

G7

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TOWARDS SUSTAINABLE, SMART COMMUNITIES

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While we are familiar with the notion of Smart Cities and Smart Communities and the myriad of ways in which today's communities are applying intelligent technology, including collecting, sharing and using data, it is a timely moment to reflect on a fundamental truth. There is no such thing as a virtual Smart City – no electricity means no Smart City.

ELECTRICITY, A BUILDING BLOCK OF SMART CITIES AND SMART COMMUNITIES

To gain the benefits of today's and tomorrow's intelligent, interconnected systems cities must have a reliable, quality power supply and all the hardware and software that accompanies it.

Smart electrification and sustainable energy generation are seeing a rise in the amount of electric power from hydro, marine, solar and wind sources – which helps to mitigate the effects of climate change. Through the use of IEC Standards, cities can also make significant Energy Efficiency gains, encourage the development of Smart Buildings and Smart Homes, adapt street lighting to peak demands, and improve the management of services such as water, waste management and public transport.

NEW KID ON THE BLOCK

Low voltage direct current (LVDC) is an innovative, disruptive technology with almost unlimited potential for Smart Cities and Smart Communities.

It will fundamentally change and accelerate energy access and highlight opportunities for economic growth and improved standards of living.

LVDC technology enables direct use of power generated by renewable, sustainable energy sources in the most efficient way. Today's homes and larger buildings are mostly supplied with DC loads, and, increasingly, appliances such as washing machines, refrigerators, fans as well as heating and cooling systems have adopted DC motors with variable speed devices.

This brings two major benefits. First, these appliances and devices with DC motors are far more energy-efficient to operate, thereby helping to reduce the impact of climate change. Second, DC motors are able to work directly with electricity generated from renewable sources – from the sun via photovoltaic (PV), wind, marine and hydro. When combined with energy storage technology, LVDC has the potential to bring millions of people out of the dark and into Smart Communities.

There is a global realization that we have been generating energy and consuming in DC for a long time and now we need to put a system around it. That is where the IEC has a leading role to play.

INNOVATIVE ENERGY SOLUTIONS

Today 1.3 billion people have no access to electricity and nearly another 2 billion people have very limited, intermittent access. Through the use of LVDC technology, these people can have access to renewable energy and enhanced economic development opportunities.



Pictured: Frans Vreeswijk

Some practical examples of LVDC at work are mobile charging stations for electric vehicles and electric locomotive metro systems; data centres and other power-hungry end users such as hospitals, office and commercial buildings; and LED lamps which operate on DC, without DC/AC conversion. Urban households can also benefit from a mixed grid model, which uses hybrid AC and DC to integrate value-added services such as Internet, telephony and television, all routed through electric lines.

Using electricity as direct current makes a great deal of sense for Smart Cities and Smart Communities. This can reduce the amount of primary energy lost through unnecessary power conversion from DC to AC to DC, as well as losses through transportation of electricity over long distances. It is time to redefine how energy is generated and consumed by future generations. The IEC contributes the technical foundation to help make this happen.

The work of the IEC in this area brings additional benefits to Smart Cities and Smart Communities. For example, by helping to enable LVDC systems,

microgrids, off-grid energy and energy storage systems, IEC's work can assist cities and communities to maintain power longer and recover power faster after power outages and disasters.

INTERNATIONAL STANDARDS MAKE CITIES AND COMMUNITIES SMARTER

There are many promises that modern cities need to fulfil if they are to remain competitive and provide a decent quality of life to their citizens. Sufficient fresh water, universal access to cleaner energy, the ability to travel from one point to another, and safety and security of citizens are some of these necessities. One common denominator, which gives cities the necessary support so they can develop tailor-made solutions for their specific urban needs, is International Standards.

Today, collaboration and cooperation beyond traditional boundaries is a key factor for the success of Smart Cities and Smart Communities. International Standards, by their very nature, contain expert knowledge and best practice, and are essential enablers to ensure high quality and performance of products and services. They drive compatibility between technologies and also, in a systems approach, they enable the integration of structures or solutions from different suppliers.

BRINGING KEY PLAYERS TOGETHER

No single entity can ever deliver everything that is needed to bring cities and communities to greater smartness – that is why many organizations need to cooperate and bring their expertise together, including in standardization.

The IEC has brought together key international and regional Standards Development Organizations, with the World Smart City Forum in Singapore in 2016. The next step is a global meeting in Barcelona in November 2017. ■

ABOUT THE AUTHOR

Frans Vreeswijk became IEC General Secretary and CEO on 1 October 2012. Prior to joining the IEC, he worked for 30 years for Philips in the Netherlands, Austria and the USA, notably in research, healthcare and consumer electronics. Previously he was President of the Dutch National Committee of the IEC (NEC) and has served on the IEC CB and SMB as well as representing the Netherlands in CENELEC.



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