**Forum on "Smart sustainable cities: a rising priority for decision-makers"**
**Reading, United Kingdom, 3 March 2015**

# How can we assess if a smart city is a sustainable city? The ITU-T methodology for the assessment of the environmental impact of ICT at city level.

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## www.jrc.ec.europa.eu

*Serving society*
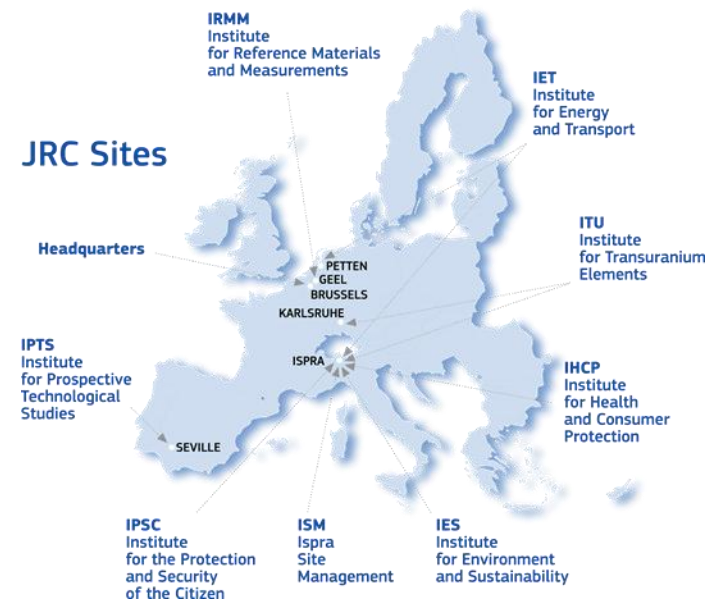*Stimulating innovation*
*Supporting legislation*

# JRC experience in Energy Efficiency in ICT and Sustainability in Cities

**EU Codes of Conduct for energy efficiency in ICT**
- Data centres
- Digital TV service
- Broadband equipment
- External power supplies
- Uninterruptible power systems

**Sustainable energy in cities:**
- the Covenant of Mayors initiative
- energy mapping in urban areas

**JRC Sites**

IRMM
Institute
for Reference Materials
and Measurements

IET
Institute
for Energy
and Transport

ITU
Institute
for Transuranium
Elements

Headquarters

PETTEN
GEEL
BRUSSELS
KARLSRUHE

IPTS
Institute
for Prospective
Technological
Studies

ISPRA

IHCP
Institute
for Health
and Consumer
Protection

SEVILLE

IPSC
Institute
for the Protection
and Security
of the Citizen

ISM
Ispra
Site
Management

IES
Institute
for Environment
and Sustainability

# How can we assess the environmental impact of ICT at city level ?

- ICT Goods? Networks? Services?

- ICT in organizations? in households? in the Public Administration?

- Environmental impact of the use phase of ICT? Overall (embedded) environmental impact of ICT?

- How does ICT contribute to reduce the environmental impact of the city?

# ITU-T Methodology for the assessment of the environmental impact of ICT at city level

- ITU L1400 series: methodologies for the assessment of the environmental impact of ICT:

  - ✓ **L1410: Goods Networks and Services**
  - ✓ **L1420: Organizations**
  - ✓ **L1430: Projects**
  - ❑ **\*L1440:Cities**

- The Editors

- Timeframe

# The ICT contributions
# to the environmental impact of a city

Part II:
positive impact
**ICT projects**

Part I:
negative impact
**ICT footprint**
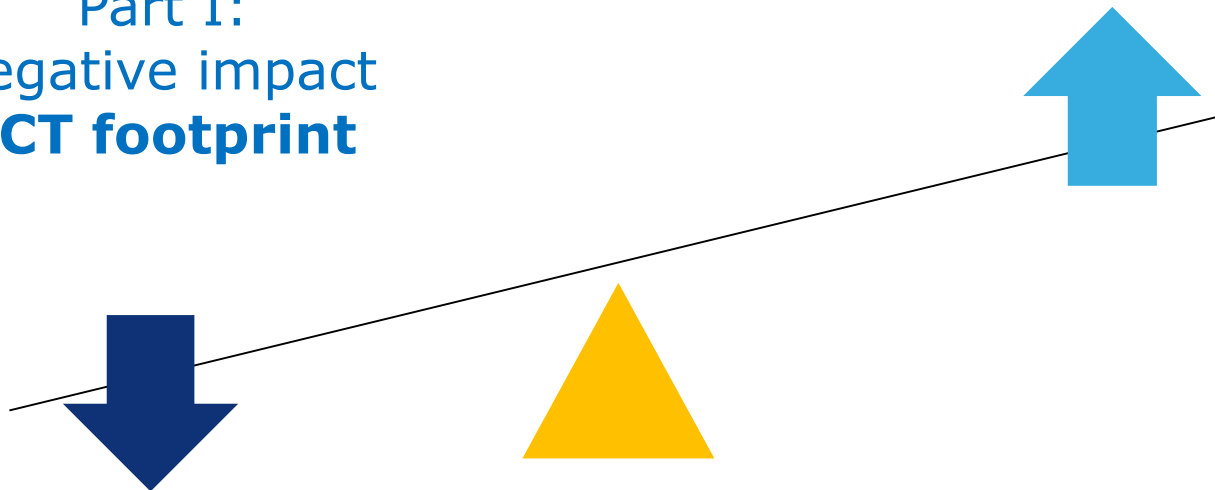
# Part I - Assessment of ICT footprint at city level

- Set city **boundaries**
- **Inventory** of ICT goods within city boundaries
  - households,
  - public administration,
  - other organisations
- **Use** patterns (modes and time) of ICT goods
- **Energy** consumption of ICT goods (only energy consumption in simplified approach or LCA in complete approach)
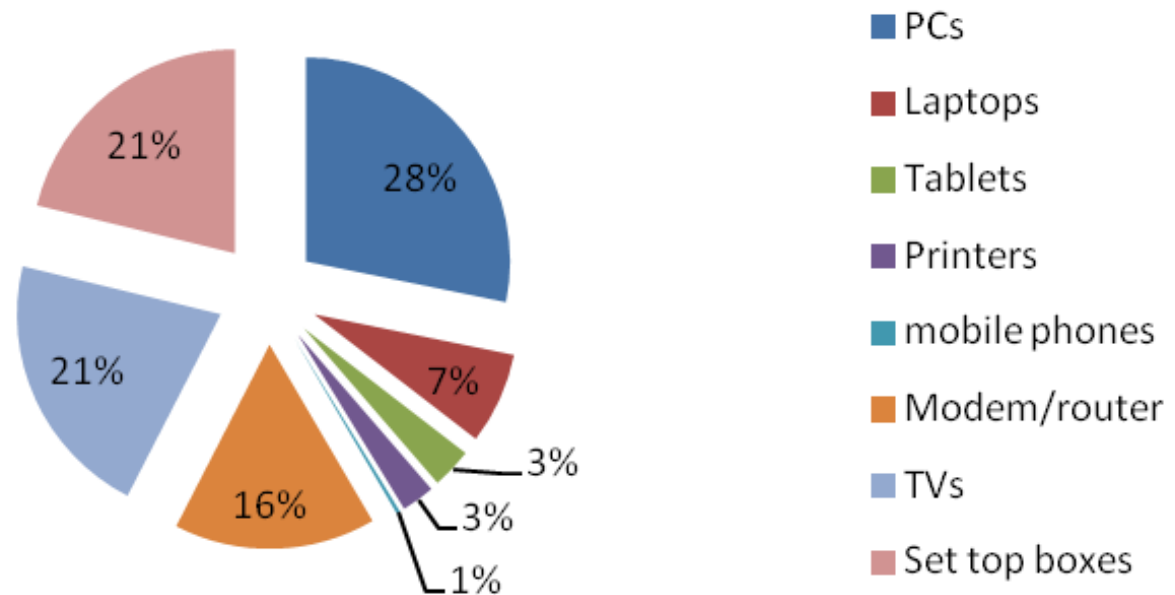- **Emission factors**

**tonnes of CO$_2$ emissions by ICT in city**

# Hypothetical assessment of ICT footprint in households in a city (25'000 households, Italy)

| | Number of **ICT items** per household | **Hours** per day in ON mode | **Power** need in ON mode (W) | **Hours** per day in standby mode | **Power** need In standby mode (W) | **Energy** consumption per year per household (kWh/y) | **Emissions** per year per household (kg $CO_{2eq}$) | Total emissions by ICT per year (t $CO_{2eq}$) |
|---|---|---|---|---|---|---|---|---|
| PCs | 1.2 | 2 | 100 | 22 | 3 | 97 | 68 | **1717** |
| Laptops | 1.3 | 5 | 10 | 19 | 1 | 25 | 18 | **442** |
| Tablets | 0.2 | 3 | 10 | 21 | 0 | 11 | 8 | **195** |
| Printers | 1 | 0.5 | 4 | 23.5 | 1 | 9 | 6 | **160** |
| mobile phones | 2.5 | 2 | 1 | 22 | 0 | 1 | 1 | **18** |
| Modem/router | 1 | 14 | 10 | 10 | 1 | 55 | 39 | **974** |
| TVs | 1.2 | 3 | 60 | 21 | 1 | 73 | 52 | **1292** |
| Set top boxes | 1 | 4 | 30 | 20 | 4 | 73 | 52 | **1292** |
| total | | | | | | 344 | 244 | **6089** |

European Commission

# Part II - Assessment of the impact of an ICT project at city level

- Set project **boundaries**
  - Identify project **activities**
  - Identify **ICT goods**
- Assess emissions of **baseline** scenario
- Assess environmental impact after **project**

## reduction in tonnes of $CO_2$ emissions by ICT project

# Some European Commission initiatives

- DG CONNECT **published: "ICT footprint - Pilot testing on methodologies for energy consumption and carbon footprint of the ICT-sector"**

- DG RTD: **Open call for research projects under H2020:  Supporting the community in deploying a common framework for measuring the energy and environmental efficiency of the ICT-sector, deadline 5 May 2015**

- DG JRC **is looking for data from cities to develop energy mapping at city level**

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