HOME CARE: LAUNDRY AND CLEANING

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Smart appliances for a circular society:
Changing the world from home

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ABSTRACT
The article introduces examples of connected, smart home appliances and the benefits that these appliances can provide for a household, focusing on comfort and convenience for the user, but also on the possibilities that these appliances offer for saving energy, resources and for reducing waste.

INTRODUCTION
Do you have enough hours in the day? Most people will likely answer that they don’t have enough time to enjoy life, both inside and outside of the home. Introducing connected, smart appliances into your home can make a major difference. However, as manufacturers of home appliances are producing innovative products that give time and value back to their users, what is more, these products provide substantial benefits to society as a whole: they help conserve energy, the use of renewable energy sources, and lowering CO2 emissions. When it is considered that appliances make up 40% of household electricity consumption, the potential savings generated through the use of smart appliances can be significant, not just for the user but also for the electricity system (2).

Smart Appliances: Definitions & Numbers
First, however, it is helpful to explain what is generally understood by connected, smart home appliances. When a product really connected, and what makes a connected product smart?

In general, the blanket term “smart” is used to describe appliances with enhanced, interactive functions that may or may not require an internet connection. More specifically, however, a clear distinction can be made between those appliances that are connected and those that are smart:

• Connected appliances can join the internet, and thereby offer a certain level of interactivity with the user through a wide range of new, intelligent features. Many connected appliances provide remote access via a smart phone, tablet, or are part of a home automation system.

• Smart appliances (or: energy smart appliances) are connected appliances that embed innovative technologies that allow consumers to supervise their electricity consumption in real time. These appliances create a two-way exchange with the electricity grid. As a result, utilities can provide more efficient power delivery to the home, while increasing the efficiency of the entire grid. For example, a smart washing machine can automatically start when it receives a signal from the grid that energy cost is at its lowest level during off-peak hours. Moreover, thanks to the flexibility of smart appliances, energy consumption can be shifted to periods when renewable energy becomes available, thereby increasing the penetration of renewable energy sources and lowering CO2 emissions. When it is considered that appliances make up 40% of household electricity consumption, the potential savings generated through the use of smart appliances can be significant, not just for the user but also for the electricity system (2).

As connected, smart appliances continue to evolve and new user needs are recognised and met, their numbers will continue to grow. It is predicted that connected devices will be in nearly every home by 2020, when their number is expected to reach 26 billion, globally (3). In 2015, already 27% of consumers owned at least one connected appliance or device (4), while 77% of consumers found the idea of having a “smart home” an appealing idea (5). In Europe, the number of Smart Homes in the smart appliances market is expected to increase by 20 million in the next six years, with the revenue in the smart appliances segment amounting to US$1,884m in 2017, and an expected annual growth rate (CAGR 2017-2022) of 31.3%, resulting in a market volume of US$1,340m in 2022 (6).

SMART APPLIANCES IN A “CIRCULAR SOCIETY”

In a circular economy, the value of products, materials and resources are maintained in the economy for as long as possible, and the generation of waste is minimised, in order to create a system that allows for long life, sharing, digitisation and resource recovery. Moving towards a full circularity of the economy is a societal challenge, in which everyone has a role to play – a “circular society”.

With the number of connected, smart appliances in the home growing, people will be able to live a more modern and sustainable lifestyle, thereby contributing to the circular society. For example, connected, smart appliances facilitate reparability and maintenance, thanks to remote diagnostics, maintenance advice and failure detections. Repair technicians are enabled to identify problems before they arrive so they can be repaired on the spot. In some cases, users may be able to make the fix with video or phone guidance from experts. In others, the problem can be fixed remotely via corrections or upgrades to software. As a result, users can keep their existing appliances longer instead of buying a newer model.

In addition, connectivity makes it possible for manufacturers to keep track of trends in appliance performance, and use that information to improve on existing and future appliances. In case any problems arise, manufacturers can be notified automatically and as they happen, which means that they will be able to quickly address minor problems before they become major problems, and often with little or no interruption of the appliance’s function. Thus, connected, smart appliances can help save resources and prevent unnecessary waste, contributing to a more circular society.

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In addition, appliances have a direct connection with people’s basic needs: conserving, processing and cooking food, keeping the home warm in winter and cool during summer, washing and drying clothes. Home appliances are therefore closely tied with well-being and with the comfort in the home.

COMFORT & LIFESTYLE

Savings in resources and energy consumption are not the only benefit that users get from connected, smart appliances. As mentioned in the introduction, these appliances also create opportunities for time-savings and convenience. It is estimated that connected appliances could save a typical household 500 hours of energy use per year. This would be the equivalent of more than four complete days and nights, or two-and-a-half 40-hour work weeks (7). For users, this means they have more time to enjoy life, both inside and outside of the home.

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Similarly, the dishwasher will know which cleaning cycle best fits the types of dishes it needs to clean, and how dirty those dishes are. Working with online retailers, appliances can automatically order detergent refills when they need them. The user can keep track of all actions through an application on their mobile devices.

Connected, smart appliances do not only communicate with the user, but also talk to each other. For example, most electricity is used after we come home from work, when electricity prices are usually high due to a peak in demand. We turn on the air-conditioning or the heating, cook dinner, turn on the washing machine or the dryer, run the dishwasher, and so on. When the washing machine is turned on for a load of laundry, it will send a signal to the dishwasher to switch on only after the clothes are cleaned.

Alternatively, if a home has solar panels, smart appliances could make optimal use of locally produced energy. For example, before leaving for work in the morning, the user programs the washing machine for a 3-hour program, which should be ready by the time work is done. The washing machine communicates this flexibility to a controller that will turn the machine ON or OFF, or change the machine’s electricity consumption, based on the local electricity measurements and needs. The controller decides to start the washing machine at midnight, because the local PV production results in a net injection into the grid.

Cooking, Cooling & Feeding
Similar to the connected, smart cleaning appliances mentioned above, refrigerators, freezers and cooking appliances can include features that show how to prepare the foods that are on hand. They can also track expiration dates, automatically adjust cooking levels to the types of food that are stored (for example through barcode or RFID scanning), create shopping lists, order groceries and show the inside of the refrigerator or oven via a mobile device, to check the content or track the progress of the meal being prepared.

Furthermore, these appliances can help you take care of loved ones. Monitoring how often the refrigerator is opened can give some peace of mind that an ageing family member still living independently, is staying nourished. Keeping track of how often other appliances are used, can inform that this person is moving around the house and is able to perform day-to-day tasks.

Home Comfort
Smart appliances in the home comfort area (i.e. heating, ventilation and air-conditioning appliances) can keep track of when these appliances are typically used, and can be set up to run automatically at those times. That way, a home is already cool or warm when getting out of bed in the morning, or when coming back from work, without the user having to worry about a thing.

In addition, an air-conditioner or heater can get a signal from the electric grid that there is a peak in demand. In response, the appliance can extend its running time slightly, to reduce its load and adapt to the needs of the grid. The user does not notice anything; the temperature in the home remains comfortable. Finally, during the night, the water is heated off-peak.

The electric water heater is curtailed during the day, when the electricity is most expensive, but the extra capacity provides plenty of hot water until the cycle restarts at night. The user does not notice anything, but the reduction in the electricity bill will be substantial.

CONCLUSION
Introducing connected, smart appliances into your home can make a major difference, as these appliances give time, comfort, peace of mind and value back to their users. What is more, these products provide substantial benefits to society as a whole, as they help conserve energy, integrate the use of renewable energy sources, pave the way for faster and more accurate appliance repairs, and reduce food waste and unnecessary replacements of appliances – contributing to a new, circular society. In other words: they can help you contribute to a change in the world, from your own home.

REFERENCES AND NOTES
1. CEDC represents the home appliance industry in Europe. Direct Members are: AEG, Ardian Thermo-Group, BSH Hausgeräte GmbH, Candy Group, Daikin, De’Longhi, AB Electrolux, Gorenje, Groupe Atlantic, LG Electronics, Liebherr Hausgeräte, Miele & Cie. GmbH & Co., Panasonic, Philips, Samsung, Groupe SEB, Vestel, Vorwerk and Whirlpool Europe. CEDC’s Member Associations cover these countries: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.


ABOUT THE AUTHOR
Sanne Goossens works as a Smart Living and Competitiveness Policy Manager at CEDC, the industry association for home appliance manufacturers in Europe. She represents the views of the industry with the European institutions and other stakeholders, and is responsible for the files related to the connected and energy smart home appliances.