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‘Many Shades of Green’ in Cleaning and Sanitation

Key considerations and steps towards “greener” cleaning



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Although awareness about **sustainability** and **green cleaning** has grown a lot, there is still a need for information to help making the right product choices.

This document helps you to look at important aspects to consider. It will briefly explain the most commonly encountered terms and claims, discuss benefits and limitations, and suggest possible first steps to follow towards **'greener' cleaning practices**.

1 Sustainability is a business imperative

The understanding that we should be working in ways that meet our current requirements but which also support the aspirations and needs of future generations is not something of the last decade.

Yet, global emissions of carbon dioxide (CO₂) have increased by almost 50 per cent since 1990, and emissions grew more quickly between 2000 and 2010 than in each of the three previous decades¹. The world population continues to increase, placing greater demands on finite resources.

So necessity compels us now more than ever. Customers want it² and many businesses have proven that they can operate with a strong sustainability agenda while increasing earnings.

But sustainability still has many different interpretations. That is not different in the cleaning industry. There is a rapid growth in 'greener' cleaning and hygiene products, and with that a growing list of benefits and sustainability claims.

As a start, the definition of the term "sustainability" can be useful.

¹ UN Sustainable Development Goals

² Survey from polling organisation Ipsos MORI who questioned almost 17,000 people across 15 major markets

³ <http://www.businessgreen.com/bg/news/2406748/unilever-sustainable-brands-growing-twice-as-fast>

Firms investing in green are likely to attain competitive advantage through improved customer and employee retention.

50%

of customers across 15 major markets prefer to "buy products and services from companies with good environmental reputations."

50%

of Unilever's 2014 growth came from brands leading its sustainability agenda, at 2X faster growth than its other brands.

2 Definition of Sustainability

There are many definitions and interpretations of what sustainability entails. Many use 'sustainability' and 'green' or 'environmental' interchangeably, but the most widely cited and accepted definition came from the so called "Brundtland Report":

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

The Brundtland definition has been further refined to the 'Triple Bottom Line' (TBL) of environmental, social and economic factors, also known as "people, planet, profit". This approach considers how environmental and social considerations contribute to top-line growth through, for example, brand value, customer relationship, talent recruitment and retention, while at the same time reduced operational costs from improvements in energy, water, waste, health and liability improve the bottom-line.

Does this sound familiar?

Sustainability is not something of the last decade.

"I sincerely hope for the sake of prosperity, that we humans will be content to be stationary long before necessity compels us to it". Otherwise "the earth must lose a great proportion of its pleasure for the more purpose of enabling to support a larger but not healthier or happier population."

John Stuart Mill was an influential 19th century English philosopher, political economist and early human rights defender. In his book "Principles of Political Economy" he argued that the logical conclusion of unlimited economic growth was destruction of the environment and a reduced quality of life, and concluded that a 'stationary state' should be preferable to unending growth.



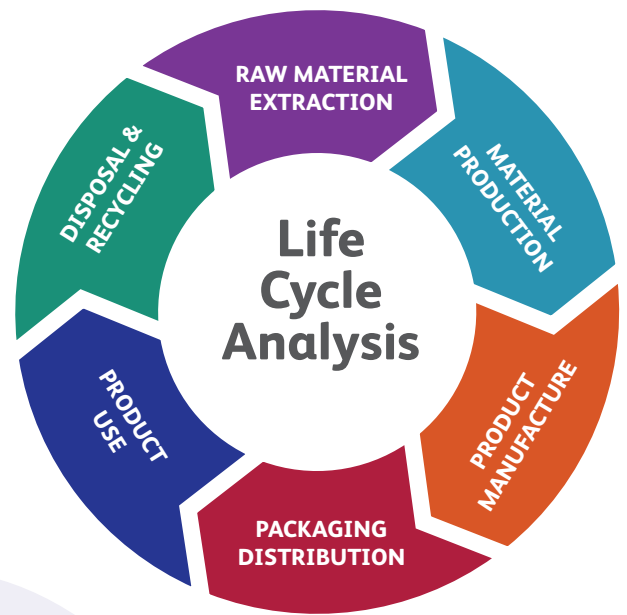
3 Life Cycle Analysis (LCA) to assess environmental impact

A life cycle assessment (also known as life cycle analysis or cradle-to-grave-analysis) is the assessment of the environmental impact of a given product or service throughout its lifespan in order to fully understand and be able to identify the biggest opportunities for improvement.

The term 'life cycle' refers to the notion that this requires the assessment of all steps in the life cycle of the product, from raw material production, manufacture, distribution, to final use and recycling, reuse, or disposal. It is crucial that data used for the completion of a life cycle analysis is accurate, current and valid within the scope of the analysis. And when comparing different life cycle analyses with one another, the scope should be similar and equivalent data should be available for all products or processes in question. This makes LCA costly and complicated, and often more of a scientific study than practical tool when done across a whole range of products.

However, end users can ask their suppliers to provide evidence of their credentials in this area. If production is itself wasteful and inefficient, no amount of careful use, dilution control, biodegradability and recycling will compensate.

A conscientious cleaning products manufacturer will be able to provide a demonstrable track record of reduced energy and waste consumption.



On a LCA perspective

“Conscientious cleaning products manufacturers will be able to provide a demonstrable track record of reduced energy and waste consumption.”



4 The most common green claims

The increase in environmental awareness has resulted in not only a growth in ‘environmental’ products, but also what people believe the characteristics of those products are and the claims associated with them.⁴

Some of these claims are accurate but do not necessarily consider the wider environmental or sustainability impact.

Other claims, while well-intentioned, may be misleading and/or infringe laws or codes of conduct. Furthermore, as independent studies have shown, there are other environmental claims that are, frankly, inaccurate and/or designed to mislead the consumer (‘Greenwashing’⁵). Surprisingly, most “greenwashing” claims are not strictly regulated. Over and above any greenwashing or potential legal infringements, there are many misconceptions surrounding these claims.

Let’s review some common ones.

4.1 ‘Environmentally friendly’

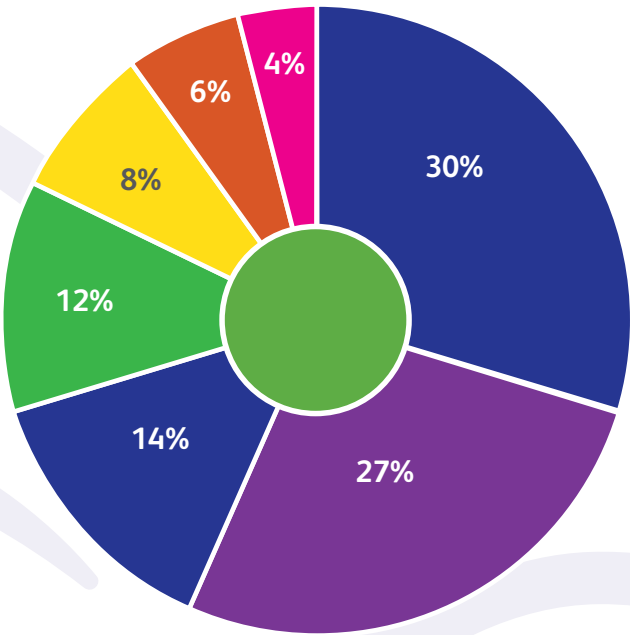
‘Friendly’ implies that it has no negative effect on the environment, but all products, whether chemicals, equipment or services, have an impact at some point during manufacturing, transportation, use and/or disposal. The term is also too generic to help you understand why the product is actually better for the environment. The relevant questions are: what is the impact, and how quickly can the product be ‘neutralised’ by nature? An activity such as cleaning should thus include processes, chemicals and equipment with minimal environmental impact, and that any effect is quickly assimilated by the environment.

Responsible suppliers will not use this term to describe their cleaning products.

⁴ IRB Europe / Diversey research in USA and Europe, across different professional sectors (Sep. 2015)

⁵ <http://www.terrachoice.com/Home>; http://www.futerra.co.uk/downloads/Greenwash_Guide.pdf;


'Green' cleaning products are believed to be...



- Based on natural ingredients
- Eco-certified
- Fully biodegradable
- Low risk / danger classified
- Chemical free
- Life cycle based
- Bacterial / enzymatic

Source: Diversey research in USA and Europe, across different professional sectors, sep. 2015.





**“Green products
and claims
– a cocktail for
confusion”**

4.2 ‘Biodegradable’

Most cleaning products ultimately end up in the environment, typically through sewage treatment systems. Biodegradability is therefore a key criterion in the development of all products. Biodegradation can be described as the breakdown of an organic (i.e. carbon containing) molecule into smaller molecules by the action of micro-organisms. Those breakdown products are typically less harmful to the environment than the original material. The concept does not apply to inorganic, mineral based materials.

In Europe, there are laws that regulate the use of organic materials such as surfactants. They should meet a minimum biodegradability standard.

Any product sourced from a reputable manufacturer will meet this minimum requirement. You can thus not infer that one product is superior to another solely by the fact that label says that it is ‘biodegradable’.

4.3 ‘Natural’ and ‘Bio based’

There is the common view that being natural is always better for human health and/or the environment. Yet in nature there are many things that are also harmful – e.g. asbestos, cyanide, mercury. Conversely synthetic products are not always bad. Take man-made disinfectant and bleaching agent hydrogen peroxide. This rapidly breaks down to water and oxygen which are about as harmless as it gets. Natural materials are often preferable to petroleum-based materials as it relates to carbon footprint, but they may be associated with water use problems due to agricultural practices.

Another interesting example is palm oil, which is highly renewable and extensively used but its production has been associated with deforestation of many parts of the world. So additional information about the source and treatment of the materials, such as “renewable, plant-based ingredients derived from agricultural waste” is important and does contribute to more efficient use of our planet’s resources. Responsible manufacturers trace the impact of their bio based materials to minimize negative impacts.

4 Enzymatic/Bacterial

For years, enzymes have been used especially in laundry detergents to help remove soils and stains on fabrics. In this application, enzymes are very effective because they generally work best under warm and wet conditions for relatively long periods of time.

In recent years, they have also appeared in a range of other cleaning products, notably grease trap and floor cleaners, lowering the need for ‘traditional’ chemical cleaning products by helping dissolve soils. The majority of these cleaners use a mixture of enzyme(s) and bacteria. These ‘benign’ bacteria are not

harmful and do not pose any risk to food safety, and act as ‘factories’ that continually produce more enzymes that may have been “flushed away” in the cleaning process. Both enzymes and bacteria are generally killed by extremes of pH and temperatures and/or in the presence of disinfectants. They are thus less suitable for areas that need cleaning with heavy duty (alkaline) degreasers and sanitizers. But biotechnology is continuously developing and maybe we will soon see bacteria and enzymes that can deal with these challenges. It is important to consider that the enzymatic/ bacterial hard surface cleaners are generally less concentrated than conventional products, with an impact on associated transport, water and packaging waste.

Enzymatic/Bacterial based cleaning products can be a sustainable alternative for traditional chemical cleaning products in areas where no heavy duty cleaning is required.

Additional and factual information about the source and treatment of materials, such as “renewable, plant-based ingredients derived from agricultural waste” is important.

Chemical-free Technologies

Ozone and Electro-Activated Water are sometimes called 'chemical-free' technologies, using special equipment to generate cleaning solutions. In reality they are not truly chemical-free as they generate chemicals – respectively ozone, and hypochlorite and sodium hydroxide – but do so when in place, thus minimizing transport and packaging.

Ozone is a natural gas. It occurs as a result of lightning during thunderstorms and is created by the sun's UV rays in the ozone layer that circles the earth. It is a known sterilant, but unfortunately it is unstable and reacts and disappears very fast, while at high concentrations it can be toxic to the respiratory system. In place generated solutions are used at low levels which in turn raises questions about efficacy.

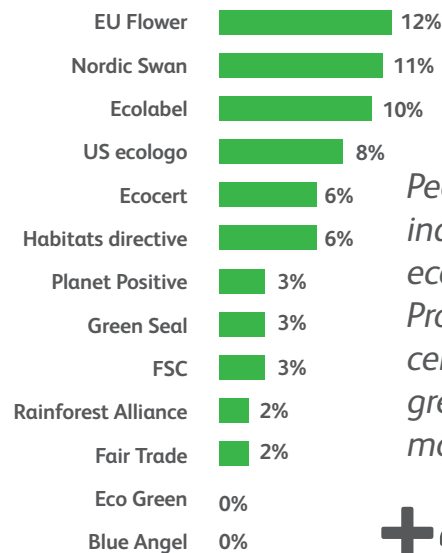
Electro-activated water uses just tap water, salt and an electric current to produce a solution of sodium hypochlorite - a known bleach and disinfectant / sanitizer – and an alkaline solution that consists essentially of sodium hydroxide – a key component in most traditional cleaners.

Unfortunately, electrolyzed water also loses its potency fairly quickly and cannot be stored for long. The equipment tends to be bulky, expensive and needs close monitoring to provide the correct solutions. Those points have so far limited the spread of both these technologies.

It is also worth mentioning that sometimes other tools and equipment can offer a completely different way of achieving the

same levels of performance. Micro and ultra-micro fibers for example, can replace some old-fashioned mop and bucket cleaning tasks and deliver improvements in terms of hygiene, economy and productivity. In 2002 the USA Environmental Protection Agency (EPA) documented a case study with savings as high as 95% in chemicals and water, and 20-60% in materials and labour⁶.

Other aspects to consider in your search for green cleaning solutions are Eco-certifications, product classification/labelling and the impact on water, energy, chemical usage and waste by the use of it. These topics will be highlighted in the following sections.



People care about independent eco-labels. Production of certified goods grew in 2012 by more than

+40%

⁶ Environmental Protection Agency (EPA)
Region 9 Pollution Prevention Program;
Using Microfiber Mops in Hospitals | November 2002

Question: Can you name any schemes that exist, either European, National, international etc.?

5 Eco-certifications

Because of all these options and claims, people care about independent third party certification, and many operations do ask for so-called 'eco-labeled' products. On the face of it, this seems like a good idea, but as always, it is not so simple.

There are numerous national, regional and global "standards" relating to sustainability.

Which ones are the most relevant?

What are the differences between them?

Some are specific to either environmental policies or social set of values, others to specific products and services. Without going into more detail in this paper, it is worth noting that EU Ecolabel ('Flower'), Nordic Swan and Canadian Ecologo belong to the most recognized schemes for cleaning products. If you want to know more, please check for example the website of the Global Ecolabelling Network (GEN)⁷.

More importantly to mention is that there are no eco-labeling schemes for certain types of cleaning products, such as sanitizers or disinfectants. Adopting an 'eco-label' only policy would therefore exclude products vital for hygiene. And equally important, perfectly acceptable and compliant products could be excluded for simply not having an eco-specific label. Eco-labels can also limit truly innovative solutions since the standards are based on current definitions of 'green' cleaning products. New technologies that accomplish cleaning via novel means might not be certifiable by the existing schemes.



⁷ <http://www.globalecolabelling.net/>

6 The Impact of Classification and Labeling

Since June 1st 2015, all produced chemical products must be classified and labeled according to the new GHS/CLP rules. GHS is the United Nations Globally Harmonized System for Classification, Labeling and Packaging of substances and mixtures. CLP stands for the implementation of these guidelines into European regulations⁸. Hazard Symbols and Hazard & Precautionary Phrases on product labels and Safety Data Sheets warn users of potential hazards when using these products.



The 'Dead Fish Dead Tree' symbol has a direct link to environmental risks and it is obviously recommended where possible to use products without this classification. For products with certain health hazards it is required (or advised) to use special Personal Protective Equipment (PPE) such as gloves and safety goggles. It is easier to use cleaning products that do not need PPE. However, this could also mean using more dilute products. More concentrated products tend to carry higher hazards; that is just an unavoidable reality. Something with a particular classification when concentrated, may be designated a less hazardous classification when diluted or pre-mixed. The only difference is the amount of water, but this then means more transport, more packaging, more waste...

This is why leading manufacturers try match both aspects by utilizing closed loop dispensing systems that dilute the concentrated chemicals to ready-to-use solutions without exposure for the operators.

⁸ For more information, see www.eu.org/clp, or check on www.diversexy.com

7 Minimize chemical, water, energy usage and waste

7.1 *Chemical miles'*

Pre-mixed or ready-to-use cleaning products may appear simple and convenient. Sometimes they are the right choice, but with concentrated chemicals there is more chemical and less water and packaging to ship around. Also the type of dilution can affect the overall impact of the product. Allowing staff to mix their own products can lead to significantly more waste because people tend to over-estimate the amount of product required. Measured portion control addresses this but the most efficient, economical and safest method is to use (semi-) automated dosing systems that eliminate the risk of contact with product, eliminate waste and ensure precise and accurate mixing every time for the best possible cleaning performance.

Using too much chemical or having to re-wash clothes or dishes due to under-dosing can be among the most damaging things we can do to our environment.

Sound packaging is essential for safe handling and transport. Ideally where the local infrastructure exists, empty packs should be fully recyclable and contain as much as possible recycled material. Readily biodegradable packaging that prematurely breaks down and leaks is neither safe, nor environmentally sound. Priority should be to improve recycling rates by using packaging that has value after the first use, and minimise the materials used and transported, and the amount of waste.

Careful design can maximise storage and transport with, for example, square packs containing more product in any given area than round packs.

7.2 *'Water and energy savings'*

Many manufacturers have introduced new formulations that work just as well at lower temperatures. There are good examples of that in laundry detergents. The benefits of this include lower energy consumption and, because it takes less time to heat up the water, faster cycle times which lead to reduced costs, increased productivity and longer life time of the materials cleaned. The process requires a reliable hygiene product as thermal disinfection is reduced. We see a similar trend in ware washing, in particular in North America, where there are machines that have a lower temperature rinse but use an additional sanitizer in the final rinse. In other parts of the world, emphasis in the ware washing industry is on reducing water and energy usage, primarily through recovering and recycling of the heat and of the wash and rinse water. Next to using effective detergents for good cleaning, one should also not forget that they should be dosed at the right concentration to prevent hard water scale: just 1.5 mm of scale increases energy consumption by 15%. Besides in laundry or dish washing, water is also used in almost all other cleaning processes. It seems to be a readily available resource, but water scarcity is becoming a big issue. It already affects more than 40 per cent of the global population and is projected to rise⁹.

We should therefore keep looking for technologies that also help to reduce the amount of water used in other cleaning applications, such as micro-fibers or highly efficient scrubber driers to replace bucket and mop cleaning, or foam soaps that have been tested and confirmed to use less water than traditional liquid or lotion soaps.

8 So, where to start?

Of course it depends... It will be clear that the choice for green cleaning products is not an easy task. The most sustainable/'green' products are the ones that meet your needs and priorities best and satisfy most of your sustainability criteria at the same time.

If you want to select the most sustainable solutions, follow the ecological "mantra" REDUCE-REUSE-RECYCLE, in that order. It is much better to first reduce the amount of product used and minimize packaging waste, than to be primarily concerned about recycling that waste which is far more complex to achieve.

With that in mind, the advice is to choose cleaning products that are:

- 1. As concentrated as possible/practical to reduce the footprint, chemical miles and waste.**
- 2. Delivered in the largest container as possible/practical for your operation and your budget.**
- 3. Equipped with integral dilution control measures to avoid waste from under-and over-dosing.**
- 4. Based on ingredients and materials from renewable resources that do not impact on other critical processes such as food production.**
- 5. Supported by tools, systems and processes to make them most efficient and effective.**

⁸ For more information, see www.eu.org/clp, or check on www.diverse.com

9 More considerations and directions to explore...

Remember – there are probably many other processes where you can achieve a sustainability benefit. For example food service facilities are highly energy intensive, using approximately three times more energy than other types of commercial buildings. Up to 80 percent of that energy is not utilized for any kind of useful work and is wasted through excess heat and noise from inefficient equipment, heating ventilators, air conditioning systems, lights and refrigerators. Can this be further optimized?¹⁰

10 About the author and Diversey



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¹⁰ www.fastcasual.com/articles/what-is-your-restaurants-carbon-footprint/



Diversey has been, and always will be, a pioneer and facilitator for life. We constantly deliver revolutionary cleaning and hygiene technologies that provide total confidence to our customers across all of our global sectors.

Diversey is headquartered in Fort Mill, SC, USA. For more information, visit www.diversey.com or follow us on social media.

