Statement by Dr. Maike Luiken, IEEE Head of Delegation
At the High Level Policy Track Interventions (September 7, 2020)
"WSIS Action Lines and SDGs: Strengthening multi-stakeholder partnership"
WSIS Forum 2020

Mr Malcolm Johnson, Deputy Secretary General, ITU:

"IEEE has a significant body of work in ICT. We know that ICTs are crucial to achieving the SDGs. What measures can be taken to ensure that they are developed and implemented with appropriate considerations for environmental sustainability and human well-being?"

Dr Maike Luiken, Head of Delegation, IEEE:

"Secretary General, Honorable Ministers, Distinguished Guests, Ladies and Gentlemen, I am honored to be here today, and to speak on behalf of IEEE as a Specific Activity Partner of the 2020 WSIS Forum.

As the world's largest technical professional association, IEEE represents over 400,000 members from more than 160 countries and is dedicated to advancing technology for the benefit of humanity. IEEE's development of trusted technical knowledge and standards has long contributed, and continues to contribute, to sustained progress across industry domains--in communications, computing, power and energy, transportation, biomedical, and more.

When looking specifically at tools and measures in support of ICT development and implementation, with environmental sustainability and human well-being in mind, they need to include:

- *Standards, including standards[1] for 'ethics in design',[2]*

- *Design for sustainability,*

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[1] IEEE, "IEEE P7000 - IEEE Draft Model Process for Addressing Ethical Concerns During System Design," IEEE Standards Association. https://standards.ieee.org/project/7000.html. (accessed September 4, 2020).
[2] Alan Winfield, Katina Michael, Jeremy Pitt, and Vanessa Evers, "Machine Ethics: The Design and Governance of Ethical AI and Autonomous Systems." IEEE. https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8662743. (accessed September 4, 2020).

● *Data governance and management,*

● *Resource management,*

● *Training and education, as well as*

● *Policies and regulation.*

1. In answer to your question, one measure that can be taken to ensure that ICTs are developed and implemented with appropriate considerations for environmental sustainability and human well-being is the development and adoption of standards. This is of pivotal importance to the successful deployment of ICTs.

Global, open standards play a prominent role in our lives and our economies. They are the unseen enabler behind innovation and successful global deployment of technology and services.

IEEE cultivates collaboration and convenes people from diverse backgrounds and industry sectors in a unique borderless, transparent standardization paradigm to develop market-relevant, open standards, for example, IEEE 802.11, the standard used globally for wireless communication.

IEEE working groups are developing green ICT standards, such as standards that aim to limit the power consumption of some wireless ICT devices, address Green storage technology, and Distributed Energy Efficient Big Data Processing.[3]

Other IEEE working groups are developing standards that explicitly focus on societal and ethical issues associated with a certain field of technology. The IEEE P7000™ standards series covers AIS-related topics such as ethically-driven nudging, child and student data governance, human well-being, and algorithmic bias considerations.

2. Another measure that can be taken to ensure that ICTs are developed and implemented appropriately is to recognize that consideration for sustainability needs to be at the start in the design phase--all aspects of sustainability need to be part of the design parameters of new technologies and services.

Examples of such considerations would be

● *'Privacy by Design'[4] or equivalent,*

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[3] IEEE, "Standards," IEEE. https://sustainableict.ieee.org/standards. (accessed September 4, 2020).
[4] Ann Cavoukian, "Privacy by Design: The 7 Foundational Principles," Information and Privacy Commissioner of Ontario. https://www.ipc.on.ca/wp-content/uploads/Resources/7foundationalprinciples.pdf. (accessed September 4, 2020).

- *Design for minimal energy consumption and/or minimal GHG emissions, design for longevity,*

- *[Circular Design, Design for a Circular Economy](link)[5] or minimal waste and de-manufacturability,*

- *Maintainability and upgradability.*

While ICTs are critical to reaching the SDGs, and standards and design considerations can increase their contribution to sustainability, we must implement carefully so that we do not reverse progress in unintended and unanticipated ways.

Considering energy consumption: Specific applications such as [Blockchain mining](link)[6] and the [training of large AI models](link)[7] have been reported to be very energy intensive.

Even recent forecasts on ICT's global life cycle GHG emissions footprint show significant divergence,[89] although there is general agreement that the ICT carbon footprint has been mostly stable for the past few years and is not growing proportional to data growth as previously predicted, but rather with the number of subscriptions. This is attributed largely to changes in device footprint and user preferences changing from 'large' devices to the more energy efficient laptops, tablets, smartphones etc.

New analyses and forecasts must be carried out frequently to permit effective development and deployment decisions.

3. To help decrease energy use and increase sustainability, measures need to be taken to manage the data. One aspect to focus on is the stored data:

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[5] Brett Fifield and Katerina Medkova, "Circular Design - Design for Circular Economy," ResearchGate. https://www.researchgate.net/publication/313771263_Circular_Design_-_Design_for_Circular_Economy. (accessed September 4, 2020).

[6] Alex de Vries, "Bitcoin's energy consumption is underestimated: A market dynamics approach," ScienceDirect. https://www.sciencedirect.com/science/article/abs/pii/S2214629620302966?via%3Dihub. (accessed September 4, 2020).

[7] Emma Strubell, Ananya Ganesh, and Andrew McCallum, "Energy and Policy Considerations for Deep Learning in NLP," Cornell University. https://arxiv.org/abs/1906.02243. (accessed September 4, 2020).

[8] Lotfi Belkhir and Ahmed Elmeligi, "Assessing ICT global emissions footprint: Trends to 2040 & recommendations," *Journal of Cleaner Production* 177 (2018): 448-463, https://www.sciencedirect.com/science/article/abs/pii/S095965261733233X?via%3Dihub.

[9] Jens Malmodin and Dag Lundén, "The energy and carbon footprint of the global ICT and E&M sectors 2010-2015," *EPiC Series in Computing* 52 (2018): 198. 5th International Conference on Information and Communication Technology for Sustainability. https://www.mdpi.com/2071-1050/10/9/3027/htm.

*   *Data integrity,*

*   *Reliable, redundant storage,*

*   *Data destruction at a pre-set date, and*

*   *Elimination of multiple copies, 'junk' and 'not-needed' data.*

As you know, ICT is truly powerful infrastructure. It has the power to misinform on a global scale and deplete precious resources. But if managed carefully, it has the power to "green" many industries, to enable more equitable and ubiquitous access to services around the globe, and indeed become the infrastructure of sustainability.

IEEE is committed to working alongside all stakeholders in the shared mission to advance the WSIS vision and to achieve the SDGs--and to ensure that we are truly advancing technology for the benefit of humanity. We look forward to continued collaboration with all of you.

Thank you."

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