

## THE CONTRIBUTION OF ICT TO CLIMATE CHANGE MITIGATION

### CEO SUMMARY OF REPORT, Submission for approval

#### BACKGROUND

##### Problem Statement

Whilst significant opportunity exists for ICT products and services to enable climate change mitigation, the opportunity is far from realising its potential. With climate change now being one of the top issues at global, intergovernmental level, a unified, clear message on the role of ICT is urgently required. This message needs to be delivered outside of the ICT sector. Otherwise, uninformed legislation and investment decisions will probably only focus on ICTs direct climate impact and thereby reduce both the overall positive impact of ICT, as well as reduce the total green technology market opportunity for the ICT sector.

A **unified and clear message** would allow the ICT sector to establish itself as a leading contributor that sees reduction of CO<sub>2</sub> as a driver for innovation and profit. It would also allow the sector to claim a leadership role as a winner in a low carbon economy.

The **status quo** is determined by a number of factors:

1. The contribution by the ICT sector has up until now focused on the sector's own carbon footprint.
2. Industry messaging has largely been internally focused.
3. Messaging by the ICT sector remains as a whole fragmented.
4. ICT is still seen as a productivity enhancer, not an energy efficiency driver.
5. Policy makers lack information on the potential contribution of ICT.

##### Question to be resolved:

How can the ICT sector unify its messaging and create a clear, global statement on the role of ICT in mitigating climate change - in order to better inform policy making and investment decisions globally over the next five years?

##### Aims of this work:

The aims of this work are to:

1. Formalise a clear set of statements on the potential contribution of ICT to climate change mitigation.
2. Gain expert and industry consensus at expert and CEO level.
3. Elevate any ICT Industry-wide consensus as a message to the highest decision makers globally.

##### About this work:

This document is the executive summary of a larger paper, which has been written in collaboration with many parties for approval by CEOs in Davos. It aims to form a key part of submissions put before the G8 plus five in March and G8 in May 2008.

The role of the World Economic Forum in this work is one of neutral orchestrator of collaboration. This work has been achieved in collaboration with the following organisations:

- **The IT & Telecoms Industry Partners of the World Economic Forum:** *Accenture, Akamai Technologies, Alcatel-Lucent, AMD, Amdocs, Applied Materials, AT&T, Autodesk, Avaya, BMC Software, BT, CA, China Mobile, Cisco, Deutsche Telecom, EMC, France Telecom, Freescale Semiconductor, Google, HCL, HP, HTC-VIA, Huawei, Infosys, Intel, Lenovo, Liberty Global, Microsoft Corporation, Motorola, Pitney Bowes, Qualcomm, Salesforce.com, SAP, SAS, Satyam, SK Telecom, Silver Lake, Telia Sonera, Telstra, Vimpelcom, Vodafone, Wipro, & Fujitsu (non-partner).*
- *American Electronics Association (AeA), Business for Social Responsibility (BSR), The Climate Group Gartner, Global e-Sustainability Initiative (GeSI), Information Technology Industry Council (ITIC), ITU, and the World Wide Fund for Nature (WWF).*

Further intellectual content for this work comes from the synthesis of other work from:

- *ABB, Arup, BP, EMPA, European Network Operators (ETNO), European Commission, Forum for the Future, GE, IKEA, International Energy Agency (IEA), McKinsey & Co. Ltd, Ministries of Commerce in China & India, Toyota, Pew Centre on Global Climate Change, United Nations Foundation, UNDP, United Nations Information and Communication Technologies Task Force, UNCTAD, United States Environmental Protection Agency, Vattenfall, Volvo, and World Business Council on Sustainable Development (WBCSD).*

## OVER-ARCHING MESSAGE

The wide-spread adoption of ICT solutions in all parts of society in the last 25 years has led to tremendous productivity improvement with high returns on investment while reducing relative energy consumption.

The application of ICT solutions can enable a transformation towards a resource efficient and services-based society, and deliver CO2 reduction emissions in particular in those sectors where the opportunities are largest: buildings, transport, and manufacturing.

The ICT sector holds great potential for mitigating climate change through the decoupling of economic growth from energy consumption. We have shown that in the past with the introduction of the PC, the Internet, and mobile telecommunications.

*“The ICT industry is responsible for approximately 2% of global CO2 emissions. ICT solutions have the potential to be an **enabler** to reduce a significant part of the remaining 98% of total CO2 emitted by non-ICT industries and the public”.*

Source: Gartner/HP/McKinsey/WWF

## LIST OF ICT CONTRIBUTIONS

The following list represents the synthesis of feedback from a large number of institutions on the most impactful contributions of ICT to mitigating climate change. This impact may be measured in absolute terms (reduction in energy usage) in the short-term and/or long term, or indirectly through strategic results (visible and symbolic impact on people's lives/ corporations behaviour supporting wider, positive behavioural change and improved regulatory framework).

**Infrastructure innovation:** This section addresses the area where many of the most significant and immediate impact can be made on energy savings and reductions of Green House Gases (GHGs). This includes the large scale physical environment consuming the most energy, which includes buildings, public utilities & infrastructure, and manufacturing. It also captures opportunities for innovation within the energy grid and efficiencies for energy distribution.

1. **Increase energy efficiency of buildings/infrastructure through intelligent systems & design**
2. **Reduce the energy use of the manufacturing sector through intelligent systems, design and business models**
3. **Enable smarter management of energy supply and demand**
4. **Sustainable energy production**

**Behavioural change and green enablement:** This section focuses on the need for global measurement and tracking of carbon reduction, as well as tools that impact positive behavioural change. This includes software tools for carbon impact measurement, and the use of innovative technologies and opportunities that reduce travel and transportation, such as those for virtual meetings, telecommuting, and on-line services (e.g. eHealth, eTaxation, and eBanking).

5. **Enable carbon accounting & the tracking of Green House Gas emissions through the Supply Chain**
6. **Enable virtual meetings**

**Energy efficiency of ICT Products and solutions:** This section covers energy efficiency of data centres, electronic devices & solutions. Even if ICT products themselves have only a marginal environmental impact, there is a great risk that the public will judge the whole sector as environmentally unfriendly if the sector does not address its own carbon footprint. First, this would impact ICT's credibility, making it difficult to deliver on the points above. Second, the rapid increase and penetration of ICT products can, if no action is taken, result in increased energy demand.

7. **Increase energy efficiency of data centres and electronic devices**

## APPENDIX A: GREATER DETAIL ON ICT CONTRIBUTIONS

\* For a fuller description of the ICT Contributions, please see the full report.

### 1. Increase energy efficiency of buildings/infrastructure through intelligent systems & design

**Description:** Within the EU, buildings are responsible for 40% of greenhouse gas emissions. This is approximately 48% in the USA. The majority of energy inefficient features in buildings are designed into them. Two key areas can be focused on to generate greater energy efficiency in buildings:

1. Existing buildings: Greater smart management of energy use through Building Energy Management Systems (BEMS) that optimally schedule the operations of major equipment including air conditioners, heat pumps, and lights according to need.
2. New buildings: Built-in energy supply and improved ICT enabled energy efficient design in buildings, including greater use of efficiency principles in position and shape of the building as well as designing windows, lighting, shading and insulation.

**Role of government:** Encourage solution innovation and implementation through policy measures and direct funding, as well as public procurement.

**Role of ICT Industry:** Development of appropriate solutions and enhanced collaboration with urban planners, design, engineering and construction industries.

### 2. Reduce the energy use of the manufacturing sector through intelligent systems, design and business models

**Description:**

- ICT enabling easier design of products with lower energy requirements, less packaging, reduced emissions, improved recyclability/reuse, longer life, lower maintenance or support needs.
- Enabling “dematerialisation” of any products or services that may be delivered virtually, especially those with high “embedded energy”. Dematerialization refers to the absolute or relative reduction in the quantity of materials required to serve economic functions.
- Product lifecycle management (PLM); manufacturing process controls (MPC) - Integrated measurement devices linked to intelligent control systems and process automation to improve plant energy efficiency while also boosting productivity by increasing throughput, yield, and product quality.
- Sensors and controls to significantly improve energy efficiency providing significant reductions in total energy consumption.
- ICT-enabled transformation towards decentralised and “on-demand” production systems.
- The development of systems that can help companies to move from a product approach to a service approach.

**Role of government:** Promote and fund energy & carbon labelling on manufactured goods, especially in public procurement; sponsor R&D into building energy toolsets; promote dematerialisation

**Role of ICT Industry:** Demonstrate and invest in technology enabling product lifecycle management, smart sensors, machine to machine communication; support development of GHG emission measurement software; greater collaboration with manufacturing sector.

### 3. Enable smarter management of energy supply and demand

**Supply:** Much of today’s energy system was built during a time where oversupply was the only way to ensure that enough power was available. This has created highly suboptimal energy systems. These can be improved by investment in better real-time information and intelligent management systems.

**Demand:** Much energy inefficiency is the result of ignorance and habit. Human beings and business are more likely to improve their environmental behaviour if they are reminded when they are doing something environmentally unsound, or if a more economic approach is indicated. They are likely to adopt more effective “green” behaviour if they are able to compare the efficacy of different behaviours.

This includes smart meters, communication, and data storage that provide high visibility into energy consumption and support energy efficiency.

**Role of government:** Create the working organizations and policies to incentivise open partnerships.

**Role of ICT Industry:** Create greater progress in integration of various technologies needed through greater collaboration and understanding of needs of stakeholders in building industry and utilities.

## 4. Sustainable energy production

**Definition:** Development of affordable sustainable energy solutions for industry and consumers. This includes micro-generation, as well as hybrid vehicle technologies.

**Role of government:** Create the supportive, long term policy and incentive frameworks to spur investment in sustainable energy technologies.

**Role of ICT Industry:** Advance technologies that reduce the cost of renewable energy to the end consumer.

## 5. Enable carbon accounting and the tracking of Green House Gas emissions through the supply chain

Provide systems to measure and report Greenhouse Gas (GHG) emissions, and to track these through the supply chain down to the individual product level. This includes accounting on the carbon footprint of:

- An organisation's operations
- A product (from production through to distribution at point of sale).

This includes software tools, reporting standards and enhanced public awareness of the relative carbon efficiency of products

**Role of government:** Establish appropriate guidance and regulation on widely acceptable and implementable standards.

**Role of ICT Industry:** Collaborate widely with key stakeholders to develop reporting systems, and champion carbon accounting and reporting.

## 6. Enable virtual meetings

Travel substitution: remote collaboration and telecommuting (home to office, inter-office travels); the use of ICT to enable and encourage remote collaborations as a substitute for some travel activities – these include ICT enabled citizen centric services, such as eGovernment, eHealth, eBanking and social networking.

**Role of government:** Encourage industry-wide adoption of remote meetings through financial incentives, as well as funding greater research into cultural and management behaviour to understand and reduce barriers.

**Role of ICT Industry:** Reduce complexity of remote meeting; understand and tackle behavioural barriers; champion virtual meetings within the industry; improve the efficiency and effectiveness of citizen-centric services.

## 7. Increase energy efficiency of data centres and electronic devices

**Description:** Progress can be made to reduce the energy-effectiveness of data centres and increase efficiency of electronic devices

**Role of government:** Greater collaboration with industry to measure data centre productivity; encourage greater focus on electrical efficiency through market stimulation and standards; create policy framework to encourage the consumer's uptake of energy efficient devices and solutions.

**Role of ICT Industry:** Promotion of holistic approach to energy efficiency in data centres; focus on the provisioning of power, virtualisation, compute and cooling resources of data centres; design energy efficient electronic devices and solutions.