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#Dishwasher4All

What if all Europeans had a dishwasher?

A short introduction

The first dishwasher was invented 130 years ago. At that time, it was considered to be a luxury product. Following considerable market developments, dishwashers became more affordable and popular over time. Today, about half of European households have a dishwasher.

While this number is already quite significant there are many good and important reasons to further increase the penetration of dishwashers into households and promote their use.

This paper shows that significant savings in terms of energy and water consumption can be made by increasing the penetration rate of dishwashers within European homes. A boost to employment and growth could also be expected if households, currently doing the washing-up by hand, were to switch to using a dishwasher.

We believe that the calculations and analysis below can be especially relevant in the context of the revision of the Eco-design and Energy labelling regulations for dishwashers.

A bit of context

In 2015, 9,223,800 dishwashers were sold in the EU28.

In that year, the percentage of European households having a dishwasher at home reached 45%[1]. This is called the 'penetration rate'.

When looking at the data from previous years, it can be seen that this penetration rate increases by more or less 0.66% every year, which means that, each year, 0.66% more households benefit from having a dishwasher at home and not having to do the washing-up by hand.

In 2015, 24% of the dishwashers sold in the EU were bought by households that did not have a dishwasher before and therefore used to wash their dishes by hand. The remaining 76% were sold to households that are replacing their old dishwashers.

Now that we know these numbers, it is interesting to look at the energy consumption figures:

Previous studies have shown that the estimated average energy consumption for dishwashing by hand is 2,5KWh per wash[2]. In comparison, the average energy consumption of a 2015 dishwasher is

[1] Calculated on the basis of 15 EU countries for which data was available. The remaining countries that could not be considered would probably have even lower penetration rates. (Low income countries, comparable countries with low penetration rate). It is therefore likely that the actual energy savings are even higher when looking at EU28.

[2] This number is representing the amount of energy for the same amount of dishes than what can be put inside a dishwasher. 10 or 13 place setting weighted according to the market distribution found in the consumer behaviour study.

0,960KWh per cycle[3]. The difference in energy consumption between washing the same amount of dishes by hand or with a dishwasher is therefore 1,54 KWh.

Now, if we multiply this by the number of cycles per year (280) and by the number of households in the EU, we come to the following conclusions:

The total of energy consumption in households washing their dishes by hand (55% of EU households) in 2015 was about 76TWh. This is three times more than the total of energy consumption in households using dishwashers (45% of EU households), which was more or less 24 TWh.

The EU households that use a dishwasher therefore saved a total of almost 38TWh compared to if they had washed their dishes by hand. In comparison, this is a bit more than the total electricity consumption of Hungary in 2014.

Even more interesting is that if all EU household had a dishwasher – in other words, if the penetration rate was a 100% – the energy saved compared to the current situation would be around 84 TWh/year only for those 15 EU countries. Estimations for EU 28 indicate that the savings would be around 92TWh/year for that extended geographical area. In comparison, the electricity consumption of Belgium in 2014 was 81TWh.

Another figure: The savings done by households that have bought a dishwasher for the first time in 2015[4] are about 0.92TWh compared to if they had continued to do the washing up hand. While households that replaced their 10 year old DW for a new one in 2015[5] saved in total 0.14 TWh compared to if they had kept the old 10yo DW. The total of these savings is 1.06TWh.

Now let us look at the water savings:

Previous studies have shown that the estimated average water consumption for dishwashing by hand is 110 litres per wash[6]. In comparison, the average water consumption of a 2015 dishwasher is 9,80 litres per cycle[7]. The difference in water consumption between washing the same amount of dishes by hand or with a dishwasher is therefore 100,2 Litres.

Now, if we multiply this by the number of cycles per year (280) and by the number of households in the EU, we come to the following conclusions:

The total water consumption of households washing their dishes by hand (55% of EU households) was in 2015 about 3360,59 billion litres. This is 13 times more than the total of water consumption in households using dishwashers (45% of EU households), which was about 247,51 billion litres in 2015.

EU households that use a dishwasher therefore saved a total of 2530,83 billion litres of water compared to if they had washed their dishes by hand. That is more than the volume of water of 1 Million Olympic-size swimming pools.

Even more interesting is that if all EU households had a dishwasher – in other words, if the penetration rate was a 100% – the water saved compared to the current situation would be around 5591,83 billion litres a year only for those 15 EU countries. Estimations for EU 28 indicates that the savings would be

[3] Based on the basecase 1 from the JRC study.
[4] ~2.144.300 appliances.
[5] ~6.534.200 appliances.
[6] This number is representing the amount of water for the same amount of dishes than what can be put inside a dishwasher. 10 or 13 place setting have been weighted according to the market distribution found in the consumer behaviour study. This number is based on the study from University of Bonn made in 2006
[7] Based on the basecase 1 from the JRC study.

around 6141,82 billion litres a year for that extended geographical area – about 2.5 Million Olympic-size swimming pools.

Two conclusions can be drawn from this analysis:

The potential energy savings that can be reached by increasing the penetration rate of dishwashers is very important.

EU public policies should not only provide incentives for consumers to buy the most efficient appliances but also allow consumers to change from washing their dishes by hand to washing using a dishwasher as this is where the potential savings are the biggest. Not to mention that such combination of public policies contributes to creating more quality jobs and growth for the European Economy.

For all these reasons, CECED believes that the most efficient policy in terms of energy savings but also in terms of growth and employment would be to create the conditions for every household to be able to use a dishwasher. Such democratisation of dishwashing would be good for industry and employment, for the consumers and the quality of their living and for the environment. These calculations show that we are not in front of a zero sum game and that it is an opportunity for all.

How to achieve such democratisation?

CECED recommends that the legislators continue designing ambitious policies in which the most efficient appliances are promoted, but in parallel, keep a sufficient differentiation of products so that low income households can afford to end with washing by hand and also start saving energy and water. A wide choice of appliances to consumers, also in terms of prices, would increase the penetration rate and would *in fine* reduce the energy and water consumption of the European Union.

Please note that these calculations were made based on the double assumption that (1) households do not pre-rinse their dishes before to put them in their dishwasher and that (2) consumers use the eco-mode cycle every time.

It is clear that both assumptions are not met all of the time and that therefore the energy and water savings estimations calculated in this paper may be to some extent lower in reality. However, CECED believes that the numbers presented above provide the reader with an accurate order of magnitude of the potential savings an increase in the penetration rate of dishwashers could bring.

CECED strongly recommends that consumers do not pre-wash or rinse their dirty dishes by hand and reminds them that using the eco-cycle during the lifecycle of their dishwasher will help them to save water and energy - https://goo.gl/DLkqKU.

In order to limit the complexity of the calculations, the analysis above only focuses on the use-phase of dishwashers and does not take into account the energy and water used during the production phase and the end-of life phase. The impact of these phases compared to the use phase is however limited and does not challenge the conclusions of this document. A study made by the JRC (European Commission) in 2015 indeed shows that "the use phase clearly dominates the consumption of energy (>80%) and water (>95% of water process and >50% of water cooling)".

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