# Mobile Technology Evolution and 6G development

# RSPG Workshop

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## Brussels


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EUTC

www.EUTC.org

# AGENDA

- *What is EUTC?*
- *Who do we work with?*
- *What is the global context of our operations?*
- *What are we trying to do?*
- *Where does Mobile Technology Evolution and 6G development fit in?*
  - *Impact of 2G/3G switch-off*
  - *Evolution to 4G/5G technologies, possible obstacles or delays, the benefits of 4G and 5G technologies, including standardization of existing 4G bands for 5G*
  - *What still needs to be addressed with 5G deployment and use cases for 6G*
  - *Expectations for 6G related to regulation, spectrum demand, licensing, sustainability, energy efficiency and timing for making spectrum available.*
- *Conclusions*

# What is EUTC?

EUTC

- Representing technical and regulatory interests of Electric, Gas and Water Utilities – critical national infrastructure.
- Membership driven – with major utility from large and small utility operators including in Spain, France, Netherlands, Germany, Portugal, Ireland and UK.
- Engaging with stakeholders including vendor and operator communities to ensure alignment of new products, standards & spectrum allocation with utility requirements.
- Responding to consultations from the European Commission, Energy and Telecom Regulators and National Administrations about digitalisation of the energy sector.
- Interacting with European Parliament and Policy Groups.

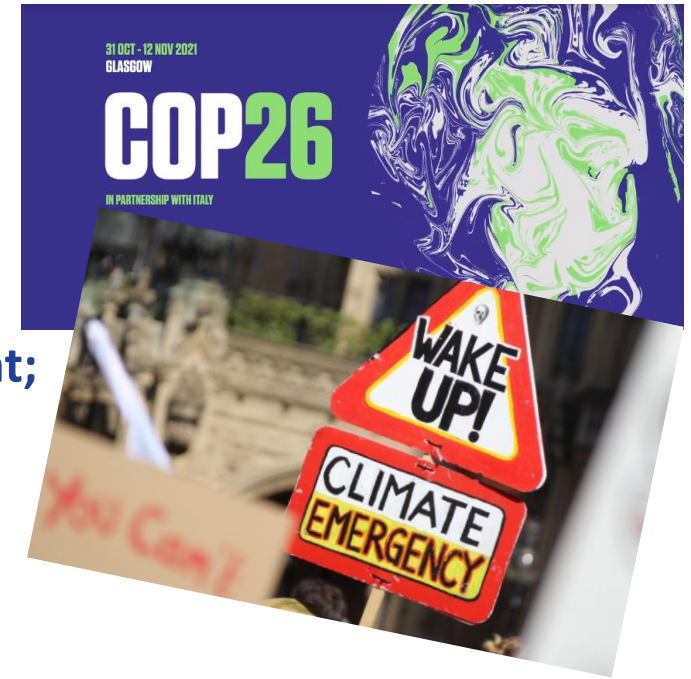
# *Relationships with other representative bodies*

- **Other UTC regions:**
  - **Utilities Technology Council (UTC) representing USA and Canada**
  - **UTC America Latina - who lead representation in ITU**
  - **Africa UTC - common standards with Europe in many areas**
- **The Critical Communications Association (TCCA); in particular:**
  - **the Broadband Group (CCBG) and SCADA Group**
- **450 Alliance – particularly the Standards and Regulatory Group**
- **ETSI – System Reference Document for Utility Operations**
- **ITU – WP1A and WP5A on Utility Telecommunications and Smart Grids**
- **3GPP (3rd Generation Partnership Project)**
- **CEPT, ECC, ECO, RSPG, RSG, BEREC, ITRE, EE-ISAC, ENSO, EDSO, GEODE …**

# *Last two years has seen an unprecedented amount of activity*

# *<u>Carbon Neutral Aspirations</u> the main driver*

## *Role of Radio Spectrum Policy to help combat Climate Change*




**RSPG Questions being addressed:**

- **Identify climate change-related aspects within spectrum management;**
- **How can spectrum management help to combat climate change?**
- **What concrete actions should be recommended at EU-Level?**

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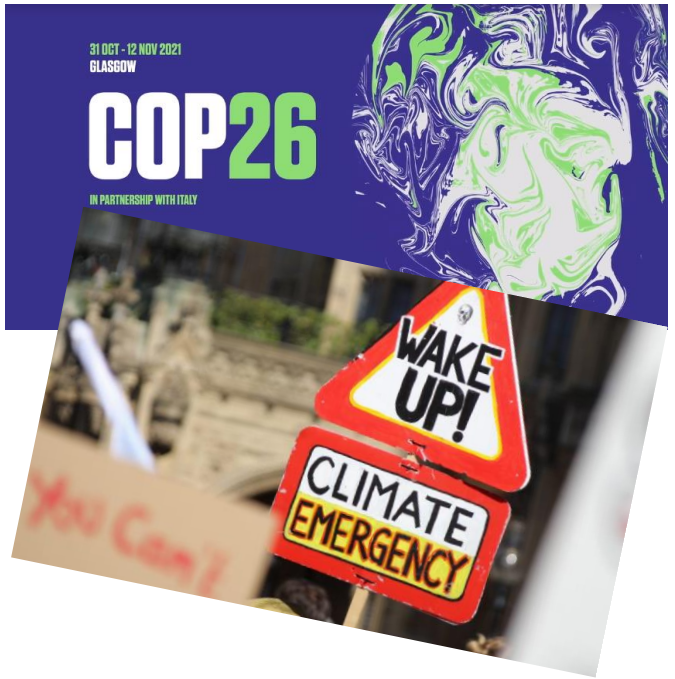


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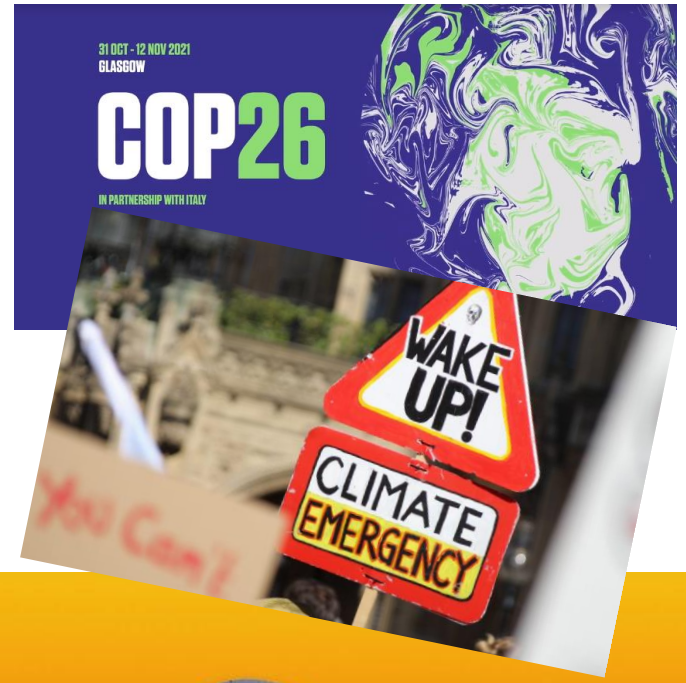


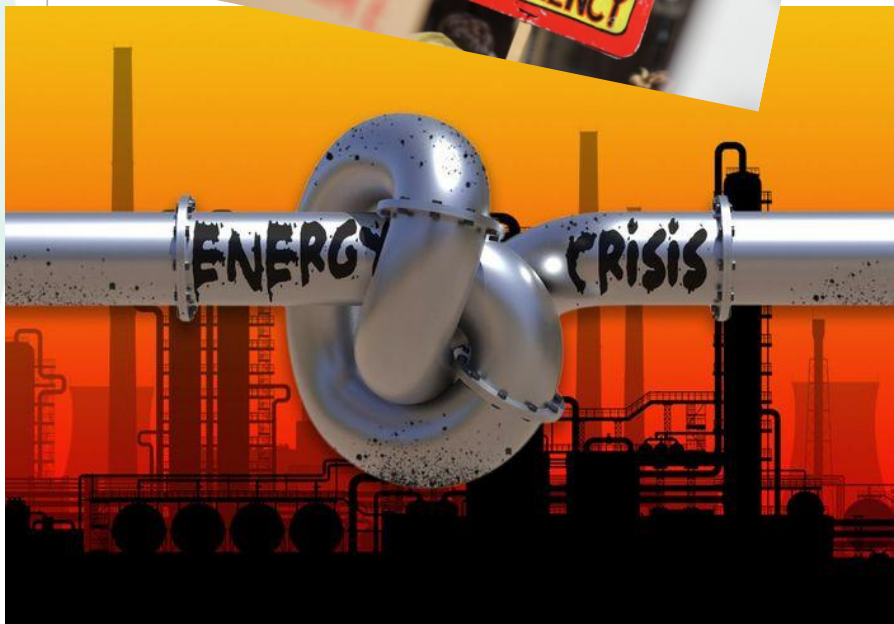

# *The Energy Trilemma*


***Trying to maintain the balance***

# *Where do Mobile Technology Evolution and 6G fit in?*

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12 September 2022

**UN Secretary-General's remarks during field visit in Pakistan**

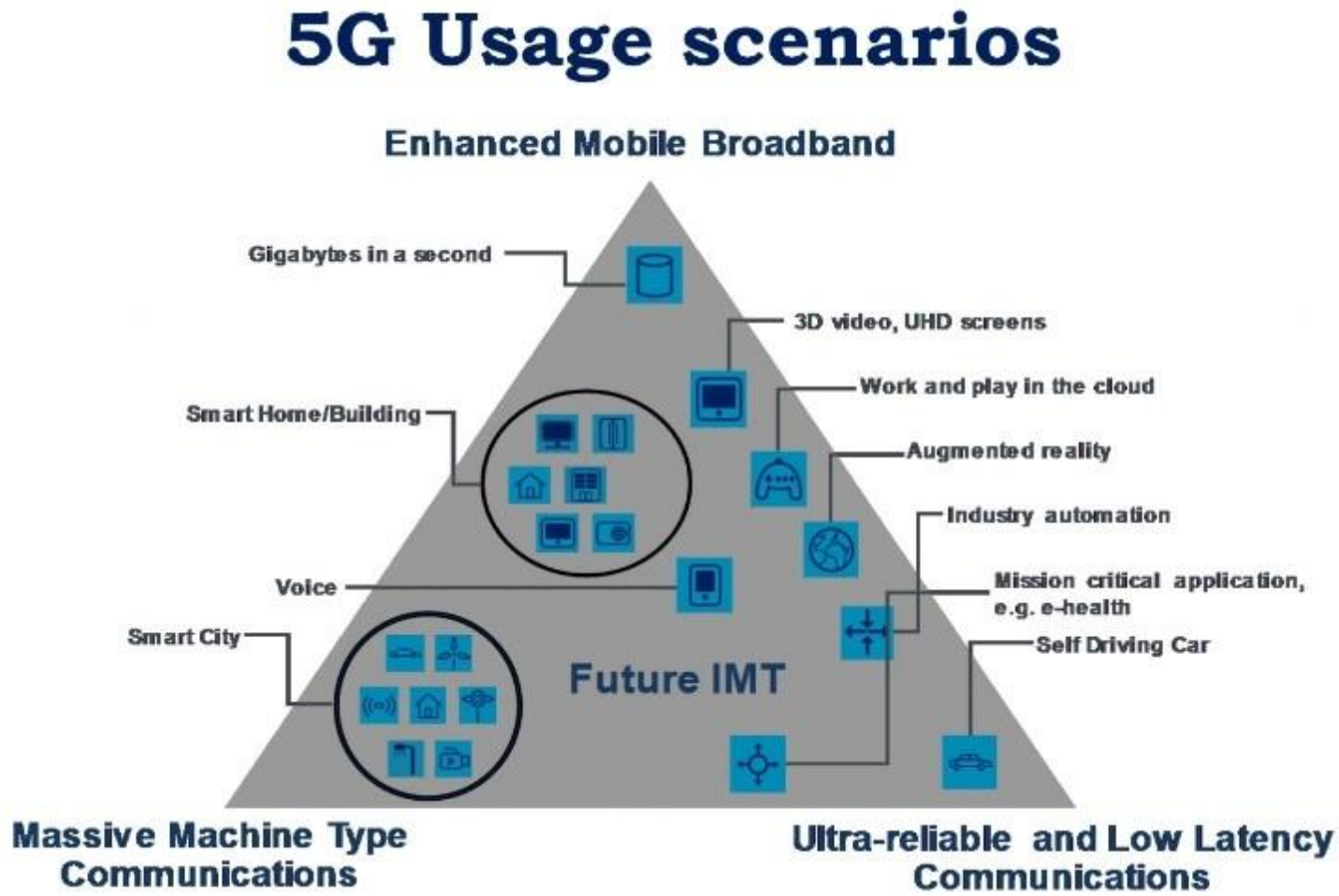
**António Guterres**

“It is difficult not to feel deeply moved when we hear such a detailed description of tragedy, of the loss of life, of destruction, the loss of property, the loss of livelihoods.

According to the scientific community, we need to reduce emissions by 45% by 2030. I'm not talking about the end of the century, I’m not talking about 2050, I am talking about now. Now is the time to reduce emissions.

But the fact is that we are already living in a world where climate change is acting in such a devastating way. So, there must be massive support to what usually is called adaptation, which means to build resilient infrastructure and to support resilient communities and to create conditions for those that are in the hotspots of climate change.”

# Where do Mobile Technology Evolution and 6G fit in?




*For utilities, we fit in at the bottom of the triangle*

*PRIORITIES: Reliability Resilience Security Longevity Latency Cost*

# Impact of 2G/3G switch-off

## Findings of study in 2020 (not including smart grid implications)

**Study on the current and prospective use of the 900 MHz band by GSM as a technology of reference, considering present and future Union policies SMART 2019/0006: 12 March 2020**

| Use case | Definition | Bottleneck/relevance | Market size indication |
|---|---|---|---|
| | | | |
| Smart meters | Smart metering technology to improve the efficiency of the energy sector both in terms of retail market competition and demand-side consumption is promoted by the Third Energy Package of 2009 i.e. the Electricity (2009/72/EC15) and Gas (2009/73/EC) directives.* Communication modules in intelligent metering devices deployed by utility companies are used to transmit information used to bill the metered resource. | Member States were expected to perform a benchmarking exercise: a wide scale target roll-out of smart meters (i.e. for at least 80% of final consumers) by 2020 was expected upon positive outcomes of cost benefit analyses (CBA). Lifetime of such devices is 15 years (preceded by time consuming procurement process). | 112 million devices.*** |

*Use of smart meters can also be linked to climate change objectives set out by European and International institutions and agreements (e.g. EC, UN, Kyoto and Paris climate agreements). Implementation of smart metering systems and increased visibility and control of utilities' distribution networks is meant to facilitate the more efficient use of energy, increased use of electric vehicles and renewable energy sources.

***At the end of 2018 based on report by ACER. A significant share of these are expected to rely on GSM e.g. one DSO country A reports an installed base of 3 mln. GPRS only devices (2015) requiring GSM to continue up to 2030; Another DSO in country B reports an installed base of 11 million smart meters indirectly relying on GPRS (PLC with GPRS), as well as 20,000 consumer devices with 2/3G connectivity and 2/3G routers for remote services (aprox. 60,000 installed in 2018).

## *Evolution to 4G/5G technologies, possible obstacles or delays, the benefits of 4G and 5G technologies, including standardization of existing 4G bands for 5G*

- *Standardisation of 4G/5G in 400 MHz bands, including 380 - 400 MHz with 1.4 MHz and 3 MHz channelisation.*
- *Higher power edge devices (CPEs) for improved coverage and ground penetration.*
- *Ability for users to see into MNO networks to predict impact of fault scenarios.*
- *Lack of resilience in public networks.*
- *Support for standardisation activities.*
- *Supply chain uncertainties.*

***How low can 5G go? 450 MHz, 410 MHz, 380 MHz …..?***

# *What still needs to be addressed with 5G deployment and use cases for 6G*

- *Resilience*
- *Coverage*
- *Low frequency spectrum for wide-area private networks.*
- *Pushing the spectrum boundary to 400 MHz and below.*
- *Regulatory certainty for interconnection of public and private networks.*
- *End-to-end latency of less than 10ms with assured symmetry.*
- *Improved security.*
- *Supply chain certainty, especially at chip level.*

***Would Regulators consider a universal coverage obligation for 5G with 99.999% guaranteed availability (as was the case for PSTN)?***

## *Expectations for 6G related to regulation, spectrum demand, licensing, sustainability, energy efficiency and timing for making spectrum available.*

- *Greater role for private networks.*
- *Vital for regulators to facilitate interworking on fair and reasonable terms.*
- *Drive for technology push to 400 MHz as well as towards Terahertz.*
- *More energy efficient in operation and on standby.*
- *Increased need for assurance of safety from electromagnetic emissions at higher frequencies.*
- *Enhanced security for both operations and supply chain.*
- *Widespread deployment of 6G not before 2030.*

# Conclusion

Utilities need a combination of radio technologies and frequency bands to complement existing radio and wire-borne technologies of:

- Fibre (utility owned & commercial).
- Copper (PSTN & pilot cables buried with electricity cables and gas pipes).
- PLC and BPL which use the power cables themselves for communications.

***Spectrum Access is the critical factor***

**The amount of spectrum required by utilities will have no impact on public broadband networks.**

## *EUTC Spectrum Proposal*

***Within Europe, multiple small allocations within harmonised bands:***

LESS INTENSE APPLICATIONS

- **VHF spectrum (50-200 MHz)** for resilient voice comms & distribution automation for rural and remote areas. [2 x 1 MHz]

ANCHOR BAND

- **UHF spectrum (400 MHz bands)** for SCADA, automation, smart grids and smart meters. [2 x 3 MHz]

MORE DENSE APPLICATIONS

- **Lightly regulated or licence-exempt shared spectrum** for smart meters and mesh networks. (870-876 MHz)
- **Mid-Band Region (1-5 GHz)** for more data intensive smart grid, security and point-to-multipoint applications. [10 MHz]

FOUNDATION BANDS

- **Public microwave bands (1500 MHz – 58 GHz)** for access to utilities' core fibre networks/strategic resilient back-haul.
- **Public satellite bands** to complement terrestrial services for particular applications.

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*And what happens if we get it wrong?*