

# Energy efficiency & Green IT

TELEFÓNICA I+D

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# 01 Current situation and EU targets



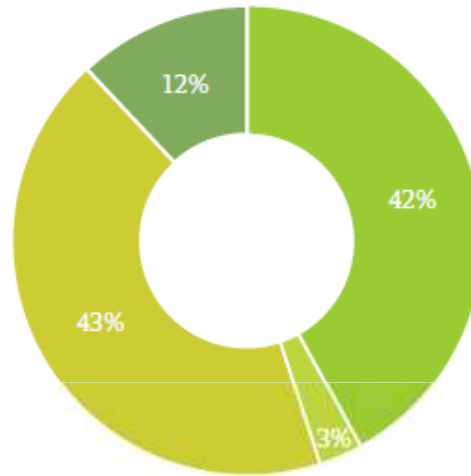
- **Prospected: Increase in final energy consumption up to 25% by 2012**
- **EU targets for 2020:**
  - 20% reduction in emissions compared to 1990 levels
  - 20% share of renewable energies in overall EU energy consumption
  - 20% savings in EU energy consumption compared to projections
- **Europe needs to ensure that ICT-enabled solutions are available and fully deployed**
- **ICT have to lead by example and reduces the energy it uses**

# Global Telecom Emissions 2002-2020

Global telecoms emissions %

2002  
100% = 151  
MtCO<sub>2</sub>e

- Mobile (66 MtCO<sub>2</sub>e)
- Fixed narrowband (64 MtCO<sub>2</sub>e)
- Telecom devices (18 MtCO<sub>2</sub>e)
- Fixed broadband (4 MtCO<sub>2</sub>e)

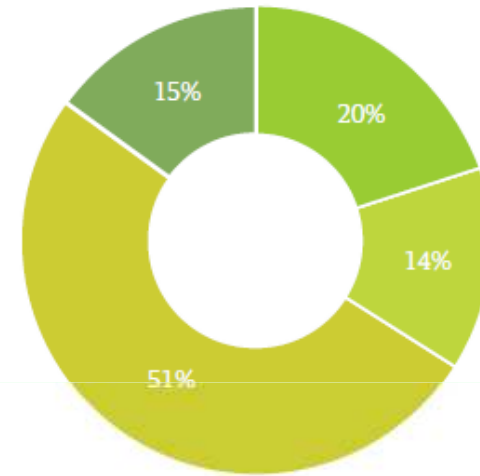


Mobile phones represented 3% of the total ICT footprint (11% of 30%).

Fixed broadband represented 1% of the total ICT footprint (3% of 30%).

2020  
100% = 349  
MtCO<sub>2</sub>e

- Mobile (179 MtCO<sub>2</sub>e)
- Fixed narrowband (70 MtCO<sub>2</sub>e)
- Telecom devices (51 MtCO<sub>2</sub>e)
- Fixed broadband (49 MtCO<sub>2</sub>e)



Mobile phones will represent 1% of the total ICT footprint (6% of 25%).

Mobile networks will represent 13% of the total ICT footprint (51% of 25%).

Fixed broadband will represent 4% of the total ICT footprint (14% of 25%).

**A report by The Climate Group on behalf of the Global eSustainability Initiative (GeSI) with an independent contribution of McKinsey & Company**








# 02 Addressing the challenge of energy efficiency through ICT

According to EU prospects






Do ICT departments pay for the energy consumed by ICT equipment?



	No and they don't see the bills	56%
	No but they do see the bills	12%
	Yes but only for specific functions such as the data centre	7%
	Yes but the energy bill is shared out equally among departments	5%
	Yes	20%

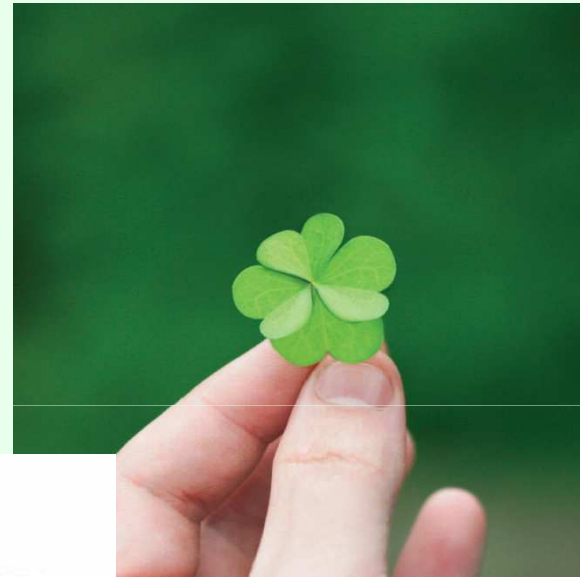
To what extent are ICT departments engaged in organisations' sustainability strategies?



	Not at all	25%
	Partially	49%
	Extensively	26%

# ICT enabling energy efficiency solutions

- **ICT are essential to achieve low-carbon status**
- **Corporate IT use must become greener**
- **Public companies must take the lead in the use of Green IT solutions**



# Addressing the challenge of energy efficiency through ICT

According to EU prospects

- **ICT as an enabler of energy efficiency across the economy**
  - an opportunity that could deliver carbon savings five times larger than the total emissions from the entire ICT sector in 2020
- **Unique business opportunity for thousands of European companies**
- **Smart logistics, Smart buildings, Smart electricity grids**

Source: Addressing the challenge of energy efficiency through Information and Communication Technologies - May 2008  
(COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS)

# 03 Addressing the challenge of energy efficiency in Telefónica



*In July 2007, Telefónica SA launched our Strategic Climate Change Plan across the entire Telefónica Group. Its aims are to:*

- **Collect and standardize carbon emission data in all of Telefónica's operating markets and companies**
- **Identify risks associated with future emission limits as well as the opportunities to cut them and improve our environmental record**
- **Draw up an Energy Efficiency Plan**
- **Calculate to what extent the products and services marketed by Telefónica reduce carbon emissions**
- **Raise awareness of the need to fight Climate Change among social and economic agents**
- **Establish a company-wide culture of awareness around Climate Change and energy savings**

"Our stated aim is to boost efficient energy usage and reduce CO2 emissions"

Source: Telefónica's Corporate Responsibility Report 2007

# 04 Addressing the challenge of energy efficiency in Telefónica I+D

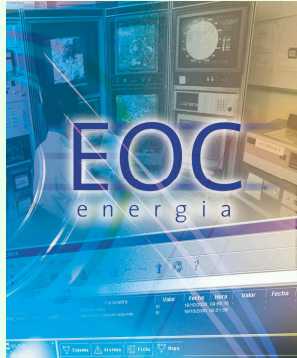


Telefónica I+D aims to support Telefónica SA energy commitments

- **Previous experience in development of ICT energy efficiency solutions**
- **Prospects in trends aiming energy efficiency**
- **New projects which will help to improve energy efficiency in and out of the ICT area**

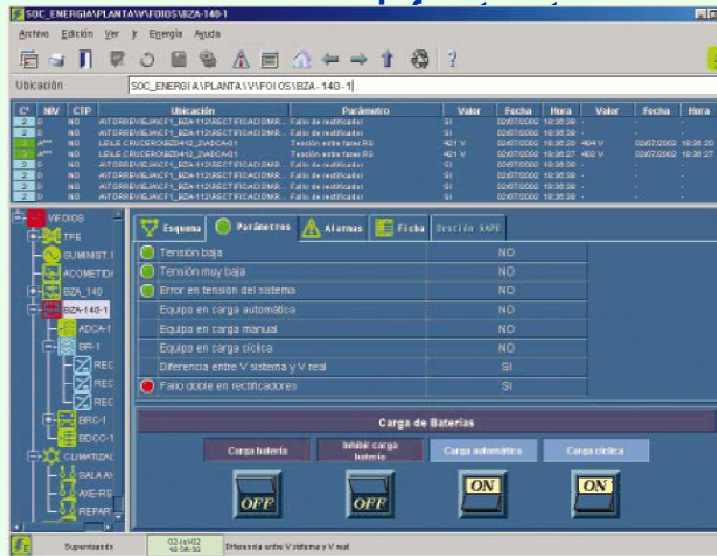
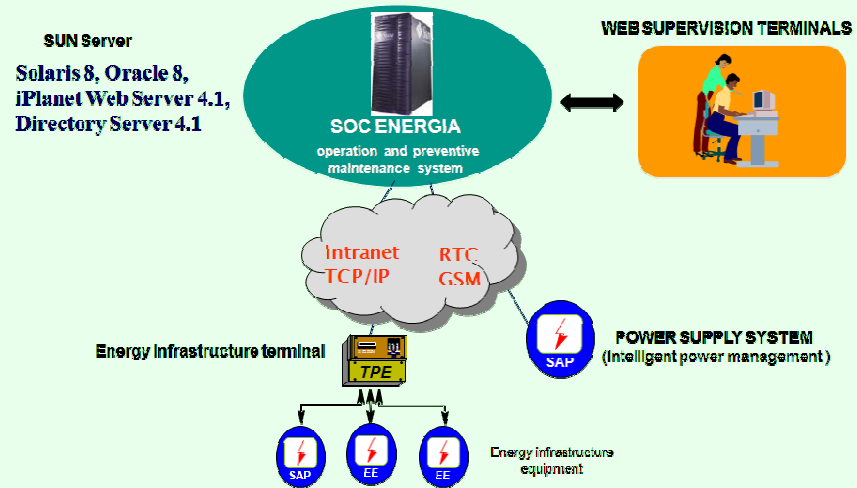
# Previous efforts in ICT energy efficiency solutions

## EOC-Energy: centralized energy management of telephone infrastructure



### EOC Conservation and Operation Structure

Group of systems devised to aid the integrated and centralized monitoring and management of the Telefónica's telephone



- Fast detection of faults
- Standardized web-based interface
- Operative capabilities

# Current situation and trends in ICT energy efficiency

## ■ **Future Networks**

**An integral approach to energy efficient networking**

- **Access segment energy efficient networking**
- **Core network and data centers**
- **Integral network energy consumption in the network design, planning, and management phases**

## ■ **Smart Power-Grids**

**Allow more efficient power distribution and enable the use of more green power**

- **The Smart Grids initiatives: software and hardware tools that enable generators to route power more efficiently**
- **Designed to reduce excess capacity and allow two-way real-time information exchange with users for Demand Side Management (DSM)**



## Current situation and trends in ICT energy efficiency (II)

### ■ **Intelligent Buildings**

#### **ICT support to energy-positive buildings**

- Set of technologies to make the design, construction and operation of buildings more efficient, applicable to both existing and new build properties.
- Building management systems (BMS) to monitor and control building
- Linked to SmartGrids initiatives as well as green transport efforts

### ■ **Green data centers**

#### **Towards Increased Infrastructure Efficiency**

- Definition of Universal Efficiency Metrics.
- Detect “hot spots” for early failure detection.
- Green Service Level Agreements (balance among service performance, business objectives, and environmental criteria)
- Dynamic Service Lifecycle definition to account for energy criteria
- Middleware platform for energy management application development
- Statistical and heuristic models to increase energy-efficiency

## 04 Current lines of work in Telefónica I+D

- **Telecommunications network:**
  - **Effective short and long-term strategies to achieve energy efficient integrated networks (equipment, planning and management in access and core)**
  - **Energy consumption measurements and technologies enabling power saving**
  - **Changes in the design of the equipment (customer and network) needed in the short and long term to obtain greater energy savings**
  - **Add network equipment intelligence related to energy use in order to achieve capabilities of data collect, monitoring and control.**
  - **Incentives for operators and users to maximize energy efficiency**

## 04 Current lines of work in Telefónica I+D (II)

- **Energy efficient buildings:**
  - **Providing intelligent energy monitoring/control and power demand balancing at Enterprise, Building & Neighbourhood level**
  - **Building an open, energy-aware SOA platform**
  - **Integrating local power-generators for own consumption and offer.**

## Current lines of work in Telefónica I+D (III)

- Energy Efficiency at Computing Infrastructures
  - **Cloud Computing**
    - Large pool of shared virtualized resources (computing hardware, storage, network or software and service platforms)
    - Resources can be dynamically provisioned depending on a variable workload and/or QoS targets.
    - Avoid dedicated resources and reduce energy consumption
  - **Virtualization**
    - Virtual resources (Virtual Machines) are hosted in a physical host (Computer with an hypervisor)
    - Integrating Green policies enable to efficiently provide required virtualized by using power management features of physical hosts.

## Current lines of work in Telefónica I+D (III)

- Energy Efficiency at Computing Infrastructures
  - **An intelligent and energy efficient strategy can be implemented by**
    - **Measuring the energy efficiency of processes and hardware**
    - **Optimizing the process distribution among the most energy efficient devices**
    - **Powering-off/on hosts based in process demand predictions**

# 05 Conclusions

- **ICT are part of the energy consumption problem and the foundation for the solution.**
- **Green IT will be essential in the following years**
- **Telefónica SA is aware of the situation and its role, and it's getting totally involved in it.**
- **Telefónica I+D is aligned to Telefónica SA commitments. Its lines of work will be useful at several levels:**
  - **Innovation: development of leading-edge market of ICT-enabled energy-efficiency technologies to foster competitiveness and new business opportunities**
  - **Environment: tools that contribute to foster environmentally aligned solutions**



*Telefonica*

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