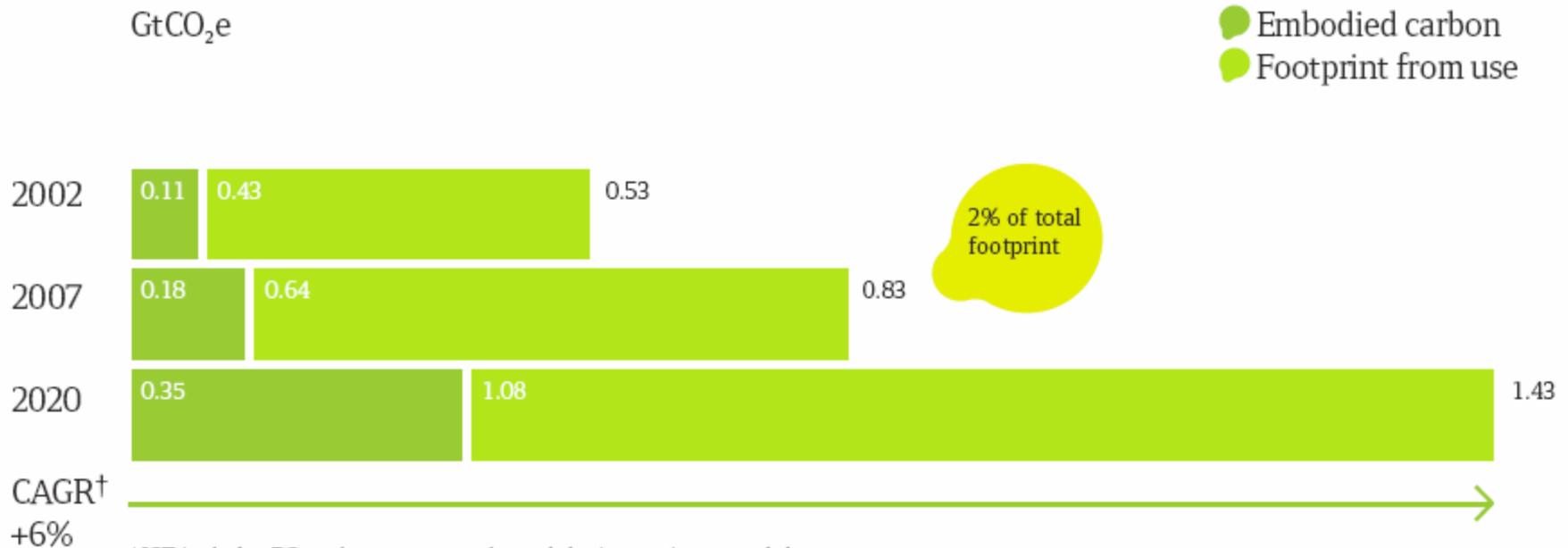




CLOUD AS A GREEN TECHNOLOGY
Keith Dickerson, Climate Associates Ltd

CLOUD STANDARDS COORDINATION
Cannes, 4-5 December 2012

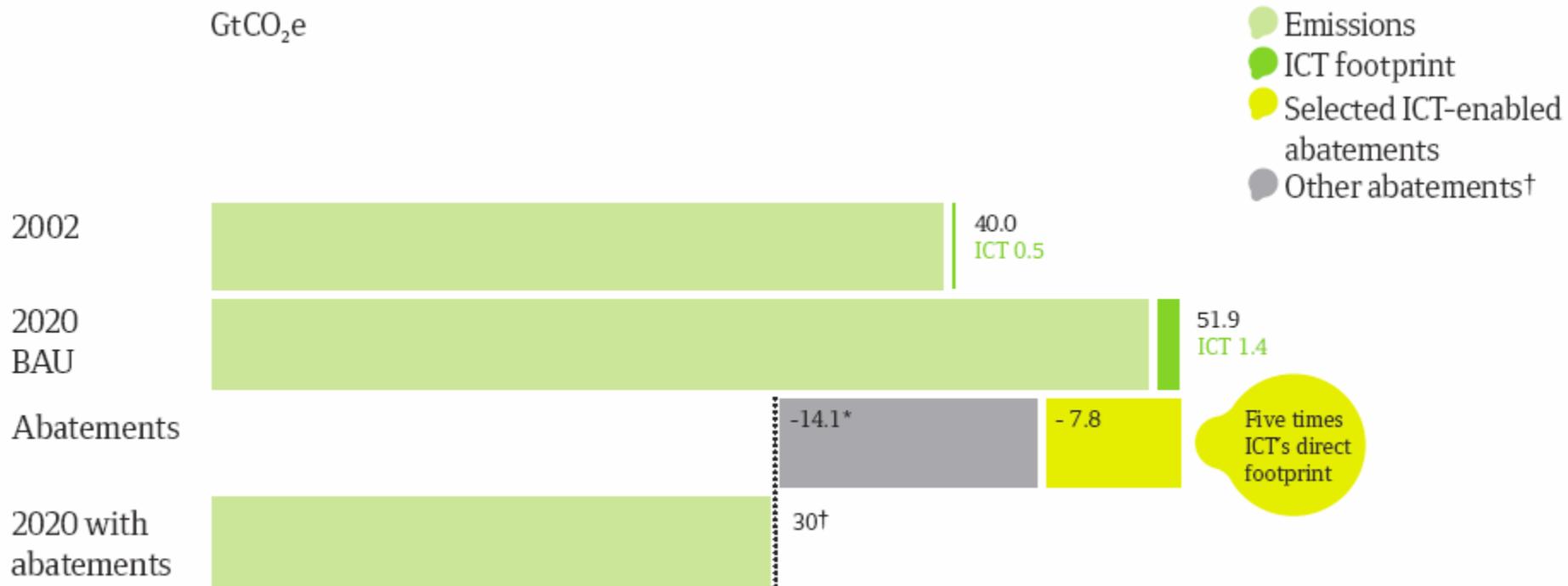
Global ICT footprint (2%)



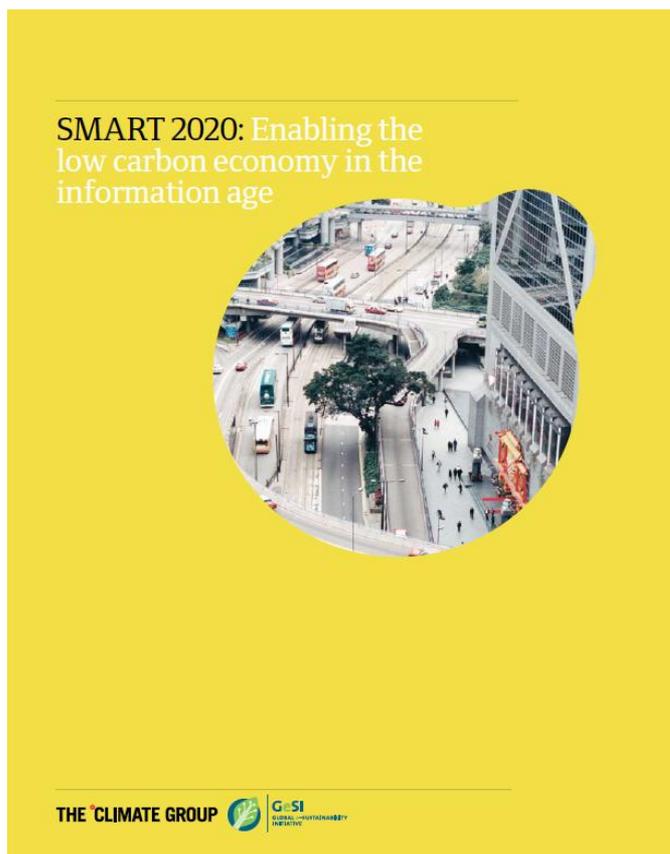
*ICT includes PCs, telecoms networks and devices, printers and data centres.

†Compounded annual growth rate.

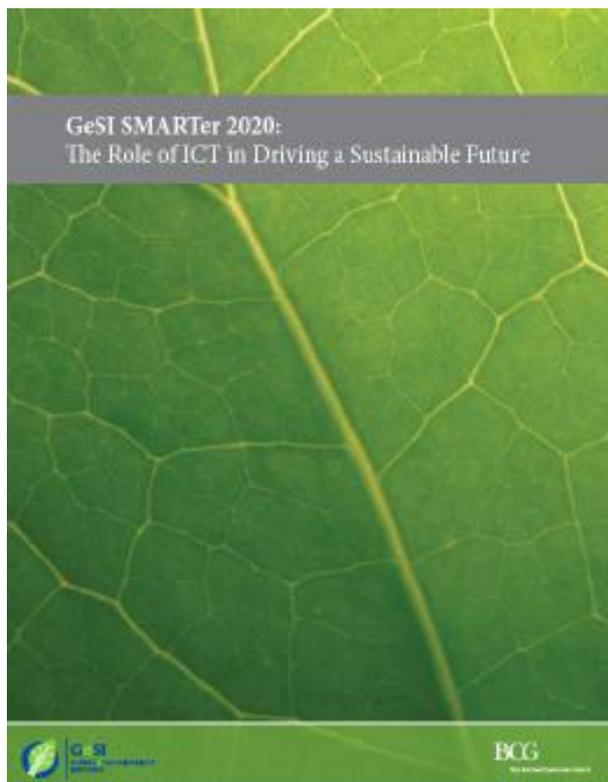
But ICT has a mitigating impact...



*reproduced by kind permission of GeSI



- **Smart motor systems: optimisation of motor speeds**
- **Smart logistics: efficiencies in transport and storage**
- **Smart buildings: better building design, management and automation**
- **Smart grids: reducing losses in power sector**



- Potential reduction in GHGs even larger than thought a few years ago.
- COP-18 Qatar 3 December 2012: Increased use of ICT could cut global greenhouse gas (GHG) emissions by 16.5% by 2020, amounting to \$1.9 trillion in energy and fuel savings.
- SMARTer2020 shows that concerted action by policy-makers to encourage use of ICT can save emissions of 9.1 GtCO₂e of GHGs.

So how Green is Cloud?



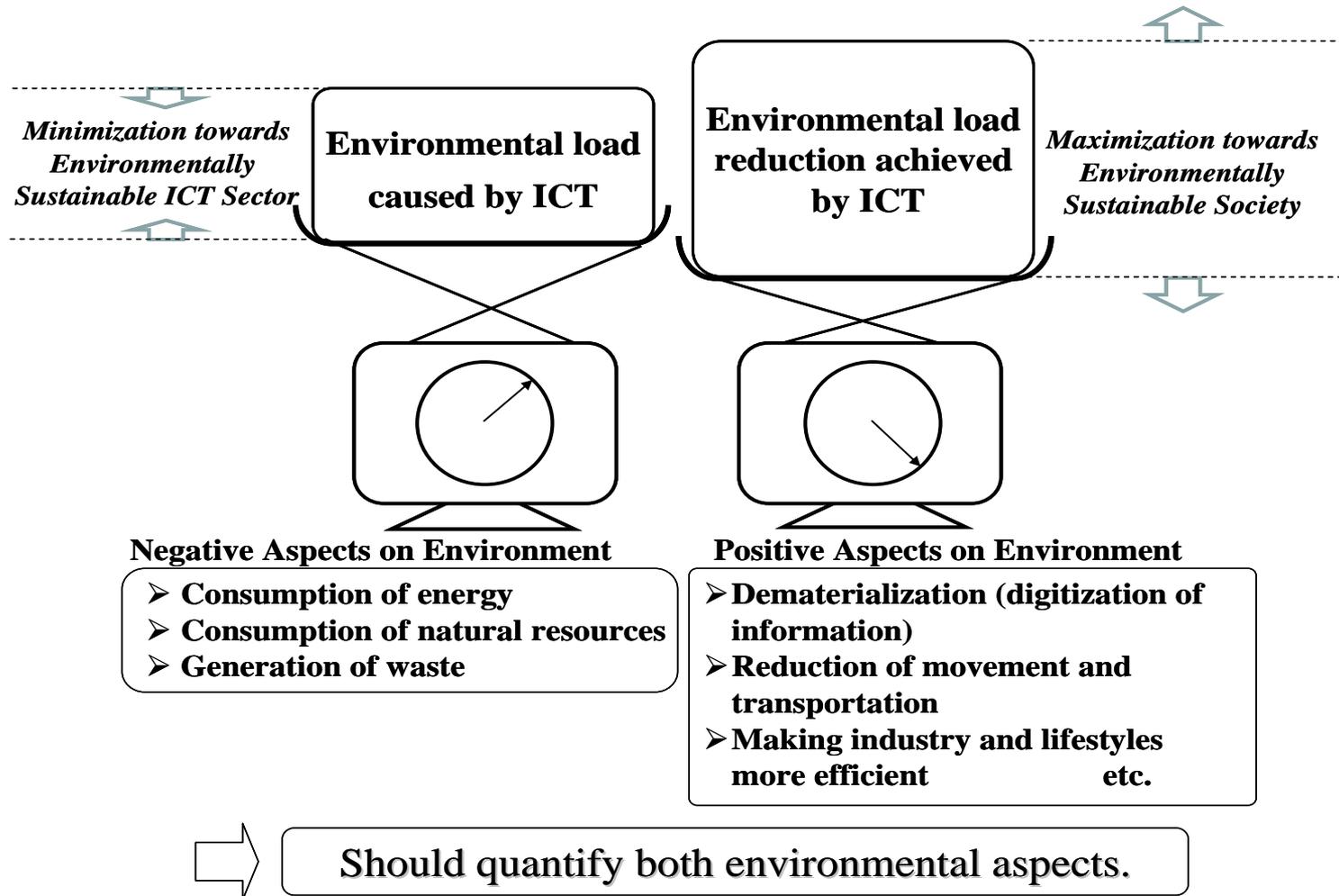
Draft **ETSI DTR/CLOUD-0013** V0.0.1 (2012-10)



CLOUD;
**Cloud as a mitigating technology to reduce GHG emissions in
other sectors**

- **GHG Protocol Product Life Cycle Accounting and Reporting Standard ICT Sector Guidance, Chapter 5: Guide for assessing GHG emissions of Cloud Computing and Data Center Services**
 - **ISO 14064-2:2006, Greenhouse gases — Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements**
 - **ETSI TS 103 199 Life Cycle Assessment (LCA) of ICT equipment, networks and services; General methodology and common requirements**
 - **ITU-T Rec L.1410 Environmental impact of ICT goods, networks and services**
 - **ITU-T Rec L.1430 Environmental impact of ICT projects - to be approved early 2013**
-

Model for environmental assessment of ICT goods, networks and services



THE ENABLING TECHNOLOGIES OF A LOW CARBON ECONOMY

*From Information Technology to Enabling Technology:
A Scenario Analysis: Can Cloud Computing enable
Carbon Abatement*

Draft paper for review

9th November, 2011

Dr Peter Thomond

peter.thomond@thinkplaydo.com

Professor David Gann

d.gann@imperial.ac.uk

Dr Ian MacKenzie

ian.mackenzie@imperial.ac.uk

Alex Velkov

alex.velkov@thinkplaydo.com

Key Carbon Abatement Mechanism of Cloud Computing



Primary Decrease in Emissions:

Carbon emissions saved by organisations switching off on-premise computing used to provide their people with email, CRM and/or groupware.

Primary Increase in Emissions:

The carbon emissions created through the full lifecycle of building, running and disposing of Cloud Computing services that replace on premise infrastructure.

Carbon Impact of Cloud Computing

How to understand the impact of Cloud Computing



On-premise computing emissions

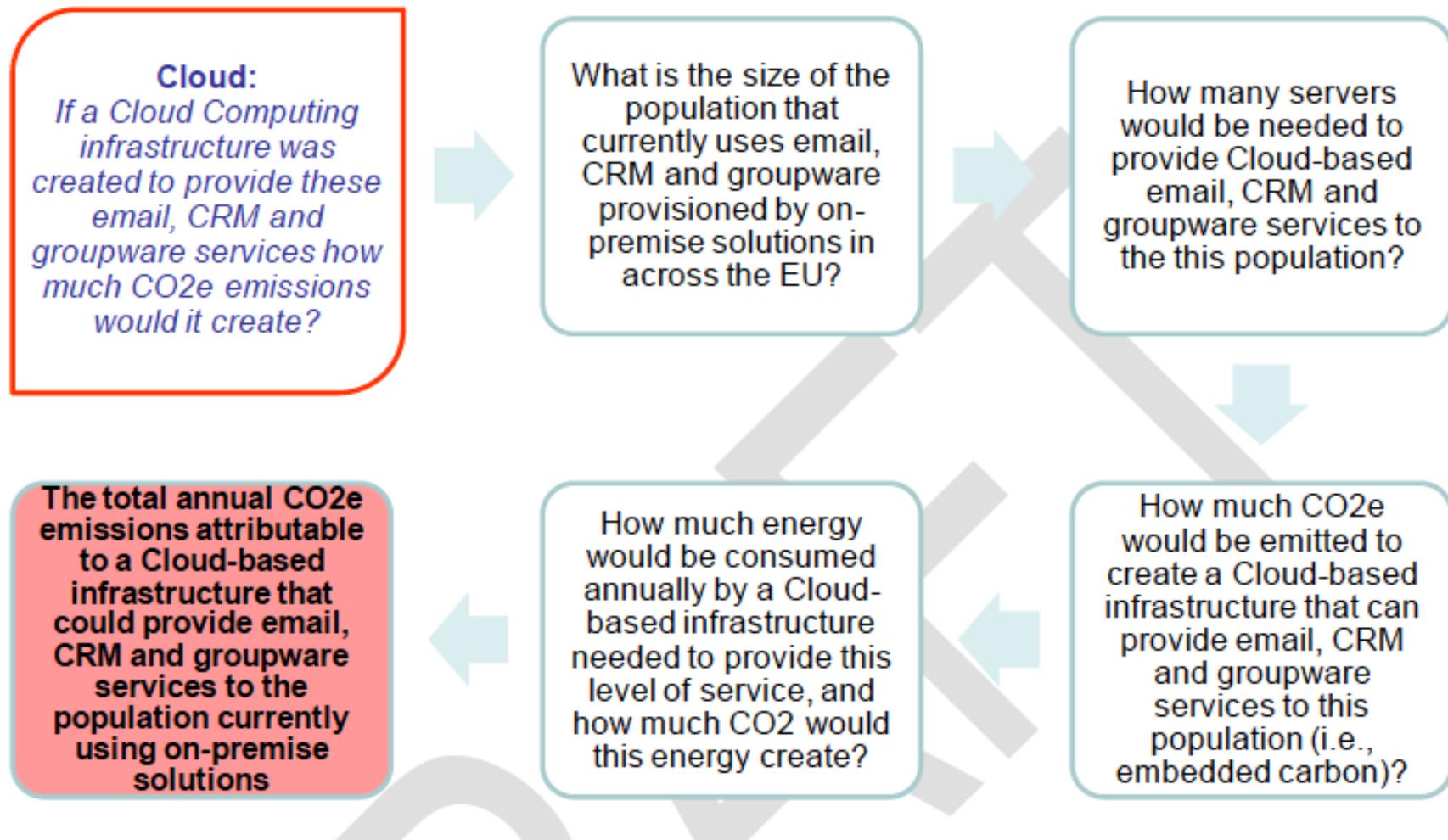
- *What are the total CO₂e emissions created by the on-premise servers and server infrastructure that supplies email, CRM and groupware to organisations across the EU?*

Cloud Computing emissions

- *If a Cloud Computing infrastructure was created to provide email, CRM and groupware to organisations that currently use on-premise solutions across the EU, how much CO₂e emissions would it create?*

Impact if Cloud is broadly adopted

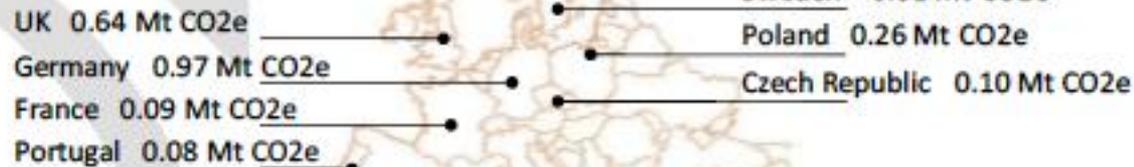
- *If 80% of organisations switched off their on-premise servers and server infrastructure and replaced it with Cloud services, what would be the impact on CO₂e emissions?*



Potential carbon abatement enabled by Cloud Computing

If 80% of organisations across the EU adopted Cloud based email, CRM and groupware we could save 3.7 Mt of CO₂e?

≈ 2.4 % of the European ICT sector's carbon footprint



7 focus countries 2.15 Mt CO₂e

3.9 Mt
CO₂e

Total emissions abatement enabled by Cloud Computing (by switching off on-premise servers and server infrastructure)

0.16Mt
CO₂e

The total emissions created by a Cloud Computing infrastructure large enough to replace the on-premise services

3.7 Mt
CO₂e

Net carbon emissions abatement enabled by Cloud Computing

Best Practices for Green Data Centers



.....

- **When enterprises switch to the Cloud, their redundant on-premise servers must be switched-off.**
 - **Applications need to consider small/micro sized firms:**
 - Nearly 60% of the savings potential relates to small/micro sized firms.
 - **Energy mix has more impact than Power Use Effectiveness (PUE):**
 - Where a Cloud data center is located is more important than overall efficiency of data center (measured by its PUE) - a cleaner energy source will deliver better carbon savings than investing in efficiency.
-