Household energy consumption and consumer electronics: The case of television

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Abstract

In recent years, there has been a dramatic rise in the number of consumer electronics in households. These new technologies and the services that support them enable new highly energy intensive behaviours. Using in-depth interview data collected from 20 households in 2006, this paper explores these energy intensive behaviours, using the example of the use of televisions. In doing so, it illustrates how the design and marketing of consumer electronics, and the services which support them, actively encourage energy intensive behaviours and how householders are reconfiguring their homes and lifestyles to fit these behaviours. This latter point is significant because, as householders change their homes and daily lives to fit energy intensive consuming behaviours, it will become increasingly difficult to encourage people to reduce their household energy consumption. This paper concludes with the implications of the research findings for policies designed to reduce household energy consumption.

Keywords: Consumer electronics; Televisions; Household energy consumption

1. Introduction

In recent years, there has been a dramatic rise in the number of consumer electronics in households. In the UK, as in other affluent countries, at least one computer is found in most homes, analogue television and radio equipment is being supplemented by digital equipment,2 and the stocks of mobile telephones, sound systems, videos, DVDs, camcorders, answering machines, digital cameras, printers and scanners are growing rapidly. Given this proliferation of consumer electronics the prediction that they will constitute the biggest single sector of domestic electricity consumption in the UK by 2010 (Owen, 2006, p. 34) is unsurprising. What is more remarkable is that, until relatively recently, concern over the energy used by consumer electronics has been all but bypassed by UK energy policy and energy saving initiatives. For example, energy labelling3 for most white goods, i.e. washing machines, refrigerators and dishwashers, etc., has been in place since the early 1990s and is now mandatory (MTP, 2006a) but there are currently no...
plans to introduce compulsory energy labelling for consumer electronics (MTP, 2006a).

There have been some recent moves by the UK government to set up a voluntary partnership for retailers to commit to sell energy efficient consumer electronic products, with the aim of significantly reducing carbon emissions from these products by 2010 (DEFRA, 2006). It is however surprising that more comprehensive policies designed to reduce the energy used by consumer electronics are not being developed given the current UK governments commitment to making an ambitious 60% reduction in UK carbon dioxide (CO₂) emissions from 1990 levels by 2050. This demands a reduction in emissions of CO₂ per head from around three tonnes of carbon per year in 1990 to around 1 tonne of carbon per head in 2050.

Reducing carbon emissions through the design and development of low carbon housing is a policy priority for the UK government (DTI, 2002). This policy approach is part of a wider European commitment to reduce household energy consumption (European-Council, 2003; European-Commission, 2005a). Or in other words, the search is on for technologies that might contribute to the mitigation of household energy consumption and associated carbon emissions (Crosbie and Guy, in press) and as consumer electronics represent the most rapidly growing sector of household electricity use they offer a considerable opportunity in this regard. The Energy Saving Trust estimates that "by 2020, entertainment, computers and gadgets will account for an extraordinary 45% of electricity used in the home" (Owen, 2007, p. 3), with the total consumption of consumer electronic equipment in the home reaching 49.6 TWh (Owen, 2007, p. 12). By then, domestic televisions in the UK will consume an estimated 19.3 TWh/year (MTP, 2006b) this is greater than the total estimated energy consumption of consumer electronics in UK homes in 2004, which then stood at around 18 TWh (Owen, 2006, p. 34).

Recently, there have been some efforts to improve the efficiency of all appliances including consumer electronics at the European policy level. For example, as part of its Integrated Product Policy (IPP) the European Parliament adopted a directive on the eco-design of energy-using products, in April 2005, which aims at improving the environmental performance of products throughout their life cycle by the systematic integration of environmental aspects at the earliest stage of their design (European Commission, 2005b). The problem with the eco-design directive is that most of its initiatives focus on improving the energy efficiency of the product and/or disposal of the product at the end of its life cycle (Charter and Belmanel, 1999, p. 26) with little attempt to understand the behaviours and infrastructures that shape energy use, which are an essential element of developing and marketing energy efficient products (Crosbie and Guy, in press). The research presented in this paper works towards filling these gaps for household consumer electronics. The approach adopted in this work builds on previous research exploring household lighting practices (Crosbie and Guy, in press).

In order to explore the factors framing the increase in the energy used by consumer electronics in the home, this paper examines the energy implications of the ways in which televisions are used in contemporary households. To do so, it uses in-depth interview data from 25 respondents conducted in the summer of 2006. The interviews were designed to explore how research participants use consumer electronics in their homes, how this may differ from the past, what type of consumer electronics they aspire to in the future and why they choose particular consumer electronics. The aim of this paper is to illustrate how an understanding of these factors can provide a sound basis from which to evaluate policy options and assess potential energy savings for this important aspect of household electricity consumption.

2. Research methods

Snowball sampling⁴ was used to recruit the 15 women and 10 men that took part in the research. Ten of the interviewees are couples living in the same household, whereas the remaining 15 interviewees were the only members of their households interviewed. One of the respondents is single and lives alone, the other 24 respondents live with their spouse or partner and 16 of these respondents have children living at home. All the interviewees live in single-family houses in urban areas. All those taking part in the research have midrange household incomes, with none falling into the lowest or highest quartile of UK household incomes, and in common with 70% of the UK population (ONS, 2006) all interviewees are owner occupiers. These households were selected because it was felt that they would more readily represent average behaviour in regard to the ownership and use of consumer electronics than either high or low income households, or those living in rented accommodation.

The interview guide approaches were taken in this research (Patton, 1990). Therefore, the interview was guided by a list of topics but the interviewer was able to vary the wording and order of the questions. This approach has the advantage that it provides systematic and comprehensive data while allowing the interviewer to tap into the issues that are most relevant to each respondent (Patton, 1990). As is usual when using the interview guide approach the interviews were recorded and later transcribed for analysis. The interviews took place in respondents’ homes allowing the interviewer to confirm some of the respondents’ responses. The length of the interviews varied, between 45 min and an hour and 20 min, depending upon the length of the responses given by respondents.

⁴The initial research participants were recruited at a community group meeting and then referrals from initial respondents were used to generate additional subjects.
3. Research findings

Unsurprisingly, the interviews revealed that in contemporary homes televisions are used for more than viewing television programs at set times during the day, they are also used to play electronic games, search the web, watch DVDs and videos, listen to the radio and watch films and sporting events on demand via satellite and cable broadcasts. Perhaps more surprisingly the interviews also suggest that heavily energy intensive consumption behaviours are encouraged by the design and marketing of televisions and the services that support them. Even more concerning, the research also indicated that householders are reconfiguring their homes and lifestyles to fit these behaviours. This issue is important because, as householders change their homes and daily lives to fit these new behaviours it will become increasingly difficult to encourage people to reduce their household energy consumption.

3.1. The design and marketing of televisions

It is not merely the proliferation of consumer electronics which is contributing to increasing energy use, but also the design and marketing of those technologies. For instance, “the rise in popularity of the large plasma screens has contributed greatly to the energy consumption of households as their on-mode consumption can be anything up to four times that of a normal sized cathode ray tube TV” (Owen, 2006, p. 35). In this way, the practice of watching television becomes more energy intensive without consumers changing their viewing behaviour.

This shift towards the use of heavily energy intensive televisions was reflected in the purchasing decisions and aspirations of research participants. In 17 of the households in which the interviews took place the residents had a chosen widescreen televisions as their main television. In 10 of the households, the main television is a traditional ray cathode cathode television (CRT), of the remaining 10 households, four use plasma televisions, four use LCD televisions and two use projection-based televisions. Of those respondents that use traditional cathode ray televisions as their main television, all except one expressed a desire to own a less obtrusive flat screen television. The following quote is typical of the comments made by these respondents’; “I think that we will want something slimmer and more ascetically pleasing when we change the television. We were slightly surprised at how big the new stuff was when we got it home, I think you don’t want half your living room taken up by televisions and sound systems” [female in her early 40s living in a two person household].

The following replies are typical of those given by the respondents, which had chosen widescreen plasma or LCD televisions when asked why they had chosen this particular type of television:

“It is important to me that our main television in particular fits in with the way our home is decorated and that it doesn’t stand out like a sore thumb” [female in her early thirties living in a five person household];

“It takes up less space and gives a better quality picture, I think that it looks good as well” [single male in his late fifties];

“My husband wanted a widescreen for watching the football and I wasn’t going to have one of those huge ugly silver things everyone has. I wanted something which had style and would not dominate the room too much” [female in her late fifties living in a two person household];

“It was advertised as the latest thing [and] it fits into the room well” [female living in a four person household].

This desire for slimmer less obtrusive and stylish televisions, directly reflects the way in which flat screen televisions are marketed to consumers. Consumer electronics in general and televisions in particular are promoted not only in terms of their size and functionality but also as stylish accessories for the home. For example, an advert for a Philips 50” HD Ready Plasma Television claims that householders should “[e]xperience the superior picture quality of this excellent Flat TV with the latest PDP technology and Pixel Plus, packed into a stunning design that will complement your interior” (Shop.Com, 2007). While, another promotion claims that “Hitachi’s new 32LD8700U LCD Widescreen Television combines the latest flat panel technology with stylish design…[that] will fit perfectly into any environment” (Shopmania, 2007).

The marketing of televisions as stylish household accessories is far from new. What is new, are the number of people that can afford the latest flat screen televisions. The cost of flatscreen televisions is falling by up to 30% a year (Owen, 2007). Therefore, televisions that cost thousands of pounds 4 or 5 years ago can now be purchased for a few hundred pounds.

The replacement of traditional cathode ray televisions with the more energy intensive flat screen televisions is a prime example of how the design of consumer electronics are facilitating an increase in the amount of energy used in existing behaviours. This shift from cathode ray televisions to flat screen technologies is being hastened by the conversion from terrestrial to digital broadcasting in the UK, as this will lead householders to invest in new televisions which, more often than not, will be the new and desirable flat screen televisions. Householders may not have the option to buy a traditional cathode ray television in the near future; some retailers have already discontinued sales of cathode ray televisions and this trend looks set to continue (Owen, 2007, p. 12).

5Whitehaven and the surrounding Copeland area lead the UK’s switch to digital broadcasts in autumn 2007, which is due for completion in 2012 (DigitalUK, 2007).
3.2. Leaving the TV on standby: laziness or design?

The standby mode found on most consumer electronics is another example of the way in which the design of consumer appliances contributes to growing electricity use. It is estimated that if everyone in the UK avoided using standby, the electricity saved would be enough to power 2.7 million homes for a year (Energy Saving Trust, 2006). Recent energy monitoring research found that standby energy use is increasing by over 10% each year (Firth et al., 2008). A study conducted by the Energy Saving Trust places the blame for this increasing waste of energy firmly on the consumer; citing laziness as the reason UK consumers use the standby function on many of their household appliances (Energy Saving Trust, 2006, p. 4). However, many consumer electronics and the services they give access to are designed with the assumption standby is used, such as goods with timing devices and television set-top boxes which are updated during the evening.

Only three of those interviewed said they made an effort not to leave their televisions on standby, all of the rest of those interviewed stated that they habitually left their televisions on standby. However, probing questions concerning why this was the case revealed that standby was integral to many of the functions incorporated within the design of televisions and associated appliances. One of the interviewees succinctly summed this up in the following quote: “Everything is made to be on standby there are things you are told not to switch off like the set top box and if I switched off the DVD every night I would have to reset the time and everything everyday and I am just not going to do that” [male in his early 20s living in a two person household].

In total, respondents in 16 of the 20 households in which interviews took place stated that they left some of their televisions and/or other consumer electronics on standby because it was necessary for one of the functions of those appliances that they use on a regular basis. For example, an older interviewee in her early 60s living in a two person household said “I don’t switch the television and video off because I have the video set to record my programs when I am out or if I take an early night. If I switched them off then it wouldn’t record would it?”.

Habits by their very nature are integrated into the way in which we live. Therefore, given how prevalent the use of standby has become in the UK (see Energy Saving Trust, 2006), it is unsurprising that interviewees indicated that they have changed their daily routines and the placement of electric sockets, televisions and associated devices in ways which lead to them leaving their televisions and associated equipment on standby, as illustrated in the following quotes.

“We were told by [the cable company] not to switch off the set top box because they send upgrades to the system during the night. So we always leave it on standby. At first I was a little worried about it being a fire hazard, because all of my married life I had switched everything off at the wall socket at night, because years ago that’s what you were told to do, because to leave them on was a fire hazard. I leave the TV switched on now as well because the way we have it means it is difficult for me to reach to wall socket and switch it off, and I figured that if it was safe to leave the set-top box on it was safe to leave the TV on as well” [female respondent in her late sixties living in a two person household].

“When we redecorated this room I had the electric socket moved so that it was behind the TV, it is tidier that way and then we stood the TV on that bureau so that now you can’t really get in easily to switch it off at the wall and I am not sure which of the buttons on everything leaves things on standby and which switches them off” [female respondent in her mid fifties living in a three person household].

Recently, the issue of standby energy use has gained an increasing international profile (IEA, 2007a, b). This led to reports that the UK government was considering outlawing standby buttons in its 2006 energy review (Sunday Times, 2006), but the review merely talks about limiting and reducing standby energy use (DTI, 2006). This is inline with the position taken by the European Council (IEA, 2007a). However, in the case of televisions, reducing or even eliminating standby power losses will do little to reduce household energy consumption if domestic televisions are used to display pictures when not being watched, as discussed the following section.

3.3. Using televisions as electronic picture frames

Televisions draw up to 250 W/h when in use (Meier and Rosen, 1999) therefore using a television as an electronic picture frame is much more heavily energy intensive than switching it off, or even leaving it on standby. However, the use of flat screen televisions for the purpose of displaying pictures is advertised as a “value added” function of flat screen televisions. For example, an advertisement for LCD screen technologies claims that owners of new LCD televisions should “feel free to display a family photo on the screen when you’re not playing video games, surfing the web or watching a DVD” (3M, 2007). While an advertisement for television screensavers claims you can turn your “TV into an Impressionist Art Gallery [and] have the world’s greatest paintings in your living room” (Vat19, 2007).

Only one of those interviewed uses their television as an electronic picture frame. This interviewee uses her main television in her lounge as her computer monitor, as well as for the usual functions of a television. When asked about this she said “well it’s my screen saver, I used a picture I took on holiday I think it brightens up the room” [female respondent in her early 30s living in a two person household]. However, given the way in which this picture frame function is promoted as an advantage of the plasma and LCD widescreen televisions it is unsurprising that five other interviewees said they would like to own widescreen televisions, which they can “disguise as a picture”. For example, one of the male respondents living in a four
person household when asked what kind of television he would like in an ideal world replied “[i]t would basically be a plasma screen…. really thin so that it can just go on the wall and it would act like a picture most of the time so that you could have a picture of your kids or something on it”.

The following quote neatly illustrates how householders can reorganise the material aspects of their home so that they can use their television as an electronic picture frame.

“I have a television in that cupboard there. You can’t tell it is a television until I open the doors, which I like. My husband wants a new one so that we can plug the DVD into it that our daughter bought for him for Christmas. Unfortunately, it doesn’t plug into our current one because we only have one plug for the satellite or something. I don’t want a new television because the new ones will not fit into the cupboard. But my husband says we will need a new one anyway because everything is all going to go digital; he did say that I could have one that we could put a picture on so that it would look better” [female respondent in her late 50s living in a two person household].

3.4. Digital radio via cable and satellite TV

As pointed out by OFCOM the ability to receive digital radio services over digital TV is one of the key drivers of digital radio broadcasts (OFCOM, 2005b). This could be seen as a positive development. The television as a ‘one-stop service provider’ of household electronic services could reduce domestic energy consumption by slowing the proliferation of consumer electronics in the home, which might otherwise be left on standby and/or used simultaneously. However, the set-top boxes and televisions necessary for listening to radio programs via digital televisions use so much more energy than either radios or music systems that this is not the case for digital radio broadcasts. On average, digital radios consume 8.5 W/h (Owen, 2007, p. 20) music systems use between 6.1 and 44 W/h (Rosen et al., 2000, p. 6) and analogue radios use a mere 2 W/h (Owen, 2007, p. 20), while televisions use up to 250 W/h (Meier and Rosen, 1999) and set-top boxes between 12 and 23 W/h (IEA, 2004, p. 11). These figures clearly illustrate that by providing and advertising the capacity to listen to digital radio services via set top boxes satellite and cable television companies are encouraging consumers to use more energy.

In nine of the households in which the interviews took place respondents stated that radio programs via televisions becomes a daily habit, householders will not provide themselves with traditional radios, ensuring that listening to the radio in this way becomes the only option available to them. As one respondent put it “I don’t have a radio at the moment, but I don’t see why I need one when I can listen to the radio on the telly” [male living in a single person household in his late 50s].

3.5. Individualised electronic entertainment

The choice provided by the growing number of television channels and other forms of electronic home entertainment has enabled individualised electronic entertainment practices in the home. Obviously, if each person in a household is watching different televisions in different rooms, or one is watching television while another is playing a computer game and third is surfing the Internet, this uses far more energy than if all the family were in the living room watching primetime television.

In all of the households of more than one person in which the interviews took place respondents stated that different members of the family watched different television programs in different rooms of their homes. The following quotes are typical of what respondents had to say about their family television viewing practices.

“We don’t watch television together as a family very much at all come to think of it” [female in her late forties in a four person household].

“We don’t really watch much TV together anymore, just the odd movie or sometimes a big football match, if England are playing or something like that” [female in her mid forties living in a three person household].

“I watch the TV in the bedroom when he [her partner] has the football on. My dad is into football as well and it used to get on my nerves when I lived at home because he would hog the TV all the time and when I was a kid we didn’t have TVs in our bedrooms like they do today” [female in her late thirties in a two person household].

“I tend to watch DVDs in the other room or play on the internet or something when she [his wife] is watching her programs. I am just not into House Doctor or other peoples screaming badly behaved children” [male in his late twenties in a three person household].

The interviews not only revealed that family television viewing practices are now far more individualised than they were in the past, but that the designs of televisions themselves are facilitating these practices. For example, one of the respondents bought their daughter a television...
for her bedroom with a headphone socket so that she did not “have to listen to her programs blaring out” [female in her late 40s living in a four person household].

Many of the respondents are so used to individualised viewing practices they expressed opinions which suggested that it was socially unacceptable to have less than two televisions in the home, as illustrated by the following quotes.

“I don’t think any family in this day and age only will only have one television” [female in her late forties in a four person household].

“Most people have at least two don’t they. I would have thought that the average would be two televisions in every home” [female in her late sixties living in a two person household].

“Well it is normal now isn’t it all kids have TVs in there bedrooms” [female respondent in her mid-thirties living in a six person household].

Market research exploring the number of televisions in homes in both the UK and America backup the opinions expressed by research participants. Households in the US have on average 2.8 televisions (US EPA, 2006) while in the UK the figure is slightly less, standing at 2.5 (Guardian, 2007). If we look at research into children and television it also points to individualised viewing practices reinforcing the findings presented. A recent study found that 80% of British children aged five to sixteen have a television in their bedrooms (ChildWise, 2008), while in the US figures would appear to be slightly lower; a study conducted in 2005 found that 68% of American children aged between 8 and 18 have a TV in their bedroom (Roberts et al., 2005).

Studies of the number of televisions in households are useful, but they do not give an insight into how individualised television viewing and the installation of televisions and associated equipment in the home to support this behaviour became normal. However, this process was aptly described by one of the female respondents that lives with her husband and two adult children. When discussing her cable television services she said: “When we first had the cable TV put in we only had it in one room. I couldn’t stand it. The kids just wanted to have rubbish on all the time, music channels and stuff I would never choose to watch. We had endless arguments and in the end I gave up and had it installed in the top room as well. I just couldn’t stand the disagreements anymore. When the eldest started work he decided he would pay to have cable in his bedroom and so now we have three set-top boxes”.

This interviewee also stated that the different members of her family “usually watch television on their own”. When asked if this viewing practice was very different from the family viewing practices in the past she replied, “we used to have two TVs one in the living room and one in the front room but when the kids were younger they didn’t have TV’s in their bedrooms and we didn’t have cable and anyway the kids went to bed and then if we had any energy left my husband and I used to watch TV together”.

4. The implications of research findings for policies designed to reduce household energy consumption

The research discussed above indicates that household’s choice of television tends to co-evolve with the development and promotion of new technologies and services. This research has also illustrated how heavily energy intensive behaviours encouraged by the design and promotion of televisions, and their associated appliances and services, are becoming embedded within the material and social aspects of everyday life in households. As mentioned earlier, this issue is important because as householders change their homes and daily lives to fit these new behaviours it will become increasingly difficult to encourage people to reduce their household energy consumption.

These findings suggest that the increasing energy consumption by consumer electronics in the home is technologically and market led and that the time to act is now, before more of the energy intensive consumption behaviours become normal. Therefore, the UK government’s current moves to reduce standby on consumer electronics and to develop voluntary agreements to encourage retailers to supply energy efficient consumer electronics (DEFRA, 2006) offers a timely positive move towards slowing the increase in the energy consumed by household consumer electronics. However, the research outlined here suggests that more comprehensive policies will be necessary if the energy used by household consumer electronics is to be reduced.

The UK government’s current initiative asks retailers to agree to procure and sell products that meet the indicative energy efficiency standards developed by the Market Transformation Program (MTP, 2007). These standards are determined by the necessary market average energy consumption of a product to meet product policy goals (MTP, 2007). The standards are only indicative and every product sold by the retailer need not fall within the standards for that retailer to achieve an overall ‘green’ rating so long as their sales-weighted score is positive (MTP, 2007). Therefore, this initiative does not supply consumers with information about the energy efficiency of individual products. Nor does this style of initiative begin to address the rapid rise in the number of consumer electronics in the home or their simultaneous use by different members of the family.

Addressing the simultaneous use of multiple consumer electronics in the home would require the production and marketing of electronic services for the whole family to enjoy together and a move away from the production and promotion of individualised electronic services. Given the extent to which individualised electronic entertainment practices have become engrained within current society, the most productive root is probably to concentrate on making
the technologies used in these practices as efficient as possible.

However, the extent to which the UK government’s current efforts to encourage retailers to sell the most energy efficient goods available will improve the energy efficiency of consumer electronics is questionable. As this type of initiative merely encourages an improvement in the energy efficiency of the consumer electronics currently on the market and does not address the issue of the service infrastructures which support their use or the development of new technologies.

Let us first consider the case of television infrastructures. It is not merely the individualisation of television programs which is contributing to increased household energy consumption, but also the method by which those programs are broadcast. For example, in 2004, 80% of primetime programming on all major UK channels was transmitted in widescreen on digital channels (Digital Television Group, 2006, p. 4), thus encouraging the uptake of heavily energy intensive widescreen televisions. National developments in broadcasting are, in turn, influencing international programme markets, which are beginning to require widescreen programmes for high definition channels (Digital Television Group, 2006, p. 4); thus fuelling the global demand for energy intensive widescreen televisions.

Now let us consider the development of new technologies. As highlighted throughout this paper, the popular LCD and plasma televisions are heavily energy intensive. However there are much more energy efficient screen technologies than either LCD or plasma; these include organic light emitting diode (OLED) and field effect diode technologies (FED) (MTP, 2006b). The problem is that without government intervention there is not enough market push to encourage the television industry to abandon their investment in LCD and plasma technologies in favour of these less developed, but much more energy efficient screen technologies.

The omission of environment as a driver in the early stages of new product development is a major barrier to the development of new energy efficient consumer electronics such as OLED televisions. “This creativity phase is largely guided by technological and market developments; a situation which does not necessarily lead to large improvements in environmental product design” (Nuij, 2001, p. 50). For example, there are concerns OLED screen technology will not “fulfil its environmental potential due to commercial pressure” (Institute for Prospective Technological Studies, 2003). For this situation to improve policies designed to place energy efficiency at the heart of new product design are needed. This will involve governments developing a meaningful dialogue, not only with retailers, but also with companies involved in the design and marketing of consumer electronics and the services which support them, to identify the energy implications of new products and services.

It might be argued by some that governments and international agencies are opening up dialogues with manufactures, retailers and service providers. For instance, the International Energy Agency (IEA) hosted workshops in 2004 and 2007 which invited policy makers, product manufactures and digital television service providers to discuss technical and policy options to improve the efficiency of television set-top box technologies (IEA, 2007b). The IEA also signed up to the International Task Force for Sustainable Products (ITFSP) launched by the Department of Environment, Food and Rural Affairs (DEFRA) in November 2005; as did 13 countries and the United Nations’ Department of Economic and Social Affairs (UN DESA), Development Programme (UNDP) and Environment Programme (UNEP) (DEFRA, 2007). The aims of the ITFSP are in accord with European Commissions “Ecodesign of Energy Using Products Directive”, which lists among its many aims and objectives to ensure that any new energy using products with sales of over 200,000 units will be designed to be as energy efficient as possible (European Commission, 2005b).

However, the laudable aims of the workshops, directives and programs, discussed above, do not seem to be feeding into joined up policy action. This is often because they are reactive to existing products rather than proactively engaging with the energy implications of new products and services.

The lack of proactive joined up thinking within UK government policy, which effects the energy consumption of consumer electronics, is evident in the lack of thought given to the energy implications of the switch to digital television, which will begin in earnest in 2008 (see DigitalUK, 2007). The UK government has lost a golden opportunity to reduce the amount of energy used by televisions in the UK. Had there been more investment in the development OLED or FED screen technology for use in televisions prior to the switch to digital this would have facilitated the replacement of traditional cathode ray televisions with televisions incorporating a less energy intensive screen technology: rather than the current situation whereby traditional cathode ray televisions will be replaced by televisions incorporating the much more heavily energy intensive plasma and LCD screen technologies. The lack of government support for the development of televisions incorporating energy efficient screen technologies prior to the digitisation of broadcasting is an even more significant oversight when the environmental issues arising from the disposal of traditional cathode ray televisions are considered (see DTI, 2005, p. 23).

It must be noted that, it is not merely the UK government which has missed the opportunity to encourage a switch to less energy intensive screen technologies. The switch to digital broadcasting is a global phenomenon (Ricker, 2006), as is the decline of CRT televisions and the switch to heavily energy intensive plasma and LCD screen technologies. From 2006, the international media began to

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6One of the main aims of the ITFSP is faster and more assured progress towards sustainable products (DEFRA, 2007).
predict the “slow death” of the CRT television (Fox News.Com, 2006) claiming that “[t]he cathode ray tube will soon become a museum piece” (Independent, 2006) and some of the largest multinational television producers are selling their CRT manufacturing capabilities (Fox News.Com, 2006). In line with these developments the market for flat screen technologies is growing exponentially. A report recently issued by Displaybank (2007), a display market research institute, shows that worldwide shipment of 101 cm (40 in) LCD panels nearly doubled in 2006. In the same time frame, 106 cm (42 in) panels showed a more dramatic increase of seven-fold (Displaybank, 2007).

The rapid growth in the market for heavily energy intensive flat screen technologies and televisions illustrates that the time for policy action is now. On a positive note, this year the International Electrotechnical Commission (IEC) reached an agreed method of measuring the on mode consumption of LCD and plasma televisions called the TC 100 (Erdmann, 2007). This is an important step as, without an international standard, no one could quantify and compare how much energy different examples of LCD and plasma screen televisions need to generate a picture. Most importantly, until an international standard is fully accepted any energy ratings7 that manufacturers place on televisions and other devices which use this new screen technology may not be accurate (Erdmann, 2007).

There are also potential problems with how the energy consumption of televisions is translated into energy efficiency labels. The upcoming TC 100 standard will enable measurement of the average on-mode power consumption—a measure of product efficiency (Erdmann, 2007). By multiplying the average on-mode power consumption by the hours of use, it will be possible to estimate the total energy use of the product over time (Erdmann, 2007). However, this is a measurement of efficiency related to the size of screen. This may mean, that if this standard gets translated into energy labelling for different screen sizes and technologies, a 32-in television that draws 100 W will receive a lower energy rating than a 42-in television that draws 110 W; which would be very confusing for householders trying to reduce their energy consumption.

The directives, workshops, programs and policies aimed at reducing the energy consumption of consumer electronics discussed throughout this paper are in many cases responses to the European IPP. The explicit aim of which is to improve the environmental performance of products throughout their life-cycle by the systematic integration of environmental aspects at the earliest stage of their design (European Commission, 2005b). However, the fact that most of the policies, programs, workshops and directives resulting from the IPP are reactive to existing products rather than proactively engaging with the design of new products and services, combined with the reluctance of the European Commission to take a leading role in implementing product policy, means that opportunities are being missed (Nuij, 2001). With the increasing globalisation of product and service markets it is questionable if such a hands-off approach will give the necessary support to develop the comprehensive policies required to reduce the energy consumption of consumer electronics in the home.

5. Conclusions

As discussed in this paper, there have been some recent moves by the UK government to set up a voluntary partnership for retailers to commit, from 2007, to sell energy efficient consumer electronic products, with the aim of significantly reducing carbon emissions from these products by 2010 (DEFRA, 2006). However, the research presented here suggests that more comprehensive measures are necessary. This approach merely encourages an improvement in the energy efficiency of current consumer electronics on the market and does not address the issue of the service infrastructures which support their use, or the development of new technologies. Given the growing number of consumer electronics in the home and the way in which these technologies are becoming embedded into everyday life, incremental improvements based on current products and services will do little to stem the tide of increasing household energy consumption.

If the energy consumption of household consumer electronics is to be reduced this will necessitate the development of new products and services that are not based on redesign or incremental changes to existing products and services; but rather on providing the consumer with the function and style they require, in the lowest energy efficient way. This is a much more complex policy issue than merely encouraging the sale of the most energy efficient products currently available on the market. It will necessitate opening up a meaningful dialogue with those involved in the design and marketing of consumer electronics and the services necessary to their use, in order to identify the energy implications of new products and services. In turn the identification of the energy implications of new products and services will require the development of absolute standards of energy efficiency, rather than standards which are relative to the size of different appliances. Given the increasing globalisation of product and service markets within the consumer electronics sector, it would seem fair to argue that the development of meaningful efficiency standards and policies will necessitate a more hands on approach from Europe.

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7There are UK and European voluntary energy labelling schemes for consumer electronic devices. However, a recent survey conducted by the National Consumer Council (2007) in the UK found that out of 350 consumer electronic items researched only one item, a television, had an energy label sticker on it.


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