

Concept note for ITU exploratory assessment mission

Assessing the potential for using ICTs to reduce energy consumption and reduce greenhouse gas emissions in the built environment in Africa.

Draft

BACKGROUND

Left unchecked, climate change could have catastrophic consequences^{1,2}. There is increased evidence that climate change is taking place in a fashion consistent with the worst case scenarios considered by the Intergovernmental Panel on Climate Change (IPCC)^{3,4}. Countries around the world as well as in Africa are looking at options for conserving energy and for increasing energy intensity as economies, populations and urbanization and demand for power continue growing.

OBJECTIVES

The objective of this proposal is to assess the potential that ICTs have for helping countries conserve energy and reduce greenhouse gas (GHG) emissions in the built environment in Africa.

The immediate objective is to measure as best possible the potential for energy savings using ICT based green design principles and smart building technologies in new buildings and in retrofits of existing buildings and then in doing a preliminary cost benefit analysis to explore the using of this technology more generally in a number of selected African countries such as, for example, Egypt and others.

THE BUILT ENVIRONMENT

While much of focus in Africa has been on the importance of helping countries adapt to climate change because that is where the greatest impact on livelihoods is likely to be felt, the intention of this proposal is to examine what real energy and cost savings and reductions in GHG emissions can be achieved by looking at ICTs in the built environment, i.e. in buildings and related energy systems, for example in the electrical grid.

The built environment is especially important. Buildings contribute about 40 % of GHG emissions. 75 % of GHG emissions come from urban areas. 75 % percent of the population of the world lives in urban environments and more and more people are moving to built areas. These sources of emissions also open up opportunities for mitigation as well as adaptation.

¹ The Parliamentary Office of Science and Technology. 2005. *Rapid climate change*. Postnote. July 2005 Number 245. Parliament of the United Kingdom, London, 4pp. www.parliament.uk/parliamentary_offices/post/pubs2005.cfm

² The Parliamentary Office of Science and Technology. 2005. *Rapid climate change*. Postnote. July 2005 Number 245. Parliament of the United Kingdom, London, 4pp. www.parliament.uk/parliamentary_offices/post/pubs2005.cfm

³ Hanley, C. J. 2010. *Long, hot summer of fire, floods fits predictions*. Aug. 12, 2010. Associated press. http://news.yahoo.com/s/ap/20100812/ap_on_sc/us_sci_climate_breakdown

⁴ NASA. 2010. *Drought Drives Decade-Long Decline in Plant Growth*. Aug. 19, 2010. <http://www.nasa.gov/topics/earth/features/plant-decline.html>

The focus of this proposal is on assessing the potential that ICTs have for reducing energy consumption in the built environment through the use of ICT based technologies and management practices such as building information modeling (BIM) and other smart building technologies such as smart and wireless sensor networks (WSNs), next generation networks (NGNs), embedded devices, radio-frequency identification (RFID) tags, smart motor systems, smart electrical systems (i.e. smart grids), etc..

THE OPPORTUNITY

In the developing world, knowledge about these opportunities may be less than in the developed world, but the opportunity may be greater in a relative sense, i.e. relative to total amount of GHG emitted by the country, to total amount of energy consumed, to GDP, to operating budgets and as a percentage of disposable income.

In less industrialized and mechanized societies, reducing the amount of energy consumed and GHGs emitted may lead to a proportionately larger savings in energy, fuel, emissions, equipment and materials as well as operating costs and other costs than in larger industrialized economies. In poorer countries, reducing the amount of fossil fuels that are imported may generate very significant savings in relation to GDP, help balance trade, etc., and free up financial and other resources for dealing with other development priorities.

"Empirical evidence shows that an up-front investment of US\$200-500 in ICT can save a tonne of carbon emission per year, with some quick wins at US\$10 per tonne. Developing countries might see higher costs because they lack some of the infrastructure developed countries already enjoy."⁵

These opportunities may be financially viable and commercially sustainable. They may also open up opportunities for outside funding under the United Nations Framework Convention on Climate Change (UNFCCC) and related mechanisms (Kyoto and post Kyoto), including from the \$ 100 billion fund now being discussed and perhaps made operational at Cop16 in Cancun. They may also open up opportunities for foreign direct investment (FDI) under various "cap and trade" or equivalent regimes.

METHODOLOGY AND OUTPUTS

The ITU is seeking to provide proof of concept for the role that ICTs can play to increase energy efficiency and abate climate change in the built environment, with a focus on multi-residential and commercial office buildings, both new and existing.

In the context of this assignment, **proof of concept will comprise a business case for ICT adoption in the built environment**. The business case will assess:

- The market conditions for adoption, including a high level estimate of the market potential;
- The technical performance of ICT applications
- The economic benefits of a full roll-out of an ICT focused initiative.

⁵ David Eurin Head of Energy Consulting, Analysys Mason in ITU. 2009. *The leading UN agency in ICT*. PowerPoint presentation, 41 slides. Presented by ITU at the Cop15 iSeeT@theClimateChangeKiosk, Dec. 2009, Copenhagen,

This initial assessment assignment will address the first dimension of the business case: the assessment of the market conditions.

If this stage successfully makes the case that the market conditions for ICT adoption are or can be established, then the next stage will be to address the technical performance and economic benefits. This would consist of selection of a set of candidate buildings in which there would be:

- Installation of promising ICTs followed by monitoring and verification (M&V)
- Assessment of performance data and comparison to expected results.

This project will also provide recommended next steps for the International Telecommunication Union (ITU) for further studies into the potential for ICTs in the built environment and in other sectors as well. In essence, this project aims to lay the groundwork for future work, including extending the analysis to other sectors of the built environment, analysis of a more substantial list of ICTs, and developing policies and programs to encourage the adoption of ICTs for enhancing energy efficiency and contributing to reducing greenhouse gas emissions.

Along with the suggestions made above, it is proposed to prepare a short study documenting the market for smart building technologies in the MENA region and in Africa at large. A brief review of the global market for ICTs in the built environment will also be made.