

# **Better Together**

**How cooperation could cut energy  
wastage in the UK mobile phone industry**

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## **Part 1.**

### **Avoidable energy wastage in the UK's mobile phone networks**

1.1 Competition between mobile phone companies is wasting enormous amounts of electricity - probably around 300 GWh a year [1] - due to unnecessary duplication of telephone network equipment.

1.2 The interim government report *Digital Britain* [5] appears not to have considered the carbon impacts of different technologies used to provide high-speed broadband. And while the report notes that cost savings can be made with network sharing, experience has shown that operators will need more than “encouragement” to share, if we are to reap the full energy benefits.

1.3 The energy used by the main mobile and fixed networks in the UK is estimated to exceed that used by all electric trains - some 40% of the country's rail network [3 & 4]. Most of this is essential usage. But the wastage in the mobile phone networks, put into perspective, is equivalent to:

- Enough electricity to run almost one-third of the London Underground [6]. Or
- Seven times as much power as the Docklands Light Railway [7]. Or
- Enough to run the Blackpool Tramway for 137 years [8]. Or
- Enough electricity for almost 70,000 homes [9].

## Part 2.

### How to cut the wastage

2.1 With Ofcom now delaying the auctioning of television spectrum until 2010, now is the time to set new energy standards for the next generation of mobile networks.

2.2 The government should require mobile phone companies to share networks. The benefits of this would be:

- Operators would save money.
- The sector would reduce its CO2 emissions significantly.
- Instead of requiring more mobile phone masts, which are often controversial in local communities, we could achieve the same level of signal cover with fewer masts.

2.3 In the short term, operators should be required to reduce energy by sharing base stations at times of low demand (i.e. at night, and in rural areas).

2.4 The sell-off of television spectrum at 800MHz [5 Action 6b] presents an opportunity to make much larger savings. Mobile operators should be required to build new infrastructure through a partnership, making the resulting super-network available for any service provider to access. Competition in services could be maintained and energy savings would benefit the operators, consumers and most of all the environment.

2.5 In a different frequency band at 900MHz discussions are ongoing in order to share the limited spectrum amongst the operators in the most equitable way [5 Action 6a]. Rather than divide the band in to ever smaller chunks, which could require each to have separate base station equipment, government should direct Ofcom to ensure that the solution that

is developed is an energy efficient one. This could be done by sharing the spectrum or requiring existing operators to allow access for others. The roaming technologies required are available today, and used by travellers in many countries.

2.6 In responding to the Digital Britain report [5] the Green Party calls on Lord Carter (Parliamentary Under-Secretary of State for Communications, Technology and Broadcasting) to ensure that Ofcom awards spectrum with due consideration for energy use, not just allowing but requiring the sharing of base stations, when it is sensible to do so [5 Action 6d]. In order to meet stringent carbon emission reductions we must end wasteful duplication of energy intensive equipment.

## **Appendix: questions**

### **Why are there several networks anyway?**

The reason there are five mobile phone networks, which now have very similar coverage, is simply that the government was keen to stimulate competition. While this has brought many benefits it has created a very energy intensive solution. It has also resulted in a needless proliferation of antennas and masts. When railway networks were first built, competing companies sometimes built their own lines on similar routes, but nobody today would suggest building five high speed rail networks in the interests of competition. The same now applies to phone networks. As more bands have become available more and more base stations have been built, exacerbating the issue.

### **Why will the operators be buying yet more spectrum?**

The lower frequency bands which are to be sold provide better coverage presenting the opportunity to save on base station numbers. This will also save energy, all the more so if the networks are built with this in mind.

### **Doesn't Ofcom consider environmental issues already ?**

They are primarily interested in spectrum management, but they could be directed by government to consider these issues, in the same way that government departments do.

## Notes

1. The energy saved would depend on the radio technologies deployed but as most of the energy in a mobile network is used in the base station (of which only a relatively small proportion is dependent on traffic volume) the reduction would be significant. The energy consumption of a modern typical 3G base station is 430W, even if it is only transmitting low traffic volumes. See: [http://www.nsn-transformation.com/uploads/documents/Transformation\\_forum\\_UK\\_stream2.Running%20your%20network%20more%20efficiently.pdf](http://www.nsn-transformation.com/uploads/documents/Transformation_forum_UK_stream2.Running%20your%20network%20more%20efficiently.pdf)

However, if we take data more representative of base stations already in service energy used will be greater. For the example in Fig 2 from a report from Berlin University the power consumption even with no traffic would be a minimum of 860W. See [http://www.tkn.tu-berlin.de/publications/papers/TechReport\\_03\\_017.pdf](http://www.tkn.tu-berlin.de/publications/papers/TechReport_03_017.pdf).

Discounting TETRA base stations (used exclusively for the emergency services) there are at least 50 000 base stations in the UK: an average of 10 000 per operator. ([www.ofcom.org.uk/sitefinder/table](http://www.ofcom.org.uk/sitefinder/table).) Vodafone alone has about 12,000 ([http://www.vodafone.com/etc/medialib/attachments/cr\\_downloads.Par.25114.File.tmp/CR%20REPORT\\_UK-FINAL%20ONLINE\\_180908\\_V6.pdf](http://www.vodafone.com/etc/medialib/attachments/cr_downloads.Par.25114.File.tmp/CR%20REPORT_UK-FINAL%20ONLINE_180908_V6.pdf)). Even allowing for the few base stations which are already shared the power that could be saved if 10,000 shared base stations were used would be  $40\,000 \times 860\text{W} = 34.4\text{ MW}$ . The annual energy saved would be  $34.4 \times 24 \times 365 = 301\text{GWh}$ .

2. Electricity used by London Underground for traction was 996GWh in 2007/8 (see <http://www.tfl.gov.uk/assets/downloads/london-underground-environment-report-2008.pdf>).

The Docklands Light Railway used 41GWh in 2006 ([http://www.lept-eu.org/documents/NEW%20Sam%20Margolis%20LEPT%20Conference%20Speech%20v3\\_Final%20change.pdf](http://www.lept-eu.org/documents/NEW%20Sam%20Margolis%20LEPT%20Conference%20Speech%20v3_Final%20change.pdf)).

3. Typical energy consumed by networks (data from operator websites):

Vodafone	2007/8	397 GWh
Orange	2007	342 GWh
O2	2006	398 GWh
BT	2008	2030 GWh

Sources:

[http://www.vodafone.com/etc/medialib/attachments/cr\\_downloads.Par.25114.File.tmp/CR%20REPORT\\_UK-FINAL%20ONLINE\\_180908\\_V6.pdf](http://www.vodafone.com/etc/medialib/attachments/cr_downloads.Par.25114.File.tmp/CR%20REPORT_UK-FINAL%20ONLINE_180908_V6.pdf);

<http://www.btplc.com/Societyandenvironment/ourapproach/sustainabilityreport/section.a.spx?sectionId=137E6298-8E3D-4419-8836-E80134657AD1>;

[http://www.orange.com/en\\_EN/tools/boxes/documents/att00005072/CSR\\_report\\_2007.pdf](http://www.orange.com/en_EN/tools/boxes/documents/att00005072/CSR_report_2007.pdf).

4. Electric trains in UK in 2006 used 2912GWh, according to ATOC

<http://www.atoc-comms.org/admin/userfiles/Baseline%20statement%20-%20FINAL%20-%20Print%20version.pdf>.

5. The *Digital Britain* report was published by government on 29 January 2009, inviting comment on plans on the use of spectrum used by Television and mobile phones.

See: [http://www.culture.gov.uk/what\\_we\\_do/broadcasting/5631.aspx](http://www.culture.gov.uk/what_we_do/broadcasting/5631.aspx).

6. Electricity used by London Underground for traction was 996GWh in 2007/8: <http://www.tfl.gov.uk/assets/downloads/london-underground-environment-report-2008.pdf>.
7. The DLR used 41GWh in 2006: [http://www.lept-eu.org/documents/NEW%20Sam%20Margolis%20LEPT%20Conference%20Speech%20v3\\_Final%20change.pdf](http://www.lept-eu.org/documents/NEW%20Sam%20Margolis%20LEPT%20Conference%20Speech%20v3_Final%20change.pdf).
8. Blackpool Tramways consumes 2.175 GWh of electricity per year - based on the annual operation of 1,450,000 km at 1.5 kWh per km (<http://www.visitblackpool.com/?OBH=80&ID=59&OBT=14&AC=5> & <http://www.trampower.co.uk/FAQ.html>).
9. Based on the figure of 4,393 kWh for average domestic consumption in 2007 taken from *Energy Trends* March 2009 report published by the Department of Energy and Climate Change <http://www.berr.gov.uk/files/file50354.pdf>. The actual figure is 68,000. Note, however, that under Green policies for domestic energy conservation, average consumption would fall significantly, so the number of houses in this equation would rise considerably.