



EU Codes of Conduct for ICT

**The European Commission's
science and knowledge
service**

Joint Research Centre



Why ICT Energy Consumption Matters?

- The **ICT** sector including data centres generates up to **2% of the global CO2 emissions**, a number on par to the aviation sector contribution and data centres are estimated to have the fastest growing carbon footprint from across the whole ICT sector.
- **ICT** sector nowadays consumes approximately **7% of the global electricity**, and it is forecasted that the share will rise up to **13% by 2030**.
- **Real-time video streaming, online gaming as well as mobile devices** (5G, IoT, etc.) already account for 60% of all data traffic, and it is predicted that this will rise to **80% by the end of 2020**.
- The data centres are estimated to account for **1.4% of the global electricity** consumption and the compound annual growth rate (CAGR) between 2007 and 2012 has been estimated as 4.4

Why the EU CoC for ICT?

- Back in the 2000s there was no EU regulation or voluntary initiatives addressing the energy efficiency of data centres. This creates risk of confusion, mixed messages and uncoordinated activities.
- Need for independent assessment and coordination – tailored to European conditions such as the climate and energy markets regulation.
- The Codes of Conduct provided a platform to bring together European stakeholders to discuss and agree on voluntary actions, which will improve energy efficiency.



EU Codes of Conduct for ICT

- Led by European Commission **Joint Research Centre**.
- **Flexible** mechanism to fill policy vacuum.
- Forum for **industry, experts and MSs**.
- **Open** and continuous dialogue on **market and product** performances.
- Identify and **focus on key issues** and agree solutions
- Set **ambitious voluntary standards** and commitments

Existing Codes of Conduct

- **Since 2000's Codes of Conduct on:**
 - External Power Supply Units
 - Digital TV Services
 - **Broadband Equipment**
 - Uninterruptible Power Supplies (UPS)
 - **Data Centres**
- One of the first policy initiative to reduce energy consumption for **External Power Supplies, Set top Boxes**, and recently on **Broadband Equipment**
- It lays groundwork which has been used by other European policies (e.g. **Eco-Design**) and other regulations (e.g. Switzerland)

Aims of the EU CoC

To **raise awareness** among managers, owners, investors, with targeted information and material on the opportunity to improve efficiency.

To provide an **open process and forum** for discussion representing European stakeholder requirements.

To create and provide an **enabling tool for industry** to implement cost-effective energy saving opportunities.

To develop a set of **easily understood metrics** to measure the current efficiencies and improvement.

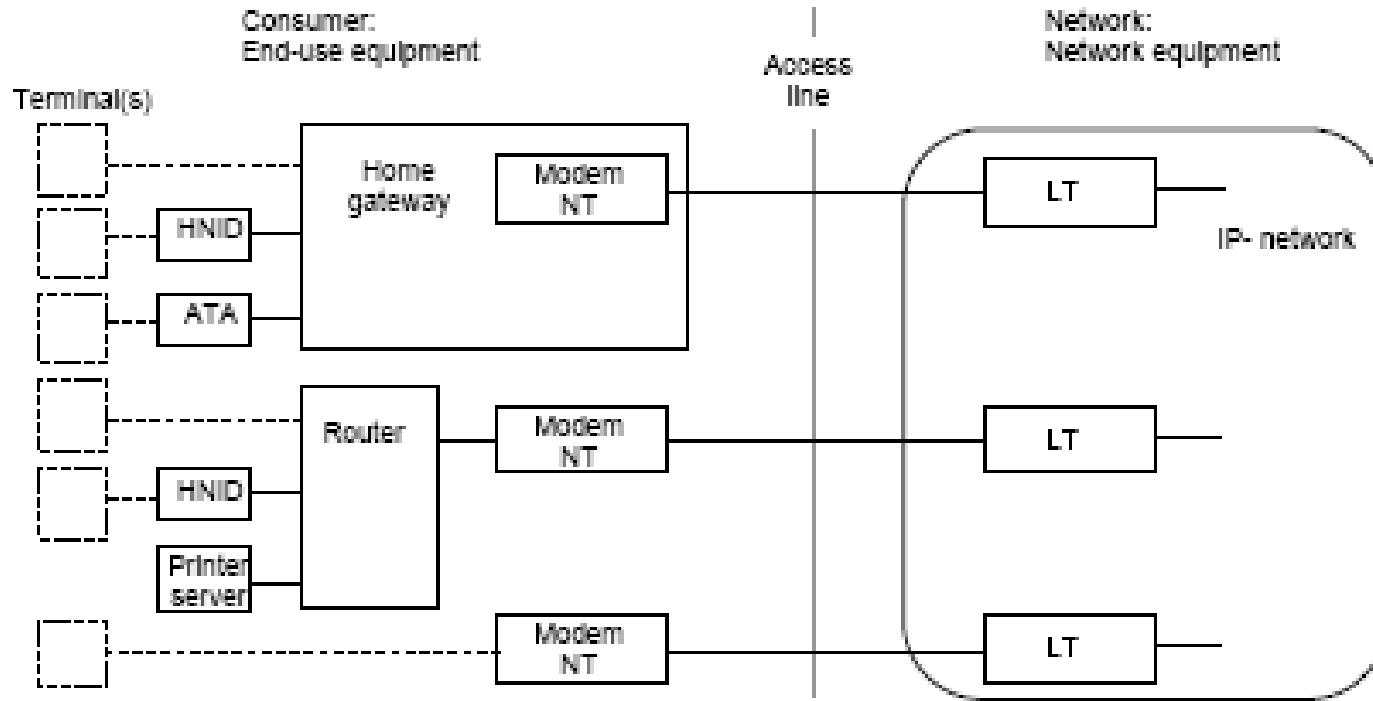
To produce a **common set of principles** in harmonisation with other international initiatives.

To **support procurement**, by providing criteria for equipment (based on the Energy Star Programme specifications, when available, and other Codes of Conducts), and best practice recommendation for complex systems.

What are the Codes of Conduct for ICT?

- Code of Conduct is a **voluntary commitment** of individual companies, with the aim of **reducing energy consumption** of the equipment introduced in the market through the adoption of **best practices in a defined timescale**.
- Energy efficiency targets are complemented by **general commitments to monitor power and energy consumption**, adopt management practices, switching off components not needed, and **reducing energy consumption where possible**.

Code of Conduct for Broadband Equipment



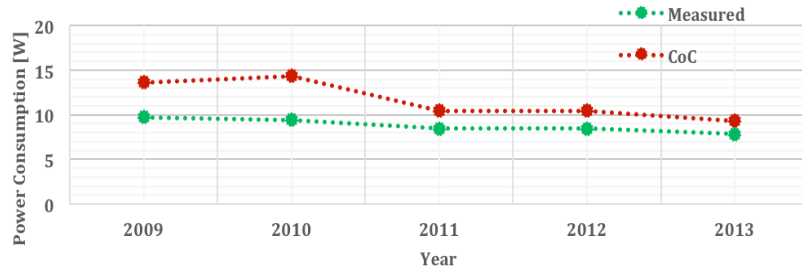
This Code of Conduct covers equipment for broadband services both on the customer and on the network side. Terminals like PCs, STBs, and TVs are not covered by this Code of Conduct.

CoC for Broadband equipment

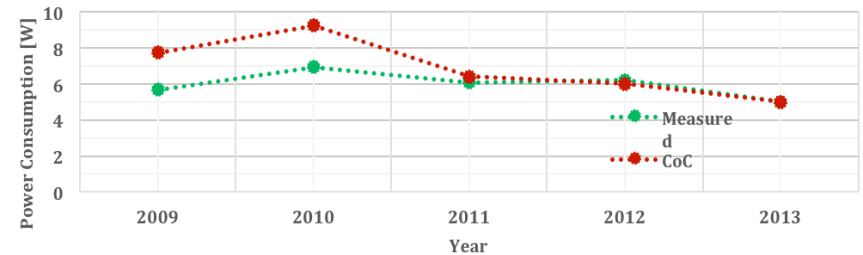
- Each of the participating companies (at the moment **14 European telecom companies and 6 major equipment suppliers**) must report the power consumption of their new equipment covered by the Code of Conduct to the European Commission JRC on **annual basis**.
- Anonymous results are discussed at least once a year by the signatories, the European Commission, Member States, and their representatives in order to:
 - Evaluation of the level of compliance and the effectiveness of this Code of Conduct in achieving its aims.
 - Assessment current and future developments that influence energy consumption, (i.e., Integrated Circuit development, etc.) with a view to agreeing actions and/or amendments to the Code of Conduct.
 - Setting targets for future time periods.

Results: Customer Premises Equipment (CPE) and Broadband DSL lowering along the years. Lowering in all categories

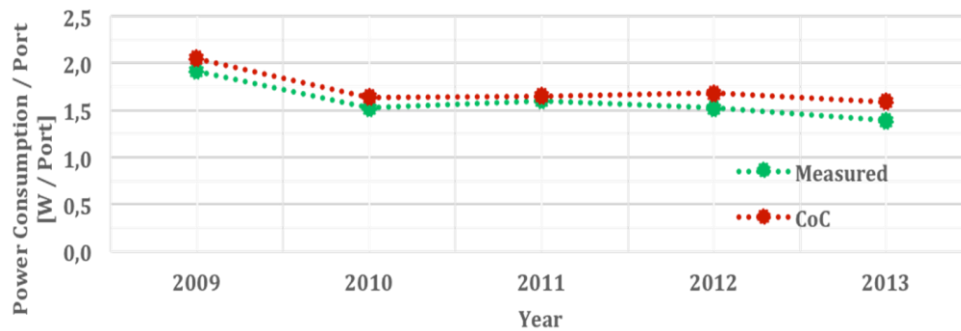
CPE - On State



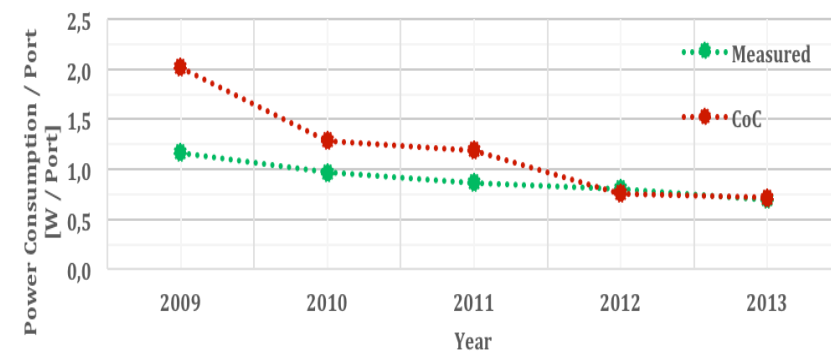
CPE - Idle State



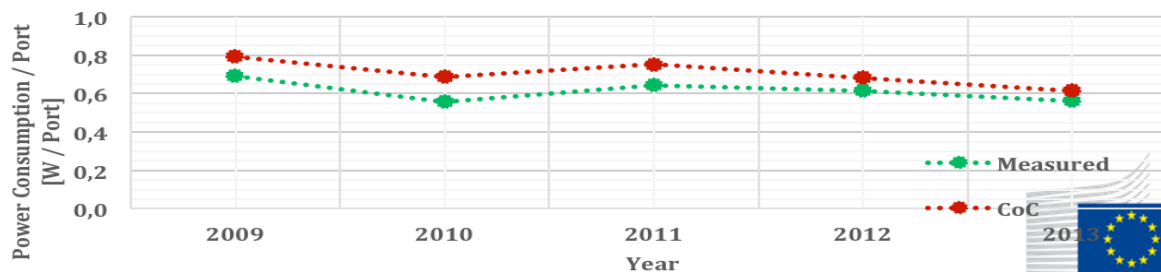
Broadband DSL - Full Load State



Broadband DSL - Low Load State



Broadband DSL - Standby State



Conclusions:

Broadband CoC as effective policy instrument

- The Code of Conduct is a **successful flexible policy mechanism** to improve energy efficiency in broadband equipment as demonstrated by the large number of participants and the **decreasing power consumption over time**, despite the increased functionalities of the equipment.
- The Codes of Conduct have served as an important platform for promoting energy efficiency in Europe in ICT. The Code of Conduct for broadband equipment covers both CPE and network equipment and every year new equipment is added to the list of the covered equipment.
- The Code of Conduct for broadband equipment has already reduced the energy consumption of this equipment, even if these offer many more features and services.

The EU CoC for DCs

The CoC covers:

- **“DC” of all sizes** – server rooms to dedicated buildings
- Existing and new
- IT power and Facility power
- Equipment procurement and system design

The CoC is for:

- **Participants**: Data centre owners and operators
- **Endorsers**: Vendors, consultants, industry associations



Participation

- For existing data centres partnership application start with an initial energy measurement, and energy audit to identify the major energy saving opportunities.
- An Action Plan must be prepared and submitted, once the Action Plan is accepted the Participant status is granted.
- Participant must implemented the Action Plan according to the agreed time table. Energy consumption must be monitored regularly

Best Practices

Category	Description
Entire Data Centre	Expected to be applied to all existing IT, Mechanical and Electrical equipment within the data centre.
New Software	Expected during any new software install or upgrade
New IT Equipment	Expected for new or replacement IT equipment
New Build or retrofit	Expected for any data centre built or undergoing a significant refit of the M&E equipment from 2011 onwards
Optional Practices	Optional (no background colour)

Best Practice Intent

- Core document of the CoC
- Neither a prescriptive nor exhaustive list of specific technologies
- Focussed on **goals and processes**
- Structured to allow the **addition of new technologies**
- Over **90 mandatory Best Practices to be implemented.**

Results

380 DCs have requested Participant Status

342 DCs have been approved as Participant

154 organisations have at least one DC approved as Participant

In Europe we have DC Participants in 22 countries: Portugal, Spain, France, Italy, Switzerland, Austria, Romania, Greece, Hungary, Poland, Malta, Finland, Sweden, Denmark, Netherlands, Germany, Belgium, Luxemburg, UK, Norway, Turkey and Ireland.

Participants outside Europe: US, Mauritius

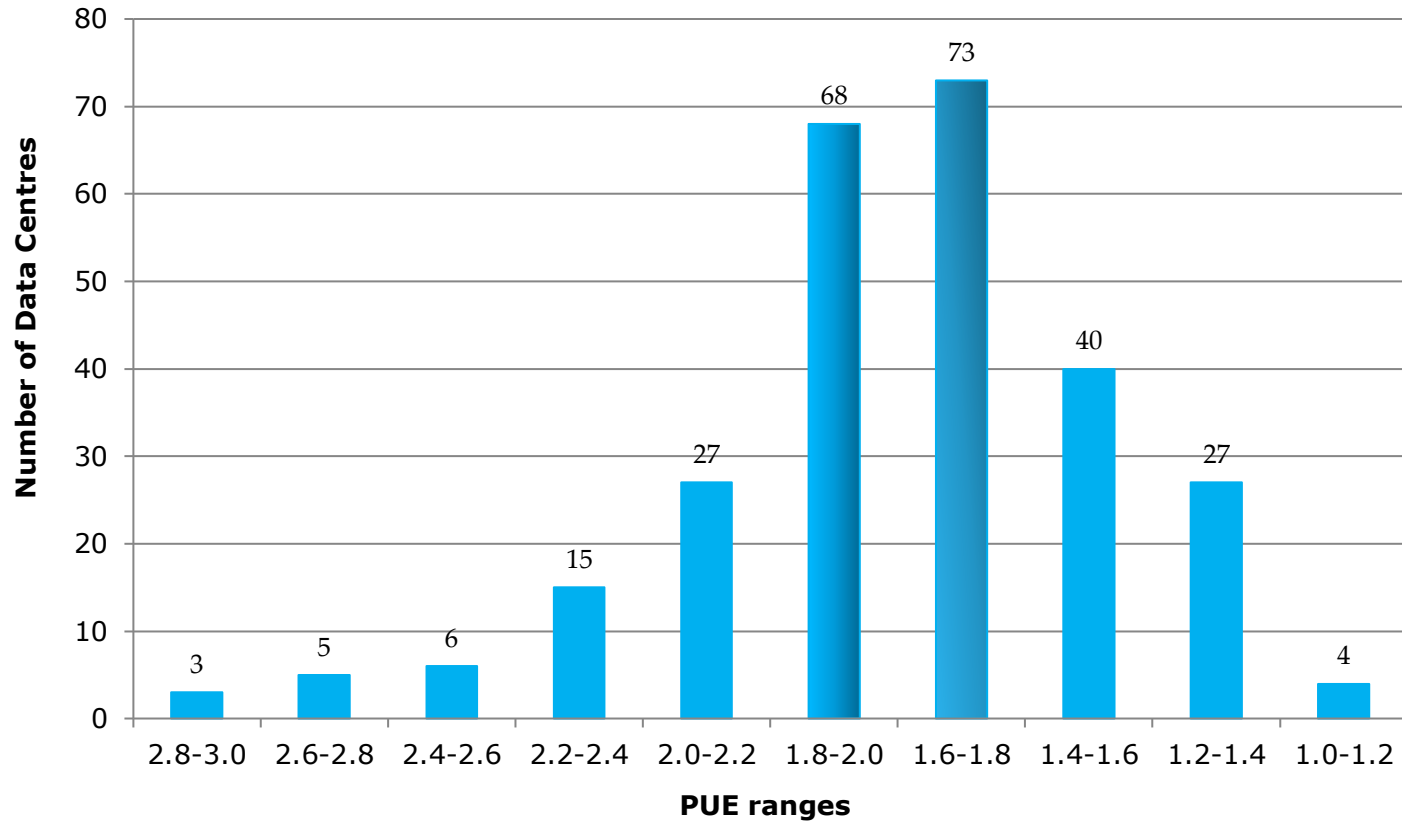
Overview of Results

Total dataset	289 Data Centres which have reported the data
Total annual electricity consumption	3735,735 MWh
Average DC floor area	2,616 m ²
Average Rated IT load	1,956 kW
Average annual electricity consumption	13,684 MWh
Average annual IT consumption	7,871 MWh
Average PUE	1.80
Average High Temp Set point	25 °C
Average Low Temp Set point	19.5 °C
Average High RH Set point	59 % RH
Average Low RH Set point	35 % RH

Geographical distribution

Geographical Zones	Countries	Temperature range (°C)	RH range (%)	Average PUE	N° of Data Centres
Nordic countries	Denmark, Finland, Norway, Sweden	18-26	20-80	1.71	13
UK and Republic of Ireland	England, Scotland, Wales, Northern Ireland, Republic of Ireland.	17-30	8-80	1.83	116
Northern/Central Europe	Austria, Belgium, France, Germany, Hungary, Luxembourg, Netherlands, Portugal, Poland, Switzerland	14-28	16-75	1.72	122
S. Europe/ Mediterranean	Gibraltar, Greece, Italy, Malta, Spain, Turkey, Monaco, Romania, Bulgaria	16-26	20-80	2.00	30
Non EU	Republic of Mauritius, US	-	-	-	5

Data Centres per PUE range



Conclusions for Data Centres

- *Declining PUE year after year*
- *Encouraging results: PUE reaching an average of 1.8*
- *Some DCs below 1.2*
- *DCs located in Scandinavia and small and larger DCs performing better*

Thank You for Your Attention

For more information contact

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or visit

<https://e3p.jrc.ec.europa.eu/communities/data-centres-code-conduct>