Connections
Transport & ICT

ICT at COP21: Enormous Potential to Mitigate Emissions

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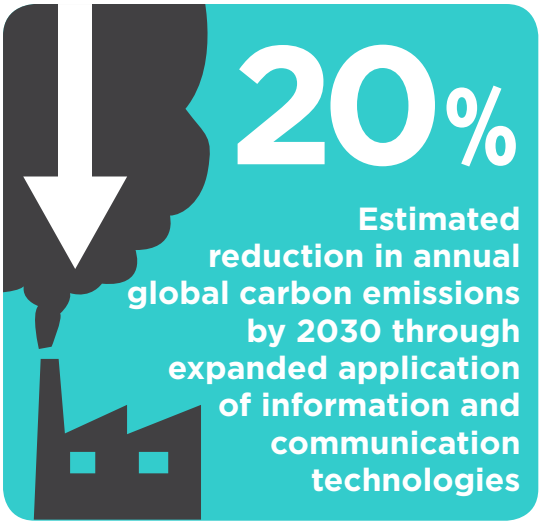
The transformational potential of new information and communication technologies (ICTs) was on display in Paris at the Twenty-First Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change. ICTs—including the Internet, mobile phones, geographic information systems (GIS), satellite imaging, remote sensing, and data analytics—could reduce yearly global emissions of carbon dioxide (CO_2) 20% by 2030, thus holding them at their 2015 level.[1] Moreover, ICT emissions are expected to decrease to 1.97% of the global total by 2030, from 2.3% in 2020, while emission reductions attributable to ICT will be nearly 10 times greater than those of the ICT sector. ICTs are also critical for climate change adaptation, providing vital tools for all phases of the disaster risk management cycle. Although the opportunities for ICTs to support the climate change agenda are enormous, much work remains in order to realize them. Governments of developing countries must be further encouraged to include ICTs in their national climate change policies. And the international development community will have to make significant efforts, particularly in low-income countries, to develop ICT infrastructure as well as the institutional capacities and skills to implement and sustain these solutions.



By 2030, ICTs could eliminate the equivalent of 12.1 billion tons of CO_2 per year in five sectors—transport (30% of the total reduction), manufacturing (22%), agriculture and food (17%), buildings (16%), and energy (15%).[2] Here are some of the ways:

Transport (mobility and logistics): Electric vehicles, traffic control, real-time route optimization, smart logistics, car sharing (e.g., Uber), and other ICT-enabled solutions can save travel time and reduce fuel consumption. The Lagos Bus Rapid Transit (BRT), supported by the World Bank, is a good example of a system embodying several of these strategies.[3] "Disruptive" ICTs in transportation (such as driverless vehicles) are expected to mature over the next decade.

[1] *Smarter 2030,* June 2015 (http://smarter2030.gesi.org/downloads/Full_report.pdf), a report by GeSI (Global e-Sustainability Initiative, an industry group) presented at COP21. Those possibilities were explored at a number of ICT-centric COP21 sessions, including those hosted by the UN Global Pulse initiative (which in April 2015 had launched Data for Climate Action), the French Development Agency, the U.K.'s Department for International Development, and the Data-Pop Alliance, which was created by the Harvard Humanitarian Initiative, the MIT Media Lab, and the Overseas Development Institute to promote the use of Big Data through collaborative research, capacity building, and community engagement.

[2] The total exceeds the combined carbon footprint of the European Union and the United States (www.ericsson.com/res/docs/2015/mobility-report/ericsson-mobility-report-nov-2015.pdf).

[3] http://blogs.worldbank.org/transport/lagos-bus-rapid-transit-system-decongesting-and-depolluting-mega-cities-0.

Manufacturing: Examples include virtual manufacturing, 3D printing (allowing customer-centric production at a faster and more efficient pace), circular supply chains, and smart services.

Agriculture and food: ICTs can help raise productivity and reduce food waste and are estimated to also reduce water needs, potentially by 250 trillion liters per year by 2030. For example, farms in developing countries can monitor soil conditions by using intelligent sensors and send the data to irrigation systems, leading to efficient allocation of scarce water resources.

Buildings: Sensing devices linked to controls and applied to building energy management could reduce energy costs by $0.4 trillion per year by 2030.

Energy: Smart grids driven by web-enabled sensor networks in combination with big data and analytics can predict electricity usage patterns with increased accuracy and modify output in response to immediate data rather than historic patterns.[4]

The use of ICTs in climate adaptation measures is becoming more routine. In Egypt, alerts for flash floods are issued on the basis of rainfall forecasts, and Chile became the first developing country to have a fully operational tsunami early-warning system that uses a satellite-based positioning system. After the April 2015 Nepal earthquake, the efficiency of rescue efforts was boosted by tech volunteers in the OpenStreetMap community, who located more than 13,000 miles of roads and 110,000 buildings within 48 hours.[5]

Projects supported by the World Bank are employing some of these technologies:

- In Samoa, GIS mapping is used to help identify important sections of the road network vulnerable to climate and weather impacts (a strategy also under way in a Belarus project).
- In Tonga, a drone for postdisaster and geospatial mapping is helping assess storm damage and plan recovery efforts.

Critical ICT infrastructure and services are still lacking, especially in low-income countries. Today, two-thirds of the population residing in developing countries remains offline, and less than 10% of the 940 million people living in the least-developed countries use the Internet.[6]

The UN's Sustainable Development Goal (SDG) 9.c is to "significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020." Globally, the arrival of 5G Internet speeds in the near future as well as the accelerating development of next-generation access (NGA) networks are expected to enable productivity gains on a massive scale. These will significantly advance the potential to attain SDG 9.c, benefiting climate change mitigation and adaptation as well as health, education, agriculture, and gender equality.

Greening the ICT sector itself will also be critical as data traffic continues to explode. In 2014, the International Telecommunications Union established the new Connect 2020 agenda, which includes two ambitious targets directed at reducing the environmental footprint of the ICT sector by 2020: reducing the volume of e-waste 50% and reducing greenhouse gas emissions generated by the sector by 30% per device.[7] The consolidation of data centers, the expansion of cloud-based services, and innovative solutions such as liquid cooling will become increasingly important to reduce energy required for ICT power.

The opportunities for ICT to support the overall climate change agenda are enormous, and the development community must continue to aggressively explore ways to raise awareness for using ICT solutions to facilitate the greater provisioning of this global public good.

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[4] The total energy footprint has started to decrease in OECD countries with high ICT use (www.ericsson.com/res/docs/2015/mobility-report/ericsson-mobility-report-nov-2015.pdf).

[5] http://www.wired.com/2015/05/the-open-source-maps-that-made-rescues-in-nepal-possible.

[6] https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFacts-Figures2015.pdf

[7] http://www.itu.int/en/ITU-T/climatechange/Documents/Publications/Resilient_Pathways-E.PDF

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