Energy Efficiency Inter-Operator Collaboration Group
General presentation
The Energy Efficiency Inter-Operator Collaboration Group: Members
The Energy Efficiency Inter-Operator Collaboration Group

Energy footprint

The electrical energy consumption of the EE IOCG members networks is equivalent to the National consumption of Switzerland.

The energy consumption at the customer side is about that of Austria ... .... without action it would increase dramatically
The Energy Efficiency Inter-Operator Collaboration Group: Reasons and Goals

- The **energy cost** is continuously growing, and this trend will continue in the future
- Broadband penetration is bringing new active equipment in the network architecture
- Fragmented actions on energy efficiency among different Standardization Bodies/Fora

- Share energy critical issues and agree on common goals
- Define high level strategic actions and coordinated guidance towards
  - Standardization
  - Equipment suppliers (both network and user side)
  - in order to speed up the availability of Energy Efficient equipment and networks, helping vendors towards investments optimization
- Finalize high level analysis to support Operator’s strategy:
  - Evaluation of energy consumption trends for different FTTx scenarios
  - Definition of a set of KPI to monitor the action implemented
The Energy Efficiency Inter-Operator Collaboration Group: Positioning

Strategic and political level

National Authorities
Regional Authorities (EC)
Fireworks

Technical strategy

EE IOCG

Technical level

ETSI
ITU-T
IEC
CEN
CENELEC

Industrial and Operators sites (Data Centers, User equipments (NT, CPEs, HG,...))

Broadband networking (DSL and FTTH)

Green Grid
DSLF
ETNO
HGI
FSAN

Regional Authorities (EC)
The Energy Efficiency Inter-Operator Collaboration Group: Critical Areas and SubAreas

<table>
<thead>
<tr>
<th>Area</th>
<th>SubArea</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>xDSL</td>
<td>Hundreds millions of xDSL lines to be deployed will have a great impact on the Operators’ energy bills</td>
</tr>
<tr>
<td>Data Centres</td>
<td>Environmental Conditions</td>
<td>Need for extension of temperature ranges, in order to allow energy saving and extend free/renewable cooling</td>
</tr>
<tr>
<td></td>
<td>IT Equipment Efficiency</td>
<td>Need for improved IT equipment (less energy hungry); proposal for efficiency ranking</td>
</tr>
<tr>
<td>Core/Metro/IP</td>
<td>Switches and routers</td>
<td>Energy optimized IP and LAN</td>
</tr>
<tr>
<td>Customer networking</td>
<td>DSL NT/ONT</td>
<td>The consumer has little voice on products. The energy saving policies must optimize both network AND user side</td>
</tr>
<tr>
<td></td>
<td>STB and End User Equipment</td>
<td>Need for STB and End User Equipment with new power save functionalities</td>
</tr>
<tr>
<td>Efficient cooling</td>
<td>Cooling @ CO/IDC</td>
<td>Need to implement new solutions in order to reduce the impact of the cooling</td>
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</table>

**SubArea**
- xDSL
- Environmental Conditions
- IT Equipment Efficiency
- Switches and routers
- DSL NT/ONT
- STB and End User Equipment
- Cooling @ CO/IDC

**Action Points towards Organizations**
- Attendance/contributions for
  - EC JRC CoCs
  - ETSI EE/ATTM/…
  - ITU-T
  - CEN/CENELEC
  - DSLF
  - ETNO Energy TT
  - Green Grid
- High level actions towards Boards

**Action Points towards Vendors**
- New purchasing policies (TCO)
- Common energy requirements in the RFI/RFQ
- Roadmaps sharing
## The Energy Efficiency Inter-Operator Collaboration Group: Action Points – Main subjects

<table>
<thead>
<tr>
<th>Subarea</th>
<th>Main subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>xDSL</td>
<td>- Reduce energy consumption in full power state according to CoC BB&lt;br&gt;- Introduce power saving methods when little or no traffic</td>
</tr>
<tr>
<td>Environmental Conditions</td>
<td>- Extend temperature ranges for DC rooms to enable more efficient cooling</td>
</tr>
<tr>
<td>IT Equipment Efficiency</td>
<td>- Extend temperature ranges of ICT equipment towards Class 3.1 of ETSI Standard EN 300 019-1-3&lt;br&gt;- Define common target values in RFQs and KPIs for efficient IT equipment</td>
</tr>
<tr>
<td>Switches and routers</td>
<td>- Energy optimized IP and LAN</td>
</tr>
<tr>
<td>DSL NT/ONT</td>
<td>- Define common target values in RFQs for DSL NT/ONT&lt;br&gt;- Define power saving mechanisms when little or no traffic</td>
</tr>
<tr>
<td>STB and End User Equipment</td>
<td>- Define common target values in RFQs for STB&lt;br&gt;- Define power saving mechanisms / architectures</td>
</tr>
<tr>
<td>Cooling @ CO/IDC</td>
<td>- Extend fresh air cooling and define KPIs (COP) for efficient cooling</td>
</tr>
</tbody>
</table>
Annex
Energy Efficiency Inter-Operator Collaboration Group – General presentation

The Energy Efficiency Inter-Operator Collaboration Group: The proposal

- If no strong care is taken, the energy trend for the next decade could end up into serious increase which, together with the significant increase of the energy unitary cost, would **deeply impact the Operator’s financial balance**

- **Without a strong and coordinated action** from the Operators towards Standardization and equipment providers we could then face **serious increase of the electrical bill** both to the Operators and to the Client

- The **inability** to show **clear and substantial** actions towards the **emission reductions** would, together with the **negative image**, bring serious threat of **punitive national caps on prices**.

- The proposal has been to set up an **Energy Efficiency Inter Operators Collaboration Group** where the Operators could:
  - share their energy critical issues and **agree on common goals**
  - define **high level strategic actions** and coordinated guidance towards Standardization and equipment suppliers (both network and user side)
  - finalize **high level analysis** to support Operator’s strategy (e.g. energy consumption trends for different FTTx scenarios, definition of KPI to enable proper monitoring of the actions)
  - speed up the standardization and earlier availability of Energy Efficient equipment and networks
The Energy Efficiency Inter-Operator Collaboration Group: Main process

- In order to be more effective, the EE IOCG should reach its goal within a short period of time
- The main process followed by the EE IOCG are be the following:
  - highlight the critical areas, e.g:
    - Access – (e.g. BroadBand systems consumption/efficiency and trends);
    - Data Centers – (e.g. Temperature range, efficiency...);
    - Powering and service continuity;
    - Efficient cooling;
    - Customer premises – (e.g. Energy consumption of network terminations and CPEs)
    - Long haul/Regional/Metro
  - define the main actions:
    - high level analysis of the various standardization/fora
    - association of each “critical area” with the reference standardization body
    - launch of joint actions towards the relevant bodies
    - launch of joint actions towards the vendors
    - finalization of strategic analysis
The Energy Efficiency Inter-Operator Collaboration Group: Joint actions

- launch of **joint actions towards the relevant bodies:**
  - Actions towards the Boards of the STD organizations to address their strategies and priorities
  - Actions towards the Technical Committees to push specific topics (e.g. new common proposals for increased temperature range within the equipment’s room/cabinet, definition of Key Performance Indicator, etc.)

- launch of **joint actions towards the vendors:**
  - sharing a common process of evaluation of the different vendors during a tender. In particular, the evaluation method could be based on a TCO that includes, other than CAPEX, also the Discounted Cash Flow of the energy OPEX, possibly related to at least 5 years (better 10)
  - giving vendors clear common indications about the operators strong need and commitment towards energy efficiency, spreading the results of this group

- finalization of **strategic analysis:**
  - energy consumption trends for different FTTx scenarios
  - definition of KPI to enable proper monitoring of the actions
In the last 30 years our energy demand has grown significantly due to digitalization of the Network and, in the last years, to the BroadBand deployment. The Operators have already pursued energy optimization campaigns (mainly on cooling and energy stations)... …but the Next Generation Networks will completely change the network paradigm as the need to deliver higher and higher speed services will bring towards more distributed electronics in the access network. The increasing load at the client’s premises will more than balance any savings actions into the network → The Operators should champion efficiency actions on CPEs, driving not only their products, but the entire market towards a greener approach.
The energy availability and self-sufficiency is a critical item

- The single Operator’s energy bill strongly depends on its Country’s strategy on energy procurement.

### Japan’s energy self-sufficiency is low in comparison to other nations

**Figure 4: Energy self-sufficiency of major countries (2003)**


- Energy self-sufficiency (Including nuclear power)
- Energy self-sufficiency (not including nuclear power)

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Italy</td>
<td>15%</td>
<td>45%</td>
</tr>
<tr>
<td>Japan</td>
<td>15%</td>
<td>6%</td>
</tr>
<tr>
<td>Germany</td>
<td>36%</td>
<td>72%</td>
</tr>
<tr>
<td>France</td>
<td>50%</td>
<td>8%</td>
</tr>
<tr>
<td>U.S.</td>
<td>106%</td>
<td>63%</td>
</tr>
<tr>
<td>LLK.</td>
<td>148%</td>
<td>96%</td>
</tr>
<tr>
<td>Canada</td>
<td>140%</td>
<td>140%</td>
</tr>
</tbody>
</table>

Note: Figures for nuclear power include imports and exports as primary energy. Figures in excess of 100% indicate exports.

Nations with low energy self-sufficiency will face bigger problems.

Source: Agency for Natural Resources and Energy – Japan
The energy cost: past, present … and future

- In the last years, the cost of energy **had a significant growth**...
- ...and it’s going to continue in the future

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**The cost of energy alone will force us towards the Energy Efficiency**

Source: www.wrtassoc.com
Source: Telecom Italia analysis for the domestic market
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Identification of most critical areas

Energy Efficiency in Telecommunication is transversal and covers several areas!
The Energy consumption distribution in Telecom Italia

- Fixed Network is the main component.

- Telecom Italia total domestic consumption: ~2.1 TWh (year 2006)

- BB and remote equipment will grow.
- NB switching is going to decrease and will induce a reduction in cooling.
- Moreover, cooling is obviously related to the energy saving of BB.
Today, TLC Data Centres have a power consumption of about 10% of the total Operator’s energy bill.

In developed countries, Data Centre are already responsible of about 1% of total energy consumption.

The Data Centres will represent a higher and higher percentage of the Operator’s energy bill.
Energy Efficiency Inter-Operator Collaboration Group – General presentation

Energy consumption for CPE

- Lots of BroadBand related appliances/gadgets already populate our homes...
  ...and many more will come
- Their consumption is already comparable to the Telecom Network part
- Energy optimization actions are in progress (CoC, Energy Star ...) and more will have to be developed to avoid an uncontrollable increase in the home (e.g. minimizing the number of TLC related equipment through integration of functionalities)
- This market is very fragmented
  - The single customer can’t influence the market
  - Operators can lead the industries, leveraging on their scale economy

In the long term, the user side will represent the vast majority of the global TLC energy consumption

Source: Opening Keynote, Intelec 2007, Stefano Pileri