Preparatory Studies for Eco-design Requirements of Energy-using Products

Lot 24: Professional Washing Machines, Dryers and Dishwashers

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Final Report,
Part: Washing Machines and Dryers

Task 2: Economic and Market Analysis

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For reasons of better readability, two Task 2 reports were prepared.

The report at hand covers ***professional washing machines and dryers***.

The Task 2 report on *professional dishwashers*
is published separately.

Part: Professional Washing Machines and Dryers

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1 Introduction

1.1 Objective of Task 2

The purpose of this task is to present the economic and market analysis related to professional washing machines and dryers. The aim is, firstly, to place this product group within the overall context of the European Union (EU) industrial and trade policy. Secondly, it provides market and cost inputs for the EU-wide environmental impacts of the product group. Thirdly, it aims to provide insights into the latest market trends. This will be an input for subsequent tasks such as improvement potential. Finally, practical data on consumer prices and rates is provided to be used later in the Life cycle Cost (LCC) calculations.

Note that the report at hand only covers professional laundry machines and dryers. The Task 2 report on professional dishwashers is published separately.

This document also includes a preliminary market analysis of dry-cleaning equipment, whose exclusion from the scope of the study was decided in Task 1 (see Annex, Section 7.1).

2 General economic data

2.1 Production

This section provides a brief description of the market situation of professional washing machines and dryers in the EU. The PRODCOM[1] database is useful for an initial analysis as it is transparent and publicly available data on manufacturing and production within the EU, as provided by Member States (MS). Of the PRODCOM categories presented in Task 1, only the following are included in the scope of the study and were analysed:

- **Code 28.94.22.30**: Household or laundry-type washing machines of a dry linen capacity > 10 kg (including machines that both wash and dry);
- **Code 28.94.22.70**: Drying machines, of a dry linen capacity > 10 kg.

The following PRODCOM product categories were not analysed in this section (cf. Task 1):

- **Code 28.94.21.30**: Ironing machines and presses, because fusing presses and dryers using indirect methods of heat transfer were proposed to be excluded from the scope in Task 1;
- **Code 28.94.21.50**: Washing, bleaching or dyeing machines (excluding household or laundry-type washing machines), because not relevant;

[1] PRODucts of the European COMmunity.

- **Code 28.94.21.70**: Machines for reeling, unreeling, folding, cutting or pinking textile fabrics, because not relevant;
- **Code 28.94.21.80**: Machines used in the manufacture of linoleum or other floor coverings for applying the paste to the base fabric or other support and machines for dressing, finishing, wringing, drying, coating or impregnating textile yarns, fabrics or made up textile articles, because not relevant.
- **Code 28.94.23.00**: Centrifugal clothes-dryers, because separate hydro-extractor or pressing appliances were excluded from the scope in Task 1.

2.1.1 Unit volume

In 2009, 31 871 washing machines and 26 127 dryers were produced in EU-27 according to PRODCOM figures for the Codes 28.94.22.30 and 28.94.22.70 (see above).[2] Table 1 and Table 2 show the number of units for 2005-2009, giving an indication of where large manufacturing centres of professional washing machines and dryers are located.

Table 1 Number of household or laundry-type washing machines of a dry linen capacity superior to 10 kg (including washer-dryers)[3] produced, 2005-2009

Member State	2005	2006	2007	2008	2009
Austria	0	0	0	0	0
Belgium	n.a.	n.a.	n.a.	n.a.	n.a.
Bulgaria	n.a.	n.a.	n.a.	n.a.	n.a.
Cyprus	0	0	0	0	0
Czech Republic	n.a.	n.a.	n.a.	0	0
Denmark	0	0	0	0	0
Estonia	0	0	0	0	0
Finland	42	47	0	0	0
France	n.a.	n.a.	n.a.	n.a.	1 480
Germany	3 060	2 943	3 221	3 388	3 264
Greece	n.a.	n.a.	n.a.	n.a.	n.a.
Hungary	n.a.	0	0	0	0
Ireland	0	0	0	0	0
Italy	1 803	2 066	n.a.	n.a.	n.a.
Latvia	0	0	0	0	0
Lithuania	25	14	0	0	0
Luxemburg	0	0	0	0	0
Malta	0	0	0	0	0

[2] Please note that these categories might also include large household washing machines or dryers > 10 kg.
[3] PRODCOM Code 28.94.22.30

Member State	2005	2006	2007	2008	2009
Netherlands	n.a.	n.a.	n.a.	n.a.	n.a.
Poland	n.a.	n.a.	n.a.	185	112
Portugal	0	0	0	0	0
Romania	n.a.	n.a.	0	0	0
Slovakia	0	0	0	0	0
Slovenia	n.a.	n.a.	n.a.	n.a.	n.a.
Spain	6 029	7 822	9 843	9 841	6 128
Sweden	n.a.	n.a.	n.a.	n.a.	n.a.
UK	0	n.a.	n.a.	0	0
EU-27	**39 999**	**44 045**	**41 640**	**37 366**	**31 871**

The PRODCOM data suggests that Spain, Germany, Italy (figures available only in 2005 and 2006) and France are the largest centres of manufacturing of professional washing machines. While this is not an exhaustive or comprehensive analysis, it gives an overview of the professional laundry market and indicates in which Member States (MS) the analysis can be usefully pursued. As for MS for which data were confidential or missing, 20 887 units are unaccounted for in 2009, which is most of the total production (66%) and shows the limits of the PRODCOM database for the categories considered here: only 34% of total 2009 reported production in the EU is reported and non-confidential data. Stakeholders have commented that Sweden, Belgium and Czech Republic contribute a significant number of units to the market, and are thought to account for most of the unaccounted units but this information is not available in PRODCOM.

The available data shows that:

- Spain produced 19% of total EU units in 2009;
- Germany produced 10% of total EU units in 2009;
- Italy produced 5% of total EU units in 2006;
- France produced 5% of total EU units in 2009.

This can be contrasted with the value of these produced units, presented in Section 2.1.2.

Table 2 Number of drying machines of a dry linen capacity superior to 10 kg[4] produced, 2005-2009

Member State	2005	2006	2007	2008	2009
Austria	n.a.	n.a.	n.a.	n.a.	n.a.
Belgium	n.a.	n.a.	n.a.	n.a.	n.a.
Bulgaria	n.a.	n.a.	n.a.	n.a.	n.a.
Cyprus	0	0	0	0	0
Czech Republic	n.a.	n.a.	n.a.	n.a.	n.a.
Denmark	n.a.	n.a.	0	0	0
Estonia	0	0	0	0	0
Finland	93	106	3	0	0
France	n.a.	n.a.	n.a.	n.a.	n.a.
Germany	n.a.	2 747	2 864	n.a.	n.a.
Greece	n.a.	n.a.	n.a.	n.a.	n.a.
Hungary	0	0	0	0	0
Ireland	0	0	0	0	0
Italy	n.a.	n.a.	n.a.	n.a.	n.a.
Latvia	0	0	0	0	0
Lithuania	0	0	0	0	0
Luxemburg	0	0	0	0	0
Malta	0	0	0	0	0
Netherlands	n.a.	n.a.	n.a.	n.a.	n.a.
Poland	n.a.	n.a.	n.a.	n.a.	42
Portugal	n.a.	n.a.	6	n.a.	n.a.
Romania	n.a.	n.a.	n.a.	n.a.	n.a.
Slovakia	n.a.	n.a.	n.a.	n.a.	n.a.
Slovenia	n.a.	n.a.	n.a.	n.a.	n.a.
Spain	1 128	1 954	1 915	1 984	2 120
Sweden	n.a.	n.a.	n.a.	n.a.	n.a.
UK	n.a.	n.a.	n.a.	n.a.	n.a.
EU-27	**36 923**	**44 799**	**30 000**	**29 055**	**26 127**

Concerning dryers, the PRODCOM data available is even scarcer. The total number of dryers produced is 26 127 units in 2009. Based on the information in Table 2, only 8.3% of total 2009 reported production in the EU is non-confidential reported data (15.9% in 2007). The available data shows that:

- Spain represents 8.1% of the units produced in the EU in 2009;
- Germany represents 9.6% of the units produced in the EU in 2007.

Of the MS where information is not available, Belgium, Italy and Sweden are expected to represent significant shares of total EU-27 production.

[4] PRODCOM Code 28.94.22.70

2.1.2 Sales value

Figure 1 shows the value of professional washing machines and dryers produced according to PRODCOM. The production value of professional washing machines and dryers produced in the EU amounted to **309 million Euros** in 2009 (compared to 468 million Euros in 2005), split into 201 million Euros for washing machines and 108 million Euros for dryers. The average annual decrease in sales over the period is 8.5%. This will be elaborated further in the market trend section (Section 4.1).

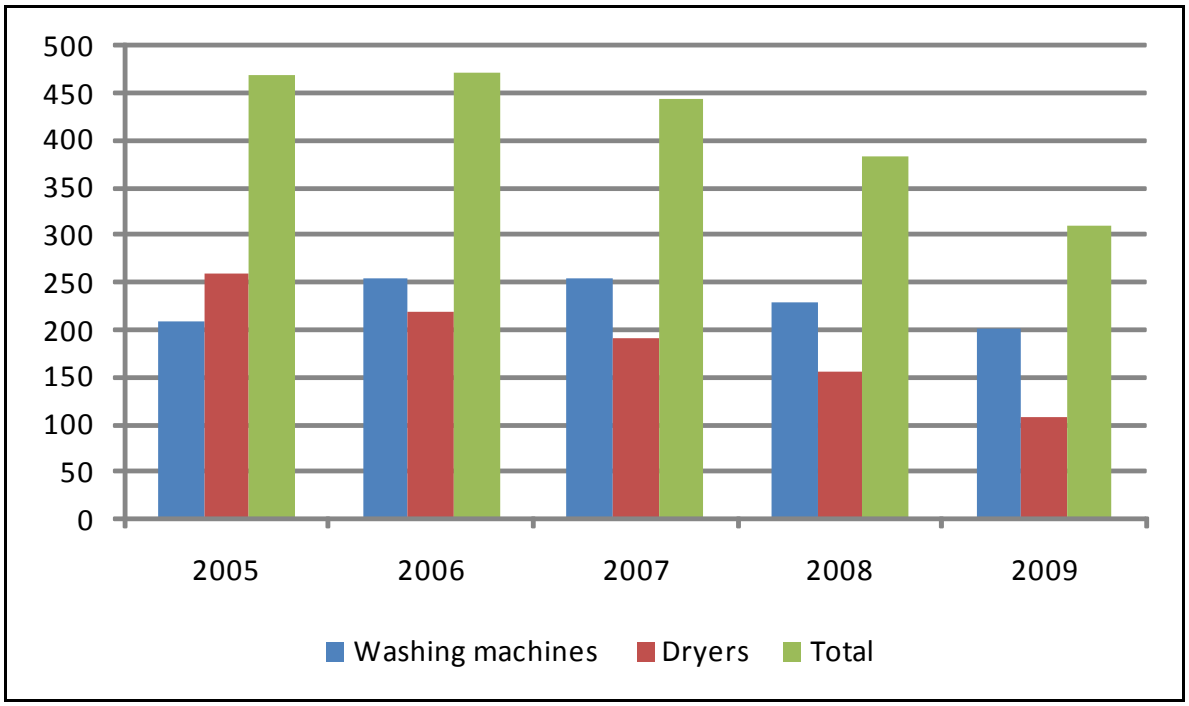

Figure 1 Value of professional washing machines and dryers produced in EU-27 (million Euros), 2005-2009[5]

MS sales data shows a key difference between the volume of units produced and the value of the sales for Germany and Spain. Table 3 shows that Germany has the highest production value of washing machines in the EU (40% of the total value), more than twice of Spain, which – shown in Table 1 – produces almost twice as many machines. This can be explained by the difference in unit values reported by PRODCOM (see Section 2.1.3). Germany and Spain have the largest market values for washing machines, with Italy (based on 2005 and 2006 data) and France playing smaller roles in manufacturing.

[5] PRODCOM statistics based on NACE 2 Rev. accessed at: http://epp.eurostat.ec.europa.eu/portal/page/portal/prodcom/data/database, 28 September 2010.

Table 3 Value of household or laundry-type washing machines of a dry linen capacity superior to 10 kg (including washer-dryers)[6] produced in EU-27 by Member State (in thousand Euros)[5]

Member State	2005	2006	2007	2008	2009
Austria	0	0	0	0	0
Belgium	n.a.	n.a.	n.a.	n.a.	n.a.
Bulgaria	n.a.	n.a.	n.a.	n.a.	n.a.
Cyprus	0	0	0	0	0
Czech Republic	n.a.	n.a.	n.a.	0	0
Denmark	0	0	0	0	0
Estonia	0	0	0	0	0
Finland	72.5	79.4	0	0	0
France	n.a.	n.a.	n.a.	n.a.	11 919.0
Germany	61 373.9	72 852.7	77 591.5	82 070.1	79 703.2
Greece	n.a.	n.a.	n.a.	n.a.	n.a.
Hungary	n.a.	0	0	0	0
Ireland	0	0	0	0	0
Italy	9 014.0	10 278.0	n.a.	n.a.	n.a.
Latvia	0	0	0	0	0
Lithuania	65.2	42.9	0	0	0
Luxemburg	0	0	0	0	0
Malta	0	0	0	0	0
Netherlands	n.a.	n.a.	n.a.	n.a.	n.a.
Poland	n.a.	n.a.	n.a.	629.3	1 069.6
Portugal	0	0	0	0	0
Romania	n.a.	n.a.	0	0	0
Slovakia	0	0	0	0	0
Slovenia	n.a.	n.a.	n.a.	n.a.	n.a.
Spain	40 514.9	45 231.6	54 181.6	49 414.3	35 258.9
Sweden	n.a.	n.a.	n.a.	n.a.	n.a.
UK	0	n.a.	n.a.	0	0
EU-27	**209 238.8**	**253 181.3**	**253 479.7**	**229 295.4**	**201 016.9**

The German market is also the largest for professional dryers, with around 73% of the total value in 2008. Spain, with around 12% of the total value, plays a secondary role and data on the remainder of the market is not available. Again, the difference in shares between the sales numbers and the sales values can be explained by the difference in unit values reported by PRODCOM.

6 PRODCOM Code 28.94.22.30

Table 4 Value of drying machines of a dry linen capacity superior to 10 kg[7] produced in EU-27 by Member State (in thousand Euros)[8]

Member State	2005	2006	2007	2008	2009
Austria	n.a.	n.a.	n.a.	n.a.	n.a.
Belgium	n.a.	n.a.	n.a.	n.a.	n.a.
Bulgaria	n.a.	n.a.	n.a.	n.a.	n.a.
Cyprus	0	0	0	0	0
Czech Republic	n.a.	n.a.	n.a.	n.a.	n.a.
Denmark	n.a.	n.a.	0	0	0
Estonia	0	0	0	0	0
Finland	135.7	160.6	12.8	0	0
France	n.a.	n.a.	n.a.	n.a.	n.a.
Germany	196 696.7	143 673.5	135 394.4	113 412.2	n.a.
Greece	n.a.	n.a.	n.a.	n.a.	n.a.
Hungary	0	0	0	0	0
Ireland	0	0	0	0	0
Italy	n.a.	n.a.	n.a.	n.a.	n.a.
Latvia	0	0	0	0	0
Lithuania	0	0	0	0	0
Luxemburg	0	0	0	0	0
Malta	0	0	0	0	0
Netherlands	0	n.a.	n.a.	0	0
Poland	n.a.	n.a.	n.a.	n.a.	82.1
Portugal	n.a.	n.a.	372.6	n.a.	n.a.
Romania	n.a.	0	0	0	0
Slovakia	0	0	0	0	0
Slovenia	n.a.	n.a.	n.a.	n.a.	n.a.
Spain	5 569.3	10 830.3	8 803.9	10 315.9	12 638.7
Sweden	n.a.	n.a.	n.a.	n.a.	n.a.
UK	0	0	0	n.a.	n.a.
EU-27	**258 940.4**	**219 437.3**	**191 652.0**	**154 922.8**	**107 734.7**

2.1.3 Unit value

Professional washing machines and dryers have a unit value which is highly dependent on the specific MS market. Table 5 shows the range of unit values for non-domestic washing machines and dryers as reported by PRODCOM for MS where information is available.

[7] PRODCOM Code 28.94.22.70

[8] PRODCOM statistics based on NACE 2 Rev. accessed at: http://epp.eurostat.ec.europa.eu/portal/page/portal/prodcom/data/database, 28 September 2010.

Table 5 Average unit value of non-domestic washing machines and dryers by MS reporting, 2008[9]

Member State	Unit value of washing machines[10] (Euros)	Unit value of dryers[11] (Euros)
Germany	24 223	47 274[12]
Spain	5 021	4 498
Italy	4 974[13]	-
Lithuania	3 061[13]	-
Poland	3 401	-
Finland	1 689[13]	4 255[12]
EU-27	**6 136**	**5 286**

The average unit value of non-domestic washing machines in the EU-27 is **6 136 Euros** while that of dryers is **5 286 Euros**. Given the low number of MS with data available, these numbers should be considered with caution.

The unit values of washing machines and dryers are much more important in Germany than in the other MS (Spain, Italy, and Finland) where information is available, which explains the large differences between the production shares and the sales value shares. It can thus be assumed that Germany manufactures larger and more expensive appliances than the other MS.

Overall, PRODCOM statistics are not complete for each product (especially for dryers) and MS, so they can only provide a rough overview of the market situation. Further detail specifically for the professional washing machine and dryer market is provided in the following section.

2.2 Trade

2.2.1 PRODCOM imports and exports

Table 6 and Table 7 show the overall imports and exports (both intra and extra EU) of professional washing machines and dryers by MS for the year 2009.[14] In terms of quantity, Belgium, Czech Republic, Spain and Sweden appear as the most important exporters of washing machines whereas the largest importers are the United Kingdom and Italy. Figures

9 Unless specified, data refers to 2008

10 PRODCOM Code 28.94.22.30

11 PRODCOM Code 28.94.22.70

12 Latest data available: 2007

13 Latest data available: 2006

14 PRODCOM statistics based on NACE 2 Rev. accessed at: http://epp.eurostat.ec.europa.eu/portal/page/portal/prodcom/data/database, 28 September 2010

for dryers are somehow different: Germany, Italy and Sweden are the most important exporters, while France and UK are net importers.

Table 6 Volume and value of exports and imports of professional washing machines 2009

Household or laundry-type washing machines of a dry linen capacity superior to 10 kg (including washer-dryers)[15]				
	Exports		Imports	
Member State	Quantity	Value (Euros)	Quantity	Value (Euros)
Austria	74	837 880	486	3 189 480
Belgium	9 574	34 821 290	1 927	9 031 210
Bulgaria	2	2 900	90	466 470
Cyprus	0	0	251	240 560
Czech Republic	14 910	22 396 620	121	829 880
Denmark	1 756	643 900	743	1 983 110
Estonia	6	41 260	11	47 380
Finland	92	641 420	300	1 931 760
France	703	5 913 740	4 800	12 127 920
Germany	2 336	43 350 940	1 010	3 204 860
Greece	122	111 710	1 025	1 389 770
Hungary	n.a.	n.a.	n.a.	n.a.
Ireland	208	59 880	236	560 360
Italy	7 908	8 947 940	8 424	16 935 380
Latvia	6	27 520	9	35 580
Lithuania	51	235 970	46	261 190
Luxemburg	40	1 011 640	409	1 570 870
Malta	0	0	450	90 990
Netherlands	122	742 280	543	2 673 090
Poland	8	28 290	385	1 768 880
Portugal	299	681 960	1 495	2 786 170
Romania	23	177 800	1 789	741 710
Slovakia	41	1 500	54	312 520
Slovenia	298	3 222 940	114	554 560
Spain	4 300	22 001 810	2 121	3 335 450
Sweden	11 061	36 985 600	303	4 119 870
UK	5 679	743 940	25 206	8 387 140

[15] PRODCOM Code 28.94.22.30

Table 7 Volume and value of exports and imports of professional dryers 2009

Drying machines of a dry linen capacity superior to 10 kg[16]				
	Exports		Imports	
Member State	Quantity	Value (Euros)	Quantity	Value (Euros)
Austria	n.a.	4 456 550	n.a.	2 264 880
Belgium	n.a.	7 248 080	n.a.	6 487 600
Bulgaria	n.a.	3 500	n.a.	451 450
Cyprus	n.a.	0	n.a.	187 390
Czech Republic	n.a.	4 664 660	n.a.	4 082 290
Denmark	n.a.	61 260	n.a.	1 511 010
Estonia	n.a.	10 780	n.a.	9 570
Finland	n.a.	210 860	n.a.	753 810
France	n.a.	2 321 820	n.a.	14 956 420
Germany	n.a.	60 188 860	n.a.	1 225 210
Greece	n.a.	151 520	n.a.	713 230
Hungary	n.a.	n.a.	n.a.	n.a.
Ireland	n.a.	0	n.a.	432 840
Italy	n.a.	20 542 130	n.a.	9 108 780
Latvia	n.a.	52 610	n.a.	56 670
Lithuania	n.a.	87 240	n.a.	15 140
Luxemburg	n.a.	36 310	n.a.	208 060
Malta	n.a.	0	n.a.	8 270
Netherlands	n.a.	1 172 170	n.a.	2 678 820
Poland	n.a.	684 260	n.a.	599 940
Portugal	n.a.	252 950	n.a.	1 048 830
Romania	n.a.	110 210	n.a.	351 440
Slovakia	n.a.	12 570	n.a.	211 850
Slovenia	n.a.	247 710	n.a.	1 285 510
Spain	n.a.	7 357 010	n.a.	3 422 480
Sweden	n.a.	10 632 370	n.a.	3 903 940
UK	n.a.	1 494 920	n.a.	15 156 740

2.2.2 INTRA

The Eurostat trade databases INTRA and EXTRA also contain import and export data albeit using the CN8 codification (Combined Nomenclature, which was established to meet the requirements both of the Common Customs Tariff and of the external trade statistics of the European Union), using 8-digit codes. The quantity and value of products traded by Member States with other Member States (INTRA) in 2009 are presented below.

[16] PRODCOM Code 28.94.22.70

Table 8 Volume and value of exports and imports of professional washing machines and dryers to and from EU Member States, 2009[17]

Member State	Exports		Imports	
	Quantity	Value (Euros)	Quantity	Value (Euros)
CN8 84501190 Fully-automatic household or laundry-type washing machines, of a dry linen capacity >6 kg but <=10 kg				
EU-27	3 430 686	807 844 843	2 633 286	710 720 965
Germany	576 941	213 818 305	711 290	180 254 165
Italy	1 032 697	223 743 547	155 485	37 248 268
Spain	151 158	31 542 646	99 032	30 562 149
CN8 84502000: Laundry-type washing machines, of a dry linen capacity >10 kg				
EU-27	18 802	87 159 696	36 434	67 286 390
Germany	1 485	27 264 610	434	1 728 899
Italy	1 162	3 493 072	2 739	14 188 362
Spain	1 106	4 849 783	770	2 744 434
CN8 84512900: Drying machines for textile yarns, fabrics or made-up textile articles (excl. machines of a dry linen capacity <=10 kg and centrifugal driers)				
EU-27	n.a.	50 592 304	n.a.	42 879 518
Germany	n.a.	18 949 504	n.a.	751 236
Italy	n.a.	7 231 098	n.a.	6 791 342
Spain	n.a.	1 392 878	n.a.	1 351 826
CN8 84501200: Household or laundry-type washing machines, with built-in centrifugal drier (excluding fully-automatic machines)				
EU-27	19 715	3 444 264	60 636	17 471 016
Germany	115	48 930	380	203 339
Italy	106	186 482	206	213 418
Spain	135	53 877	1 088	383 325
CN8 84512190: Drying machines of a dry linen capacity >6 kg but <=10 kg (excluding centrifugal driers)				
EU-27	8 320	85 577 165	47 485	77 452 329
Germany	n.a.	24 078 511	n.a.	29 066 406
Italy	n.a.	1 697 696	n.a.	2 034 500
Spain	n.a.	427 101	n.a.	1 275 828

2.2.3 EXTRA

The quantity and value of products traded by Member States with non-Member States (EXTRA) in 2009 are presented in Table 9.

[17] Source: Eurostat trade database INTRA

Table 9 Volume and value of exports and imports of professional washing machines and dryers to and from non-Member States, 2009[18]

Member State	Exports		Imports	
	Quantity	Value (Euros)	Quantity	Value (Euros)
CN8 84501190 Fully-automatic household or laundry-type washing machines, of a dry linen capacity >6 kg but <=10 kg				
EU-27	1 201 232	471 962 517	1 268 862	235 790 593
Germany	902 090	396 407 921	76 138	15 564 701
Italy	117 547	26 689 832	101 958	18 598 394
Spain	36 174	9 484 190	190 255	32 515 547
CN8 84502000: Laundry-type washing machines, of a dry linen capacity >10 kg				
EU-27	40 831	96 481 114	15 914	11 140 938
Germany	851	16 086 083	576	1 475 911
Italy	6 746	5 454 614	5 685	2 746 934
Spain	3 194	17 151 892	1 351	590 990
CN8 84512900: Drying machines for textile yarns, fabrics or made-up textile articles (excl. machines of a dry linen capacity <=10 kg and centrifugal driers)				
EU-27	n.a.	71 400 043	3	28 239 124
Germany	n.a.	41 239 199	n.a.	473 898
Italy	n.a.	13 310 832	n.a.	2 317 362
Spain	n.a.	5 963 974	n.a.	2 070 583
CN8 84501200: Household or laundry-type washing machines, with built-in centrifugal drier (excluding fully-automatic machines)				
EU-27	88 265	3 492 768	156 038	20 331 893
Germany	393	387 482	33	8 584
Italy	258	197 224	5	35 359
Spain	368	138 424	1 787	407 137
CN8 84512190: Drying machines of a dry linen capacity >6 kg but <=10 kg (excluding centrifugal driers)				
EU-27	n.a.	30 345 808	3 773	21 414 956
Germany	n.a.	12 616 856	n.a.	2 446 718
Italy	n.a.	390 264	n.a.	604 290
Spain	n.a.	103 330	n.a.	1 328 899

2.3 Apparent EU consumption

Apparent consumption as shown in Table 10 and Table 11 provides information on the total quantity sold by manufacturers in the EU. It is calculated as follows:

Apparent consumption = Imports – Exports + Production

Apparent consumption can be calculated in currency (Euro) or in physical units. In order to have consistent categories, PRODCOM trade data is used. Note that for several countries, import and export data is reported in PRODCOM but production is reported as zero. These

[18] Source: Eurostat trade database EXTRA

figures should thus be considered with caution (some figures in the table are negative which is in theory impossible).

Table 10 Apparent consumption of household or laundry-type washing machines of a dry linen capacity superior to 10 kg (including washer-dryers) at EU level, 2005-2008[19]

Member State	2005		2006		2007		2008	
	Value (million Euros)	Quantity (units)	Value (million Euros)	Quantity (units)	Value (million Euros)	Quantity (units)	Value (million Euros)	Quantity (units)
Austria	4.72	1 035	4.95	1 045	4.59	357	3.14	266
Belgium	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Bulgaria	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cyprus	0.22	71	1.28	155	0.40	80	0.50	140
Czech Republic	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-30.06	-11 215
Denmark	3.16	-447	2.64	-828	2.15	-2 610	2.44	-937
Estonia	0.50	102	0.27	42	0.69	-26	0.47	4
Finland	1.69	739	0.83	467	2.86	459	0.53	298
France	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Germany	10.27	1 103	12.73	2 561	19.39	7 263	26.49	4 160
Greece	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Hungary	n.a.	n.a.	0.56	431	0.65	57	0.56	98
Ireland	1.48	461	0.14	-727	0.62	64	0.29	202
Italy	12.77	1 761	12.81	3 292	n.a.	n.a.	n.a.	n.a.
Latvia	0.07	17	0.36	49	0.19	88	0.16	14
Lithuania	0.07	-31	0.11	28	0.40	92	0.46	9
Luxemburg	1.44	209	0.80	191	0.71	47	1.63	201
Malta	0.37	616	0.27	1 139	0.19	545	0.18	252
Netherlands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Poland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.86	469
Portugal	2.34	480	1.46	376	2.54	328	2.03	-35
Romania	n.a.	n.a.	n.a.	n.a.	2.77	540	2.05	1 947
Slovakia	0.25	81	0.36	53	1.15	39	0.60	29
Slovenia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Spain	26.84	3 773	26.56	4 328	25.38	1 750	25.00	5 254
Sweden	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
UK	12.50	10 274	n.a.	n.a.	n.a.	n.a.	9.17	12 524
EU-27	**114.59**	**25 849**	**137.21**	**32 618**	**127.09**	**16 424**	**104.74**	**12 691**

[19] Source: Eurostat PRODCOM, Code 28.94.22.30

Table 11 Apparent consumption of drying machines of a dry linen capacity superior to 10 kg at EU level, 2005-2008[20]

Member State	2005	2006	2007	2008
	Value (million Euros)			
Austria	n.a.	n.a.	n.a.	n.a.
Belgium	n.a.	n.a.	n.a.	n.a.
Bulgaria	n.a.	n.a.	n.a.	n.a.
Cyprus	0.17	0.18	0.19	0.31
Czech Republic	n.a.	n.a.	n.a.	n.a.
Denmark	n.a.	n.a.	2.00	1.79
Estonia	0.11	0.10	0.04	-0.11
Finland	1.63	1.53	0.88	1.04
France	n.a.	n.a.	n.a.	n.a.
Germany	109.05	40.68	29.16	2.43
Greece	n.a.	n.a.	n.a.	n.a.
Hungary	0.23	0.36	0.14	0.24
Ireland	3.13	2.69	2.87	2.35
Italy	n.a.	n.a.	n.a.	n.a.
Latvia	0.23	0.51	0.03	0.04
Lithuania	0.72	0.12	0.19	-0.04
Luxemburg	0.15	-0.17	0.01	0.20
Malta	0.07	-0.24	-0.06	0.07
Netherlands	2.01	n.a.	n.a.	0.91
Poland	n.a.	n.a.	n.a.	n.a.
Portugal	n.a.	n.a.	1.04	n.a.
Romania	n.a.	1.93	1.92	1.19
Slovakia	0.11	1.10	0.23	0.55
Slovenia	n.a.	n.a.	n.a.	n.a.
Spain	1.11	6.12	8.64	5.77
Sweden	n.a.	n.a.	n.a.	n.a.
UK	1.06	8.78	8.43	n.a.
EU-27	**151.59**	**120.28**	**110.29**	**55.18**

The apparent unit consumption of dryers is not available in PRODCOM (exports and imports data are missing). For washing machines, it is not substantial (around 20 000–30 000 washing machines on average). In terms of value, the apparent consumption of washing machines is almost twice that of dryers in 2008 but they are similar for the period 2005-2007 (around 100–150 million Euros).

[20] Source: Eurostat PRODCOM, Code 28.94.22.70

When dividing the number of inhabitants by the apparent consumption of washing machine in 2008 by MS (see Table 12), it appears that the values are not consistent at all between MS: some are negative (because of "impossible" negative apparent consumption); the positive ones range from 1 628 (Malta) to 374 040 (Lithuania). Although slight differences can be expected across MS depending on the laundry habits, such discrepancies clearly stresses a problem of availability and consistency of the PRODCOM data, for the codes considered.

Table 12 Number of inhabitants per household or laundry-type washing machines of a dry linen capacity superior to 10 kg (including washer-dryers) by Member State, 2008[21]

Member State	2008	
	Population (inhabitants)	Number of inhabitants per washing machine (apparent consumption)
Austria	8 318 592	31 273
Belgium	10 666 866	n.a.
Bulgaria	7 640 238	n.a.
Cyprus	789 269	5 638
Czech Republic	10 381 130	-926
Denmark	5 475 791	-5 844
Estonia	1 340 935	335 234
Finland	5 300 484	17 787
France	64 004 333	n.a.
Germany	82 217 837	19 764
Greece	11 213 785	n.a.
Hungary	10 045 401	102 504
Ireland	4 401 335	21 789
Italy	59 619 290	n.a.
Latvia	2 270 894	162 207
Lithuania	3 366 357	374 040
Luxemburg	483 799	2 407
Malta	410 290	1 628
Netherlands	16 405 399	n.a.
Poland	38 115 641	81 270
Portugal	10 617 575	-303 359
Romania	21 528 627	11 057
Slovakia	5 400 998	186 241
Slovenia	2 010 269	n.a.
Spain	45 283 259	8 619
Sweden	9 182 927	n.a.
UK	61 191 951	4 886
EU-27	**497 683 272**	**39 215**

[21] Source: Eurostat PRODCOM, Code 28.94.22.30

The Eurostat PRODCOM database has the advantage of being an official EU source that is used and referenced in other EU policy documents regarding trade and economic policy. However, it is not complete or of high enough quality to serve as a useful market data source for this study and it was necessary to investigate other sources of sales and stock data. Additional information that was gathered through questionnaires sent to stakeholders (cf. Annex, Section 7.2), mainly manufacturers, is therefore presented in the next section.

3 Market and stock data

Based on the product definition in Task 1, seven categories have been defined for professional washing machines and seven categories for professional dryers, which can be used here for market and stock data definition. Based on the market data collected, further refinement will allow the key representative products (or product features) to be identified and analysed in the later stages of the study, while others may be put aside.

Questionnaires were sent to the complete mailing list of stakeholders registered on the preparatory study website, and were followed up by contacting nine key manufacturers and associations directly. Responses were received from five manufacturers[22] and cross-checked for consistency.

3.1 Market structure

The professional laundry market is above all a business-to-business (B2B) market and therefore can be characterised by some key points.

3.1.1 Sales and distribution

- The majority of smaller manufacturers typically sell and distribute their products to laundry equipment dealers who can stock and sell one or several brands of washing machine, dryer and usually other types of laundry equipment (pressing and ironing appliances, etc.). This is particularly applicable for the smallest capacity professional washer extractors and washing machines. Manufacturers of small capacity appliances sold through intermediate dealers/retailers generally do not track where many of their products end up.
- Many professional laundry appliances are also directly sold by the manufacturer to the customer, especially larger capacity machines (heavy duty appliances) which are usually tuned to customer-specific specifications or requirements upon purchase. In particular, manufacturers can assist the customers in the definition of suitable washing or drying programmes for semi-professional (partly programmable) and professional

[22] Electrolux, Miele, Kannegiesser, VDMA, Fagor.

(fully programmable) equipment, depending on the use patterns (see Task 3 for more details).

- Equipment dealers often service and maintain products and can also be dedicated (affiliate) to one or a few brands.
- The proportion of appliances sold directly or through dealers varies depending on the manufacturer, the type of appliance and the MS considered. Manufacturers estimate that around 20% of the sales are made directly between the manufacturer and the customer and the remaining share occurs through intermediate dealers.

3.1.2 International trade

- Professional washing machine and dryer imports from outside EU are not a major market presence in the EU market. Foreign brands (Alliance Laundry Systems, Whirlpool Commercial, etc.) are predominantly American and some have subsidiary manufacturing plants within the EU. Other non-EU manufacturing countries include China and Thailand. Few sales of professional washing machines and dryers are expected to be direct imports from the United States or other non-EU countries. Stakeholders have commented that total EU imports represent a low share of the EU market. Nevertheless, according to the PRODCOM and EXTRA databases, the value of imports from non-EU countries in 2009 represented 6% of the production value for professional washing machines[23] and 26% for professional dryers[24]. These figures have to be considered with caution given the uncertainty related to the different categorisation.
- Exports to countries outside the EU are estimated to represent a small share according to stakeholders. While the main EU manufacturing Member States export their products, it is expected that the majority of this trade is done on an intra-EU level. Russia, Japan, South East Asia and the Middle East are the largest extra-EU professional washing machine and dryer export markets, according to stakeholders. According to the PRODCOM and EXTRA databases, the situation seems different as exports to non-EU countries in 2009 represented around 48% of the production value for professional washing machines[23] and 66% for professional dryers[24]. Again, these figures which are surprisingly high have to be considered with caution given the uncertainty related to the different categorisation used in PRODCOM and EXTRA.

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[23] Comparing categories CN8 84502000 (Laundry-type washing machines, of a dry linen capacity >10 kg) in EXTRA and PRODCOM Code 28.94.22.30 (household or laundry-type washing machines of a dry linen capacity superior to 10 kg, including washer-dryers).

[24] Comparing categories CN8 84512900 (Drying machines for textile yarns, fabrics or made-up textile articles (excl. machines of a dry linen capacity <=10 kg and centrifugal driers)) and PRODCOM Code 29.94.22.70 (Drying machines of a dry linen capacity superior to 10 kg).

3.2 Manufacturers

The B2B nature of the professional washing machine and dryer market makes it much less visible than the domestic market. This poses difficulties when attempting to characterise the market in terms of sales, stock and prices. Besides, there are few manufacturing companies so that the market data is highly sensitive for competitiveness reasons. It is considered relevant to list the manufacturers for the sake of characterising the market. The following manufacturers have been identified in the professional washing machine and dryer market in the EU (see Table 13).

Table 13 Non-exhaustive list of professional washing machine and dryer manufacturers relevant to EU market

Manufacturer	Country (alphabetic order)	Manufacturer	Country (alphabetic order)
IPSO (part of Alliance Laundry Systems)	Belgium	PODAB	Sweden
Primus	Belgium (Czech Republic)	Schulthess	Switzerland
Jensen	Denmark (Sweden, Germany, Italy, Switzerland)	Broadbent	UK
Danube	France	Warwick	UK
Kannegiesser	Germany	Alliance Laundry Systems	United States
Miele Professional	Germany (Austria)	ASKO	United States
Stahl	Germany	American Dryer Corporation	United States
IMESA	Italy	Whirlpool Commercial	United States
Girbau	Spain (France)	Staber	United States
Fagor Industrial	Spain	Milnor	United States
Electrolux Professional	Sweden (France, Thailand)		

(Brackets for country signify presence of production sites)

The above list is not intended to be exhaustive but it should include a majority of the manufacturers relevant to the European market with a vast majority of the market share covered. It can be seen by the number of manufacturers operating in each MS that Belgium, Germany, Sweden, Spain, Czech Republic and Italy are major manufacturing countries in the EU. These countries account for a dominant share of the manufacturing market in Europe.

There are no EU-wide professional washing machine and dryer manufacturer associations which partly explains the limited market data available on professional laundry appliances. There are, however, textile services associations at MS level and at EU level (e.g. European Textile Services Association ETSA).

3.3 Sales

The aim of this section is to assess the sales volume (number of units sold) for different types of semi-professional and professional laundry equipment. Based on the previous market structure data, Table 14 summarises approximate laundry machine manufacturing capacity in the EU.

Table 14 Estimated production of professional laundry machines by Member State, 2009[25]

Member State	Share of laundry machines produced per year	Comparison with PRODCOM[26]
Belgium	17.5%	n.a.
Czech Republic	17.5%	n.a.
France	0.5%	5% (2009, washing machines only)
Germany	14.0%	8.5% (2007)
Italy	6.0%	5% (2006, washing machines only)
Slovenia	0.5%	n.a.
Spain	21.0%	14.2% (2009)
Sweden	23.5%	n.a.
EU Total	**100.0%**	**100.0%**

Despite differences in the percentages and loopholes in the PRODCOM data, the results are in line with the available PRODCOM data, which showed that Spain, Germany and Italy were the major manufacturers in the EU, representing around 35-40% of EU production capacity. Other major manufacturing MS are Belgium, Czech Republic and Sweden.

Stakeholder estimations[27] suggest that 82 000 washing machines and 41 000 dryers are produced annually in the EU, i.e. a total of 123 000 professional laundry appliances. This figure is significantly higher than the figure given by PRODCOM (66 000 professional laundry appliances produced in 2008, of which 37 000 washing machines and 29 000 dryers). This might partly come from the fact that the PRODCOM categories take into account only machines with a capacity superior to 10 kg, whereas semi-professional and professional appliances with capacity in the range 6-10 kg represent an important market segment. Although PRODCOM is an official source, the disadvantage is that the data is less timely and often less complete compared to unofficial sources. We assume that the estimation of

[25] Based on stakeholder communications

[26] Sources: Table 1 and Table 2

[27] Questionnaires responses received from: Electrolux, Kannegiesser, VDMA, Miele, Fagor

123 000 professional appliances produced annually in the EU is more accurate than the PRODCOM inputs but **the uncertainty in this figure remains high**.

Manufacturers feedback indicates that 85% of the appliances are sold for use within the EU, meaning that 15%, i.e. 18 500 appliances, are exported to non-EU countries. Including a proportion of professional laundry machines imports from outside the EU of 10% according to manufacturers estimates (which is in line with PRODCOM estimates in Section 3.1.2), professional laundry appliance sales in the EU are estimated at **117 000 units per year**. Table 15 summarises this data.

Table 15 EU professional laundry machines sales, 2009 (estimate)

	Professional laundry machines per year
EU manufacturing estimate	123 000
minus units exported (15% of EU manufacturing estimate)	-18 500
plus units imported (10% of EU manufacturing estimate)	+12 300
Total EU sales	**116 800**

If we assume that the market export and import percentages are the same for washing machines and dryers, approximately **78 000 professional washing machines and 39 000 dryers were sold annually in the EU in 2009.**

The distribution of these sales is estimated to be roughly proportional to each Member State's market size but is also expected to vary with the different cultural habits of the MS. The average laundry washing needs per customer in each MS are not expected to vary much from one region of Europe to another, however the types of establishments (e.g. apartment machines vs. launderettes), their number of customers, and thus the type of machine which is most appropriate for the average laundry establishment is expected to vary from region to region in Europe. For instance, in Nordic countries, Switzerland and Austria, it is common practice to have professional laundry equipment in buildings that can be used by the inhabitants of the building whereas launderette options will be preferred in other countries.

The range of products according to the definition of the scope in Task 1 is included in this estimate.

3.3.1 Sales by product type

As stated earlier, very few market data on EU professional laundry machines manufacturing and trade exist. This poses several challenges for an eco-design preparatory study such as this one, as a lack of information can prevent clear and informed policy recommendations from being made. At the international level, even fewer data sources are available.

According to a summary of a report on the United States commercial laundry sector[28], washers and extractors account for 40% of the laundry equipment sales (pressing machines and dry cleaning equipment included) while professional dryers represent 16% of the sales, but no further breakdown is available.

While this information is not directly relevant to the European market, it is useful for approximating how many machines of each type are sold as a proportion of the total which would be similar to European sales. Thus, washing machine sales should be around 2.5 times dryer sales if these proportions were to be respected. Our sales estimations show that this ratio is 2:1 in the EU.

The following analysis is divided by the type of laundry equipment, as segregated in Task 1 for professional washing machines and dryers. As no public information was available, the breakdown of annual sales by product type was calculated from aggregated manufacturers' responses to the questionnaire. All the estimated sales are summarised in Table 16.

3.3.1.1 Professional washing machine categories

Categories WM1-4: Semi-professional and professional washer extractors

These categories of washing machines account for by far the largest number of laundry equipments sold. They are very flexible regarding capacity (from 6 to 120 kg), are expected to be the least expensive (the price strongly depends on capacity) and are suitable for many applications. The customers of these products are most diverse and have a variety of needs.

- Category WM1: Sales of semi-professional washer extractors are estimated to be **25 000 units per year**,
- Category WM2: Sales of professional washer extractors less than 15 kg capacity are estimated to be **45 500 units per year**,
- Category WM3: Sales of professional washer extractors between 15 and 40 kg capacity are expected to be **6 200 units per year** and
- Category WM4: Sales of professional washer extractors over 40 kg are expected to be **210 units per year**.

Category WM5: Professional washer dryers

Washer dryers are specific products which combine the washing and drying processes into one single appliance. Manufacturers estimate that this market is currently very limited but that it may grow in the coming years. The market for this type of appliance is particularly

[28] See http://business.highbeam.com/industry-reports/equipment/commercial-laundry-drycleaning-pressing-machines

increasing in Japan, where space is precious, and also in the United States. EU sales are estimated at **200 units per year**.

Category WM6: Professional barrier washers

Barrier washers are not as common as washer extractors as they are usually bought by customers with specific hygienic requirements (e.g. hospitals). Indeed, they enable to achieve specific sanitary targets thanks to their unique design: the inlet and outlet are separated to isolate clean linen from soiled linen. Cross contamination (germs, bacteria, dirt) is thus avoided. The market is estimated to have high potential and EU sales were estimated at **850 units** in 2009.

Category WM7: Washing tunnel machines

Every heavy duty machine design is customer specific and industrial laundry equipment is mostly integrated in a comprehensive system of different laundry processes.

Sales are estimated by manufacturers at **250 tunnel washing machines per year** in the EU.

3.3.1.2 Professional dryer categories

Categories D1-2, D4-6: Semi-professional dryers and professional tumble dryers

These categories of dryers account for the most important share of dryer equipment sold. Like washer extractors, they are very flexible regarding capacity, and are suitable for many applications.

- Semi-professional dryer, condenser (D1) and air vented (D2): Sales of semi-professional dryers are estimated to be **7 500 units per year**,
- Professional tumble dryers, <15 kg (D4): Sales of professional tumble dryers less than 15 kg capacity are estimated to be **16 000 units per year**,
- Professional tumble dryers, 15-40 kg (D5) and >40 kg (D6): Sales of professional tumble dryers over 15 kg are estimated to be **3 800 units per year**.

Category D3: Professional cabinet dryers

Sales in this product category are estimated at **10 700 units per year**.

Category D7: Pass-through (transfer) tumble dryer

Heavy duty dryers are customer specific and sold to limited customer segments, which explains their low sales. Approximately **1 200 transfer dryers** are sold annually.

Table 16 summarises the estimated numbers of sold units per product category. Given the lack of available public market data and the limited number of responses from manufacturers

(also due to the fact that the market is dominated by a few large companies), these figures are to be considered with caution.

Table 16 Estimated EU sales of professional laundry machines by product type, 2009

Product type	Estimated number of units sold
Washing machines	
WM1: Semi-professional washer extractor	25 000
WM2: Professional washer extractor, <15 kg	45 500
WM3: Professional washer extractor, 15-40 kg	6 200
WM4: Professional washer extractor, >40 kg	210
WM5: Professional washer dryer	200
WM6: Professional barrier washer	850
WM7: Washing tunnel machine	250
Total washing machines	**78 710**
Dryers	
D1: Semi-professional dryer, condenser	3 200
D2: Semi-professional dryer, air vented	4 300
D3: Professional cabinet dryer	10 700
D4: Professional tumble dryer, <15 kg	16 000
D5: Professional tumble dryer, 15-40 kg	3 500
D6: Professional tumble dryer, >40 kg	300
D7: Pass-through (transfer) tumble dryer	1 200
Total dryers	**39 200**
Total laundry appliances	**Approx. 118 000**

3.3.2 Sales by customer

In the US in the late 1990s, the consumers of professional laundry equipment with the largest market share were hotels, hospitals and contract laundry services that serve commercial and institutional customers.[29] Government institutions, including the armed services, prisons, schools, and hospitals, bought about 11% of the production. It seems reasonable to assume that these shares have not substantially changed since, and EU estimations should therefore be close to these. Professional laundry equipment is produced for the following main customer segments (cf. Task 1 report):

- **Coin & Card Laundry (CCL)**: laundrette, camping, student dorms, real estate etc. and **Apartment Household Laundry (AHL)**: household, real estate, old people's homes etc; the users are not the owners and therefore safety and easy handling are the most important issues.

[29] http://business.highbeam.com/industry-reports/equipment/commercial-laundry-drycleaning-pressing-machines

- **Hospitality Laundry (HPL)**: hotels, restaurants, quick service restaurants etc.
- **Healthcare Laundry (HCL)**:
  - **Healthcare Hospital (HH)** with very high hygiene demands
  - **Healthcare Nursing Home (HN)** with hygiene demands
- **Commercial Industrial Laundry (CIL)**: service providers, textile rent cleaning, small or heavy duty laundries etc.
- **Speciality Laundry (SP)** including high-tech industries (mops, functional garments like fire and rescue service or offshore, pharmaceutical and electronic factories).

It will be quite difficult and not well targeted to estimate the different market shares and all the associated parameters (lifetimes, user behaviours, etc.) for each product group in each market segment. To focus the analysis, the most dominant customer segment for each category has been evaluated (see Table 17 and

Table 18). The presentation of the market shares for each type of appliance is based on global market research and stakeholders' feedback.

Table 17 Target customer segments of professional washing machines by product category

Product type	Market share of customer segments	Dominant customer segment
WM1: Semi-professional washer extractor	**CCL+AHL: 60%** HPL: 25% HH: 10% HN: 5% CIL: ~0% SP: ~0%	**Coin & Card Laundry + Apartment Household Laundry**
WM2: Professional washer extractor, <15 kg	**CCL+AHL: 50%** HPL: 25% HH: 10% HN: 5% CIL: 5% SP: 5%	**Coin & Card Laundry + Apartment Household Laundry**
WM3: Professional washer extractor, 15-40 kg	CCL+AHL: 0% **HPL: 65%** HH: 10% HN: 15% CIL: 5% SP: 5%	**Hospitality Laundry**
WM4: Professional washer extractor, >40 kg	CCL+AHL: 0% HPL: 35% HH: 5% HN: 5% **CIL: 50%** SP: 5%	**Commercial Industrial Laundry**
WM5: Professional washer dryer	CCL+AHL: 35% **HPL: 65%** HH: 0% HN: 0% CIL: 0% SP: 0%	**Hospitality Laundry**

Product type	Market share of customer segments	Dominant customer segment
WM6: Professional barrier washer	CCL+AHL: 0% HPL: 0% **HH: 50%** HN: 40% CIL: 0% SP: 10%	**Healthcare Hospital Laundry**
WM7: Washing tunnel machine	CCL+AHL: 0% HPL: 0% HH: 5% HN: 0% **CIL: 90%** SP: 5%	**Commercial Industrial Laundry**

Table 18 Target customer segments of professional dryers by product category

Product type	Market share of customer segments	Dominant customer segment
D1: Semi-professional dryer, condenser	**CCL+AHL: 60%** HPL: 25% HH: 10% HN: 5% CIL: 0% SP: 0%	**Coin & Card Laundry + Apartment Household Laundry**
D2: Semi-professional dryer, air vented	**CCL+AHL: 60%** HPL: 25% HH: 10% HN: 5% CIL: 0% SP: 0%	**Coin & Card Laundry + Apartment Household Laundry**
D3: Professional cabinet dryer	**CCL+AHL: 70%** HPL: 10% HH: 10% HN: 10% CIL: 0% SP: 0%	**Coin & Card Laundry + Apartment Household Laundry**
D4: Professional tumble dryer, <15 kg	**CCL+AHL: 50%** HPL: 25% HH: 10% HN: 5% CIL: 5% SP: 5%	**Coin & Card Laundry + Apartment Household Laundry**
D5: Professional tumble dryer, 15-40 kg	CCL+AHL: 0% **HPL: 65%** HH: 10% HN: 15% CIL: 5% SP: 5%	**Hospitality Laundry**
D6: Professional tumble dryer, >40 kg	CCL+AHL: 0% HPL: 35% HH: 5% HN: 5% **CIL: 50%** SP: 5%	**Commercial Industrial Laundry**

Product type	Market share of customer segments	Dominant customer segment
D7: Pass-through (transfer) tumble dryer	CCL+AHL: 0% HPL: 0% HH: 5% HN: 0% **CIL: 90%** SP: 5%	**Commercial Industrial Laundry**

The tables show that industrial users (CIL) are purchasers of heavy duty appliances (professional washer extractors >40 kg, washing tunnel machines, professional tumble dryers >40 kg, pass-through tumble dryers) while users in hospitality and coin & card/apartment household laundry are purchasers of smaller washer extractors and dryers. The health care sector purchases both small and large appliances, and is the main market segment for professional barrier washers.

It is expected that the variation between MS on the type of professional laundry equipment purchased varies very little, but the type of purchasers can be slightly different for cultural reasons. As already stated before, in Nordic countries, Switzerland and Austria semi-professional or professional laundry equipment is provided in every building to be used by the inhabitants while launderettes are more common in other MS. The type of equipment and the use patterns in these two end markets are similar even if these machines are not used in the same environment. Thus, the average laundry needs and purchases are estimated to be similar in the different MS, despite possible structural differences of the market segments.

3.4 Average product life

The lifetime of the appliances is of interest as being a key parameter in assessing the LCCs of the appliances as well as the environmental impacts in the later stages of the study (Tasks 5 and 7). Lifetime can also be used to estimate the stock data based on sales. In the context of this study, the focus is on 'active lifetime', meaning the time in service.

Professional appliances are expected to be used more frequently than washing machines and dryers for household use, but should also be designed more robustly so that the order of magnitude of the lifetime should be similar.[30]

With regard to the customer segments (see Section 3.3.2), the typical average product lifetime of professional washing machine and dryer categories depends on the respective use patterns (number of cycles per day): for instance, the number of cycles per day may

[30] According to: BIO Intelligence Service / Giraffe / Intertek (2009); "Reducing the environmental impacts of clothes cleaning", for DEFRA; household washing machines' lifetime are estimated to be 12 years and household tumble dryers' lifetime to be 13 years. In preparatory study Lot 14 on household washing machines (ISIS, 2007, for DG TREN), the lifetime used is 15 years.

differ between a professional washing machine either used in launderettes or in hospitality laundry.

Based on responses to the working document,[31] the design lifetimes in cycles of the product categories in this study are estimated in Table 19. The design lifetime in years were derived from the lifetimes in cycles and the user behaviour parameters based on the respective main customer segment for each product category presented in Task 3 (see Task 3 for calculations details).

While semi-professional appliances (categories WM1 and D1-2) only have a lifetime of 8 years (considering the main customer segment defined within the study), professional machines (categories WM2 to WM6; D3 to D6) have an average lifetime of 11 to 15 years. For heavy duty appliances (categories WM6-7 and D6), the lifetime is similar and estimated to be 13-14 years.

Table 19 Estimated lifetimes of products in this study based on stakeholder responses

Type of appliance	Design lifetime in cycles	Design lifetime in years[32]
Laundry machines		
WM1: Semi-professional washer extractor	15 000 cycles	8
WM2: Professional washer extractor, <15 kg	30 000 cycles	13
WM3: Professional washer extractor, 15-40 kg	30 000 cycles	14
WM4 : Professional washer extractor, >40 kg	40 000 cycles	15
WM5 : Professional washer dryer	20 000 cycles	11
WM6 : Professional barrier washer	30 000 cycles	14
WM7 : Washing tunnel machine	40 000 hours	13
Dryers		
D1: Semi-professional dryer, condenser	15 000 cycles	8
D2: Semi-professional dryer, air vented	15 000 cycles	8
D3: Professional cabinet dryer	20 000 cycles	15
D4: Professional tumble dryer, <15 kg	30 000 cycles	13
D5: Professional tumble dryer, 15-40 kg	30 000 cycles	14
D6: Professional tumble dryer, >40 kg	40 000 cycles	13
D7: Pass-through (transfer) tumble dryer	40 000 hours	13

[31] Questionnaires responses received from: Electrolux, VDMA, Miele, Fagor, Kannegiesser.

[32] Taking into account the use rate in the main customer segment associated.

3.5 Stock

The aim of this section is to assess the total stock of professional laundry appliances in use today for different types of commercial use. No information has been obtained from market studies. Estimates given here are based on the sales estimation for 2009, the past trends deducted from PRODCOM data and stakeholders' feedback, as well as the lifetime of the equipments.

3.5.1 Assumptions

According to stakeholders' comments on the working document, the annual growth rate of the professional laundry equipment market for the period 2000–2009 was approximately 1%, except for barrier washers for which it was 2%. The growth rate of 1% is estimated to be an average between the products categories and may slightly differ but this effect will not be taken into account in the calculations of the stock.

PRODCOM data suggests results in line with this growth rate concerning professional washing machines (see Figure 2, growth rate estimation of 0.7%) but shows the professional dryers market decreasing over the past five years (see Figure 3), growth rate estimated at -1.7%. However, the important variations of the figures make this trend not fully reliable.

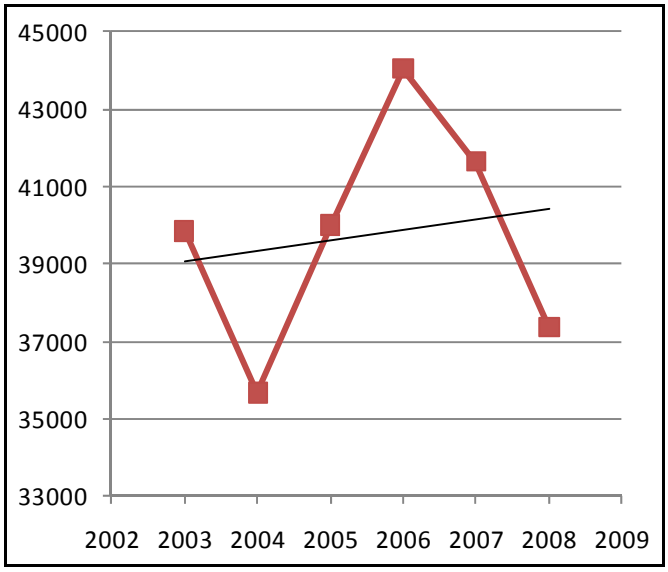

Figure 2 Production figures of professional washing machines in the EU-27 between 2003 and 2008[33]

[33] PRODCOM statistics based on NACE 2 Rev. accessed at: http://epp.Eurostat.ec.europa.eu/portal/page/portal/prodcom/data/database, June 3 2010

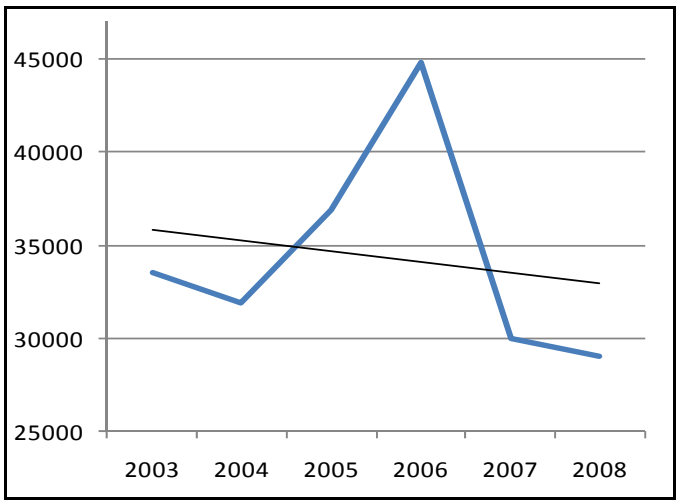

Figure 3 Production figures of professional dryers in the EU-27 between 2003 and 2008 [33]

To calculate the stock of professional laundry appliances in use in 2009, we will thus assume a constant growth rate of 1% over the past twenty years for all product categories, except category WM6 for which 2% will be applied.

The lifetime determines the average duration of a unit within the stock. Therefore, the current number of units will correspond to the accumulated number of units sold during the lifetime. Appliance lifetimes ranges related to the main market segment identified for each product category were presented in Table 19.

3.5.2 Results

Considering the sales estimations given in the previous section for 2009, the total stock of professional laundry machines in the EU for the year 2009 is shown in Table 20. Cells in grey indicate the sales contributing to the stock in 2009.

The total stock of professional laundry equipment is estimated at around 1 300 000 machines in the EU-27.

Table 20 Total stock of professional laundry equipment calculated from sales as per Table 16, 2009

Year	WM1	WM2	WM3	WM4	WM5	WM6	WM7	D1	D2	D3	D4	D5	D6	D7	Total
Sales 1994	21 501	39 133	5 332	172	172	628	215	2 752	3 698	9 203	13 761	3 010	258	1 032	100 867
Sales 1995	21 719	39 528	5 386	174	174	641	217	2 780	3 736	9 296	13 900	3 041	261	1 042	101 895
Sales 1996	21 938	39 927	5 441	176	176	654	219	2 808	3 773	9 389	14 040	3 071	263	1 053	102 928
Sales 1997	22 160	40 331	5 496	177	177	667	222	2 836	3 811	9 484	14 182	3 102	266	1 064	103 975
Sales 1998	22 383	40 738	5 551	179	179	681	224	2 865	3 850	9 580	14 325	3 134	269	1 074	105 032
Sales 1999	22 610	41 149	5 607	181	181	695	226	2 894	3 889	9 677	14 470	3 165	271	1 085	106 100
Sales 2000	22 838	41 565	5 664	183	183	709	228	2 923	3 928	9 775	14 616	3 197	274	1 096	107 179
Sales 2001	23 069	41 985	5 721	185	185	723	231	2 953	3 968	9 873	14 764	3 230	277	1 107	108 271
Sales 2002	23 302	42 409	5 779	186	186	738	233	2 983	4 008	9 973	14 913	3 262	280	1 118	109 370
Sales 2003	23 537	42 837	5 837	188	188	753	235	3 013	4 048	10 074	15 064	3 295	282	1 130	110 481
Sales 2004	23 775	43 270	5 896	190	190	768	238	3 043	4 089	10 176	15 216	3 328	285	1 141	111 605
Sales 2005	24 015	43 707	5 956	192	192	784	240	3 074	4 131	10 278	15 370	3 362	288	1 153	112 742
Sales 2006	24 257	44 149	6 016	194	194	800	243	3 105	4 172	10 382	15 525	3 396	291	1 164	113 888
Sales 2007	24 503	44 595	6 077	196	196	816	245	3 136	4 214	10 487	15 682	3 430	294	1 176	115 047
Sales 2008	24 750	45 045	6 138	198	198	833	248	3 168	4 257	10 593	15 840	3 465	297	1 188	116 218
Sales 2009	25 000	45 500	6 200	200	200	850	250	3 200	4 300	10 700	16 000	3 500	300	1 200	117 400
Stock 2009	**193 139**	**557 280**	**81 379**	**2 799**	**2 093**	**10 471**	**3 063**	**24 722**	**33 219**	**149 737**	**195 967**	**45 937**	**3 674**	**14 697**	**1 318 175**

3.6 Summary of market data

Table 21 summarises the market data presented in the previous sections. This data will be useful in later tasks (Task 5-7-8) for estimating life cycle properties of these products and build scenarios at the EU level.

Table 21 Market data summary, by product type

Product type	Estimated number of units sold per year (2009)	Estimated stock (2009)	Average product lifetime (years)
Laundry machines			
WM1: Semi-professional washer extractor	25 000	193 139	8
WM2: Professional washer extractor, <15 kg	45 500	557 280	13
WM3: Professional washer extractor, 15-40 kg	6 200	81 379	14
WM4: Professional washer extractor, >40 kg	200	2 799	15
WM5: Professional washer dryer	200	2 093	11
WM6: Professional barrier washer	850	10 471	14
WM7: Washing tunnel machine	250	3 063	13
Dryers			
D1: Semi-professional dryer, condenser	3 200	24 722	8
D2: Semi-professional dryer, air vented	4 300	33 219	8
D3: Professional cabinet dryer	10 700	149 737	15
D4: Professional tumble dryer, <15 kg	16 000	195 967	13
D5: Professional tumble dryer, 15-40 kg	3 500	45 939	14
D6: Professional tumble dryer, >40 kg	300	3 674	13
D7: Pass-through (transfer) tumble dryer	1 200	14 697	13

4 Market trends

4.1 General market trends

This subtask aims to provide market trends indicating market structures and relevant trends in product design. According to the information provided by stakeholders, the main markets for professional laundry appliances are apartment, launderettes and hospitality (around 80% of the market of the washer extractors and tumble dryers which are the most sold appliances).

It is logical to expect that the evolution of the markets of these machines is closely related to the evolution of these sectors. Furthermore, environmental policy constraints that apply to this sector have a great impact on the type of machine sold. Several companies have already

started to produce appliances with energy and water efficiency features: the market is changing as environmental awareness increases.

An estimation of the future market for laundry equipment must consider the following aspects:

- growth of the launderettes and apartment sector;
- growth of the hospitality segment;
- evolution of sales for large capacity equipments.

No public information has been found on the market growth of the launderette or apartment sector. It will be assumed that the trends of this section will be mainly based on the evolution of the hospitality sector.

The current trend in the hotel industry is to outsource tasks in order to simplify internal processes[34], e.g. cleaning and administrative tasks. Thus, on-premise laundries (OPLs) are increasingly being replaced by large off-premise laundries that will deal with a large number of customers[35]. Regarding the market competition for hotels, in the same study it is mentioned that regardless of the size of the company, in order to keep their market share, new technologies must be adopted, including environmentally-friendly products and IT systems.

In hotel (and catering) industry, actions to improve the environmental performance of the whole sector including its equipment are mostly expected to come from policies and regulations.[34] To a lower degree, concern for the environment is also producing a change in the technology of machines used within the hotel and catering sector – less energy-consuming machines are increasing their share of the market[36]. Based on the feedback of stakeholders, the market share for more energy and water efficient appliances has been increasing during the past years.

In a study conducted by Oxford Research,[37] the growth tendency of the hotel and catering sector was estimated to be 1% per year at EU level for the combination of different scenarios.

Since no studies presenting the actual size of laundry equipment sector have been identified, the trend for hospitality and health care laundries is going to be assumed to reflect the behaviour of professional laundry machines and dryers sales for the coming years. Stake-holders' comments on the working document are in line with these estimations of 1-2%

[34] European Foundation for the Improvement of Living and Working Conditions (2005); Visions of the future. What future? The hotels and catering sector

[35] Freedonia (2008); Freedonia Focus on Commercial & Industrial Laundry Machinery

[36] European Foundation for the Improvement of Living and Working Conditions (2005) Policies, issues and the future. The hotels and catering sector

[37] Oxford Research (2009); Comprehensive sectoral analysis of emerging competencies and economic activities in the European Union Lot 12: Hotels and restaurants

annual growth in the last 10 years, except for the barrier washers, which are growing quicker (2–3% per year).

Thus the future trends appear similar to the past trends. In order to estimate sales in 2015 and 2020, a growth rate of 1% will be applied to categories WM1 to WM5 and D1 to D6 and a growth rate of 2% will be applied to WM6. Regarding heavy duty appliances, stakeholders indicated that the market is expected to follow the growth of the linen volume, assessed between 2 and 5% per year. For categories WM7 and D7, a growth rate of 3% will be used for the calculations. These rates are mainly driven by the replacement of old laundry equipment and by the population growth.

The total sales of professional washing machines and dryers estimated for 2009 are 117 000 units (Table 16). The estimation of sales for 2015, 2020 and 2025 is represented in Table 22.

Table 22 Projected market for different types of washing machines and dryers 2009-2025

Type of appliance	Sales 2009	Estimated sales 2015	Estimated sales 2020	Estimated sales 2025
Laundry machines				
WM1: Semi-professional washer extractor	25 000	26 550	27 900	29 300
WM2: Professional washer extractor, <15 kg	45 500	48 300	50 750	53 350
WM3: Professional washer extractor, 15-40 kg	6 200	6 600	6 900	7 300
WM4: Professional washer extractor, >40 kg	200	210	220	235
WM5: Professional washer dryer	200	210	220	235
WM6: Professional barrier washer	850	960	1 060	1 170
WM7: Washing tunnel machine	250	300	350	400
Dryers				
D1: Semi-professional dryer, condenser	3 200	3 400	3 550	3 750
D2: Semi-professional dryer, air vented	4 300	4 550	4 800	5 050
D3: Professional cabinet dryer	10 700	11 350	11 950	12 550
D4: Professional tumble dryer, <15 kg	16 000	17 000	17 850	18 750
D5: Professional tumble dryer, 15-40 kg	3 500	3 700	3 900	4 100
D6: Professional tumble dryer, >40 kg	300	320	335	350
D7: Pass-through (transfer) tumble dryer	1 200	1 450	1 650	1 950

4.2 Employment figures

Stakeholders' feedback on employment in EU manufacturing companies (direct production) of professional laundry appliances indicates that approximately 6 000 persons are currently employed in these companies.

4.3 Redesign cycle

According to information provided by stakeholders, the redesign cycle varies with the category of equipment and the objective of the process. Designing equipment “from scratch” with completely new characteristics can take between 10 to 12 years for heavy duty appliances and from 6 to 10 years for smaller washing machines and dryers.

Redesigning a single part of the appliance can take between 6 and 36 months depending on its complexity: the required time is very specific to the design changes so that it is not realistic to indicate an average or typical timing. Normally these redesign processes are intended to improve the water or energy efficiency.

4.4 Product specific trends – development of professional laundry machinery, 2000-2020

Manufacturer brochures and websites were analysed to identify important product specific developments and trends of professional laundry equipment. Furthermore a questionnaire was sent to stakeholders to confirm the identified market trends and developments and also to receive some quantitative data (see Annex, Section 7.2).

4.4.1 Energy and water consumption

Professional washing machines

In general, the market has changed towards professional washing machines with reduced energy and water use in recent years. As Table 21 shows, the average energy consumption of professional washing machines sold in the EU has decreased by approximately 25 to 40% within the past 10 years (difference between new products sold and average products still in use today). Similar figures apply to the average water consumption. Table 23 shows that the average water consumption of professional washing machines has decreased by approximately 7 to 50% over the last ten years. It is assumed that due to a constant dosage of detergents and laundry aid, their respective savings correspond to the water savings. Note: The figures are based on estimations by stakeholders as currently no commonly applied European measurement standard for professional washing machines and dryers exists (see also Task 1).

Table 23 Development of energy consumption of washing machines in the past 10 years

Washing machine category	Consumption of a ten year old washing machine kWh/kg laundry	Consumption of an average new washing machine kWh/kg laundry	Improvement between ten year old and new product
WM1: Semi-professional washer extractor	0.20	0.15	25%
WM2: Professional washer extractor, <15 kg	0.24	0.17	29%
WM3: Professional washer extractor, 15-40 kg	0.30	0.21	30%
WM4: Professional washer extractor, >40 kg	0.50–0.55	0.35	30%–42%
WM5: Professional washer dryer	n.a.	0.80 (Wash and Dry)	n.a.
WM6: Professional barrier washer	n.a.	0.39	n.a.
WM7: Washing tunnel machine	n.a.	0.35	n.a.

Table 24 Development of water consumption of washing machines in the past 10 years

Washing machine category	Consumption of a ten year old washing machine l/kg laundry	Consumption of an average new washing machine l/kg laundry	Improvement between ten year old and new product
WM1: Semi-professional washer extractor	12.5	9	28%
WM2: Professional washer extractor, <15 kg	15–18	12	20%–33%
WM3: Professional washer extractor, 15-40 kg	15–18	13	13%–28%
WM4: Professional washer extractor, >40 kg	15–18	14	7%–22%
WM5: Professional washer dryer	n.a.	10	n.a.
WM6: Professional barrier washer	18-20	16	11%–20%
WM7: Washing tunnel machine	8-12	6	25%–50%

Data from A.I.S.E.[38] comparing the water and energy consumption of washer extractors and tunnel washers in the 1970s with the 1990s back these developments (the consumption figures refer to litres of fresh water per kg of dry linen or kg of steam per kg of dry linen).

[38] A.I.S.E.: “Industrial & Institutional Sector – Environmental dossier on Professional laundry”; (2000).

Table 25 Water and energy consumption of washer extractors and tunnel washers in the 1970s and 1990s (Source: A.I.S.E)

	Washer Extractor	Tunnel washers
Steam		
1970s	1.1 kg/kg	0.7-0.8 kg/kg
1990s	0.6-0.8 kg/kg	0.4-0.5 kg/kg
Fresh water		
1970s	30 l/kg	10-15 l/kg
1990s	15-20 l/kg	8-12 l/kg

Key factors to these reductions have been new products and processes for low temperature washing and for re-use of rinse water.

Regarding the next ten years, the reduction of energy and water consumption of professional washing machines is assumed to continue. According to three stakeholder responses to our questionnaire, the average energy consumption of the future sold (and thus manufactured) washing machines (over all product categories in EU in comparison to the average product) is expected to further decline between 2010 and 2020 by approximately 10 to 40%. Over the same period, the average water consumption (accordingly the consumption of detergents and laundry aid) is expected to decrease by approximately 10 to 20%. These rough estimations will be counterchecked by further calculations within Task 7 (improvement potentials compared to current base cases).

Professional dryers

As the following table shows, the average energy consumption of dryers sold in the EU has decreased by approximately 18 to 26% within the past 10 years (representing the difference between new products sold and average products still in use today). The figures are based on estimations by stakeholders that are not measured according to a common standard as such a standard does not yet exist at EU level (see also Task 1).

Table 26 Development of energy consumption of dryers in the past 10 years

Dryer category	Consumption of a ten year old dryer kWh/kg laundry[39]	Consumption of an average new dryer kWh/kg laundry[39]	Improvement between ten year old and new product
D1 Semi-professional dryer, condenser	0.73	0.60	18%
D2 Semi-professional dryer, air vented	0.70	0.56	20%
D3 Professional cabinet dryer	n.a.	0.75	n.a.

[39] Numbers in brackets: Energy consumption kWh/cycle

Dryer category	Consumption of a ten year old dryer kWh/kg laundry[39]	Consumption of an average new dryer kWh/kg laundry[39]	Improvement between ten year old and new product
D4 Professional tumble dryer, <15 kg	n.a.	0.55	n.a.
D5 Professional tumble dryer, 15-40 kg	0.85	0.65	23%
D6 Professional tumble dryer, > 40 kg	1.15	0.85	26%
D7 Professional pass-through (transfer) tumble dryer	n.a.	0.80	n.a.

n.a. no information available

Regarding the development over the next ten years, the reduction of energy consumption is assumed to continue. According to three stakeholder responses to our questionnaire, the average energy consumption of the future sold dryers (over all product categories in EU in comparison to the average product) is expected to further decrease between 2010 and 2020 by approximately 15 to 20%. These rough estimations will be counterchecked by further calculations within Task 7 (improvement potentials compared to current base cases).

4.4.2 Detergent consumption

Companies in the industrial and institutional (I&I) market provide a variety of detergent products and services that make their business fundamentally different from the household products market. The products and services that are offered cater for specialised cleaning and hygiene needs.

According to A.I.S.E.[40], the institutional laundry detergent segment has developed towards a higher acceptance of concentrated detergents, both for granular and liquid detergents. This development has moved forward faster in the last few years and is expected to continue.

The industrial laundry market uses mostly concentrated granular detergents and liquids. 'Paste-type' products or anhydrous liquids can also be found The use of concentrates reduces the amount of packaging and transport (because of a smaller volume) and chemicals and therefore might have a reduced total environmental impact[41]. Further, there

[40] International Association for Soaps, Detergents and Maintenance Products. Its memberships currently totals 37 National Associations in 42 countries, comprising more than 900 companies – ranging from small- and medium sized enterprises (SMEs) to multinationals, primarily in Europe.

[41] So called volume concentrates have a higher bulk density (0.6-0.9 g/cm^3) compared to regular detergents (0.5-0.6 g/cm^3). However, the ingredients do not differ considerably besides the almost total absence of the bulking agent sodium sulphate. Thus, with volume concentrates not the entry of chemicals into the waste water is reduced but the packaging, as the same amount is realised with a smaller volume. A further development is provided by the so called super concentrates. Besides a higher bulk density and the absence of bulking agents, the composition is changed resulting in less pollution of the waste water – optimum dosage

are trends towards more environmentally friendly types of packaging, like e.g. bag-in-box or reusable packs.

There is a growing market for multi component systems[42] which depend on the country, water conditions and the type of soil in order to use the correct chemicals at optimum concentrations.

According to A.I.S.E., customers generally tend to look more for:

- Automatic and controlled dosing systems.
- Easy and simple systems to use.
- Multi component systems, convenience, ergonomics.
- Hygiene claims.
- Powders and liquids.
- Lower temperatures (40–60°C).
- Sustainable solutions – i.e. energy and water savings; also (or mainly) for cost savings.
- Hand dosed products (as opposed to automatic dispensing).

4.4.3 Changes on the demand side

The demand for professional laundry machines has changed significantly over the past 10 years. The following arguments apply to all market segments:

- According to stakeholders' feedback, today consumers pay more attention to a low energy consumption compared to ten years ago. The reasons however have to be seen rather in cost aspects than in pure environmental aspects.
- Today, energy and partly water consumption are important purchase arguments for many customers. Water consumption does not play such an important role as energy consumption (the water rates differ within the EU).
- Today, life cycle costs play a more important role compared to 10 years ago. Life cycle costs have become a stronger criterion in the sales talk, especially for high value products. The changing awareness of the customers has partly led to the willingness to pay more for energy-saving features if the investment pays back within a certain time span (usually two to five years). The importance of life cycle considerations to commercial and public customers obviously depends on the financial situation of both the economy in general and the customers.

provided.
(Source: http://www.oekoplus.sepeur-media.de/fp/archiv/RUBsonstiges/Waschmittelkonzentrate.php)

[42] A multi-component system is a detergent systems based on components used to build up a complete detergent, a stock solution or a laundering programme for automatic dosing. This system may incorporate a number of products such as pre-wash agents, basic detergents, washing strengtheners, bleaching agents, rinsing agents and special detergents for laundering delicates. (Source: www.nordic-ecolabel.org)

- Due to budget cuts, life cycle costs play a lower role in governmental installations compared to private companies, although governmental institutions are obliged to consider not only investment cost but the whole life cycle cost. This relation has not changed within the last ten years.
- The investment (including the payback period) and the process parameters (functionality, hygiene) remain of highest importance.

4.4.4 Marketing of professional laundry machinery and technological features

In relation to influencing customer attitudes, important aspects of manufacturers' communications regarding professional laundry machinery are:

- functionality,
- economic and environmental aspects of the use phase (i.e. costs of energy and water consumption),
- comfort / ergonomics,
- hygiene / sanitation.

When analysing the most recent brochures, it was observed that functional aspects in combination with their energy and water consumption, and resulting economic saving potential, are used to advertise the latest generation of washing machines and dryers. Some examples of technological features in high-end appliances:

- load control,
- heat exchanger,
- heat recovery systems for waste-water or exhaust heat,
- heat pump,
- residual moisture control.

New design options are generally first implemented in household equipment before possibly being included in professional equipment as well. The reason for this phenomenon is that reliability and lifetime play a more important role for professional equipment compared to household machines; increasing the complexity of a machine by applying new and more sophisticated technological options may increase the risk of breakdown.

It is assumed that these features will become more widespread in dryers within the next ten years. The detailed descriptions, further best available technologies and their market shares are provided in Task 6.

5 Consumer expenditure base data

Based on the defined product categories for professional washing machines and dryers, average consumer prices, including VAT (in Euro), as well as applicable rates for running costs (e.g. electricity, repair and maintenance, disposal) and other financial parameters (e.g. inflation rates) will be determined.

The total lifetime cost of a laundry machine can be divided into five relevant categories:

- Purchase price: the cost incurred to purchase the machine (including labour costs, costs due to raw material, etc.);
- Installation cost: the cost required to install a professional laundry machine;
- Running costs: the costs incurred to operate the machine throughout a typical lifetime. They may include electricity costs and costs of consumables (detergents, water, filters, etc.);
- Maintenance and repair costs: the costs incurred by the owner of the professional laundry machine throughout the lifetime of the machine to ensure its proper and effective operation;
- Disposal costs: the quantifiable costs (or benefits) borne by the owner of the machine at the end of life of professional machine.

5.1 Purchase price

In the context of this study, average appliance consumer prices are of interest as they are required as an input for the LCC calculations of the base cases that will be performed in Task 5.

Prices within an appliance category can vary widely on the different markets of the EU. Parameters that are the most critical for fixing the price are the capacity, followed by the technical features and functional options available and chosen by the client. Because professional laundry equipment is a business to business sector, prices of appliances are not easily available (at least, prices from EU manufacturers). Therefore, the assessment of average product prices relies entirely on aggregated stakeholders' data. They were estimated as an average of the responses received to the questionnaires sent to manufacturers (5 replies received).

Professional washing machines

Semi-professional washer extractors (WM 1) tend to start at 1 000 Euros and can cost up to 5 500 Euros. The price range of professional washer extractors up to 40 kg (WM 2-3) is comprised between 5 000 and 35 000 Euros. These appliances tend to occupy the lower

cost portion of the market, while appliances designed for heavier garment load (WM 4-7) tend to occupy the more expensive portion of the market, with purchase prices up to 500 000 Euros. Their price range is much larger than other types and therefore they are more difficult to characterise on a broad European level. Washing capacity and digital programmes tend to be the differentiating factors between purchasing prices of products in this study. Barrier washers (WM6) tend to be more expensive than washer extractors as they have specific features and accessories, ensuring their specific objectives related to hygiene are met. These products typically have been found to start at 15 000 Euros and can cost up to 120 000 Euros.

Professional dryers

The same structure of the market applies to professional dryers. Smaller tumble dryers and cabinet dryers (D1 to D6) cost between 800 and 35 000 Euros, while heavy duty appliances (D7) belong to the range of 40 000 to 110 000 Euros. The costs for pass-through (transfer) tumble dryers are influenced not only by the capacity, but by the different features (e.g. heat recovery), components and stages presented by the appliance. The most expensive models include for example one pre-treatment module, four steam modules, four air circulation modules, one exit module.

The average prices for the machines within the classifications are shown in Table 27.

Table 27 European average price by machine category

Type of appliance	Typical price range (Euros)	Average price (Euros)
Laundry machines		
WM1: Semi-professional washer extractor	1 000–5 500	2 670
WM2: Professional washer extractor, <15 kg	5 000–35 000	5 000
WM3: Professional washer extractor, 15-40 kg	5 000–35 000	15 250
WM4: Professional washer extractor, >40 kg	50 000–170 000	58 750
WM5: Professional washer dryer	n.a.	8 000
WM6: Professional barrier washer	15 000–120 000	38 250
WM7: Washing tunnel machine	280 000–500 000	390 000
Dryers		
D1: Semi-professional dryer, condenser	800–3 500	1 970
D2: Semi-professional dryer, air vented	800–3 500	1 680
D3: Professional cabinet dryer	3 500–20 000	3 500
D4: Professional tumble dryer, <15 kg	3 500–20 000	4 000
D5: Professional tumble dryer, 15-40 kg	3 500–20 000	7 125
D6: Professional tumble dryer, >40 kg	18 000–35 000	21 500
D7: Pass-through (transfer) tumble dryer	40 000–110 000	62 500

5.2 Installation costs

Delivery and installation costs can be included in the product price as the manufacturers deal with this task requiring skilled personnel but it is not always the case (e.g. if the appliance is sold through a intermediate dealer). Depending of the product considered there is a high variation of these costs. They are not negligible compared to other expenses due to laundry appliances (purchase price or operating expenses). Stakeholders have estimated that delivery and installation costs represent around 4% of the purchase price of the smallest appliances and around 9% for the heavy duty machines (WM7 and D7).

However, no information was available by product category so that this rate will be used for all appliances.

5.3 Running costs

Running costs, understood as costs generated by the use of the appliance, can be split into energy (electricity, gas), water and consumable costs (detergent, rinse, etc.).

Energy costs are a significant running cost of professional laundry equipment. They are mainly due to the mechanical action required (e.g. tumblers) as well as to the heating of the water in laundry machines and of the air in dryers. According to stakeholders, the equivalent of 1 kWh of heat per kg is used to heat water.

In industrial applications, the consumption is variable: manufacturers usually only deliver the appliances or systems and the specifications of the washing process (i.e. the “recipe” of the process, including programme time, temperature, dosage of chemicals, water/laundry ratio) are defined individually by the customer himself or the detergent provider. The energy, water and detergent (and other chemicals) consumption depends on the definition of the recipe (see Task 3).

The latest electricity and gas rates for industrial customers in MS are presented below, according to the different consumption classes. The EU average will be used in LCC calculations at a later stage of the study (Task 5 and Task 7).

5.3.1 Energy costs

Electricity rate

The electricity rate in EU depends on the consumption and therefore will vary depending on the customer types (which can be attributed to certain product types too). Three consumption bands for the electricity rate at industrial rates (IA – < 20 MWh, IB – 20-500 MWh, and IC – 500-2 000 MWh) are presented in Table 28.

Table 28 Electricity rates for industrial customers in EU-27,[43] average 2007-2009 (taxes excluded)

Member State	Consumption Band Rate (Euros/kWh)		
	Industrial – IA < 20 MWh	Industrial – IB 20 MWh – 500 MWh	Industrial – IC 500 MWh – 2 000 MWh
Belgium	0.141	0.120	0.097
Bulgaria	0.073	0.069	0.061
Czech Republic	0.161	0.129	0.106
Denmark	0.102	0.086	0.079
Germany	0.156	0.112	0.093
Estonia	0.071	0.059	0.055
Ireland	0.165	0.144	0.127
Greece	0.136	0.108	0.087
Spain	0.148	0.119	0.100
France	0.099	0.075	0.059
Italy	:	:	:
Cyprus	0.160	0.160	0.144
Latvia	0.110	0.086	0.077
Lithuania	0.107	0.094	0.083
Luxembourg	0.162	0.116	0.100
Hungary	0.128	0.125	0.116
Malta	0.151	0.148	0.137
Netherlands	0.161	0.103	0.088
Austria	0.111	0.104	0.086
Poland	0.136	0.101	0.085
Portugal	0.121	0.093	0.083
Romania	0.109	0.102	0.088
Slovenia	0.145	0.122	0.094
Slovakia	0.185	0.150	0.126
Finland	0.077	0.071	0.062
Sweden	0.108	0.078	0.068
United Kingdom	0.134	0.112	0.102
EU-27	**0.138**	**0.105**	**0.090**

Small hotels/restaurants are estimated to use less electricity, while large institutional facilities would use much more. Thus, an electricity price was allocated to each of the main market segments previously described:

- Coin & Card Laundry, Apartment Household Laundry: 0.138 Euros/kWh (band rate IA);
- Hospitality Laundry: 0.105 Euros/kWh (band rate IB);

[43] Eurostat (2009); Environment and Energy, Data in focus, 48/2009; extracteD12/08/2010

- Healthcare Laundry: 0.105 Euros/kWh (band rate IB);
- Commercial Industrial / Specialty Laundry: 0.090 Euros/kWh (band rate IC).

Taking into account the dominating market segments for each different product category presented in Table 28, the average electricity rates for LCC calculations are given in Table 29.

Table 29 Electricity rates for professional laundry appliances in the EU based on market segment shares

Type of appliance	Electricity rate (Euros/kWh)
Laundry machines	
WM1: Semi-professional washer extractor	0.138
WM2: Professional washer extractor, <15 kg	0.138
WM3: Professional washer extractor, 15-40 kg	0.105
WM4: Professional washer extractor, >40 kg	0.090
WM5: Professional washer dryer	0.105
WM6: Professional barrier washer	0.105
WM7: Washing tunnel machine	0.090
Dryers	
D1: Semi-professional dryer, condenser	0.138
D2: Semi-professional dryer, air vented	0.138
D3: Professional cabinet dryer	0.138
D4: Professional tumble dryer, <15 kg	0.138
D5: Professional tumble dryer, 15-40 kg	0.105
D6: Professional tumble dryer, >40 kg	0.090
D7: Pass-through (transfer) tumble dryer	0.090

The results are in line with the fact that smaller machines tend to be used in smaller establishments and hence have a higher electricity rate as shown in the table. Larger laundry machines would be used in facilities with higher electricity consumption and thus lower electricity rates.

Natural gas rates

Natural gas rates have to be taken into account for dryers which use natural gas fuel for heating. There are also few laundry machines using gas as a direct energy source (but indirectly, steam used to heat up the water may come from gas heating) but this option is more common for dryers. The evolution of natural gas rates between 2007 and 2009 as well as rates that vary depending on the customers' consumption as reported by Eurostat are presented in Table 30.

Table 30 Natural gas rates for consumers in EU-27,[44] average between 2007 and 2009 (taxes excluded)

Member States	Consumption band rate [Euros/GJ]		
	Industrial – I1 < 1 000 GJ	Industrial – I2 1 000 GJ – 10 000 GJ	Industrial – I3 10 000 GJ – 100 000 GJ
Belgium	12.4820	10.6260	8.7920
Bulgaria	7.2216	7.0365	6.5722
Czech Republic	10.4181	9.1017	8.4341
Denmark	13.7775	13.0929	7.0364
Germany	12.2960	11.5920	10.6360
Estonia	7.7399	7.2829	6.6899
Ireland	13.4760	10.8900	9.6740
Spain	10.6561	8.7573	7.9959
France	11.7276	10.2872	9.2532
Italy	11.0010	10.6386	9.0520
Latvia	10.2443	9.7811	9.0292
Lithuania	9.3861	9.1367	8.7945
Luxembourg	11.8760	10.5800	10.2420
Hungary	11.4618	10.7835	9.3420
Netherlands	11.8480	10.3720	8.7142
Austria	10.6300	10.4400	:
Poland	10.1192	9.2683	8.2000
Portugal	13.8253	10.7658	8.6272
Romania	5.5257	5.5080	5.6072
Slovenia	13.3580	12.6800	9.8840
Slovakia	11.7883	10.5191	9.9378
Finland	:	:	7.5800
Sweden	14.7633	13.1448	11.2499
United Kingdom	10.8420	8.4012	7.1704
EU-27	**11.2115**	**10.0097**	**8.7921**

Again, the three first consumption bands available for natural gas have been used here to determine the natural gas rates as they are assumed to be the applicable bands for professional laundry appliances customers (as was the case for electricity consumption bands), however, no specific data for natural gas consumption has been given:

- Coin & Card Laundry, Apartment Household Laundry: 11.2115 Euros/GJ (band rate I1);
- Hospitality Laundry: 10.0097 Euros/GJ (band rate I2);
- Healthcare Laundry: 10.0097 Euros/GJ (band rate I2);
- Industrial / High-Tech Laundry: 8.7921 Euros/GJ (band rate I2).

[44] Eurostat (2009); "Environment and Energy, Data in focus, 49/2009"; extracteD12/08/2010

Based on the market segments given in Table 17, the rates presented in Table 31 will be used for LCC calculations.

Table 31 Summary of the rates used for gas for professional laundry equipment

Type of appliance	Gas rate (Euros/GJ)
Laundry machines	
WM1: Semi-professional washer extractor	11.22
WM2: Professional washer extractor, <15 kg	11.22
WM3: Professional washer extractor, 15-40 kg	10.01
WM4: Professional washer extractor, >40 kg	8.79
WM5: Professional washer dryer	10.01
WM6: Professional barrier washer	10.01
WM7: Washing tunnel machine	8.79
Dryers	
D1: Semi-professional dryer, condenser	11.22
D2: Semi-professional dryer, air vented	11.22
D3: Professional cabinet dryer	11.22
D4: Professional tumble dryer, <15 kg	11.22
D5: Professional tumble dryer, 15-40 kg	10.01
D6: Professional tumble dryer, >40 kg	8.79
D7: Pass-through (transfer) tumble dryer	8.79

Preliminary information shows that gas may not be relevant for smaller laundry appliances. However this will be elaborated in later tasks (Task 3).

5.3.2 Water costs

The cost of water to consumers can be difficult to evaluate as it is either based on a variable rate which corresponds to consumption or a fixed rate which is set by local utilities.

An indication of water prices in France is shown in Figure 4, where a breakdown in the cost of water to consumers is given over 15 years.

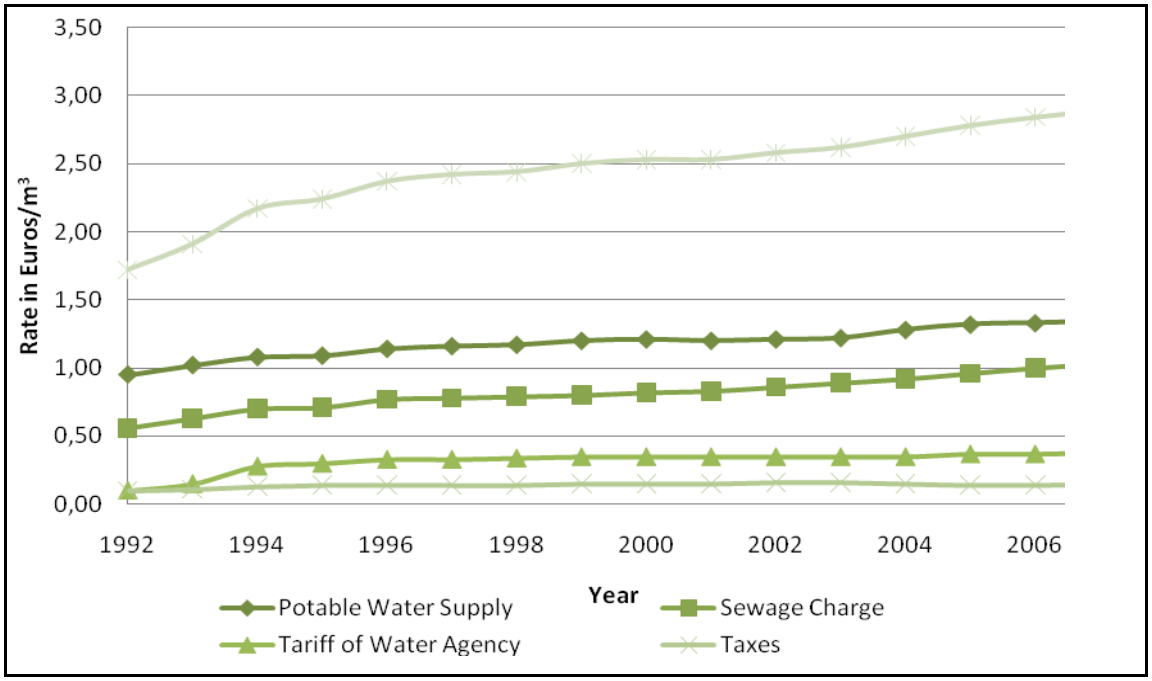

Figure 4 Water cost break down in Rhone region of France for 15 years

A final water tariff to the consumer can be observed at 2.90 Euros/m^3 with an average increase of 0.064 Euros/m^3 per year, suggesting a current water tariff in this region of France of 3.08 Euros/m^3. Furthermore, a study by the company BIPE analysed the water rate for eight major European cities in 2006. The relevant information is presented in Table 32.

Table 32 Water consumption and effective rate for eight European cities[45]

City	Water Consumption (m^3/capita/y)	Average persons per household	Average water bill per household (Euros)	Effective water rate (Euros/m^3)
Amsterdam	57	2.3	506	3.86
Athens	61	2.7	171	1.04
Berlin	43	1.8	360	4.65
London	54	2.4	312	2.41
Madrid	61	2.9	207	1.17
Paris	52	1.9	229	2.32
Rome	104	2.6	229	0.85
Stockholm	77	2.0	303	1.96

[45] Consumption, persons per household and average water bill per household taken from: BIPE, Analysis of Drinking Water and Wastewater Services in Eight European Capitals: the Sustainable Development Perspective, 2006

Based on the population of the above cities, the weighted average water rate for the eight cities cited by BIPE is 2.38 Euros/m^3.

Based on the above sources, a water rate extrapolated from the weighted average of the eight largest cities in the EU to the year 2010 based on the evolution of water price experienced in France over 15 years gives a water price of **2.64 Euros/m^3** for the EU-27.

This figure will be used to calculate the LCCs of laundry equipment in Task 5 of this study and may impact the LCCs of these appliances when considered on the scale of the entire European laundry machines market. As water consumption is arguably a central theme to efficiency, this figure will be used in a sensitivity analysis to determine how variations in this price affect the LCC of professional laundry equipment. This will also help to evaluate the high variability in water prices found in the above analysis.

Starting from 2010, the Water Framework Directive[46] requires MS to improve their water management strategy through setting pricing and policy incentives to preserve the natural water systems of MS. It can be expected that in years to come, the price of water will become an increasingly large concern for professional laundry equipment manufacturers and likewise, professional laundry equipment users, as MS gradually increase the cost of water to reflect environmental and resource use costs more adequately, as defined in the Directive.

5.3.3 Detergent costs

There is a wide variety of detergents available. For household laundry equipment, the sales proportions of the UK detergent market, expected to be representative of the EU market in the absence of authoritative EU-level data, are the following: 40% powders, 20% tablets, 16% super concentrated liquids, 15% liquid tablets, 5% gels and 4% concentrated liquids.[47] Regarding the commercial sector, the situation is slightly different as customers often choose their suitable detergent formula in order to adapt their washing process to the type of garment and soiling they deal with: there is more customer-specific demand. Thus the range of chemicals used in the washing process is even broader: on-premise laundry detergents; fully formulated detergents; powder/liquid detergents; pre-wash additives; boosters; pH-adjustment; water hardness regulators; bleach additives; disinfectant detergents/additives for hygienic laundry (hospital, food industry); fabric softeners; starch finishing; ironing aid; fragrance rinse; etc (cf. Task 1). The industrial and institutional sector of laundry detergents (including the products previously quoted) in 2008 represented 0.66 billion Euros and 10% of the global Industrial & Institutional (I&I) products sector (see Figure 5).

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[46] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. Available at: http://europa.eu/legislation_summaries/agriculture/environment/l28002b_en.htm; accessed 01 Feb 2010

[47] BIO Intelligence Service / Giraffe / Intertek (2009); “Reducing the environmental impacts of clothes cleaning”; for DEFRA

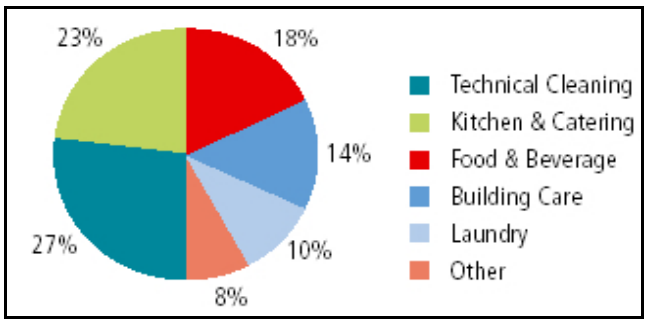

Figure 5 Value of industrial and institutional products by category in EU-27+NO+CH, 2008[48]

It would not be realistic to try and assess prices and quantities used of each of these products for each product category. The simplified tool that is used for the environmental and economic assessment in Task 5 (called EcoReport) only has one type of detergent in its database. Thus one single price for detergent will be determined and used within the whole study. A sensitivity analysis is carried out in Task 8, taking into account the possible variations of the detergent rate.

The types of detergents used in professional laundry equipment might also change in future as laundry sustainability programmes have been launched by A.I.S.E since 2006 in order to promote the use of compacted powders, which are more environmentally-friendly than non-compacted detergents.[49]

Prices for commercial laundry detergents are not publicly available but we can assume that there is wide variation in the prices of detergents found in Europe. Also, commercial laundry prices can be expected to be slightly cheaper than household laundry detergents, as customers buy in bulk. For the purposes of this study, the cost of detergent is assumed to be **2 Euros/kg**, which is based on an internet search; stakeholders including manufacturers and professional detergent associations were unable to provide data. This price will be translated into a direct cost for the consumer for each wash cycle in later tasks when the amount of water, concentration of detergent and frequency of use is characterised (Tasks 3 and 4).

The total annual volume of fabric washing detergents used in commercial laundries is estimated to be about 10% of the volume used by consumers in the household market[50].

[48] A.I.S.E, Annual review 2008. Available at: http://www.aise.eu/downloads/AISE_AR2008FINAL.pdf

[49] http://www.aise.eu/downloads/AISE%20SR-AR2009-2010.pdf

[50] Association Internationale de la Savonnerie, de la Détergence et des Produits d'Entretien (2000), Professional laundry and the environment.

5.3.4 Interest and inflation rates

Table 33 shows the latest reliable national inflation and interest rates for the EU-27 as published by Eurostat and the European Central Bank (ECB). Figures from 2007 have been given as more recent data is unavailable for 2008 and 2009.

Table 33 Interest and inflation rates for EU-27

Member State	Inflation rate [%][51]	Interest rate [%][52]
Austria	2.9	4.29
Belgium	2.8	4.33
Bulgaria	10.9	4.54
Cyprus	3.4	4.48
Czech Republic	5.1	4.28
Denmark	2.3	4.29
Estonia	9.3	5.69
Finland	2.5	4.29
France	2.5	4.30
Germany	2.7	4.22
Greece	3.7	4.50
Hungary	7.2	6.74
Ireland	3.1	4.31
Italy	2.7	4.49
Latvia	13.8	5.28
Lithuania	8.6	4.55
Luxembourg	3.5	4.56
Malta	2.3	4.72
Poland	3.6	5.48
Portugal	2.6	4.42
Romania	6.7	7.15
Slovakia	2.6	4.49
Slovenia	5.3	4.52
Spain	3.7	4.31
Sweden	2.4	4.17
Netherlands	1.7	4.29
UK	n.a.	5.06
EU-27 Average	**3.0**	**4.58**

[51] 12 month average rates May 08-07 / May 07-06; source: Eurostat; http://europa.eu/rapid/pressReleasesAction.do?reference=STAT/08/85&format=HTML&aged=0&language=EN&guiLanguage=en

[52] European Central Bank long-term interest rates; 10-year government bond yields, secondary market. Annual average (%), 2007; http://epp.Eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-30-08-410/EN/KS-30-08-410-EN.PDF

The above information regarding the economy in general has changed significantly since it was published, effectively rendering it obsolete: it will not be used in this study. The European Commission has provided a general discount rate for this project to be assumed at **4.0%**.

5.4 Maintenance and service costs

Stakeholders have commented that service contracts are usually included as part of the purchase of professional laundry equipment. The exact nature of the contracts can vary and depends on the type of equipment, complexity and capital cost. Normally more sophisticated and expensive equipment have more elaborate and comprehensive service contracts to help ensure a long product lifetime and payback period on capital investments. For smaller appliances dealers or wholesalers may provide warranty services to clients on behalf of the manufacturer, or they may also provide the warranty services at their own expense as part of the dealer arrangement between the manufacturers. For heavy duty appliances, the manufacturer typically services the product as these products are also typically sold directly from the manufacturer themselves. The amount of money represented by the maintenance and repair costs is not negligible in the assessment of the life cycle costs of professional laundry appliances. Stakeholders have estimated that maintenance and repair costs represent approximately:

- 3% of the purchase price of the product over the whole lifetime for categories WM1-2-3-5 and D 1-2-3-4-5;
- 25% of the purchase price over the whole lifetime for categories WM 4-6-7;
- 18% of the purchase price over the whole lifetime for categories D6-7.

These values will be used to estimate the life cycle costs of the appliances later in the study.

A recent study[53] in the US also assessed the annual repair and maintenance costs of professional washer equipment. The ratios of the repair and maintenance costs (over the lifetime) on the purchase price of three product categories are presented in Table 34.

Table 34 Repair and maintenance costs over lifetime of professional laundry equipment[53]

Category	Purchase price	Repair and maintenance costs over lifetime	Ratio
Single-load	$1 090	$274	25%
Washer extractor	$190 000	$112 500	59%
Tunnel washer	$1 100 000	$209 000	19%

[53] Navigant Consulting (2009); Energy Savings Potential and RD&D Opportunities for Commercial Building Appliances, for US Department of Energy.

Despite slight differences in the product category definitions between the two studies, single-load machines are similar to WM1 while washer extractors correspond to WM2-3 and tunnel washers to WM7. The amount of money spent for repair and maintenance over the lifetime of the appliances is much larger according to this table, than the 3% indicated by stakeholders but is similar for tunnel washers (19%). This is most likely due to differences in definition and differences between the US and EU markets, for example in terms of service contracts. The feedback from the manufacturers was therefore used as estimations of the maintenance and repair costs.

Stakeholders have commented that the most common items for maintenance on professional laundry equipment are control panels, doors, drive belts, and heating elements. All these components in professional laundry machines and dryers are easily replaceable and generally justify maintenance rather than replacing the entire machine. The most common cause for professional laundry machine breaking is operator misuse or abuse.

5.5 Disposal costs

In general, most commercial laundry service establishments need a working laundry appliance for daily operation. As a result, for all replacement sales, the old laundry unit is removed at the same time as the new unit is provided.

Many professional laundry machines can be refurbished and resold as second hand products by dealers. These products generally are given some new elements (drive belts, doors...) as was described as the most common items to fail in the maintenance section.

Professional laundry equipment that is not refurbished is almost always recycled for scrap parts. A large majority of the materials is valuable metallic parts (stainless steel) and the value for scraps is high. As a result, most dealers or manufacturers will offer to remove the old appliances on purchase and delivery for new units, and may even provide the customer with a discount for the salvaged product.

As a result, this study will assume the **disposal cost for professional laundry equipment is 0 Euro per product.**

5.6 Summary of end-user expenditure

Table 35 summarises the consumer expenditure data presented in the previous sections. This data will be useful in later tasks (especially Task 5) for estimating life cycle properties of these products.

Table 35 User expenditure base data

Category	Cost items	Units	Value
Purchase	Purchase price	Euros/product	800–500 000
Purchase	Delivery and installation	% of product price	4 (9 for heavy duty)
Use	Electricity rate	Euros/kWh	0.090–0.138
Use	Gas	Euros/GJ	8.79–11.21
Use	Water rates	Euros/m^3	2.64
Use	Detergent	Euros/kg	2
Use	Interest-inflation rate	%	4
Maintenance	Servicing and repair	% of product price	3–25
Disposal	Removal and disposal / recycling	Euros/product	0

6 Conclusion

In conclusion, Task 2 presents the professional laundry appliances market sector with generic economic data extracted from the Eurostat database, completed by information obtained directly from the main manufacturers.

The main manufacturing Member States identified are Germany, Spain and Sweden. The smallest professional appliances (professional washer extractor, <15 kg, professional tumble dryer, <15 kg) are the most sold product types, followed by semi-professional machines. Largest products (professional barrier washer, washing tunnel machine, pass-through tumble dryer) have low sales as these machines are reserved for heavy duty installations. Their environmental impacts should not be neglected, however, due to the intensity of use and the large capacities of these machines.

The task also contains the consumer expenditure data that will serve as a basis for the economic analysis of the base cases (Task 5) and the improvement options (Task 7). Purchase prices of professional laundry appliances are comprised between 800 and 500 000 Euros. As a general remark, customers show an interest in more energy-efficient products, provided that these products result in cost savings in the long term.

7 Annex

7.1 Dry-cleaning equipment

The following shall provide a brief description of the market situation of professional dry-cleaning machines in Europe. Please note that during the course of the study, dry-cleaning equipment has been excluded from the scope of Lot 24.

PRODCOM analysis

The PRODCOM database is useful for an initial analysis as it contains transparent and publicly available data provided by Member States of the EU on manufacturing and production information within the EU.

The dry-cleaning machines are labelled by the PRODCOM code 28942250. The production quantities between 2005 and 2009 are presented in Table 36.

Table 36 Number of dry-cleaning machines produced, 2005-2009[54]

Country	2005	2006	2007	2008	2009
Austria	0	0	0	0	0
Belgium	0	0	0	0	0
Bulgaria	0	0	0	-	0
Cyprus	0	0	0	0	0
Czech Republic	0	0	0	0	0
Denmark	0	0	0	0	0
Estonia	0	0	0	0	0
Finland	0	0	0	0	0
France	0	0	0	0	0
Germany	-	-	-	-	-
Greece	-	-	-	-	-
Hungary	0	0	0	0	0
Ireland	0	0	0	0	0
Italy	4 088	5 917	10 414	8 996	6 959
Latvia	0	0	0	0	0
Lithuania	15	10	5	7	5
Luxembourg	0	0	0	0	0
Malta	0	0	0	0	0
Netherlands	0	0	-	0	0
Poland	0	0	0	0	0

[54] PRODCOM statistics based on NACE 2 Rev. accessed on 31.08.2010 at: http://epp.Eurostat.ec.europa.eu/portal/page/portal/prodcom/data/database

Country	2005	2006	2007	2008	2009
Portugal	0	0	0	0	0
Romania	0	0	0	0	0
Slovakia	0	0	0	0	0
Slovenia	0	0	0	0	0
Spain	-	-	-	-	-
Sweden	0	0	0	0	0
United Kingdom	0	0	0	0	0
EU 27	4 603	6 874	14 000	15 000	10 400

'-' signifies that the information is unavailable. Source: PRODCOM

The PRODCOM data suggests that Italy is a very important manufacturer of dry-cleaning machines (64% of the EU 27 production in 2008 and 67% in 2009). However, in 2007, 2008 and 2009, a large share of the EU 27 total is missing. As no information is available for Germany, Spain and Greece, these countries may be important producers as well. Stakeholders' information confirmed that the main producing Member States are Italy and Germany.

In terms of production values, Italy represented 94% of the EU 27 total in 2009 (see Table 37). The figures are again missing for Germany, Spain and Greece which might explain the gaps between the EU 27 total and the sum of the available Member States figures.

Table 37 Value of dry-cleaning machines by Member State (thousand Euros) produced in EU 27, 2005-2009[55]

Country	2005	2006	2007	2008	2009
Austria	0	0	0	0	0
Belgium	0	0	0	0	0
Bulgaria	0	0	0	-	0
Cyprus	0	0	0	0	0
Czech Republic	0	0	0	0	0
Denmark	0	0	0	0	0
Estonia	0	0	0	0	0
Finland	0	0	0	0	0
France	0	0	0	0	0
Germany	13 520	-	-	-	-
Greece	-	-	-	-	-
Hungary	0	0	0	0	0
Ireland	0	0	0	0	0
Italy	87 627	132 417	199 152	174 765	120 662

[55] PRODCOM statistics based on NACE 2 Rev. accessed on 31.08.2010 at: http://epp.Eurostat.ec.europa.eu/portal/page/portal/prodcom/data/database

Country	2005	2006	2007	2008	2009
Latvia	0	0	0	0	0
Lithuania	40	28	19	20	14
Luxembourg	0	0	0	0	0
Malta	0	0	0	0	0
Netherlands	0	0	-	0	0
Poland	0	0	0	0	0
Portugal	0	0	0	0	0
Romania	0	0	0	0	0
Slovakia	0	0	0	0	0
Slovenia	0	0	0	0	0
Spain	-	-	-	-	-
Sweden	0	0	0	0	0
United Kingdom	0	0	0	0	0
EU 27	101 200	140 000	215 738	188 069	128 324

'-' signifies that the information is unavailable. Source: PRODCOM

Dry-cleaning is considered a business-to-business market. Small companies account for 60% of sales, while 40% are distributed among big industrial companies. Small-and medium-sized machines are mainly sold in Europe and the Middle East, while the principal market for bigger equipment is located in the United States. Domestic consumption accounts for 70% of European sales according to PRODCOM figures.

Main manufacturers

The following enterprises have been identified as manufacturers of dry-cleaning machines in Europe. Brackets refer to the country where the headquarters are located.

- Techno-dry (Italy)
- Real Star (Italy)
- ILSA (Italy)
- Firbimatic (Italy)
- Ama Universal (Italy)
- Bergparma (Italy)
- Lindus (Italy)
- Maestrelli (Italy)
- Union Spa (Italy)
- Italclean (Italy)
- Renzacci (Italy)
- MIPA (Italy)
- Suprema (Italy)
- EazyClean Technologies (Germany)
- Böwe (Germany)
- Satec (Germany)

Sales estimation

According to PRODCOM[56] values, the average value of dry-cleaning units in Europe was around 12 340 Euros per unit in 2009.

Table 38 Apparent sales of dry-cleaning equipment in EU-27, according to PRODCOM values for 2009

	Quantity (EU-27) (units)	Total value EU-27 (Euros)	Value/unit[b]
Production (P)	10 400[a]	128 324 502[a]	12 340
Import (I)	190[b]	2 348 380[a]	12 340
Export (E)	2 675[b]	33 008 180[a]	12 340
Apparent sales (P+I-E)	**7 915[b]**	**97 664 702[b]**	**12 340**

[a] *Figure from PRODCOM Eurostat*
[b] *Calculated figure*

In Table 38, sales of dry-cleaning machines are estimated at around **7 915 units** per year in 2009 within EU-27, according to PRODCOM figures. No differentiation by technology (per-chlorethylene, hydrocarbon, cyclosiloxane) was found. Italy, Germany, France, Spain and the United Kingdom are the main European markets of these appliances. According to a stake-holder's market analysis, the sales in these countries in 2009 are estimated at 250 appliances in Italy, 70 units in Germany, 100 units in France, 150 units in Spain and 75 units in the UK. Given that these countries represent the majority of EU sales, these estimations result in a much lower sales figure than the one estimated through PRODCOM as EU sales would then represent around **1 000 units** in 2009. At first sight, the PRODCOM-based estimation seems less reliable than the direct evaluation from stakeholders, because of the data gaps and unusual trends between 2005 and 2009.

Purchasers of these machines are mainly small businesses offering retail services and big industrial service providers. Figures from the United States suggest that the ratio of retail to industrial companies is 20:1. In both cases, the service can be related to clothing, rugs and leather items, among others. The estimated useful life of the machines is up to 20 years, considering major maintenance actions have to be taken at 10 years.[57]

Estimation of the stock

A study directed by First Research Industry Profile estimated that the total amount of companies providing dry-cleaning services in the United States (2005) was about 20 000 for

[56] http://epp.Eurostat.ec.europa.eu/portal/page/portal/prodcom/data/database

[57] Source: www.dentoncad.com/index.php?option=com_docman&task=doc_download&gid=394&Itemid=37, Stakeholders questionnaire answers

retail service and 1 000 at industrial level.[58] For Europe, the estimate is up to 60 000 considering differences in behaviour, total gross domestic product (GDP) and total population. According to stakeholder inputs, the total number of dry-cleaning stores in 2003 in the EU was 54 600, with the following breakdown: 43 700 stores with one single machine, 8 050 stores with two to four machines and 2 850 stores with more than four machines. A rough estimation of the stock thus gives 76 400 appliances in the EU in 2003.[59]

The figures for dry-cleaning stores in 2010 show that the dry-cleaning market has been shrinking since 2003 in France, Germany and Italy, which are the countries with the biggest markets.

Table 39 Number of dry-cleaning stores[60]

Dry-cleaning stores	2003	2010	Average annual decrease
France	5 800	4 500	3.7%
Germany	3 900	3 500	1.6%
Italy	22 000	14 800	5.8%
EU	54 600	-	-

The PRODCOM data already presented is much more variable and despite a decrease between 2007 and 2009 in the production figures (see Table 36), the number of units produced in 2009 is twice the production in 2005, a trend which does not seem very likely. The PRODCOM data should thus be considered with caution.

The stock in 2010 can be estimated by assuming that the share of France, Germany and Italy in the total number of dry-cleaning stores in the EU has remained constant between 2003 and 2010. The number of dry-cleaning stores in these three countries represented 58% of the total number of stores in the EU in 2003. The number of dry-cleaning stores in the EU is then estimated at 39 300 in 2010. Assuming that the stores have the same number of machines on average in 2003 and in 2010, **55 000 dry-cleaning machines** should be in use in the EU in 2010. This figure is consistent with estimations that stakeholders made for stocks at national level: 3 500 appliances in Germany, 5 000 in France and 6 000 in Spain.

Given the lifetime estimated at 20 years and the stock of 55 000 appliances, it looks surprising to have a sales number of only 1 000 products per year. A sales estimation of 2 500-3 000 appliances would be more in line with the stock. Several factors might explain this phenomenon: the error on the sales estimation (PRODCOM, estimated less relevant,

[58] Source: First Research Industry Profile; Dry Cleaning and Laundry Facilities, 2005.

[59] Assuming an average of three machines for stores with two to four machines and five machines for stores with more than four machines.

[60] Source: Stakeholder inputs. Data for other Member States was incomplete or not available.

however shows much higher sales figures than stakeholder input); the recent decrease of the dry-cleaning sector, lowering the sales number at a given time in comparison with the number of appliances used during a period of 20 years; and the fact that a large number of dry-cleaning shops are closing down every year, introducing a lot of second-hand machines to the market, especially in Italy.

The market share of small machine sales is expected to remain roughly constant or decrease for two main reasons: new fabric technologies have widened the spectrum of washable clothes and new household products capable of "dry cleaning" with similar results.[61]

The total cost of dry-cleaning machines can be divided into five categories:

- Purchase and installation costs

  The purchase price of dry cleaning machines depends on the country in which the machine is meant to be used. Industry sources indicate that French and German regulations are the most demanding in this regard. Therefore, the machinery should include specific characteristics that increase the price. The list price of an appliance of 15 kg capacity that complies with French standards is estimated to be between 30 000 and 35 000 Euros. Installation costs are estimated to reach up to 15% of the purchasing cost.
- Running costs – running costs are the costs incurred to operate the dry-cleaning machine throughout a typical lifetime. They may include electricity costs and costs of consumables (detergents, water, filters, etc.).
  - Energy cost: this is expected to be significant over the life cycle of dry-cleaning machines. The latest costs for industrial customers are presented below, according to the different consumption classes.
    - *Electricity rate:* three consumption bands are presented in Section 5.3.1 for the electricity rate at industrial rates (IA – < 20 MWh, IB – 20-500 MWh, and IC – 500-2 000 MWh) in the table below (source: Eurostat). Retail service providers are assumed to be in the IB range, while industrial service providers are assumed to be in the IC rate band.
    - *Natural gas rates*: natural gas rates have to be taken into account for dry-cleaning machines which use natural gas fuel for heating. The rates vary depending on consumption as reported by Eurostat and presented in the Section 5.3.1. Machines using gas as an energy source are likely to be used for industrial purposes. Therefore, the IC rate band is expected. The percentage of dry-cleaning machines using gas remains unknown.

[61] Recent wet-cleaning appliances have been approved to clean garments labeled as P (dryclean only).

- Water rate: A small portion of water is used in the process. Water rates are presented in Section 5.3.2.
- Consumables:
  - *Detergents*: dry cleaning consumables are represented by the solvent used in the process and the required detergent. According to some studies and websites selling the products, the type of solvent influences the price: on average, perchloroethylene (Perc) costs around 1.7 Euros per litre, and it requires the purchasing of special detergents (4.4 litres of detergent/litre of Perc) at an approximate cost of 5.5 Euros/litre. Hydrocarbon dry-cleaning reduces the price of the solvent (1.2 Euros/litre) but increases the consumption. A business using two machines to process about 75 000 kg of clothing per year can use around 2 300 litres of Perc per year or 2 500 litres of hydrocarbon over the same period (using two hydrocarbons machines). From these figures, the estimated consumption of solvent is 0.031 litres of Perc/kg of laundry and, 0.033 litres of hydrocarbons/kg of laundry[62].

- Maintenance costs – the costs incurred by the owner of the dry-cleaning machines throughout the lifetime of the machines to ensure their proper and effective operation. According to a study from the United States, the maintenance cost can reach up to 12 Euros/hour, and is required around 620 hours per year. This translates to 7 440 Euros per year of maintenance. Hydrocarbon equipment maintenance is almost 100% more expensive than for Perc appliances, including the cost of special maintenance equipment.
- Disposal costs – in the market there are several providers of refurbished machines. This leads to the conclusion that most machines are re-used at the end of their useful life, either by refurbishing or recycling valuable metallic parts.
- Labour costs are neglected as they are assumed not to be relevant for the study at hand.

7.2 Questionnaires “Task 2” for stakeholders

These papers are provided separately:

- EuP_Lot24_Wash_T2_Annex_Questionnaire.pdf
- EuP_Lot24_Wash_T2_Annex_Additional_Questionnaire.pdf
- EuP_Lot24_Wash_T2-T7_Questionnaire_for_Final_Report.xls

[62] Source: M. Morris & K. Wolf.; Hydrocarbon Technology Alternatives to Perchloroethylene for Dry Cleaning. 2005

7.3 Stakeholder feedback to draft versions of Task 2

Please note that the feedback refers to prior versions of draft Task 2 report; thus the indicated numerations of chapters, tables, figures or pages might have been changed.

Feedback		Comment
JRC-IPTS		
	A section referring to the intra-community trade market of the products based on Eurostat and/or on real market data is missing.	PRODCOM provides import and export data for the products by Member State. A breakdown by destination is not available, precluding a distinction between intra-community and extra-community trade. The available PRODCOM data have been provided, as well as data from the Eurostat INTRA database.
	With respect to the previous point a section referring to the extra-community trade market of the covered products is missing.	PRODCOM provides import and export data for the products by Member State. A breakdown by destination is not available, precluding a distinction between intra-community and extra-community trade. The available PRODCOM data have been provided, as well as data from the Eurostat EXTRA database.
	A calculation of the apparent consumption of the product group based on Eurostat data is missing.	Will be included in the next task version.
	The apparent consumption is calculated by a developed model in which a number of assumptions are made. This model is mainly based on numerous proportion values which where estimated based on stakeholder input. No cross-check has been made. Eurostat data (see attached spreadsheets) indicate strongly differing values (please see below in detailed comments section). These differences should be presented, analysed and explained.	The project team is aware that the market data is highly dependent on stakeholder inputs but the data presented in Eurostat does not seem highly reliable. Also, the stakeholder collaboration depends on their willingness to co-operate, and companies have limited resources for data gathering. Differences with Eurostat data have been stated and will be more thoroughly analysed.

Feedback		Comment
	The calculation of the product stock data values is not sufficient. Data gaps of sales in several years are filled in with reverse calculations based on estimated apparent consumption values for one year. A more robust determination of these values is needed. In the current version of the stock sales values, all calculations rely on one estimated aggregated value of one year and several additional. The environmental performance of the product as computed in the MEEUP methodology is strongly based on the stock data values. Thus, these rates strongly affect the final outcome and therefore need to be developed in a more reliable way.	We agree that the data limitations make the stock estimation quite uncertain. We have used the available sales data and a simple, transparent extrapolation to calculate stock. Also, please be aware that although the stock numbers will affect the total EU estimations, they have no influence on the relative difference between the base case and the improved products when expressed in percentage terms (for the environmental and economic analyses and also in the scenario analysis of Task 8).
	Various values presented in Section 2.3.2 on product-specific trends are not substantiated. There is no reference, and therefore lacks transparency and traceability of them. References and complementary sources should be presented and in case of stakeholder input, the metadata on the stakeholder information panel is considered necessary.	References and complementary sources will be added in the revised version.
	Similar, to draft Task 2 report on professional dishwashers, part of Lot 24, stakeholder input is the main used source. For sake of transparency metadata information on the survey basis and the response of the stakeholders is necessary.	To be included, to the extent possible (confidentiality issues).
	Starting from Section 2.4.3 and up to Section 2.4.5, several paragraphs have been copied and pasted from the draft Task 2 report on professional dishwashers. This information, to the extent that it is relevant, should be properly referenced and presented in a different form.	The study was split into two sections, “dishwashers” and “washing machines and dryers”, by the project team but these two parts belong to the same study, Lot 24. Some information is common to both parts so it does not seem appropriate for one part to reference the other. As professional dishwashers and laundry appliances have some similar aspects (regarding their end users, recycling behaviour, etc.), it is natural that some information would be relevant to both product groups. Another consistency check will nonetheless be carried out.

Feedback		Comment
VDMA – Garment and Leather Technology		
Draft Version Task 2 Report	On the occasion of Interim Stakeholder Meeting for the laundry part on 1st October 2010 in Paris we would like to issue comment to Draft Version Task 2 on the topic "sales by product type for the categories WM 6-7: Heavy duty washers" as follows: From our point of view, 400-450 tunnel washing machines are sold per year. You can calculate one press or centrifugal extractor (65% presses and 35% centrifugal extractors) and 4-5 transfer dryers per tunnel washer worldwide. The verified total amount of heavy duty washer extractors and professional tumble dryers is unknown to us.	Noted
	Due to our experience we assume that 65% to 70% of the machines are delivered into the EU. Therefore we think it is possible to calculate with approximately 280–315 tunnels, approximately 280–315 presses or extractors and approximately 1120–1575 transfer dryers in the EU.	Noted
	From our point of view the described lifetime (Table 2-11) of the heavy duty tunnel washers and the transfer dryers is more than 20 000 h.	Noted and amended in the next task
	We support the statement "Exclusion of heavy duty appliances". Furthermore we suggest also the exclusion of WM5 and D5 due to the minor amount of heavy duty units in the industrial market segment.	Noted

Further Feedback from VDMA

VDMA

Garment and Leather
Technology Association

VDMA comment on Preparatory Studies for Eco-Design Requirements of Energy-using Products
Lot 24: Professional washing machines, dryers and dishwashers (Tender No. TREN/D3/91-2007)
Draft Version Task 2 Report Professional laundry machines and dryers

On the occasion of Interim Stakeholder Meeting for the laundry part on 1st October 2010 in Paris we would like to issue comment to Draft Version Task 2 on the topic "*sales by product type for the categories WM 6-7: Heavy duty washers"* as follows:

From our point of view, 400-450 tunnel washing machines are sold per year. You can calculate one press or centrifugal extractor (65% presses and 35% centrifugal extractors) and 4-5 transfer dryers per tunnel washer worldwide. The verified total amount of heavy duty washer extractors and professional tumble dryers is unknown to us.

Due to our experience we assume that 65% to 70% of the machines are delivered into the EU. Therefore we think it is possible to calculate with approximately 280 – 315 tunnels, approximately 280 – 315 presses or extractors and approximately 1120 – 1575 transfer dryers in the EU.

From our point of view the described lifetime (Table 2-11) of the heavy duty tunnel washers and the transfer dryers is more than 20,000 h.

VDMA
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VDMA
The Technology Makers

We support the statement “Exclusion of heavy duty appliances”. Furthermore we suggest also the exclusion of WM5 and D5 due to the minor amount of heavy duty units in the industrial market segment.

Munich, 29th September 2010

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