) and common in the UK (95% of bath market, including bath taps and bath/shower mixers)	Either a single outlet high-flow mixer or the bath outlet of a bath/shower mixer. These products are required to allow bath filling as quickly as possible to prevent energy and heat loss. The size of the bath tub would be the relevant factor , not the tap. The faster a bath is filled, the lower the amount of heat loss.
Household food waste disposers installed in sinks	Different market , however this product hardly exists in France and it is not permitted in Portugal .	Not a water using product included within the scope of the project.
Industrial kitchens taps	Different market shares (indicatively 1% by value in Germany and about 0% in Portugal).	Industrial kitchen taps are professional tools that need to be assessed accordingly to the particular needs of their users . Water is part of the food recipe or needed to clean food in big wash basins. Hand-wash basins in industrial kitchens represent an exception. Sensor operated taps could be mandatory for these applications.

Product	Market significance	Technical comment
Instant hot water dispensers	No specific data available.	Not a water using product included in the scope of the project.
Luxury and wellness showers	No specific data available , however it has been reported that market is very low in Portugal.	These are showerhead with a diameter above 200mm. However, very clear definitions are required to understand these sectors. Luxury devices do not necessarily mean that they perform a 'wellness' function. Moreover, wellness devices may be required to perform a 'medical' function.
Pre-rinse shower units	Market share of this product is expected to be quite small (1% by value in Germany for industrial kitchens and about 0% in Portugal)	This is not a regular function of the majority of the products on the market (apart from industrial kitchens taps). Moreover, a simple reduction of the flow rate for this product would imply a longer use. More efficient spray nozzles could be a more effective option to save water. Dominant design is spray gun, spring and hose on a tap.
Safety showers	No specific data available , however the market share is considered very low in Portugal.	The function of this product is to wash a person/body part in order to provide relief and to minimise as quickly as possible the effects of an incident. Frequency of use is very low and safety is the only important parameter.

Measurement methods and standards

Updated information

- **EN 806 series (-1;-2;-3;-4;-5)** on "*Specifications for installations inside buildings conveying water for human consumption*"
- **EN 12056-1;-2;-3;-4;-5** on "Gravity drainage systems inside buildings"
- **EN 16145** on "*Extractable outlets for sink and basin mixers*" and **EN 16146:2013** on "*Extractable shower hoses for sanitary tapware for supply systems type 1 and type 2*"
- **DIN 1988-100;-200;-300;-8;-500;-600;-7**

Standards to be deleted

- **EN 1717** on protection against pollution of potable water in water installations
- **EN 13618** on flexible hose assemblies in drinking water installations
- **EN 13904** and **EN 13905** ⇨ **replaced by EN 1112** and **EN 1113**

Additional information

a) Functional performance parameters

- Apart from EN 16507, EN 16058 and DIN 2459, **no other standards** allow the characterizing the **fitness for contact with drinking water**
- some methods exist to assess the **distribution of the flow** ⇒ **a proxy for comfort or efficiency** (BS 6340-4 - AUS/NZ 3662 - ASTM F2324-03). **A method for rinsing effectiveness of showers is being developed by CEIR**
- **In Sweden** ⇒ SS 820000 and SS 820001 that **include methods for temperature measurement, flow distribution and rinsing ability**
- In **Portugal**, **test for evaluation of water efficiency** (ANQIP ETA 0807 and ETA 0809)

- **Functional performance** parameters for **thermostatic mixing valves**:
 - **EN 1111**
 - **EN 15092-1; -2; -3; -4** on Aluminium and aluminium alloys
 - **Australian Standards AS 4032.1-2-3-4**
 - Standards of the American Society of Sanitary Engineering **1016, 1017, 1062, 1069, 1070** on temperature control
 - **KIWA guidelines** and **TMV2 and TMV3 certification**
 - **NF 077** and **NF 079** on certification and control and safety valves
 - **Chinese Standard QB 2806**

b) Resources use (energy, water and other materials)

- **EN 15804** related to the environmental impact of construction products
- **EN 27842** on "Methods for Determination of Discharge Capacity of Automatic Steam Traps" (?)
- **DIN 1988-300** on "Codes of practice for drinking water installations- Part 300: Pipe Sizing"

c) Water abstraction, treatment and supply

d) Waste production

e) Emission measurement

No relevant information identified

f) Safety

- **EN 1287** on "Sanitary tapware. Low pressure thermostatic mixing valves. General technical specification"
- **EN 15092** on "Building valves. Inline hot water supply tempering valves. Tests and requirements"

g) Noise and vibrations

- **EN 200** on "Sanitary tapware. Single taps and combination taps for water supply systems of type 1 and type 2"
- **EN 1112** on "Sanitary tapware. Shower outlets for sanitary tapware for water supply systems of type 1 and type"

h) Waste-water collection and treatment which discharge into surface water

- **EN 12056** on "Gravity drainage systems inside buildings Roof drainage, layout and calculation"
- **DIN 1986-30; -100**



New standards, mandates or revision

- Standards such as **EN 246, EN 200, EN 817, EN 15091, EN 1111, EN 1287** have to be revised and updated
- **EN 1111** should be under **final approval**. **ASSE 1016** has been modified in order to **integrate lower flow rates**. Revision in the Australian Code
- **CEIR** has been developing a **pre-normative method for showerhead 'efficiency' or cleanability rating test**

Problems of accuracy, reproducibility and representativeness

- According to stakeholders ⇒ often 'type tests' and not validation tests
- For performance, comfort and water use efficiency some methods exist to assess the flow distribution, but they are very sensitive to the test conditions and with reproducibility problems.
- Swedish methods are also considered to have some reproducibility problems. Results seem to be directly correlated with flow rate and it is very complicated to measure efficiency



Legislation

Ecodesing and Energy labelling

- EU mandatory legislation involving some WuP but not taps and showers
- Additional information (e.g. water consumption, noise) can be included into the Commission's energy label

Voluntary labelling schemes at European level

- **EU Ecolabel** criteria for sanitary tapware (November 2012)
- Some **water labelling schemes** based on water efficiency rating systems have been identified:
 - **Water Label**
 - **Water Efficiency Label (WELL)**

Updated information on legislation

■ Regulations for drinking water and materials

- Schemes for the market approval of WuP differ from country to country (AU; BE; DK; DE; Norway; CH; UK). Need of harmonization
- The **UBA works** according to **the German drinking water directive** (TrinWV) on **mandatory criteria** for **materials** and **substances** in contact with drinking water
- **In UK**, compliance with the **Water Regulation** ⇒ no specific testing for metallic while organics shall comply with BS 6920
- **In Portugal** ⇒ Scheme Approval
- **Test methods** to secure safe and healthy drinking water ⇒ NKB 4 - ACS, Wras, KTW, AS 4020, NSF 61, UBA list, KIWA
- **4 MS initiative: any update?**

Building regulations

- **French regulation on energy performance of buildings** ⇒ calculation method for taps
- **UK building regulations** under revision ⇒ possible influence on water use in new homes
- **National Building Code of Finland** covering "water supply and drainage installations for buildings" (water quality must be taken into consideration in materials selection. Small amount of dezincification is allowed for water fixtures)

Additional labelling of interest

- **Voluntary environmental labelling** for buildings such as **LEED (USA)**, **BREEAM (GB)**, **DNGB (Germany)** and **HQE (France)**
- In the **French "Marque NF"** products are tested and ranked according to nominal flow rate and flow and temperature management

Additional information

Safety

- **French regulation** ⇒ **hot water** delivered **below 50° C**
- **In the UK** ⇒ **specific safety issues for the delivery of hot water in healthcare premises**. Additionally Scottish and English Building Regulations also cover hot water safety to baths and other appliances

Waste-water collection and treatment which discharge into surface water

- The UK Building Regulations – Sustainable Drainage Requirements

No relevant information identified for:

- Water abstraction, treatment and supply
- Waste production
- Emission measurement

Potential barriers to producers

- **Approvals** are a **market-entry barrier for SMEs** and they should be harmonized;
- The variety of different schemes, labels and associated certifications is a problem ⇒ antagonist criteria and high associated costs
- The **national requirements for materials in contact with drinking water are different in EU Member States**. The 4MS procedure has not been discussed or accepted at EU level;
- **Flow Rate requirements in Finland (?) are different** compared to rest of the Europe ⇒ extra burdens and costs
- **Difficulties** for the producers **to respect restrictions on the content of hazard substances** in materials **without applying some derogations**, as for instance specified in the EU Ecolabel criteria for sanitary tapware

Discussion area

1. **Definition and classification** for taps and showers
2. Refining of **products not relevant** for water/energy saving (e.g. definition of luxury and wellness showers)
3. Information on **standards, labelling and legislation** (e.g. 4MS)



Supporting information for Task 1

EU Ecolabel criteria for sanitary tapware (November 2012)

1. Water consumption and related energy saving

- Maximum and lowest maximum available water **flow rates**
- Presence of a **temperature management device** / technical solution (where water supply is not temperature controlled)
- Guidelines on **time control** for taps and showers with time control devices

2. Materials in contact with drinking water

3. Excluded or limited substances and mixtures

4. Product quality and longevity

5. Packaging

6. User information

7. Information appearing on the EU Ecolabel

Product sub-group		Lowest maximum available flow rate (L/min)	Maximum available water flow rate (L/min)
Kitchen taps	without flow limiting device	2.0	6.0
	with flow limiting device ^[1]	2.0	8.0
Basin taps	without flow limiting device	2.0	6.0
	with flow limiting device ^[1]	2.0	8.0
Showerheads and showers ^[2]		4.5	8.0
Electric showers and low pressure showers		3.0	-
<p>^[1] The flow limiting device must allow for setting the default water flow rate (water-saving setting) at the value of max of 6/min. The maximum available water flow rate shall not exceed 8 l/min.</p> <p>^[2] Showerheads and showers with more than one spray pattern shall fulfil the requirement for the setting with the highest water flow</p>			

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TASK 2: MARKET ANALYSIS

- EU production and trade volume (official statistics)
- Market and stock data (model)
- Market structure and trends
- Consumer expenditure and base data

Generic economic data (official statistics)

- Production in EU-27 (1995-2012) (Prodcom, EUR and kg ⇒ **units**)
- Imports/exports from/to third countries (ComExt, EUR and kg ⇒ **units**)
- Sales in EU-27 = Production in EU-27 + imports – exports (EUR/**units**)

Taps and Showers - PRODCOM codes and corresponding 2012 CN codes

Code	Description
Prodco 28.14.12.33 m	Mixing valves for sinks, wash basins, bidets, water cisterns etc. excluding valves for pressure-reducing or oleohydraulic/pneumatic power transmissions, check valves, safety/relief valves
CN 8481 80 11	Mixing valves for sinks, washbasins, bidets, water cisterns, baths and similar fixtures
Prodco 28.14.12.35 m	Taps, cocks and valves for sinks, wash basins, bidets, water cisterns etc. excluding valves for pressure-reducing/oleohydraulic transmissions, check, safety, relief and mixing valves
CN 8481 80 19	Taps, cocks and valves for sinks, washbasins, bidets, water cisterns, baths and similar fixtures (excl. Mixing valves)

Showers in the same categories of relevance for taps
Pillar taps are not included

EU Production

Mixing valves (28.14.12.33) \Rightarrow 99 millions kg and 2.3 billion€ (2012)

Other valves (28.14.12.35) \Rightarrow 300 millions kg and 2.4 billion€ (2012)

in terms of units

- All **products** reported in **PRODCOM** refer to **taps and showers** of relevance for this study (with the **exception of pillar taps**).
 - The **share of taps and showers** (in terms of **units**) sold and/or installed **in domestic premises** represents **90% of the market** and the remaining part (**10%**) is sold and/or installed **in non-domestic premises**
 - The **ratio between taps and showers** is **3:1** for the **domestic sector** and **30:1** for the **non-domestic sector**
- \Rightarrow the **ratio between taps and showers** in the **overall market** is **5.7:1**

Based on feedback from stakeholders

Product	Average weight (kg/product)	Weight range (kg/product)	
		Min	Max
Taps	Basin mixer: 1kg Bath/shower mixer: 2.5kg	0.5 kg for a basin pillar tap	4 kg for a thermostatic bath/shower mixer
	1.8 kg in a global retailer	1.2	3.5
Showerheads and hand showers	100 mm plastic hand shower: 0.4 kg 150 mm metallic showerhead: 1.5kg	0.1 kg basic plastic hand shower	10 kg for a 500mm x 250mm showerhead

Assumptions

- The **average weight of taps** is evaluated as **average** of the provided data
- **Showers** are made of:
 - 1. Thermostatic valves** (4 kg) installed in **50% of the showers** and **mechanical mixing** valves (1.8 kg) in the **other 50%**
 - 2. Showerhead/handshower** (1 kg)

Product	Average product (kg)	Min (kg)	Max (kg)
Tap	1.8	0.5	4
Showerhead and handshower	1.0	0.1	10
Shower	4.1	1.8	14

Split between taps and showers

- **Taps: 85%** of the total sold units - **71 %** of the total sold volume in weight
- **Showers: 15%** of the total sold units - **29 %** of the total sold volume in weight

Assumptions

- **Presence of pillar taps** is significant only in the **UK (30%** of the market in terms of units and 45% of the stock in 2012). Trend for following years is -3%.
- **UK production** reported in the official statistics has to be increased by **30%** to take into account for pillar taps.

Estimated production (in 2012):

- **161 millions of taps** and **28 millions of showers**

This corresponds to 284 Millions of kg, or 3,397 M€, for taps and 116 Millions of kg, or 1,367 M€, for showers

EU trade

Total value

- **Other Valves (CN 8481 8019)** - largest importers/exporters
- **Mixing Valves (CN 8481 8011)** - largest importers/exporters

The same assumptions made for the production volume have been applied to the evaluation of imports and exports of taps and showers



Estimated trade (in 2012):

- **Import** ⇔ 82.3 millions of taps and 13.7 millions of showers
- **Export** ⇔ 61.9 millions of taps and 10.8 millions of shower

Intra-EU Trade and Extra-EU Trade

EU sales and trade

Half than in previous calculations
for EU Ecolabel and GPP

	Year	Population	Taps (M units)	Showers (M units)	Total (M units)	Ratio Taps to Showers
France	2012	65,327,724	8.1**	1.9**	10*	4.3
UK	2012	63,456,584	7*	2.3*	9.3	3.0
Germany*	2012	81,843,743	-	3.8*	-	-
EU27 apparent consumption (EU statistics)	2012	502,623,021	181	31	212	5.8
EU27 - scale up (% compared to EU27 apparent consumption (EU statistics))	2012	502,623,021	59 (33%)	19 (61%)	75 (35%)	3.1

- **Apparent consumption variation** considering weight
- **Lower average weights** ⇒ *apparent consumption from statistics vs. results of the scale-up* decreases **from 3.1 to 1.5 for taps** and from **1.6 to 0.6 for showers**

Market and stock data (model)

Installed stock and penetration rate

⇒ *Domestic stock*

Assumptions

- **4.5 taps and 1.5 showers per apartment** and **5.5 taps and 1.83 showers per house** are installed on average in the EU27.
- The **ratio** between taps and showers is thus **3:1**
- According to Eurostat, **houses** form **60% of all dwellings** across the EU27 and **apartments** the remaining **40%**.
- This parameter has been considered **constant** over EU27 and time

⇒ *Non-domestic stock (1)*

Business

- **100% of private businesses** provide **showering** to employees
- **1 shower per 100 employees** is present in all cat. of companies
- Separate showers are provided for male and female employees
- The **ratio between taps and showers** is equal to **30:1**
- An additional **20% of employees work in public administrations**

Healthcare

- **1 bathroom with 1 tap every bed** (average across all MSs)
- **1 shower every 4 beds** (average across all MSs)
- **1 kitchen tap every 75 beds** (average across all MSs)

⇒ *Non-domestic stock (2)*

Tourism

- For **50% of beds, 1 bathroom** with **1 tap and 1 shower**
- For the other **50% of beds, 1 bathroom** with **1 tap and 1 shower every 2 beds**
- **1 kitchen taps every 100 beds**

Education

- **1 tap, 1 shower and 1 kitchen tap every 100 student/pupils**



Taps stock

- **domestic sector: 1.22 billion of units (2012). Growth (2010-2050) +14% ⇒ 1.36 billion of units (2050)**
- **non-domestic sector: 73.2 million of units (6% of domestic) (2012). Growth (2010-2050) +24% ⇒ 87.5 million of units (2050)**



Showers stock

- **domestic sector: 406 million of units (2012) [261 million units in the study for EU and GPP criteria for sanitary tapware]. Growth (2010-2050) +14% ⇒ 452 million of units (2050)**
- **non-domestic sector: 24.7 million units (6% of domestic) (2012). Growth (2010-2050) +17% ⇒ 28 million of units (2050)**

Annual sales

Assumptions

- **Frequency of substitution = 1/average lifetime of the product**
- **Annual sales = product installed x frequency of substitution**

Product	Real life time (years)	Technical life time, as declared by manufacturer (years)
	Average (min-max)	Average (min-max)
Taps, domestic	16 (10-40) in France	25 (15-50) in France
	3-10 (3-50) in the UK	Variable among manufacturers in the UK
Taps, non-domestic	12 (5-20) in France	25 (10-50) in France
	5-10 (5-20) in the UK	Variable among manufacturers in the UK
Showers, domestic	10 (5-15) in France	15 (2-25) in France
	2-10 (2-30) in the UK	Variable among manufacturers in the UK
Showers, non-domestic	7 (5-15) in France	15 (5-25) in France
	5-10 (5-15) in the UK	Variable among manufacturers in the UK
Industrial kitchen taps	5 (1-10)	15 (10-20)

	Domestic dwellings	Non-domestic sector
	Average life time in years (min-max)	Average life time in years (min-max)
Taps	16 (3-50)	10 (5-20)
Showers	10 (2-30)	7 (5-15)



Taps sales

- **domestic sector: 76.1 million of units (2012).**
Growth (2010-2050) +12% ⇒ 85 million of units (2050)
- **non-domestic sector: 7.3 million of units (2012).**
Growth (2010-2050) +17% ⇒ 8.5 million of units (2050)



Showers sales

- **domestic sector: 40.6 million of units (2012).**
Growth (2010-2050) +11% ⇒ 45.2 million of units (2050)
- **non-domestic sector: 3.5 million of units (2012).**
Growth (2010-2050) +20% ⇒ 4.2 million of units (2050)

Results of the analysis		Taps (2012)	Showers (2012)
Stock of taps (M units)	Domestic	1,217	406
	Non Domestic	73	25
	Total	1,291	431
Sales (M units)	Domestic	76.1	40.6
	Non Domestic	7.3	3.5
	Total	83.4	44.1
Apparent consumption (M units)			
		(scale-up)	59
		(EU statistics)	181
Average lifetime (years)	Domestic	16	10
	Non domestic	10	7
	Under the assumption that 90% is domestic	13.7	8.6
	From stock and total sales	15.5	9.7

- **Share of non-domestic stock and sales <10%**

- ⇒ **apparent consumption** based on official statistics could be **overestimated for taps** and **underestimated for showers**

- ⇒ **modelling of stock and sales** should be **more robust**

Market structure and trends

- 50% of companies are **SMEs**. Progressive absorption in larger companies
- **80-96%** of taps and showers are sold for **domestic applications**
- **Market channels:** large stores, retailers and distributors, trade associations, on-line sellers, importers, manufacturers and construction companies

Country	Major players and key contacts (Feedback from stakeholders)
France	Wholesalers: Saint Gobain, Tereva, Comafranc/Aubade DIY: Leroy Merlin, Castorama (Kingfisher), Manufacturers: Grohe, Hansgrohe, Kohler/Jacob Delafon, Ideal Standard/Porcher, Roca, Presto, Delabie
Germany	Valves manufacturers: VDMA Industrial kitchen taps: Echtermann, Knauss, KWC Germany
Portugal	Large stores: Leroy Merlin, AKI, Isibuild, etc.
The UK	Suppliers: Keramag, Villeroy &, VitraA, Duravit Ag, Kohler and Ideal Standard, Grohe, Hansgrohe, Kludi, Ideal Standard, Hansa, Bristan Group, Ideal Standard (UK), Jacuzzi UK Group, Qualceram Shires, Roca, Samuel Heath & Sons, Triton, Twyford Bathrooms Key importers: VitraA and Tipravit from Turkey, Dahll from China, Lecico from Egypt, Roca and Porcelanosa from Spain
Industrial kitchens	Pentagast Group, Citti Group, Metro, MKN, Electrolux, Blanco, Franke

Consumers expenditure base data

Domestic products

	Bathroom tap		Kitchen tap		Showers	
	Range (Min - Max) (€)	Median (€)	Range (Min - Max) (€)	Median (€)	Range (Min - Max) (€)	Aver. (€)
Shower					10-150	>15 (40)
Monobloc mixer	10- 500	35-50 (25-30 at the factory)	10-350	35-50 (25-30 at the factory)	Please check	
2/3 hole mixer	100-400		50-150			
Pillar Taps (pair)	20-150		20-60			
Industrial kitchen tap				300 (150 at the factory)		

Non domestic products

Type of Tap/ Showerhead	Range (Min - Max) (€)
Infra-Red Mixer Tap	250-500
Lever Taps (Pair)	50- 100
Single Lever Mixer Tap	100- 600
Self-closing single taps	30- 300
Showerheads (Wall mounted/swivel design)	30-150

Domestic	Installation cost (€)	Maintenance and repair (€)^a
Bathroom taps	30-200	50-100
Showerheads	20-60	15-100
Shower/bath	300	50-100
Kitchen taps	30-300	50-100
Outdoor taps	100	50-100
Non-domestic	Installation cost (€)	Maintenance (€)
Bathroom taps	30-200 ^b	50-100
Showerheads	60	15-100
Kitchen taps	150	50-100
Outdoor taps	100 ^b	50-100

(a) in case of intervention of professionals
(b) considered as the cost for domestic

Please check

Spare Part		Cost (€)^a
Aerators	single	5-10
Ceramic Disc Cartridges (single lever taps)	single	20
O Rings	Box of mixed o rings for taps (approx. 115)	10
Tap heads	single	10-40
Valves:		
• Ceramic disc valve	pair	25-40
• Compression tap valve	single	5
Washers	Box of mixed washers for taps (approx. 80)	10

(a) when not included in the price of repair and maintenance

Disposal Tariffs

- Taps and showerheads may be disposed alongside other waste
- However, it seems that taps are usually collected and recycled
- **No economic burdens identified**

Gas and Electricity Prices

- Reference to MEErP Methodology Report

Water Prices

- Task 2 report for Ecodesing of Washing Machines considered an average price for water supply and sewage of 2.5 Euro/m³
- Alternatively, reference to MEErP Methodology Report

Interest and Inflation Rates

- Reference to Eurostat and MEErP Methodology Report

Summary energy, water & financial rates for EU-27

	Domestic incl.VAT	Long term growth per year	Non- domestic excl. VAT
Electricity (€ / kWh)	0.18	5%	0.11
Gas (€ / GJ (LHV))	14.54	3-5%	8.90
Oil (gas oil) (€ / 1000 ltr)	824	5%	Not Available
Water (€ / m ³)	3.70	2.50%	Not Available
Interest rate	7.7%	Not Available	6.5%
Inflation rate	2.1%		
* real (inflation corrected) increase Discount rate (EU default)	4%		
Energy escalation rate*	4%		
VAT	20%		

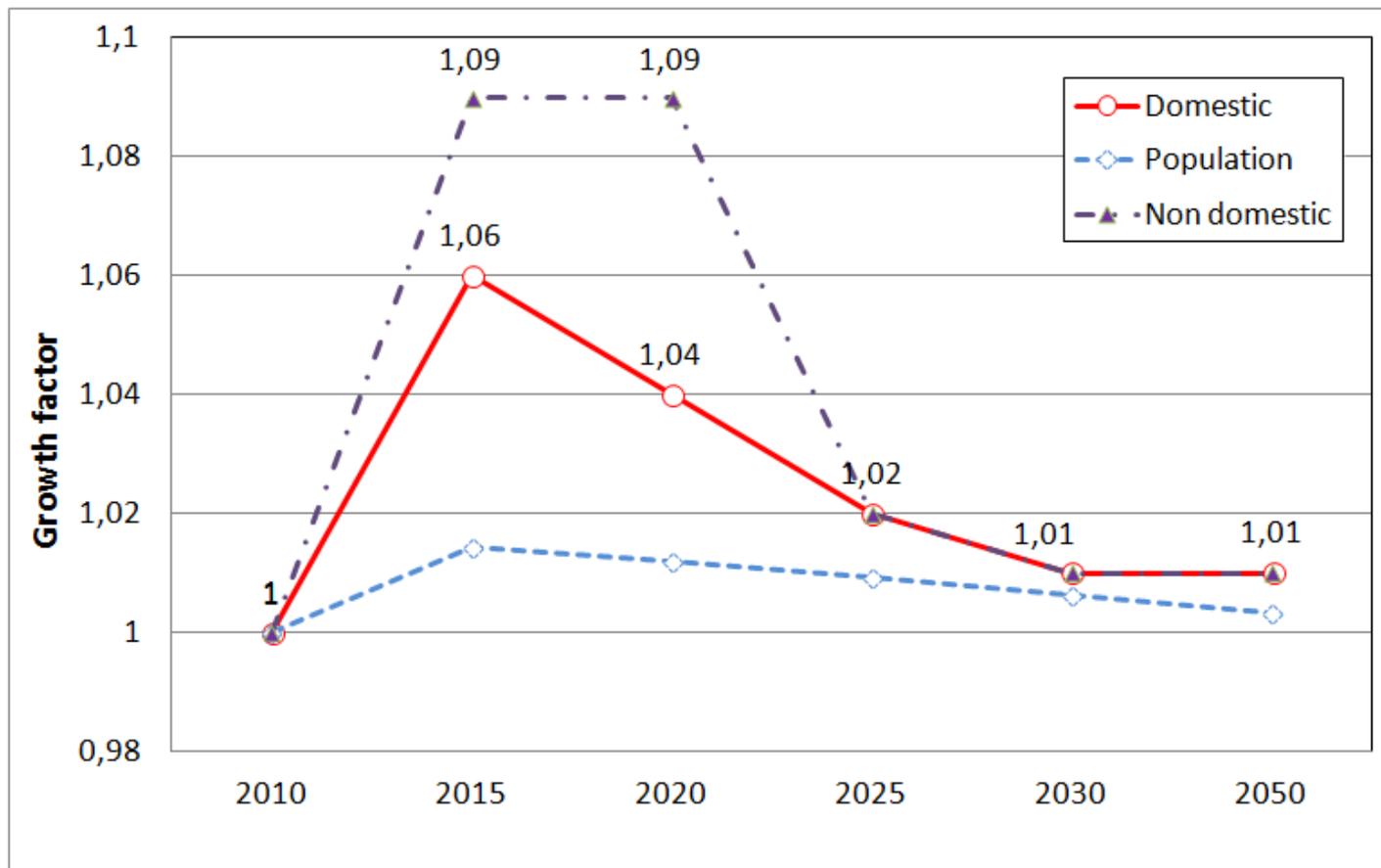
Discussion areas

- 1. Assumptions** on: general market data, stock and sales model (from KO meeting and interaction with stakeholders), e.g.
 - *Prodcop categories and taps and showers definition*
 - *ratio between taps and showers,*
 - *domestic vs. non-domestic*
 - *average weight*
 - *% pillar taps*
 - *number of taps and showers in domestic and non-domestic*
 - *forecasts*
 - *product lifetime*
- 2. Information on market trends**
- 3. Information on consumer expenditures** (cost of products, installation, maintenance and repair, EoL)



Supporting information for Task 2

Growth factors estimated for domestic and non-domestic dwelling



Source of information: development of EU Ecolabel and GPP criteria on sanitary tapware + VHK report "Study on Amended Working Plan under the Ecodesign Directive. Task 3"

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TASK 3: USERS AND SYSTEM ASPECTS

- Water and energy use in taps and showers
- Water and energy saving potential
- Impact on waste water treatment

Urban water consumption

- 60.7 billion m³/yr (FAO, 2008-2012), 17-25% of total abstraction
- Demographic and economic trends to increased use
- Different uses and differences across the EU (507 M persons)
- Domestic: 150 L delivered/p/d (EUREAU)
- Non-domestic: 50 L delivered/p/d (EUREAU)
- Water loss: 10-50%, 24% on average
- General consistency between EUREAU, FAO and EEA

Water and energy use in taps and showers

- Aim: EU average for domestic and non domestic sectors (2012) + variation range
- Domestic: based on 4 geographical zones
- Non-domestic: based on split between different uses
- Tier 1: demand at the end-product (no losses)
- Water → Hot water → Energy
- Tier 2: system aspects included

Domestic sector

4 geographical areas:

- Central, Eastern and Balkan Europe
- Nordic and Baltic Europe
- UK and Ireland
- Southern Europe

For each area:

- Water consumption per capita (without losses)
- Split between different uses
- Comparison with EUREAU data

→ EU water demand in taps and showers (2012)
Baseline scenario + variation range

	Baseline Scenario (Mm ³ /yr, %)		Variation range	
Bath	644	2%	-17%	19%
Shower	8384	31%	-19%	25%
Tap, washbasin	1846	7%	-41%	67%
Tap, kitchen - drinking/cooking	930	3%	-30%	52%
Tap, kitchen - dish washing	1037	4%	-27%	36%
Tap, indoor - clothes washing	364	1%	-20%	26%
Tap, indoor - other uses	1931	7%	-46%	63%
Outdoor	1308	5%	-34%	30%
Toilet flushing	6862	25%	-20%	20%
Dishwashing machine	802	3%	-23%	24%
Washing machine	3188	12%	-19%	26%
Total	27296	100%	-24%	31%

Results at EU level

- Total: 147.4 L/p/d (EUREAU: 149 L/d)
- 60% = taps and showers (88 L/p/d)
- 33% = showering and bathing (93 : 7)
- Qualitatively similar results in the literature

Non-domestic sector

- Less information available
- Total demand from EUREAU
- Constant: about 1/3 of domestic
- 4 models built for water split between uses (DEFRA, EWF Property Maintenance, Architechstock, EPA-DEFRA hybrid)

	Baseline	Min	Max
Shower	3.7%	0.5%	6.7%
Tap, washbasin	14.8%	2.0%	24.2%
Tap, kitchen	6.1%	0.8%	11.8%
Tap, indoor - other uses	0.2%	0.0%	1.0%
Toilet flushing	Not relevant for this study		
Outdoor and others			

- 21.1% taps (2.8-37%)
- 3.7% showers (0.5-6.7%)

Water demand in taps and showers – Tier 1

Taps

- Domestic: 8060 Mm³/yr = 6.6 m³/yr/unit (-35%/+49%)
- Non-domestic: 2086 Mm³/yr = 28.5 m³/yr/unit (-87%/+75%)

Showers

- Domestic: 8348 Mm³/yr = 20.6 m³/yr/unit (-19%/+25%)
- Non-domestic: 362.9 Mm³/yr = 14.7 m³/yr/unit (-85%/+82%)

Total: 12% non-domestic, 45% showers

Average use in the non-domestic:

- *Washbasin taps (10 L/use): 0.8 uses/p/d (0.1-1.3)*
- *Washbasin taps (4 L/use): 2.6 uses/p/d (0.4-4.3)*
- *Showers (80 L/use): 8.9 uses/p/yr (1.3-16.3).*



Energy model

- Based on 1st and 2nd questionnaires
- Bathing and showering: 80-100% hot water at 36-40° C
- Washbasin taps (+ non domestic taps): 30-50% hot water at 32 and 38° C
- Dish/cloth washing: 40-60% hot water at 32 and 38° C
- Drinking, cooking and other uses: 0% hot water
- Average inlet temperature: 15° C (conservative choice since varying from 8.6 to 15° C)
- Temperature of water leaving the boiler: 60° C (delta T = 45° C)
- No heat loss in Tier 1
- Specific heat capacity of water 4.187 kJ·kg⁻¹·K⁻¹



100 litre of hot-water

- at 40° C at the outlet = 55.56 litre of hot-water at 60° C from the boiler.
- at 32° C at the outlet = 37.78 litre of hot-water at 60° C from the boiler.

- Bathing and showering: 80-100% hot water at 36-40° C
- Washbasin taps (+ non domestic taps): 30-50% hot water at 32 and 38° C
- Dish/cloth washing: 40-60% hot water at 32 and 38° C
- Drinking, cooking and other uses: 0% hot water
- Average inlet temperature: 15° C (conservative choice since varying from 8.6 to 15° C)
- Temperature of water leaving the boiler: 60° C (delta T = 45° C)
- No heat loss in Tier 1
- Specific heat capacity of water 4.187 kJ·kg⁻¹·K⁻¹

Hot water from taps and showers

- At domestic outlets: 51.7 L/p/d, about 60% of tot. from T&S
- At domestic boilers: 25.9 L/p/d, about 30% of tot. from T&S
- Conservative and consistent estimation (VHK Lot2, Swedish Energy Agency, stakeholders)
- Breakdown:
 - 79% showers
 - 8% washbasin taps
 - 6% bathing
 - 5% dishwashing
 - 2% cloth washing
- Non-domestic: hot water about 50% of total (70% taps)

Energy demand in taps and showers – Tier 1

Taps

- Domestic: 176.4 PJ/yr = 144.9 MJ/yr/unit (-49%/+91%);
- Non-domestic: 69.9 PJ/yr = 954.9 MJ/y/unit (-92%/152%);

Showers

- Domestic: 726.6 PJ/yr = 1790 MJ/yr/unit (-34%/+51%)
- Non-domestic: 31.5 PJ/yr = 1273 MJ/yr/unit (-88%/+120%)

Total:

- 10% non-domestic (12% water)
- 75% showers (45% water)

Tier 2 – Inclusion of system aspects

- Heating systems: summary of key information from VHK Lot2 Ecodesign study
- Mix of energy and conversion/transmission efficiency (energy weighted EU average from Lot2)
- Water loss and energy demand for water supply;
- Energy demand in the wastewater treatment system;
- Considered to refer to 2012

Tier 2 – Inclusion of system aspects

Energy mix (total efficiency):

- Heating systems: summary of VHK Lot2 Ecodesign study
 - 40% electricity (72%)
 - 40% natural gas (50%)
 - 20% oil (52%)
- Mix of energy and conversion/transmission efficiency (energy weighted EU average from Lot2)
- Water loss and energy demand for water supply;
- Energy demand in the wastewater treatment system;
- Reference to 2012

Tier 2 – Inclusion of system aspects

Energy mix (total efficiency):

- 40% electricity (72%)
- 40% natural gas (50%)
- 20% oil (52%)

- Heating systems: summary of VHK Lot2 Ecodesign study
- Mix of energy and conversion/transmission efficiency (energy weighted EU average from Lot2)

- **Water distribution loss: 24%** (10-50%)
- **Water supply: 0.63 kWh electricity per m³** (-25%/+43%).
Abstraction = 50%
- **Wastewater collection and treatment: 1.97 kWh electricity per m³** (-85%/+422%). Mainly treatment

Water consumption – Tier 2

- Total water abstraction for use in taps and showers in the EU28: 24860 Mm³/yr (-35%/+42%) = **40% of total urban water abstraction**
- **87% in the domestic sector** and 13% in the non-domestic sector
- **Domestic:** 21640 Mm³/yr (-27%/+37%) for taps (49%) and showers (51%)
- **Non-domestic:** 3223 Mm³/yr (-83%/+76%) for taps (85%) and showers (15%)

Energy consumption – Tier 2

- **Total system energy demand** associated to the use of water in taps and showers is 1794 PJ/yr (-44%/+54%)
- **94% in the domestic** and 6% in the non-domestic sector
- **Domestic:** 1693 PJ/yr (-41%/+54%) for taps (22%) and showers (78%)
- **Non-domestic:** 101.3 PJ/yr (-90%/+59%) for taps (69%) and showers (31%)
- **Energy contributions:**
 - *Hot water: 46-55%*
 - *Water heating efficiency: 32-38%*
 - *Wastewater treatment: 5-15%*
 - *Water abstraction and delivery: 2-7%*

In line with literature

Water and energy saving potential

Based on stakeholders feedback:

	Volume of water	Wastage of water	Daily frequency
Baths	155-185 L (40% actual)	0-10%	0.2 in the UK
	Time of use	Wastage of water	Daily frequency
Showers	7 min (2.5-10 min)	10% (0-20%)	1 (0.6-1.5)
Washbasin taps	1 min (0.33-2.5 min)	10% (0-50%)	5 (3-7)
Kitchen taps	1 min (0.5-2.5 min)	10% (0-20%)	5 (3-7)

	Baseline	Min	Max
Baths	185 L (50% actual)	155 L (40% actual)	200 L (60% actual)
Showers	10 L/min	6 L/min	13 L/min
Washbasin taps	10 L/min	6 L/min	13 L/min
Kitchen taps	10 L/min	6 L/min	13 L/min

Technical measures to achieve water savings applied to

- 43% of water from all taps (washbasin, dishwashing, bathing)
- 100% of water from all showers.

Water saving potential (product only):

- 36% for domestic taps (mix of different taps, 32% w/o bathing)
- 40% for non-domestic taps
- 34% for showers in both domestic and non-domestic sectors.
- No switch from bathing to showering

→ Annual water saving potential over tot. water from T&S:

- 15% for domestic taps (14% w/o bathing) and 17% for non-domestic taps.
- 34% for all showers.

Compared to baseline (literature: 0-30% for the non-domestic)

Total EU28 **water saving** from taps and showers:

- 6027 Mm³/year (**89% domestic**, 11% non-domestic)
- **24%** of the total water abstraction for **taps and showers**
- **12%** of the total water abstraction for **urban use**
- Variation range: from 65% to 142%

Total EU28 **energy saving** from taps and showers:

- 548.2 PJ/year in Tier 2 (297.1 PJ/year in Tier 1)
- **92% domestic sector**, 8% non-domestic
- **17%** of the total energy demand for **taps and showers**
- Variation range: from 56% to 154%

Product group	Estimated savings ^a (PJ/yr)
Taps and showers – Tier 2	548 (307-844)
Electric motors	486
Taps and showers – Tier 1	297 (156-458)
Domestic Lighting	140
Street & Office Lighting	137
Standby	126
Fans	122
Televisions	101
Circulators	83
Air conditioners and comfort fans	40
External power supplies	32
Simple set top boxes	22
Domestic refrigerators	14
Domestic dishwashers	7
Domestic washing machines	5
Total^b	1318

(a) Estimated at 2012 for taps and showers and at 2020 for other product groups

(b) Without considering taps and showers

Impact on wastewater collection and treatment infrastructures

1. *UK Environmental Agency.*
2. *Plumbing Efficiency Research Coalition*
3. *Monteiro et al.*

Preliminary outcomes:

- Wastewater management network **not affected by** reduced consumption of water in **taps and showers**
- Any negative effects possibly associated to toilet flushing and disposal of toilet paper and other materials in toilets
- Possible to **control** effects **through technical actions** on toilets and management of sewage system.

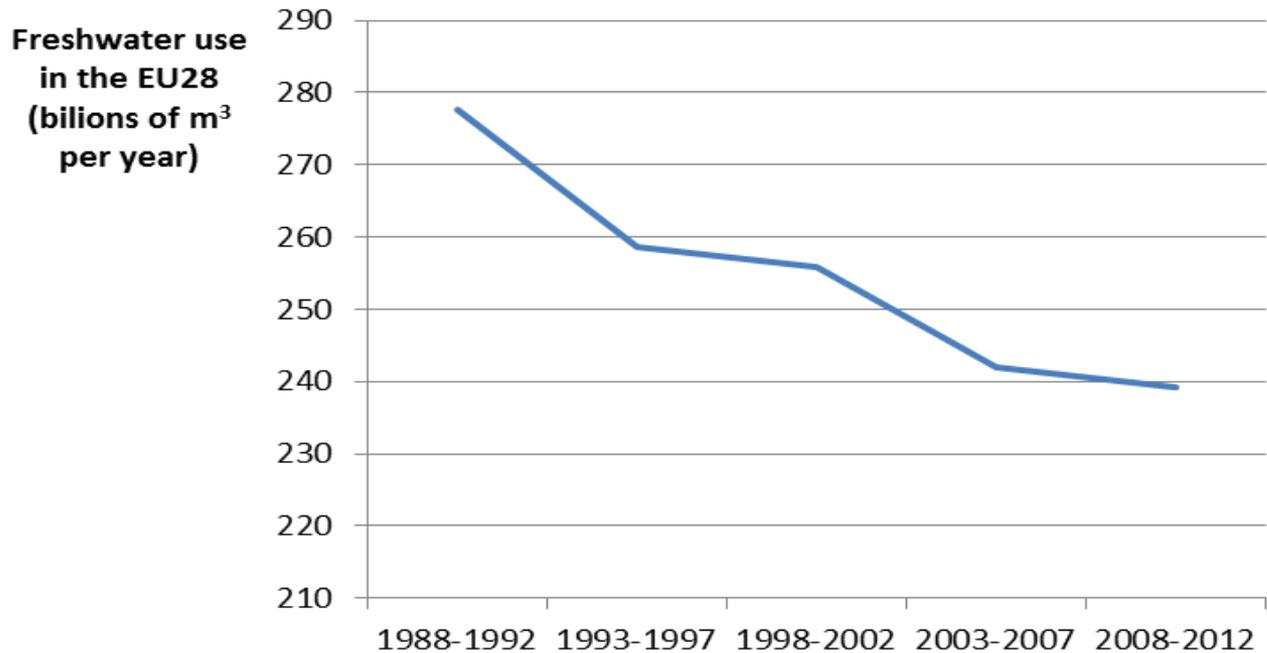
Discussion Areas

1. Assumptions for water/energy use calculation
2. Information on user behaviour
3. Assumptions for water/energy saving calculation (current and forecasts)
4. Information on impact on wastewater infrastructures



Supporting information for Task 3

Water availability



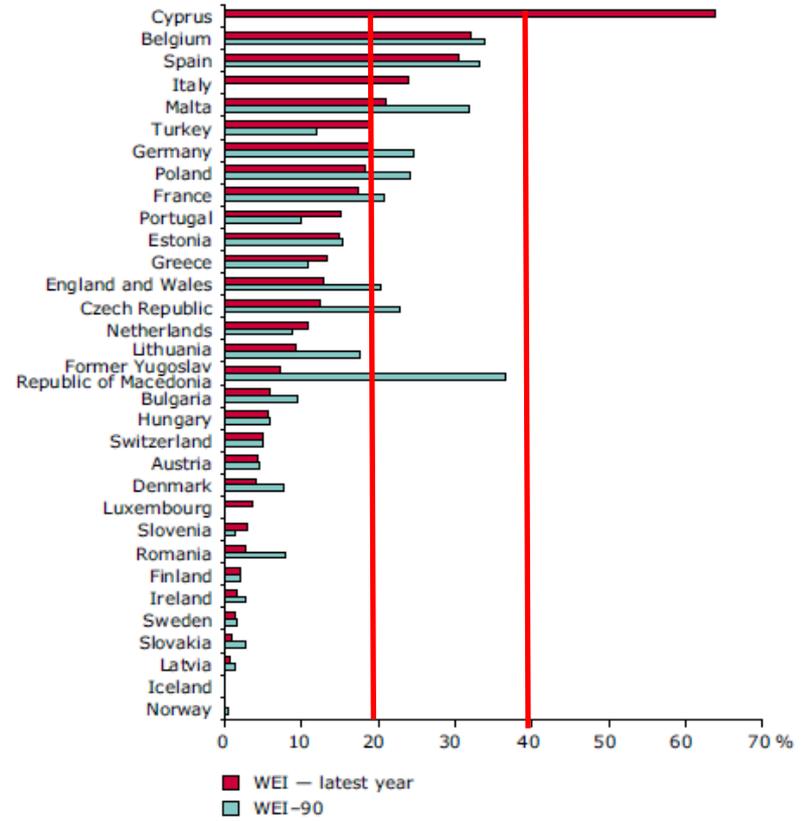
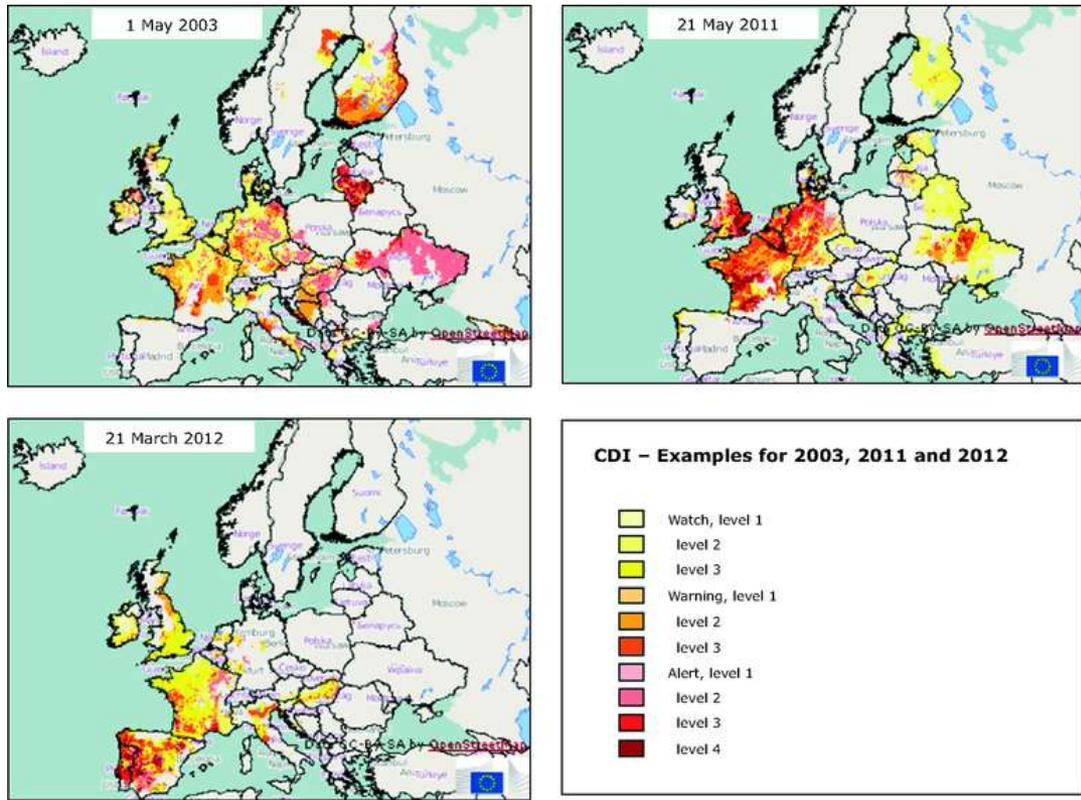
*FAO's
Aquastat database*

FAO, EEA, Ecologic project:

- 44-59%: Industry and energy
- 20-32%: Agricultural
- **17-25%: Urban**

Combined Drought Index

Water Exploitation Index



Importance of water all across the EU!

Saving potential = f(technology; user behaviour)

Technology effect:

- Switch from bathing to showering: -46%
- **Taps: -40% / +30%**
- **Showers: -34% (85% of -40%) / +30%**

Higher considering the influence of user behaviour

- Washbasin Taps: -82% / +485%
- Other taps: -73% / +73%
- Showers: -69% / +109%
- **Bathing: -20% / +80%**

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TASK 4: ANALYSIS OF TECHNOLOGIES

- Conventional and water/energy saving technologies
- Market segmentation
- Production, use, end-of-life

Information on conventional products

- **Variety** of designs, materials and functionality for taps and showers
- Taps designed for the **pressure system** they are to be used with
- **Innovations** in technology for taps and showers are on average introduced **every 2-10 years** and stay on the market **for 10-40 years**
- **Increasing number of water/energy-efficient** taps and showers

Water/Energy saving technologies

List of technologies/features:

Technology	Primary saving potential
<i>1. Flow and spray pattern design, aerators and flow regulators</i>	Water (and energy)
<i>2. Flow switch options</i>	Water (and energy)
<i>3. Sensor taps</i>	Water (and energy)
<i>4. Push taps</i>	Water (and energy)
<i>5. Two stage taps</i>	Water and/or energy (and energy)
<i>6. Thermostatic valves</i>	Water and energy
<i>(Hot-water limiters)</i>	Safety device (energy)

Flow rate: variable

Theo. saving potential: up to 55-85% for water, 65% for energy

Payback time << lifetime for the product

Technology	Purchase price and payback time (PBT)	Level of diffusion
Flow and spray pattern design	<ul style="list-style-type: none"> •Cost variable (€ 20-220). •Short PBT (months) 	Common issue for all products
Aerators	<ul style="list-style-type: none"> •Short PBT (<1-2 years) 	Commonly implemented
Flow regulators	<ul style="list-style-type: none"> •<€ 5.5 •Short PBT (months) 	Commonly implemented
Flow switch options	<ul style="list-style-type: none"> •Cost and PBT variable 	Available for both taps and showers, market diffusion expected to increase
Sensor taps	<ul style="list-style-type: none"> •Indicative price: € 375 •PBT between 3-6 months 	Commonly used in non-domestic, possible expansion to domestic
Push taps	<ul style="list-style-type: none"> •Retrofit possible at € 12-24. •PBT between 2-3 years. 	Commonly used in non-domestic, possible expansion to domestic
Two stage taps	<ul style="list-style-type: none"> •€ 150-210 •PBT variable (0-4 years) 	Available for both taps and showers, market diffusion expected to increase
Thermostatic valves	<ul style="list-style-type: none"> •Higher costs (up to € 400-500 for a high quality mixer) . Influence of cartridge. 	Up to half of market for showering, possible expansion to other applications.

Water flow control

Water control device	Technology penetration
Pillar taps	0% in France, market penetration decreasing 30% in the UK, -2% expected over next five years
Double lever, single outlet	10% in France, market penetration decreasing 43% in the UK, -2% expected over next five years 50% for industrial kitchen taps in Germany (-)
Single lever, single outlet	62% in France, market penetration increasing 25% in the UK, +3% expected over next five years 30% for industrial kitchen taps in Germany (+)
Infrared sensors	1.8% in France, market penetration increasing 10% for industrial kitchen taps in Germany, market stable
Mechanically controlled	8% in France, market stable 10% for industrial kitchen taps in Germany, market stable
Thermostatic valves	18% in France, market penetration increasing, they could represent up to 50% of valves installed in showers.

Technology penetration in terms of water flow rate

- Key information but **limited information**
- Number of products registered in the Water Label scheme (updated at Sep 2013)
- Different levels of performance on the market

Flow rate (L/min)	Basin taps		Shower controls		Shower handset		Kitchen taps	
	Number	%	Number	%	Number	%	Number	%
< 6	364	87.9	197	58.5	38	28.6	13	81.3
6-8	34	8.2	76	22.6	44	33.1	1	6.3
8-10	9	2.2	16	4.7	21	15.8	0	0.0
10-13	0	0.0	48	14.2	30	22.6	2	12.5
>13	7	1.7	0	0.0	0	0.0	0	0.0
total	414	100	337	100	133	100	16	100

Stakeholders feedback



Water flow in L/min	Kitchen taps (%)	Bathroom Taps (%)	Showers (%)
Max 4 L/min		10% in Portugal (trend to 60%)	
Max 6 L/min	10% in Portugal (trend to 50%)	29.5% in one global retailer	
Max 7.2 L/min			10% in Portugal (trend to 60%)
Max 8 L/min		99.5% in one global retailer	
Max 13 L/min		100% in one global retailer	
Lowest flow rate technically feasible (L/min)	2 L/min at 3 bar	Below 2 L/min functionality of non-domestic basin taps could be undermined.	4.5 L/min at 3 bar. Below 6 L/min, functionality of showers could be undermined.
Highest flow rate known (L/min)	110 L/min in pot or kettle filling taps	30 L/min at 3 bar	> 30 L/min at 3 bar

Expected trends and innovations:

- Product **size** reduction and increased importance of **water and energy savings** technologies
- Increase importance of **wellness** together with water saving.
- Increase **penetration of automatic valves** in private households and extending the battery life up to 10 years
- Increase penetration of **electronics**;
- Increase penetration of **thermostatic valves**;
- Integration of a flow switch element in the **aerator** and improved system for cleaning and change;
- Selection of **materials** that ensure the respect of hygiene quality standards.

Production - Materials

- 90-99% of the **taps mostly made of brass**, with chrome plating as metal finishing. Unlikely to change in the short to medium term.
- Other materials play a more important role in Germany (5% of taps based on stainless steel) and the UK (4% of taps based on stainless steel; 1% on plastic and 5% on other materials (e.g. Zinc-Al alloys)).
- **Shower valves** mostly based on **brass** (70% in the UK and 90% in France) but high relevance of plastics (25% in the UK and 10% in France).
- **Plastics** used considerably more in **showerheads and hand showers** (70% of the end product in the UK and 89% in France).
- Other materials: **brass** (20% in the UK and 10% in France), **stainless steel** (4% in the UK and 1% in France).
- Scenarios for the coming year should not change significantly, although the **use of plastic could increase** in the future.

Production – resources and emissions

Some rough indications referred to **1 ton of generic product**:

- 6.2 - 7.4 m³ of water consumed
- 0.89 - 1.01 tons of CO₂ emitted
- 0.17 - 0.21 tons of waste produced

Huge variability

- Any **metal 'scrap'** is recovered and **recycled** back
- **Foundry sands?**

Production – Plastic materials

Broad use of **technical** plastics:

- Spray gun bodies: POM or Grivory
- Aerators: POM,
- Rings: POM and PA6,
- Cartridges: PSU, POM and PA6
- Thermostatic cartridges: PSU, PEI, PPA;
- Parts under extreme conditions of pressure and temperature or requiring special accuracy during manufacture: PPA, PPO, PSU, PEI, ABS
- Wet parts, not pressurized: POM, PP
- Hoses for mixers: inner tube of PEX (with braid of nylon or stainless steel and brass sleeves).
- Hoses for showers: PVC
- Showerheads and hand shower: housing (90%) made of ABS and internal elements made of POM, PPO or PS and others.
- Other parts : PA, ABS, POM

Bill-of-Materials of example products

- Average data on **material composition and weight** of taps and showerheads was provided by manufacturers.
- **Selected examples of products** for domestic and/or non-domestic applications.
- Taps: “light” and “heavy” brass taps and “light” stainless steel tap
- Shower systems:
 - A “light” shower mixer with a showerhead
 - A “heavy” wall mounted shower mixer with a showerhead
 - A “heavy” shower mixer with a shower plate
 - A shower pipe

Materials	Brass Tap (lightest)	Brass Tap (heaviest)	Stainless steel Tap
Body (brass) [g]	842	1558	0
Body (stainless steel) [g]	0	0	720
Nickel chrome plating [g]	2	2	2
Plastic (mainly PSU for the cartridge) [g]	63	84	63
Ceramic discs [g]	21	21	21
Handle (zinc) [g]	209	223	0
Pressure hoses (plastic) [g]	142	166	142
Packaging (cardboard) [g]	365	760	365
Total [g]	1644	2814	1313

Material	Shower mixer + showerhead (lightest)	Wall mounted shower mixer + showerhead (heaviest)	Shower mixer + shower plate (heaviest)	Show er pipe
Body (brass) [g]	1653	4200	2800	5101
Waste fitting (brass) [g]	0	0	0	0
Plastic (mainly PSU for the cartridge) [g]	86	642	428	957
Ceramic discs [g]	21	63	42	15
Handle (zinc) [g]	223	707	484	416
Pressure hoses (plastic) [g]	0	0	0	0
Packaging (cardboard) [g]	437	1049	699	1191
Brass outlet [g]	0	0	1902	0
Plastic outlet [g]	163	163	393	0
Nickel chrome plating [g]	2	2	2	2
Packaging outlet [g]	92	92	650	0
Total [g]	2677	6918	7400	7683

Product distribution

- **Packaging: few 100 grams - more than 1 kg**
- Materials used: **cardboard, paper and plastic/cloth bags.**
- Cardboard: recycled for fitments, higher quality and printed for end products.
- LD-PE/cloth bags for components
- Average dimensions:
 - Length 30-80 cm
 - Width 18-26 cm
 - Height 6-13 cm
 - **Volume: 4.6-16.0 L**
- Mainly road transportation (2-5 days from the factory to the place of installation)

Installation, use and maintenance

- **Installation and maintenance varies** for all products (compliance with manufacturer's requirements)
- **Durability** can be reduced significantly by bad installation or maintenance.
- Importance of **product cleaning and lime removal**
- **Very few replacements** of parts. Some producers provide spare parts for repairing
- Depending on the quality of water, **aerators** could be replaced periodically, even by the user.
- For **other parts** (e.g. seals, valves, diverters, cartridges), intervention of the plumber

Product	Real life time (years)	Technical life time, as declared by manufacturer (years)
Taps, domestic	16 (10-40) in France	25 (15-50) in France
	3-10 (3-50) in the UK	Variable among manufacturers in the UK
Taps, non-domestic	12 (5-20) in France	25 (10-50) in France
	5-10 (5-20) in the UK	Variable among manufacturers in the UK
Showers, domestic	10 (5-15) in France	15 (2-25) in France
	2-10 (2-30) in the UK	Variable among manufacturers in the UK
Showers, non-domestic	7 (5-15) in France	15 (5-25) in France
	5-10 (5-15) in the UK	Variable among manufacturers in the UK
Industrial kitchen taps	5 (1-10)	15 (10-20)

	Domestic	Non-domestic
	Average life time in years (min-max)	Average life time in years (min-max)
Taps	16 (3-50)	10 (5-20)
Showers	10 (2-30)	7 (5-15)

End-of-life practices

- **Usually collected by installers and recycled**, due to the value of their metal content (indicatively 90-95%)
- **Metals and alloys** can be extensively recycled.
- Few barriers:
 - Recycling of stainless steels containing nickel
 - Recycling of copper alloys containing lead and nickel
 - Presence of infrastructures
- Recovery of metals should be efficient also in case the product is collected and disposed by municipal services
- **Plastic components** usually disposed as municipal solid waste.
- Disposal costs, if any, are minimal (money return likely)

Preliminary identification of technical options for environmental assessment

Technical option(s)	
Typical product (T4)	<ul style="list-style-type: none"> • Brass tap • Shower (mixer + showerhead)
Weight/materials (T4)	<ul style="list-style-type: none"> • Stainless/brass tap • Lighter – heavier tap • Lighter - heavier showers
Use (T3)	<ul style="list-style-type: none"> • Domestic / Non-domestic
Water/energy consumption (T3)	<ul style="list-style-type: none"> • System aspects + variation range • Water Heating Systems (Energy mix, Electricity, Gas, Oil) • Water/energy saving potential
Lifespan (T2)	<ul style="list-style-type: none"> • Durability

Discussion areas

1. Information on technologies (types, costs, water/energy savings)
2. Distribution of products on the market in terms of water consumption
3. Additional information on BoM, production and EoL
4. Key options of interest for next tasks



Supporting information for Task 4

Technology	Typical flow rates (L/min)	Max. saving potential (ref. to 16 L/min for showers and 14.5 L/min for taps)	
		Water	Energy
Flow and spray pattern design	6-16 L/min	•Up to 65% for showers	
Aerators	2-14.5 L/min for taps (typically 6 L/min) , 7.5-16 L/min for showers	Aerators + flow regulators: •Up to 60% for taps •Up to 55% for showers	
Flow regulators	1-25 L/min, typically: 6 L/min for washbasin mixers; 8 L/min for showers	Aerators + flow regulators: •Up to 60% for taps •Up to 50% for showers	
Flow switch options	Water saving position: 5-7 L/min for taps; 8-11 L/min for showers	•Up to 65% for taps •Up to 50% for showers	
Sensor taps	2-6 L/min for basin taps and 10 L/min for showers.	•Up to 85% for taps •Up to 40% for showers	
Push taps	2-6 L/min for basin taps, around 10 L/min for showers. Flow duration: 1 to 30 seconds.	•Up to 85% for taps •Up to 40% for showers	
Two stage taps	5-7 L/min in water saving position	•Up to 65% for taps	•30-60%
Thermostatic valves	Variable	•10-50% for showers	•5-15%

Parameter	Domestic sector		Non-domestic sector	
	Taps	Showers	Taps	Showers
Water abstraction (m ³ /yr /unit)	8.714	27.17	37.51	19.33
Energy for water supply (MJ/yr/unit): • Electricity	20.71	64.56	89.12	45.39
Energy for water heating (MJ/yr/unit) ^a : • Electricity (40%) • Gas (40%) • Oil (20%)	97.92 97.92 48.96	1209 1209 604.6	645.2 645.2 322.6	860.4 860.4 430.2
Energy for water supply (MJ/yr/unit): • Electricity	46.97	146.5	202.2	104.2
Water and energy saving potential	36% (for 43% of products)	34% (for 100% of products)	40% (for 43% of products)	34% (for 100% of products)

(a) In case of heating with a single source of energy, total energy consumption (MJ/year) would be:

Electricity	201.2	2486	1326	1769
Gas	289.8	3580	1910	2547
Oil	278.7	3442	1836	278.7

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TASK 5: ANALYSIS OF DIFFERENT DESIGN OPTIONS

- Preliminary environmental assessment

Outline:

- Introduction
- Description of base cases for the preliminary assessment
- Base cases inputs for the preliminary assessment
- Preliminary environmental impact assessment
- Next steps of the analysis
- Questions / Discussion

Introduction

Preliminary assessment of the environmental impacts

Objectives:

1. Show examples of results that will be produced in Task 5 and 6
2. Provide an initial screening of impacts and to identify key life cycle phases and materials of two design options.

Methodology: MEErP 2011EcoReport – Excel tool for the environmental and economic assessment of ErP

This analysis is based on the:

- ✓ Background study for the development of EU Ecolabel and GPP criteria for taps and showers (To be updated)*
- ✓ Previous Task 4 “Analysis of technologies” (BoM)

*<http://susproc.jrc.ec.europa.eu/ecotapware/>

Description of base cases for the preliminary analysis

Two base cases have been chosen according to Task 3 and Task 4 for this preliminary assessment of the environmental impacts.

Functional Unit: 1 tap/shower along its lifetime.

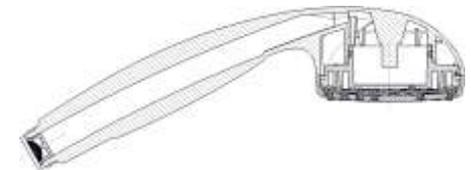


Two base cases:

1. A conventional tap made of brass ("lightest product among the models for which a BoM was provided")
2. A shower mixer with a showerhead ("lightest product among the models for which a BoM was provided")

For both:

- Domestic application
- Electrical water heating



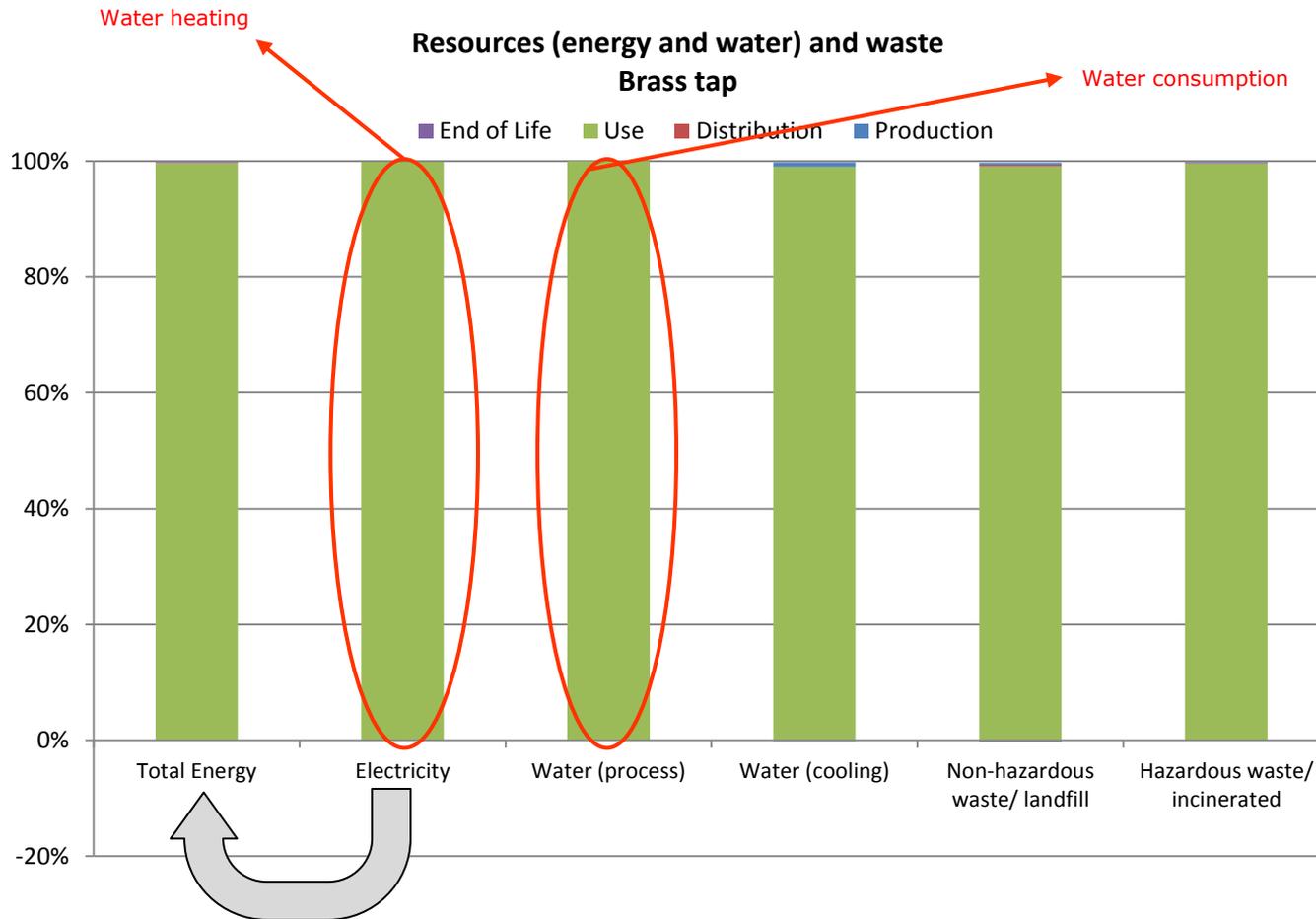
Base cases inputs for the preliminary analysis

BoM of the BRASS TAP and SHOWER MIXER WITH SHOWERHEAD*

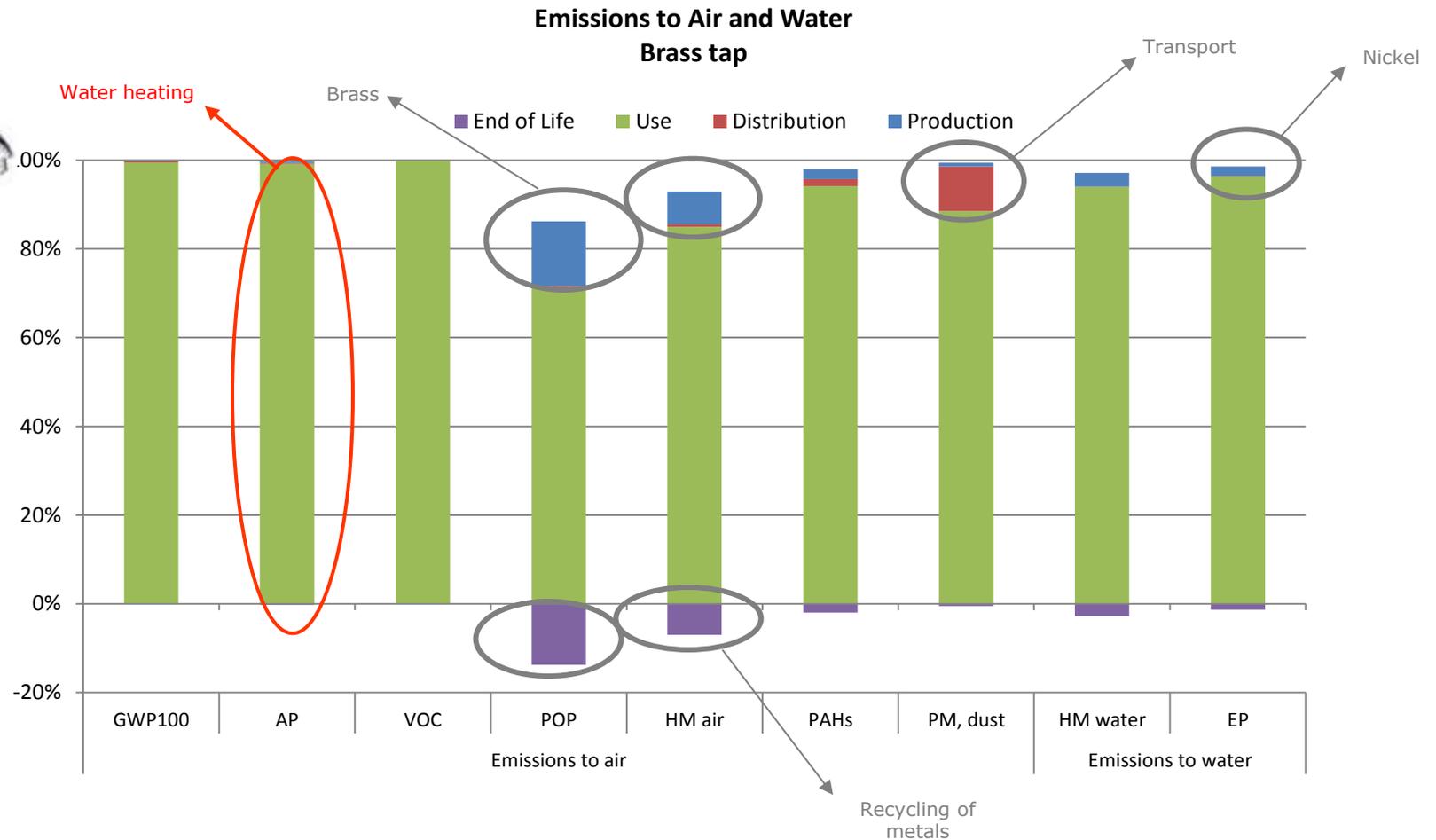
Material	BRASS TAP	SHOWER	Material code in EcoReport
	Weight (g)	Weight (g)	
Body (brass) [g]	804	1653	32 -CuZn38 cast
Waste fitting (brass) [g]	329	-	32 -CuZn38 cast
Handle (zinc) [g]	124	223	33 -ZnAl4 cast
Nickel chrome plating [g]	2	2	41-Cu/Ni/Cr plating
Plastic [g]	65	86	11 -ABS
Plastic outlet	-	163	11-ABS
Ceramic discs [g]	21	21	100-Ceramic
Pressure hoses (plastic) [g]	142	-	8 -PVC
Packaging cardboard	365	437	57 -Cardboard

*Task 4 "Analysis of technologies"

Preliminary environmental impact assessment



Preliminary environmental impact assessment



Preliminary environmental impact assessment

Conclusions

- Water and energy consumption takes essentially place in the **USE PHASE**
- The **USE PHASE is the main contribution on** RESOURCES, WASTE, EMISSIONS TO AIR AND TO WATER (>62/70%).
- The **PRODUCTION PHASE** (brass and nickel) shows little but appreciable impact on EMISSIONS TO AIR and WATER (10/19%).
- The **DISTRIBUTION PHASE** seems relevant only for the PM category (+/- 10%).
- Credits (avoided impacts) may be associated to the **EoL PHASE** (POPs, HM, PAHs) mainly because of the recycling of metals (-7/-18%).

- **Next steps**

- **Further environmental assessment will be refined based on the outcomes from the previous tasks:**

- ❖ BoM of taps and showers.
- ❖ Calculation of water and energy consumption, also including other system energy aspects
- ❖ EoL
- ❖ LCC
- ❖ Assessment of different scenarios of analysis in accordance with the previous tasks.

Discussion areas

1. Comments on the presentation of the preliminary assessment
2. Additional recommendations on scenarios of analysis

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SYNTHESIS AND POTENTIAL RESULTS

- Summary from previous tasks
- Potential results from the project
- Discussion

Installed stock in the EU

Tap: a valve controlling the release of water

Shower: system composed of a mixing **valve** (e.g. mechanical or thermostatic) and a water **outlet**

Domestic sector:

- 1.217 billion of taps
- 0.406 billion of showers

Non-domestic sector:

- 73.20 million of taps
- 24.7 million of showers

Saving potential: comparison with other measures

Product group	Estimated savings ^a (PJ/yr)
Taps and showers – Tier 2	548 (307-844)
Electric motors	486
Taps and showers – Tier 1	297 (156-458)
Domestic Lighting	140
Street & Office Lighting	137
Standby	126
Fans	122
Televisions	101
Circulators	83
Air conditioners and comfort fans	40
External power supplies	32
Simple set top boxes	22
Domestic refrigerators	14
Domestic dishwashers	7
Domestic washing machines	5
Total^b	1318

(a) Estimated at 2012 for taps and showers and at 2020 for other product groups

(b) Without considering taps and showers

Technology penetration in terms of water flow rate

- Key information but **limited information**
- Number of products registered in the water labelling scheme (updated at Sep 2013)

Flow rate (L/min)	Basin taps		Shower controls		Shower handset		Kitchen taps	
	Number	%	Number	%	Number	%	Number	%
< 6	364	87.9	197	58.5	38	28.6	13	81.3
6-8	34	8.2	76	22.6	44	33.1	1	6.3
8-10	9	2.2	16	4.7	21	15.8	0	0.0
10-13	0	0.0	48	14.2	30	22.6	2	12.5
>13	7	1.7	0	0.0	0	0.0	0	0.0
total	414	100	337	100	133	100	16	100

- A large number of taps and shower models
- Possibility of **choice between different levels of performance** in terms of water and energy savings.
- The number of **water saving technologies is increasing.**
- **Technically effective, economically convenient** and offering greater flexibility to users
- Savings potential also depend on the **user practices.**
- **Other important aspects:** safety, satisfaction, installation

Discussion area

Possible policy options:

- a. No action other than Ecolabel and GPP
- b. Resource efficiency label, as for other products
- c. Implementing Ecodesign measures
- d. Combination of (b) and (c)
- e. Others (e.g. voluntary industry agreement)

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Next steps:

Deadline for comments: **10 November at the latest**

2nd TWG meeting (Brussels, 2nd half of Mar 2014, tbc)

Completion of the final report (Jul 2014)

Consultation process for the implementation of SPP (tbd)



Thanks for your contribution!