



# INFORMATION AND COMMUNICATIONS TECHNOLOGY TO MANAGE CLIMATE RISKS AND EMISSIONS

## INTRODUCTION

The Industrial Revolution brought along to society, and particularly to business, a set of technologies that applied a new rhythm to work and production, as well as to the exploration of the environment for economic development purposes. That technological leap was based on the use of fossil fuels as the major energy source.

Production processes introduced by the new technological solutions enabled cost and time reduction in many activities conducted by the companies, particularly those concerning access and transformation of raw materials and distribution of finished goods. On the other hand, the environmental impacts caused by those new technologies and processes have not been properly internalized by the business, rather threatening the natural capital upon which the economic activity and the social well-being depend.

Climate change is particularly relevant in this context. According to IPCC<sup>1</sup> Fifth Assessment Report on Global Climate Change, it is directly related to the increase of greenhouse gas (GHG) anthropogenic emissions.

In order to mitigate and facilitate adaptation to probable environmental, social and economic impacts of climate change, a new array of technological solutions is necessary and has been developed, mainly with the aim of reducing power consumption, transitioning to other energy sources, and supporting adaptation strategies.

In the past 20 years, companies operating in the Information and Communications sector made great advancement, both in the products and services offered, and in the technological development of those products and services. Currently, they play a critical role in the efforts to mitigate and adapt to the impacts related to changes in the global climate. Business strategies focused on efficient technologies and effective communication have been targeting at reducing costs and strengthening the management of environmental risks. In this sense, ICT offers important solutions to reduce GHG emissions, enabling businesses to analyze their emissions and power consumption in real-time, as well as gather and analyze the environmental data needed to manage climate risks. Still according to The Climate Group and GeSI (2008), they expect innovation opportunities in ICT, based on transparency and efficiency principles that promote access and analysis of consistent and updated data and information.

ICT importance and potential to reduce emissions have been globally studied, whether because of its energy efficiency aspect, whether because of emissions real-time monitoring and improved management of climate risks, as previously mentioned. According to The Climate Group<sup>2</sup> and GeSI<sup>3</sup> Report, *Smart 2020* (2008), ICT may enable a 7.8 GtCO<sub>2</sub> reduction in global

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<sup>1</sup> The Intergovernmental Panel on Climate Change – IPCC published, on September 27<sup>th</sup>, 2013, the first of four parts of its Fifth Report: *The Physical Science Basis*. The text can be accessed at the following link: <http://www.ipcc.ch/report/ar5/wg1/#.UmU-ZXDkvFk>.

<sup>2</sup> The Climate Group: Non-profit organization that works with businesses and governments to foster clean technologies worldwide.

emissions, by 2020, which accounts for 15% of total emissions expected for that year. The same report states the energy efficiency from ICT implementation will allow for savings around 946.5 billion dollars by 2020.

ICT solutions that will drive the results mentioned include mainly smart motor systems, logistics and transport, buildings and power grids, in all major economies around the world. ICT applied to logistics and transportation, for instance, may result in 1.52 GtCO<sub>2</sub> of avoided emissions (3% of global expected emissions) by 2020, which also accounts for 441.7 billion dollars in savings. In India, improved power monitoring and managing, thanks to the use of ICT, such as smart power meters, can allow for up to a 30% reduction in power losses. For 2020, smart grids are the most relevant technologies, with chances of reducing 2.03 GtCO<sub>2</sub>e of carbon emissions (4% of the emissions expected for 2020) (The Climate Group and GeSI, 2008).

The International Telecommunication Union<sup>4</sup> (ITU) has also calculated GHG abatement potential thanks to ICT services. Based on a case study and on socioeconomic characteristics and indicators from the Republic of Korea, one of the most advanced countries when it comes to ICT, ITU published a report where it presents 14 key ICT services and their corresponding GHG abatement potentials in the Republic of Korea between 2011 and 2020 (Table 1). The smart grid, similarly to what happened in The Climate Group and GeSI study, is ranked as the top solution for abating GHG emissions. In second, it is telepresence.

Table 1: Potential to reduce GHG through 14 ICT services, in the Republic of Korea

ICT Services	2011 - GHG abatement (millions of tCO <sub>2</sub> e)	2020 - GHG abatement (millions of tCO <sub>2</sub> e)
1. Smart Grid	1.98	68.70
2. Telepresence	0.86	11.03
3. E-commerce	1.09	7.93
4. E-civil services	0.47	6.11
5. E-logistics	1.34	4.79
6. Real-Time Navigation	0.59	3.57
7. E-government	0.15	3.48
8. Power Management System	0.76	2.96
9. Smart motor (industrial)	1.61	2.89
8. Digital Content	0.52	2.05
11. Smart Work	0.17	1.89
12. E-learning	0.69	1.61
13. Information System for Buses	0.25	1.40
14. E-health Care	0.02	0.04

Source: ITU, 2013

<sup>3</sup> Global e-Sustainability Initiative: National strategic partnership of ICT businesses and associations committed with creating and promoting technologies and practices to foster economic, social and environmental sustainability.

<sup>4</sup> International Telecommunication Union: A United Nations agency specialized in information technology and communications.

International organizations such as the UNFCCC<sup>5</sup> pointed out that ICT 'may be critical to anticipate, determine and measure the extension of climate change, as well as develop effective response strategies to adapt to harmful effects of climate change in areas such as agriculture, labor, technology transfer, energy, among others' (ITU, 2012). Tools such as base radio, remote sensors and rain gauge stations are important to monitor the climate, prepare weather forecasts and trigger alerts in case of climate events such as floods and droughts. Thus, they contribute to save people's lives and they are likely to be increasingly used in developing countries.

At the United Nations Climate Change Conference held in 2011 (COP 17), in Durban, South Africa, climate adaptation strategies gained momentum. Aware of the relevance of the information and communications technology in this process, a coalition on ICT and climate was formed, with the purpose to disseminate the tools for climate risk mitigation and adaptation. Ghana is one of the most active countries in the coalition, and a pioneer in the use of ICT to tackle extreme climate events. The country made use of technologies to inform farmers about changes in meteorological conditions and deploy e-learning and e-government systems through which citizens were able to get informed about the risks and prepare for climate change. In 2012, ITU published a report showing the main lessons learnt with the country – 'Climate Change Adaptation, Mitigation and Information & Communications Technologies (ICTs): the Case of Ghana'. The report shows how technological solutions can contribute to key climate change adaptation business and governmental processes (Box 1).

**Box 1: ICT and Climate Change Adaptation Processes, 2012**

Process of adapting to climate change	ICT Contribution
Informed decision-making	Contribute to climate change adaptation strategies by strengthening decision-making with relevant information. Tools can be used to gather and disseminate information related to climate change, prioritize it according to the local, regional or national level, and support in the identification of resources and capabilities available to respond to climate threats and opportunities.
Engagement of stakeholders	Facilitate inclusion of multiple players in the design and implementation of adaptation strategies.
Feedback and learning	Can be used to facilitate networking, feedback and learning, when it comes to adaptation options and lessons learnt.

Source: adapted from ITU, 2012.

<sup>5</sup> UNFCCC: United Nations Framework Convention on Climate Change

Considering its relevance, the ICT solutions topic in the context of climate change was covered by the Center for Sustainability Studies (GVces) at Getulio Vargas Foundation in 2013, through the Companies for the Climate (EPC) Platform. The goal of this work is to highlight ICT solutions that are being implemented in Brazil in order to reduce GHG emissions and manage climate risk, as well as determine trends and opportunities that can be further explored in the coming years. Mapping the solutions that have been developed and implemented by businesses in Brazil, particularly the ones that are members of the EPC platform, the debates held in the EPC forum, and discussions with organizations that are active in the topic served as the basis to build this work.

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