# Energy-Efficiency Research in the IRTF
Bar BoF tonight – 20:15 Room 2103

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Potential Saving (today)

- According to the ITU-T 2 – 2.5% of all green house gas emissions is from the use of ICT [1]

- EU says ICT uses 8% of electrical power in the EU and produces about 2% of the CO_2 (2005 figures)[2]

- Example: Telecom Italia is the second biggest consumer of electrical energy in Italy (>2TWh - 2010)

- Not the biggest fish to catch but significant

- Increasing…

ICT
Other
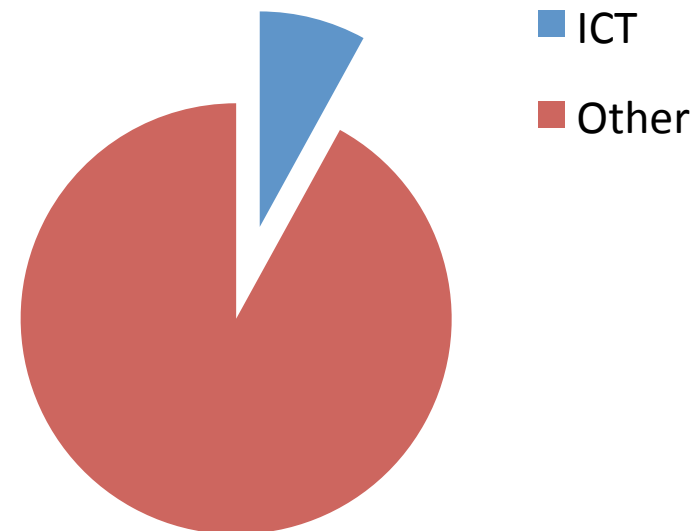
[1] Information and communications technologies and climate change - Resolution 73, 2008
[2] Impacts, European Commission DG INFSO, September 2008

How much is spent on the infrastructure?

Country		Energy consumption on network [GWh]	Energy consumption total [GWh]	Source	available at
Spain	Telefonica Europe total 2006		1.719,60	Corporate Responsibility Report 2006, Telefonica S.A.	http://www.telefonica.es/rc2006/telefonica/informe_rc/docs/corporativo/RC2006_ENG.pdf
Germany	Telekom Konzern total without USA 2006		3.854,83	Corporate Responsibility - Daten und Fakten 2007, Deutsche Telekom AG	http://www.download-telekom.de/dt/StaticPage/47/47/60/CR_Daten_Fakten_2007.pdf_474760.pdf
UK	Britsh Telecom	1.992,00	2.619,00	BT's Sustainability Report 2007, BT Group	http://www.btplc.com/Societyandenvironment/Socialandenvironmentreport/pdf/2007/FullReport.pdf
Italia	Telecom Italia Group		2.571,43	Sustainability Section extract from 2006 Annual Report, Telecom Italia S.p.A.	http://www.telecomitalia.it/sostenibilita2006/English/Download/TI-2006-bilancio-sostenibilita.pdf
France	Telecom France		1.724,00	Rapport de responsabilité d'entreprise 2006, Group France Telecom	www.francetelecom.com/fr/groupe/responsabilite/publications/att00022872/1005_0703399_FT_DD.pdf
	Sum	9.991,09	12.488,86		
	Total EU-25	14.272,98	17.841,23		EU-5 calculated as 70% of EU-25

What falls under ICT?

BAU Scenario Annual Electricity Consumption of ICT (in TWh/a)
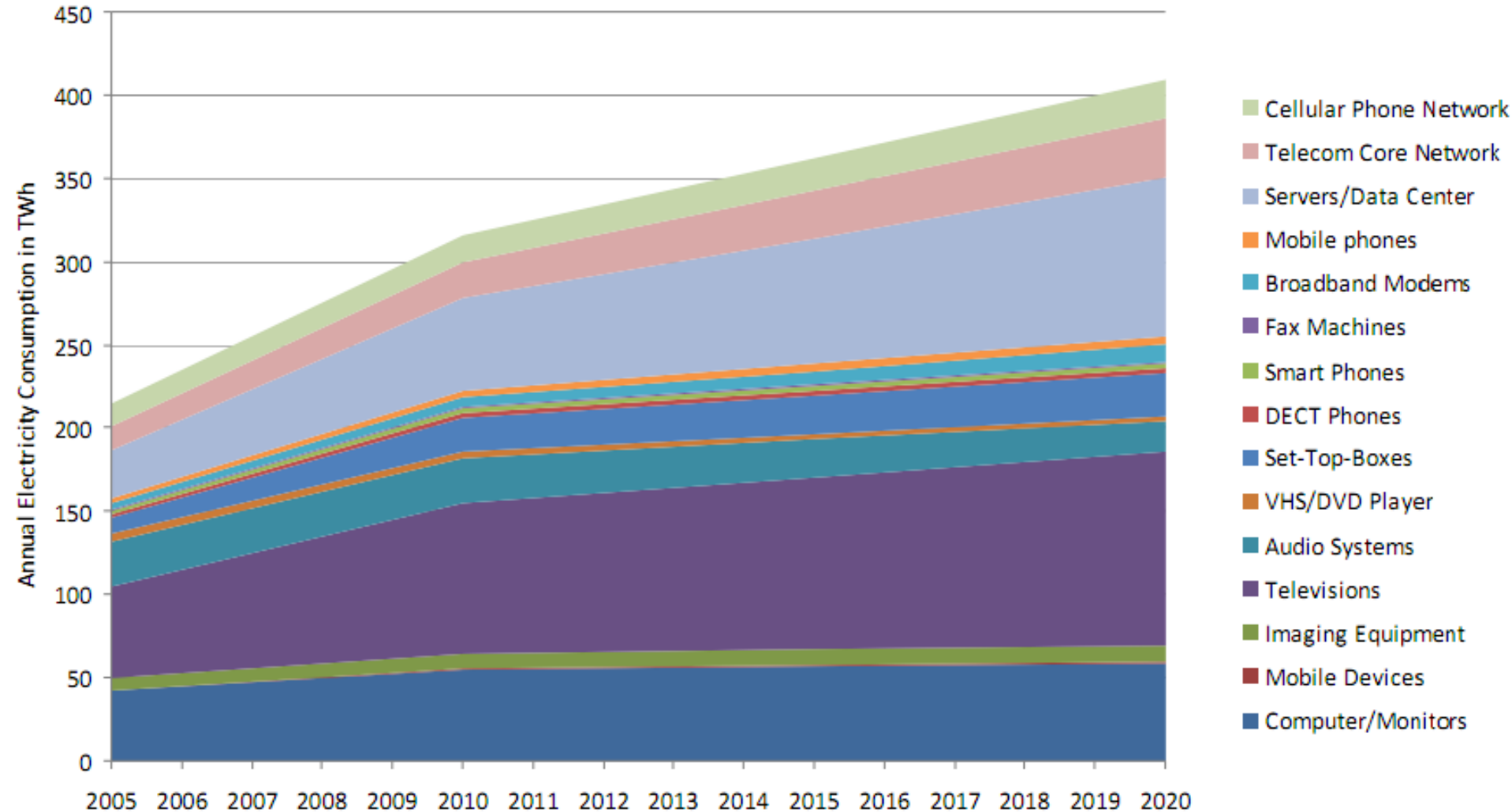
2010: 4.2% of all CO_2 and 10.5% of all electrical energy consumed in the EU
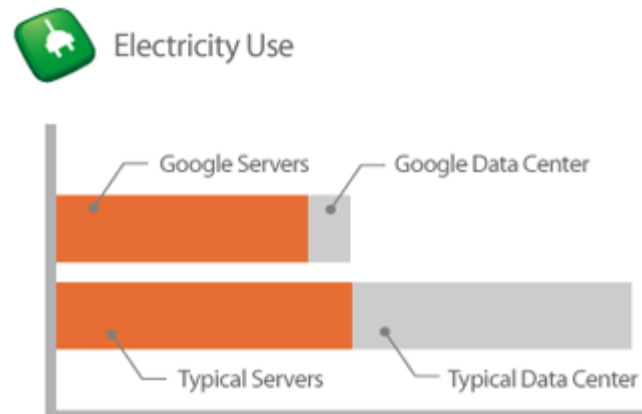
Some ongoing activities

- Guidelines and Certification

- Energy saving at lower layers

- Corporate initiatives

What can the IRTF do and why?

- Lower layer energy efficiency is the low(er) hanging fruit, what then?
- Some devices stay on because the Internet (protocols) assumes that devices are always-on
  - So it prevents other devices from saving energy
- At some point devices will go into sleep and they need to do extra work to join the net again
  - Help making this go faster/easier

What can the IRTF do and why?

- New protocols to support application proxys?
- Delay sending packets for some time to being able to send them in bursts of packets (delay tolerance)
- Metrics and benchmarking
- Monitoring and control plane issues
- …

Related activities in the IETF/IRTF

- IETF EMAN – energy management (SNMP)
- IRTF DTNRG – delay tolerance
- IETF 6LOWPAN, ROLL, CORE – constraint networks
- Interconnecting Smart Objects with the Internet (WS in Prague) – see also material referenced at http://www.ietf.org/mail-archive/web/recipe/current/msg00041.html
- …

Questions we should to talk about later today

- Is there a sufficiently large group that wants to work on this
  - As opposed to may individuals that work each on their own thing (small changes to existing protocols be it routing, management etc.)
- What should the first priorities be
  - Protocol survey of which protocols need attention
  - The things we talked about before

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