

THE TRUTH ABOUT LAUNDRY **MICROPLASTICS** **EDITION**

A pan-European report into reducing
the release of microplastic fibers from
synthetic clothing during a wash cycle

Executive Summary

The Truth about Laundry - Microplastics edition is a new pan-European report, commissioned by Electrolux, which provides the most comprehensive analysis of attitudes and behaviors towards laundry and, in particular, the impact of microplastic fibers released from synthetic clothing.

It is the second successive study undertaken, aimed at improving knowledge and furthering understanding of the environmental impact of laundry practices and, critically, what can be done to alleviate them.

The scale of the problem is significant with the United Nations Environment Programme (UNEP) estimating half a million tons of plastic microfibers are released into the ocean every year – the equivalent of almost three billion polyester shirts.⁹

The issue is prominent amongst Europeans as the majority (53%) believe strongly that microplastics do pose a serious environmental issue. However, significantly less people (41%) strongly believe it to pose a serious health risk.

In terms of positive behavioral change, the study reveals a significant reduction in wash temperatures across Europe. This is a change to be celebrated as has potentially prevented over 500,000 tons of CO₂ equivalent being released in the past twelve months. More still needs to be done however, with 58% of all households continuing to mainly wash 40°C and above. On the subject of microplastic fibers, awareness and understanding of what materials are made of is very low.

There is also confusion over language, in particular what 'synthetic' means and a lack of fiber knowledge, both of which contribute to practices which are harmful to clothes and to the environment:

- 94% of Europeans do not know the amount of plastic contained in clothes with the vast majority underestimating the amount by nearly half.
- The majority of adults are unaware that the most commonly used synthetic fibers are forms of plastic. For example, over two thirds (69%) did not know Nylon is plastic and nor did 63% correctly label Polyester.

People are, on the whole, aware of the benefits to changing laundry behaviors, even if they have yet to adopt them. In fact, 58% of people would buy a microplastic filter to reduce the release of plastic fibers during laundry, a positive sign that people are willing to find solutions. With 38% believing consumers can play a key role in reducing the release of microplastics, there is much that can be done to bring about positive change.

Helping people to understand what materials are actually made from could help address the growth of fast fashion. Simplifying language and care instructions could help people to care for their clothes more accurately and effectively. Encouraging people to step outside of default laundry practices could continue to reduce the release of both CO₂ equivalents and microplastic fibers.

Background to the study

The Truth about Laundry - Microplastics edition was commissioned by Electrolux, a global leader in household appliances.

In 2021 Electrolux published The Truth About Laundry, one of the largest pan-European studies conducted into attitudes and behaviors towards laundry. It revealed the true extent of laundry practices and, their often, detrimental impact, on the environment. It also revealed, for the first time, detailed analysis of the wash cycle at different temperatures using different detergents and their resulting effects on global warming potential.

This report builds on that previous work. It revisits specific attitudes and behaviors to see if any change has occurred within the course of a year. It also, for the first time, focusses on a major challenge facing the environment – the release of microplastic fibers from synthetic clothing, into the world's waterways.

One of Electrolux's key sustainability priorities is to help make clothes last twice as long, with half the environmental impact. Helping to reduce the release of microplastic fibers from synthetic clothing during the laundry process is a key component.

The aims of this study included understanding awareness of synthetic fibers and their potential impact on the environment; gaining insight into whether people recognize the behaviors that might be contributing to the release of microplastics during the laundry process; and identifying what might be done to reduce the resulting environmental impact.

A recognized sustainability leader in the appliance industry, Electrolux has won many awards for its commitment and performance¹, including the A score for its actions on Climate and Water by CDP and inclusion in the Dow Jones Sustainability World Index every year since 1999.

¹ <https://www.electroluxgroup.com/sustainabilityreports/2021/>

Methodology

To inform the direction and content of the study, Electrolux first commissioned a review of existing research and commentary on laundry, garment care and microplastic fibers from synthetic clothing. The review covered newswires, news sites, industry news and commentary, and research from relevant brands and environmental organizations. Using the analysis, it then commissioned new research.

The findings in the study are based on quantitative data collected from **15,000** adults across fifteen European markets. OnePoll, a survey-led market research company – managed the research in collaboration with Electrolux and its partners. The survey was fielded between 15th October 2021 and 10th November 2021 with data collected in the following countries: Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Poland, Portugal, Russia, Spain, Sweden, Switzerland, and the UK (general population).

The data was weighted for each country to ensure accurate representation by age, marital status, income/social class, ethnicity and religion. For a statistic of 50% the margin of error for sampling on a sample of 1000 respondents is $\pm 3.1\%$. For smaller or larger statistics, the margin of error will decrease and falls to 1.9% for a statistic of 10% or 90%. This is based on all countries having 1000 respondents per market. This margin of error is small making the data highly reliable.

Foreword by Sarah Schaefer

VP Sustainability Europe, Electrolux

This is the second report we have commissioned, in as many years, into laundry attitudes and behaviours across Europe. The first, *The Truth About Laundry*, was a broad analysis aimed at furthering understanding of how we might care for our clothes in ways which extend clothing life and, therefore, create positive environmental impacts. It included, for example, the first analysis of what lowering temperature and detergent choices have on climate change, highlighting the enormous difference washing at 30°C can make to reducing CO₂.

For this study, we broadened our base from twelve to fifteen countries and from 12,000 respondents to 15,000. We repeated a certain number of questions, to monitor any changes but we also shifted our focus to the study of microplastic fibers from laundry.

The world cannot escape the impact of microplastic pollution; not only in terms of its impact on marine ecosystems, but also increasingly, on human life – a subject which research is only just starting to get to grips with. We can't change society's dependence on synthetic materials in the short term, but through research like ours, we may be able to reduce its negative impact on the planet.

During the study, we found news to celebrate. The number of European households mainly washing at 40°C and above over the past twelve months reduced by 5% during the last year, equating to saving over 500,000 tonnes of CO₂ equivalent. That's about the same benefit as removing nearly 110,000 petrol cars from the road. It's positive news and, together with other analysis, shows there is a real willingness from the majority of people to do more to protect the environment.

But, as ever, there is still much more we can all do and, when it comes to microplastic fibers, it seems one of the small steps we can take is to further our understanding of the materials we are buying and wearing and then how best to care for them.

At Electrolux, we want to give people opportunities to make sustainable choices in their homes every day. This is why we want to raise awareness of the effects that of microplastics fibers pollution has on the environment and what we can all do to reduce this by changing our laundry habits. I hope this report helps to inspire real change and contributes to the ongoing conversation how we together reduce our environmental impact.



A stylized, handwritten signature in black ink that reads 'Sel Schaefer'.

Sarah Schaefer

VP Sustainability Europe,
Electrolux

Microplastics and synthetic fibers

Microplastics are pieces of plastic material smaller than 5mm that come from a variety of sources: directly released in the environment as small particles (Primary microplastics) or originated from degradation of larger plastic objects (Secondary microplastics)^{2 3}.

Once in the environment, microplastics do not biodegrade and their continued release contributes to permanent pollution of our ecosystems and food chains⁴.

As an emerging field of research, not a lot is known about microplastics and their impacts yet, but recent studies demonstrated several negative effects of microplastic fibres on aquatic organisms (tissue damage, reduced growth, and body condition and even mortality) and potential risk for human being^{5 6}.

Primary microplastics are purposefully manufactured to carry out a specific function. They include certain cosmetics, hand cleaners, air blast cleaning media, and plastic beads manufactured specifically for this purpose (e.g., abrasive particles, powders for injection molding). Nurdles or pre-production pellets and resin beads are bulk transported between manufacturing sites. They are produced separately and melted down for use by plastics producers (plastics pellets), by manufacturers of household products (personal care products and cosmetics), for ship and building cleaning (abrasive powders), and in manufacturing (powders for injection molds and 3D printing)³.

Secondary microplastics represent the results of wear and tear or fragmentation of larger objects, both during use and following loss to the environment (e.g. textile and rope fibers, weathering and fragmentation of larger litter items, vehicle tire wear, paint flakes)³.

The volume of cellulosic (natural and regenerated) and synthetic fibers entering the oceans every year has been estimated to range between 8,000 and 520,000 metric tons⁷.

Microplastics from synthetic fibers are a distinct sub-category of the microplastics family, spanning a wide range of sizes (roughly 3 to 30 micrometers [μm] in width) and originating mainly from clothing and textiles. They comprise various synthetic polymer materials (e.g. polyester, nylon, spandex, PLA-poly-lactic acid)³.



² Wright, S.L., Thompson, R.C., Galloway, T.S. (2013) The physical impacts of microplastics on marine organisms: A review, *Environmental Pollution*, Vol. 178, 483-492

³ <https://www.europarl.europa.eu/news/en/headlines/society/20181116STO19217/microplastics-sources-effects-and-solutions>

⁴ ECHA <https://echa.europa.eu/hot-topics/microplastics>

⁵ Rebelein, A., Int-Veen, I., Kammann, U., Scharsock, J.P.(2021) Microplastic fibres – Underestimated threat to aquatic organisms? *Science of the Tot Envir*, Vol. 777

⁶ Toussaint, B., Raffael, B., Angers-Loustau, A., Gilliland, D., Kestens, V., Petrillo, M., Rio-Echevarria, I.M., Vanden Eede, G. (2019) Review of micro- and nanoplastic contamination in the food chain – *Food Add.&Contam.: Part A*, 35(5):1-35

⁷ UNEP From Pollution to Solution. A Global Assessment of Marine Litter and Plastic Pollution

Size of the microplastic problem

Total plastic entering the marine environment

12.2
Million Tons per annum

Beaches = **5%** of total

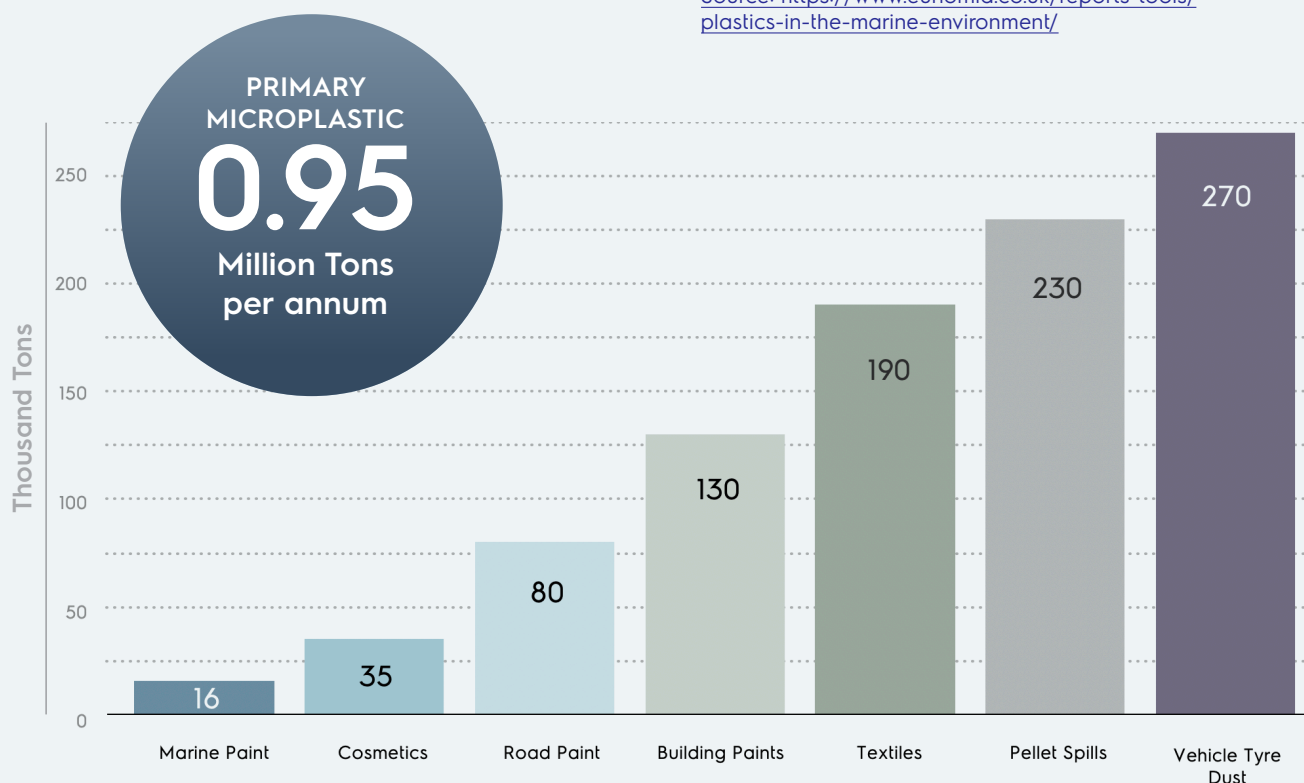
Ocean Surface = **1%** of total

Sea floor = **94%** of total

Research into microplastics and their impacts is on-going and, as stated, it is an emerging field. There is little to no universal consensus over data. Studies and the boundaries within which they operate are different and therefore being able to exactly pinpoint the size of the problem is impossible. However, below are listed some of the most current and widely referenced data points.

A report in 2016, found four sources of microplastics accounted for 1.3 million metric tons (Mt)—or 11%—of total ocean plastic pollution. These were the breakdown of plastic fibers caused when synthetic textiles are washed; microbeads used in personal care products such as face scrubs; plastic pellets, also known as nurdles, that are used in the production of almost every plastic item; and the wear and tear of car tires, with this final source making up more than three quarters (78%) of microplastic pollution in the ocean⁸.

Source: <https://www.eunomia.co.uk/reports-tools/plastics-in-the-marine-environment/>



⁸ <https://www.pewtrusts.org/en/research-and-analysis/articles/2021/03/30/microplastics-are-a-big-and-growing-part-of-global-pollution>

Microplastic pollution from synthetic fibers

A recent study discovered that 73% of microfiber pollution in formerly pristine Arctic waters is from synthetic fibers that could be coming from textiles. Microplastics have also been found in the placentas of unborn babies, affecting the human body in ways that are not yet fully understood⁹.

"As the world population grows, greater numbers of synthetic fibers will be produced and washed. The annual releases of plastic fibers will increase, and so will their impact on the environment. Animals which previously contained only a few fibers will be exposed to many, many more, and those that suffered increased mortality or other negative impacts will be more dangerously affected".

Natalie Welden, Research Associate:
Marine Pollution/Ecotoxicology/Microplastics,
The Open University.

According to the UNEP, there are already an estimated 1.4 million trillion plastic fibers in the ocean which are a direct consequence of the hundreds and thousands of fibers that are present in clothes¹⁰.

It is therefore estimated that 5.6 metric tons of synthetic microfibers were emitted into the environment from clothes washing between 1950 and 2016, with a 12.9 per cent growth rate during the past decade. This figure is likely to be an underestimate given the poor understanding of the quantities involved in the emission pathways from clothing production, use and washing, along with emission and retention rates during washing, wastewater treatment and sludge management¹¹.

The UNEP stated laundering alone causes around half a million tons of plastic microfibers to be released into the ocean every year – the equivalent of almost three billion polyester shirts¹⁰.

Several initiatives around the world are evaluating microplastic fiber (MP) release from different perspectives: from the fabric nature and structure to washing conditions, in order to establish basic elements towards a harmonized test method to evaluate MP release.

⁹ Changing Markets Foundation Fossil Fashion 2021

¹⁰ <https://www.unep.org/news-and-stories/story/fashions-tiny-hidden-secret>

¹¹ <https://www.unep.org/resources/pollution-solution-global-assessment-marine-litter-and-plastic-pollution>

Determining the amount of microplastics released during laundering

Measuring the amount of microplastics rejected in every wash cycle is a quite complex topic as there are a number of variables which influence the release process.

Firstly, microplastic shedding is related to the type of fabrics used in garments e.g. fiber composition and structure, yarn construction, quality and age of fabrics and manufacturing process.^{12 13 14}

In addition, different washing cycles, chosen by consumers, could affect microplastic release: e.g. cycles factors as time and temperature, type of detergent, water: fabric ratio.^{11 15 16}



For examples, Lassen et al (2015)¹⁷, estimated 300/1500 mg of microplastics loss per kg of synthetic textiles per wash in real life situations

Another literature review, that has been commissioned by APPLiA, estimated that roughly 20-500 mg/kg MFs are released from polyester textiles during laundry (for a domestic full-scale washing machine in Europe; excluding the values of the MF release during the first wash cycle)⁹. The values of De Falco (2019)¹¹ align with each other and represent an estimation of ca 30-50mg/kg microplastic fiber release on average and reaching plateau levels of ca 10-15 mg/kg after 10 wash cycles.

Another study showed that a new garment may shed as many as 8 times more microfibers than the same garment after 5 washes. After that, microfiber release stabilizes at a much lower level.¹⁸

¹² RISE literature review (2020)

¹³ Carney Almroth, B. M. et al. (2018) Quantifying shedding of synthetic fibres from textiles; a source of microplastics released into the environment

¹⁴ De Falco, F. et al. (2018) Evaluation of microplastic release caused by textile washing processes of synthetic fabrics

¹⁵ Yang, L. et al. (2019) Microfiber release from different fabrics during washing

¹⁶ Zambrano, M. C. et al. (2019) Microfibers generated from the laundering of cotton, rayon and polyester based fabrics and their aquatic biodegradation.

¹⁷ Lassen et al. (2015) Microplastics : Occurrence, effects and sources of releases to the environment in Denmark

¹⁸ <https://www.xerostech.com/updates/how-to-stop-the-microplastics-in-your-clothes-polluting-the-ocean>

The amount of microplastics released from synthetic materials can depend on a number of factors:

Washing	Time, temperature, detergent, softener, water: fabric ratio, equipment
Drying	Time, temperature, equipment
Polymer type	Polyester, nylon, acrylic
Yarn	Size, length, twist
Fabric	Construction, finishing, cutting, sewing
Age of garments	New, pre-owned

Reference ^{13 19 20}



¹⁹ Jönsson, C. et al. (2018) Microplastics Shedding from Textiles—Developing Analytical Method for Measurement of Shed Material Representing Release during Domestic Washing

²⁰ Rathinamoorthy, R. et al. (2020) A review of the current status of microfiber pollution research in textiles

Why are microplastic fibers released during a wash cycle?

The release of microplastics from synthetic clothing is strongly related to the fabric/yarn structure and manufacturing process. When it comes to laundry, however, the release from synthetic clothes is mainly caused by the mechanical and chemical stresses that fabrics undergo during a washing process in a laundry machine. This leads to the detachment of microfibers from the yarns that constitute the textile.²¹

What can be done?

According to a report by the Ellen MacArthur Foundation, significantly reducing microfiber release falls into two parts²². From an industry perspective, the obligation is very much on designers and manufacturers changing the way clothing is made and developing new materials. Secondly, technologies such as microplastic filters, need to be made widely available and efficient in capturing synthetic microfibers.

Various studies, including those from Leeds University²³, the University of Plymouth²⁴, Northumberland University²⁵ and reports from the United Nations Environment Programme (UNEP)^{10,11}, have also highlighted the role of consumers in helping to tackle the problem including:

1. Wash less – As many as 700,000 microfibers can be released from a single load of laundry. Washing less will reduce the amount of microplastic fibers released.
2. Keep clothes longer and wear them more often – keeping clothes for longer and wearing them more before disposal reduces microplastic release and is generally just better for the environment. According to research, the average number of times a garment is worn, before being disposed of, is ten²⁶.

3. Wash full – larger wash loads have been shown to reduce the release of microfibers, due to less friction and a lower ratio of water to fabric.
4. Wash lower – studies have shown washing at 40°C shed more fibers than washing at 30°C
5. Install a microplastic filter or use alternative devices such as washing bags and balls which have been proven to reduce microfiber release into wastewater.



²¹ The contribution of washing processes of synthetic clothes to microplastic pollution

²² <https://ellenmacarthurfoundation.org/a-new-textiles-economy> <https://ellenmacarthurfoundation.org/a-new-textiles-economy>

²³ https://www.leeds.ac.uk/news/article/4524/quicker_and_cooler_is_best_for_clothes

²⁴ <https://www.plymouth.ac.uk/news/washing-clothes-releases-thousands-of-microplastic-particles-into-environment-study-shows>

²⁵ <https://phys.org/news/2020-06-thousands-tons-ocean-pollution-habits.html>

²⁶ https://traid.org.uk/wp-content/uploads/2018/09/impacts_of_clothing_factsheet_23percent.pdf



THE FINDINGS

How serious of an issue is it for consumers?

Many studies have concluded that marine litter and plastics present a serious threat to all marine life. It is also generally accepted that, even with the need for more detailed research, human health and well-being are at risk.

As reported by the United Nations Environment Programme (UNEP) in their report “Pollution to Solution”, a global assessment of marine litter and plastic pollution:

“Human uptake of microplastics via seafood is likely to pose serious threats to coastal and indigenous communities where marine species are the main source of food. The links between exposure to chemicals associated with plastics in the marine environment and human health are unclear. However, some of these chemicals are associated with serious health impacts, especially in women.”

“Marine plastics have a widespread effect on society and human well-being. They may deter people from visiting beaches and shorelines and enjoying the benefits of physical activity, social interaction, and general improvement of both physical and mental health. Mental health may be affected by the knowledge that charismatic marine animals such as sea turtles, whales, dolphins and many sea birds are at risk. These animals have cultural importance for some communities. Images and descriptions of whales and sea birds with their stomachs full of plastic fragments, which are prevalent in mainstream media, can provoke strong emotional impacts.”



But what do people think about the issue and how serious a threat do they think it is?

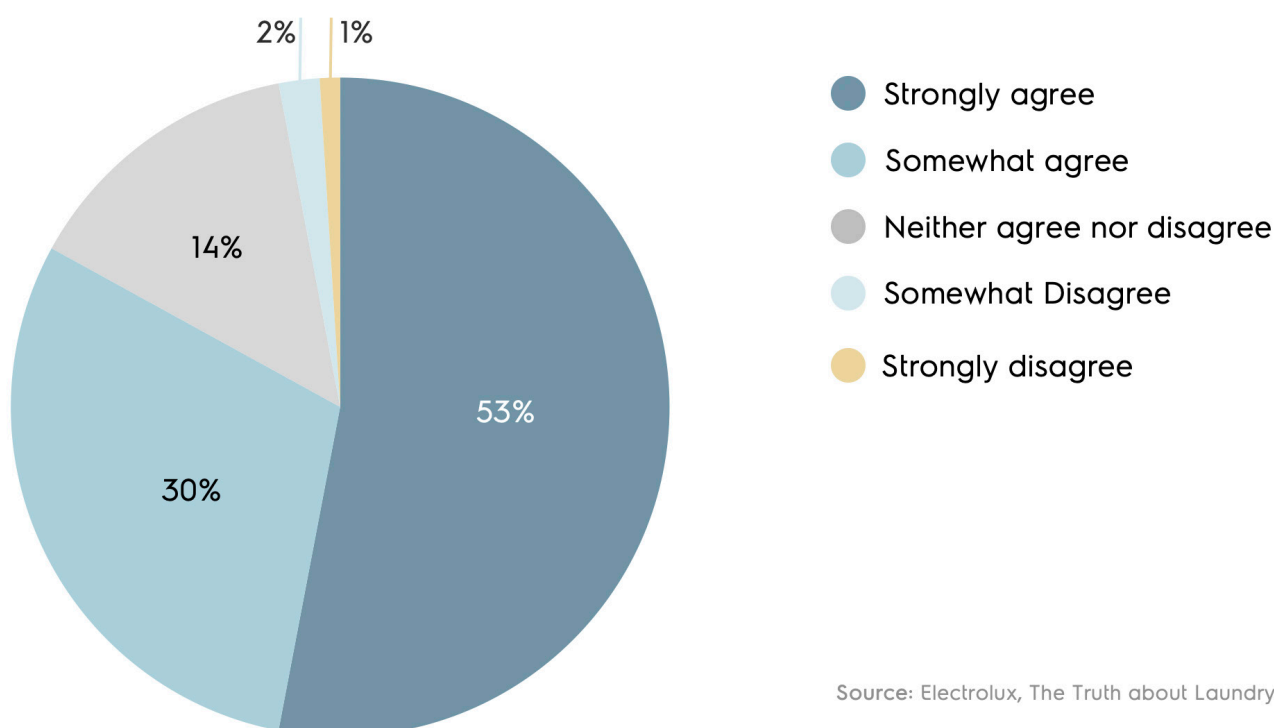
Environmental Risk?

When asked to what extent they agreed or disagreed with the following statement: 'Microplastics pose a serious environmental issue', the responses were surprising.

Just over half (53%) believe microplastics pose a serious environmental issue. Nearly a third (30%) somewhat agree and 14% are not sure. With microplastics one of the prominent topics of COP26 and with it gaining prominent media attention over a prolonged period, one might have thought a higher percentage of people would strongly agree.

With a majority believing it to pose a serious environmental threat, we then asked whether people also believed it to pose a health risk.

To what extent do you agree or disagree with the following statement:
'Microplastics pose a serious environmental issue'



Source: Electrolux, The Truth about Laundry

Health Risk?

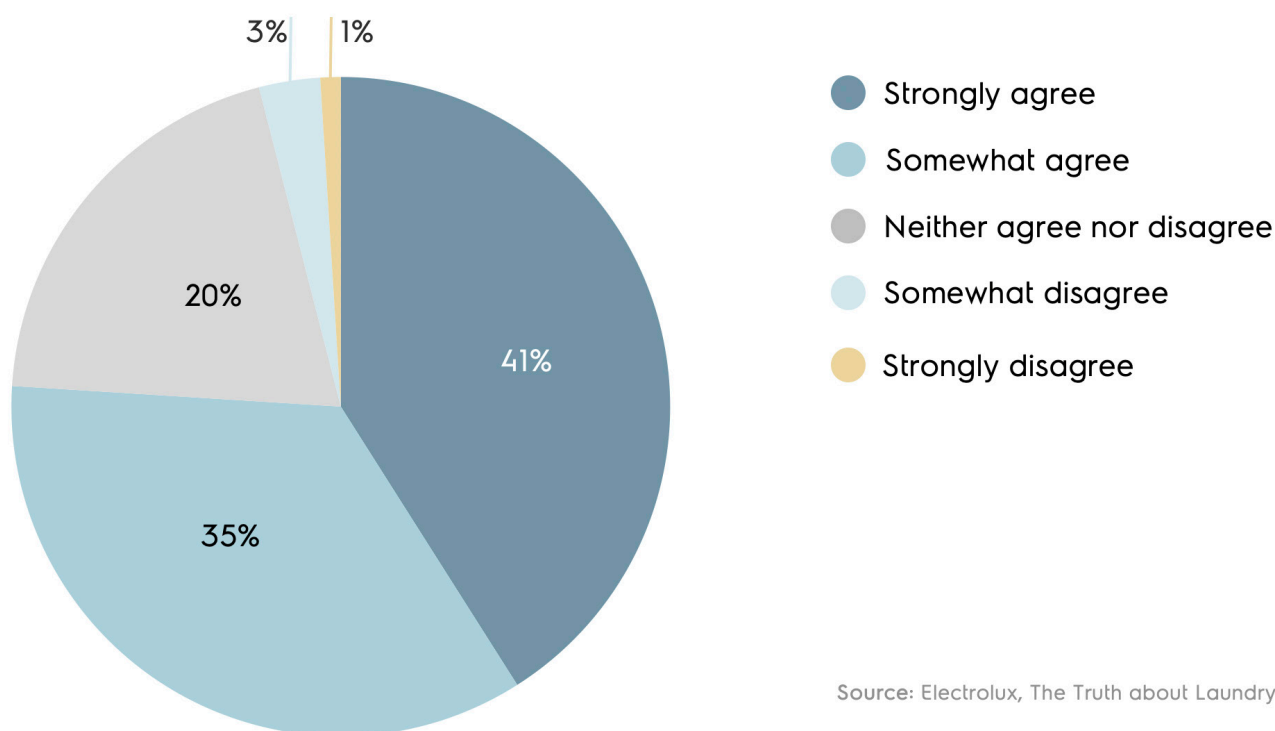
Less than half (41%) of all Europeans believe strongly that microplastics pose a serious health risk. 35% somewhat agreed while nearly a quarter (24%) either had no view or disagreed.

Without further research we can only assume why more people believe it to be an environmental issue rather than a health risk. There has certainly been widespread reporting of plastics being found in the food chain as well as, concerning, within the placenta of newborn babies.

Whether awareness of these stories is low, or this transfer is not deemed by most to be a health issue we do not know. But the results are in stark contrast to the opinion of both the UNEP, environmental NGOs and the scientific community.

The study wanted to understand consumer reactions to three questions. Do people believe the release of microplastic fibers is less of a problem for people who do not live near waterways (such as rivers, lakes, oceans etc.). Who do they think is primarily at fault for the microplastic fiber pollution and who do they think has the most responsibility to reduce/rectify the issue?

'Microplastics pose a serious environmental issue'

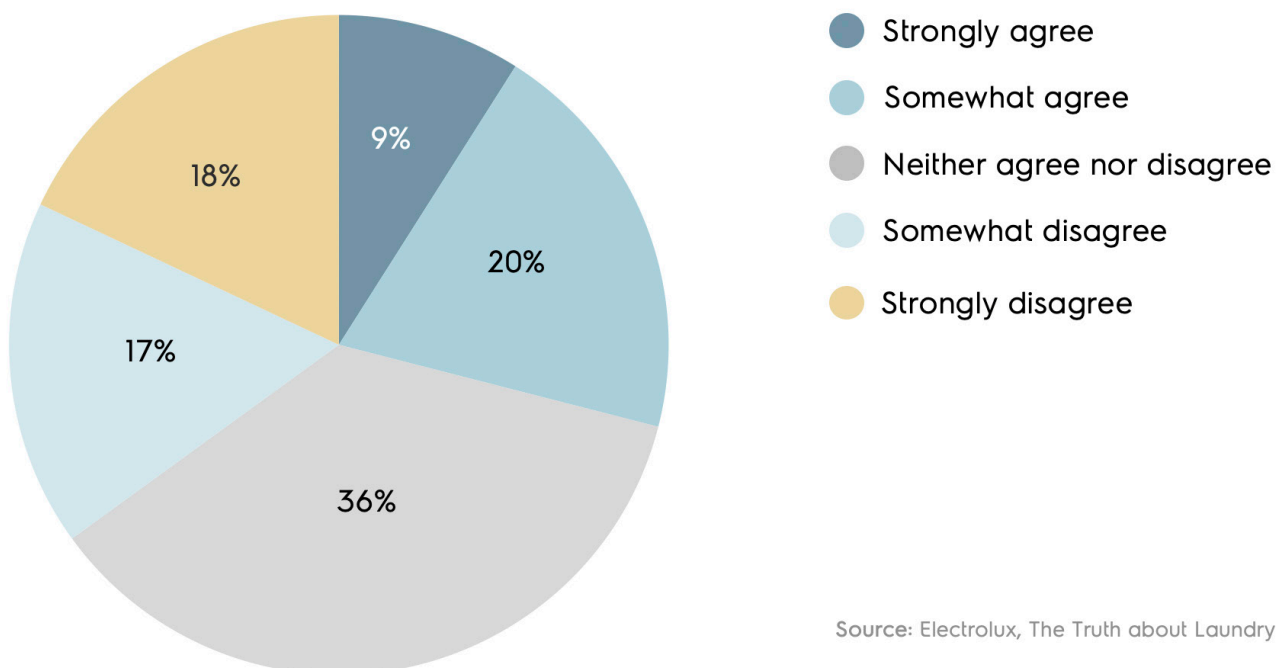


Only an issue for people who live near water?

The release of microplastic fibers from laundry is, of course, the same for every household that does laundry, regardless of where they live. But is there confusion over whether people think it is more or less of a problem for people who live near waterways?

When asked, the study found education on the issue is required with nearly two thirds of Europeans (65%) either thinking it is more of a problem for those living near water or they don't know.

To what extent do you agree or disagree with the following statement: 'I think microplastics released from laundry is less of a problem for people who don't live near water e.g. ocean, sea, river.'



Source: Electrolux, The Truth about Laundry

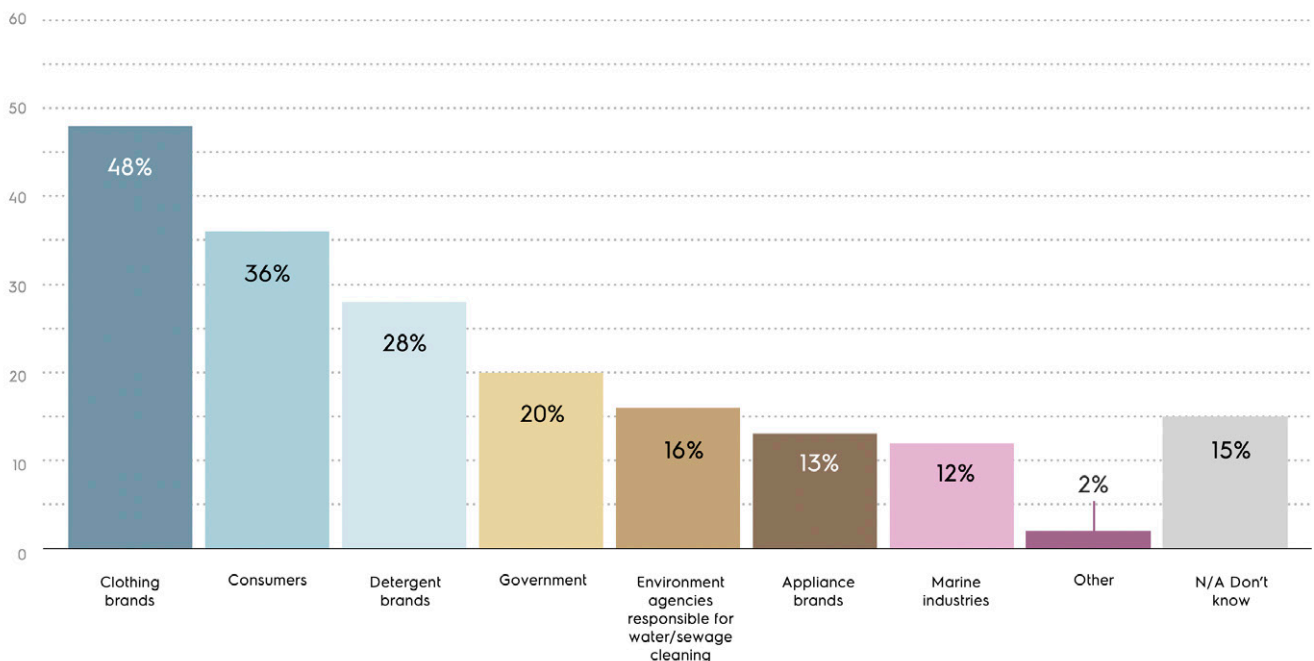
Where does responsibility lie?

The study was interested to explore who people think are primarily at fault for microplastic pollution from synthetic fibers and who they believe has the most responsibility for reducing / redressing the issue.

When asked to pinpoint who is primarily at fault, nearly half of all consumers (48%) laid the blame at the door of clothing brands (see Table 1 below).

Surprisingly 36% of all Europeans said they, consumers, were mainly at fault. 28% thought detergent brands should be doing more and 20% pointed at Government. 16% thought Environmental agencies, who have a responsibility water and sewage treatment, are culpable and 13% said appliance brands.

Table 1: Who would you say is at primarily at fault for microplastic pollution from synthetic fibers in laundry? Select up to 3 options.



Source: Electrolux, The Truth about Laundry

Who can do the most to reduce the shedding of microplastic fibers from synthetic clothes?

From accountability for the issue to obligation for doing something about it. The study then asked who has the most responsibility to reduce the amount of microplastic fibers that are released during laundry.



There were some slight but interesting differences from above. Clothing brands were again singled out (46%) as the audience with the most responsibility for positive action, potentially by creating new and innovative materials.

38% of all consumers said consumers need to do more followed by detergent brands (29%), Government (26%) and Environmental Agencies (18%). Appliance brands (16%) and Marine Industries (10%) were next in line.

While everyone has a responsibility to reduce the shedding and release of microplastic fibers from synthetic clothes, UNEP points to a specific change that must happen:

“Ultimately, the world’s dependence on synthetic materials must change to adequately reduce plastic microfiber release. But until new materials are designed, reducing shedding and capturing fibers before they enter the environment can limit potential harm to marine life and humans.” ⁵

How much plastic do people wear?

Studies have indicated that yearly consumption of fibre for apparel amounts to 69.7 million tons globally. Synthetic fibres represent almost two-thirds (60.1 %) of this consumption²⁷.

Together with the research that pinpoints the average number of times a garment is worn before being disposed of, is ten²⁸, it is therefore fairly safe to assume that the majority of people's current wardrobes contain microplastic fibers from synthetic materials.

To begin to understand awareness of the plastic in clothes, consumers were asked to estimate the amount of plastic contained in the clothes they own. 94% of Europeans are unaware of the amount of plastic in their clothes. The average percentage suggested was 35%, nearly half of the actual amount. Nearly a third (28%) estimated the amount to be less than 20% of their wardrobe while 17% said they didn't know.

The study then went on to ask whether people look at care labels to see what the garment is made of.

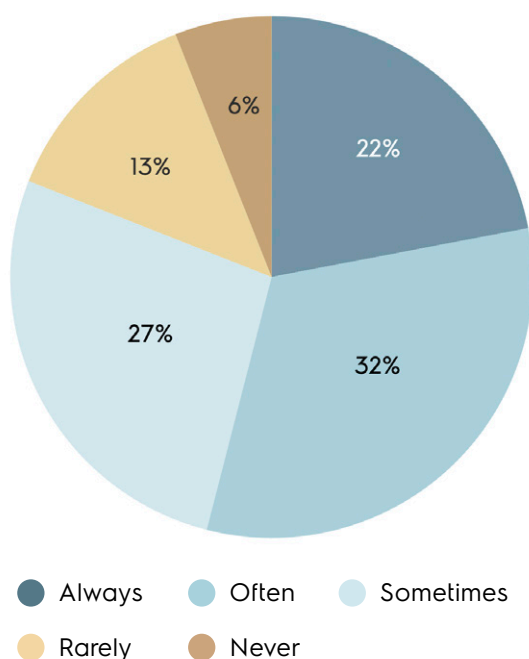
As the vast majority of people misjudge the amount of plastic in their wardrobe, it might stand to reason that people do not take too much notice of care labels.

However, over a fifth (22%) said they always check to see what the garment is made of. Nearly a third (32%) said they often look and 27% said sometimes. Only 19% said they rarely if ever look.

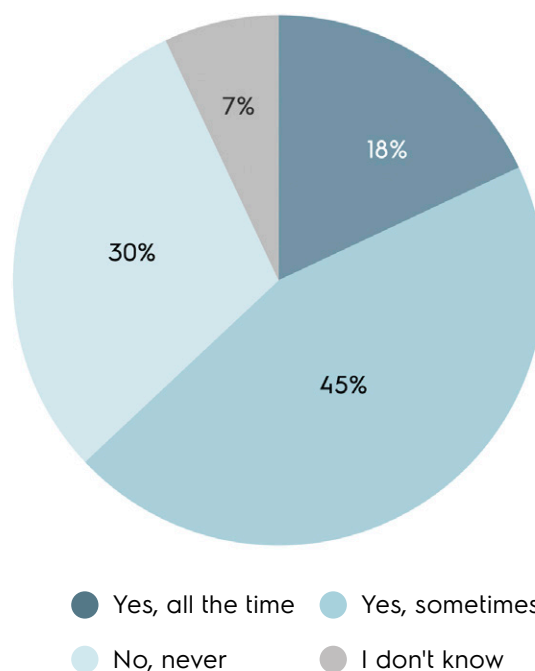
To probe further, the study asked whether people ever actively look for labels that indicate clothes are free of synthetic fibers. Again, the response was positive with nearly two thirds of respondents (63%) claiming they always or regularly check. 30% said they never check.

If people are considerably underestimating the amount of plastic in their clothes, but the majority claim to check labels for either what the clothes are made of or, for clothes free of synthetic fibers, then is there confusion over what synthetic means?

How often do you look at a care label to see what the clothes/garment is made from?



When buying new clothes, do you ever actively look for labels that indicate they are free of synthetic fibers?



²⁷ Boucher J., Friot D. – IUCN Primary Microplastics in the Oceans: A Global Evaluation of Sources (2017)

²⁸ https://traid.org.uk/wp-content/uploads/2018/09/impacts_of_clothing_factsheet_23percent.pdf

What are synthetic fibers?

Synthetic fibers are human-made fibers. They are produced by joining chemical monomers into polymers using a chemical reaction called polymerization, i.e synthetic means synthetic polymers which means plastic.

Global synthetic fiber production in 2020 was estimated to be around 68 million tons – or around 62 per cent of all fibers produced annually ²⁹.

Differentiating between fibers

The big distinction between fibers is whether they are natural or man-made. Examples of natural fibers include cotton, silk and hemp.

Within man-made fibers, it is important to distinguish between synthetic polymers (such as polyester) and natural polymers, which are also called regenerated or artificial fibers (such as rayon). But synthetic polymers are always plastic and it is this area the study wanted to probe next.

There are many different types of synthetic fiber, but the most commonly used ones are:

Polyester	It is a type of plastic derived from oil. There are many types, but the most popular is polyethylene terephthalate, or PET, which is widely used in both packaging and clothing. It is the most commonly used fiber in the world having overtaken cotton in 2002 and made up over 52% of all fibers produced globally in 2020.
Nylon	Essentially, nylon is a type of plastic – a synthetic polymer made up of polyamides. Invented in 1938, it was the world's first entirely synthetic fiber and is known for its strength and durability.
Acrylic	Acrylic is a transparent plastic material made from a petrochemical called Acrylonitrile. Acrylonitrile is the name of the main monomer used to create the polymer (which is polyacrylonitrile). Lightweight and strong, it provides very good warmth and insulation making it a popular fabric for outdoor wear, jumpers, coat linings and blankets.
Spandex	Also known as elastane and lycra®, this famously stretchy fiber is a polyurethane which comes in various forms. It is often blended with natural fibers but can also be blended with nylon.

²⁹ <https://www.commonobjective.co/article/fibre-briefing-polyester>

The fiber test

Do people know the difference between plastic, synthetic and natural fibers?

Consumers were asked to decide whether a fiber was natural, plastic or synthetic. Would they primarily associate Polyester, for example, as a plastic fiber or a synthetic one. Of course, Polyester is both synthetic and plastic but here we were looking for the first reaction. If awareness of Polyester being a plastic fiber was high, one would expect the majority to vote accordingly.

As can be seen in table 2 below, not only is there a question mark over whether people truly understand what a synthetic fiber is, there is also confusion over natural fibers.

Why does knowing more about fibers matter?

The more education and awareness around fiber composition of clothes, the greater the chance of people caring for them in a way which can reduce the shedding of microplastic fibers.

When analyzing the full set of data behind Table 2 below, certain observations can be made.

1. There is a high degree of uncertainty between what differentiates a plastic fiber from a synthetic one.
2. There is a higher-than-expected lack of knowledge over what the most common plastic fibers are – less than a third (31%) knew Nylon is a form of plastic. 63% did not know Polyester is a plastic fiber, nor could 65% of respondents correctly label Acrylic. Only 28% could say Spandex is made from plastic.
3. Natural fibers fared similarly with a fifth all respondents (20%) not able to state that cotton is a natural fiber. 28% of all respondents were unable to correctly label silk, 29% linen, 31% hemp, 45% Angora and 21% bamboo.
4. Lyocell and Rayon, which are trying to be positioned as natural-based materials, fare no better with the vast majority not opting to call them natural.

Table 2: For each of the following fibers, please select whether you think it is a natural, synthetic or plastic fiber. Select one for each row.

Fiber	Natural	Plastic	Synthetic	Don't know/ none of these
Acrylic	7%	35%	43%	15%
Angora	55%	7%	15%	23%
Bamboo	78%	4%	7%	10%
Cotton	80%	4%	8%	8%
Hemp	69%	5%	10%	16%
Jute	49%	8%	16%	27%
Linen	72%	5%	12%	12%
Lycra®	8%	22%	49%	20%
Lyocell	8%	21%	32%	39%
Nylon	10%	31%	45%	13%
Polyester	7%	37%	45%	11%
Rayon	12%	19%	37%	32%
Silk	73%	10%	5%	13%
Spandex	6%	28%	37%	29%

Attitudes and behaviors towards laundry practices

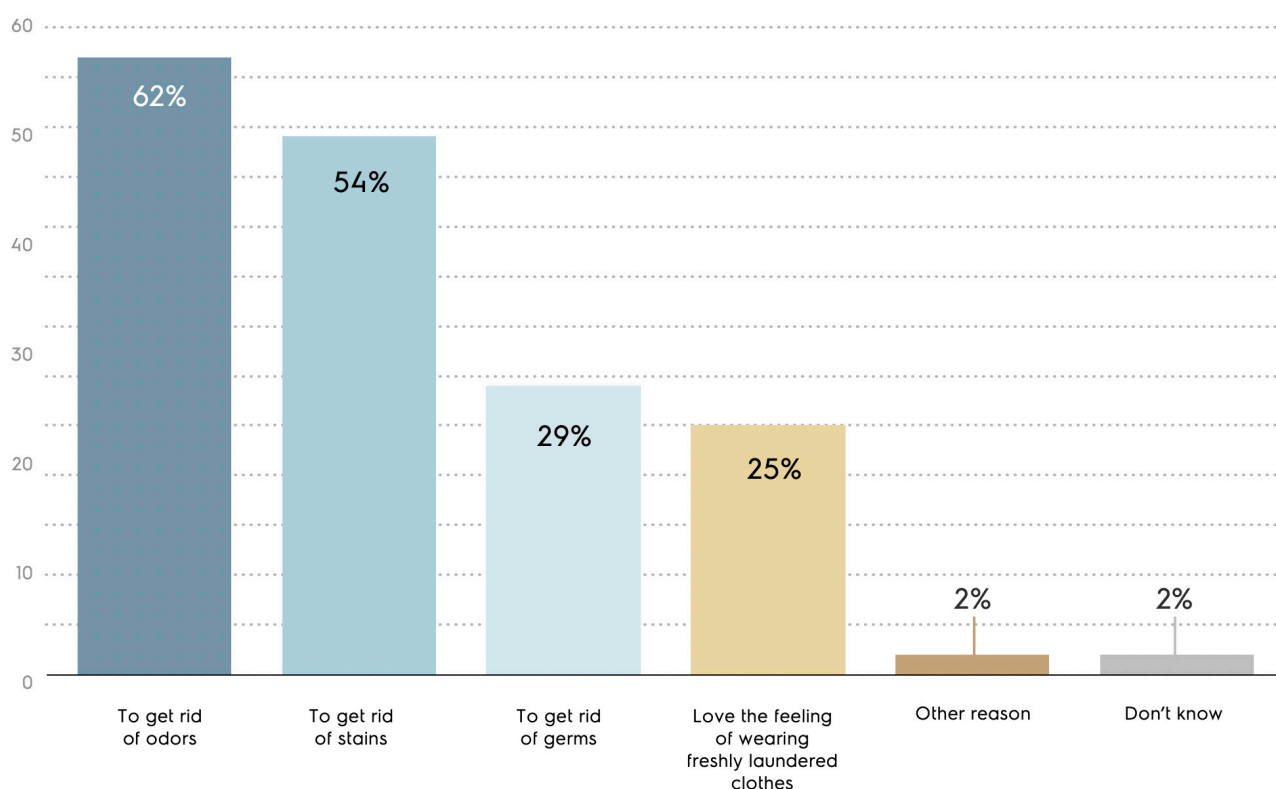
Having explored knowledge and attitudes around the subject, the study moved to specific laundry practices. These are practices which have been identified as being part of a solution to reducing microplastic fiber release from synthetic clothing.

What are the main reasons for washing clothes?

Understanding more about why people clean clothes might help identify ways and means of reducing microplastic fiber release. Particularly when seen in the wider context of other laundry practices.

When asked to provide the two main reasons why they wash their clothes, 62% of Europeans said it was to remove odors, 54% to tackle stains and 29% to get rid of germs. The percentage seeking to get rid of germs was a marked increase from research undertaken in 2020 (14%). 25% of all adults mainly washing clothes because they like the feeling of wearing freshly laundered items was in line with 2020 (26%).

What would you say are the main reasons you wash clothes? Select up to 2 options



Wash temperatures

As reported, studies have shown there is a direct link between higher wash temperatures and an increase in microplastic fiber release from clothing. The Truth About Laundry³⁰ also, for the first time, revealed the impact on global warming potential from wash temperatures. It showed that over 60% of the 12,000 Europeans studied still, mainly, washing at 40°C and above. If every household, that washed at 40°C, switched to 30°C, the potential saving would be the equivalent of nearly 5m tons of CO₂, every year.

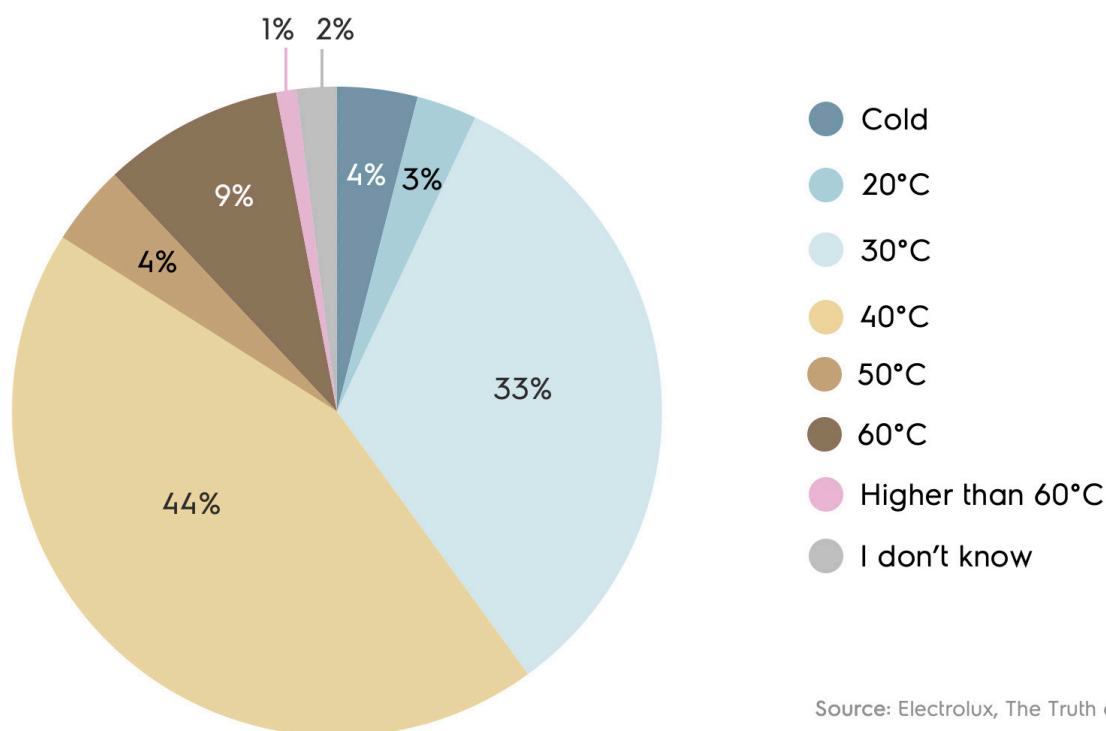
This study was interested to see if behaviors had changed.

The results show a significant decrease in the number of people washing at 40°C and above. In 2020, the percentage of households washing at 40°C and above was 63%; one year later it is 58% representing a 5% decrease across Europe.

The switch appears to mainly be from 40°C to 30°C as the percentage of adults who wash at temperatures above 40°C has only decreased by 1% (15% vs 14%).

By applying previous analysis from Electrolux, contained in The Truth About Laundry, it is possible to identify the potential CO₂ equivalent saving from this switch to lower temperatures.

When doing your laundry, what temperature do you use the most?



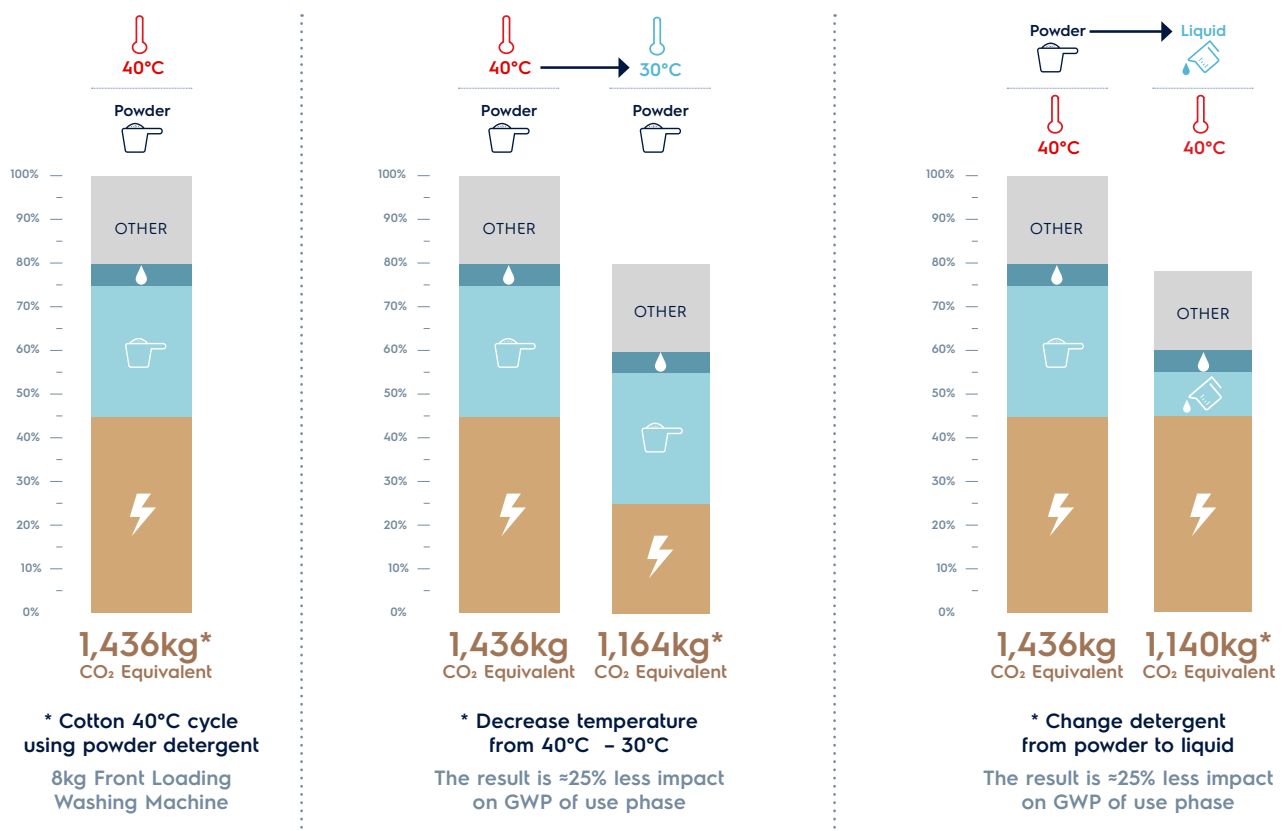
Source: Electrolux, The Truth about Laundry

³⁰ https://admin.betterlivingprogram.com/wp-content/uploads/2021/02/Electrolux_TheTruthAboutLaundry_WhitePaper-1.pdf

Wash temperatures continued

Electrolux established that reducing wash temperature from 40°C to 30°C would save over 27kg of CO₂ equivalent, per household, per year (see illustration 1 below). Applying this to the 5% decrease would equate to a potential saving of approximately 506,424 tons of CO₂ equivalent over a twelve month period.³¹

Illustration 1: Global Warming lifecycle impacts vs key factors in use phase of a washing machine. Source: The Truth About Laundry



³¹ Based on 375,129,035 households across Europe, including Russia, washing an average 4.2 loads per week

Wash temperatures continued

Table 3 below shows the results from asking respondents to specify the wash temperatures for a range of clothing types. The majority of wash temperatures are 40°C and above. Of particular note, are the wash temperatures for jeans (56% washing at 40°C and above), outdoor wear (51%), woolen items (26%) and clothes made of synthetic fibers (41%).



Table 3: What temperature do you normally wash the following items at?

Garment type	Cold	20°C	30°C	40°C	50°C	60°C	>60°C	N/A	I don't know
Cotton T-shirts	6%	5%	34%	39%	4%	7%	1%	1%	4%
Jeans	4%	4%	30%	40%	6%	9%	2%	2%	4%
Regular underwear	4%	4%	25%	34%	6%	20%	3%	1%	4%
Sportswear	4%	4%	29%	36%	7%	10%	2%	5%	4%
Outdoor wear	4%	4%	32%	36%	6%	8%	2%	3%	6%
Clothing made from Synthetic fibers	6%	6%	36%	30%	5%	5%	1%	4%	7%

What would encourage people to wash at lower temperatures more often?

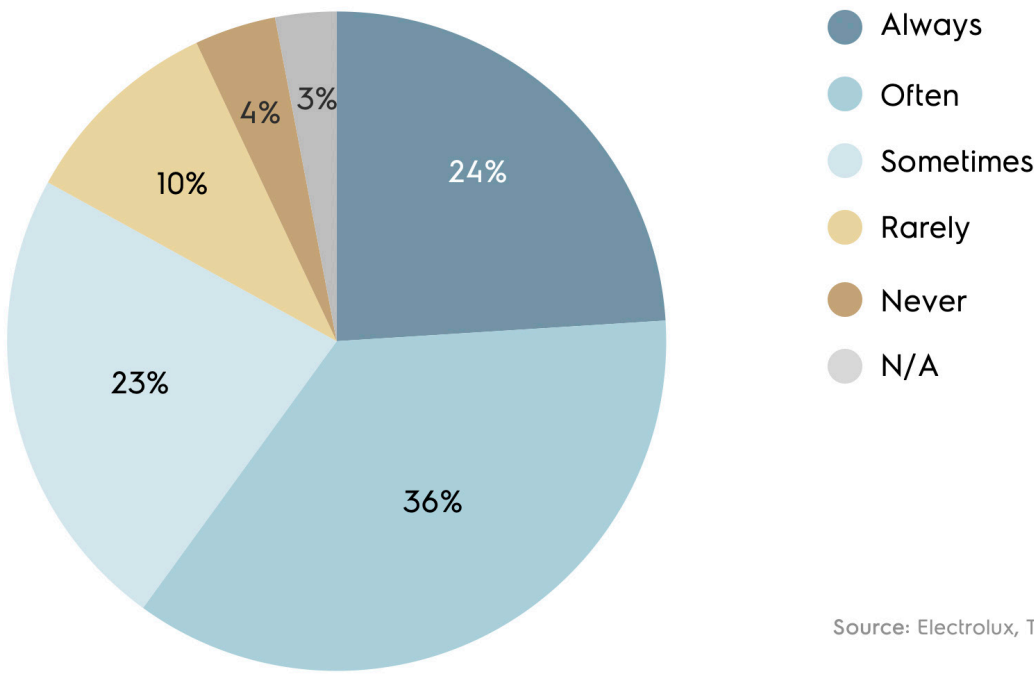
Given a range of options to choose from, Europeans said the following benefits would encourage them to wash at lower temperatures more often:

1. If it made clothes last longer	(37%)
2. If it saved money	(35%)
3. If it reduced energy	(33%)
4. If it reduced the release of microplastics	(31%)
5. If it reduced CO2 emissions	(20%)
6. None of these	(8%)

Interestingly, reducing wash temperatures more regularly, delivers each of the benefits above. Lower temperatures have been proven to increase clothing life which includes reducing the shedding of microplastic fibers. It has been proven to save money, reduce CO2 emissions and reduce energy consumption accordingly.

If lowering wash temperature is a desired outcome, then turning to care labels might be part of the solution. The study showed 84% of all adults do read care labels when doing the laundry, albeit with nearly a quarter (24%) saying 'always'. If more labels indicated lower wash temperatures, it potentially could help deliver positive change.

How often do you follow the washing instructions on the care label?



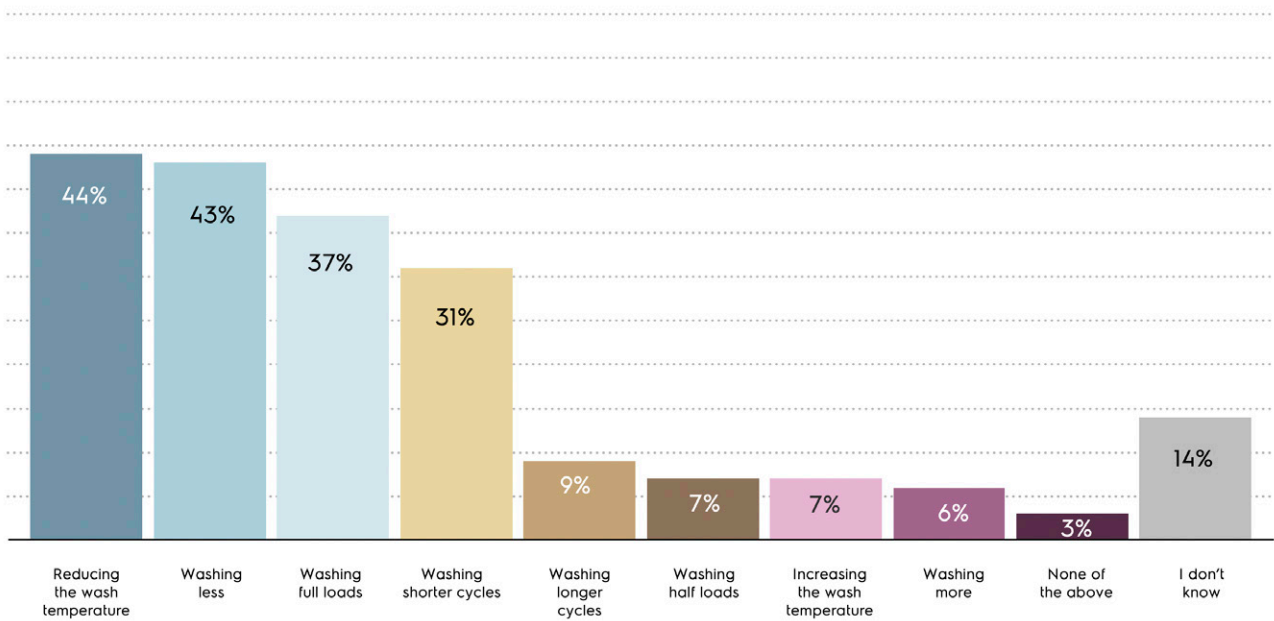
Source: Electrolux, The Truth about Laundry

Continued

If lowering wash temperature is a desired outcome, then turning to care labels might be part of the solution. The study showed 84% of all adults do read care labels when doing the laundry, albeit with nearly a quarter (24%) saying ‘always’. If more labels indicated lower wash temperatures, it potentially could help deliver positive change.

The study then asked, which practice would help reduce the release of microplastic fibers from laundry (Table 4 below). Reducing wash temperature (44%), washing less (43%), washing full loads (37%), and washing shorter cycles (31%) were the top four choices and mirror the key behaviors required to change. One interpretation of the results is that there is awareness of the changes people should make, but there is a reticence to make them.

Table 4: Which of the following do you think would help to reduce the amount of microplastics released during a laundry wash cycle? Tick all that apply.



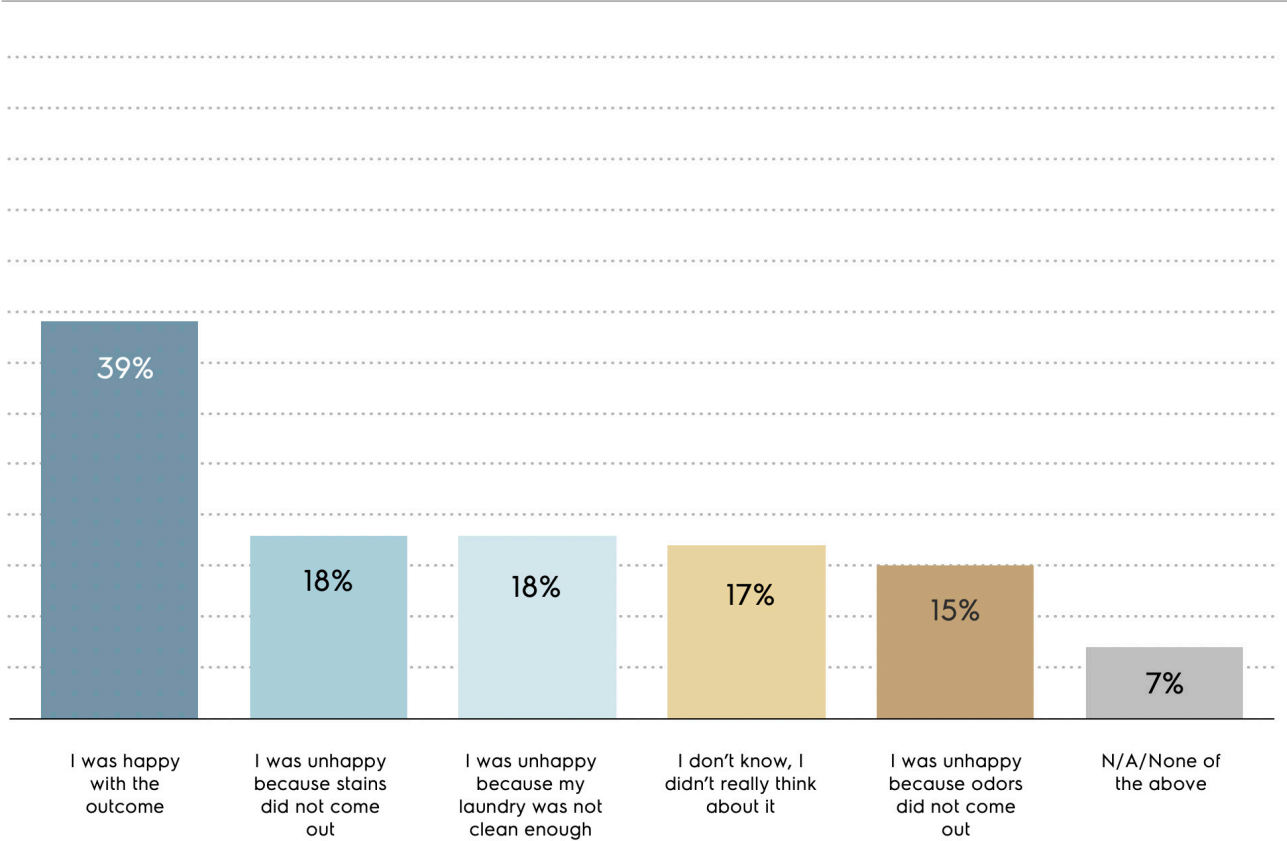
Source: Electrolux, The Truth about Laundry

Why is there a resistance to lowering wash temperatures?

When asked what their main recollections were of washing at 30°C or lower (Table 5 below), 39% said they were happy with the outcome, in line with the percentage of people who regularly wash at those temperatures. For the remainder, the issues are in cleaning effectiveness with 18% claiming stains were not tackled, 18% generally unhappy with the laundry not being clean enough and 15% believing it did not tackle odors.

17% though stated they don't really think about A behavior, referenced in the Truth About Laundry, as 'the default wash'. Laundry can often be a low involvement 'chore' where not much active thought is given to it. This can result in using a default mode - e.g. the same temperature, the same settings etc. regardless of material and clothing type.

Table 5: Please think back to the last time you washed at 30 degrees or lower. Which of the following describe the outcome?



Washing less

Reducing the number of times an item of clothing is washed is not only better for the garment, as it increases clothing life, it is also better for the environment. It reduces water and energy usage and lessens the shedding of microplastic fibers. Washing clothes less is also a message which has been publicly advocated by many of the world's leading fashion brands, celebrities and designers including Levi's³², Stella McCartney and Victoria Beckham.

The study asked respondents how often they would wear seven specific types of garment / material before washing it. Responses were then averaged. The data provokes further questions such as, if one could encourage the majority of people to wear jeans one more time before washing, the positive environmental impact would be sizeable.

Cotton T-shirt:	2.9 times
Jeans:	4.9 times
Regular underwear (including bras):	2.1 times
Sportswear:	2.4 times
Outdoor wear:	5.4 times
Woolen items:	4.1 times
Clothing made of synthetic fibers:	3 times



³² <https://www.independent.co.uk/life-style/fashion/levi-s-ceo-explains-why-you-should-never-wash-your-jeans-a6881031.html>

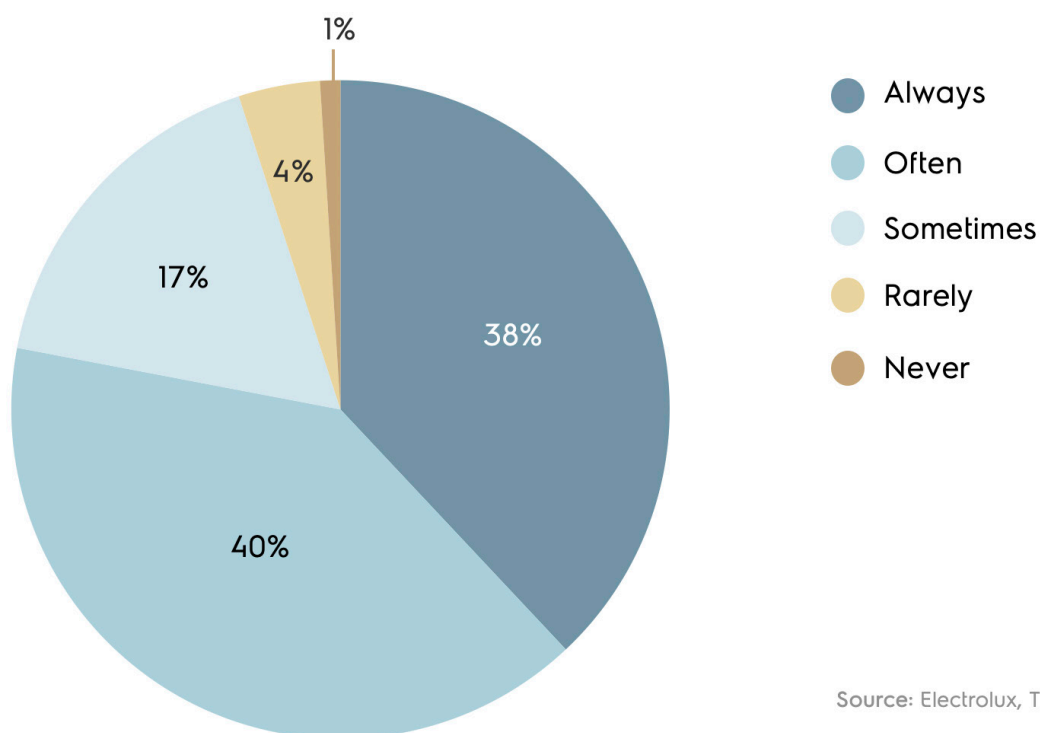
Frequency of washing and full loads

The average number of loads per week was found to be 2.9 with nearly a third of households (32%) washing 4 or more loads a week.

When asked how often the loads were full, 38% replied 'always' and 40% said 'often'. Only 5% replied rarely to never.

It is often not possible to 'always' wash full loads, but increasing frequency will reduce water usage, and, critically, reduce the release of microplastic fibers from synthetic clothes.

Thinking about when you do the laundry, how often do you a wash that is a 'full load'?



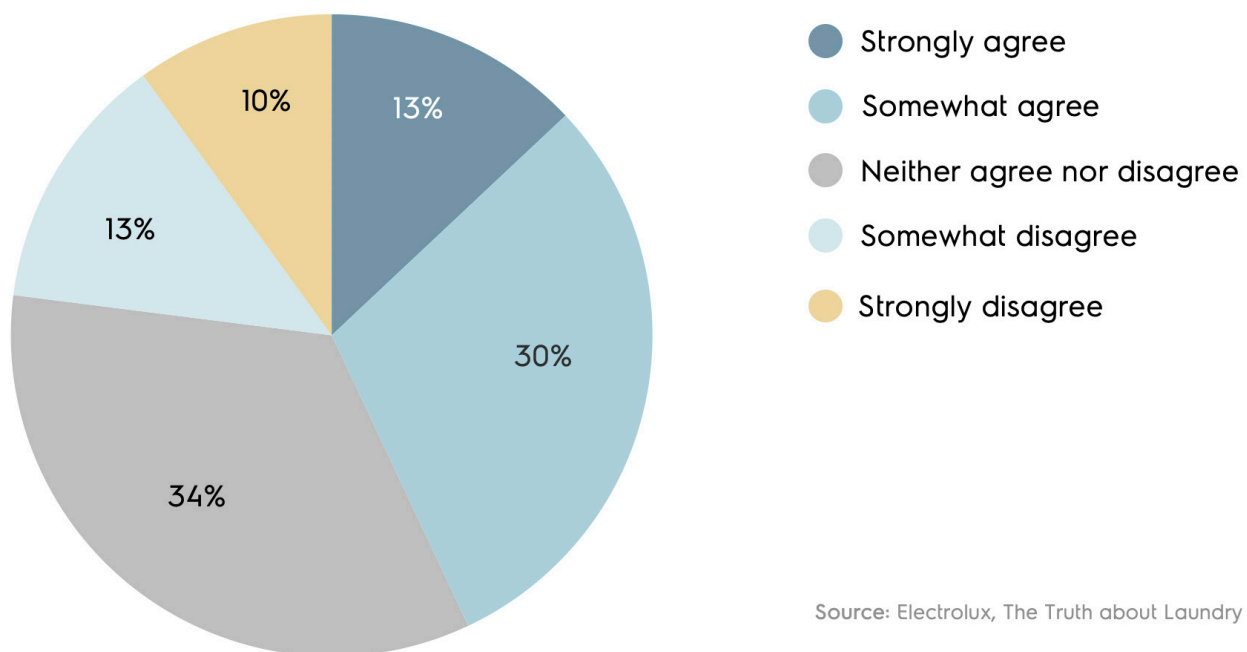
Source: Electrolux, The Truth about Laundry

Emotional engagement is on the increase

The question of guilt was first raised in The Truth About Laundry as a means of understanding the level of emotional engagement in doing the laundry. In 2020, 37% of 12,000 respondents said they did feel a degree of guilt about the impact on the environment from doing the laundry. For this study the percentage has increased to 43%, a statistically significant increase across Europe. Those who 'strongly' agreed increased by 3% from 10% to 13% and 'somewhat agreed' saw a 4% increase, representing millions of households. The biggest change was with those who 'strongly disagreed' – declining from 16% to 10%.

It is not possible to say whether there is a direct relationship between the increase in the number of people washing at colder temperatures and this increasing sense of responsibility, but they are both signs of positive change.

To what extent do you agree or disagree with the following statement?
'I often feel guilty about the impact that doing laundry has on the environment/planet'



Source: Electrolux, The Truth about Laundry

How well do people know their appliances?

The Truth about Laundry³⁰ established 63% of all washing machines were less than 5 years old. Taking into consideration market and appliance variations, the majority of these appliances will have multiple settings.

The study asked whether people choose the most suitable program on the washing machine and 53% said 'yes'. 32% also reported learning their laundry habits from a previous generation.

With this level of active involvement, the study then asked how many settings people actually use on their machines. 44% reported using one to two settings and a further 33% reported using up to four.

With 77% of all European households therefore using an average of 3.1 settings on their appliances, the idea of a default approach to doing the laundry becomes quite plausible. Particularly with a third of potentially adults using outdated practices handed down to them.

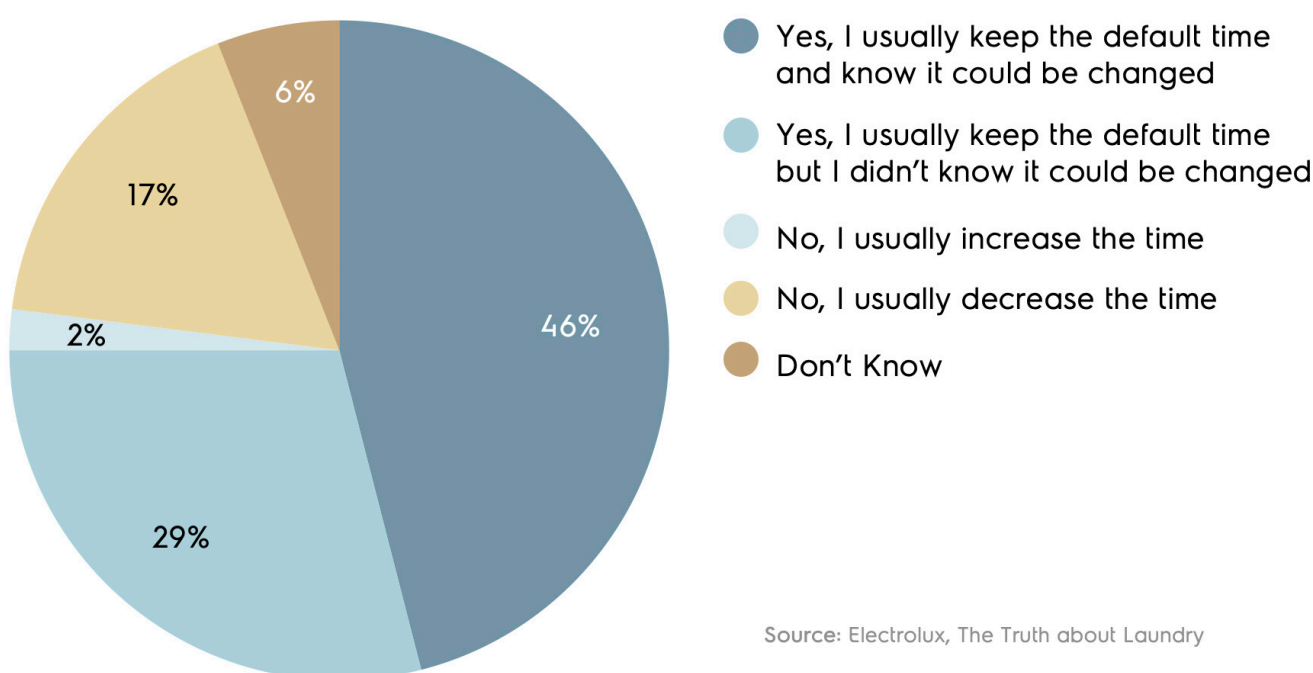
Encouragingly, 16% of those polled reported hearing or reading about better ways to wash/dry their clothes and a further 32% claimed to be trying to wash clothes in more environmentally friendly ways.

Studies²³ have shown that reducing time and temperature in laundry could have a significant impact in terms of increasing clothing life and reducing the shedding of microplastic fibers into the environment

Many appliances provide the option for reducing wash time. But how many people are either aware of it or make use of it?

From the research, 46% of adults keep the default time and know that it can be changed. 29% keep the default time but didn't know it could be changed. Only 17% of adults actively decrease the time pointing to a potential opportunity to deliver positive change.

Do you keep the default time when you choose a washing program?



Source: Electrolux, The Truth about Laundry

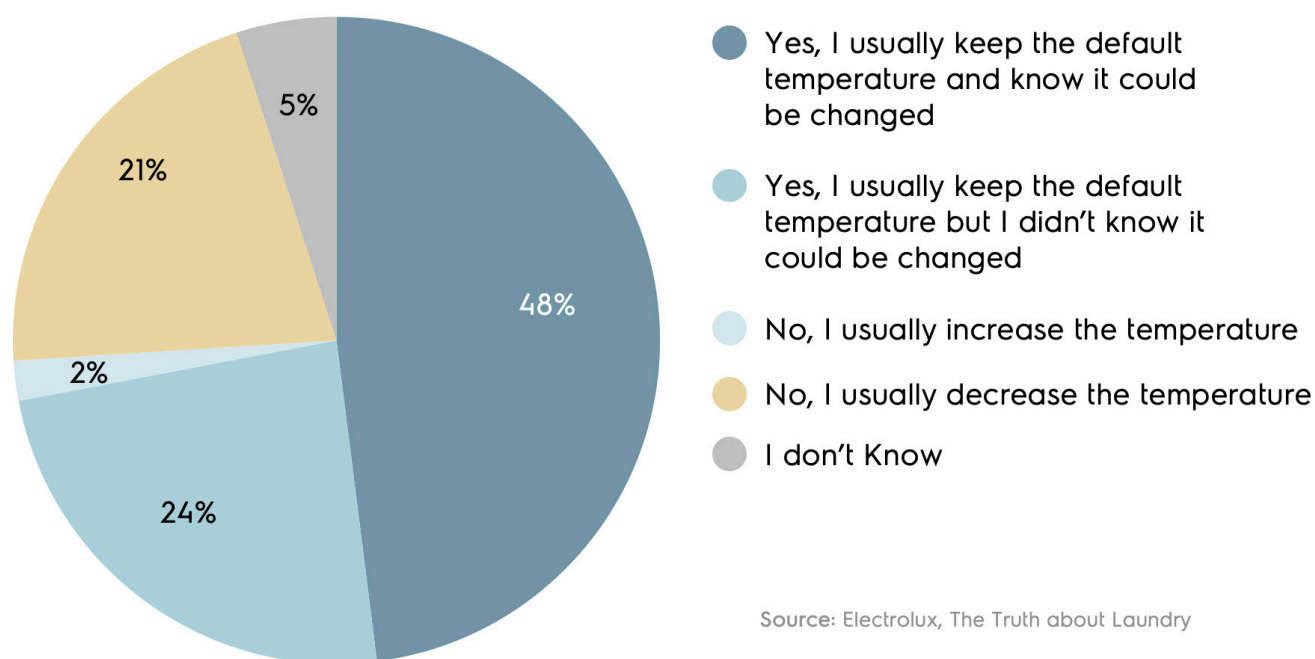
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If nearly a third of consumers don't know it's possible to change the time on their appliance, how many would know it's (a) possible to change the wash temperature and (b) change it

Similar to wash time, 48% of people know the temperature can be changed but choose to stick with the default – which, in many countries, is 40°C.

Nearly a quarter of all adults however (24%) do not know the temperature could be changed. Encouragingly, over a fifth (21%) choose to decrease the temperature.

Do you keep the default temperature when you choose a washing program?



Willingness to change

Earlier in the study, it was shown that, in terms of encouraging positive change, making clothes last longer was a more attractive benefit to consumers than reducing the release of microplastic fibers. The study followed this up to probe what consumers would be willing to do if the impact was an increase in clothing life.

54% said they would be willing to wash at 30°C or lower. 47% said they would wash full loads more often and 39% said they would wear their clothes more often between washes, the same percentage who also said they would wash their clothes fewer times. Each of these behaviors could also reduce the release of microplastic fibers from synthetic clothes, reduce CO₂ equivalent emissions, cut down on energy and water usage and save money. All benefits which have been proven to be attractive to consumers.

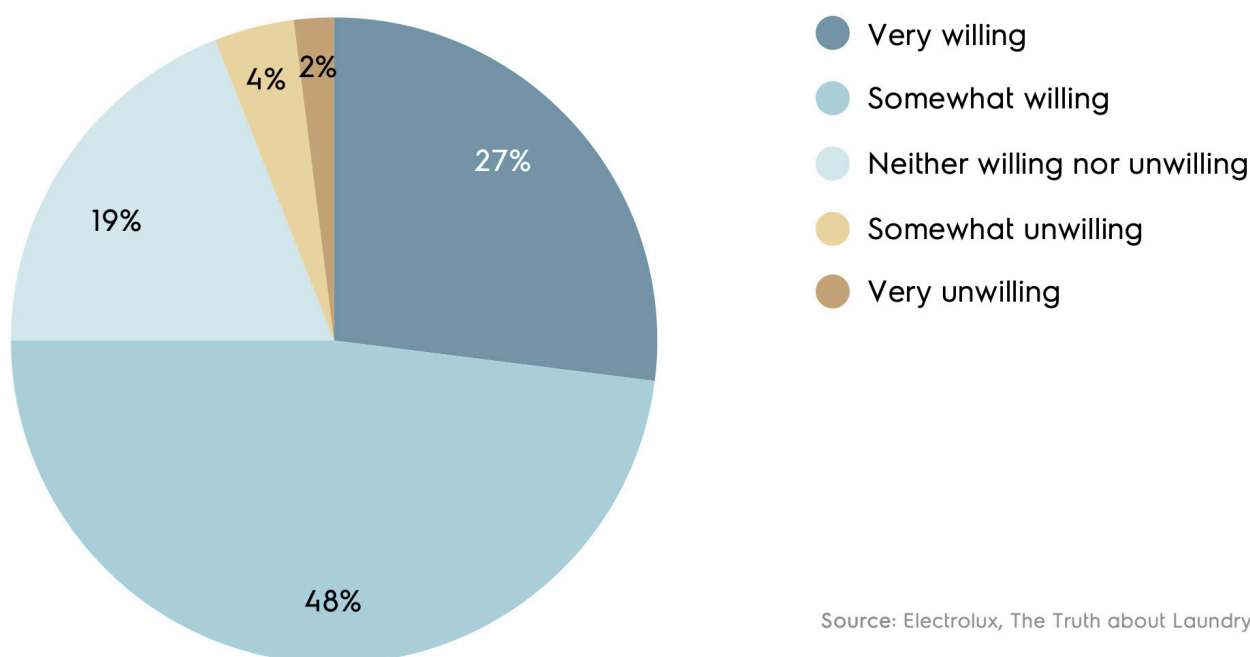
The study then asked how willing each individual would be to proactively help tackle climate change. No mention was made of the amount of effort required, just a simple question to gauge appetite for change.

27% replied they would be very willing to make a personal effort to help tackle climate change. 48% said they would be somewhat willing, and a quarter reported either being unsure or unwilling.

The study then enquired whether consumers would be interested in acquiring a microplastics filter to help reduce the amount of microplastic fibers released from their laundry.

22% said very likely. 36% said somewhat likely. A quarter (25%) were undecided and only 13% said unlikely.

How willing or unwilling are you to do things that require your personal effort to help tackle climate change?



Source: Electrolux, The Truth about Laundry

Conclusions

One cannot ignore the proliferation of plastic into the environment and its impact on marine life and ecosystems. The majority of people feel strongly about the risks it poses to the planet and, while fewer agree on the seriousness of the risk to human life, there is broad agreement that something has to be done. While people see fashion brands as being largely to blame for the current situation, consumers also see themselves as being part of the problem as well as part of the solution.

To reduce the amount of microplastic fibers being released from synthetic clothing, during laundry, will require both attitudinal and behavioral change. Too often, laundry is done by default – using the same settings, the same temperature and the same approach regardless of material or fiber.

This study has highlighted a significant reduction in the number of people who are washing at 40°C, a positive change that has more than likely reduced CO₂ equivalent emissions by over 500,000 tons. However, the majority of people continue to wash at too high a temperature as well as wash clothes too often and not wear them enough. Changing these three behaviors, alongside washing full loads more often and using a device such as a microplastic filter, could all make significant dents in the release of microplastic fibers.



3DSense Technology

Colours	Dryness Level	Time Dry
Synthetics	Extra Allergies	Delay Start
Mixed XL		
Delicates		
Sport		

Extra Save Reverse Plus End Alert Refresh

On/Off

