I PREFER 30°

THE CASE FOR THE "A.I.S.E. LOW TEMPERATURE WASHING" INITIATIVE

Substantiation Dossier / October 2013

An initiative from the detergent industry
to promote low temperature washing.

Supported by GINETEX

WWW.IPREFER30.EU

Climate change is not a distant future threat. It is happening already - and accelerating.

2012 was the 36th year in a row, where the global temperature was above the average of the 20th century, and the first 12 years of the 21st century (2001-2012) nearly all set temperature records. Formerly one-off extreme weather events seem to be becoming the new normal. This is in line with what scientists have been projecting about what a world undergoing global warming will be like.

We are also seeing impacts in Europe, for example through repeated record-breaking cold snaps and heat waves, which already caused tens of thousands of premature deaths; through more frequent river and coastal flooding affects millions of people in Europe every year; and through decreasing agricultural yields in southern Europe due to droughts.

Scientists say that to prevent climate change from spiraling out of control, global warming must be kept below 2°C compared to the temperature in pre-industrial times. But if current trends continue, the world is set for a temperature increase of more than 3°C, with all the devastating effects that will go with it.
Climate change is caused by greenhouse gas emissions – mainly from human activity. Burning fossil fuels is responsible for three quarters of global emissions. Greenhouse gas emissions in Europe are currently almost 18% below 1990 levels. Global emissions, however, keep on rising, in particular due to rapid economic growth in countries like China, India and Brazil.

It is not too late to fix the climate. But this requires drastic and rapid cuts in greenhouse gas emissions of at least 50% globally and 80-95% for Europe by 2050. Studies show this is feasible and affordable, but it requires us to make the transition to a low-carbon society sooner rather than later. The longer we wait, the more expensive it becomes.

Building a climate-friendly society is without doubt a big challenge, but it is also a huge opportunity. Making our society low-carbon will create new, green jobs and innovative technologies. It will give us lower energy bills, comfortable and modern homes, cleaner air and more mobility.

The low-carbon economy is about a smarter kind of growth. If we start now we can make a smooth and cost-effective transition. We already have many of the necessary technologies and solutions - whether it is about our homes and buildings, our shopping and eating habits or our travel and transport patterns. The real challenge is to apply them and bring them to scale. And all of us can help with that.

With the **"A world you like. With a climate you like"** public awareness campaign we want to collect and showcase concrete examples from all over Europe of how individuals, local groups and businesses are already taking their own low-carbon measures for the benefit of both the climate and the economy. Since its launch in October 2012, the campaign has attracted more than 25.000 followers on social media and more than 160 official partners including public authorities, non-governmental organisations, academia and businesses, among them also A.I.S.E.

I very much welcome the "I prefer 30°" campaign by A.I.S.E. This is an example of partnership at its best and is fully in the spirit of the Commission's aim to encourage multi-stakeholder action in the fight against climate change. If we all make small changes to our daily habits, together we CAN make a big difference. Let's work together for a better climate - one machine wash at a time!

Connie Hedegaard, European Commissioner for Climate Action

Key facts & insights

Consumers are looking for information and guidance

- 72% of European consumers look for advice and commitment on sustainability when buying detergents. Detergents rank third, after Food and Energy Services.

Wash frequency

- In Europe, around 35,6 billion laundry loads are done every year, meaning that approximately 1130 washes are started every second.
- The average wash frequency across the EU is 3,2 times per week.

Wash temperatures

- The average laundry washing temperature across Europe is 41°C.
- Currently, Denmark has the highest average wash temperature within the 'I prefer 30°' campaign countries, with an average wash temperature of 43°C.
- Within the 5 campaign countries, the UK (with 115,6 kWh/hh/yr) and Italy (112,7 kWh/hh/yr) have the highest 'per capita' energy consumption for washing.
- Approximately 43% of washes are done at 40°C, making the 40°C cycle is the most popular programme today. Around 68% of European loads washed at or above 40°C, of which 17% are washed at 60°C or above.
- Washing at or below 30°C is on the rise, with 32% of loads washed at 30°C or colder in 2011 (up from 29% in 2008).

Energy use and potential savings

- The current laundry energy use in the 5 campaign countries (UK, It, Fr, Be, Dk) represents 38% of total European laundry energy use.
- A reduction of the current average wash temperature by 3°C in the 5 campaign countries could reduce the energy consumption for laundry washing by 1065 GWh/yr. This corresponds to 11,7% of the current total of 9129,5 GWh/yr; it is also the electricity consumption of a city of more than 140000 inhabitants in a year! (Ref. Exceltys, 2013).

(Source: Insites for A.I.S.E. - 2011 data, Stamminger survey - 2013)

INTRODUCTION

A.I.S.E., the International Association for Soaps, Detergents and Maintenance Products is the official representative body in Europe for this industry. Based in Brussels, its membership includes 34 national associations from 39 countries, representing 900 companies. A.I.S.E. also has 9 direct members (Unilever, Procter & Gamble, Henkel, Mc Bride, Colgate-Palmolive, ReckittBenckiser, Ecolab, SC Johnson, Sealed Air).
A.I.S.E. is active in a broad range of fields, both through voluntary initiatives and through contributions to policy affairs. Throughout the years, the industry has had sustainability at the heart of its work, in close dialogue with stakeholders. A.I.S.E. has a long history of voluntary initiatives which promote the safe use as well as the sustainable sourcing, production and sustainable consumption of detergents and cleaning products (See Annex A).

June 2013 marks the launch of the A.I.S.E. "Low Temperature Washing Campaign", the latest initiative from A.I.S.E. and its National Associations developed in close collaboration with various stakeholders in several European countries. This new initiative aims at promoting a more sustainable use of household laundry detergents. The objective of this project is to focus on energy saving through low temperature washing (which is the biggest area of potential environmental savings) by raising consumer awareness on the benefits of washing at low temperatures. The specific objective of the "I prefer 30°" campaign is to reduce the average laundry wash temperature in key European countries and hence, reduce the overall energy consumption of the laundry process.

The initiative has been developed based on the experience that an industry association-led initiative is a very efficient way to make consumers' habits switch to more sustainable patterns as it can achieve greater recognition by consumers being led by the whole industry sector and in particular when this is co-organised more broadly with other stakeholders. Such an approach can build on and benefit from a coordinated communication campaign.

The energy consumption for laundry washing in EU, estimated at 22,1 TWh/yr (Ref: Pakula and Stamminger, 2009) is a substantial share of household energy use. Life Cycle analysis studies show that the energy consumed by the washing machine to heat the water in the main wash cycle is causing by far the largest environmental impact of washing. Consequently, a temperature reduction is a pivotal driver to improve the overall sustainability profile of the laundry process.

Currently, the average laundry temperature in Europe is 41°C. The average wash temperature in the "A.I.S.E. low temperature washing" campaign countries is 39°C (UK), 39,7°C (FR), 40,4°C (It), 41,2°C (Be), and 43°C (Denmark). While these averages cover diverse wash habits, this overview shows that important energy saving opportunities exist through lowering the average wash temperatures. Calculations of the potential energy savings from lowering the wash temperature in the campaigning countries are reported.

Detergent manufacturers and raw materials suppliers have invested significant efforts in the last years to improve the washing performance of modern detergents at low temperatures. Appliance manufacturers have also significantly improved the performance and energy/water efficiency of their washing machines. These innovation processes will continue and consumers will be able to wash the majority of their loads with confidence at reduced temperatures, such as 30°C or even lower washing temperatures.

The challenge is thus to engage consumers to convert their laundry habits and wash at reduced temperatures where appropriate, which in turn, will reduce the consumption of energy and water substantially.

Such habit changes cannot be achieved by individual companies or organisations. They can only be achieved by a genuine multi-stakeholder collaboration, which is the main purpose of the "A.I.S.E. low temperature washing" campaign. A recent analysis of the European laundry energy use (Ref: Van Holstein& Kemna, 2011) confirmed the significant energy savings potential from washing at lower temperatures: "**The analysis indicates that the energetic improvement potential can only be achieved by a concerted effort of detergent manufacturers, appliance manufacturers and consumers together, which is already being sought through voluntary initiatives** ". This refers to previous voluntary A.I.S.E. initiatives, such as the A.I.S.E. Code for Good Environmental Practice, or the more recent A.I.S.E. Charter for Sustainable Cleaning or other cleanright.eu campaigns, and it is equally applicable to the upcoming "A.I.S.E. Low Temperature Washing" Campaign.

This substantiation dossier is the central source of factual information to allow all partners and interested stakeholder to know more about the rationale for the A.I.S.E. "I prefer 30°" consumer engagement campaign and help bring it to a successful outcome. It summarizes available knowledge regarding laundry habits and practices of European consumers, insights from lifecycle analyses, trends on energy and water consumption, sustainability initiatives in the detergent, apparel/textile and appliance industry, as well as estimations of the energy savings potential for the "I prefer 30°" A.I.S.E. campaign.

Following the announcement of the campaign (June 2013), additional information can be obtained via the webportal www.iprefer30.eu or by contacting A.I.S.E.
The website will be a key communication vehicle for stakeholders, media and consumers. It will be developed in two stages:

- **"Business to Business"** communication from June 2013 onwards: the communications toolkit will be provided to partners.
- **"Business to Consumers"** communication from January 2014 onwards: this site will be available in the relevant languages where the project will be implemented.

Consumers and their interest in sustainability

72% of consumers look for advice and commitment on sustainability for detergents. Consumers rank laundry and cleaning products very high in term of looking out for advice and commitment on sustainability - Detergents come third, after Food and Energy Services).

Q: For which product or services are you likely to look for commitment on sustainability and advice when purchasing them?
(Source: Insites survey for A.I.S.E. – 2011 mentioned later in the report as «A.I.S.E. 2011 survey»)

1

WASHING AND DETERGENTS: HOW DOES IT WORK?

1.1 A COMBINATION OF FIVE FACTORS: WATER, TIME, DETERGENT, TEMPERATURE, MECHANICAL ACTION (THE SINNER CIRCLE)

The laundry cleaning model of Dr. Sinner (former R&D head Henkel) shows how laundry cleaning performance is influenced by 4 interdependent factors, represented in the so-called Sinner Model or Sinner Circle (Ref: Sinner, 1960). If the role of one factor is reduced, the loss must be compensated for by increasing one or more of the other factors to maintain the same level of washing performance.
The four factors are:

- **Chemical action (chemical energy):** This represents the action of the dissolved detergent. The action is increased or decreased by the concentration of the detergent ingredients in the solution (water + product).
- **Mechanical action (mechanical energy):** This is the mechanical action of the washing machine, which generates friction and pressure. For manual washing, when no equipment or devices are used, the person doing the cleaning is considered to provide mechanical action by rubbing, sometimes with the help of auxiliary devices (e.g. scrubbing board).
- **Temperature effect (thermal energy):** Heat is often used in cleaning activities. The elevated temperature enhances the chemical reactions, solubilises greasy soils and weakens the binding forces of the soil on the fabric.
- **Time:** The duration of the cleaning operations determines how long the product is allowed to act. Combined with the mechanical, thermal and chemical action, the duration affects the cleaning power. Longer cleaning times will typically improve the cleaning performance.

Water has been introduced by Stamminger (Ref: Stamminger, 2010) as a fifth factor to show the importance of water as essential element in wet cleaning. Water acts as the agent for dissolving the detergent, for transportation of the detergent ingredients and heat to the laundry, for providing mechanical force on the soil particles via hydrodynamic flow resistance, for transporting the released soils away from the fibres and for diluting the detergent solution during the rinsing process.

The Sinner Circle is represented graphically (Fig. 1) by a circle divided in four pies, each representing one of the four factors. The size of the pie pieces may be different, depending on the contribution of each individual factor to the overall cleaning result.
This picture visualizes how an energy saving cycle is formed by reducing the temperature pie (heating is responsible for the energy consumption) and by simultaneously enlarging the contribution (size of the pie) coming from the factor time.
Short programs can be visualized by reducing the time and enlarging the contributions coming from detergent or temperature.
As long as the circle surface is constant, the Sinner Circle shows that the actual overall washing performance is maintained. Reduced or enlarged washing performance can be visualized by smaller or larger surface area of the circle.
More water use (shown as the inner circle) may be used to visualize washing processes which use more hydrodynamic forces (e.g. vertical axis washing or manual washing processes), as opposed to processes where water usage is minimised.

While the Sinner Circle may have shortcomings (e.g. it will not show the interaction among individual detergent ingredients), it can qualitatively and transparently communicate the interdependence of the various factors influencing the washing process.

Specific to the "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign, the Sinner model can help to understand how energy saving cycles (washes at lower temperatures) can be operated without compromising the washing performance. The reduced thermal energy (from lower washing temperatures) can be compensated by a longer wash duration and/or by the use of detergents that have been designed to be highly efficient in the lower temperature range.
Most modern detergents have intentionally been designed to wash efficiently across the entire range of temperatures, and specifically to wash well at low temperatures maintaining good cleaning performance. With the objective to make low temperature washing more efficient, significant R&D efforts have been invested in the recent decade to better understand which ingredients and formulations work best at lower wash temperatures with real soils/stains and under consumer-relevant laundry conditions.
Special ingredients, such as enzymes and other catalytic and activator ingredients, have been developed to be active at 30°C and lower temperatures. These have been assessed to be safe for consumers and the environment. In addition, consumers have a broad choice of product forms to determine which one best fits their washing needs, loads and habits (see chapter 1.2 on Detergent composition and role of enzymes). In general, it is recommended to avoid short cycles when a performance cycle is needed or desired.
If consumers use a short cycle at low temperature (e.g. quick & cold), the Sinner model shows that both time and thermal energy will be reduced. As a consequence, this would thus mainly be considered as a refreshment cycle with a relatively low cleaning performance (check the washing machine manufacturers' booklet). Cold cycles can offer the sometimes desired consumer benefit of convenience, combined with improved fabric care properties (e.g. longevity of clothes, reduced colour fading). Short cycles should be avoided if a performance cycle is desired, especially at lower washing temperatures.

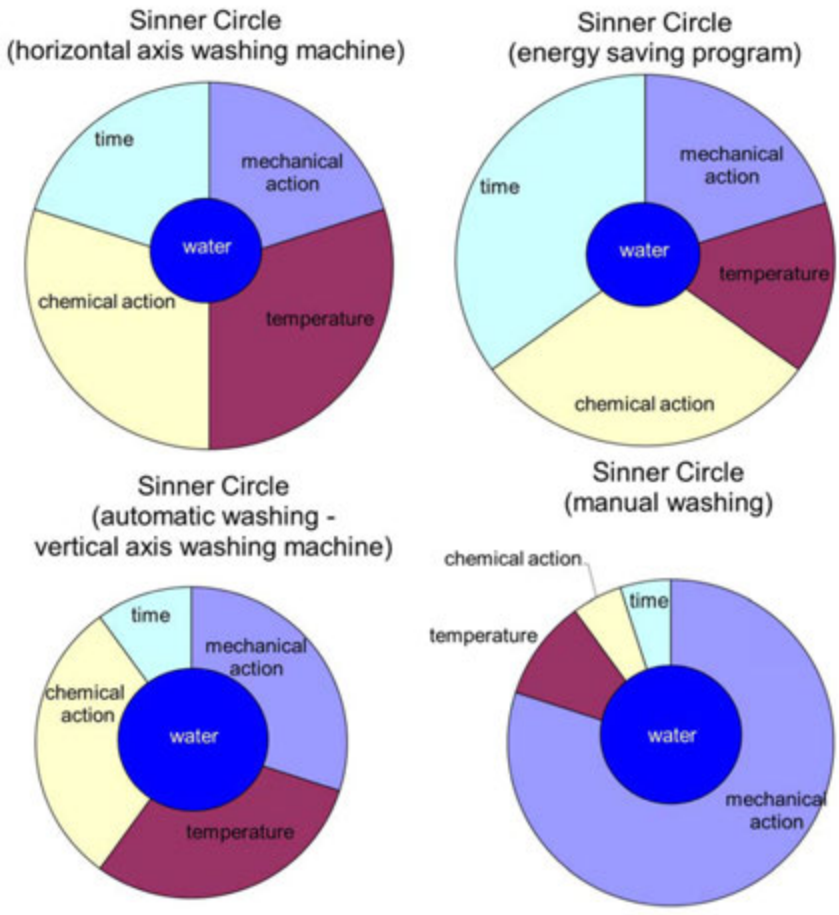


Figure 1: Representation of 4 different washing processes through the 'Sinner Circle' (Ref: Sinner, 1960)

1.2 DETERGENTS AND HOW THEY WORK

Today's household detergents are sophisticated formulations, designed to meet a diverse and demanding set of cleaning requirements and conditions. They contain a broad range of ingredients each of which contribute uniquely and efficiently to the overall cleaning performance. This range of chemicals is required to optimally meet consumer needs in a safe and cost-effective manner, and this increasingly at lower wash temperatures.

1.2.1 TYPICAL COMPOSITION OF DETERGENTS – RECENT TRENDS

During the recent years, special attention has been given to strengthen and improve the washing performance in particular in the low wash temperature range. For more than 10 years, detergent manufacturers have recognized from lifecycle studies that the largest environmental impact of the laundry process is during the use phase, when consumers use detergents at home in the washing machine (see Section 1.3.2). Between 60 and 80% of all energy is consumed in the use phase, in particular when the water of the main wash is heated. The use of advanced cleaning technologies that are active at low temperature enables detergent formulations to perform optimally at lower wash temperatures on relevant consumer soils and stains. Furthermore, washing at cooler temperatures is known to be gentler for coloured items and for fabric care (see Annex B). This helps to significantly reduce energy consumption and greenhouse gas emissions, whilst maintaining expected cleaning and care performance for the vast majority of home laundering tasks.
The following section explains how efficient washing at low temperatures can be achieved by using advanced technologies and that this does not require higher doses or more aggressive chemistry.
Modern detergents are formulated to provide good cleaning performance under a broad range of conditions, including washing at reduced temperatures such as 30°C or lower.

More info?

The composition of modern detergents and the function of the most important ingredients is described in detail on the A.I.S.E. consumer information portal, **www.cleanright.eu**

The main differences between conventional detergents and modern detergents that work especially well at low temperatures is mainly due to the choice of surfactants and polymers (and how these are combined), the use of more sophisticated enzyme systems, and (for general purpose powder detergents) the use of bleach systems that are activated at lower temperatures.

All these classes of ingredients (and others) have important roles:
Enzymes break down dirt and are able to do this at low temperatures.
Surfactants and certain classes of polymers solubilize and remove the dirt from the laundry wash.
Polymers prevent the re-deposition of soil by keeping it in the wash water.
Active oxygen bleach leads to better cleaning and improved whiteness of the laundry.

- **Surfactants** differ in various ways - molecular structure, physical and biologically relevant properties. Surfactants are often referred to as the "work horse" of the detergent system. They wet the fabrics and soils and this facilitates the removal of soils and dirt. They suspend a whole range of stains and dirt (particulate, greasy, body soils, cosmetics). Detergent formulators choose the surfactant mixtures from a range of commercially available surfactants, which are all readily biodegradable as required by EU legislation.

- **Laundry polymers** have a wide range of molecular and physical properties. Their function in detergents ranges from providing protection to the surfactant from water hardness to improving whiteness maintenance of cotton and synthetic fibres. Specific classes of polymers contribute to the overall laundry cleaning performance, for example by modifying the fabric surface, by keeping soil suspended in solution to prevent redepositing on the fabrics. Soil release polymers modify the fabric surface to minimize soiling by reducing the affinity of oils and fats to deposit on the fabric surfaces. They make it easier to remove these stains during subsequent washing. Soil suspending agents aid in keeping soil suspended and dispersed in the wash water, allowing it to be removed completely during the rinse cycle.

- **Detergent enzymes** act as so-called catalysts to speed up chemical reactions that would otherwise not occur or at a much slower rate. As ingredients in detergents they help breakdown a broad range of dirt and stains thereby increasing their water solubility and removal. Certain enzymes also contribute to fabric care, for example by making fabrics softer. Some enzymes are also designed to function together with other detergent ingredients, including bleaching systems.

- General purpose powder detergents typically contain a **bleach system**, which is usually based on active oxygen. The primary purpose of the active oxygen bleach is to achieve better cleaning and improved whiteness of the laundry. Bleaching agents are especially effective in helping to remove soil by breaking the dirt molecules into smaller fractions that can be more easily washed away. As such, they help deliver a stronger overall cleaning performance. The active oxygen system consists of a 2-component bleach system. The oxygen source (sodium percarbonate) is combined with a so-called bleach activator such as TAED. In the wash, sodium percarbonate is rapidly solubilised into sodium, carbonate and hydrogen peroxide, where hydrogen peroxide is the actual bleaching agent. The role of the bleach activator is to increase bleaching efficiency at low wash temperatures. In the presence of the bleach activator, hydrogen peroxide produces peracids which are effective bleaching agents already at lower temperatures.

How to recognize a detergent with active oxygen bleach system ?

The active oxygen bleach system is typically delivered via a 2-component bleach system, the bleaching agent percarbonate combined with a so-called bleach activator such as TAED.

Consumers can easily find out if their detergent contains an active oxygen bleach system. Across Europe, the detergent composition is disclosed by the manufacturer.

A first set of information can be found easily on-pack in the **'ingredient label'**, where the active oxygen bleach system will be described as Oxygen-based bleaching agents (UK), Sbiancanti a base di ossigeno (It), Iltbaserede blegemidler (Dk), 'Agents de blanchiment oxygene' (Fr/Be), 'zuurstofbleekmiddel' (NL/Be), 'Bleichmittel auf Sauerstoffbasis' (De).

In addition, manufacturers will disclose the full list of detergents ingredients via their product information websites (website address can be found on-pack).

As a rule of thumb, the active oxygen bleach system is only present in general purpose powder detergents and dry tablets. On the contrary, powder detergents with a 'color' positioning will not contain an active oxygen bleach system and liquid detergents also do not contain this.

1.2.2 THE VALUE OF ENZYMES FOR LOW TEMPERATURE WASHING

Enzymes have enabled detergents to work better at removing stains, offering whiteness and brighter colours, as well as fabric care and wear benefits. Enzyme containing detergents are effective with smaller dosages (detergent compaction) and perform well under a broad range of conditions including washing at low temperatures such as 30°C.

Like all proteins, enzymes are composed of long, three-dimensional chains of amino acids. In this folded form, the enzyme forms a small area, the active site, to which the substrate (e.g. a specific stain component) can bind. Enzymes are very specific to this substrate, e.g. a cellulase enzyme can only degrade cellulose. They are weight-efficient, meaning that a smaller quantity of enzymes can be used to achieve these cleaning effects, when compared to other detergent ingredients. When enzymes find their designated stains, they lock on and remove them, then continue to the next stain. One enzyme molecule can act repeatedly on different substrate molecules (e.g. soil), so a small amount of enzyme added to a laundry detergent can provide a big cleaning benefit to the consumer consumer. This gives enzymes and other catalytic ingredients a crucial role in compacted and concentrated detergents.

The key benefits of enzymes can be summarized as follows:

- **Stain removal** - Enzymes degrade stains into smaller, more water-soluble parts that can be removed more easily during washing. There are a variety of stain removal enzymes.

o Protease for protein stain removal, e.g. stains from blood, dairy, eggs, and grass
o Amylase for starch stain removal, e.g. baby food, spaghetti, potato, gravy, chocolate and pasta. Also if starch is not degraded with an amylase, it tends to spread in the laundry and act as a strong dirt binder resulting in a less satisfactory wash result.
o Lipase for grease, fatty acid and oily stain removal, e.g. fats, butter, salad oil, sauces, and cosmetics
o Mannanase for mannan-based stain removal, e.g. food products such as ice cream, tomato sauce or salad dressing that contain guar gum
o Pectin-degrading enzyme for food-based stain removal

- **Whiteness** - Enzymes cleave off damaged cotton fibers, thus preventing particulate soil from depositing and participating in fabric graying, improving whiteness performance.
- **Color and fabric care** – Specific types of enzymes improve the appearance of fabrics (colour care and smoothening the surfaces) which helps to prolong their lifetime.
  o Cellulases degrade cellulose and contribute to fabric care.

The main task of enzymes in laundry detergents is the removal of stains of animal or plant origin. Another important task is to prevent soils from spreading throughout the laundry by 'redeposition'. This benefit is often referred to as «general cleaning» or «whiteness maintenance.» Enzymes also provide care effects by acting directly on cotton surfaces, helping garments look new longer.

Detergent products typically contain more than one class of enzymes. Food stains are complex substrates containing protein, starch, and fat all mixed together. By combining different enzymes, soils are removed more efficiently, utilizing synergies between each enzyme's cleaning abilities.

By far the most commonly used types of enzymes in detergents are protease and alpha-amylases. Lipases,

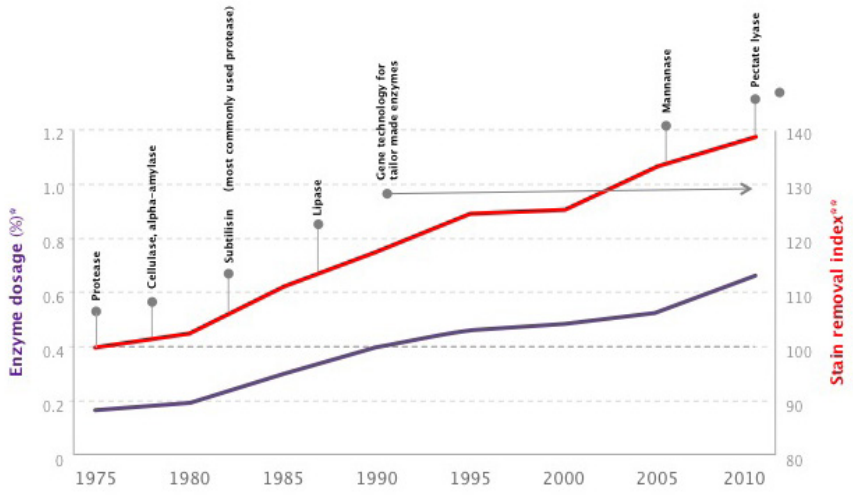


Figure 2: Introduction of detergent enzymes (Ref: Amfep, 2013)

The importance of enzymatic detergency is expected to continue to increase, driven by the following trends:

- Reduction of washing temperatures without compromising on good washing performance
- More detergents without bleach (e.g., color detergents and liquid detergents)
- More compact detergent formulations
- More cost-effective enzymes

1.3 WASHING AND ENVIRONMENTAL IMPACT

1.3.1 ENVIRONMENTAL PROFILE OF DETERGENTS

Modern detergents are formulated to provide good washing performance under a broad range of conditions, including washing at reduced temperatures such as 30°C. The difference between the two is mainly in the choice of surfactants and polymers (and how they are combined) and in the use of more sophisticated enzyme systems. Consumers can be reassured that detergents designed for lower washing temperatures do not have a higher impact on the environment compared to more conventional products.

No burden shift !

The argument is sometimes raised that today's detergents wash better at low temperatures because the ingredients have become more aggressive and are less safe. This is not the case !

Efficient washing at low temperatures saves energy and occurs without a 'burden shift'. Here is why:

- **The performance** of today's detergents has been improved in particular in the lower temperature range.
- **Enzymes** break down dirt and stains efficiently at much lower temperatures. Only small amounts of enzymes are needed.
- **Surfactants** remove soil and stains very effectively and other ingredients such as polymers prevent released soil to redeposit on the fabrics.
- Detergents only use ingredients with a **proven safety record**. The risk assessments are favourable and are publicly available.
- The key cleaning ingredients such as **surfactants and enzymes are rapidly biodegradable.**

If you want to find out more, visit www.cleanright.eu (product information), www.heraproject.com (risk assessments) or contact A.I.S.E.

All surfactants and new combinations of surfactants typically have a similar low impact on the environment. Detergent formulators choose the surfactant mixtures from a range of commercially available surfactants. All detergent surfactants must be readily biodegradable as required by EU legislation (Detergent Regulation and latest amendment Regulation (EU) No 259/2012). All commercially available detergent surfactants used in Europe have been thoroughly assessed in so-called risk assessments, such as the Human and Environmental Risk Assessments published by A.I.S.E. and CEFIC (HERA, www.heraproject.com). These studies concluded that they are safe for humans (consumers) and for the environment. The safe use of these surfactants in consumer detergents is currently also ensured by REACH. Polymeric surfactants such as alkylethoxylates are not covered by REACH, but HERA risk assessments are publicly available for these and they confirm the safe use of these detergent ingredients.

The use of low temperature detergent enzyme systems, like all detergent enzymes, does not result in a higher environmental impact since detergent enzymes are proteins that are readily inactivated and biodegraded. Their impact on the environment is assessed as very low and of no concern. HERA assessments are available for the commercially available detergent enzymes (www.heraproject.com). Likewise, these risk assessments have also been established that the current use of enzymes in laundry and cleaning products represents no safety concerns for consumers.

In general, it can be expected that the overall impact of today's detergent ingredients will likely have a reduced overall environmental impact, as detergents have become more concentrated and, in addition, work with lower amounts of active substances due to more efficient formulation designs.

This means that lower amounts of chemicals can be used to do the wash, leading to reduced releases into the environment after the use phase.

A.I.S.E. and CEFIC published human and environmental risk assessments for common detergent ingredients (www.heraproject.com). Also, information on different ingredients and their function in detergents can be found on www.cleanright.eu.

Tip - Read the label

The most important advice for users of detergents and maintenance products is also the simplest: Read the label before using a product.

Consumers are encouraged to read the label.
This helps safe use of the products as well as correct dosage
A detailed table with dosage instructions is printed on every detergent pack. it takes into account the water hardness and level of soiling. Both underdosing and overdosing are undesirable. Underdosing leads to unsatisfactory performance. Overdosing does not improve performance.

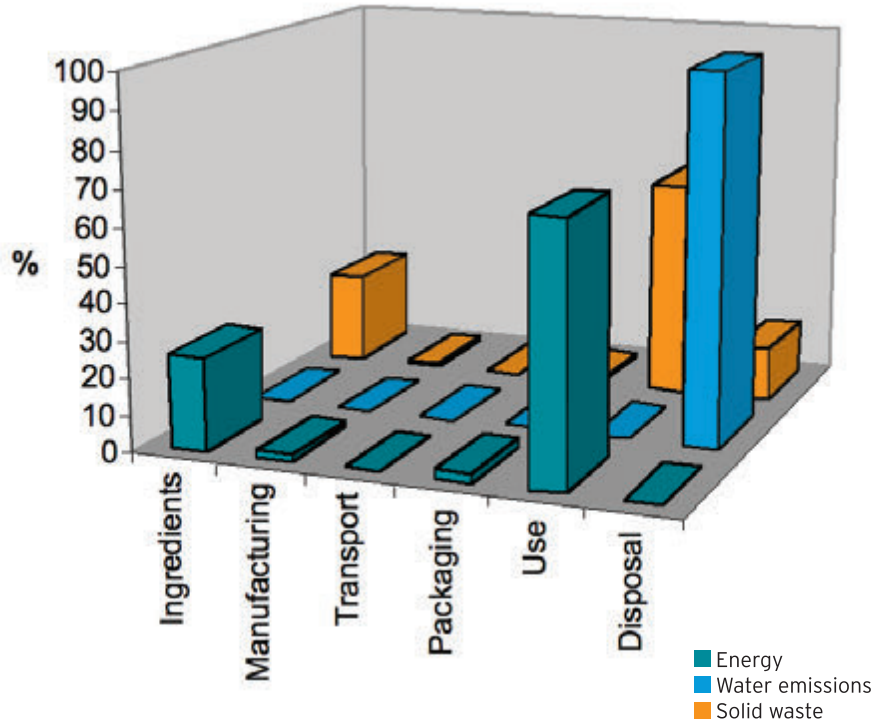
For further information, go to www.cleanright.eu

1.3.2 WHAT THE LIFECYCLE ANALYSIS SHOWS US - OPPORTUNITIES FOR ENERGY SAVINGS BY LOWERING WASHING TEMPERATURES

The life cycle stage with the largest contribution to the overall environmental impact is the use phase, driven in particular by the energy needed to heat the water during the wash cycle. Encouraging consumers to wash at lower temperatures (in particular, 30°C and below) will achieve significant energy savings.

The life cycle stages with the highest contribution to the environmental impacts were evaluated by A.I.S.E. and its member companies in several previous LCA studies, as outlined below:

Life Cycle Analysis of a Generic Fabric Washing Powder (normalized on a per wash basis) - 2001.
Source A.I.S.E.



Later in 2013, A.I.S.E. will publish a reference LCA study on solid (powder) detergents (Ref: A.I.S.E., LCA, 2013 – see summary overview in Annex B). In general, the same conclusions in terms of reduced climate change impact can be expected when other laundry product types are used at lower temperatures.

The LCA study showed that the lifecycle stage with the largest contribution to the overall environmental impact is the use phase, driven in particular by the energy needed to heat the water during the wash cycle. For powder detergents , the contribution of the use phase to the total impact is typically higher than 50% for the majority of the 'impact categories'. In terms of primary energy and related global warming potential the use phase contributes more than 60% to the total lifecycle energy demand (at 40°C.).

The other phases (formulation, packaging, transport and the end of life) should also be taken into account but they actually have a relatively smaller contribution towards the total environmental impact when compared to the use phase at 40°C.

The use phase dominates the impact categories fossil depletion, climate change and particulate matter formation. The majority of these impacts are strongly correlated to each other via the energy use in the use phase.

The LCA study concluded that the choice of the wash temperature was one of the key environmental performance indicators, i.e. it was among the key variables that mainly drive the results.
The other parameters were the amount of product used, choice/amount of surfactant and the country sourcing of electricity used for heating the water.

To remember!

The Lifecycle Analysis study concluded that the **choice of the wash temperature** was one of the **key** environmental performance indicators, i.e. it was among the key variables that drive the savings.

Each of these areas is important to further improve the sustainability profile of washing. The specific theme of "choice of the wash temperature" is the key focal point of the upcoming "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign.

The study calculated the effect of varying wash temperatures (30°C, 40°C, 60°C) via a series of sensitivity analyses. The results are shown in Figure 3. The impacts are considerably reduced for the 30°C wash scenario as compared to the 40°C and 60°C scenarios. The impact categories most affected by the wash temperature are climate change, particulate matter formation and fossil depletion, since they are driven by the use phase. Similar results were obtained for powder laundry products and, more in general, the same conclusions in terms of reduced climate change impact can be expected when other laundry product types are used at lower temperatures.

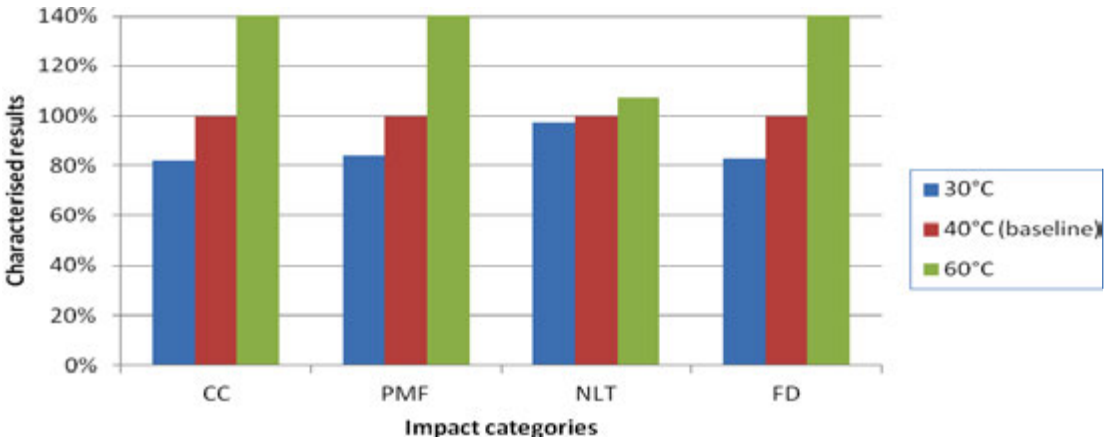


Figure 3: LCA sensitivity analysis for selected wash temperatures (A.I.S.E. 2013). (Legend: CC: Climate Change , PMF: Particulate Matter Formation; NLT: Natural Land Transformation; FD: Fossil Depletion)

Calculations of the total energy savings potential from lowering the wash temperature in the campaigning countries have been made. These are reported in section 3.4.

This analysis shows that a reduction of the wash temperature will result in reduced impacts specific to climate change and depletion of fossil materials, supporting the theme and focus of the "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign.

2

SUSTAINABLE WASHING - WHERE DO WE STAND?

INTRODUCTION

This chapter reports insights from a series of European consumer surveys. The objective of these surveys was to assess current consumer habits and define potential areas for improvement in the domain of laundry practices.

In 2008 and 2011, A.I.S.E. commissioned two online consumer studies with InSites Consulting about household laundry habits (Ref: A.I.S.E. survey 2008) and laundry and cleaning habits (Ref: A.I.S.E. survey 2011). The sample sizes of both studies were approximately 5200 respondents in total (e.g. 5249 for A.I.S.E. 2011 survey), consisting of 200 up to 250 respondents in each of the 23 countries. The survey covered laundry habits and practices, specifically frequency and number of wash cycles, selected wash temperature and the degree of loading of the wash machines.
A.I.S.E. intends to repeat such surveys on a regular basis. The next survey is foreseen in 2014 and will be used to evaluate the success of the "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign.

In 2011, Prof. R. Stamminger (University of Bonn) conducted a large scale consumer study (Ref: Stamminger survey, 2011), surveying around 2300 European households in 10 European countries via an online questionnaire. The participants were asked about their behaviour with washing machines and laundry drying and about their opinion about energy issues in general.

While there were differences in terms of data gathering methodology and in term of categorizing the different temperature categories, the insights from these surveys are very similar.

2.1 CONSUMERS PERCEPTIONS

2.1.1 ENVIRONMENTAL HOTSPOTS AND CONSUMERS' PERCEPTION: A DISCONNECT

It was highlighted above (see section 1.3.2) that the LCA study shows that the lifecycle stage with the largest contribution to the overall environmental impact is the use phase, driven in particular by the energy needed to heat the water during the wash cycle. For powder detergents, the contribution of the use phase to the impact categories fossil depletion, climate change and particulate matter formation is typically higher than 50% for the majority of the 'impact categories' at 40°C.
The graph below (see Figure 4) is highlighting how consumers - when being asked about which stage of the process do they find the most polluting – react. It clearly shows that the disconnect between perception (here marked in red), versus reality (in grey) differ.
It also shows that consumers do not currently realise that when it comes to driving mores sustainable washing, there is a lot that THEY can do to influence and help, in addition to the manufacturers' efforts to manufacturer and design more sustainable products too.....

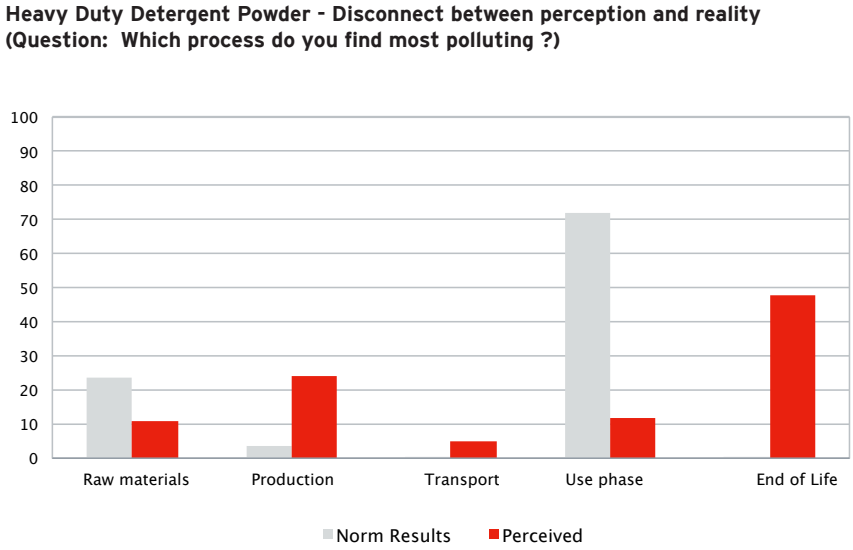


Figure 4: Disconnect between consumers' perception and most relevant impacts of the life cycle of laundry detergents. Normalization with European average data for the year 2000.
(source: Henkel, consumer survey 2011)

2.1.2 INTENTIONS EXPRESSED FROM HABITS SURVEY

The A.I.S.E. 2011 survey showed that European consumers are genuinely looking for information and guidance when it relates to the sustainability of washing.

In general, when asked which aspect of sustainability consumers are interested in during shopping, 69% of consumers consider environmental issues such as the use of energy and the impact on the water (63%) most relevant with respect to purchasing products. When asked for which products or services consumers will likely look for sustainability advice when shopping, up to 72% of European consumers confirm to look for advice and commitment on sustainability when buying detergents. Remarkably, detergents rank third in this survey, after Food and Energy Services.

Specific to laundry washing, when asked: **"Thinking about doing the laundry, which of the following statements do you believe will help reduce your impact on the environment?"**

- Washing at low temperatures comes first with 74% of consumers stating that it will help reduce the impact, followed by
- Avoid underfilling the machine (72%)
- Carefully follow the dosing instructions (71%)
- Buying more compacted/concentrated detergents (with only 44%)

These findings reiterate the crucial role of consumer education to influence consumer habits.

When then asked **"Which of the following efforts do you make to clean more sustainably?"**, they indicate:

- Avoid underfilling the machine (67%)
- Do laundry at low temperature (67%)
- Purchase more sustainable products (42%)
- Avoid using a lot of water (40%)

But the results provided in the actual habits (see section 2.2) show that there is still great potential for improvement.

LAUNDRY WASHING HABITS
DIVERSE PROFILES ACROSS EUROPE

In spring 2011, A.I.S.E. commissioned a pan-European survey on consumers' washing habits in 23 countries. The objective of this exercise was to find out about current consumer habits and define potential areas for improvement in the domain of laundry practices. The survey covered countries in Western, Southern, Eastern Europe and Scandinavia, with approximately 200 respondents taking part per country (exactly 5249 in total). Here is a summary overview of key findings linked to laundry washing habits.

In Europe, around 35.60 billion laundry loads are done every year, meaning that approximately **1130 washes are started every second.**

European households wash on average **3,2 times per week.**

The average laundry washing temperature across Europe is **41°C.**

The 40°C cycle is the most popular programme today, with 43% of European loads washed at that temperature.

Washing at or below 30°C is on the rise, with **32% of loads washed at 30°C or lower** (up from 29% in 2008).

If all 5 countries were to reduce their average wash temperature by 3 degrees, that would save 1065 GWh/year....
The equivalent of the total electricity consumption of a city of more than 140000 inhabitants for a year!

UNITED KINGDOM - DOING THE LAUNDRY
Average number of washes per week per household: 4
Average wash temperature: 39°C
Washes at or below 30°C: 32,3%
Washes at or above 40°C: 67,6%
Annual laundry energy use : 115,6 kWh per household
Country washing energy use: 2988,4 GWh/year
Potential savings (wash T reduced by 3°C): -20,1%

DENMARK - DOING THE LAUNDRY
Average number of washes per week per household: 2,9
Average wash temperature : 43°C
Washes at or below 30°C: 18,1%
Washes at or above 40°C: 81,9%
Annual laundry energy use: 97,3 kWh per household
Country washing energy use: 259,6 GWh/year
Potential savings (wash T reduced by 3°C): -10,4%

BELGIUM - DOING THE LAUNDRY
Average number of washes per week per household: 3,1
Average wash temperature: 41,2°C
Washes at or below 30°C: 32,2%
Washes at or above 40°C: 67,8 %
Annual laundry energy use: 97,4 kWh per household
Country washing energy use: 458,9 GWh/year
Potential savings (wash T reduced by 3°C): -11,1%

FRANCE - DOING THE LAUNDRY
Average number of washes per week per household: 3,1
Average wash temperature : 39,7°C
Washes at or below 30°C: 35,3%
Washes at or above 40°C: 64,7%
Annual laundry energy use: 92,1 kWh per household
Country washing energy use: 2589,6 GWh/year
Potential savings (wash T reduced by 3°C): -11,5%

ITALY - DOING THE LAUNDRY
Average number of washes per week per household: 3,7
Average wash temperature : 40,4°C
Washes at or below 30°C: 38,9%
Washes at or above 40°C: 61,1%
Annual laundry energy use : 112,7 kWh per household
Country washing energy use: 2833 GWh/year
Potential savings (wash T reduced by 3°C): -11,5%

Sources: Insites report for A.I.S.E., 2011 - A.I.S.E. I Prof. Stamminger - Uni Bönn report for A.I.S.E. 2013

An initiative from the detergent industry to promote low temperature washing.

Supported by GINETEX

I PREFER 30°

WWW.IPREFER30.EU

Figure 5: Information panel on European wash habits (A.I.S.E. survey 2011)

2.2 CONSUMER WASHING HABITS AND TRENDS – OPPORTUNITIES FOR IMPROVEMENT

2.2.1 FREQUENCY OF WASHING

The A.I.S.E. survey showed that 35.60 billion laundry loads are done every year in Europe (2011). This is equivalent to 2.97 billion washes per month, 684 million washes per week, 98 million washes per day, which means that approximately 1130 are started every second in Europe!

In 2011 (Figure 6), the average wash frequency across the EU was 3.2 times per week (corresponding to 6.4 washes per 2 weeks), slightly less than in 2008. There are countries such as UK and Ireland with a higher frequency, up to 4 or more wash cycles per week, while the frequency can be below 3 per week in countries such as Turkey and Czech Republic.

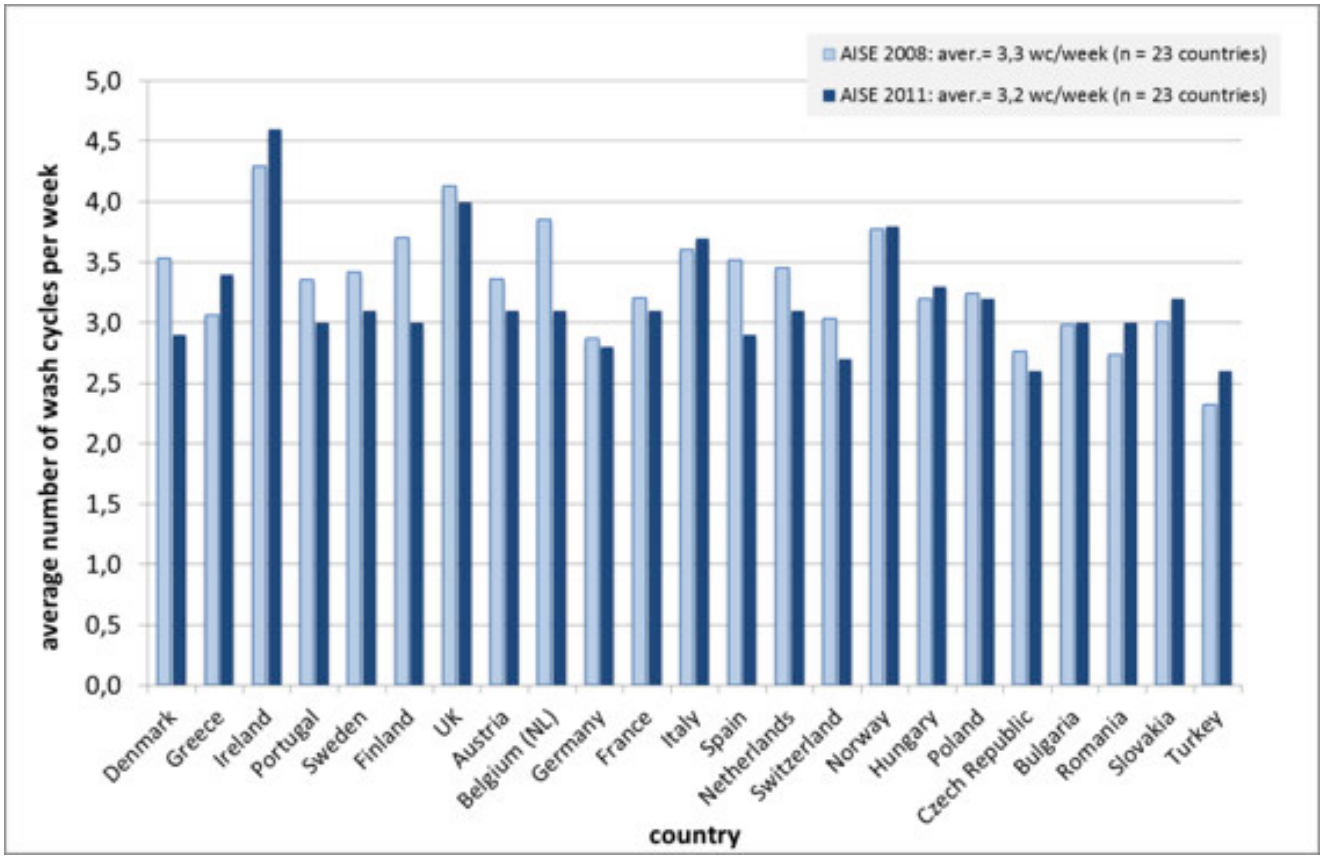


Figure 6: Average number of wash cycles
(Ref: A.I.S.E. Survey, 2008 and 2011)

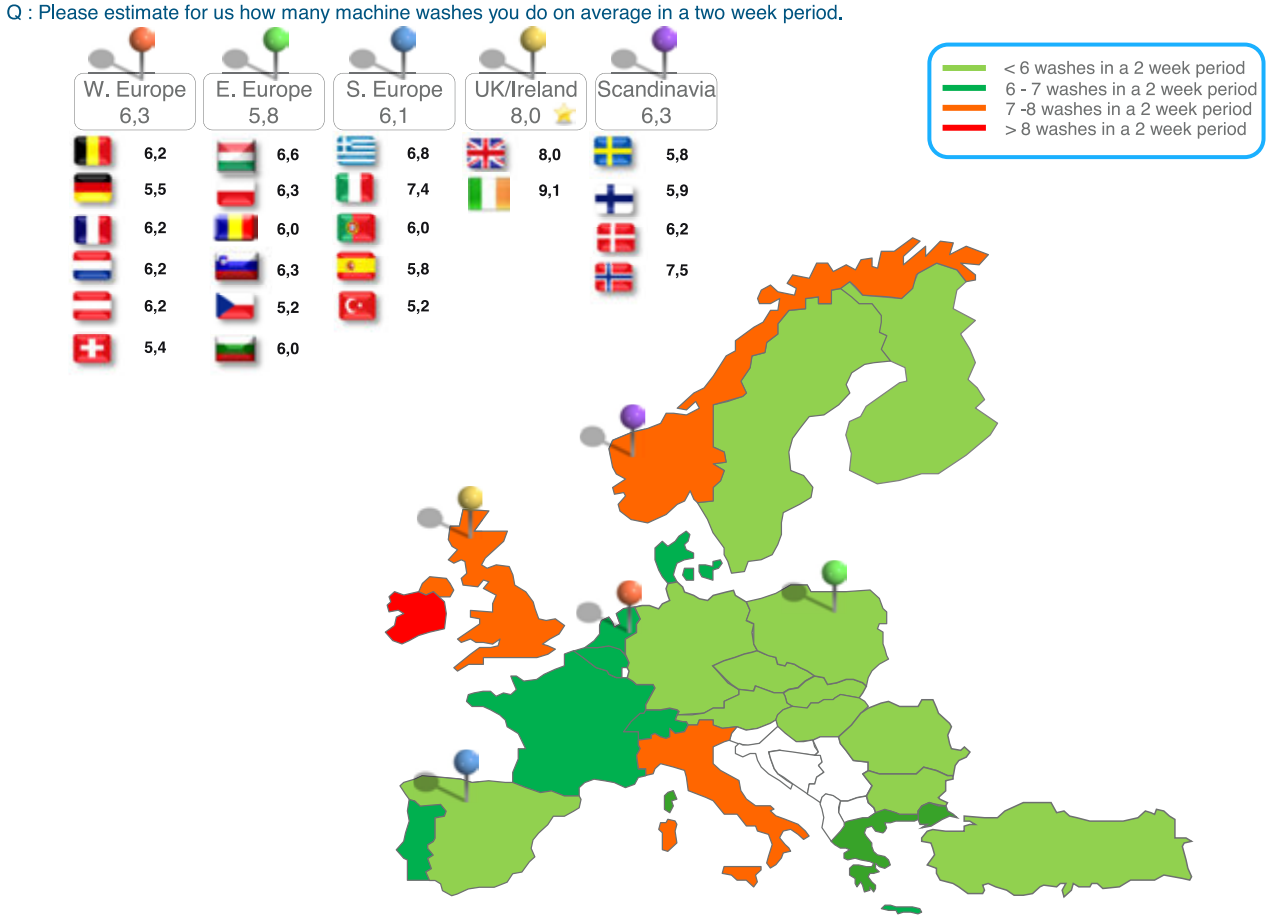


Figure 7: Survey on frequency of washing (number of washed in a 2 week period) (ref A.I.S.E. survey 2011)

While there were differences in terms of data gathering methodology, this corresponds well with the 2011 survey conducted by Prof. R. Stamminger (University of Bonn). That study among 2290 households reports that the average number of washes ranges from 3,5 cycles per household per week (e.g. France or Czech Republic) up to 4,1 cycles/hh/w (e.g. Italy) with an average at 3,8 cycles/hh/w.

Frequency of washing

The A.I.S.E. 2011 survey showed that 35.60 billion laundry loads are done every year in Europe. This means that **1130 washes are started every second.**

2.2.2 WASH TEMPERATURES

While there were differences in terms of data gathering methodology and in terms of categorizing the different temperature categories, the insights from these surveys are very similar.

The analysis of chosen temperature classes shows that, on average across Europe, the laundry is done with a washing temperature (nominal cycle temperature, not the actual measured temperature in the machine) of 40,9°C.

There are typically small differences between 2008 and 2011 in the temperature class distributions, but there are important country by country differences.

As can be seen in Table 1 , the average wash temperature in the 5 countries of the "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign is 39,8°C and ranges from 39°C (UK) to 43°C (Denmark) (nominal cycle temperatures).

Country	**Average washing temperature** (°C)
Austria	43
Belgium	41,2
Bulgaria	42,4
Czech Republic	44,3
Denmark	43
Finland	45,1
France	39,7
Germany	42,2
Greece	41,5
Hungary	41,8
Ireland	39,7
Italy	40,4
Netherlands	41
Norway	45,2
Poland	44
Portugal	36,5
Romania	42,8
Slovakia	43,5
Spain	33,9
Sweden	45,3
Switzerland	42,8
Turkey	42,5
United Kingdom	39
Average (Europe)	**40,9**
Average (5 campaign countries)	**38,9**

Table 1 :
(Ref: Stamminger, 2013; average temperature calculated by A.I.S.E., weighted by annual number of wash loads per country)

Specific to the washing temperature, the 2008 and 2011 data support the trend of a general reduction of washing temperature, observed over the last decade for almost all countries, with exception of Spain where the average wash temperature was already very low (33°C).

These studies show that the average wash temperature in European countries is typically between 39°C – 43°C (full range is from 33,9°C (Spain) to 45,3°C). This corresponds with the finding (Table 2) that a substantial number (around 68%) of loads are washed in cycles at or above 40°C.

Did you know?
Across Europe, 69% of consumers consider environmental issues such as the use of energy and the impact on the water (63%) most relevant with respect to purchasing products.

Q: Which of the following aspects of sustainability are you interested in when you buy a product?
Ref: A.I.S.E. Survey 2011

Especially Spain (33.9°C) and Portugal (36.5°C) have low average washing temperatures. Here the percentage of wash cycles with chosen temperature classes of < 30°C lies over 50% of all wash cycles. For Spanish household this value reaches even 74% (fig. 8).
During the last 3 years the relative frequency of wash cycles less than 30°C shows an absolute rise of approx. 3% (Fig. 9). The higher temperature classes declined accordingly, particular the temperature class > 60°C.

For Spain, Prof. R. Stamminger (Ref: Stamminger survey, 2011) reports that almost 40% of the washes are done at "cold" temperatures and almost no boil wash temperature programs (2%) are used.

In the Scandinavian countries, the temperature class >60°C shows the highest values with nearly 30% of all wash cycles (Fig. 8). Correspondingly, the average washing temperatures are the highest with approx. 45°C for Sweden, Finland and Norway (Fig. 9).

Across Europe, the 40°C cycle has become a very frequent wash programme, which justifies the focus of the "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign.
Approximately 43% of all wash cycles across all countries are washed at 40°C (Table 1 and Fig. 8). In some European countries (such as Sweden and Finland) more than 50% of the washes are done at 40°C.

Wash temp.	Wash load (%) (*)					
	Across Europe (**)	Belgium	France	Denmark	Italy	UK
60°C and higher	16,8	19,6	13,3	22,7	16,8	8,9
50°C	7,9	4,8	5,8	3	8,9	5,2
40°C	43,1	43,4	45,6	56,2	35,4	53,5
30°C and below	32,3	32,2	35,3	18,1	38,9	32,3
total	100	100	100	100	100	100

(*) Questionnaire: Please estimate what percentage of your normal wash loads you do at these different temperatures.

(**) Data for 23 European countries

Table 2 : Overview of wash load temperatures across Europe and in campaigning countries

The 2011 survey conducted by Prof. R. Stamminger (Stamminger Survey, 2011) confirmed the popularity of the 40°C programs, covering around 40% of all programs. The second most used temperature is 60°C while the 90°C program was used in less than 5% of the washes.

The UK WRAP report 'Valuing our Clothes' (WRAP, 2012) reports: 'Around a third of UK consumers would seriously consider washing their clothes at 30°C more often, the key factor being cleanliness. Six in ten would do so 'if they felt my clothes would be clean'. Combining this insight with the growing popularity of the 30°C cycle shows that UK consumers feel confident with the washing performance at 30°C. The trend is towards increased use of the 30°C cycle, indicating that consumers get a satisfactory 30°C performance with today's detergents).

The findings from these surveys and reports are encouraging for the "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign.
The average wash temperature is already low in countries like Spain and Portugal where the majority of washes is done at or below 30°C (74% for Spain), which shows the importance to increase the number of washes done at or below 30°C in the campaign countries.

In general, consumer education is crucial to reduce energy and water consumption further. The "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign will be an important project to achieve this by encouraging consumers to wash at lower temperatures.

In 2011, **74%** of European consumers think that washing at low temperatures can help a lot in reducing the impact of washing on the environment (vs 64% in 2008).
Washing at low temperatures became the most important factor to reduce impact on the environment.

Q : Thinking about doing laundry, which of the following statements do you believe will help reduce your impact on the environment?
(A.I.S.E. Survey, Insites, 2011)

Wash temperature
Did you know that **41°C is the average temperature** of a machine wash in Europe ? (compared to 43°C in 2008, 46°C in 2002 and 48°C in 1997 - Ref: A.I.S.E. Code of Good Environmental Practice)

32% of loads are washed at 30°C or lower (compared to 29% in 2008)

17% are washed at 60°C or above.

(A.I.S.E. Survey, Insites, 2011)

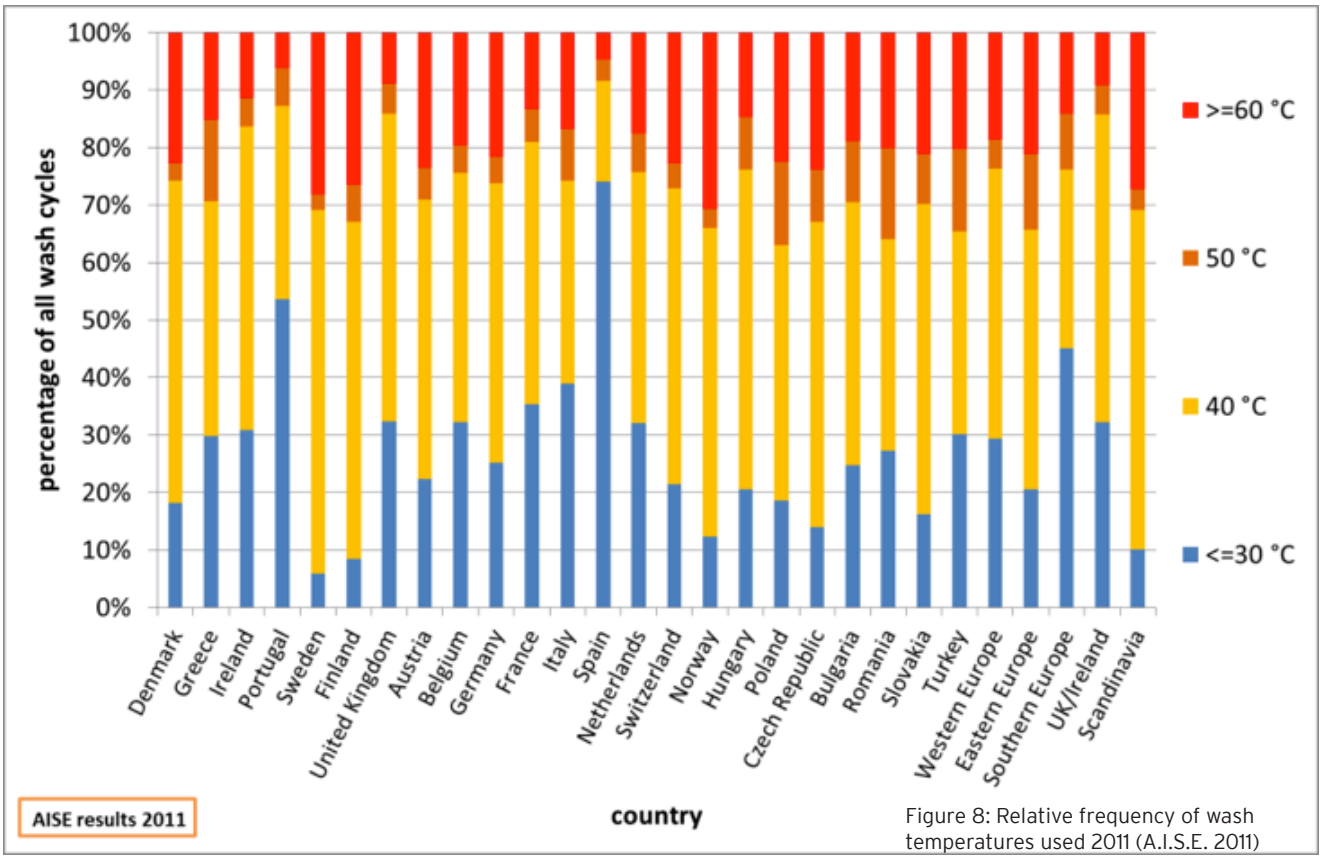


Figure 8: Relative frequency of wash temperatures used 2011 (A.I.S.E. 2011)

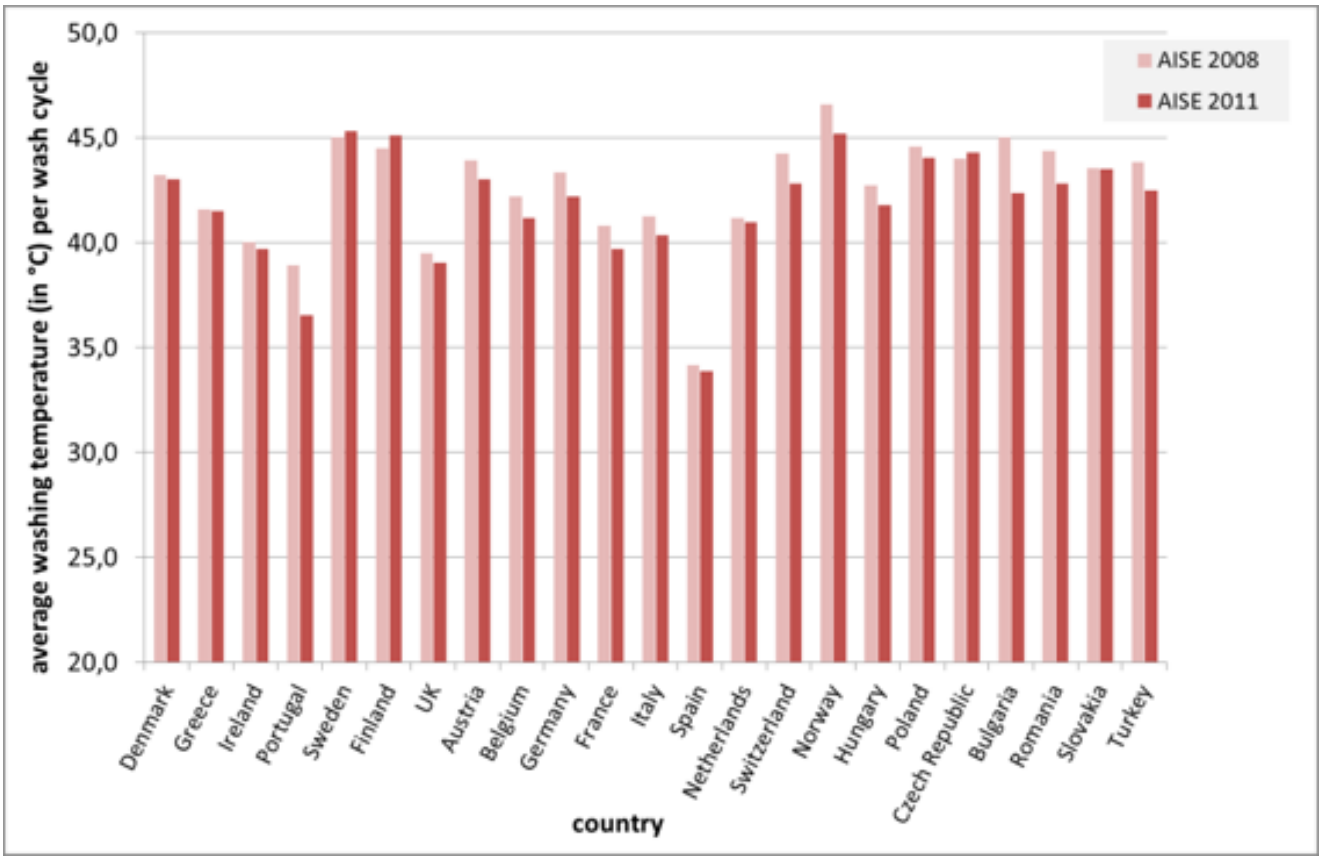


Figure 9: Average wash temperature per country for year 2008 and 2009 using the nominal temperature values of 30°C, 40°C, 50°C and 60°C for calculating the average.

2.2.3 WASHING FREQUENCY AND TEMPERATURES – HISTORICAL PERSPECTIVE

A number of washing behaviour studies has been reported with sufficient details to allow a comparison of today's wash behaviour with previous periods.

- Washing temperatures:

IKW, the German association for detergents and personal care products, (Industrieverband für Körperpflege- und Waschmittel e.V.) published statistics on the selected program temperatures back to 1972 (Figure 10). This shows a drastic reduction of 90°C washes in the 1970s with the so-called first energy crisis, and a continuous increase of washes done at 40°C and lower temperatures. The calculated average wash temperature has dropped from 63°C with approximately 20 degrees in the reported period which covers almost 40 years.

Prof. Stamminger compared the data from several surveys, specifically the 2011 Stamminger survey and A.I.S.E. (2008, 2011) with previously published studies, such as the 2006 data set from Presutto et al. (Ref: Presutto 2007). In comparison to the 2006 data (Presutto, 2007), the average washing temperature in 2011 has decreased as a result of the more frequent use of lower wash temperatures, specifically an increase of 5% for the 30°C programs, combined with the decreased use of the 60°C / 90°C programs (decrease 2 – 3%).

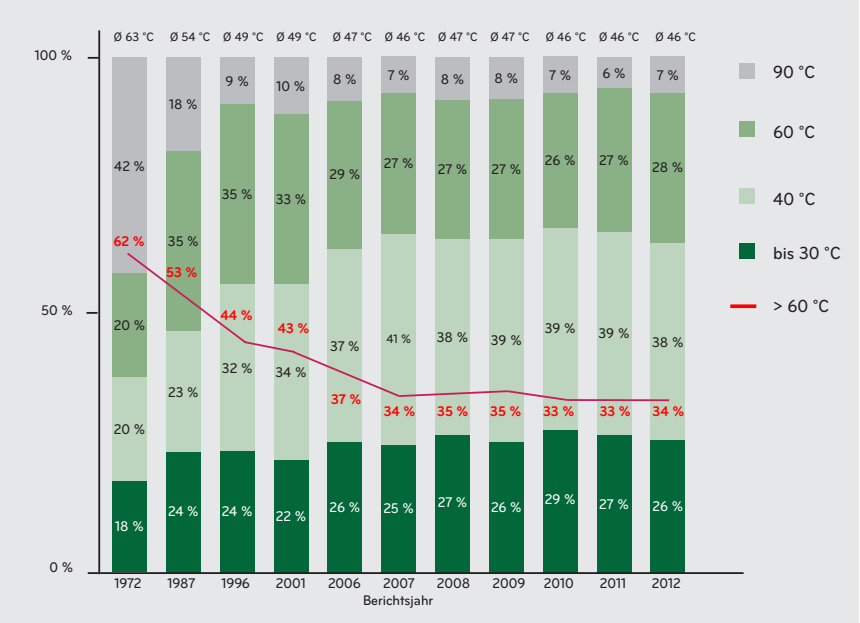


Figure 10: Historical data on washing temperature from 1972 to 2010 for Germany
(Ref: IKW Nachhaltigkeitsbericht 2010)

Did you know?

Denmark (43°C) currently has the highest average wash temperature within the "I prefer 30" campaign countries.
Belgium (41,2°C) is among the campaign countries with highest current average wash temperature.

Outside of the campaign countries, Spain (33,9°C) and Portugal (36,5°C) have the lowest current average wash temperature.

Other historic data are reported in surveys conducted by A.I.S.E. in 1996 and 2001, covering 17 European countries (Ref: A.I.S.E. Code Good Environmental Practices, 2003).
These data have been compared to the 2008 and 2011 survey statistics. Between 1996 and 2011, there has been a decrease in the calculated average wash temperatures (except for Spain). In the majority of countries (except Spain), a reduction is observed of the washes done above 40°C. In most of these countries, the washes have shifted to the 40°C wash programs. Only in some countries (GR, IE, PT, UK, NL), there has actually been an increase of the programs at temperatures below 40°C.
In Spain, the average wash temperature stayed almost equal in the period 1996-2011, or shows even a slight increase, mainly since washes done at temperatures above 40°C have slightly increased.
Today, as reported earlier in this report, the 40°C wash cycle has become the most popular wash programme.

- Washing frequency:

Year	Number of washing cycles per machine per year
1953-1981	277
1982-1992	256
1993-1996	251
1997	251
1998-1999	245
2000	245
2001-2002	245
2003-2004	234
2005	234

Table 3: Annual average number of wash cycles per washing machines in EU 15 (Ref: Kemna & Stamminger, CECED)

A historic analysis by Kemna and Stamminger (Table 3) shows a trend towards a lower wash frequency. Until the early 1980s, there were around 277 wash cycles per machine per year and this frequency reduces to around 234 in 2005.
Supportive of this trend, the A.I.S.E. survey shows that the average weekly wash frequency in 2011 is around 3,5 cycles per household per week, which corresponds to a annual average of 182 wash cycles per household. The Stamminger survey (2011) reports an average weekly frequency of 3,8 cycles per household per week, which corresponds to an annual average of 198 wash cycles per household. While there are differences in the data gathering methodologies, these surveys confirm the general trend towards lower wash frequencies. In the recent years, the average capacity of the washing machines is increasing (from about 4,8 kg in 1997 to 6,0 kg in 2008). This trend started around 2002 and is continuing, and is expected to further reduce the wash frequency.

2.2.4 MACHINE LOADING

The 2008 and 2011 A.I.S.E. surveys investigated to what extent consumers fill their washing machines.

While country by country differences exist, the vast majority of panellists claimed to load the machine 75% up to 100% full. Slovakia was an exception since more than 20% of consumer answered that they filled their machine only half full (the origin of this low fill level is not understood).

There were no significant differences on machine fill levels between 2008 and 2011.

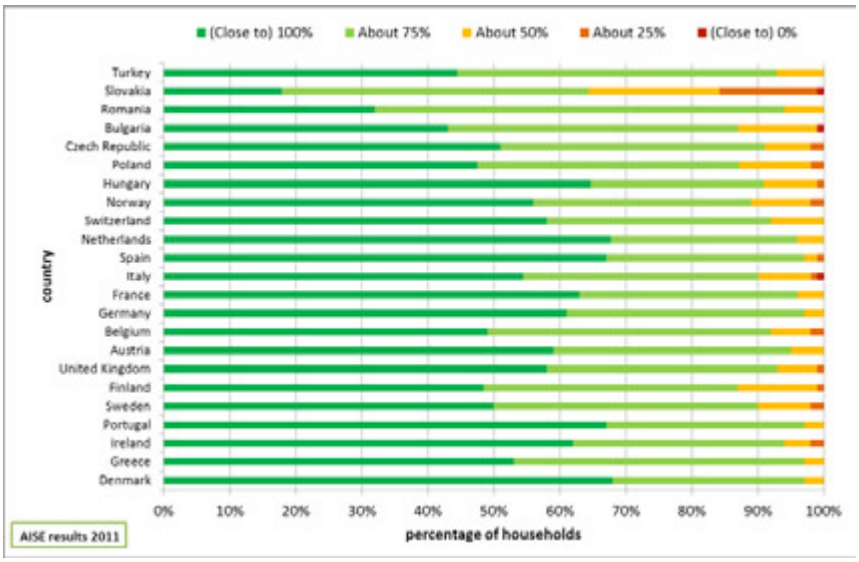


Figure 11: A.I.S.E. 2011 survey findings (Question "On average, for normal laundry washes, for what percentage of your washes do you consider that the washing machine is «full»?")

The 2011 Stamminger survey showed that almost 60% of all consumers claim to use the full capacity of their machine (Fig. 12), while 13% report usually not to fill the machine completely. Approximately 10% mentioned that the degree of filling depends on the type of laundry load. 10% of all panellists admitted to overload the machine.

Many of the new washing machines use sensors to determine the degree of wash loading and match the amount of added water to it. They will dose and heat the water according to the load. Not all machines in the market offer this functionality, so it is important to continue engaging the consumer to use full loads.

This analysis shows that there will be important additional opportunities for saving water and energy if consumers can be engaged to use the full capacity of their machines on a more regular basis. In general, consumer education is a very important element to reduce energy and water consumption further, since the systematic washing with full loads (closer to 'rated capacity') can increase the washing energy and water efficiency considerably as it would reduce the total number of wash cycles.

67% of European consumers avoid underfilling the washing machine.

Q : Which of the following efforts do you make to clean more sustainable? (doing the laundry) (A.I.S.E. Survey, Insites, 2011).

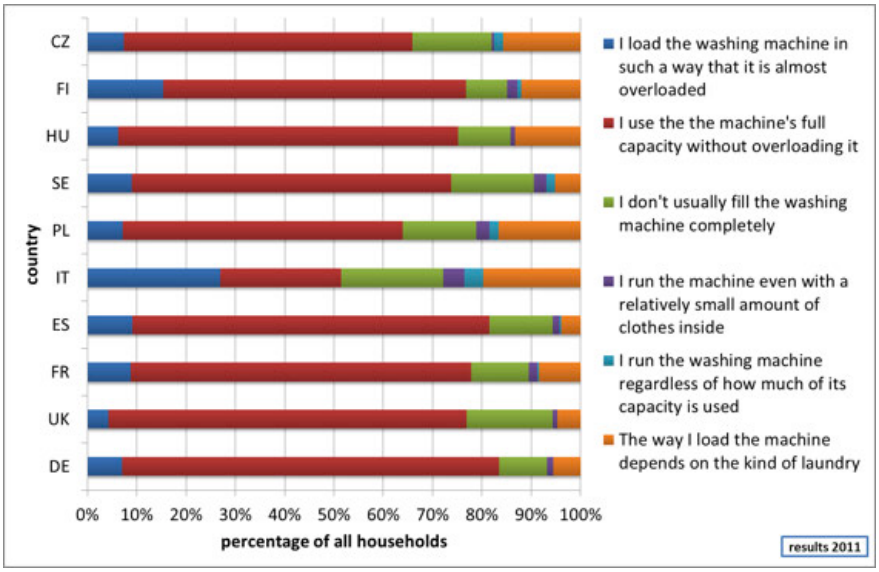


Figure 12: Consumer loading behaviour (Ref: Stamminger survey, 2011)

2.3 PROMOTING SUSTAINABILITY IN THE DETERGENT, WASHING MACHINE AND APPAREL/ TEXTILE CARE SECTORS

2.3.1 DETERGENT SECTOR

A.I.S.E. has a long history of voluntary initiatives which promote safe use, sustainable sourcing and production and sustainable consumption of detergents and cleaning products (See Annex A). This includes initiatives such as the A.I.S.E. Code of Good Environmental Practices (Ref: A.I.S.E. Code Good Environmental Practice, 2003), as well as on-pack and on-line information developed specifically to advise consumers on the sustainable use of detergents and cleaning products, and the A.I.S.E. Charter for Sustainable Cleaning.

A.I.S.E.'s Code of Good Environmental Practice

Between January 1997 and December 2001, the A.I.S.E. Code for Good Environmental Practice focused on household laundry detergents across WE (EU 15 + Iceland, Switzerland, Norway) during a 5 year period from Jan. 1, 1997 to Dec. 31, 2001. The Code was established during the European Commission's 5th Action Programme on the Environment (Ref: A.I.S.E. Code Good Environmental Practice, 2003; and EU Commission Recommendation 98/480/EC).

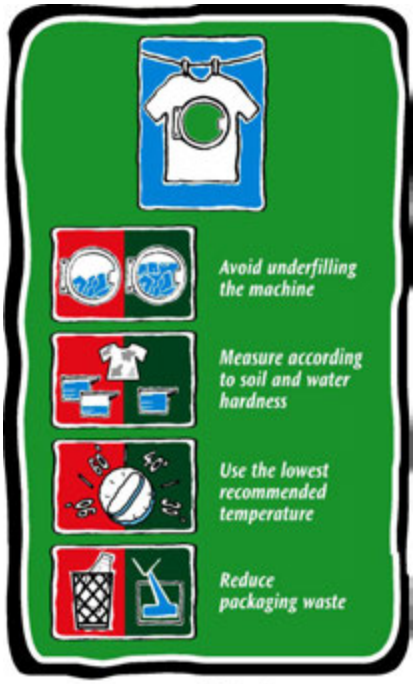
The initiative helped to reduce the average washing temperatures, resulting in a reduction of 6.4% of the energy per wash cycle over the 5 year period. The average wash temperature across Europe was 46°C in 2002 (down from 48°C in 1997). See final Code report available via www.aise.eu

In addition to this laundry energy saving, the A.I.S.E. Code for Good Environmental Practice enabled significant reductions in the use of Laundry detergents, packaging and poorly biodegradable organics (per capita and per wash).

Consumer information initiatives (on-pack, on-line)

Initiated with the Code (see above), A.I.S.E. has been since 1997 promoting the sustainable use of products (laundry and autodish detergents, cleaners etc) through common, on pack information. All those – available to all industry players in the A.I.S.E. sector – can be downloaded from www.aise.eu/end_user_info.

The set of panels below is illustrating how over the last 17 years, A.I.S.E. has been pioneering the first pan-European sustainable consumption on laundry detergents through washright campaign. Besides on pack information (see below), this was accompanied by a number of common industry campaigns undertaken in 1998-2000 (for more information please contact A.I.S.E.)



What is Washright ?
A pan-European campaign launched in 1998 through A.I.S.E., the European detergents industry federation in the context of the first A.I.S.E. voluntary industry initiative ; the Code of Good Environmental Practice for household laundry detergents.
The washright campaign aimed at providing tips to consumers to encourage them to use their laundry detergents in a more environment-friendly way. The panel herewith was developed and has been since then used on billions of packs. Whilst the Code came to an end in 2003, the A.I.S.E panel continued to be used on billions of pack.

2008 - Revision of Washright panel to make it more consumer-friendly.

2008 - Launch of www.cleanright.eu portal, the central A.I.S.E. consumer information portal.

2010 – Update of Washright panel, referring now to www.cleanright.eu.

2013 - 1764 million units of products in Europe include tips for sustainable use (laundry and other products - A.I.S.E. activity and sustainability report, June 2013)

Cleanright.eu

In 2008, A.I.S.E. developed the pan-European www.cleanright.eu webportal. This aims at providing common industry information to European consumers related to soaps, detergents and maintenance products. Developed initially in 4 languages, the Cleanright portal has been subject to different updates and is now available in 27 languages! It reached in 2012 more than 250000 visitors and is now being conveyed on many packs of products from the detergence and maintenance products. It is now the primary reference point for consumers, teachers, students and other interested parties across Europe on household cleaning and maintenance products. Cleanright offers a wide range of objective information to help consumers to get the best results from their cleaning products in a safe and environmentally responsible way.

When the " I prefer 30°" campaign will be launched vis-à-vis consumers across Europe (Jan 2014), the cleanright webportal will be updated to help support this campaign.

www.cleanright.eu

A.I.S.E.'s Charter for Sustainable Cleaning

Launched in 2005, the Charter for Sustainable Cleaning is A.I.S.E.'s biggest and most encompassing initiative to date to promote the sustainable manufacturing, design and consumption of products. It covers all product categories of the soaps, detergents and maintenance products industry, in the household and industrial/institutional sector, in all EU countries plus Norway, Iceland and Switzerland. The A.I.S.E. Charter for Sustainable Cleaning promotes sustainability among companies making detergents and other household and professional cleaning and maintenance products by setting ambitious sustainability compliance criteria and reporting annually on progress. The Charter stipulates a set of twelve Charter Sustainability Procedures (CSPs) which its member companies implement in their management systems, covering all lifecycle phases from raw material selection, occupational health and environmental management during manufacturing up to safety and sustainability requirements for marketed products. Companies must report annually on 11 Key Performance Indicators linked to these CSPs.

The Charter in a few figures:

- 210 companies committed as at Oct. 2013 representing > 85% of the total production output in the EU.
- 19% energy and 24% CO_2 reduction saved per tonne of production over the last 7 years.
- 30% of the brands in the total laundry category already compliant with the Charter Advanced Sustainability profiles.

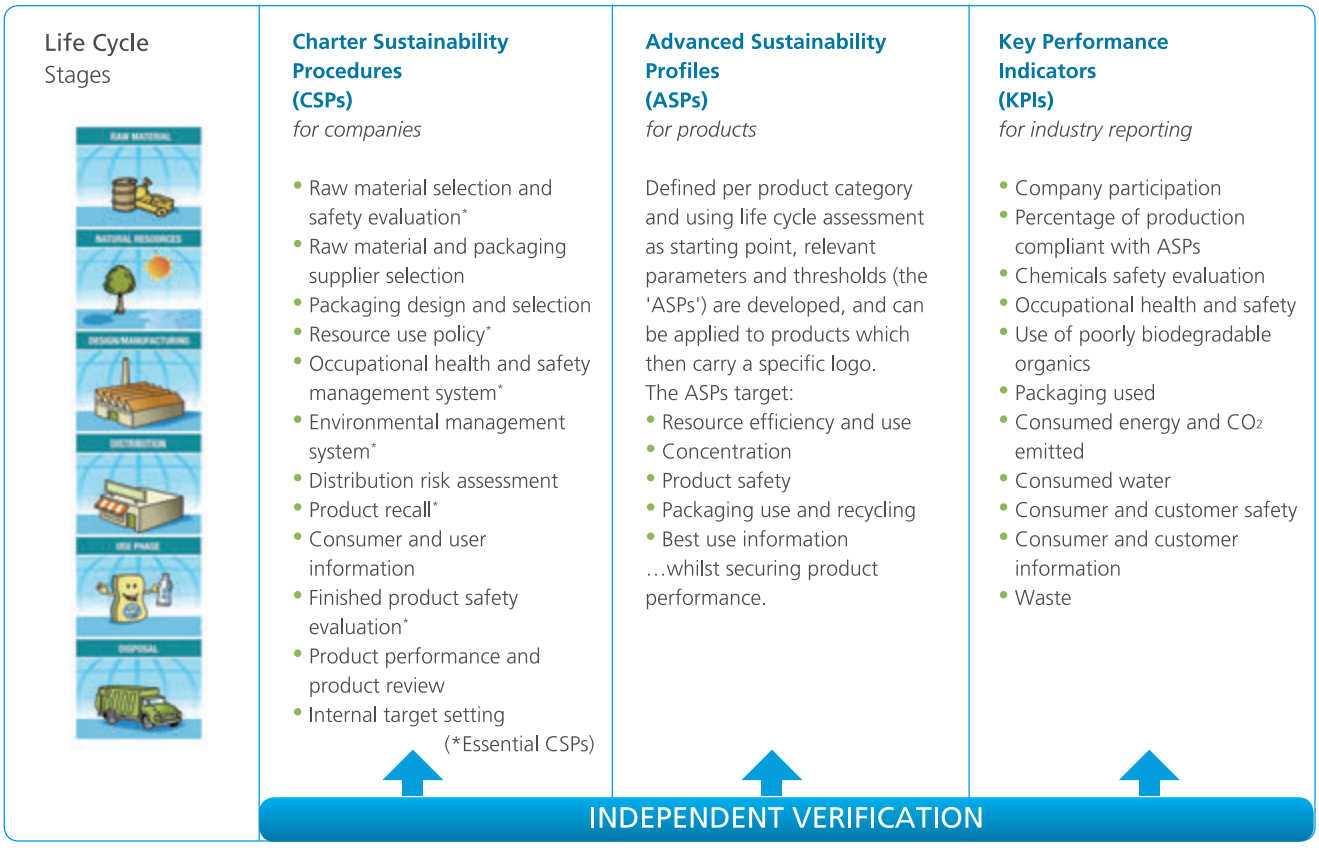


Figure 13: Overview of the Charter principle

Membership is continuously growing: as at October 2013, 210 companies had signed up to the Charter scheme, and 151 of these to the Charter Update 2010, representing more than 85% of the industry's volume output in Europe. Regular upgrades of the Charter, the latest revision in 2010, ensure that it continuously offers the most relevant sustainability assurance system for the industry sector, using life-cycle thinking and science as a basis. For more information, please visit: www.sustainable-cleaning.com

2.3.2 WASHING MACHINES SECTOR

This section describes European appliance market trends relative to washing, as well as facts and figures around energy consumption in key EU countries and by households.

The washing machine market in Europe is characterised by a very high penetration of washing machines in the households with almost saturation in EU-15. In CEE-countries the penetration is increasing continuously. JRC (Ref: JRC, 2009) reports that the number of household washing machines in EU-27 was approximately 173 million units (2007), with sales around 13,7 million units per year. Over the past years the washing machine market has transformed towards appliances with higher efficiency in both energy and water. This change was the result of major technological innovations promoted by industry via several Voluntary Agreements. The trend towards more efficient appliances continued thanks to successful European policies (such as the Energy Label) and national financial incentive campaigns to promote low consuming appliances.

In addition to the trend towards using more energy/water efficient machines, the JRC report advises that behavioural measures, most importantly lowering the washing temperature, can still contribute significantly to further energy savings. In general, consumer education is a very important element to engage consumers towards reducing their energy and water consumption. The specific theme of lowering the average wash temperature in key European countries is the key focal point of the upcoming "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign.

a. Regional differences of laundry electricity use

There are important regional differences in Europe in terms of how much electricity is consumed for machine laundry washing. Table 4 shows an overview of the average annual laundry electricity consumption per household, as well as the total laundry electricity consumption per country.

Across all countries, Norway and Ireland have the highest 'per capita' energy consumption for laundry, followed by UK and Italy. At the other end, Spain and Portugal have the lowest 'per capita' energy consumption for laundry, followed by Germany and France.

Within the countries that are part of the "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign, the UK (with 115 kWh/hh/yr) and Italy (112,7 kWh/hh/yr) have the highest 'per capita' energy consumption, followed by Belgium (97,4 kWh/hh/yr), Denmark (97,3 kWh/hh/yr) and France (92,1 kWh/hh/yr).

Did you know?

Norway and Ireland have the highest 'per capita' energy consumption for laundry (across all European countries).

Italy and UK have the highest 'per capita' energy consumption for laundry within the campaign countries.

France has the lowest 'per capita' energy consumption for laundry within the campaign countries.

Spain and Portugal have the lowest 'per capita' energy consumption for laundry across all European countries.

	Number of households (x1000)	**Energy consumption for laundry washing**	
		per household per year (kWh/hh/y)	per country/region per year (GWh/y)
Austria	3641,4	104,0	378,7
Belgium	4713,0	97,4	458,9
Bulgaria	2701,3	98,4	265,7
Czech Republic	4202,7	91,0	382,6
Denmark	2667,4	97,3	259,6
Finland	2548,3	106,1	270,4
France	28128,0	92,1	2589,6
Germany	38953,5	89,7	3494,0
Greece	4187,1	108,1	452,8
Hungary	3851,7	106,0	408,4
Ireland	1595,7	135,1	215,5
Italy	25141,8	112,7	2833,0
Netherlands	7206,5	96,6	696,5
Norway	2208,3	135,2	298,6
Poland	13631,2	109,4	1490,9
Portugal	3799,2	78,0	296,5
Romania	7400,8	100,0	739,9
Slovakia	1937,5	107,5	208,2
Spain	16424,6	66,4	1090,5
Sweden	4447,9	112,3	499,3
Switzerland	3385,1	90,0	304,6
Turkey	17697,9	85,6	1514,2
United Kingdom	25844,6	115,6	2988,4

Table 4:
Annual energy consumption for machine laundry per household and per country (A.I.S.E. campaign countries in blue) (Ref: Stamminger, 2013)

Source:
Destasis, 2007

b. Improvements of energy and water efficiency of washing machines

Historic analysis shows that impressive improvements of energy efficiency have been achieved. For example, the energy consumption was 37% lower in 2005 as compared to 1992 (Ref: Stamminger, 2013).

Year	Energy Average Consumption (kWh/cycle)
1953-1981	3,250
1982-1992	1,830
1993-1996	1,350
1997	1,177
1998-1999	1,177
2000	1,081
2001-2002	1,081
2003-2004	1,081
2005	0,997
2006	1,005 (*)
2007	1,038 (*)
2008	1,055 (*)(**)

Table 5: Energy: Average Consumption (kWh/cycle) of washing machines in EU15 for a 60°C wash (Ref: Kemna & Stamminger, CECED).
(*)The slight increase in energy consumption in 2006-2008 is probably related to the increasing average machine capacity. In the most recent years (2012, 2013), the average energy use continues to decrease.

By 2008, the average energy consumption for a 60°C cycle was reduced around 1 kWh/cycle, whereas it had been in the 2-3 kWh/cycle range until the late 1980s. More recent surveys (2011-2012; GFK, unpublished) show that the average laundry energy use continues to decrease further in the major European countries.Figure 14 shows that a rapid decrease of the amount of energy and water used per cycle and per kg of laundry. The average water consumption of European washing machines has been reduced from 66,6 (1997) to 47,3 litres per cycle (2008). When this is expressed on the basis of 1 kg of laundry, the water consumption has been reduced from 13,2 l/kg laundry down to 9,5 l/kg laundry (2008), As can be seen in the figures in Annex C. It is currently at 8 l/kg laundry (Ref: CECED, 2013). The more pronounced decrease on a 'per kg' basis can possibly be explained by the increasing average machine capacity (larger capacity machines).
The average capacity of the washing machines (Annex E) has increased from about 4,8 kg in 1997 to 6,0 kg in 2008. This trend started around 2002 and is continuing. Models with capacities from 4 to 5 kg are being substituted by models of 5 to 6 kg. New models with a capacity of 7 kg or higher have become available. The market for small washing machines (3 kg capacity) is almost unchanged.

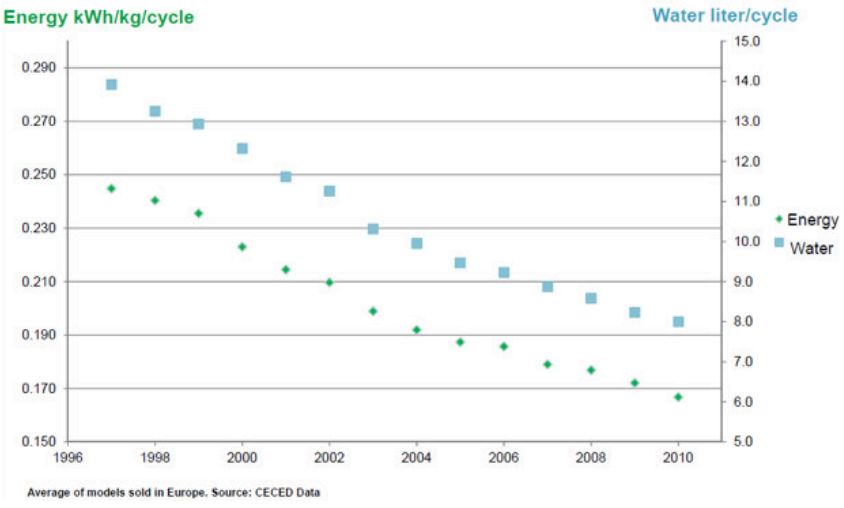


Figure 14: Evolution of Energy and Water Consumption for European Washing Machines
(Energy use is expressed in kWh per kg per cycle; Water use is expressed in liter per kg per cycle).
(Ref Electrolux, 2012)

c. The role of the EU energy label and Eco-Design regulation

The year 1996 marked the introduction of the EU Energy Label scheme for washing machines, focusing the attention of the consumer and the manufacturer to energy and water efficiency. Since 2005, no machines worse than class C were registered in the database, showing the unilateral industrial agreement of CECED functioned effectively. By 2008, about 98% of the sold machines rated in class A or better.

The updated Energy Label regulation (see Annex D) entered into force at the end of 2010 and introduced a new energy label layout with 7 classification classes (ranging from from A+++ to D).
More than 33% of washing machines purchased in 2012 were labeled A+++ or A++ and over 60% had a label A+++, A++ or A+ (GFK, 2013).

The regulation defines technical and labeling requirements for appliance producers and retailers.

Interestingly, the initial energy label scheme required performance testing only with the 60°C programme (Average of 5 measurements). The 2010 update recognised that the majority of washes was no longer done at 60°C and it now requires performance testing with the 60°C and 40°C programmes (full and partial loads in cotton cycles, weighting the results of 3 full loads in the 60°C programme, 2 half loads in the 60°C programme and two half loads in the 40°C programme). In addition, the energy label for washing machines no longer includes a washing performance class since an "A class" washing performance is mandatory for all washing machines.

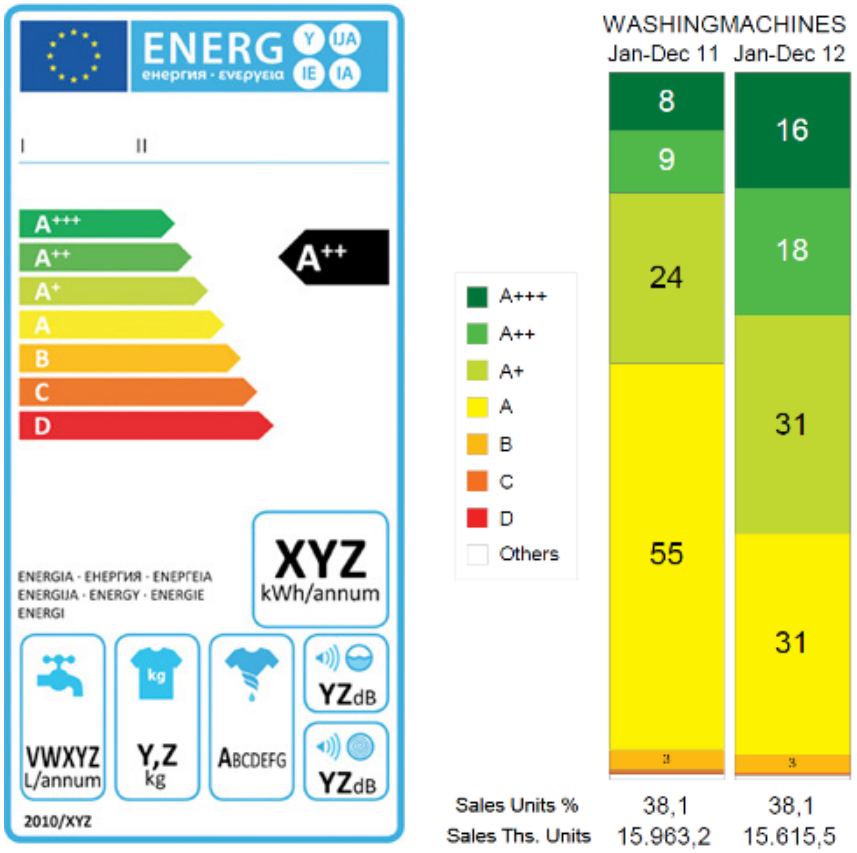


Figure 15: Market overview of EU Energy Label for washing machines
(Period: 2011-2012, 23 EU countries; Ref: GFK, 2013)

The eco-Design Commission Regulation (1015/2010) on household washing machines (see Annex D) defines mandatory requirements for energy and water efficiency, energy consumption during power-off and stand-by mode, information requirements for programmes (e.g. standard cotton programme at 40°C and 60°C, or specific cycles programme) and for the user booklet of instructions (in force by end 2011 or end 2012). Other energy, water and information requirements must be implemented by end 2013, including a new requirement that all new household washing machines must include a 20°C cycle, in order to stimulate consumers to wash colder. "Household washing machines shall offer to end-users a cycle at 20°C. This programme shall be clearly identifiable on the programme selection device of the household washing machines or the household washing machines display". In general, consumers should verfiy in their washing machine booklet which programmes are defined as refreshment or performance cycles.

In general, such developments mandate specific energy, water and information measures and these efforts can contribute to increased consumer awareness around the possibilities and benefit to wash at lower temperatures.

Getting good washing performance is key

Consumer guidance
Read the **booklet of instructions** of your washer to find the facts on energy and water consumption of the various programmes.

If you want to run a **performance cycle,** avoid short cycles and ensure that the wash programme is long enough to achieve a good cleaning performance. The 'main cycle' of the programme during which the water is heated should be long enough.

Comparative detergent testing
To help organisations who plan comparative detergent testing, A.I.S.E. published a test protocol for the performance assessment of Heavy Duty, Light Duty Household Laundry Detergents and Laundry Additives. It is important that test conditions are as close as possible to realistic consumer conditions. The A.I.S.E. protocol provides the minimum requirements for assessing the washing performance of detergents across Europe and allows a realistic and reliable comparison of detergent quality for consumers.

2.3.3 TEXTILE/APPAREL SECTOR

The apparel, textile and fashion industry is also working on the sustainability agenda and we can see different initiatives in the domain, aimed at securing adequate sourcing, design, washing/caring of clothes and possibly, recycling as well. The section below offers an overview of those.

a. Opportunities for savings in the apparel/textile life cycle

When evaluating the environmental impact of clothing throughout its lifecycle phases, a set of opportunities exists to reduce the resource impacts of clothing (Ref: WRAP UK, Valuing our Clothes, 2012). Changes to the way a country like UK supplies, uses and disposes of clothing could reduce the carbon/energy footprint of clothing consumption by 10-20% each.

WRAP research identified the key areas which offer opportunities to save money and resources as well as delivering other benefits. These opportunities cover the entire clothing life-cycle and include the in-use phase and specifically wearing, laundry/ironing behavior.

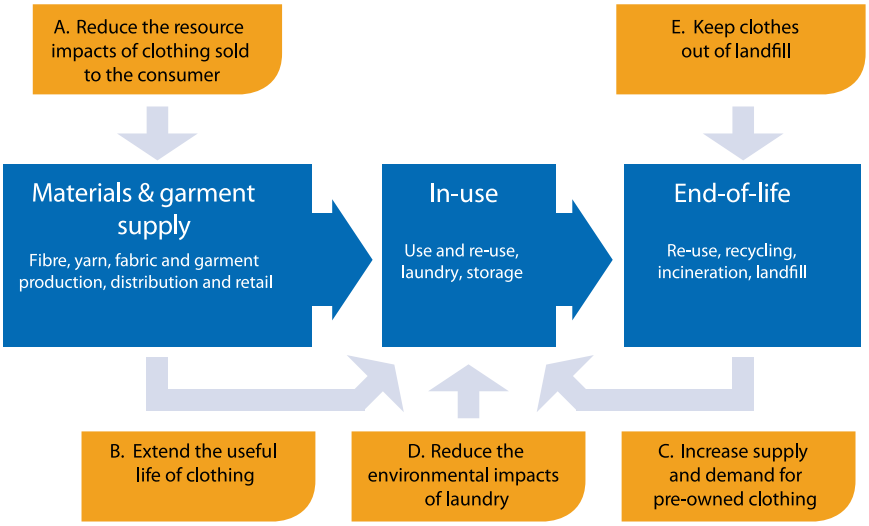


Figure 16: The opportunities for resource efficiency in the clothing sector (source WRAP -www.wrap.org.uk)

One major opportunity for savings is to increase the active life of clothing. As explained above, modern detergents provide color and fabric care benefits, thus lengthening the active use phase of garments. Such effects can help to reduce the environmental impact of clothing.

In the UK, clothing accounts for around 5% of the UK's total annual retail expenditure, with consumers spending £44 billion a year on buying clothes – or around £1700 per household.
The EU27 textile and clothing industry represents a EUR 470,5 Billion business (Ref. Eurostat, 2012) Extending the average life of clothes by 3 months of active use per item would lead to a 5-10% reduction in each of the carbon, water and waste footprints. If clothes stayed in active use for nine months longer (extending the average garment life to around three years), this could save £5 billion a year (in UK) from the costs of resources used in clothing supply, laundry and disposal. Given that over 5% of the UK's total annual carbon and water footprints result from clothing consumption, savings of this scale would be hugely significant not only in financial and commercial terms, but also environmentally.

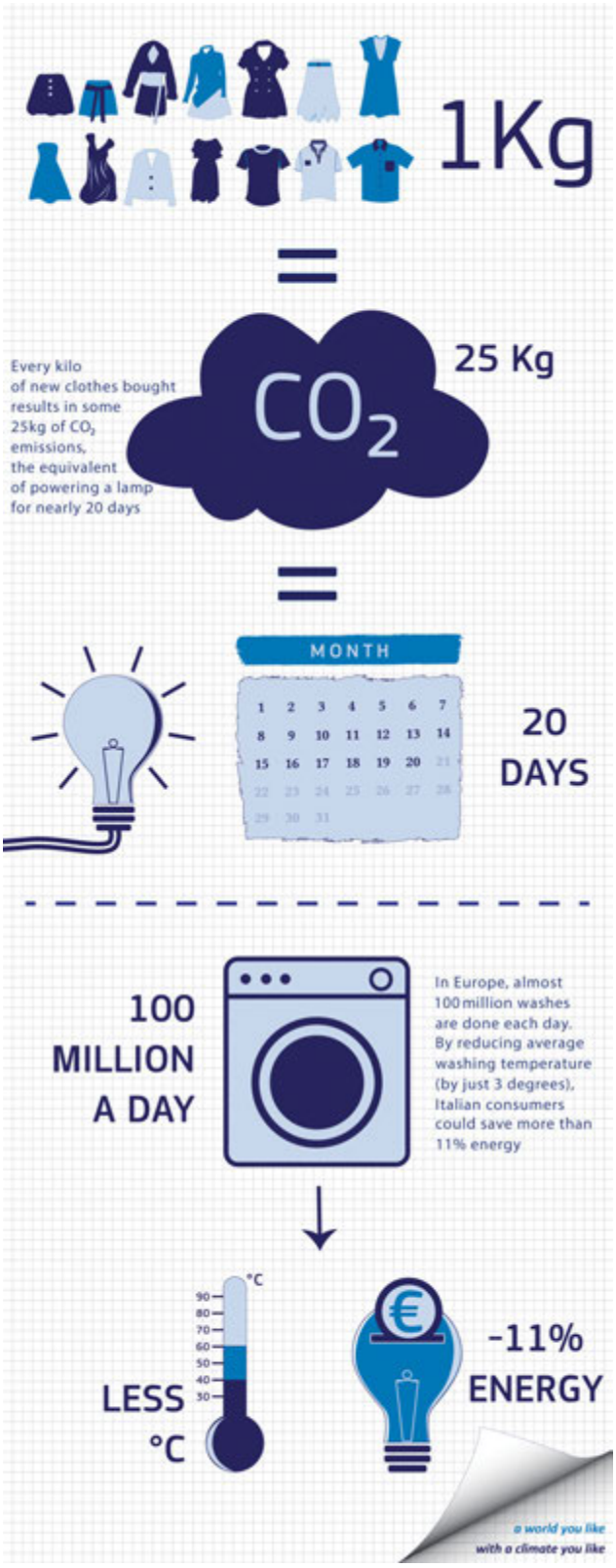


Figure 17: Life cycle information about clothing

Source : European Commission, DG Climate Action - 2013

http://world-you-like.europa.eu/en/

b. Textile care: the GINETEX care symbols

A closely related area to help extending the life of clothing is to promote their proper care. This is the main aim od GINETEX, the International Association for Textile Care Labelling which represents stakeholders and experts for textile care and textile care symbols that are featured in billions of textile labels.

GINETEX: Generic care label symbols

The GINETEX care label on garment are broadly used around the world. They provide maintenance instructions in 5 domains: washing, bleaching, drying, ironing and professional cleaning. They indicate the most severe treatment and care of clothes that can be applied without irreversible damage. Care treatment performed as indicated on the label provides a guarantee that the textile product will not be damaged.

One should note that the visuals do not guarantee that all dirt and stains will be fully removed.
Milder forms of treatment and lower temperatures than those indicated on the label are permitted.

Note: A.I.S.E. has been in close contact with GINETEX in order to secure support from this organisation for the use of the washtub for the purpose of the "I prefer 30°" campaign. Indeed, given the well established visuals and associated textile environment, the creative proposal is closely inspired from this symbol. An agreement of collaboration in the context of this specific campaign has been reached between A.I.S.E. and GINETEX on terms and conditions for use of this trademarked symbol (see design guidelines from "I prefer 30°" campaign). The reference to the fact that the "I prefer 30°" campaign is supported by GINETEX needs to be featured on the toolkit components.

95	For example, the indicated wash temperature on a care label is the maximum allowed wash temperature, but consumers can always wash colder than the temperature indicated on the care symbol.

GINETEX recently developed the "clevercare" campaign and its association symbol (www.clevercare.info) . This symbol advises consumers that they can influence the environmental impacts of garment care by following a set of tips and by carefully following the care symbols that can be found on textile labels. The clevercare symbol is not a technical symbol but advises consumers to consider a wide range of actions during washing, bleaching, drying, ironing and professional textile care.
Specific to washing, the GINETEX recommended advice includes washing at low temperature to save energy, in addition to the recommendation to follow on-pack dosage recommendations and filling the washing machine according to the selected program.

Further information on textile care can be obtained from GINETEX (ginetex@ginetex.net; www.clevercare.info and http://uk.cleanright.eu/force-download.php?file=/media/wde-uk/en_annex%203_2011%20.pdf)

c. Sustainable fashion design and the Nordic Fashion Association

Scandinavian Design is an international renowned trademark known for simple aesthetics and functional lifestyles. Through the Nordic Fashion Association (NFA), 10 Nordic fashion organisations came together to globally help position Nordic fashion. Launched in 2008 by five (now 10) Nordic fashion organizations, the NFA has an intense strategic cooperation across regional and organisational boundaries and is developing and implementing principles for sustainable fashion (e.g. the Nordic Initiative Clean and Ethical (NICE) project was launched in 2009). The new partners aim to accelerate the development of the Nordic fashion industry. They include Sustainable Fashion Academy, Norwegian Fashion Institute, Finatex, The Icelandic Design Center, STIL (the Swedish Trade Federation). In partnership with Danish Fashion Institute, the NFA hosts the world's largest event on sustainable fashion – the Copenhagen Fashion Summit (the next Summit takes place on 23-24 April 2014).

The "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign has been developed in close dialogue with the Nordic Fashion Association.

d. Sustainable textiles : Sustainable Apparel coalition

Another recent example is the Sustainable Apparel coalition. This is an industry-wide group of more than 80 leading apparel, footwear brands, retailers, suppliers, non-profit organizations and NGOs, working to reduce the environmental and social impacts of apparel and footwear products around the world. They take a life-cycle approach and cover water, energy, waste, ingredients as well as social aspects.

For more information, please visit www.apparelcoalition.org

The crucial role of sustainable consumer habits

Laundry creates around one-quarter of the carbon footprint of clothing which corresponds to 3 tonnes of CO_2 per tonne of clothing as a result of energy use.

A combination of good practices – lower wash frequency, lower wash temperature, less tumble dryer usage in summer time and larger loads – could cut the footprint by 7%. And it allows taking better care of clothing while doing the laundry.

Consumers can reduce damage to clothes in the wash by checking on garment labels: one in ten people have not worn clothes because of fading, stains and garments losing their shape in the laundry.

Ref: WRAP, Valuing our Clothes, 2012

3

THE A.I.S.E. LOW TEMPERATURE WASHING CAMPAIGN - WHY AND HOW?

3.1 WHY SUCH A CAMPAIGN? WHAT CAN WE ACHIEVE?

3.1.1 TODAY'S SHARE OF HOUSEHOLD ENERGY USED BY LAUNDRY

Several studies report on the use of electricity consumed by automatic laundry machines. Overall, the use of washing machines represents around 6.4% of household EU electricity consumption, so there is a substantial savings potential if consumers would reduce their energy consumption by lowering the wash temperatures on a large scale.

Pakula and Stamminger (2009) estimate that the current worldwide electricity consumption for laundry machine washing sums up to about 100 TWh of electricity. For Europe, where mostly horizontal axis machines with heating rods are used, they calculated a 2009 electricity consumption for laundry machine washing of 22,1 TWh.

The Joint Research Center (Ref: JRC, 2009) studied the market situation and energy consumption of European washing machines (2007 data) and reported a 90% penetration rate of washing machines in the EU-27 households. This report estimates that washing machines consume 6.4% of the total electricity consumption of the residential sector for the EU-27.

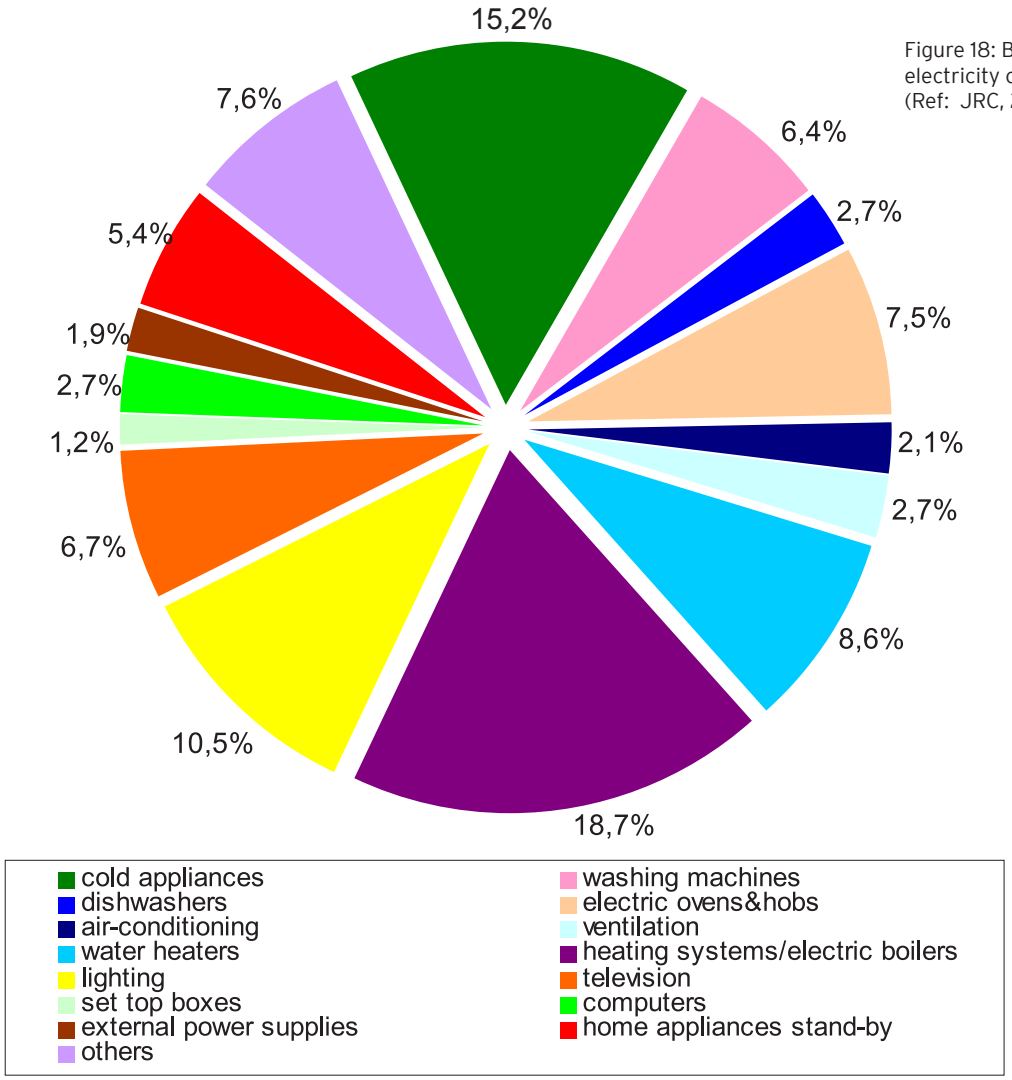


Figure 18: Breakdown of EU-27 residential electricity consumption, year 2007 (Ref: JRC, 2009)

The results of a UK DEFRA study with UK households (Ref: DEFRA, 2012) indicate that washing machines use close to 5% of the total UK annual electricity consumption.
In this study, the six main domestic appliance sectors – cold, wet, cooking, lighting, consumer electronics and computing – made up approximately 80 per cent of the total electricity used in a typical household (excluding electric heating). All 'wet applications' (laundry, dryer, automatic dishwashing,..) account for approximately 17% of the annual household energy consumption.

Appliance type	Contribution to 2010 domestic power use by main 6 appliance sectors (ECUK 2011)[28]
Cold	17
Lighting	17
Cooking	16
Wet	17
CE	25
ICT	8
Total	100

Table 6: A comparison of the main six domestic appliance sectors contribution to domestic demand (Ref: DEFRA, Powering the Nation, 2012)

(CE: Consumer Electronics; ICT: Information and Communication Technology)

The European laundry energy use and in particular the potential for energy saving was recently analysed in the context of the amended work plan for the EU Ecodesign regulation for energy using products and energy related products (Ref: Van Holstein & Kemna, 2011). This analysis confirmed that there is a significant energy savings potential from washing at lower temperatures: "**The analysis indicates that the energetic improvement potential can only be achieved by a concerted effort of detergent manufacturers, appliance manufacturers and consumers together, which is already being sought through voluntary initiatives** ".
The authors refer to the significant energy savings potential which has been achieved through previous voluntary A.I.S.E. initiatives, such as the A.I.S.E. Code for Good Environmental Practices (A.I.S.E., Code of Good Environmental Practice, 2003). This logic applies even more so to the planned A.I.S.E. "Low Temperature Washing Campaign".

3.1.2 ENERGY SAVINGS POTENTIALS FROM LOW TEMP WASHING CAMPAIGN

In summary, washing at lower temperatures has the potential to save about 11% of today's energy used for laundry machine washing assuming that a 3°C reduction of the average wash temperature can be achieved across Europe. This corresponds to 2,49 TWh/yr washing energy saved out of a total washing energy of 22,1 TWh/yr.

The study by Van Holstein& Kemna on the European laundry energy use (Ref: Van Holstein& Kemna, 2011) confirmed that there is a significant energy savings potential from washing at lower temperatures, and emphasized that the optimal way to achieve this is through "a concerted effort of detergent manufacturers, appliance manufacturers and consumers together, which is already being sought through voluntary initiatives ".

In 2013, A.I.S.E. commissioned a study with Prof. R. Stamminger (University of Bonn) to estimate the potential energy savings for the "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign

The study reflects the European laundry situation in 2011 and used the European laundry habits data from the A.I.S.E. habits survey (Ref: A.I.S.E., 2011) to ensure that the diversity of consumer habits and regional differences were taken into account. A number of working assumptions were made, such as assuming a linear correlation between wash temperature and electricity consumption (given that the energy consumption of a single wash cycle depends on the temperature of the wash cycle). It is assumed that the ownership rate of washing machines is 100% in all countries, which is close to reality for most countries and certainly for the campaign countries. The annual energy consumption for laundry washing was calculated by multiplying the number of wash cycles per year with the energy consumption per wash cycle. The total laundry electricity consumption of a country was calculated by multiplying the electricity consumption for laundry washing per household with the number of households in the respective country.
The studied scenarios included variations of wash temperature, machine loads, and changes in energy efficiency of washing machines. The energy savings for all scenarios were calculated against the current energy consumption for automatic laundry washing.

Overall, the study can be considered as the best available assessment of the effect of reduced wash temperatures on the energy requirements for machine laundry in Europe.

Detailed regional and country assessments were included for the 5 campaign countries (Belgium, Denmark, France, Italy, UK), and more broadly for 23 European countries (Au, Belg, Bulg, Czech Rep, Denm, Fi, Fr, Ge, Gr, Hung, Ire, It, Neth, Norw, Pol, Port, Rom, Slovakia, Sp, Swe, Switz, Turk, UK).
In this section, the results are given for "Europe", referring to the 23 European countries where the survey was carried out.
The results for the 5 campaign countries are described in section 3.4.

Across Europe, 68% of wash loads are done at 40°C or higher. The presented analysis shows that the energy savings potential from lowering the wash temperature is substantial.

A reduction of the current wash temperature with 3°C across the EU23 countries can reduce the energy consumption for laundry washing by 11,3% on average. This saving of washing energy corresponds to 2,49 TWh/yr out of a total of 22,1 TWh/yr washing energy.
If the average wash temperature across all EU23 countries would be reduced with 5°C (instead of 3°C), the consumer laundry electricity would be reduced with approximately 18% (41,5 TWh/yr out of the total of 22,1 TWh/yr).

Even more important savings can be achieved in the future when a reduction of the average wash temperature can be combined with increased energy efficiency of the washing machines and with better filling of the machine (washing with full loads), in particular with the growing success of larger capacity washing machines.

This assessment shows the high potential energy savings for the "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign. Reducing the average wash temperature can reduce the electricity consumption for laundry washing significantly. With a relatively simple call to action (lowering the wash temperature to 30° for most wash loads), a considerable energy saving can be achieved, especially when this call to action would be applied massively by consumers in the campaign countries.

Parameter	EU
Population (Millions)	503
Laundry energy use (*)	22,1 TWh/yr
Energy Savings (*) (3°C reduction; TWh/yr)	2,49 (11,3% of current)
Average current wash temperature	40,9°C
Wash loads at/above 40°C (%)	67,8

Table 7: European overview of laundry energy/savings and habits

(*) the listed data are for 23 European countries: Au, Belg, Bulg, CR, Denm, Fi, Fr, Ge, Gr, Hung, Ire, It, Neth, Norw, Pol, Port, Rom, Slovakia, Sp, Swe, Switz, Turk, UK

Energy savings from conversion to low wash temperatures

90°C to 60°C	35% saving
60°C to 40°C	35%-45%
40°C to 30°C	25%-35%
40°C to cold	50%-65%

Table 8: Energy saving potential from conversion to low washing temperatures (Ref. Electrolux, 2012; P&G, 2013)

3.1.3 THE CRUCIAL ROLE OF CONSUMER ENGAGEMENT

As mentioned above, the average energy consumption for a 60°C cycle was around 1 kWh/cycle (2008), whereas it was in the 2-3 kWh/cycle range until the late 1980s. More recent surveys (2011-2012; GFK, unpublished) show that the average laundry energy use continues to decrease further in the major European countries.
As mentioned above, these remarkable changes are to some extent the result of the continuously high pace of sustainable innovation and investment from the detergent industry and the appliance industry.

The other major contributor to the reduction of the washing energy use has been the changes in consumer behaviour, specifically the more frequent use of lower temperature washing programmes during the year-long use of the washing machines in consumers' homes. The improvement of the machine and detergent performance at low temperatures has encouraged users to use these programmes more frequently.

Voluntary initiatives have encouraged consumers to wash at lower temperatures. For example, between January 1997 and December 2001, the A.I.S.E. Code for Good Environmental Practice helped to reduce the average washing temperatures in the EU 15 countries, resulting in a reduction of 6,4% of the energy per wash cycle over the 5 year period. The average wash temperature across Europe was 46°C in 2002 (down from 48°C in 1997).

Organisations such as CECED, the European association of appliance manufacturers, have also invested significantly in consumer communication campaigns. For example, the www.newenergylabel.com website provides detailed and accessible information for the consumers of more than 30 European countries. In addition, governmental and stakeholder initiatives such as the European 'Come On Labels' project (www.come-on-labels.eu) help to raise awareness of the energy label by compiling and promoting European experience related to the energy labeling of appliances and by supporting the proper implementation of the EU energy labeling scheme.

There continues to be ample opportunity to further influence consumer washing behaviour, specifically via the "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign, which will encourage consumers to wash at lower washing temperatures such as 30°C.

Tip – Save energy

Make sure to **read the user manual** of your washing machine and other household appliances ('booklet of instructions').

Find out what the energy/water consumption is for the major cycles.

The programmes indicated as **"standard cotton programme 40°C and 60°C"** are used to declare the information on the energy label. These are optimized for water and energy efficiency.

Use the most efficient cycles at low temperature.

3.2 WHAT? - PROMOTING LOW TEMPERATURE WASHING ADEQUATELY

3.2.1 THE FOUR BENEFITS OF LOW TEMPERATURE WASHING

The "I prefer 30°" consumer engagement campaign will be centered on 4 main consumer benefits:

- **Great cleaning performance for most of the washing**
- **Better clothes care**
- **Great energy savings/better for the environment**
- **Money savings**

The final, detailed consumer material will be provided by A.I.S.E. no later than October 2013 in different tools (leaflet, web banners, advertising, advertorials, website, infographics etc). It will be centered on the above benefits, and consumer guidance elements outlined below.

3.2.2 CONSUMER ADVICE REGARDING HOUSEHOLD LAUNDRY TEMPERATURES

Background

Currently, the average laundry temperature in Europe is 41°C. As reported elsewhere in this document, there is significant potential for energy savings by lowering the average wash temperature. This potential can only be achieved by encouraging consumers to wash certain loads at lower temperatures.

To ensure that its efforts to improve sustainability do not have potential side effects on consumer health, A.I.S.E. is keen to secure that the campaign provide adequate guidance to the consumer, highlighting that a majority of loads and laundry items can be adequately washed at low temperatures (e.g. 30˚C) – but that some items do require more precaution.

An in-depth literature review, regarding the effectiveness of the laundry process in the context of hygiene at different wash temperatures, has been commissioned by A.I.S.E. to the International Scientific Forum on Home Hygiene (IFH) and prepared by Prof. S. Bloomfield (2013). This will be finalised and published by end 2013. Next, thirteen independent experts in the areas of hygiene and public health were requested to provide input to specific questions regarding consumer health aspects of low temperature laundry. This written consultation took place in June/July 2013 and was then analysed by A.I.S.E and Prof. Bloomfield. A summary of the expert consultation, as well as the list of participating experts, is given in Annex F.

The A.I.S.E. guidance outlined below, and represented in Figure 19, was developed taking into account the input received and is the basis for the A.I.S.E. campaign to promote low temperature washing, planned early 2014 for consumers. Adequate transposition into consumer language will be organised in order to convey the advice to consumers.

Principles

IFH recommends that laundering of fabrics in the home should, in addition to making clothes fresh and visibly clean, also help prevent transmission of microorganisms that may be involved in infectious disease. The level of this risk is however considered to be lower than other circumstances involving transmission of microbes in the home, such as direct contact with food contact surfaces. Further, no direct causal relationships have been demonstrated between laundry effectiveness and the occurrence of infections in the home. Nevertheless, due to the overall uncertainty and difficulty to quantify the actual risk, A.I.S.E. recommends that the potential risk be suitably managed.

The main sources of microorganisms harmful to human health are infected family members, food (mainly raw contaminated food), and domestic pets. This rationale is used to differentiate between laundry items and situations depending on the hygiene-related risk:

- First, a differentiation is needed between items / situations where there is a "higher risk" that laundry may have a health impact, versus normal daily laundry items.
- Second, among the normal daily items, further sorting is needed to identify those items for which additional precautions may be appropriate, or at least prudent.
- Finally, it is important to emphasize that full disinfection is outside of the scope of the normal household laundry process (see text box below).

Important remarks regarding laundry disinfection.

In order to achieve disinfection of laundry items, as a minimum, a high temperature boil-wash process (90°C), with sufficient cycle length and a sustained high temperature, is required (or the use of specific biocidal laundry products that have been proven to offer disinfection). Furthermore, in order to keep laundry items disinfected, they should be wrapped and sealed immediately after the laundry process. Laundry disinfection is a specific (usually professional) need that is outside the scope of this guidance.

In the below guidance, it is taken into account that for household laundry cleaning, in several circumstances - whereas disinfection is not required - there is nevertheless a higher need to deliver in-depth cleaning. This is needed to proactively manage any potential health risks that may otherwise be associated with the presence of residues after laundering. The intent of these laundry processes is to deliver thorough cleaning of the laundry; neither the processes nor the used detergents are able to deliver disinfection, i.e. the resulting laundry will not, and is not intended to, be sterile.

The effectiveness of the laundry process to deliver in-depth cleaning is achieved through a combination of several factors (cf. Sinner circle, see section 1.1 in this document): temperature, rinsing, mechanical agitation, cycle length, and the ability of the detergent to detach and solubilize soil. Consequently, the below recommendation provides guidance on all these aspects of the laundry process – aiming to achieve a level of cleaning that is adequate for the different circumstances.

GUIDANCE FOR "HIGHER RISK" LAUNDRY ITEMS AND SITUATIONS

A number of laundry items and situations are inherently of a "higher risk" from a health point of view, because of the substantially higher probability of contamination with (potentially pathogenic) micro-organisms, due to the presence of infection, the contact with contaminated food, or other sources of pathogens. In addition, any situation involving people who do not have a fully functional immune system are also of "higher risk" for these individuals.

For these "higher risk" laundry items, and/or for situations that imply a higher risk for the spreading of infection, it is recognised that the laundry process has an important role to help avoid potential health concerns.

a. Identification

The following laundry items are considered "higher risk":

- In normal healthy households:
  - Items that are heavily soiled with faeces, vomit, blood, body fluids (including babies nappies), or soiled by pets
  - Cloths and towels that are used in the kitchen during food preparation
  - Clothes used in high people contact sports e.g. rugby, American football, martial arts, etc
- Presence of infection in the household:
  - Clothing and household linens of ill people (e.g. with infectious diseases, chronic wounds, or skin diseases), including clothing of hospitalized patients that is laundered at home
  - Clothing of people giving care to infected family members

- Specific situations:
  - Uniforms of health care workers that are laundered at home, as well as other professional clothing that may be contaminated with infectious microorganisms (e.g. veterinarians, sewage workers, medical laboratory clothing, etc.) [1]
  - Clothing and household linens of persons who are particularly vulnerable to infection due to a compromised immune system (e.g. undergoing cancer chemotherapy, HIV/AIDS, etc.)

b. Recommendation

For the "higher risk" laundry items and situations, A.I.S.E. recommends the combination of a 60°C wash with the use of a general-purpose powder detergent [2]. In terms of wash settings, a programme with a sufficiently long cycle length (at least 40 minutes) should be selected, e.g. a standard cotton cycle. The use of quick wash settings is inappropriate for "higher risk" items.

Next to choosing the right temperature and detergent, it is equally important to appropriately sort the laundry. Especially, it is critical to wash laundry items that are (or may be) heavily contaminated separately from other items – even if they are all considered as "higher risk".

In severe situations of infection, especially when spore-forming organisms such as Clostridium difficile are involved, use of a boil wash cycle (or equivalent effectiveness through use of disinfecting agents) may be required. In such situations, A.I.S.E. recommends to seek more specific guidance from the treating medical doctor.

GUIDANCE FOR NORMAL DAILY LAUNDRY ITEMS

In situations of good health, based on the expert review, A.I.S.E. judges that the potential infection risk associated with a substantial number of normal daily laundry items is sporadic and sufficiently low that no specific precaution is needed in the laundry process. Consequently, laundering at a low temperature (e.g. 30 °C), regardless of the type of detergent used, is adequate and does not lead to health risks.
However, building on the IFH position that also "normal" laundry items can be a risk factor for transmission of infection in home and everyday life settings, and building on the guidance from several of the consulted experts, A.I.S.E. judges it is prudent to apply a more precautionary laundry process to a number of items that may have a higher bio-burden.

a. Identification

The following normal daily items (with typically no soiling from body fluids) are judged to carry no meaningful infection risk:
- All outer clothing items (jackets, sweaters, shirts, skirts, trousers, dresses,...)
- T-shirts
- Top underclothing
- Socks (unless in cases of fungal infection)
- Table linen
- Curtains

[1] Ideally, A.I.S.E. recommends that the professional garments listed here be laundered in dedicated professional laundry facilities, using appropriate processes. However, if in practice these items are to be laundered at home, they should be handled as "higher risk" items.
[2] Containing oxygen-based bleaching agents, as listed on the ingredient label (i.e. excluding powder detergents specifically developed for delicates or for colored laundry items, and excluding liquid detergents). Oxygen-based bleaching agents are especially effective in helping to remove soil by breaking the dirt molecules into smaller fractions that can be more easily washed away (cf. section 1.2.1 of this document). As such, these detergents can deliver a stronger overall cleaning performance.

- Beach towels
- Etc

The following normal daily items may, on the other hand, have a higher bio-burden:
- Those body contact items that are normally (or accidentally) contaminated to some extent by body fluids such as mucosal secretions, faecal matter, urine, heavy perspiration (i.e. underwear, sports clothes, bath towels and wash cloths, bed linen, handkerchiefs)
- Items that are heavily soiled or that carry strong malodour (as these aspects may be indicators for microbial contamination)

To note/good practice: for situations where a shared laundry facility is used (e.g. shared machines in large buildings and launderettes), similar precaution is recommended as for the above items with a higher bio-burden

b. Recommendation

Considering the sustainability and fabric care benefits, for the majority of daily laundry items, A.I.S.E. recommends to routinely wash at low temperature (e.g. 30˚C or below), without any further precautionary measures.
For those body contact and/or heavily soiled items that may have a higher bio-burden (cf. above), as well as for shared laundry facilities, A.I.S.E. judges it is appropriate to wash with a general-purpose powder detergent [3], at a temperature of 30 to 40˚C. A temperature of 30˚C is judged to be adequate for lightly soiled loads, for items that have not been in humid conditions, or for items that are subsequently ironed or dried in the sun or machine-dried [4]. Otherwise, 40 ˚C is recommended. In terms of wash settings, a programme with a sufficiently long cycle length (at least 40 minutes) should be selected, e.g. a standard cotton cycle.

Note that in the majority of cases, these items are not expected to be contaminated with pathogens at harmful levels. Therefore, they could also be washed at low temperature without further precautions. However, due to their higher bio-burden than most daily laundry items, the risk may be higher and hence, it is prudent to take extra precautions.

Beyond the identification of those daily laundry items that require this additional precaution, it is still necessary to sort the laundry based on the usual needs such as colour, degree of soiling, and fabric care aspects.

[3] Containing oxygen-based bleaching agents, as listed on the ingredient label (i.e. excluding powder detergents specifically developed for delicates or for colored laundry items, and excluding liquid detergents
[4] Please note that machine drying is very energy-intensive, and consequently, is not recommended as a replacement for a higher wash temperature to achieve adequate hygiene. However, if machine drying is applied for other reasons, a wash temperature of 30˚C is judged adequate.

ADDITIONAL GUIDANCE

a. Fabric care aspects

For some items identified as "higher risk" or as requiring additional precaution, the fabric care label may not be compatible with the laundry process recommended in the above guidance, either because the recommended washing temperature is not allowed, or because a milder detergent should be used, or both. For these items, a lower temperature wash, and/or the use of a different type of detergent, is acceptable – provided the overall laundry process is equivalent. For example, this can be achieved through the use of a suitable laundry additive.

b. Drying

It is recommended to dry the laundry as soon as possible after washing. It should not be left damp for long periods, e.g. in the washing machine overnight, because remaining microbes may multiply quite rapidly. In particular, although these are not harmful, this includes microbes that impart unpleasant odors to the textiles. Similarly, it is recommended to not leave soiled laundry in damp conditions, to avoid proliferation of microbes prior to the laundry process (which will unevitably lead to a higher residual contamination after the wash).

c. Hand hygiene

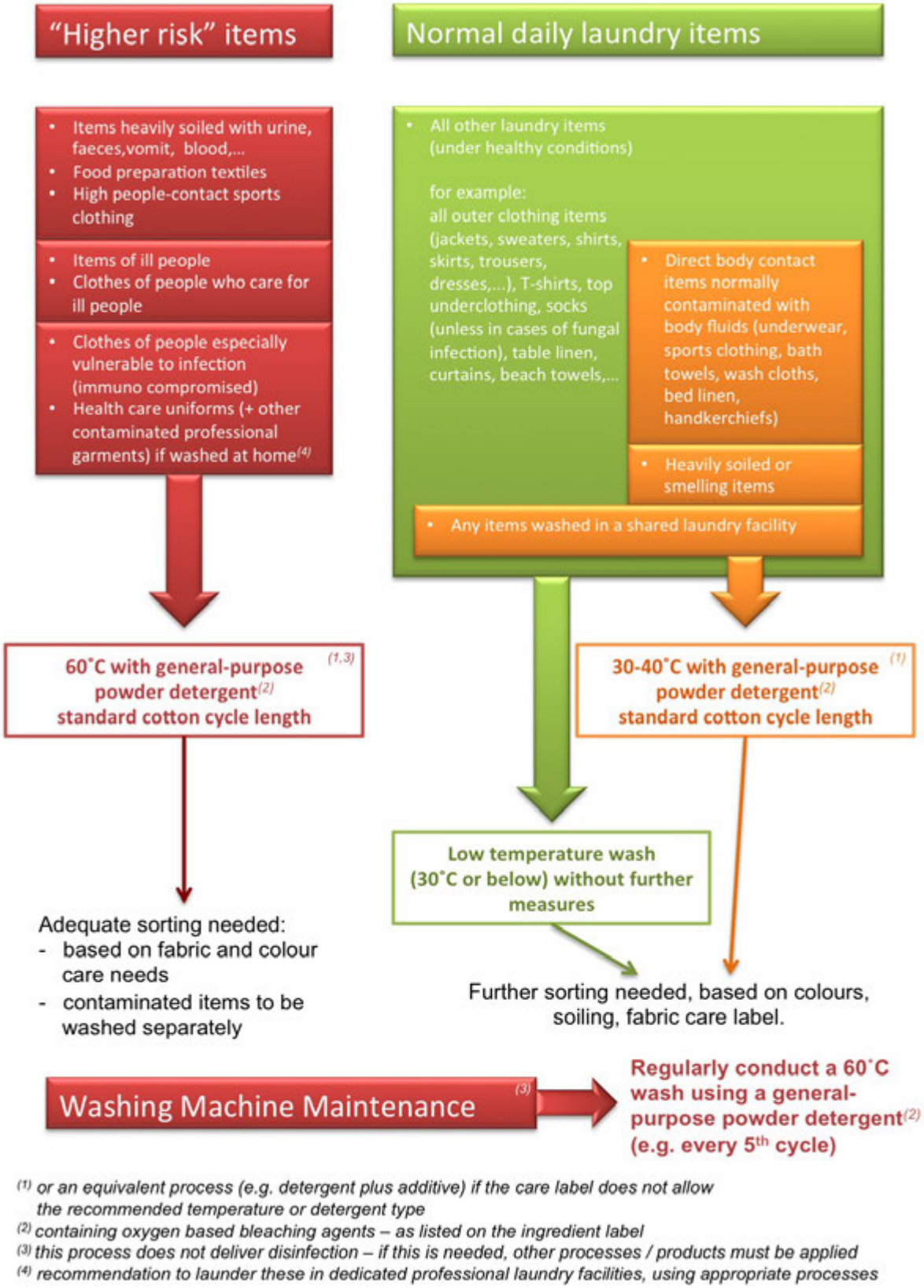
It is recommended to wash hands after handling soiled laundry. For "higher risk" laundry items as identified above, this is especially important – even if the laundry is not visibly dirty. When handling soiled "higher risk" laundry items, it would be prudent to wear gloves.

d. Washing machine maintenance

When washing only at low temperatures, malodours may develop inside the washing machine. These malodours are not known to be associated with adverse health effects, but can be unpleasant and persistent. To avoid them, A.I.S.E. recommends to regularly conduct a 60°C wash (using a general-purpose powder detergent), for example every 5th cycle. Alternatively, the machine may be regularly cleaned using a dedicated product (according to the usage instructions).

In addition, the door and the detergent drawer should always be left open when the machine is not in use, allowing the interior of the machine to vent and dry, because humid conditions within the machine may stimulate biofilm growth. Also, the rubber lining of the machine's door and the detergent drawer should be kept clean.

Please note that the above guidance does not lead to full disinfection of the washing machine (cf. higher, box "important remarks regarding laundry disinfection").



(1) or an equivalent process (e.g. detergent plus additive) if the care label does not allow the recommended temperature or detergent type
(2) containing oxygen based bleaching agents – as listed on the ingredient label
(3) this process does not deliver disinfection – if this is needed, other processes / products must be applied
(4) recommendation to launder these in dedicated professional laundry facilities, using appropriate processes

Figure 19: Summary of A.I.S.E. consumer advice regarding household laundry temperatures

3.2.3 OTHER IMPORTANT ASPECTS OF GOOD LAUNDRY PRACTICE

Sorting
In the above guidance it is recommended to sort laundry items based on potential health aspects. In addition, of course it should be borne in mind that other parameters including fabric care guidance, colors vs. whites, type and intensity of stains, etc., need to be taken into account when determining what laundry process (cycle type and detergent type) is appropriate.

Correct use of the detergent and the washing machine
Consumers should wash full loads (avoid underfilling or overloading the machine).

Consumers should use the correct dose – dosing too much is wasteful, too little could mean poor results, rewashing, increased wear and poor hygiene. They should dose according to the water hardness in their area.

The most important advice for users of detergents and maintenance products is also the simplest: consumers should be encouraged to read the label. This helps secure safe use of the products as well as correct dosage.

Consumers should also be encouraged to read the instructions booklet of their washing machine, to find the facts on energy and water consumption of the various programmes. Consumers should verify in their washing machine booklet which programmes are defined as refreshment or performance cycles.

Besides the on-pack information panels with tips for saving water, energy, CO_2 and money without compromising on cleaning performance, consumers can find ample information on the on the 'cleanright' website, including the 'Laundry Consumer Tips Guide' with easy to use tips for match detergent products with the specific job.

http://uk.cleanright.eu/force-download.php?file=/media/wde-uk/laundry-annex2.pdf

3.3 HOW? THE CONCEPT AND VALUE OF A MULTI STAKEHOLDER CAMPAIGN

A.I.S.E. has a long history of voluntary initiatives which promote safe use, sustainable sourcing and production and sustainable consumption of detergents and cleaning products (See Annex A). Several of these initiatives were executed in partnership with other organizations.
The "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign has been developed based on the proven concept that an Industry Association-led initiative is a very efficient way to make consumers' habits switch to more sustainable patterns as it can achieve greater recognition by consumers being led by the whole industry sector specially if also organised jointly with other stakeholders. Such an approach can build on and benefit from a coordinated communication campaign that is expected to be more successful if it is supported by a broad coalition.

The concept of the "A.I.S.E. low temperature washing" campaign combines a core campaign, based on a central toolkit and similar, synchronized communication by multiple amplifiers.

Today's most popular wash programme: 40°C. Tomorrow: 30°C!

Approximately **43% of all wash cycles** across all European countries are **washed at 40°C**, making the 40°C cycle the most popular programme today.

The majority of washes in Spain and Portugal is done at or below 30°C.
Spain is the champion with 74% of loads done at 30°C or lower.

The "A.I.S.E. low temperature washing" campaign aims to **make the 30° programme the most popular cycle !**

A.I.S.E., through detergent companies, undertakes to run a consumer engagement campaign ('core campaign') to drive low temperature washing. This campaign will be deployed in a specific time window and be based on a communications toolkit centrally designed by A.I.S.E.

The concept of the campaign is that the core campaign will be led by detergent companies, based on the "I prefer 30°" communications toolkit. The toolkit will be made available to other potential partners in related industries (e.g. textile/apparel, appliance industry, retailers) as well as other relevant stakeholders (e.g. consumer and environment NGOs, national energy agencies), based on the Campaign Design guidelines. Detergent companies as well as additional partners will complement the core campaign by using the communications toolkit through their own communication channels. In total, the campaign will then be used in different communications channels (see below), during the same timing window (January-October 2014).
Whilst initiated by the detergent industry through A.I.S.E., the campaign is open to different partners (to find out more about the partners' commitment, please visit www.iprefer30.eu).
i. Core campaign leaders - This category are companies manufacturing and/or placing on the market household laundry detergents (either branded or private label products) within the defined geographical scope. Their key role will be to support the financing of the core campaign and make optimal use of the toolkit through their communication channels.

ii. **Gold partners** - This category covers companies active within the geographical scope of the project in a 'Business to Consumers' industry related to the detergent industry, such as appliance (washing machines) manufacturers/retailers, apparel/textile industry/retailers, fashion houses, retailers. Their key role will be to make optimal use of the toolkit through their communication channels.

iii. **Corporate supporters** - This category includes 'Business to Business' companies outside of the "core campaign leader" category but which may be related to this sector (e.g. suppliers), when they see an opportunity in helping the successful roll out of the campaign. They can help sponsor the campaign and help amplify it through their communication channels.

iv. **Institutional supporters** – These can be organisations such as associations, Non Governmental Organisations, Academia or National Authorities, with a link or an interest in driving further the sustainability profile of household laundry detergent products. Institutional supporters will support the campaign and agree to have their logos featured in the project's communication material. Industry associations may wish to apply to this category. Their key role will be to make optimal use of the toolkit through their communication channels.

Also, A.I.S.E. will seek to have **Ambassadors** to the project. Those will be individuals selected by A.I.S.E. or its National Associations, on the basis that they would have a link or an interest in driving further the sustainability profile of household laundry detergents products in the context of the specific A.I.S.E. low temperature campaign ("I prefer 30°"). Ambassadors may be or come from senior representatives from EU or national authorities, detergent industry representatives, consumer or environmental organisations, detergent test institutes, academia, consumers or any other individual motivated by the promotion of sustainable consumption patterns and the A.I.S.E. low temperature campaign in particular.

Through this unique, multi-stakeholder collaborative campaign, A.I.S.E. and its partners aim to drive consumers towards low temperature washing in each of the campaign countries.

3.4 WHERE? 5 CAMPAIGN COUNTRIES & THEIR ENERGY SAVINGS POTENTIAL

The "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign is planned for 5 important European countries : **UK, France, Italy, Belgium, Denmark.**

Combined, these countries represent 41% of the EU population. They are characterized by a very high degree of washing machine penetration, close to 100% (Ref: JRC, 2009; Stamminger, 2013).

Those countries have been selected either due to their size, current average wash temperature, opportunities with partnerships already in place or under way (eg Belgium with its multi-stakeholder sectoral agreement or Denmark with Nordic Fashion Association).
Based on the learnings from this campaign, A.I.S.E. will assess whether to repeat it or extend it to a broader scope of countries in the future.

Across Europe, 68% of wash loads are done at 40°C or higher. Table 9 reports the wash load temperature distribution for the 5 countries. These range from 61,1% (Italy) up to 81,9% (Denmark).

The energy consumed for washing in each of these countries is important in absolute terms as well as relative to the total European laundry energy use. Combined, the laundry energy use of these 5 countries represents

38% of total European laundry energy use, which is a very high proportion.
A reduction of the current wash temperature with 3°C in the 5 campaign countries can reduce the energy consumption for laundry washing by 14,3% on average. This saving corresponds to 1307,9 GWh/yr out of a total of 9129,5 GWh/yr laundry energy for the 5 campaign countries.
As mentioned above (Chapter 3.1.2), the reduction would be approximately 12% of 22,1 TWhyr if the 3°C reduction would be achieved across the 23 European countries. This corresponds to 2,49 TWh/yr. And if the average wash temperature in the 5 campaign countries would be reduced with 5°C (instead of 3°C), the consumer laundry electricity would be reduced with approximately 18%.
Specifically in Belgium, the national sectoral agreement between the government, retailers and detergent producers aims (among other topics) to reduce the average wash temperature with 4°C by 2015, as compared to 2008. The agreement aspires to achieve a further reduction of the wash temperature by 2019, for which the targets will be defined based on 2015 findings.
Currently, Denmark has the highest average wash temperature within the 'I prefer 30' campaign countries, with an average wash temperature of 43°C.
Within these 5 countries, the UK (with 115,6 kWh/hh/yr) and Italy (112,7 kWh/hh/yr) have the highest 'per capita' energy consumption for washing, followed by Belgium (97,4 kWh/hh/yr), Denmark (97,3 kWh/hh/yr) and France (92,1 kWh/hh/yr).
The combination of these facts show the important potential contribution of these 5 countries to the success of the "A.I.S.E. low temperature washing (I prefer 30°)" consumer engagement campaign.

	UK	France	Italy	Belgium	Denmark	5 countries combined	Europe
Population (Millions; % of EU27)	63 (12,5%)	65 (13,0%)	61 (12,1%)	11 (2,2%)	5,6 (1,1%)	**206 (41,0%)**	*579 (>100%) (*)*
Laundry energy use per household (kWh/hh/yr)	115,6	92,1	112,7	97,4	97,3	/	/
Laundry energy use (in country/region; GWh/yr)	2988,4	2589,6	2833,0	458,9	259,6	**9129,5 (38%)**	*22,1 TWh/yr (*)*
Energy Savings (3°C reduction; GWh/yr)	358,61 *(12,0% of current UK)*	304,22 *(11,7% of current FR)*	324,56 *(11,5% of current IT)*	50,97 *(11,1% of current BE)*	26,99 *(10,4% of current DK)*	**1065,35** *(11,7% of current 5 Countries)*	*2493 (11,3% of current Europe 23) (*)*
Average current wash temperature	39°C	39,7°C	40,4°C	41,2°C	43°C	**40,9°C**	*40,9°C*
Wash loads at/above 40°C (%)	67,6	64,7	61,1	67,8	81,9	**65,2**	*67,8*

Table 9: Overview of laundry energy/savings and habits in 5 campaign countries

(*) the listed data are for 23 European countries: Au, Belg, Bulg, CR, Denm, Fi, Fr, Ge, Gr, Hung, Ire, It, Neth, Norw, Pol, Port, Rom, Slovakia, Sp, Swe, Switz, Turk, UK

3.5 GREENHOUSE GAS REDUCTION POTENTIAL

3.5.1 CALCULATION OF GREENHOUSE GAS REDUCTION POTENTIAL

Energy (electricity) savings achieved by reducing the laundry temperature were quantified on a country-per-country basis by Pakula & Stamminger (2013). From the reported national savings potentials, aggregated savings across Europe were calculated by A.I.S.E..
Subsequently, the potential energy savings were converted to their equivalent in greenhouse gas reduction, taking into account country-specific (or for the aggregated number, European average) conversion factors from household electricity to CO_2 equivalents. These emission factors cover all greenhouse gas emissions across the entire life cycle of electricity production until delivery of the power at the consumer's home, as reported in the European Reference Life Cycle Database (ELCD) (JRC, 2009).
Note that for the European aggregation, Turkey was excluded, as the available average European electricity-to-CO_2 conversion factor did not include Turkey. This approach covers most of the European Union with the exception of Croatia, Cyprus, Estonia, Latvia, Lithuania, Luxembourg, Malta and Slovenia. On the other hand it does include some non-EU European countries (Norway, Switzerland).
Overall this leads to a somewhat conservative savings estimate for all of Europe (the reported savings are expected to be an underestimation by about 2,5%).
Several scenarios were explored by Pakula & Stamminger (2013). For the purpose of quantifying the potential environmental benefits, the following scenarios were used, or derived from the reported results:

- Reduction of average laundry temperature (nominal) by 3°C
- Reduction of average laundry temperature (nominal) by 1°C
- Average wash temperature of 34,5°C, achieved through the following distribution: 25% at 20°C / 35% at 30°C / 25% at 40°C / 15% at 60°C / 0% at 90°C

The latter scenario aims to represent a possible best case scenario of implementation of the A.I.S.E. guidance on laundry temperatures – i.e. an average nominal temperature of approximately 6-7°C less than today's average, achieved by washing at or below 30°C whenever possible, but leaving a number of loads at 40°C or 60°C to ensure potential health concerns are adequately managed. This scenario is further referred to as "A.I.S.E. guidance". The resulting energy and greenhouse gas savings are provided in Table 10.

Table 10: Potential energy savings and greenhouse gas emission reductions for several laundry temperature reduction scenarios

	Annual Energy Savings			Annual Reduction of Greenhouse Gas Emissions			
	3°C Reduction GWh/y	1°C Reduction GWh/y	A.I.S.E. Guidance GWh/y	CO_2 equivalent per GWh consumed T CO_2- eq/GWh	3°C Reduction T CO_2- eq/y	1°C Reduction T CO_2 - eq/y	A.I.S.E. Guidance T CO_2 - eq/y
Belgium	51	17	114	402	20490	6830	45631
Denmark	27	9	77	760	20512	6840	58322
France	304	101	528	146	44416	14806	77138
Italy	325	108	634	708	229788	76599	448851
United Kingdom	359	120	545	658	236222	78741	358367
Europe	2333	778	4810	578	1348306	449435	2779943

3.5.2 VISUALIZATION OF ENVIRONMENTAL BENEFIT

The potential environmental benefit that can be achieved by reducing laundry temperatures can be better visualized by comparing the greenhouse gas emission reductions to other processes or activities that also lead to greenhouse gas emissions. For the visualization of the potential benefits of the "I prefer 30°" campaign, the analogy is made with CO_2 emissions by passenger cars.

In 2012 the CO_2 emission by a new EU passenger car was, on average, 132,2 g/km (European Environment Agency, 2013). This implies that for the emission of 1 ton of CO_2, a distance of 1000000/132,2 = 7564 km can be driven by an average 2012-model European car. Reducing greenhouse gas emissions through energy savings in laundry can be compared to the emission reductions that would be achieved by not driving a certain distance with such a car.

The average distance travelled annually with a passenger car in Europe is 14000 km/year (ACEA, 2013). With an average CO_2 emission of 132,2 g/km, this implies that an average (new) European car will emit 132,2 x 14000 = 1850800 g CO_2 per year. Consequently, 1 ton of CO_2 is equivalent to the annual emission of 1000000/1850800 = 0,54 cars. In Table 11, the potential magnitude of greenhouse gas savings from reducing laundry temperatures is expressed as the equivalent mileage with a passenger car, as well as the equivalent number of cars).

	Energy savings equivalent to the emissions produced by a car (*) for ...million km			Energy savings equivalent to the emissions produced by ...cars (*) (**)		
	3°C Reduction	1°C Reduction	A.I.S.E. Guidance	3°C Reduction	1°C Reduction	A.I.S.E. Guidance
Belgium	155	52	345	11071	3690	24655
Denmark	155	52	441	11083	3696	31512
France	336	112	583	23998	8000	41678
Italy	1738	579	3395	124156	41387	242517
United Kingdom	1787	596	2711	127632	42544	193628
Europe	10199	3400	21028	728499	242833	1502022

Table 11: Equivalence of potential greenhouse gas emission reductions with driving passenger cars.

(*) average EU car, model year 2012
(**) average annual distance travelled

To communicate the environmental benefit in consumer language, statements like the following examples can be made:

- If everyone in Italy were to reduce their laundry temperature, washing at 40°C or 60°C only when strictly needed, the greenhouse gas savings would be the same as not driving over 3 billion kilometers by car every year.
- For every degree that the average Belgian laundry temperature is reduced, we save as much CO_2 emissions as produced by over 3500 cars every year.

I PREFER 30°

SUMMARY

SUMMARY

As part of its commitment to drive sustainability progress in the sector, in early 2014, A.I.S.E. is planning to run a consumer engagement campaign to promote the benefits of low temperature washing. The launch of the A.I.S.E. campaign project was in June 2013. The purpose is to reduce the overall energy consumption of the household laundry process, by reducing the average laundry temperature (currently 41°C in Europe).

The energy consumption by the washing machine to heat the water contributes by far the largest proportion of the environmental impact, when considering the lifecycle of washing. In Europe, the average wash frequency is 3,2 times per week; around 35,60 billion laundry loads are done every year, meaning that approximately 1130 washes are started every second. The average laundry washing temperature across Europe is 41°C. Consequently, a wash temperature reduction can significantly improve the overall sustainability profile of the laundry process.

Today's household detergents are sophisticated formulations, designed to meet a diverse and demanding set of cleaning requirements and conditions. During the recent years, special attention has been given to strengthen and improve the washing performance in particular in the low wash temperature range. The detergents designed for lower washing temperatures do not have a higher impact on the environment as compared to more conventional products.

To ensure that its efforts to improve sustainability do not have potential side effects on performance or hygiene, A.I.S.E. is keen to secure that the campaign provides adequate guidance to the consumer, highlighting that a majority of loads and laundry items can be adequately washed at 30°C – but also that other items require specific attention and need to be laundered in a more precautionary way.

The 40°C cycle is the most popular programme today, with around 68% of European loads washed at or above 40°C (43% at 40°C). Washing at or below 30°C is on the rise, with 32% of loads washed at 30°C or colder in 2011 (up from 29% in 2008). To promote lower wash temperatures, the main campaign tagline will be "I prefer 30°", adequately translated into the languages where the campaign is proposed to be held (UK, F, I, DK, BE).

The current laundry energy use in the 5 campaign countries represents 38% of total European laundry energy use. A reduction of the current wash temperature with 3°C in the 5 campaign countries can reduce the energy consumption for laundry washing with 1065 GWh/yr. This corresponds to 11,7% of the current total of 9129,5 GWh/yr.

Such large scale and sustained consumer habit changes cannot be achieved by individual brands, companies or organisations. They can only be achieved by a genuine multi-stakeholder collaboration, which is the main purpose of the "A.I.S.E. low temperature washing" campaign. The campaign invites partners, e.g. from the textile and appliance industry, retailers, governmental and NGO organisations, to join this initiative
Detailed information can be found at www.iprefer30.eu

REFERENCES / ANNEXES

REFERENCES

- ACEA - "Vehicles in use": http://www.acea.be/news/news_detail/vehicles_in_use. European Automobile Manufacturers Association website. 2013
- A.I.S.E., LCA - "A.I.S.E. - Screening LCAs for Cleaning Products in Europe - Solid laundry detergents", available from the A.I.S.E. secretariat, 2013
- A.I.S.E. Survey - Laundry and cleaning habits study, Insites 2008
- A.I.S.E. Survey - Laundry and cleaning habits study, Insites 2011
- A.I.S.E. Code of Good Environmental Practices. Report "Implementation of the A.I.S.E. Code of Good Environmental Practice for household laundry detergents in Europe - A.I.S.E. 1996/2001 FINAL REPORT", Available from A.I.S.E. or from www.ec.europa.eu/enterprise/sectors/chemicals, 2003
- AMFEP - correspondence with A.I.S.E., 2013
- Bloomfield S.F. - "Effectiveness of laundering processes used in domestic (home) settings (final draft)". Due for external release by end 2013
- Bloomfield S.F., Exner M., Nath K.J., Scott E.A. and Signorelli C. - "The infection risks associated with clothing and household linens in home and everyday life settings, and the role of laundry". International Scientific Forum on Home Hygiene, available from: http://www.ifh-homehygiene.org/best-practice-review/infection-risks-associated-clothing-and-household-linens-home-and-everyday-life - 2011, updated by Prof. S. Bloomfield in May 2013
- CECED - correspondence with A.I.S.E., 2013
- DEFRA – "Powering the Nation - Household Electricity Survey: A study of domestic electrical product usage", Report R66141, UK DEFRA, May 2012
- Electrolux, Presentation, A.I.S.E. Info Day 2012
- EU Commission Recommendation (98/480/EC) concerning good environmental practice for household laundry detergents, 22 July 1998
- European Environment Agency - "CO_2 emissions from new cars fell further in 2012" http://ec.europa.eu/clima/news/articles/news_2013043002_en.htm. Published on 29/4/2013
- Eurostat – "European business, Facts and figures. Report 4 : Textiles, clothing, leather and footwear", Website www.epp.eurostat.ec.europa.eu, June 2012
- Exceltys, 'Fiche Pratique 1-Ordres de grandeurs - Energy Electrique', www.exceltys.fr website 2013
- GFK – "Market overview of EU Energy Label for washing machines (2011-2012, 23 EU countries", 2013
- IKW – "Nachhaltigkeitsbericht 2009/2010", Industrieverband Körperpflege und Waschmittel (IKW), 2010
- JRC – "Electricity Consumption and Efficiency Trends in European Union - Status Report 2009", Institute for Energy, JRC, 2009
- JRC - "European Reference Life Cycle Database (ELCD). LCA data sets of key energy carriers, materials, waste and transport services of European scope". 2009. (http://lca.jrc.ec.europa.eu/lcainfohub/datasetArea.vm)
- Kemna, V.H., Stamminger, R.- "Energy consumption of domestic appliances in European households", Prof. R. Stamminger, Report to CECED, University of Bonn, 2013
- Presutto, M., R. Stamminger, R. Scaldoni, W. Mebane & R. Esposito – "Preparatory study of Eco-design requirements of EuPs; Lot 14: Domestic Washing Machines and Dishwashers", Task 1-2, ISIS, 2007
- Pakula, C. & Stamminger, R – "Electricity and water consumption for laundry washing by washing machines worldwide", Energy Efficiency, P. Bertoldi (ed)., Springer Science & Business Media B.V., 2009
- P&G, correspondence with A.I.S.E., 2013
- Sinner, H., "Über das Waschen mit Haushaltwaschmachinen", Haus&Heim Verlag, 1960
- Stamminger, R. - Chapter "Reinigen", in U. Gomm (ed.) Lebensmittelverarbeitung im Haushalt, aid-Verlag (978-3-830°8-0851-0), 2010
- Stamminger Survey 2011 – "European washing, machine use and energy habits", To be published (later in 2013)
- Stamminger, R. – "Part 1: Consumer Laundry Behaviour", Prof. R. Stamminger, Report to A.I.S.E., University of Bonn, 2013
- Stamminger, R. – "Part 2: Energy Efficiency Potential of Temperature and Load reduction in Automatic Laundry washing processes", Prof. R. Stamminger, Report to A.I.S.E., University of Bonn, 2013
- Van Holsteijn& Kemna (VHK) – "Final Report Task 4, Study on Amended Working Plan under the Ecodesign Directive (remaining energy-using products and new energy-related products", page 37, December 2011
- WRAP - "Valuing our clothes: the evidence base", www.wrap.org.uk/clothing, Waste & Resources Action Programme, 2012

ANNEX A - OVERVIEW OF A.I.S.E.'S VOLUNTARY INITIATIVES (1997-2013)

A·I·S·E

Association Internationale de la Savonnerie, de la Détergence et des Produits d'Entretien
International Association for Soaps, Detergents and Maintenance Products

AN OVERVIEW OF A.I.S.E.'S VOLUNTARY INITIATIVES

Over the past years, we have seen a growing awareness around the world of the importance of climate change and a strengthening political and social resolve to act. A.I.S.E. has a long track record of being proactive on the sustainability front and sees its role as a leading one in driving the sustainability agenda forward among its members.

Through our various initiatives we have taken measures to ensure that both the industry and the consumer abide by the principle of 'shared responsibility'. This means that just as our industry contributes to sustainable production practices in the sourcing and manufacturing of products, consumers can also contribute by supporting sustainable consumption practices in the use and disposal of their product.

Below is an overview of A.I.S.E.'s voluntary initiatives which promote the **sustainable production** and **sustainable consumption** of our products.

		Sustainable Production	*Sustainable Consumption*
1997 – 2002	**CODE OF GOOD ENVIRONMENTAL PRACTICE** The 'Code of Good Environmental Practice' ('the Code') was the first major voluntary initiative by A.I.S.E. specifically designed for household laundry detergents.		
1997 →	**WASHRIGHT©** Initially developed in the context of the Code, Washright is a pan-European awareness-raising campaign to promote good washing practices to consumers when doing the laundry. *www.cleanright.eu*		
1999 – 2004	**HERA** *(Human and Environmental Risk Assessment on Ingredients of Household Cleaning Products)* A joint A.I.S.E./Cefic initiative, five years ahead of REACH. *www.heraproject.com*		
2001 →	**DUCC** *(Downstream Users of Chemicals Co-ordination group)* A platform to address REACH's objectives. *www.ducplatform.org*		
2004 →	**CHARTER FOR SUSTAINABLE CLEANING** Promoting a life-cycle approach to sustainability through independent assessment, with annual reporting. Updated in 2010 with additional product specific requirements. *www.sustainable-cleaning.com*		
2005 →	**SAFE USE ICONS** A harmonised set of icons and sentences for voluntary, proactive use by companies to help consumers use products in a safe way.		
2006 →	**LAUNDRY SUSTAINABILITY PROJECTS** Educating consumers to dose concentrated laundry detergents correctly. *www.aise.eu/preps*		
2006 →	**SAVE ENERGY AND WATER PROJECT** Promoting the use of low-temperature dishwasher programmes *www.saveenergyandwater.com*		
2007 →	**PRODUCT STEWARDSHIP PROGRAMMES** Air Fresheners 2007: an initiative to promote responsible manufacturing, communication and use of Air Fresheners *www.aise.eu/airfresheners* Gel Capsules 2012: an initiative to secure safe use and storage by consumers of liquid laundry detergent capsules		
2008 →	**WWW.CLEANRIGHT.EU** A joint Cefic and A.I.S.E. industry website initiative providing consumers across Europe with information and advice on the safe and sustainable use of soaps, detergents and maintenance products. *www.cleanright.eu*		
2013 →	**I PREFER 30°** A unique multi-stakeholder campaign by the detergent industry to drive low temperature washing, in partnership with retailers, appliance manufacturers and fashion houses. *www.iprefer30.eu*		

Working together for a cleaner Europe

www.aise.eu

May 2013

ANNEX B

A.I.S.E., LCA - "A.I.S.E - Screening LCAs for Cleaning Products in Europe - Solid laundry detergents",- ABSTRACT

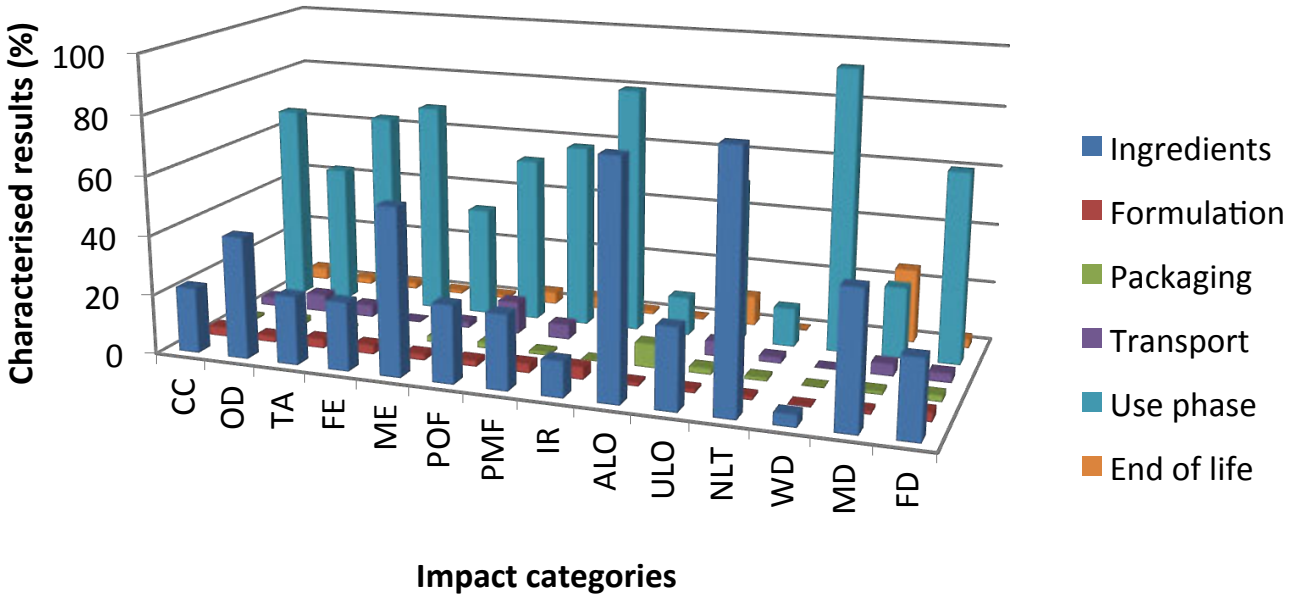


Figure 20:
Contribution of a solid powder detergent (A.I.S.E. 2013)

(Legend: CC: Climate Change , OD: Ozone Depletion, TA: Terrestrial Acidification, FE: Freshwater Eutrophication; ME, Marine Eutrophication; POF: Photochemical Oxidant Formation; PMF: Particulate Matter Formation; IR: Ionising Radiation; ALO: Agricultural land occupation; ULO: Urban Land Occupation; NLT: Natural Land Transformation; WD: Water Depletion; MD: Metal Depletion; FD: Fossil Depletion)

ANNEX C: CLOTHES CARE TESTING

One major opportunity for savings is to increase the active life of clothing. As explained above, modern detergents provide color and fabric care benefits, thus lengthening the active use phase of garments. Such effects can help to reduce the environmental impact of clothing.
The side by side comparison of 2 baby garments in Figure 21 (Washed 10 times under the same wash conditions at 20°C or at 40°C) is an example demonstrating improved apparel colour care from washing at colder temperatures.

Figure 21: Improved colour care at low wash temperatures.
(Identical garments, washed 10 times under same conditions at 20°C (left) and at 40°C (right) - Ref: P&G, 2013)

ANNEX D - OVERVIEW OF EU ENERGY LABEL AND ECODESIGN REQUIREMENTS (CECED)

LOT 14: DOMESTIC WASHING MACHINES			
POLICY FRAMEWORK	**STUDY PHASE & CONSULTATION**	**FINAL ADOPTION**	**CONTENT**
ECODESIGN	ISIS 04.12.2008 Working doc 26.03.2010 Working doc Washing machine	Commission Regulation 1015/2010 on Household Washing machines (O.J. L 293 - 11.11.2010) Corrigendum (O.J. L 298 – 16.11.2010) Commission communication: Publication of transitional symbols for Reg. 1015/2010 (O.J. C 206 - 13.07.2012)	**Scope**: Electric mains-operated household washing machines (including those powered by batteries), including appliances for non-household use and built-in household washing machines (as defined in art. 2). Art 1.2 excludes household combined washer-driers. **Entry into force**: 01.12.2010 **Requirements**: **As of 01.12.2011,** *Generic Requirements:* - Information on different programmes and washing recommendations (Annex I.2) - Power consumption of the off-mode and left-on mode (Annex I.2) - Information on Standard cotton programme (Annex I.2) *Specific Requirements:* - Energy efficiency index of appliances shall not exceed 68 - Washing efficiency index provided in Annex I.2 (1) by type of product - Water consumption provided in Annex I.2 (1) **As of 01.12.2012,** *Generic Requirements:* - Standard cotton programme - Specific cycles shall be identifiable on the programme selection devices (Annex I.1) - Information requirement in the booklet of instructions of appliances (Annex I.1) **As of 01.12.2013,** *Specific Requirements:* - Washing Efficiency Index - Energy efficiency index of specific appliances shall not exceed 59 (Annex I.2(2)) - Water consumption provided in Annex I.2(2) *Generic Requirements:* - Standard programme - Power consumption of the off-mode and left-on mode - Information on different programmes and washing recommendations - Appliances shall offer clearly identifiable cycle at 20°C **Review**: no later than 01.12.2014.

LOT 14: DOMESTIC WASHING MACHINES			
POLICY FRAMEWORK	STUDY PHASE & CONSULTATION	FINAL ADOPTION	CONTENT
ENERGY LABELLING	Consultation Forum 26.03.2010	Commission delegated Regulation 1061/2010 Published in O.J. L314 - 30.11.2010	**Scope:** Household washing machines as defined in art. 2.1 **Entry into force**: 20.12.2010 **Requirements**: **As of 20.12.2011** ***Requirements for suppliers:*** - Printed label as set out in annex I - Product fiche as set out in annex II - Technical documentation as set out in annex III ***Requirements for dealers:*** - Label on the outside of the front or top of the product **As of 20.04.2012** ***Requirements for suppliers and dealers:*** - Any advertisement must contain the energy efficiency class - Any technical promotional material must include the energy efficiency class ***Requirements for dealers:*** - Marking of the information provided by suppliers as set in annex IV for products offered for sale, hire or hire purchase (for dealers) **Review**: No later than 20.12.2014

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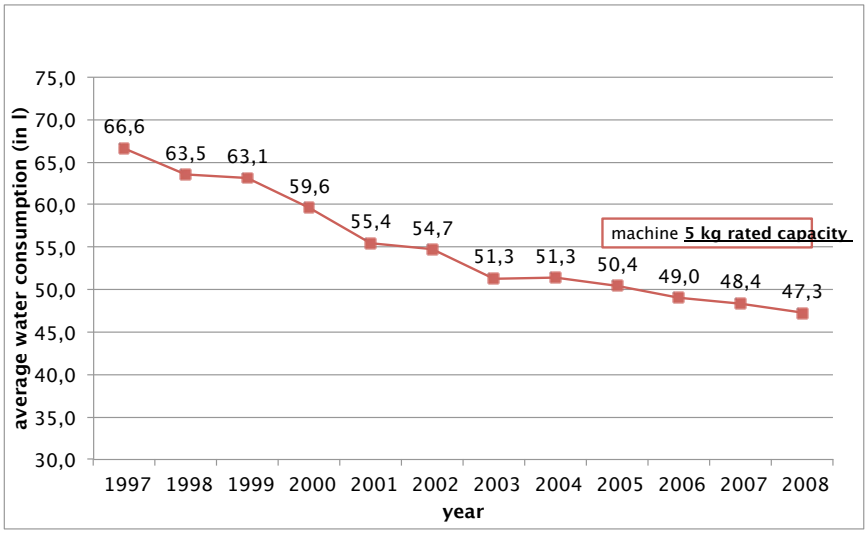
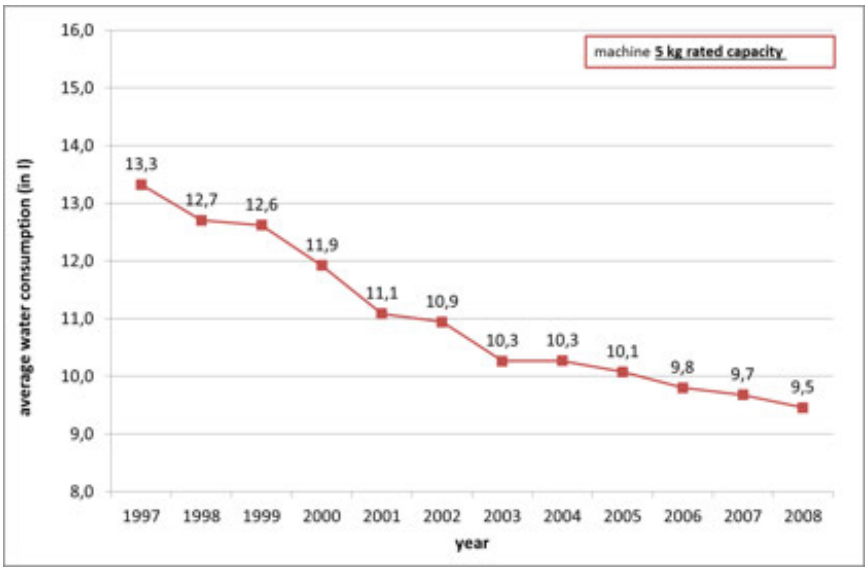
ANNEX E: EVOLUTION IN WASHING MACHINES (WATER, CAPACITY)





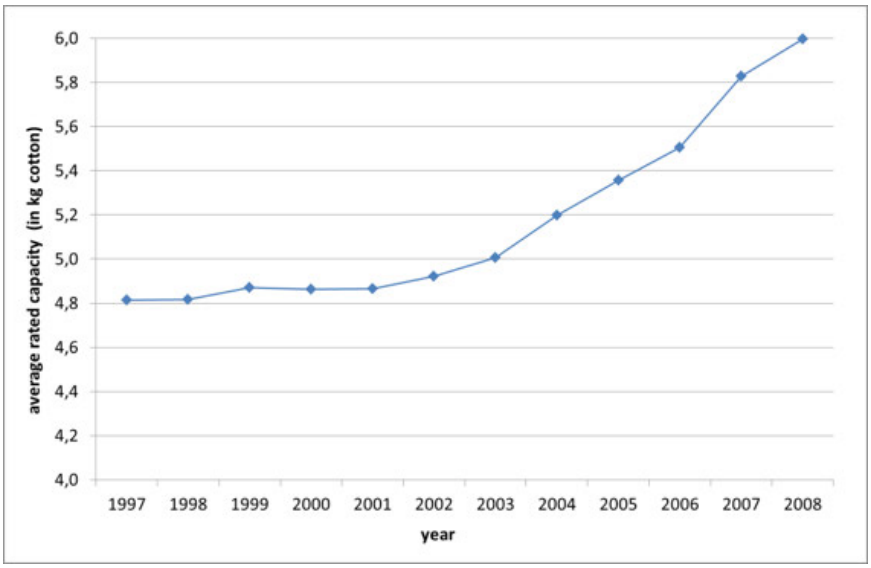


Figure 22: Evolution of water consumption in washing machines expressed in liter per cycle (Top), in liters per kg laundry (Middle); Evolution of average rated capacity of washing machines 1997 – 2008 (Bottom); (Ref: Stamminger, 2013)

ANNEX F: EXPERTS CONSULTATION ON THE CONSUMER HEALTH ASPECTS OF LOW TEMPERATURE LAUNDRY

1. EXPERTS CONSULTATION PROCESS

Thirteen experts in the areas of hygiene and public health were requested by A.I.S.E. to provide input to specific questions regarding consumer health aspects of low temperature laundry. The written consultation took place in June/July 2013. The list of participating experts is provided below.

As pre-reading, the experts were presented with a draft A.I.S.E. proposal for consumer guidance. In short, in this draft proposal it was suggested to differentiate "higher risk" items and situations from normal daily laundry items. For the latter, a further subdivision was proposed between items that hardly come into contact with the skin and items that have direct intense skin contact. In addition, the experts received the IFH Literature Review commissioned by A.I.S.E. (Bloomfield, 2013), and the IFH report "The infection risks associated with clothing and household linens in home and everyday life settings, and the role of laundry" (Bloomfield S.F. et al., 2011-2013), and a draft communication leaflet for the "I prefer 30°" campaign (A.I.S.E. June 2013).

Based on this material, the experts were asked to respond to questions regarding (1) the general approach of the draft A.I.S.E. guidance, (2) the concept, identification and recommended laundry process for items or situations of "higher risk" from a consumer health point of view, and (3) whether among the normal daily laundry items (outside of the "higher-risk" items or situations) further precautions are required and if so, what is their recommendation. In addition, the experts were asked whether they had any other considerations, additional information, or comments (e.g. current status of the literature, availability of other data, etc.)

Subsequently, the contributions received were aggregated and interpreted by Prof. Sally Bloomfield and Dr. Geert Boeije (August 2013). The overall summary is presented below.

2. EXPERTS CONSULTATION SUMMARY

Approach in general

Most experts agreed it is beneficial to sort the laundry based on the necessary hygienic precautions. However, they advised that - whilst the health related matters are to be considered when doing the laundry - the guidance should also take into account other parameters regarding the sub-division of loads (such as care label, colors, textile types, etc.) Also, it should be emphasized that contaminated items should always be washed separately.

Identification and guidance for "higher risk" items and situations

Although two experts disagreed that laundry items can be a high risk for infection or transfer of micro-organisms, the large majority of the experts endorsed the need to identify items that are likely to be contaminated and to apply a more thorough laundry procedure to these items.

For the identification of these items, with the exception of sports clothes, there was in general terms agreement with the list proposed in the expert consultation brief [5]. Further, a number of additional items and situations were proposed.

For the "higher risk" items, there was largely a consensus that washing a 60˚C, with the use of a detergent that contains oxygen-based bleaching agents, is adequate and necessary. However, the concern was raised by multiple experts that the desired performance may not be achieved in a "60 degree cycle" if an actual temperature of 60˚C is not reached, or not maintained for a sufficient time – which seems to be the case with most household washing machines today.

Guidance for normal daily items (healthy conditions) without intense body contact

Nearly all experts (except one) agreed that items that do not come into intensive contact with the body, do not represent a meaningful risk in terms of hygiene and infection or transmission of micro-organisms. As such, there was almost a consensus that washing at low temperature (e.g. 30˚C), without further precautionary requirements regarding the detergent type, is appropriate for these items. This laundry process may not be adequate under other circumstances, but as for these items the risk is only occasional, there is no need for further assurance.

Guidance for normal daily items (healthy conditions) with direct body contact

For items that do come into direct contact with the body, there are three lines of thought, each supported by a critical mass of experts:

- no need to handle body contact items separately from other daily items (i.e. 30˚C without further precautions is sufficient for these items)
- need to identify specific body contact items that may be contaminated (specifically by body fluids) – and manage these separately, with additional precaution

[5] items that are heavily soiled with faeces, vomit, blood (including babies nappies); items that are used in the kitchen during food preparation; clothes used in heavy people contact sports e.g. rugby, American football, judo, etc.; uniforms of health care workers – as well as all laundry loads with items from an infected person (regardless of whether these are visibly soiled), or for a vulnerable individual with a compromised immune system.

- need to manage all body contact items with additional precaution
Regarding the additional precautionary measures for body contact items (when needed) – the opinions also varied (ranging from 30˚C + detergent with oxygen-based bleaching agents, 40˚C + detergent with oxygen-based bleaching agents, 60˚C + any detergent, up to 60˚C + detergent with oxygen-based bleaching agents).

Additional notes
Several experts pointed to the fact that additional experimental data at 30˚C and 40˚C cycles, under controlled and well-monitored conditions, would help to better define this guidance.
The majority of the experts did not explicitly consider the risk for spreading antibiotic-resistant strains – whereas some experts pointed to the critical importance of this aspect, which is likely to become still more critical in the future.

3. LIST OF CONSULTED EXPERTS

Expert	*Country*	*Affiliation*
Prof. Sally Bloomfield	*UK*	*International Forum for Home Hygiene (IFH), Chair* *London School of Tropical Medicine, Hon. Prof.*
Prof. Dirk Bockmühl	*D*	*University Rhein Waal*
Dr. Montse Bosch	*SP*	*Leitat research institute*
Prof. Martin Exner	*D*	*University of Bonn – Hygiene & Public Health*
Dr. Jürgen Gebel (*)	*D*	*University of Bonn – Hygiene & Public Health*
Prof. Susanne Knøchel	*DK*	*University of Copenhagen, Department of Food Science/Food Microbiology*
Prof. Cesira Pasquarella (**)	*IT*	*University of Parma, School of Hygiene and Preventive Medicine*
Dr. Elizabeth Scott	*US*	*Simmons College, Boston MA, Simmons Center for Hygiene and Health in Home and Community*
Prof. Carlo Signorelli	*IT*	*University of Parma, School of Hygiene and Preventive Medicine*
Prof. Paul Terpstra	*NL*	*Wageningen University , Hon. Prof.* *Chair of Consumer technology research Institute SOHIT*
Prof. Lutz Vossebein	*D*	*Hochschule Niederrhein - University of Applied Sciences*
Prof. Hans-Peter Werner	*AU*	*HygCen laboratories*
Dr. Jennie Wilson	*UK*	*University of West London*

(*) joint input with Prof. Exner

(**) joint input with Prof. Signorelli

I PREFER 30°

ACKNOWLEDGEMENT

A.I.S.E. wishes to thank the following persons/organizations for their help for the substantiation dossier:
Mrs. Connie Hedegaard, European Commissioner for Climate Action, and her team, Ms. V. Séjourné (A.I.S.E. Sponsor), Dr. M Stalmans (P&G, Author), members of the A.I.S.E. Sustainability Communications task force, Prof. R. Stamminger (University of Bönn, Germany), CECED (Messrs. L. Meli, M. Rambaldi), GINETEX (Ms. A Pacard and colleagues), Association of Manufacturers and Formulators of Enzyme Products (AMFEP), Danish Fashion Institute (Mr. J Heder-Hansen), Dr G. Boeije.

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