

# **European Policies for Energy Efficiency in ICT**

**Paolo Bertoldi**  
**European Commission DG JRC**

- Office Equipment is responsible for about 60 TWh of electricity consumption in the EU (with another 20 TWh in the residential sector)
- Data Centres are responsible for about 50 TWh and is projected to increase to 100 TWh per year by 2020
- Broadband equipment electricity consumption will be up to 50 TWh
- Standby consumption in the residential sector is about 40 TWh (this includes STBs)
- All the above consumption is the fastest raising consumption in the EU

# EU Key Climate and Energy Objectives for 2020

By 2020 -20% **EU GHG**

By 2020 +20% **ENERGY  
SAVING**

By 2020 binding 20% **RENEWABLES** in final  
energy consumption at EU level

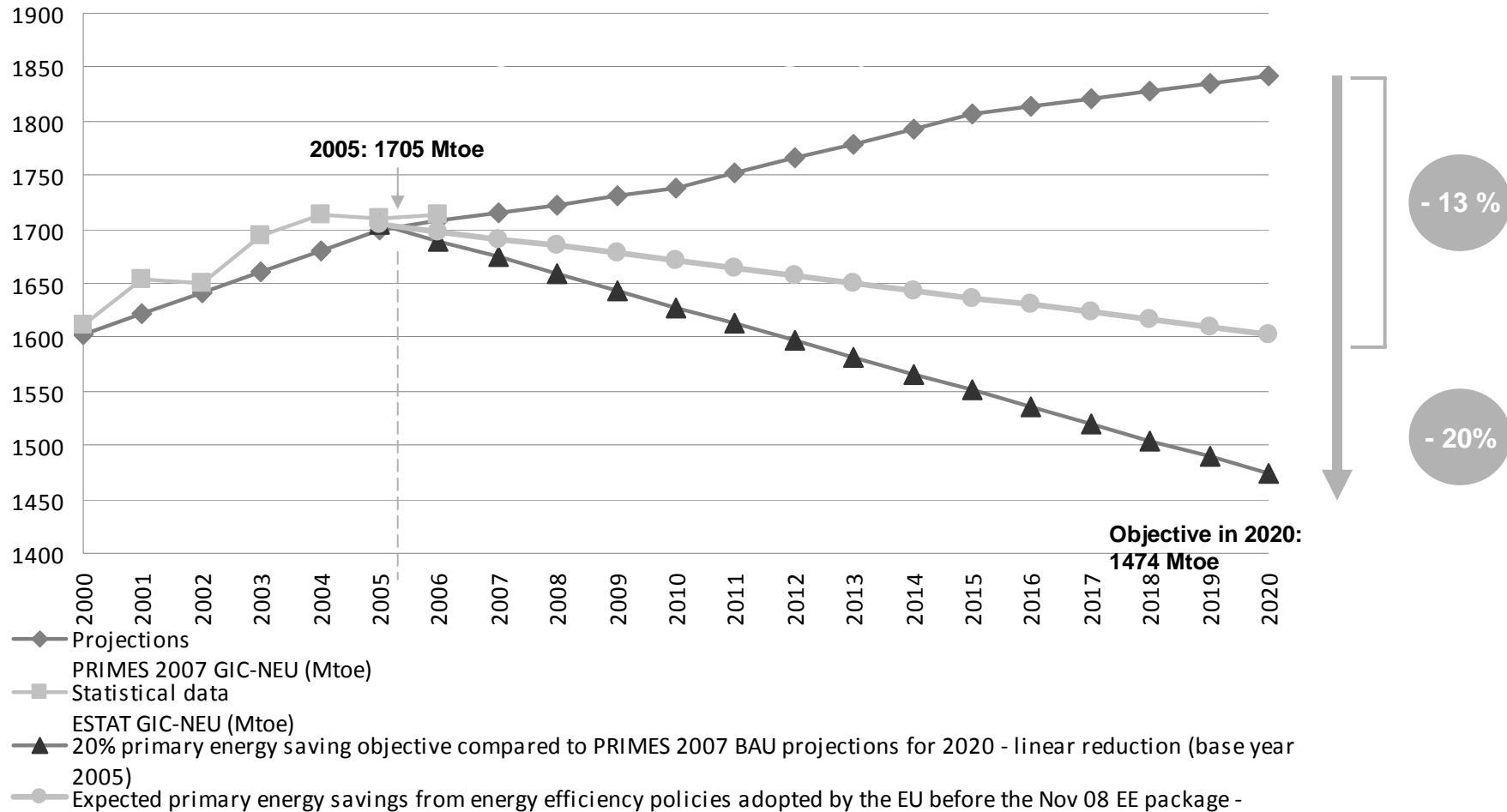
**RES in  
transport**  
  
**Min 10%  
binding**

**ELECTRICITY**  
  
**MS binding  
choice**

**HEATING &  
COOLING**  
  
**MS binding  
choice**

**NATIONAL TARGETS & ACTION  
PLANS**

# Objective: 20% EU primary energy savings in 2020



Source: European Commission

# Eco-Design of Energy Using Products Directive

- Framework Directive
- Focus on energy-using products over life-cycle
- Complementary with Buildings and Energy Services directives
- Legal base *Article 95*. Ensures free movement for the products conforming to the applicable eco-design requirements and a high level of environmental protection

- EuP framework does not create immediate obligations for manufacturers but allows the Commission to do so through implementing Directives;
- Proposed draft implementing measures or voluntary agreements are first discussed with stakeholders in the Consultation Forum; Impact assessment precedes the submission of Commission draft measures;
- Implementing measures are adopted by the Commission assisted by a regulatory Committee;
- Stakeholders participate throughout the whole process (studies, impact assessments, preparatory discussions within the Consultation Forum);

## Preparatory Study

|   |                                       |                       |                       |   |
|---|---------------------------------------|-----------------------|-----------------------|---|
| Significant Environmental Impacts/life cycle (Including energy) | Best Available Technology (Worldwide) | Improvement Potential | Least Life Cycle cost | Measurement requirements leading to mandates etc) |
|---|---------------------------------------|-----------------------|-----------------------|---|

### Specific Eco-Design Requirements



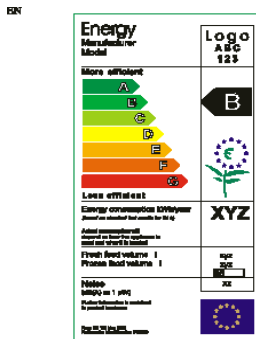
Maximum levels tolerated for "CE" marking

### Eco-Label

top of the class



### Energy Label



### Voluntary Agreements

when ambitious compared with Business as usual and significant share of the market

EN Measurement Standards

### Revision

- **5-10** years depending on product group and progress of technology but staged requirements possible
- **Dynamic** but predictable to encourage improvement products while providing clarity on investments for Industry
- **Consistent**
  - Thresholds to be maintained (A becomes D etc.)
  - Reward Development of 'good' products, compatibility of incentives



# The EU Energy Star Programme



## Voluntary energy efficiency labelling of office equipment: computers, monitors, printers, copiers ...

### Basis:

- EU-US Energy Star Agreement, in force until end 2011  
(OJ L 381 of 28.12.2006, p. 26)
- Council Decision on its conclusion  
(OJ L 381 of 28.12.2006, p. 24)
- Energy Star Regulation of EP and Council  
(OJ L 39 of 13.2.2008, p. 1)



- General principle: when specifications are set **25%** of the models on the market may qualify  
(Agreement, Article I)
- Time delay between specification setting and effective date (usually approx. 1 year) means that a higher market share will qualify when specification is effective (which is the desired impact of the programme)



- Agreement contains recent energy efficiency criteria for all product categories
- Updated tier 2 criteria for computers and imaging equipment (copiers, printers ...) and new monitor criteria
- Specifications for servers to be added to the Agreement
- EU market survey (beginning 2008 to end 2010): input to efficiency criteria update, monitoring of programme impact in Europe (with a view to a possible successive Agreement)



[www.eu-energystar.org](http://www.eu-energystar.org)

## Contains

- Up-to-date information on specifications, revision process, documents related to Board meetings
- Up-to-date database of registered products meeting the criteria, available in the EU
- Energy savings calculator
- further related information



# The New European Policy for ICT: The Code of Conduct

- Led by EC Joint Research Centre
- Flexible mechanism to initiate and develop policy
- Forum for industry, experts and Member States
- Open and continuous dialogue on market and product performance
- Identify and focus on key issues and agree solutions
- Set ambitious voluntary standards and commitments

## Code of Conduct:

a voluntary commitment of individual companies, with the **aim of reducing energy consumption of products and/or systems** through the setting of agreed targets in a defined development timescale, without hampering the fast technological developments and the service provided

Targets could expressed in **maximum allowed power consumption** for the different operational modes or based on indicators (e.g. W, KWh/m<sup>2</sup>) or benchmarking.

Energy consumption levels are complemented **by general commitments of power and energy management**, switching off components not needed, and reducing energy consumption where possible.

Since 1999:

- External power supply units
- Digital TV services
- Broadband (since 2007)
- Uninterruptible power supplies (since 2007)
- Data Centres (under development)

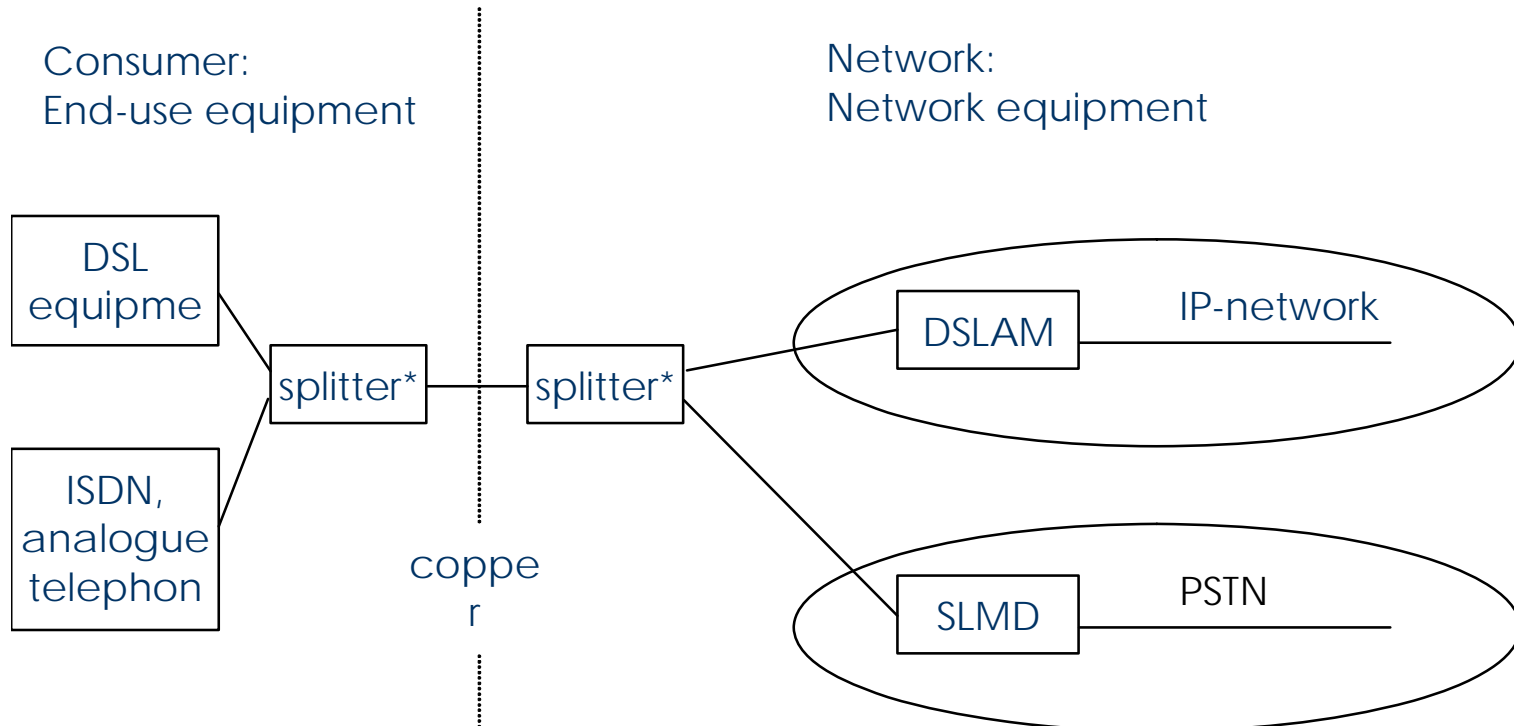
Lays groundwork which has been used by other European policies

- 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.
- Set efficiency targets**, for public and corporate data centre owners and operators (targets could be differentiated according to the status of existing data centres, the geographical location, the return on investments, etc).

- Broadband equipment will contribute to the electricity consumption in European Community depending on the penetration level, the specifications of the equipment and the requirements of the service provider, a total European consumption of up to 50 TWh per year can be estimated for the year 2015.
- With the general principles and actions resulting from the implementation of this Code of Conduct the (maximum) electricity consumption could be limited to 25 TWh per year, this is equivalent to 5,5 Millions tons of oil equivalent (TOE) and to total saving of about €7,5 Billions per year.

# Equipment covered by the Code of Conduct for Broadband Equipment

Equipment both on the consumer side (end-use equipment) and the network side (network equipment), for services providing a two way data rate of 144 kb/s or above.



# Equipment covered by the Code of Conduct for Broadband Equipment

| End-user equipment associated with broadband distribution for residential customers and SOHO   | Network equipment   |
|--|---|
| <ul style="list-style-type: none"> <li>• DSL modem</li> <li>• Cable modem</li> <li>• PLC modem</li> <li>• (DSL) router with/without WLAN up to 5 ports (1WAN port and 4LAN ports) up to 1000 Mbits/s</li> <li>• Small hubs and switches up to 8 ports (10/100/1000 Mbits/s)</li> <li>• WLAN access points</li> <li>• WiMAX</li> <li>• Small printer server (connected to broadband)</li> <li>• Home gateway</li> <li>• Telephone devices for VoIP (ATA or VoIP-Handset)</li> <li>• Optical network termination (ONT)</li> <li>• Equipment that is a combination of one or more of the equipment above</li> </ul> | <ul style="list-style-type: none"> <li>• DSL port (example: ADSL, ADSL2, ADSL2+, VDSL2)</li> <li>• Combined port (example: MSAN, POTS/ISDN + ADSL2+ etc)</li> <li>• NTBA (ISDN terminator at customer premises)</li> <li>• WiMAX Base Stations</li> <li>• PLC &amp; Cable service provider equipment</li> <li>• Optical line termination (OLT)</li> </ul> |

Equipment suppliers: E.g. Thomson, Alcatel Lucent, Huawei

Equipment purchasers: Telecom companies, e.g. DT,  
Telecom Italia, Swisscom, TDC Services, TeliaSonera

In addition, it is important that companies in any case follow  
the CoC requirements to their best efforts

- Continuing demand for IT services
- Rising DC electricity consumption projected:
  - Western Europe: 56 TWh in 2007, rising to 104 TWh in 2020
- Expected to contribute substantially to the UK and European Union (EU) commercial sector
- Maximise energy efficiency of data centres to ensure the carbon emissions and energy consumption are mitigated

- Many activities have been initiated including EPA Energy Star, *DoE Save Energy Now*, IEE E-Server project and The Green Grid
- But no EU regulatory 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 new Code of Conduct provides a platform to bring together European stakeholders to discuss and agree voluntary actions which will improve energy efficiency

The Code of Conduct covers:

- “Data centres” of all sizes – server rooms to dedicated buildings
- Both existing and new
- IT power and Facility power
- Equipment procurement and system design

The Code of Conduct is for:

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

- Day to day operations (energy management)
- Normal replacement cycle/adding new servers
- Retrofit/ dedicated energy efficiency programme
- Designing new data centres

## Metrics and measurements

- How to measure and report efficiency

## Best Practice

- Establishing guidance and support

## Data collection & analysis

- Monitor and report on savings

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 implement the Action Plan according to the agreed time table. Energy consumption must be monitored regularly, as described in the monitoring section. It is expected to see over time progresses in the energy efficiency indicator related to the data centre.

- For existing data centres recently (not before 2005) updated or constructed to very high efficiency standards, the energy measurement (possibly before and after and/or the efficiency indicators) and a description of the action/technologies implemented must be submitted in order to the Participant Status.
- For new data centres (under construction or recently completed) a full description of the technologies and solutions adopted to make the data centre "best in class" must be included in the application from o be updated

The Commission will approve the plan submitted within 30 days, or explain its reasons for not approving and grant Participant status to the organisation.

The Participant carries out its Action Plan, and reports at the completion of the actions to the Commission.

The Commission will review the Participant 's report, and check whether it corresponds to the Action Plan.

- All Participants have the obligation to continuously monitor energy consumption and adopt energy management in order to look for continuous improvement in energy efficiency.
- One of the key objectives of the Code of Conduct is that each Participant benchmark their efficiency overtime, using the Code of Conduct metric (or more sophisticated metrics of available) so to have evidence of continuous improvements in efficiency.

Practices are marked in the expected column as;

|                  |   |
|------------------|---|
| No               | Optional  |
| Yes              | Expected  |
| New Software     | Expected during any new software install or upgrade   |
| New IT Equipment | Expected for new or replacement IT equipment  |
| During retrofit  | Expected whenever a significant refit of the M&E equipment is carried out or the build of a new data centre |

## Best Practice Intent

- Neither a prescriptive nor exhaustive list of specific technologies
- Focussed on goals and processes
- Structured to allow the addition of new technologies

- Establish common vocabulary and terminology
- Provide operators with an understanding of the available technology options
- Their relative merits
- The processes they should establish
- The communication that is necessary
- The relationship between technology areas
- Most people are non-expert in some area(s) of the data centre
- Best Practices are guidance to operators on how they might improve energy efficiency
- Practices are scored 1-5 (min-max) based upon their likely energy use benefit
- Practices are ordered by score
- Practice scores are not intended to be summed for an ‘overall score’

| Type  | Description  | Expected                   | Value |
|---|--|----------------------------|-------|
| Multiple tender for IT hardware – Power   | Include the Energy efficiency performance of the IT device as a high priority decision factor in the tender process. This may be through the use of Energy Star or SPECPower type standard metrics or through application or deployment specific user metrics more closely aligned to the target environment which may include service level or reliability components. The power consumption of the device at the expected utilisation or applied workload should be considered in addition to peak performance per Watt figures.   | New IT Equipment           | 5     |
| Multiple tender for IT hardware – Basic operating temperature and humidity range    | Include the operating temperature and humidity ranges of new equipment as high priority decision factors in the tender process. The minimum range, at the air intake to servers, is 18-27C and 5.5C dew point up to 15C dew point & 80% RH. The current relevant standard is the ASHRAE Recommended range for Class 1 Data Centers as described by ASHRAE in "2008 ASHRAE Environmental Guidelines for Datacom Equipment".   | New IT Equipment           | 4     |
| Multiple tender for IT hardware – Extended operating temperature and humidity range | Starting 2012 new IT equipment should be able to withstand the extended air inlet temperature and relative humidity ranges of 5 to 40°C and 5 to 80% RH, non-condensing respectively, and under exceptional conditions up to +45°C. The current relevant standard is described in ETSI EN 300 019 Class 3.1.<br><br>All vendors should indicate the maximum allowable temperature and humidity for all equipment to maximise the efficiency opportunities in refrigeration and free cooling.<br><br>It should be noted that where equipment with differing environmental requirements is not segregated, the equipment with the more restrictive temperature range will influence the cooling conditions and corresponding energy consumption for all of the IT Equipment. | New IT Equipment from 2012 | 4     |
| Select equipment suitable for the data centre –                                     | Select and deploy equipment at the design power density (per rack or sq m) of the data centre to avoid running the cooling system outside design parameters.   | No                         | 4     |

## Stakeholder meeting in

**London on 20 November 2009.**

The meeting will start at **13.00** and will end at **17.30**,

The meeting will be at:

**Victoria Park Plaza – Edward Suite,**  
239 Vauxhall Bridge Rd, London, SW1V 1EQ

At the meeting, examples of successful implementation of the Code of Conduct will also be presented

Interested parties are welcome subject to registration

1. Business & Decision - Corporate level
2. Bytesnet BV - Data Centre in Groningen
3. EvoSwitch Netherlands B.V. - Data Centre in Haarlem (Amsterdam)
4. FUJITSU Services - 2 data centres in London, one DC in Slough, one DC in Warwick and one DC in Manchester
5. Hewlett-Packard - Data Centre Doxfrod Park
6. INTEL - Data Centre Leixlip
7. LAMDA Hellix S.A. - Data Centre Koropi Attica
8. Memset Ltd. Corporate level - 2 Data Centres in Reading
9. Microsoft - Data Centre in Dublin
10. Petroleum Geo-Services (PGS) - Data Centre in Weybridge
11. Reed Specialist Recruitment - Corporate level
12. TCN Telehousing - Data Centre in Groningen
13. TelecityGroup - 4 Data Centres in Amsterdam
14. Telekom Austria TA AG - data centre in Vienna
15. TISSAT S.A. - Data Centre Tissat, Valencia
16. VCD Infra Solutions - Data Centre in Groningen
17. Vodafone Group Service GmbH - Data Centre Rehhecke, Ratingen

- 3Com Corporation
- Active Power Solutions Ltd.
- ADJUGO SA/NV
- Aegide
- APL France
- BCS HQ
- Belden
- Bull
- Business & Decision
- ByrneDixon Associates
- Camco International Limited
- Cap Ingelec
- CBI Plc
- Corning Cable Systems GmbH & Co. KG
- CNet Training
- Colofinder (Anytime Office Limited)
- CS Technology Ltd.
- Datacentre UK Limited
- Daxten GmbH
- Deerns
- Dimension 85 Ltd
- e-Business & Resilience Centre
- Enefyg
- FIBROPTIC INDUSTRY ASSOCIATION
- FUJITSU Services
- Future-Tech SCI Ltd
- Greenvision
- Haskoning Nederland B.V.
- Hewlett Packard Company
- Hewlett-Packard - Critical Facilities Services
- Hitec Power Protection bv
- ITM Communications Ltd
- JLBdata
- Keysource Ltd
- LAMDA Hellix S.A.
- Memset Ltd. Corporate level
- MANSYSTEMS NEDERLAND BV
- NDSL Ltd
- NETPLEX Ltd.
- Nexans Cabling Solutions
- Prism Power Ltd
- Siemens NV/SA
- SNIA Europe (Storage Networking Industry Association)
- Stratégies S.A.
- STULZ GmbH
- TA Migration Solutions Ltd.
- TelecityGroup
- Thames Renewables
- UK Department for Environment Food and Rural Affairs (Defra)
- Uniflair S.p.A.
- Waterman Building Services
- Weatherite Building Services Ltd
- Workspace Technology Ltd

- Energy efficiency is the fastest and most cost effective way to reduce CO2 emissions.
- The ICT sector is responsible for an increased energy consumption. The same services could be offered to citizens and companies by using less energy without any negative impact on the service provided
- The Codes of Conduct try to set commonly agreed (shared) targets that would reduce the energy consumption. We hope that the ITC sector could join these effort.

**Thank you!**

**We welcome comments**

**For more information!**

***Paolo.Bertoldi@ec.europa.eu***

[http://energyefficiency.jrc.cec.eu.int/html/standby\\_initiative.htm](http://energyefficiency.jrc.cec.eu.int/html/standby_initiative.htm)