The standby generation: electricity low-power mode and sociotechnical change

I recently bought a new television for the forthcoming change from terrestrial to digital signal in my area. Interested in environmental impact, I researched the various options of digital televisions thoroughly—or at least I thought I did. I decided that LED digital televisions offer more efficient use of electricity: I worked out which retailers offered recycling policies for my soon-to-be-redundant television under the European WEEE (Waste Electrical and Electronic Equipment) Directive; and I grilled the salesperson about exactly how much ‘more efficient’ meant in percentage terms. I finally got my LED digital television home, plugged it all in, turned it on, and tuned into the stations. Then I tried to turn it off. No off-switch. Standby (low power mode) only. How had I not noticed this? I had never even thought to ask if it had an off-switch.

This is my first encounter with the next generation of products: the standby generation of products which operate at low-power mode by default, keeping internal clocks running and ready to boot up at a moment’s notice; products that will only increase in number as the global rich buy more electrical goods and run them more often or even continuously. And this is not only about products—this is also about the next generation of users: the standby generation who are always online or wired up, for whom standby is the new norm and the off-switch is archaic or unknown. Choice is first removed, then naturalised, then forgotten, and reverse engineering the off-switch becomes not only difficult but unthinkable.

Environment

This matters for several reasons. In environmental terms, more electricity use means more power generation and (under the current energy mix) more carbon emissions. The environmental consequences of this new standby generation of products is therefore potentially very large because, although low-power mode uses a small fraction of the power used by more active modes, most appliances are on low-power mode for most (or all) of the time, so the total power usage during standby may exceed the power usage during activity.

For example, a DVD player that is active for 2% of the time (while a family watches a DVD) will use 1.8 kilowatt hours (kWh) per year during that time, but will use an additional 19 kWh per year for the remaining time as it sits in low-power mode (Meier et al, 2007, page 48). Energy used to run appliances in low-power modes in Californian homes (which in 2006 had on average about forty-four such appliances, staggeringly) totalled about 13% of total electricity used and was the fourth largest residential use—that is, 13% to do very little or nothing at all. Similarly in the UK, standby was estimated to use about 8% of electricity consumed in the home in 2004 (DTI, 2006) and about 10% of energy consumed by computer equipment (DECC, 2009).

As a consequence, energy used to power appliances in standby mode is estimated to cause about 1% of global CO₂ emissions a year (Lawrence Berkeley National Laboratory, 2011). In the UK, televisions running on standby are estimated to produce 480,000 tonnes of CO₂ emissions [BBC (2011), using figures from the Energy Savings Trust] and across the EU it was estimated that electricity consumption in standby or ‘off’ (actually very low power) modes in 2005 produced 20 million tonnes of CO₂ emissions (Europa, 2008). For a single DVD player the Department of Energy and Climate Change (DECC, 2009) estimates that one third of its CO₂ emissions are due to standby mode.
Consumption

Another reason why this matters is to do with our sociotechnical practices, as user expectations change and standby is built into ways of living. As well as a generation of electrical appliances, a standby generation of electrical appliance users is developing, with habits and expectations shaped not merely by any suppositions about demand, price, or quality, but about what constitutes ‘off’. And this invisible shaping of consumer practices is not about the ratcheting up of consumer expectations in terms of bells and whistles on new gadgets, but part of the routinisation of standby, as appliances become phantoms by default, drawing down ‘vampire’ energy, often through the night, normalised but hidden or forgotten.

To find out why my television has no off-switch, I e-mailed the company that manufactured it. Their customer services department initially responded thus: “The power button on the front of the television is in fact the ‘off’ switch. It turns all power off to the unit except the red LED light on the front of the television. This uses about 2 Watts of energy. This often gets confused with being in stand by mode.” In equating ‘off’ with ‘standby’, this comment not only normalises ‘off’ as meaning ‘a little bit on’, but fails even to suggest that the appliance can be switched off at the socket instead.

And, like the products, the standby generation of people are also ‘always on’ (Turkle, 2011), as workers, friends, parents, and consumers, with no let-up, no off-switch to disconnect from the pressures of online living and working, to the potential detriment of interpersonal relationships and individual privacy. Time is annihilated and media channels multiply as it becomes harder to imagine alternative ways of working offline—or even just ‘switching off’ electrically and psychologically. Disconnection ceases to become normal as a life lived eternally ‘in touch’ becomes the expectation for productivity, advancement, and social acceptance. All manner of devices conspire to keep people and their appliances perpetually on standby, booted up, and ready to communicate at a moment’s notice or plugged in to recharge before the next period of use. There is increasingly no down time, it seems, for devices or their users.

Responses and resistance

Policy, as usual, is struggling to keep up with these sociotechnical changes by fighting a rearguard action; attempting to raise awareness in the standby generation of the consequences of being ‘always on’, and to counter consumption myths, such as that switching lights on and off uses more electricity than leaving them on when a room is not being used, or that switching off an appliance will cause operating problems later (Energy Saving Trust, 2011a).

But this behavioural fix of promoting better ‘switch-off habits’ is so difficult that policy has shifted to a technological fix instead, by setting standards for standby to minimise, if not eliminate, energy consumption in low-power mode. For example, EU Directives in 2005 and 2009 set a limit of 1 – 2 W in various modes of standby as an initial target, but noted that even appliances physically switched off can still suck 0.1 – 0.3 W of power, so “it is left to the manufacturer to decide whether a hard off switch would be appropriate to comply with off-mode requirements” (Europa, 2008). As a consequence, some countries have implemented mandatory labelling and/or standards for energy consumption in standby modes, but their limits are continually increased to accommodate rising technological trajectories. For example, in the UK, the Department for Environment, Food and Rural Affairs (2008) product specifications state that digital television recorders (which are generally left on standby continuously, to run preprogrammed recordings at any time) must consume no more than 4.9 W in standby (26.6 W in ‘on’ mode) and the UK’s Energy Saving Trust (2011b) recommends that digital television recorders must consume a maximum of 3 W in
standby (60 W in ‘on’ mode) to earn its endorsement—both figures are well above the initial EU targets.

Personally, I have resisted standby by using the physical off-switch on the wall socket as a substitute for the lack of one on the appliance itself. Luckily, this switch is easy to reach in my house, but with the denormalisation of a physical off-switch (and mode), how many of the standby generation will even contemplate this solution?

**Future**

And this is only the start of the standby generation. First, the number of products that continuously default to standby mode is increasing. Tests on eight new, unoccupied ‘model’ homes in California showed that equipment already built-in (to run garage doors, security, smoke detectors, garbage disposal, irrigation timers, etc) was using 117 W per house at low power mode—more than the estimate for (older) homes that were actually occupied (Meier et al, 2007).

In the UK, standby electricity consumption is expected to rise in future (DTI, 2006, page 43). This will be driven at least partly by the nationwide move to digital television signals in the UK by 2012 that will prompt many people (like me) to buy new digital televisions, digital recorders, and other appliances which, as well as having no off-switch, are also likely to consume up to twice as much electricity when active—average consumption during ‘on’ mode is 74 W for old-style televisions, 134 W for new LCD models and 287 W for new plasma models (IEA, 2011). And users can now download ‘apps’ to send messages from their ‘smart’ phones to their digital recorders to start recording a programme from afar; soon, no one will feel able to switch off appliances before leaving the house in case they later want to take this option—both appliance and user are perpetually ‘on’, perpetually connected and draining power.

Second, the IEA warns that new models are also coming onto the market that have much higher average standby consumption, some using over 17 W in standby mode to make them quicker to start up—I recently saw a television advert for a notebook-style computer that used precisely this attribute in its sales pitch. It seems that the qualities of standby mode itself are becoming part of a product’s marketability for a time-hungry generation of consumers under pressure to be permanently connected. How soon before even truly ‘low’-power mode becomes obsolete?

Changing products, changing consumers, changing environments—we are used to their entanglements but, unlike other problems such as increasing air travel, in the case of low-power modes, here the shift to new ways of working (literally) are hidden, vampiric, but not inconsequential. Policy is fire fighting against a change that nobody seemingly made, to redirect consumer decisions because of a choice that nobody seemingly chose. Even as governments and others try to push users towards using less energy, technological shifts push them towards using more—these opposing trajectories of practice emphasise the challenges of modern consumption and of the normalisation of nonchoice. Current research into reducing domestic energy consumption (eg, Gram-Hanssen, 2011; Hargreaves et al, 2010) is therefore pulling against the tide of technological change because, even if we wish to reengineer the off-switch back into products later, promoting its use will not work if the ‘off’ mode itself becomes lost to history and increasingly unthinkable not only as a way of using energy, but also as a way of living and working.

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