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Subject: Consultation on the Digital Connectivity Strategy - CONNECT SFI Centre
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Consultation on the Digital Connectivity Strategy
Department of the Environment, Climate and Communications
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[REDACTED],
Please find attached a short series of responses and observations to Digital Connectivity Strategy. It is written from the point of view of CONNECT as an expert research centre in the field of Future Communications Networks, and our knowledge of current and emerging technological developments and how they are likely to impact and disrupt communications and connectivity.

Our only purpose is to add to a Governmental awareness of "what's next" in our expert field, and what it may enable in future.

I hope that it will be a useful viewpoint among the main others that you will likely receive.

Kind regards

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[REDACTED]
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[REDACTED]

Is lárionad taighde de chuid SFI é CONNECT atá chun tosaigh ar leibhéal domhanda do líonraí agus do chumarsáid na todhchaí agus déantar comhchistiú air faoi Chiste Forbraíochta Réigiúnaí na hEorpa.

Nóta rúndachta: D'fhéadfadh ábhar rúnda agus/nó pribhléideach a bheith san fhaisnéis atá sa teachtaireacht seo agus in aon cheangaltáin. Tá an fhaisnéis beartaithe don duine/do na daoine nó don eintiteas a bhfuil sí seolta chuige/chucu amháin. Tá cosc ar dhaoine nó ar eintitis, seachas an duine/na daoine a bhfuil an fhaisnéis ceaptha dó/dóibh, athbhreithniú, atarchur nó scaipeadh a dhéanamh uirthi nó aon ghníomh a dhéanamh ag brath ar an bhfaisnéis sin. Más trí earráid a fuair tú an teachtaireacht seo, déan teagmháil leis an seoltóir le do thoil agus scríos an t-ábhar ó aon ríomhaire. Ná seol aon sonraí íogaire i gceangaltán le ríomhphost mar go scríosfar ríomhphoist dá leithéid. Féadfar postas leictreonach chuig, ó nó laistigh den Choláiste a iarraidh faoin Acht um Shaoráil Faisnéise.

Question 1 Is the ambition level set out in the State's Digital Connectivity Strategy appropriate?

The state's digital connectivity strategy is ambitious and well targeted to bring value and positive impact to Ireland. Key elements of it, however, will need careful follow up. In particular, the term Gigabit Network is not defined. People in Ireland will likely expect that this means if they run a speed test on their phones that they will see 1 Gb/s or higher speeds. However, a network operator might deploy a network that only shows 1 Gb/s at 3 am when there is not other traffic on the network. The strategy should include the formation of a multistakeholder that can set achievable and specific targets and monitor progress against those targets. Service Level Agreements should include structured definitions of the minimum expectation of speeds by time of day, day of week, and with seasonal factors added, so that a balanced scorecard of service metrics over the daily, weekly and annual cycles can be measured. Expectation management, by means of Education and Public Engagement, will be needed to develop a realism about what service levels can be delivered in landscapes of different population densities, in a country with a distributed population. That should not temper ambition, which should be to deliver the optimal connectivity for each area, leveraging the new technological opportunities for network sharing enabled by 5G and beyond.

We also need to think beyond the traditional "commuting" to "work" mindset. "Work" is actually not the proper description for much of our modern economic activity. "Work" originally meant, and really means, taking raw materials and "working" them physically into higher added value products. Many people today "process" information and data, and add or extract value from it, to deliver services or higher quality information, or meta-information, from it. In German, the language makes the distinction, by adding the prefix "be-" in front of "arbeiten" (to work) to mean "to process". So, we must think that the information, not the people, should do the "commuting" – along these networks. This is how to sustainably redistribute our population into depopulated areas of rural Ireland, and such a result will only make better connectivity more economically viable. So, the plan should be ambitious beyond "commuting routes", and have a vision of "where people live and work" being everywhere. "Everywhere" needs to have sufficient connectivity to allow, at least in the nearest modest sized town, competitive e-commerce and IT industry to thrive, as well as making teleworking viable for all. We should ask what would be the ambitions of the Finnish, Swedish, or Estonian Governments, as examples of small countries with distributed populations and known leadership in communications infrastructure.

5G technology will bring an unprecedented dynamism in what might be called "market agility" offering very fine temporal and local granularity in the definition of and trading in microshares of network capacity. The correct structuring of the infrastructure, sufficiently dimensioning the network for provision of the service level, without excessive capital expenditure, is the economic ideal. 5G technology offers two powerful technology options for this, especially relevant in less populated regions: the neutral host concept, and the network slicing concept. The former is a hardware solution, while the latter has a significant element of software allied to suitable hardware. Both offer economies of scale, and enable new operator concepts and modes of operation. Both should be seen as key to offering the maximum user experience on the minimum of hardware, and to delivering the economic essential of a return on capex investment. Neutral host concepts will avoid the "infrastructure competition" referred to in the current draft (green) paper, and can bring 5G with multiple operators and a truly functioning market to places where it would otherwise not reach, or else would only reach by monopoly. Any strategy needs to understand that 5G will be costly for operators, and prohibitive in many places without such strategies for optimisation of network assets. Network slicing will offer exquisite small bespoke offerings. A recent anecdotal concept was to imagine a visiting tourist from Bosnia-Herzegovina to Ireland, who was with a small

regional operator, whose only data-roaming customer she might be in a given district of rural Munster on a given day. Her operator would buy her dynamic micro-slices of the network, potentially based on her immediate use. One could even conceive of blockchain-generated and self-settling invoices for such microslices in future architectures.

Question 2 The Department invites commercial operators to submit details of their existing or future planned networks delivering broadband services to premises with at least 1Gbps download speed?

Details should include the list of premises that are or will be covered and the expected date by which the Gigabit broadband service will be made available to each premises. There is an argument for having a connectivity rating for every premises by Eircode, in the same way as a premises can have a BER certificate. Proposed service level agreements should be submitted, including the expected variances in service by time of day, day of week, and season.

Question 3 Are the strategic enablers set out in the State's Digital Connectivity Strategy appropriate? Do these strategic enablers need to be amended? Are further strategic enablers, initiatives or measures needed?

This strategy identifies excellent strategic enablers that are appropriate in all but one aspect: infrastructure requires people in order to get value out of it. While the operators might run and maintain the network, they will not ensure that the connectivity is reaching critical smart city services with the necessary performance and interfaces. Similar to the city and county managers who deal with all of the physical utilities, construction regulations, etc., counties and cities across Ireland will need managers knowledgeable in smart city technologies. Digital infrastructure will need to be managed and maintained in ways that bring value to the people of Ireland. Funding supports will be needed for public bodies across Ireland so that they can have the resources to benefit from this connectivity and building the smart communities that are to be encouraged. In particular, enablers for the digital connectivity should include an infrastructure focused digital public works program that will both train the needed workforce on the infrastructure and build the public supports to ensure the connectivity brings value to the communities. An example of this is the new Telecoms Unit in Dublin City Council.

The emerging field of Quantum Communications, and its allied fields of Quantum Encryption, Quantum Computing, Quantum Internet and Satellite Communications, will require its own infrastructure, starting with staging/test bed infrastructure but developing to a full service infrastructure to at least serve the strategic users who will require access. Ireland is starting to address this with its first proposal response to the EuroQCI call from Digital Europe, but will need to make repeated investments in this field, including at Governmental level, to ensure that Ireland remains to the forefront of the various fields of Quantum Communications.

The national Cybersecurity Infrastructure requires continued investment, including further development and resourcing of the mobile CyberRange research, education/training and test infrastructure at Munster Technological University. CyberRange access is critical to Ireland's response to cybersecurity threats and for upskilling of personnel to maintain a high level of communications security.

Question 4 The Department welcomes any views on the State structures, agencies and resources needed to oversee and ultimately secure the delivery of the Digital Connectivity Strategy?

It is critical that funding be made available to support all elements of the plan and that there are specific milestones and review points set along the way so that adjustments can be made where needed in order to ensure that the plan is successful in the end. A multistakeholder group is needed to set very clear metrics and milestones and to monitor progress against those.

In addition, communities across Ireland need incentives and funding in order to provide staff to support all of the new digital infrastructure and programs that will take advantage of this new digital connectivity. It will be important that the person in charge of digital transformation in each local authority is well integrated into the management team, rather than being an isolated evangelist of new technologies. It will also be important to resource a general upskilling of key department leaders in all public bodies. If necessary, to ensure that they get a sufficiently high level digital transformation team, it could be advantageous for smaller local authorities to share such a team.

The State needs to draw advice from all experts and expert groups in Ireland in the various fields allied to digital connectivity, and to either lead, or facilitate leadership, of Ireland's digital transformation, in a public way, and with significant public engagement. This will impact all citizens and our way of life.

Question 5 The Department welcomes any views on how to ensure a sufficiently skilled workforce, with the necessary competence and experience, is available to industry and the State so that Digital Connectivity Strategy can be delivered? The Department would welcome suggestions on the State's role in encouraging the development of this workforce?

Infrastructure requires a skilled workforce in order to operate, maintain, and pull value out of it—especially so for digital infrastructure. The roll out of digital connectivity should be connected with digital skills programs as part of the larger Digital Ireland Framework. Smart city infrastructure can be used as a training ground to upskill and reskill workers who can learn about the technology as they help to deploy, maintain, and use it for community projects. Training programmes that involve the digital infrastructure can target all levels of education and ages and can help inform the public about the infrastructure—demystifying it and giving people a sense of pride and civic ownership of the technologies. Through this type of engagement and indeed, co-creation even, the technology becomes part of the community and not just something that a high tech company installed to make money out of the community.

Question 6 The Department welcomes any other general observations and views on the State's Digital Connectivity Strategy and how it can be improved.

Lessons could be learned from the approach taken to rural electrification rollout. Public engagement is the key to generating enthusiasm and demand, which will make the digital connectivity drive become a mainstream society expectation, beyond the enthusiast and early adopter market segments.