# Evaluating the Carbon-Reducing Impacts of ICT

An assessment methodology developed in cooperation with the Boston Consulting Group

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# About the Global e-Sustainability Initiative

- GeSI was launched in 2001, and brings together leading ICT companies – including service providers and equipment manufacturers as well as industry associations – and non-governmental organisations committed to help improve the global environment and to enhance human and economic development, thereby making a key contribution to a global sustainable future.
- In June 2008 GeSI was re-established as a legal independent entity in the form of an international non-profit association.

# GeSI Commitments

1. Develop an agreed ICT industry-wide methodology for the carbon footprinting of ICT products and services.
2. Put more emphasis on climate change issues in our supply chain work so we influence the end-to-end manufacturing process for electronic equipment.
3. Ensure that energy and climate change matters are fully considered by the organisations that set the technical standards for our industry.
4. Work with organisations in the key opportunity areas – travel/transport, buildings, grids and industry systems – to help turn potential CO2 reductions into reality. This will include a strong emphasis on the significant opportunities offered by dematerialisation.
5. Work with public policy makers to ensure that the right regulatory and fiscal frameworks are in place to move us all in the right direction.

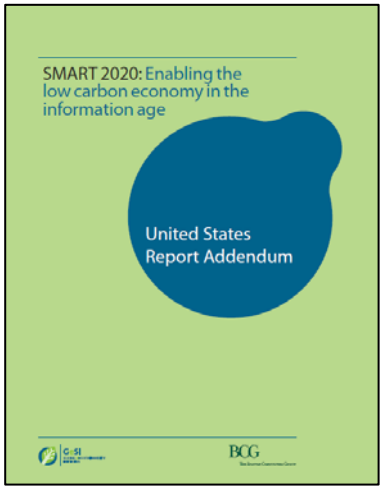
# GeSI's SMART 2020 report series identified ICT as a major low carbon enablement opportunity

## 2008 SMART 2020 Report

- Globally, ICT solutions have the potential to reduce by 15% (7.8 Gt $CO_2e$) of the remaining 98% $CO_2e$ emitted.

## 2008 U.S. Addendum

- ICT enabled solutions could cut annual CO2e emissions in the U.S. by 13–22% from business as-usual projections in 2020.
- This translates to a gross energy and fuel savings of $140-240 billion dollars. These savings are equivalent to a reduction in total oil consumption by 11-21% and a reduction of oil imports into the U.S. by 20-36%.

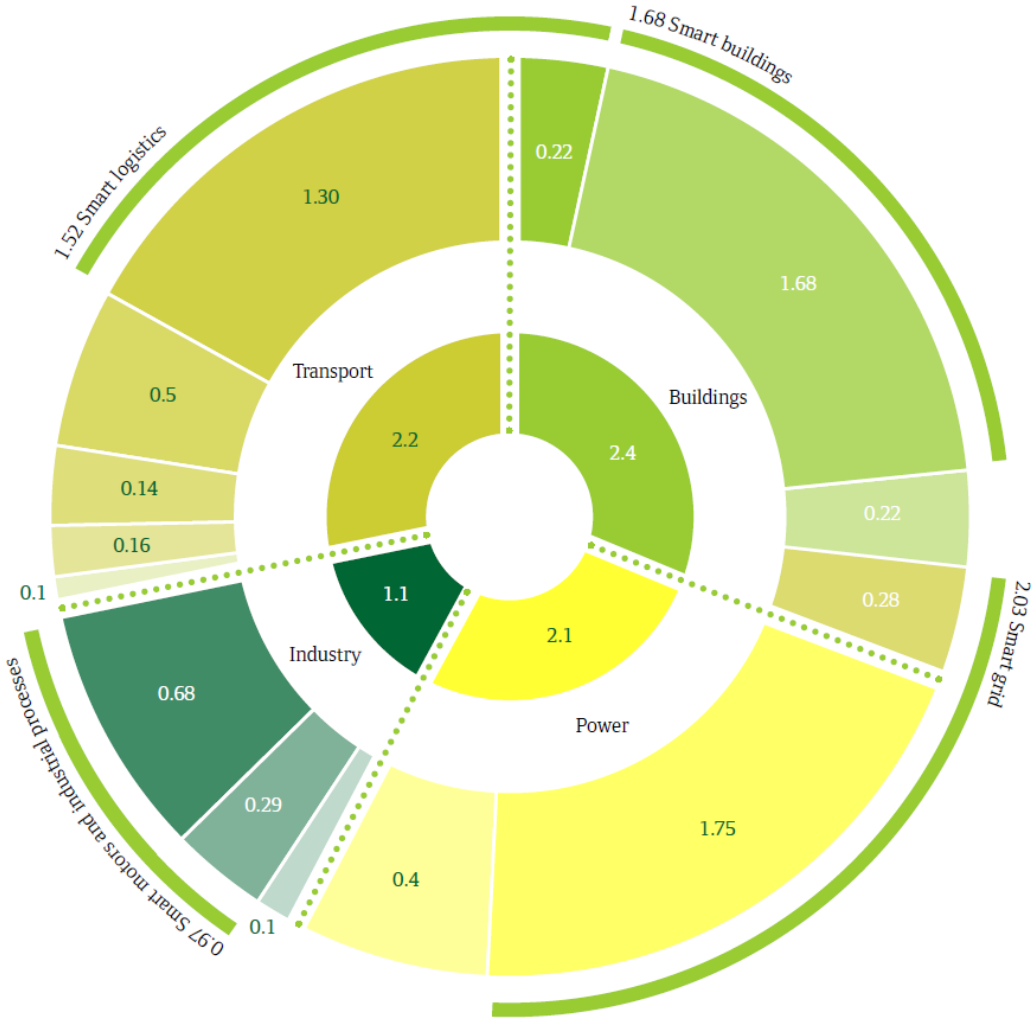
# The enabling effect covers 4 primary areas

**Industry**
- Smart motors
- Industrial process automation
- Dematerialisation* (reduce production of DVDs, paper)

**Transport**
- Smart logistics
- Private transport optimisation
- Dematerialisation (e-commerce, videoconferencing, teleworking)
- Efficient vehicles (plug-ins and smart cars)
- Traffic flow monitoring, planning and simulation

**Buildings**
- Smart logistics
- Smart buildings
- Dematerialisation (teleworking)
- Smart grid

**Power**
- Smart grid
- Efficient generation of power, combined heat and power (CHP)



# The reports identified government support needed to accelerate adoption

**Create policies that build overarching framework for encouraging CO2 reduction and ICT solution adoption**

Over-arching policies

**Use targeted policies to accelerate adoption and address specific technical, economic and behavioral challenges**

Targeted policies

**Smart Grid**

**Road Transport**

**Smart Buildings**

**Travel Substitution**

## Principles for effective government policies

**Create an enabling regulatory framework**
- Aim for consistent legislation that supports market-based solutions

**Enable development of solutions**
- Conduct fundamental research benefiting all stakeholders
- Encourage innovation, not specific technologies
- Encourage investment in required infrastructure

**Support the business case when necessary**
- Create the right incentives
- Ensure that markets create desired environmental and social outcome

**Encourage positive behavior change**
- Lead by example and support pilot projects
- Facilitate and coordinate the sharing of information

Source: GeSI policy expert interviews; BCG analysis; SMART 2020 United States Addendum Report

# ICT enablement methodology study context and objectives

## Context

**Despite the positive reception of these reports, the lack of policy- and commercially-relevant assessments is preventing the full realization of benefits from smart use of ICT**

- ICT industry unable to clearly define the specific benefits of different types of ICT investments
- Policy-makers unable to create appropriate incentives for the government, commercial and residential sectors

## Project objectives

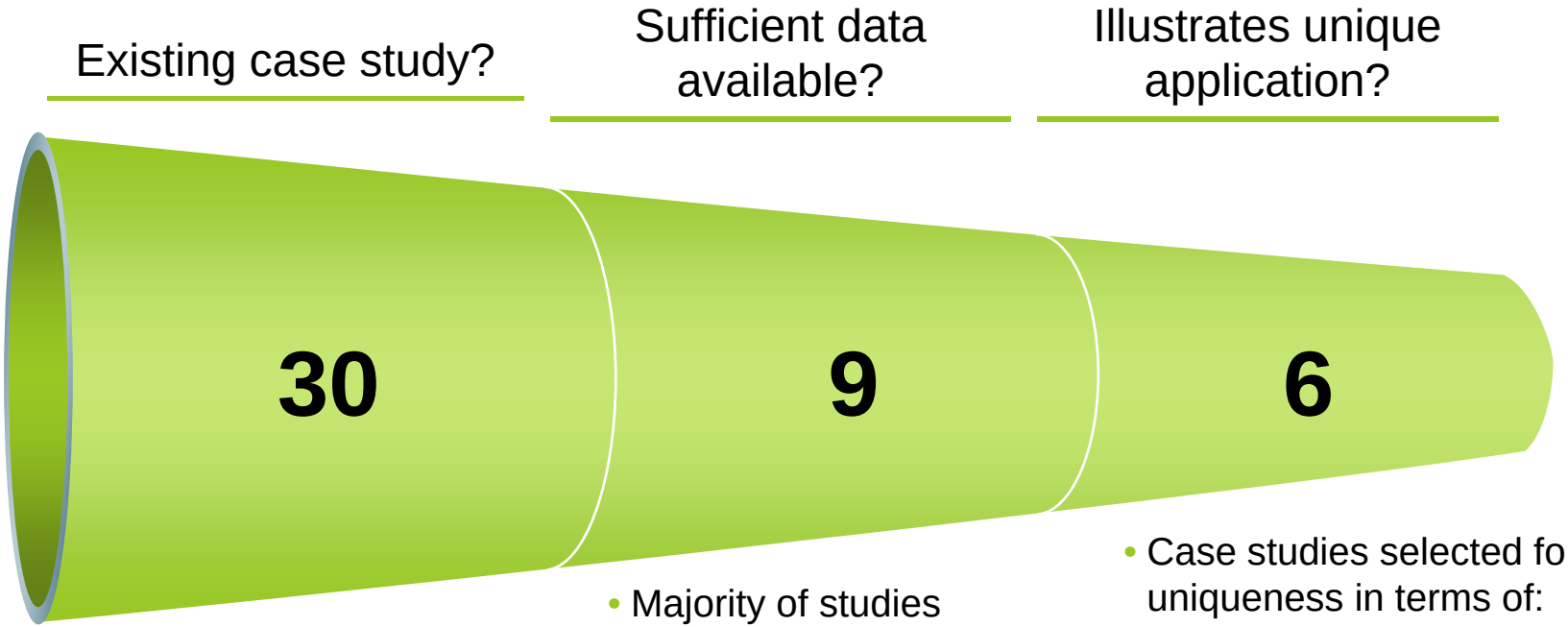
- Survey and evaluate existing methodologies relevant for assessing enabling impacts of ICT
- Highlight key characteristics of existing methodologies
- Develop an optimal "next step" methodology
- Apply methodology to selected case studies
- Identify issues for application and path forward for the ICT industry

# 18 international ICT companies sponsored and provided input to the study

# Developed methodology meets specific needs

| | |
|---|---|
| **Comprehensive** | **Captures all major impacts, both positive and negative** (i.e., direct ICT emissions, enabling effects, and rebound effects) |
| **Burden-limiting** | **Limits burden of assessment**: Minimizes time and resources required by facilitating exclusion of negligible components of net effect |
| **Communication-friendly** | **Supports clear, transparent communication** of methodological approach and findings to broad stakeholder audience |
| **Applicable for varying scope** | **Widely applicable for assessing impact of ICT products and services and ICT category levels** |
| **Applicable across geographies** | **Effective when applied in both developed and developing world settings** |
| **Flexible** | **General and flexible enough for large-scale adoption** – will meet current and future stakeholder needs as sector innovation occurs |
| **Adaptable** | **Can adapt as more detailed guidance, industry-wide standards and software assessment tools are developed** |
| **ISO compliant** | **Based extensively on ISO 14040-series standard**, but introduces additional guidance specific to assessing enabling effects of ICT |

# 6 case studies selected from 30 identified and evaluated




- Existing studies identified via:
  - GeSI team members
  - Review of existing literature
  - Discussion with external experts

- Majority of studies eliminated due to lack of sufficient existing data on ICT impacts
  - E.g., emission reductions for key forms of impact

- Case studies selected for uniqueness in terms of:
  - SMART ICT category
  - Geographic scope
  - Scope of measurement

# Six case studies included in the report

| | | SMART area | Location | Assessor | Description |
|---|---|---|---|---|---|
| 1 | Home energy monitoring kit | **SMART grids** | **United Kingdom** | **AlertMe** | **Energy savings in household before and after installation of AlertMe home energy monitoring system** |
| 2 | HVAC automation system | **SMART buildings** | **United States** | **Cypress** | **Energy savings in building complex after installation of HVAC automation system** |
| 3 | Eco driving software solution | **SMART logistics** | **United Kingdom** | **Microlise** | **Fuel efficiency gains across 350+ vehicle fleet after software implementation** |
| 4 | Telecommuting | **Dematerialization** | **United Kingdom** | **BT** | **Assessment of whether telecommuting has positive net enabling effect despite rebound effect of increased home energy use** |
| 5 | E-health delivery system | **Dematerialization** | **Croatia** | **Ericsson** | **Emission-reducing impact of e-referral and e-prescription services in Croatia** |
| 6 | Telepresence system | **Dematerialization** | **Multinational company** | **Cisco** | **Assessment of net enabling effect from company-wide adoption of telepresence** |

Source: BCG analysis

# ICT enablement methodology

| 1 Define goal and scope | 2 Limit assessment | 3 Assess and interpret |
|---|---|---|
| 1a Define goal of study | 2a Estimate BAU reference value | 3a Rigorously assess significant life cycle processes |
| 1b Define scope of study | 2b Limit life cycle processes require rigorous assessment | 3b Interpret net results |

**Methodology uses a Life Cycle Assessment (LCA) approach to guide the assessment of changes to an existing system resulting from the adoption of an ICT solution**

# Case Study: Home energy monitoring kit

## Summary

### Assessor and location of ICT solution


Cambridgeshire, UK

### Smart opportunity area

Smart grids: user information
- Estimated 2020 abatement potential: 0.28 $GtCO_2e$†

### Description of assessment

Energy savings in household before and after installation of AlertMe home energy monitoring kit

### Net enabling effect

Reduced emissions by 4.33$tCO_2e$/household/yr (pilot study result)

### Sources of data

Pilot primary data only;
larger study in progress

## Goal of study

### Purpose of study

Produce a consumer-ready claim of potential $CO_2e$ reduction from ICT implementation

### Intended audience

Individual homeowners

## Scope of study

### Direct ICT emissions

Increased emissions from home energy monitoring kit

### Enabling effects

Primary: reduced energy consumption
Secondary: none assessed

### Rebound effects

Primary: increased non-peak consumption
Secondary: none assessed

†Source: *SMART 2020: Enabling the low carbon economy in the information age*

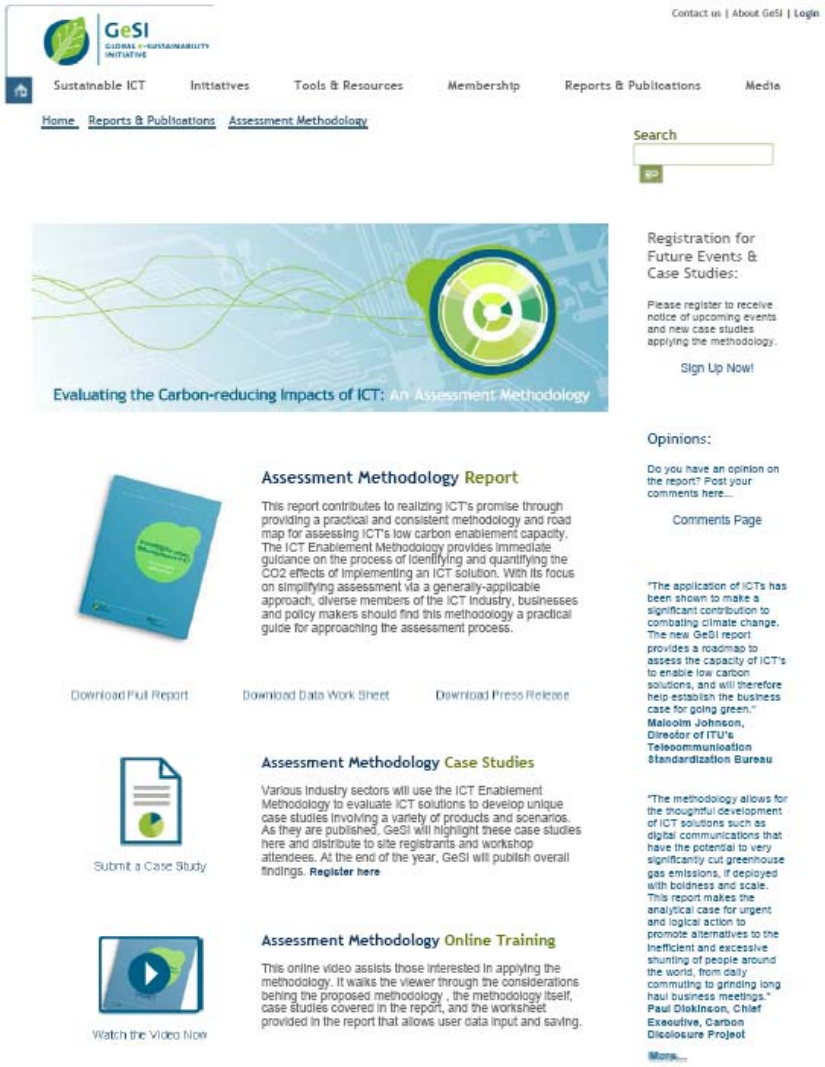
# The way forward

- Development of additional case studies
  - Additional real-world case studies to demonstrate successful application of methodology
- Expansion of shared data
  - Increased volume of, access to primary data to more accurately capture real-world impacts (especially those driven by adoption rates and behavioral changes)
- Development of assessment tools and databases
  - Continued development of tools to support application of methodology
  - Integration of tools and aggregation of underlying data
- Standardization of impacts and life cycle processes included in assessment
  - Establishment of agreed-upon approaches for assessing effects of specific ICT product or service categories

# The launch website at www.gesi.org is the starting point

## There, you can:

- Download the Report
- Download methodology worksheets you can use to guide your own assessment and track your data
- Review the latest case studies
- Watch a video explaining the study
- Register your interest in future workshops and published case studies



That's all,

but it's just the beginning!

Thank you very much

for your kind attention.