

UNITED KINGDOM

GreenNet
Paul Mobbs
www.gn.apc.org



Introduction

As the sixth largest developed economy in the world, a large part of the UK's infrastructure is dependent upon information and communications technology (ICT) for its operation. More recently, the economic value of ICTs and consumer electronics has formed an increasingly important part of the national economy in its own right. As a result, over the last two decades, the ecological footprint of ICT use has changed significantly. This has been driven by three trends:¹ firstly, the continued growth and diversification of mobile communication devices and the new applications that this has created; secondly, the growth of online services as a part of everyday life, and the development of broadband networks to support this; and finally, the effects of the switchover to fully digital broadcast systems² and the large turnover of appliances that this has created.

Regulating e-waste

Following the privatisation of the national telecommunications provider in 1984 and the opening up of access to the communications network with liberalisation in the 1990s,³ the use of telecommunications networks has grown rapidly. In late 2003 the Office of Communication⁴ was established, merging the existing media and communications regulators, to create one body to regulate all fixed, mobile, broadcast radio and television, and broadband internet communications services. A major part of its remit has been to supervise the switchover to digital broadcasting services. Analogue transmission of terrestrial television is scheduled to end in 2012, and a target date has been set to end analogue radio transmissions by 2015.⁵ The commitment to provide all homes with a broadband connection has also been a policy of government, supported by the industry, over recent years, but the date for this has slipped due to the economic recession – from 2012 to 2015.⁶

As a result of new communications and entertainment devices coming onto the market, and the digital switchover creating a larger turnover of electrical goods, there has been a large increase in the amount of electronic waste (e-waste)

requiring disposal. Contrary to the government's belief that many people would retain their old equipment and buy conversion kits, as the date for the final switchover approaches, many local authorities are seeing a surge in the amount of e-waste requiring disposal.⁷ As with the problems the UK experienced with the "fridge mountain" a decade ago,⁸ there has been little planning in order to develop more reclamation sites to process this waste.

Britain enacted the European directive⁹ on waste electrical and electronic equipment (the WEEE Directive) in 2006.¹⁰ The purpose of these regulations is to prevent electrical and electronic goods being disposed of as part of the municipal waste stream, and to develop dedicated collection and recovery systems to ensure they are disposed of with the least harm to the environment. However, the system is highly fragmented, with local authorities, retailers and private contractors all having responsibility for collection and disposal of e-waste. Consequently there is no way to collect data effectively and to track e-waste movements within the UK. This lack of collection data permits abuse of the system¹¹ and hampers the regulatory authorities when they try to pursue and bring enforcement actions against those breaching the regulations.¹² Recent investigations have demonstrated that e-waste from the UK is being shipped to unregulated disposal sites in Africa and elsewhere.¹³

The regulation of e-waste is, at this moment, rather complex since there is an overlap with the regulation of hazardous substances and hazardous wastes. A lack of co-ordination means that there is little strategic oversight of the issue. At present the national waste strategies do not have a strategic overview of how e-waste will be managed in the future, and all available data is based upon estimates rather than statistics from collected waste. In England¹⁴ (Northern

1 ONS (2007) *Focus on the Digital Age*, Office for National Statistics. www.statistics.gov.uk/downloads/theme_compendia/foda2007/FocusOnDA.pdf

2 en.wikipedia.org/wiki/Digital_terrestrial_television_in_the_United_Kingdom

3 UtilityWatch (2003) *The History of Telecommunications*. www.utilitywatch.co.uk/documents/History-of-Telecommunications.pdf

4 Office of Communications (Ofcom) www.ofcom.org.uk

5 Robinson, J. (2010) Ed Vaizey's praise for digital radio stops short of switchover date, *The Guardian*, 8 July. www.guardian.co.uk/media/2010/jul/08/ed-vaizey-digital-radio

6 Wearden, G. (2010) Broadband target put back to 2015, *The Guardian*, 15 July. www.guardian.co.uk/technology/2010/jul/15/fast-broadband-target-put-back

7 Vaughan, A. (2009) Rise in dumped TVs due to digital switchover, figures show, *The Guardian*, 4 November. www.guardian.co.uk/environment/2009/nov/04/tv-dump-digital-switchover

8 BBC (2002) Row over £40m fridge 'mountain', *BBC News*, 20 June. news.bbc.co.uk/1/hi/uk_politics/2055285.stm

9 en.wikipedia.org/wiki/Waste_Electrical_and_Electronic_Equipment_Directive

10 Environment Agency (2010) *NetRegs: Waste electrical and electronic equipment (WEEE)*. www.environment-agency.gov.uk/netregs/topics/WEEE/default.aspx

11 Pearce, F. (2009) Greenwash: WEEE directive is a dreadful missed opportunity to clean up e-waste, *The Guardian*, 25 June. www.guardian.co.uk/environment/2009/jun/25/greenwash-electronic-waste-directive

12 Warren, P. (2009) Organised crime targets waste recycling, *The Guardian*, 8 July. www.guardian.co.uk/technology/2009/jul/08/recycling-electronic-waste-crime

13 Milmo, C. (2009) How a tagged television set uncovered a deadly trade, *The Independent*, 18 February. www.independent.co.uk/news/world/africa/how-a-tagged-television-set-uncovered-a-deadly-trade-1624873.html

14 DEFRA (2007) *Waste Strategy for England*, Department for the Environment, Food and Rural Affairs. www.defra.gov.uk/environment/waste/strategy/strategy07/index.htm

Ireland, Wales and Scotland have their own strategies), current trends mean that the amount of e-waste requiring disposal is estimated to rise from 2.3 million tonnes per year in 2010 to three million tonnes per year in 2017.¹⁵

Ecological impacts of energy consumption and the developing information society

Britain was one of the few developed states to meet its commitments under the United Nations Framework Convention on Climate Change (UNFCCC)¹⁶ to reduce carbon emissions to 1990 levels by the year 2000. While this achievement was technically true using the arithmetic of the UNFCCC, in reality the total impact of the UK's ecological footprint has grown consistently over this same period. From the point of view of the UNFCCC's calculations, the reduction was achieved because, from the late 1980s, the UK's electricity supply system switched from coal to natural gas as its major source of fuel, and for space heating in homes and commercial buildings¹⁷ – and as the utilisation of natural gas is more efficient this led to a reduction in carbon emissions. In reality the ecological footprint of the UK has grown because, at the same time as the change in the energy system occurred, a large proportion of the UK's manufacturing industry was moved offshore, and the increase in the use of consumer products over the last 30 years has largely been supplied from outside the UK. Because of this, the increase in emissions that these goods create does not apply to the UK's results in the data returned under the UNFCCC, but instead forms part of the emissions of other states.¹⁸ Recent academic research estimates the real increase in carbon emissions since the 1990s, due to the expansion of economic activity in Britain, at 19%.¹⁹ Research carried out for the Department of the Environment²⁰ suggests that these "hidden" embodied emissions from *all* imported goods and services could add as much as 40% to the UK's official statistics on carbon emissions – that's about 200 million tonnes per year above what is reported to the UNFCCC.

A significant factor in the expansion of Britain's ecological footprint has been the increased level of expenditure on consumer goods and services. As incomes have risen, and the costs of traditional consumer goods (clothing, food,

etc.) have fallen, the British public have had a higher level of disposable income – a process also assisted by the easy availability of consumer credit. For example, there are more than 77 million mobile phone subscriptions in the UK,²¹ mobiles now account for just under half the calls made, and the value of mobile communications to the UK economy is between 2% and 3% of national income.²² Over the last decade mobile phone ownership more than quadrupled, from around 18% to 80% of all households, and the number of households with internet connections rose from around 10% to 65%.²³ Since 1970 the expenditure of British households on "communications" (a term that encompasses fixed and mobile phones as well as digital entertainment and data communications) has increased by 1,132%.²⁴ As a result of these and related consumer trends, British households today use 55% more energy for lighting and appliances than in the 1970s.²⁵

It is forecast that by 2020 nearly half the electricity used in homes will be used to power information, communication and entertainment devices.²⁶ The digital switchover has been one of the drivers of this trend. Two thirds of homes now have a digital TV service,²⁷ and new digital displays can use up to three times the amount of power of the analogue screens that they are replacing. The use of set-top boxes and digital recording devices adds to the electricity load. This growth has in turn negated the increased efficiency of modern electrical goods. For example, two decades ago most households had only one TV set, but today a third have two sets and just over a tenth have four.²⁸ Consequently, while individually these devices are more efficient than ever before, it is not having an impact on overall energy consumption because more are in use at any one time.

As a result of the speedy adoption of digital communications, Britain is also top of the European league for purchasing goods and services online,²⁹ as well as having the most active online population with the highest average number of daily visitors (21.8 million), the highest usage

15 DEFRA (2007) Annex C10, *Waste Strategy for England*, Department for the Environment, Food and Rural Affairs. www.defra.gov.uk/environment/waste/strategy/strategy07/documents/waste07-annex-c10.pdf

16 en.wikipedia.org/wiki/United_Nations_Framework_Convention_on_Climate_Change

17 DECC (2010) Long Term Trends, *Digest of UK Energy Statistics*, Department for Energy and Climate Change. www.decc.gov.uk/en/content/cms/statistics/publications/dukes/dukes.aspx

18 IISD (2008) *Embedded Carbon in Traded Goods*, International Institute for Sustainable Development. www.iisd.org/pdf/2008/cph_trade_climate_carbon.pdf

19 Helm, D., Smale, R. and Phillips, J. (2007) *Too Good To Be True? The UK's Climate Change Record*. www.dieterhelm.co.uk/sites/default/files/Carbon_record_2007.pdf

20 SEI (2008) *Development of an Embedded Carbon Emissions Indicator*, a research report to the DEFRA by the Stockholm Environment Institute and the University of Sydney. randd.defra.gov.uk/Document.aspx?Document=EVO2033_7331_FRP.pdf

21 Mobile Operator's Association (2010) *History of cellular mobile communications*. www.mobilemastinfo.com/information/history.htm

22 O2 (2004) *The Contribution of Mobile Phones to the UK Economy*. www.o2.com/media_files/news_100504.pdf

23 ONS (2010) Table 6.9, *Social Trends 40*, Office for National Statistics, p. 82. www.statistics.gov.uk/downloads/theme_social/Social-Trends40/ST40_2010_FINAL.pdf

24 ONS (2010) Table 6.3, *Social Trends 40*, *ibid.*, p. 78.

25 ONS (2010) Household energy use for lighting and appliances rises 155 per cent, Office for National Statistics news release, 2 July. www.statistics.gov.uk/pdfdir/stenv0710.pdf

26 Owen, P. (2007) *The Ampere Strikes Back: How consumer electronics are taking over the world*, Energy Saving Trust. www.energysavingtrust.org.uk/Publication-Download/?p=4&pid=1085

27 ONS (2010) *Use of ICT at Home*, Office for National Statistics. www.statistics.gov.uk/cci/nugget.asp?id=1710. The latest statistical research on UK digital services is available from Ofcom, *The Communications Market Report*, August 2010: stakeholders.ofcom.gov.uk/market-data-research/market-data/communications-market-reports/cmr10

28 ITC (2003) *The UK Television Market: An Overview*, Independent Television Commission. www.ofcom.gov.uk/static/archive/itc/research/industry_info_june03.pdf

29 ONS (2010) Figure 13.4, *Social Trends 40*, *op. cit.*, p. 188.

days per month (21 per user) and the highest average time spent per month per user (34.4 hours).³⁰ This in turn has challenged the traditional print media and music industries. For example, while subscriptions to digital entertainment services and downloading digital music are rising, the numbers reading a daily printed newspaper have almost halved over the last two decades.³¹

The problem with quantifying the impact of computers and digital communications in general is that the global reach of the network makes it difficult to attribute impacts to specific locations. Another difficulty is that the impacts we measure at one moment in time will soon be invalid due to the high level of growth in the use of networked services.³² Today the internet and its associated gadgets and hardware are using about 5% of global electricity production,³³ and producing as much carbon as the airline industry.³⁴ Recent studies commissioned by the European Union³⁵ estimate the total electricity drain of ICT at about 8% of EU electricity generation, equivalent to 98 megatonnes (or 1.9%) of EU carbon emissions. This is projected to rise to 10.5% of electricity production in 2020 (the figures for the whole EU are likely to be roughly accurate for the UK individually).

New trends

It is important to note that, compared to the UK's total carbon emissions, the impact of ICTs and similar electrical and electronic goods is not the major carbon emitter. Research from the Carbon Trust³⁶ shows that communications and recreation between them account for much less than a third of the UK's carbon emissions. For this reason dealing with our carbon emissions is a far more difficult issue than changing our use of consumer electronics and ICTs, and will require structural change to both the UK economy and British lifestyles.

The difficulty in finding a way to reduce the impact of the ecological footprint of ICTs is that – due to changing technologies, and inconsistencies between the way the impacts of the production, use and disposal are assessed – there is a divergence of views on where the impacts of ICT lie. For example, many studies, even those by environmental

advocates,³⁷ cite the figures produced by a twelve-year-old survey carried out for the European Commission; this states that 20% of the impact of computers takes place during production and 80% during their use by consumers.³⁸ More recent research states the split as nearer 50:50,³⁹ or tips the balance wholly the other way stating that 80% is due to manufacturing and 20% due to use.⁴⁰ Other approaches stress the economic and managerial component of developing more “sustainable” ICTs,⁴¹ while others put greater weight on the toxic impacts of production (such as Greenpeace's *Guide to Greener Electronics*).⁴² If we assume that ICTs are no different to other aspects of the developed world's lifestyle, then other studies of ecological impacts usually put the greatest burden on the production side of the equation rather than use.⁴³ This makes it difficult, from the consumer's position, to significantly change the level of impacts through personal change – instead we have to look to significant changes to production methods, and to significantly extending the service lifetime of goods.

As the main determinant of our use of ICTs is the health of the general economy, the present uncertain economic outlook holds the greatest potential to produce a change in the pattern and ecological footprint of their use. Certainly within the UK, due to the changing nature of our growing economic and energy supply problems,⁴⁴ how we develop our use of ICTs in the future may be very different from the trends of the past twenty years. Our need to make difficult economic choices may create a higher priority to lower energy use and extend the service life of goods, both of which have a very positive effect on the ecological footprint of consumption.

30 comScore (2008) Study reveals internet usage in Europe, *FIPP*, 15 July. www.fipp.com/News.aspx?PageIndex=2002&ItemId=13692

31 ONS (2010) Figure 13.5 and 13.6, *Social Trends 40*, op. cit., p. 189.

32 Johnson, B. (2009) Web providers must limit Internet's carbon footprint, say experts, *guardian.co.uk*, 3 May. www.guardian.co.uk/technology/2009/may/03/internet-carbon-footprint

33 Thompson, B. and Wallace, J. (2008) Smarter bytes, slimmer footprints, *Green Futures*, 13 October. www.forumforthefuture.org.uk/greenfutures/articles/Smarter_bytes_slimmer_footprints%2B

34 Petty, C. (2007) Gartner Estimates ICT Industry Accounts for 2 Percent of Global CO2 Emissions, Gartner press release, 26 April. www.gartner.com/it/page.jsp?id=503867

35 Beton, A. et al. (2008) *Impacts of Information and Communication Technologies on Energy Efficiency: Final Report*, Bio-Intelligence Service for the European Commission. [ftp.cordis.europa.eu/pub/tp7/ict/docs/sustainable-growth/ict4ee-final-report_en.pdf](http://cordis.europa.eu/pub/tp7/ict/docs/sustainable-growth/ict4ee-final-report_en.pdf)

36 Carbon Trust (2006) *The carbon emissions generated in all that we consume*. www.carbontrust.co.uk/Publications/pages/publicationdetail.aspx?id=CTC603

37 Madden, P. and Weißbrod, I. (2008) *Connected – ICT and sustainable development*, Forum for the Future. www.forumforthefuture.org/files/Connected.pdf

38 Atlantic Consulting/IPU (1998) *LCA Study of the Product Group Personal Computers in the EU Ecolabel Scheme*, European Commission. ec.europa.eu/environment/ecolabel/about_ecolabel/reports/lcastudy_pc_1998.pdf

39 Duan, H. et al. (2009) Life cycle assessment study of a Chinese desktop personal computer, *Science of the Total Environment*, 407 (5), p. 1755-1764. www.summer.ucsb.edu/rmp/2010SamplePapers/EnvironScience.pdf

40 UNU (n.d.) *Life Cycle Assessment of IT Hardware*, UN University. www.it-environment.org/about%20project%20-%20LCA%20of%20IT%20hardware.html

41 Mingay, S. (2007) *Green IT: The New Industry Shock Wave*, Gartner's Research. www.netdesign.dk/manedens-tema/telepresence/green-it-the-new-industry.pdf

42 Greenpeace (2010) *Guide to Greener Electronics* (15th edition). www.greenpeace.org/international/campaigns/toxics/electronics/how-the-companies-line-up

43 For example, Nijdam, D. S. et al. (2005) Environmental Load from Dutch Private Consumption: How Much Damage Takes Place Abroad?, *Journal of Industrial Ecology*, 9 (1/2), p. 147-168. www3.interscience.wiley.com/cgi-bin/fulltext/120129086/PDFSTART

44 Mobbs, P. (2009) Peak Oil, the Decline of the North Sea and Britain's Energy Future, presentation to the All Party Parliamentary Group on Peak Oil, 24 November. appgopo.org.uk/index.php?option=com_content&task=view&id=55

Action steps

- To reduce the ecological impacts of ICTs we need to take a much longer-term view of our use of technology. Where possible we should plan to use all electrical devices until they wear out or are incapable of working reliably – as most of the impact of ICT/entertainment appliances takes place during production, using electrical goods until they are physically unserviceable has a lesser impact than replacing them at an earlier date because of a perceived reduction in direct power consumption or increase in functionality. This will reduce resource consumption and e-waste production.
- The growth in the UK's ecological footprint for digital communications is not defined solely by technological change, but also by the growing number of TVs, mobile phones and other appliances in use today. As we develop the new “digital culture” we must repeatedly pose the question as to whether having quantitatively “more” of these devices is qualitatively “better” for society.
- When disposing of any electrical device it is important to check that the organisation/company accepting your waste takes steps to ensure that the materials are not shipped as e-waste to any nation which does not have the infrastructure to process it to the best available techniques. Lobbying for an independent auditing and standards body for e-waste contractors would be the best way, within the present legal system, to address the complexity of the e-waste issue. ■