EUROPEAN UTILITIES
TELECOM COUNCIL

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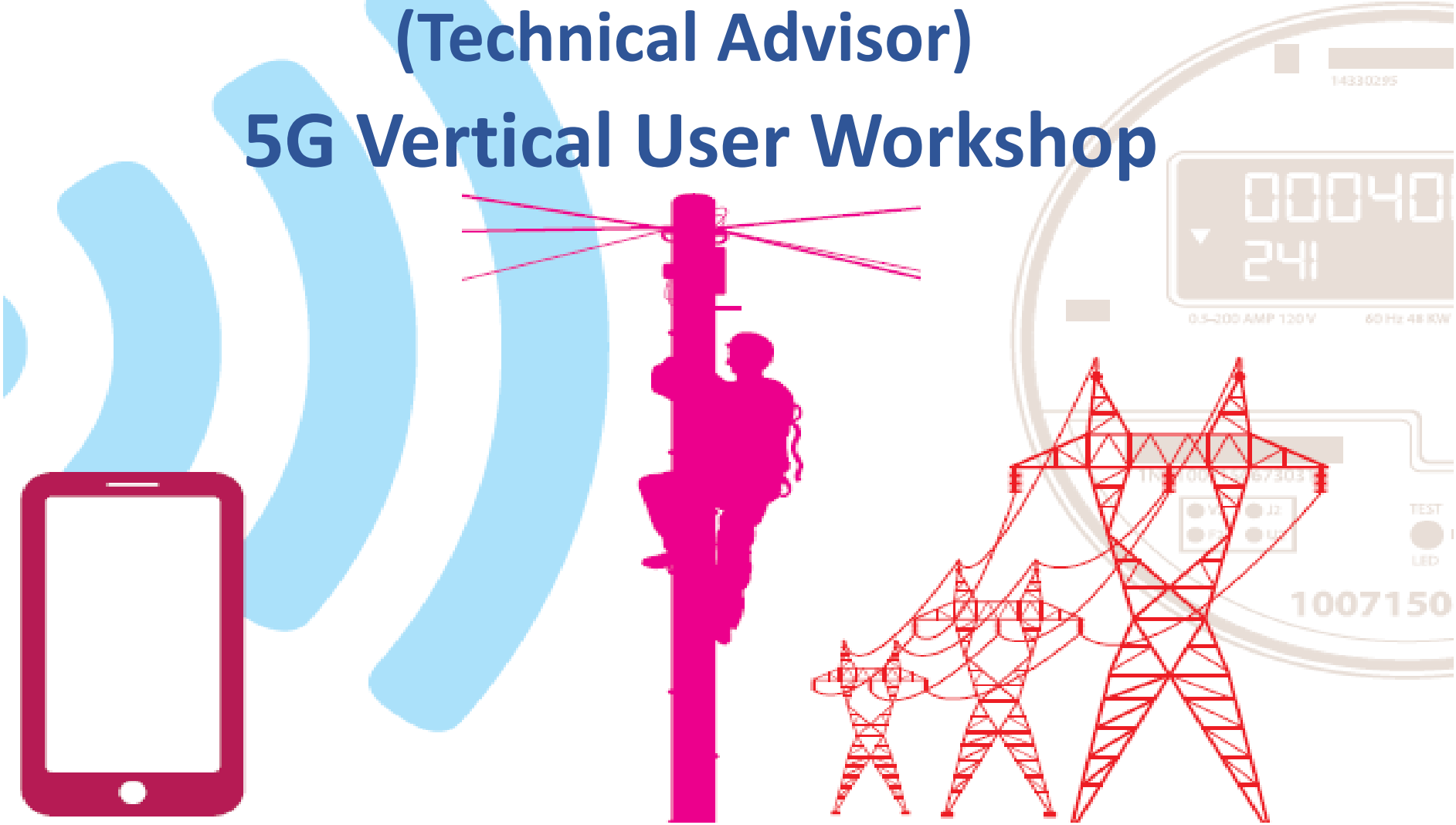
5G Vertical User Workshop



European Utilities Telecom Council
- Background

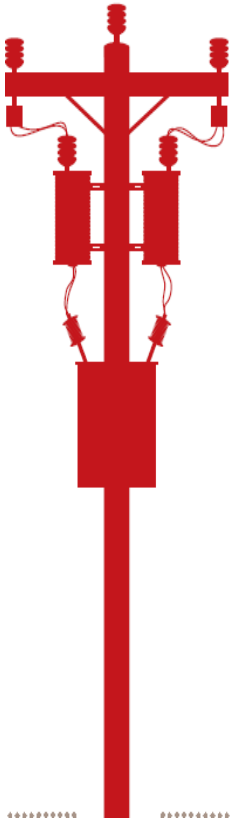
Representing the specific technical and regulatory interests of Electric, Gas and Water Utilities – all of which are considered critical national infrastructure

Membership driven – with major utility participation from large and small utility operators including those in Spain, France, Holland, Germany, Portugal, Ireland and the UK

Part of a larger international group (UTC) established in 1948 with presence in USA, South America and Africa– dealing with mission critical communications throughout these regions

Engaging globally with stakeholders including the vendor and operator community to ensure alignment of new products, standards & spectrum allocation with the needs of the utility sector

Utility telecoms is often perceived as a 'hidden world' due in part to the self sufficiency of utility businesses to provide their own proprietary solutions.



Utility Specific Telecommunications Requirements

Very high availability (ranging from 99.9 % to 99.9999% depending upon application)

Low Latency – often <6ms round trip delay in safety critical applications (tele-protection)

High degree of power autonomy required to enable gradual re-energising of the electric grid in the event of a 'black start' scenario – typically between 12 and 120 hours as dictated by the function of the edge device

Cyber Security – an increasing attack surface is created by the additional connectivity being introduced to utility networks. This increases exposure to unwanted attempts to disable critical infrastructure. Removal of the historic 'air gap' and 'security by obscurity' brings new challenges.

Ubiquitous coverage – significant part of utility infrastructure is located in rural areas with no connectivity – especially true of the increasing amount of small & medium scale solar and wind energy installation

Throughput – generally low when compared with consumer based applications. However, additional functionality and encryption is increasing this by one or two orders of magnitude

Longevity of solutions and support for legacy interfaces (25 - 30 year lifespan are common)

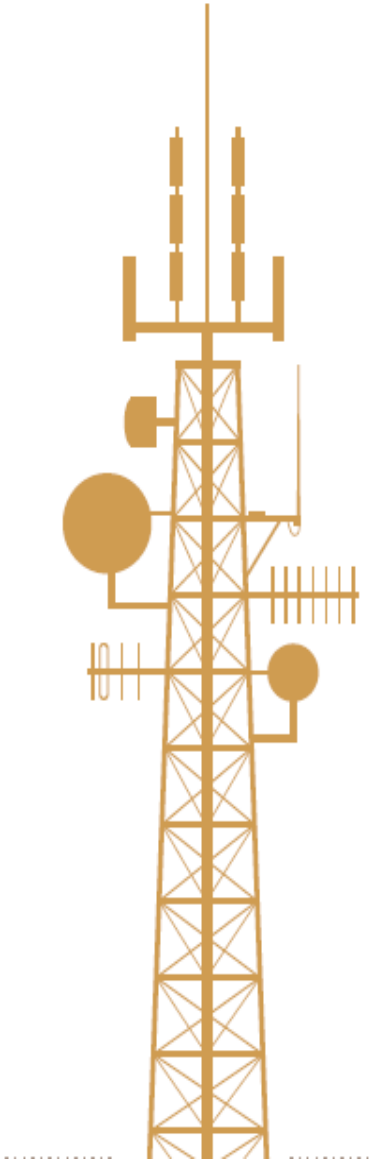
Traffic prioritisation – especially for critical monitoring and control (SCADA)

ETUC

Provision of Services – Current Situation

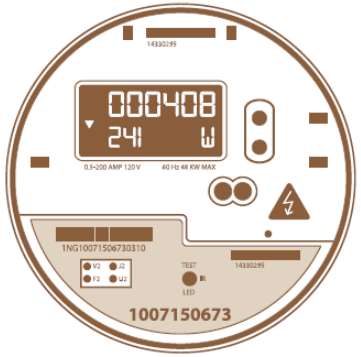
A significant amount of self-provide, proprietary solutions including -

- Narrow band UHF & VHF radio systems (12.5 kHz RF channels supporting 1,200 bits / second)
- Self provide fibre cables wrapped around overhead conductors
- Self provide copper pairs installed adjacent to power cables
- Millimetric microwave links (4 – 38 GHz)
- Power line carrier systems in the LF and ELF range (~10-500 kHz)
- Some use of 3rd party cellular (2G & 3G) – with mixed results
- Some use of satellite technology (VSAT and BGAN) – with mixed results



Provision of Services – Future Challenges & Opportunity

An evolution in Utility Telecommunications is taking place right now - being driven by global changes in energy production, storage and consumption -



- Distributed renewable energy generation and its place in reducing CO2 emissions

- Huge increase in electric vehicle adoption

- Peer to peer trading of electricity through smart phone apps

- The need for more efficiency coupled with control & visibility of devices at the edge of the network

All of the above creates a huge increase in the number of connected devices on the grid and also the amount of data throughput required. Estimates indicate increases in both of these figures of between 10 x and 100 x

This increase in demand represents one of the largest opportunities for 5G technology (as a mixture of both private and public network solutions) – but only if the technology and networks are specified and deployed appropriately.

Many parallels with other 5G use cases included medicine, PPDR and Autonomous vehicles

5G Network Deployment and Utilities – Potential for a Symbiotic Relationship ?

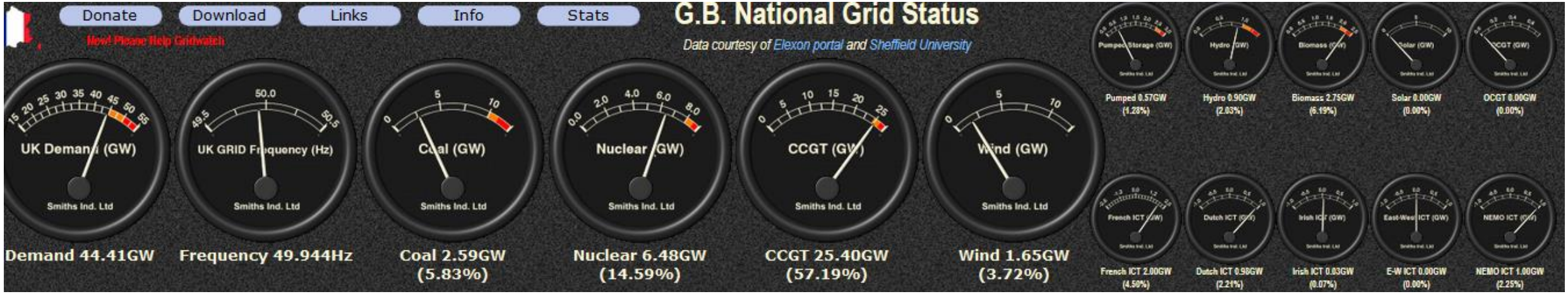
With the exception of densely packed urban areas, questions remain about the precise business model for mass 5G deployment – especially with regard to the very large increase in number of cell sites at ever higher frequencies used in the RAN. There is much discussion around neutral host models, C-RAN etc but it remains to be seen how successful these will be at scale and under different regulatory regimes

Key uncertainties appear to be related to –

- Access to cost effective fibre backhaul
- Access to a cost effective, reliable power source
- Access to cost effective support structures
- Willingness of consumers to pay significantly more for ‘all you can eat’ data packages

However, there is large potential for utilities and telcos to have a mutually beneficial relationship - with utilities requiring far more granular monitoring and control of their networks at the same time as having an abundance of the things which operators need for 5G deployment (power, backhaul and vertical estate).

Further engagement between the utility sector and 5G expert groups could deliver very fruitful outcomes



11th February 2019 7.30 pm – UK

Thank you for Listening