



**GSC** | 22  
MONTREUX, SWITZERLAND



# Smart Sustainable Buildings

## Connectivity and Sustainability

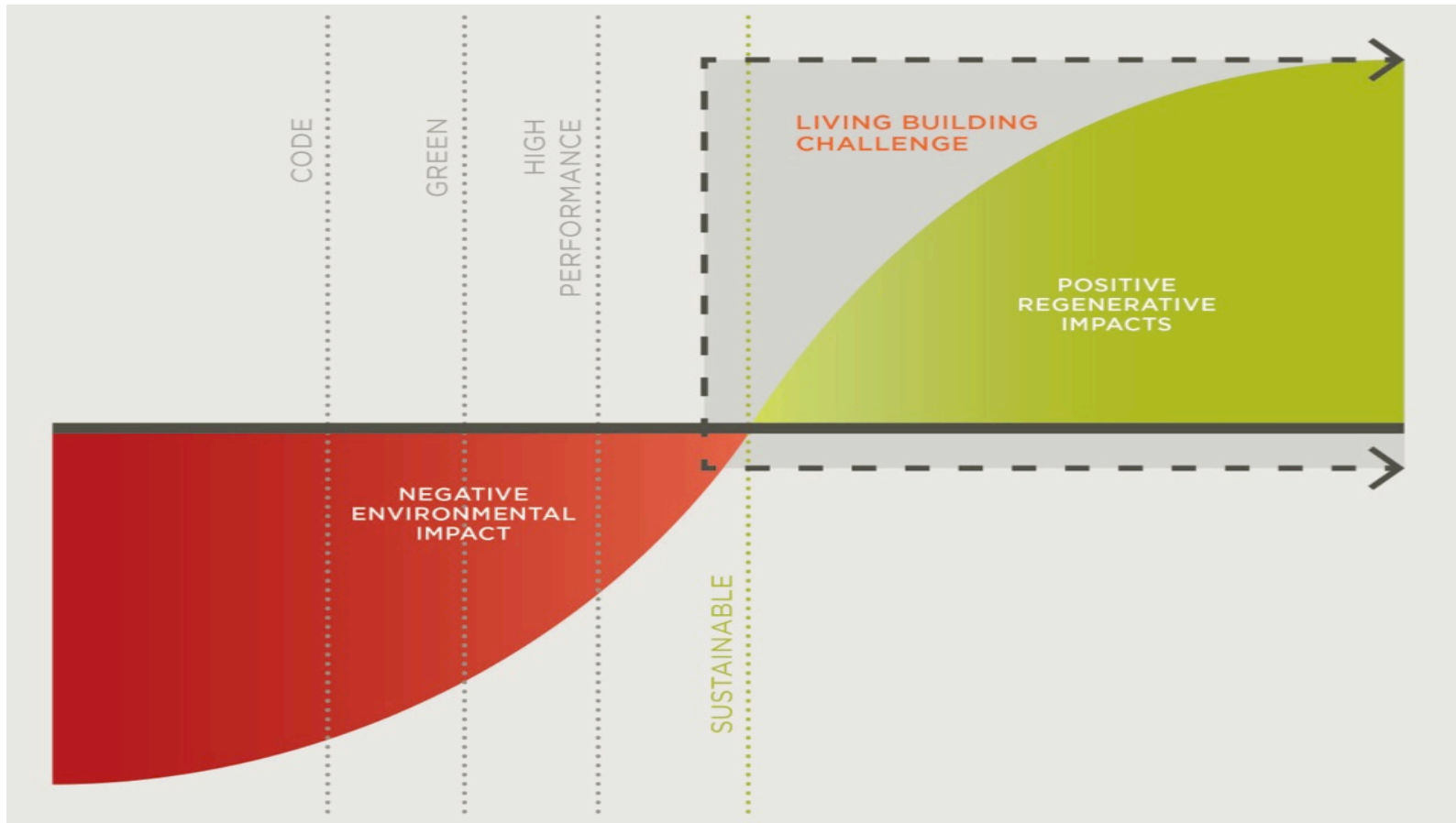
GSC-22 Montreux, CH

26-27 March 2019



# TIA Standards Perspective Sustainable Smart Cities

# Sustainability is just the beginning



Graphic courtesy of Superior Essex

# Why do we care about Smart Buildings? (1)

Global mobile population is 3.98B unique users

Monthly mobile data usage with surge to 98.34 GB/SIM  
by 2025

(from today's ~13GB/SIM)

82% of internet traffic will be IP video by 2021

75% of worldwide video traffic is over mobile

80% of all mobile usage takes place inside a building

# Why do we care about Smart Buildings? (2)

70% of World Population Living in Urban Environment by 2050

with a population growth from 7.6B to nearly 10B

Climate Change and Sustainability (green energy definition)

Resilience: U.S. 14K properties ~\$1T threatened by SLR by 2100

Population shifts: U.S. by 2100 –

3M moving from S. Florida and New Orleans; \$1.5+ moving to  
Austin, Orlando. Atlanta

Happy, Healthy Live, Work, Play Environments



# Why do we care about Smart Buildings? (3)

- Edge (Deloitte, Amsterdam) uses 70% less energy than the average office building
- Ethernet-powered LED lighting system is 80% more efficient than conventional illumination
- HVAC, lighting, and some types of electrical loads, can expect savings 10%-25% savings with a proactive energy-management programs
- Effect a desk to colleague ratio of 1:14 (Hot Desking)
- Personalized control of room temperature can raise productivity by 3%
- Optimized air quality can increase productivity by 11%

# What are the Smart sources of sustainability?

- Device efficiency: \$35.50 / FTE vs. \$13.50 / FTE = >60% wasted
- Collaborative consumption, a la WeWork
- Obviation of transportation expense and carbon emissions with lower latency, uniformity of experience and standards around remote communication
  - Will lower latency and higher bandwidth of 5G, coupled with new telepresence + AR /VR / MR lead to a major shift in cultural practices around video conferencing / virtual events / remote collaboration?
  - What are the opportunities and imperatives for SDOs to collaborate and accelerate cultural shifts?

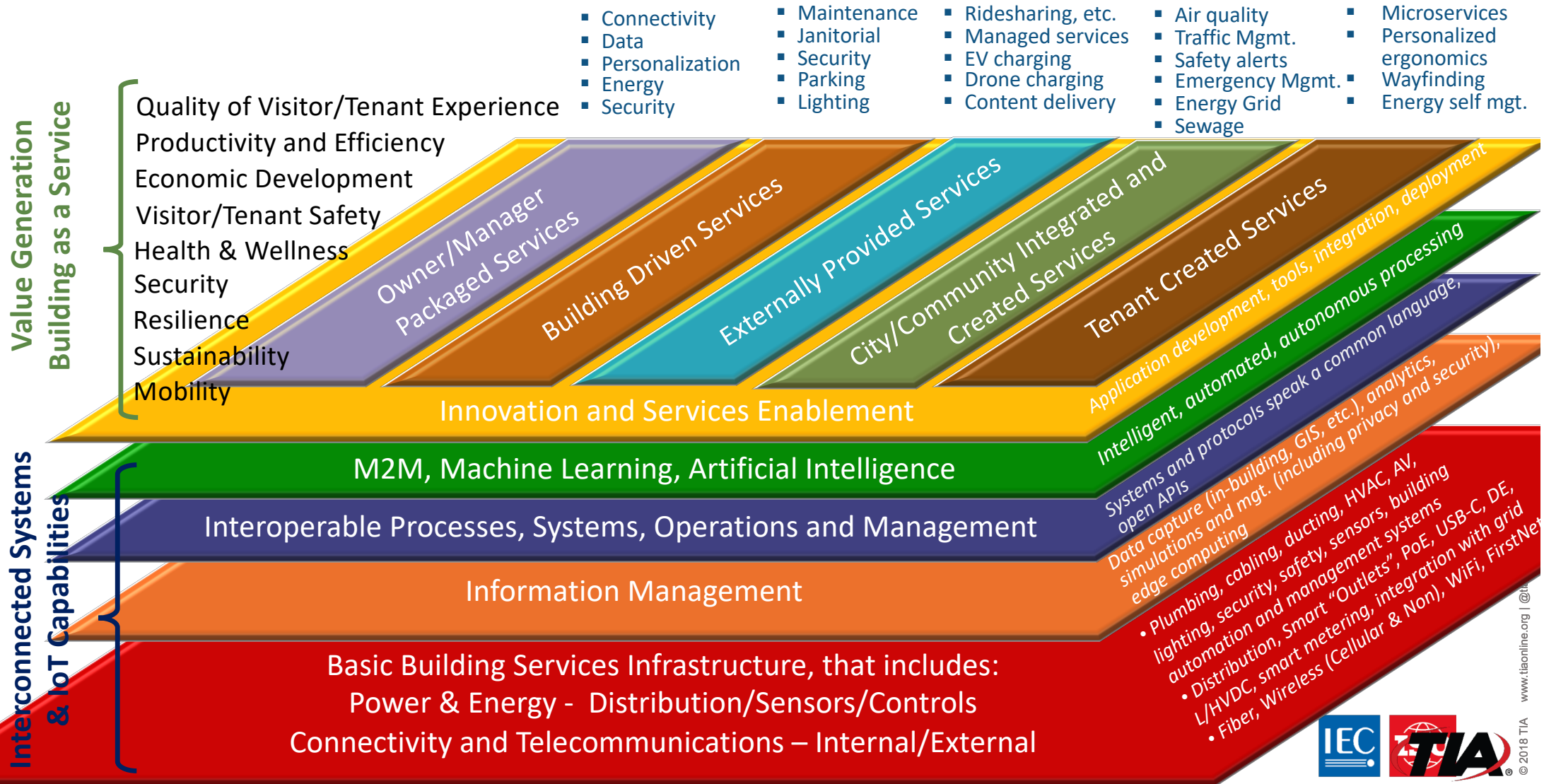


# Sustainable Smart Building Developments with TIA

# Abundance of wireless protocols

Cellular WAN	WLAN/WPAN	WAN	WAN Fixed	LPWAN, IoT
<p><b>GSM</b></p> <p><b>2G</b> GPRS EDGE</p> <p><b>3G</b> UMTS HSPA HSPA+ HSUPA DC-HSPA+</p> <p><b>4G</b> LTE FDD-LTE TDD-LTE</p> <p>small cells</p> <p>3G 4G 5G</p> <p>UNLICENSED</p> <p>lte 4DVA™ lte</p>	<p><b>WiFi</b></p> <p>COOPERATE WiFi lte</p> <p><b>Bluetooth®</b></p> <p>Bluetooth MESH</p> <p><b>LoWPAN</b> IPv6-based Low-power Wireless Personal Area Networks</p>	<p><b>MIMO</b></p> <p><b>In-Building DAS</b></p> <p><b>Signal Booster</b></p>	<p>ALLIANCE <b>cbrs</b></p> <p><b>OnGo</b></p> <p><b>MULTEFIRE™</b></p>	<p><b>LoRa™</b></p> <p><b>WEIGHTLESS™</b></p> <p><b>NB-IoT™</b></p> <p><b>INGENU</b> simply genius</p> <p><b>lteU</b> <b>LTE-M</b> <b>sigfox</b></p>
<b>Broadband Wireless</b>				
<p><b>LIFI</b></p> <p><b>WiMAX</b></p>				
		<p><b>PAN</b></p> <p><b>ZigBee®</b></p>	<p><b>BAN</b></p> <p><b>N™</b></p>	<p><b>Other Wireless</b></p> <p><b>EnOcean</b> Self-powered IoT</p> <p><b>wiSUN</b></p> <p><b>ZWAVE®</b></p>

# Smart Building Integrated Ecosystem



# TIA's Smart Buildings Community



# What we've learned

- Developers, architects, and ICT agree defining/benchmarking the smart building will help the ecosystem marketplace
- Fragmented market interest in smart buildings – developers still typically resistant, risk averse, cost averse, but seeing tenant demand – they expect connectivity
- Single owner predominant smart building developer – visionary owner
- Occasional multi-tenant – market differentiation; possible higher value /area
- Some smart building developers not seeing net benefit
- Most of the global RE firms and some local ones completely on board – still trying to figure it out. We are at the crest of the wave.
- Most A&E and developers have little to no knowledge of communications infrastructure, FirstNet, NG911 - issues, implications, how to solve
- Profound need for education, aggregation of information, COLLABORATION!



# Thank you

## **Telecommunications Industry Association**

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