Smart Docklands

Small Cell Neutral Host 5G Trial Network

With Dense Air & CONNECT

Michael Guerin
Programme Manager - Smart Docklands

DUBLIN AS A TESTBED

> “ WE ARE BIG ENOUGH YET SMALL ENOUGH TO BE THE IDEAL LOCATION TO PILOT NEW CITY SERVICES & SOLUTIONS

Smart Docklands Structure

1. Connectivity Infrastructure
2. Use Cases / Projects
3. Engagement

Connectivity as a Baseline

Connectivity Infrastructure

LPWAN

LoRa™

sigfox

vodafone NB-IoT

Cellular

3G

4G LTE

5G

Wi Fi™

FEB 2019: DUBLIN 5G TESTBED

FORA

Dublin's docklands could be turned into a playground for testing 5G technology

The city council hopes a 'small cells' network will be available for use by native and international firms.

BY ZUZIA WHELAN REPORTER, FORA
FEBRUARY 18TH 2019 | 3 MIN READ

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Dublin to test 'neutral' 5G network

21st February 2019 Jonathan Andrews

Dublin's smart docklands is the city's testbed for smart city solutions

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The digital magazine of C Today

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EARLY 2017


JCDecaux
ERICSSON
NOKIA
Alcatel-Lucent
ZTE
RADWIN
NEC
KATHREIN
Developing innovative solutions able to host more than Small Cells
JCDecaux has gained an expertise in developing hosting solutions supported by major Small Cell players for the benefit of operators and cities
7

SUMMER 2017

Comhairle Cathrach
Bhaile Átha Cliath
Dublin City Council

Prior Information Notice (PIN)
With the Purpose of Inviting Market Consultation
Contract Type: Provision of Broadband Wireless Connectivity and Related Smart City Enhancements

Dublin City Council through its smart city function is promoting a number of so called "smart city" initiatives, partnering with academic institutions and private organizations to improve quality of life, deliver more efficient and responsive city services and increase engagement with citizens.

Recognising that connectivity is becoming a critical element of infrastructure for a smart city, the City Council is keen to provide free wireless connectivity to businesses, residents, visitors etc. which will be accessible at key locations in the public domain. All such connectivity must be provided free of charge, and meet expected demand for data over the lifetime of the platform. The technology should support gigabit broadband wireless connectivity, including WiFi, LTE and emerging "5G" connectivity technologies, many still under development. Backhaul should be by means of fibre so as to be future-proofed and upgradable. Consideration should also be given to the integration of solutions into city assets and on street infrastructure / furniture. All facilities should be designed to support the hosting of equipment and services from any and all telecommunications operators (shared service). The project should be able to be delivered with no operating cost to Dublin.

Please note that this is not a call for competition and no tender documents are available at this stage. Also this process will not be utilised in order to preclude any future competition to be conducted by Dublin City Council.

Without prejudice to competition in the market places, the purpose of this market consultation will be to examine and consider the various technical and commercial options which might present themselves through a competitive tender process to be advertised in the near future.

The market consultation may also assist Dublin City Council in the development of the procurement strategy for any subsequent competition.

NEW BUSINESS MODELS / USE CASES

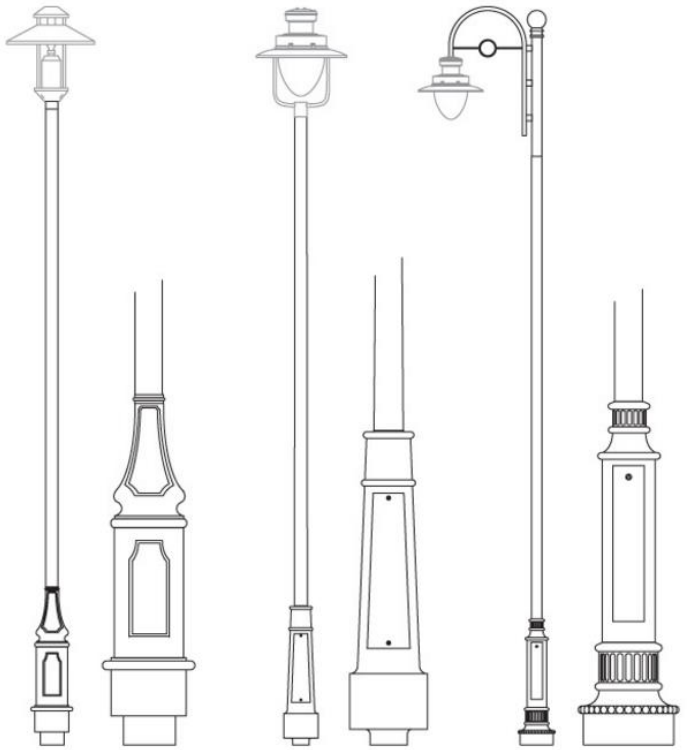
Herald.ie Wednesday 18 January 2017

News Courts Sport Staying In Going Out Lifestyle Opinion

Herald.ie

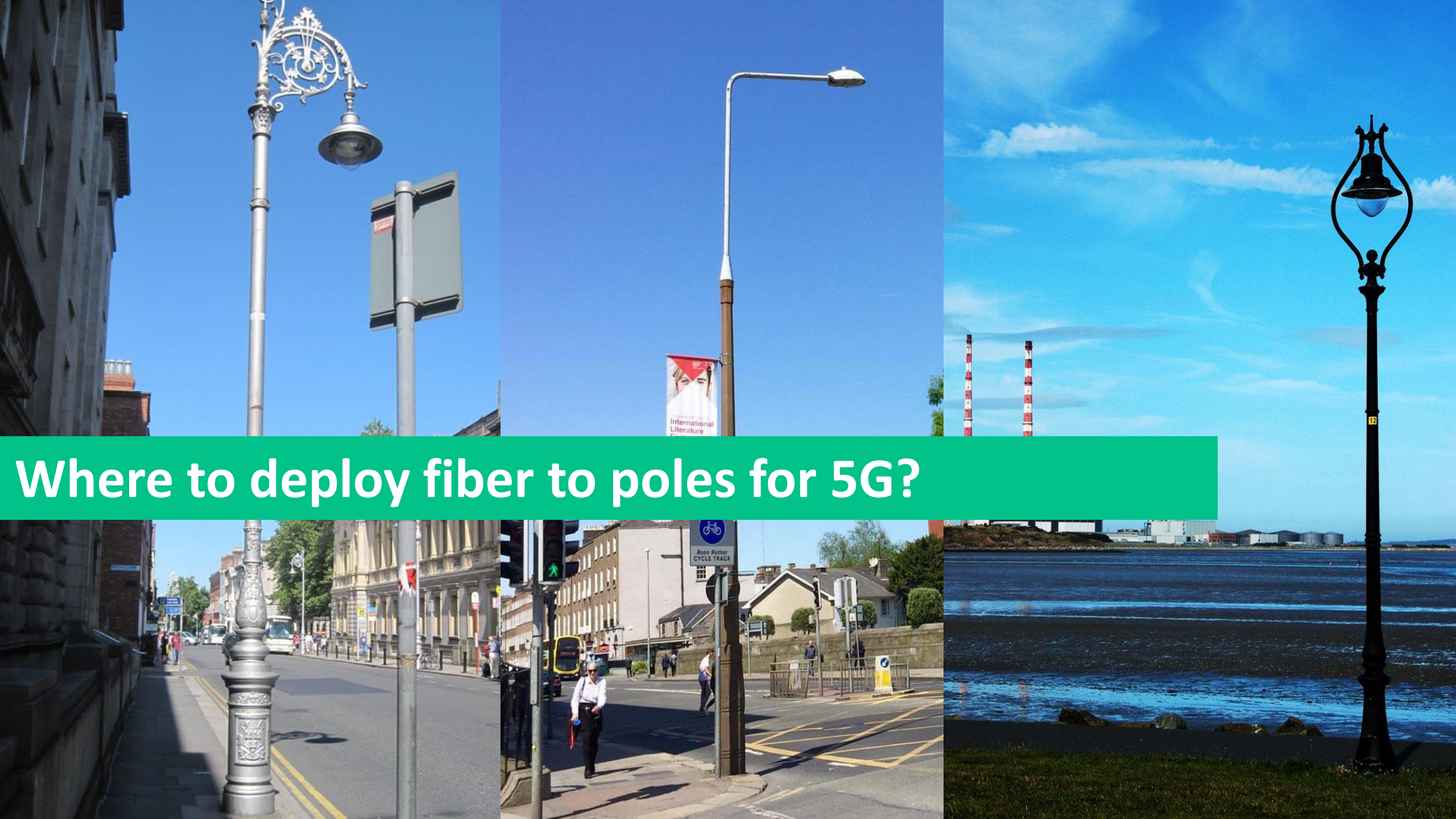
Dublin to get 800 high-tech solar litter bins in €5m 'smart city' plan

Luke Byrne - 19 December 2016 02:30 AM



Working across siloes

Rethinking how we utilize city assets



Where to deploy fiber to poles for 5G?

Developing an asset utilisation strategy

102 Bike Station Kiosks

45,000 Street Lights

1000 Smart Bins?

600 RTPI signs

DCC building stock (25k)

600 Smart Parking Meters

DENSE AIR

Mobile Networks Enhanced and Extended

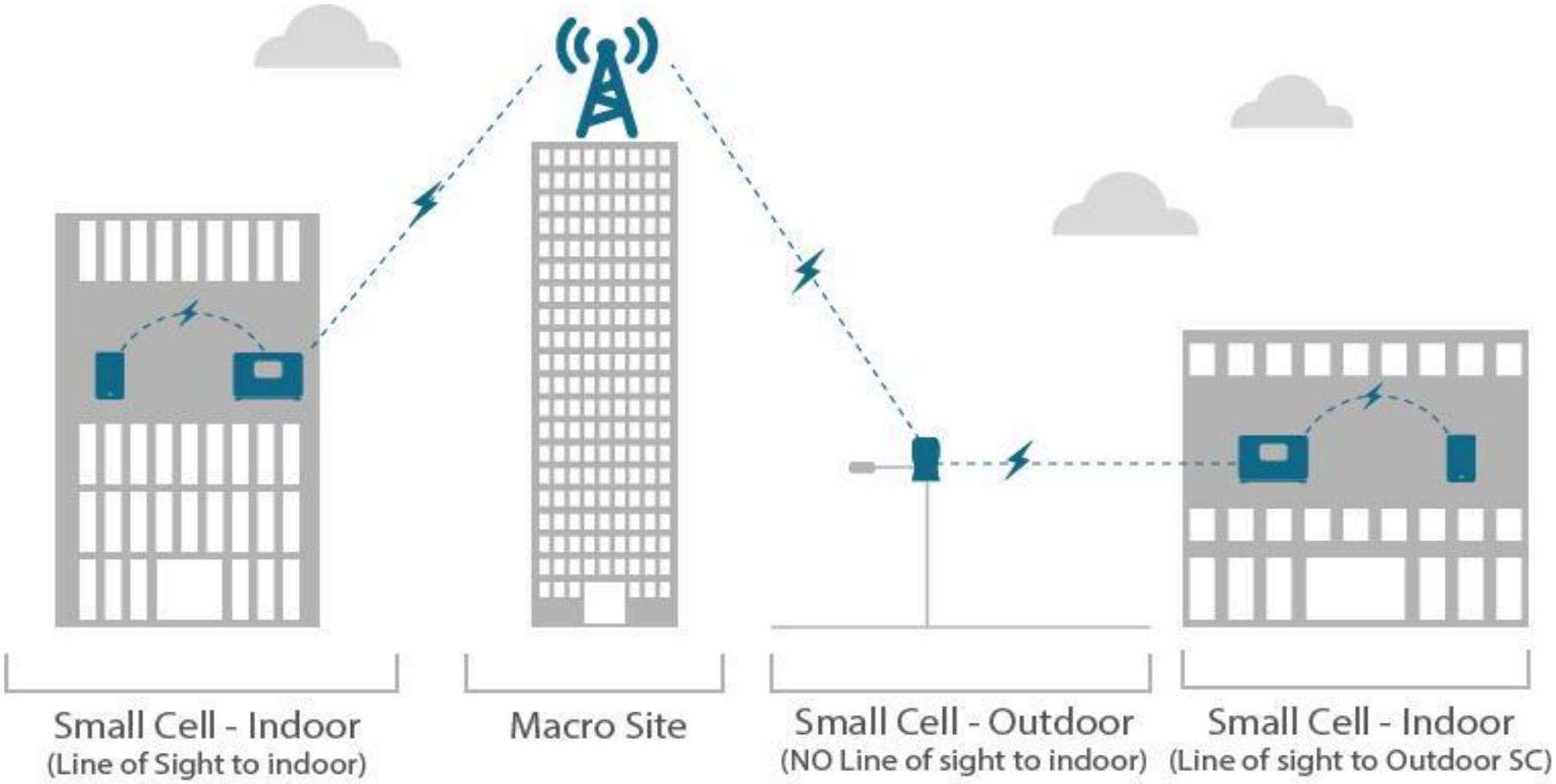
Proven, Cost Effective
INDOOR
Network Penetration

Extending Network reach to
RURAL
Areas

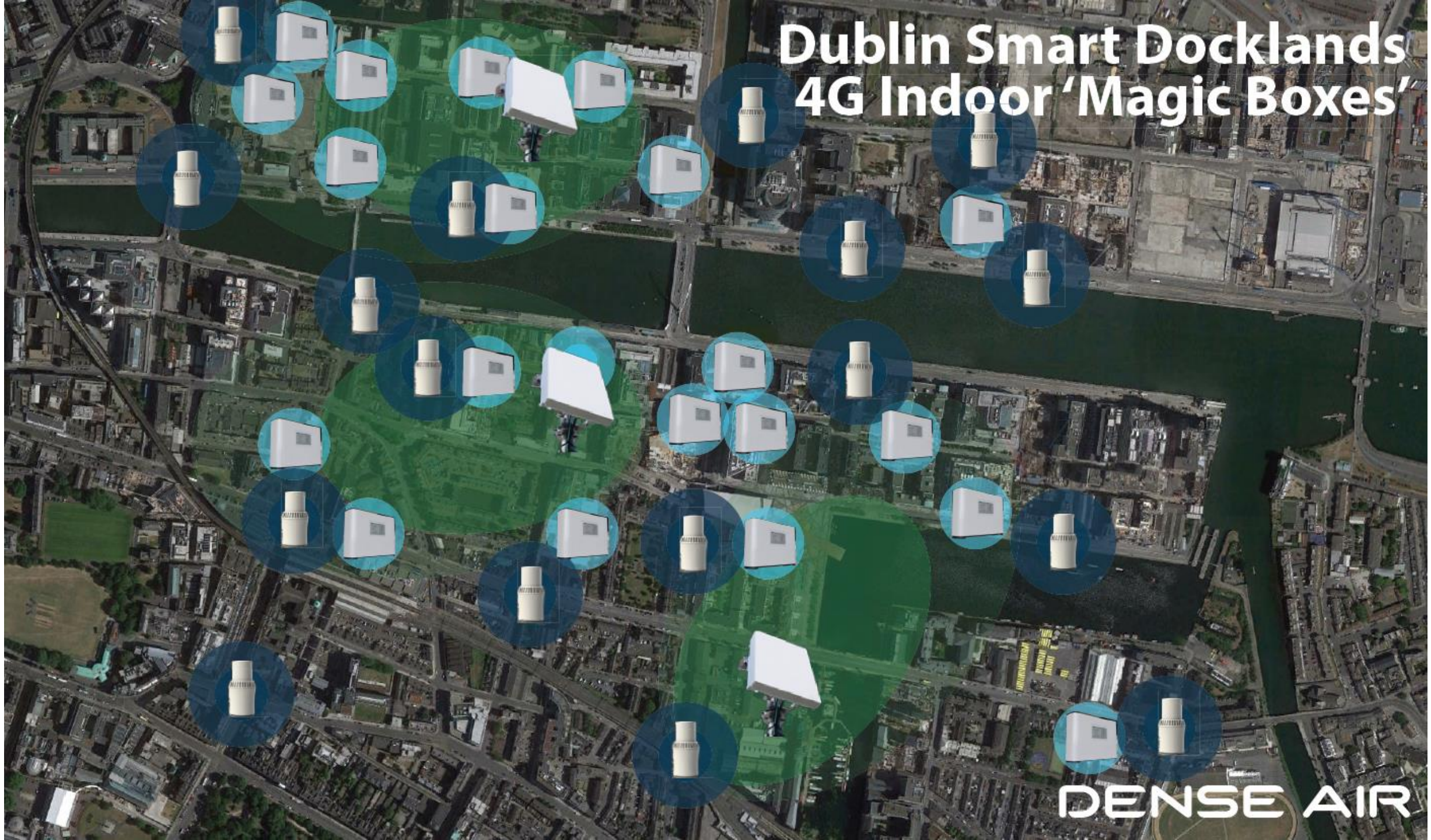
Enabling High Performance
5G Connectivity in **URBAN**
Environments

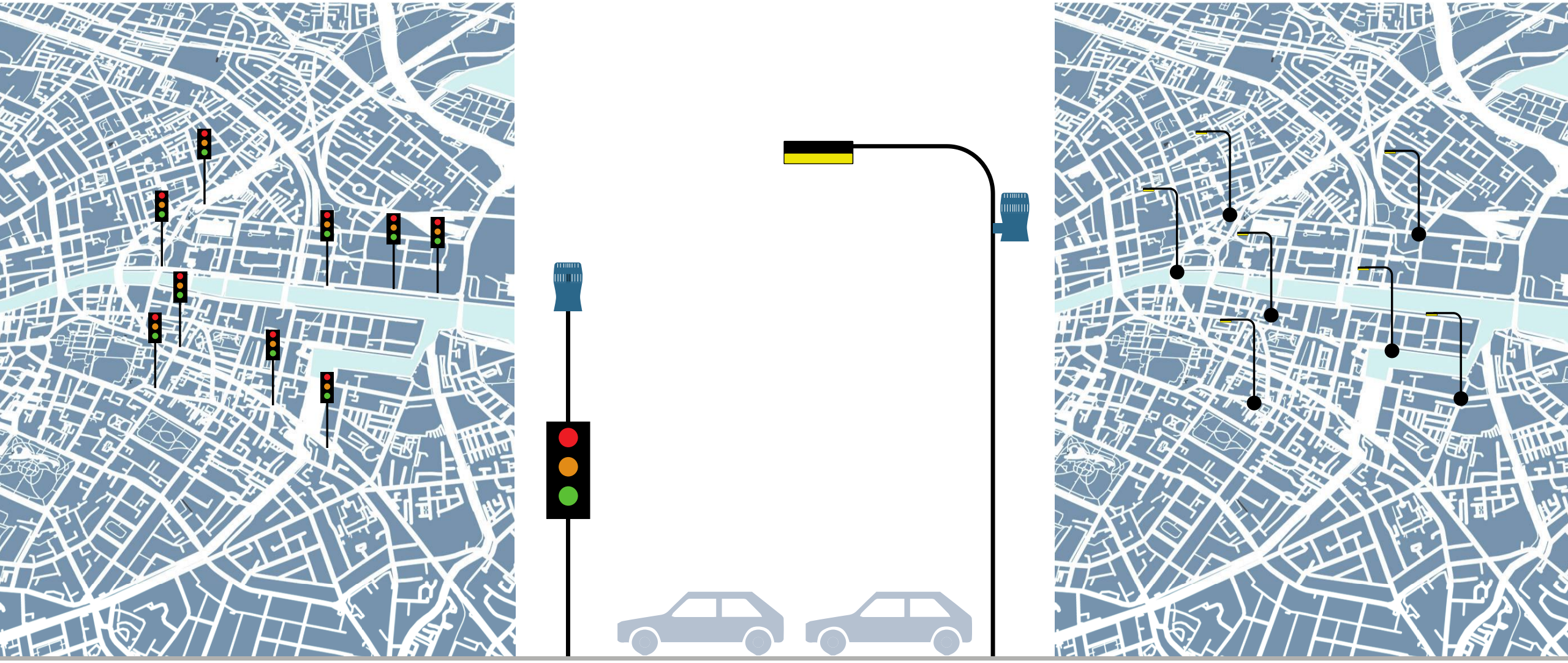
A Neutral Host - Enhancing Multiple Carrier Connectivity
and Penetration through our **'MAGIC BOX'**
Solution

Smart Docklands - Small Cells



Dublin Smart Docklands 4G Indoor 'Magic Boxes'





Outdoor Densification...

Utilising DCC Street assets, providing a pervasive layer, enabling smart city services

DENSE AIR


620
GAS
P

THEMARKER
HOTEL BAR BRASSERIE

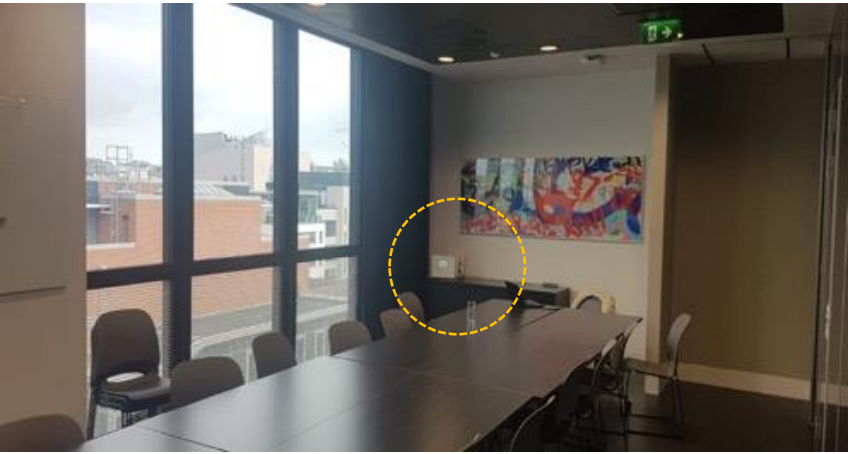
IPUT

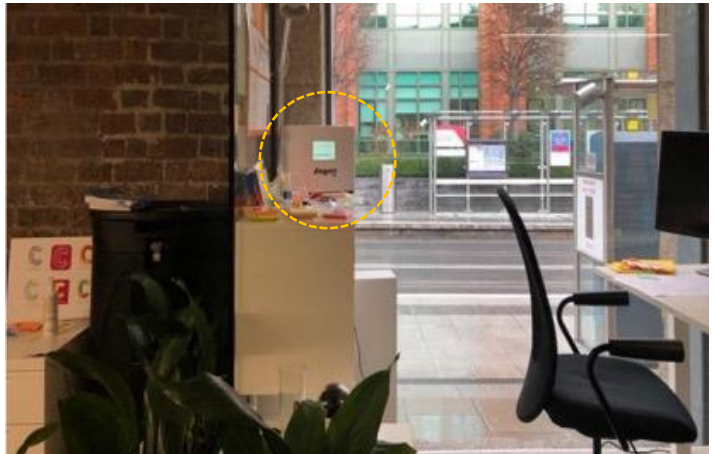
chq

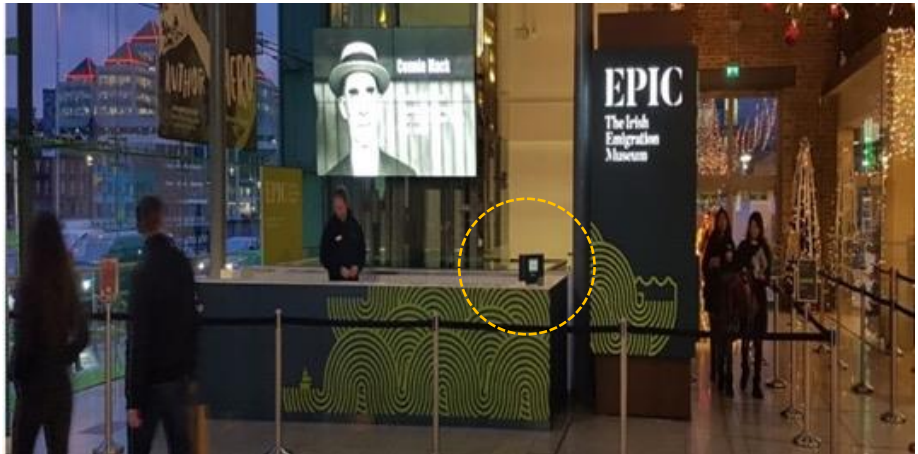
dogpatch LABS

hibernia REIT

CONNECT







SMART DOCKLANDS
A Smart Dublin District

Challenges Remaining

- Densification Challenges
- Economics and business model
- Fare and equitable access
- Roadmap and national strategy

SMART DOCKLANDS
A Smart Dublin District

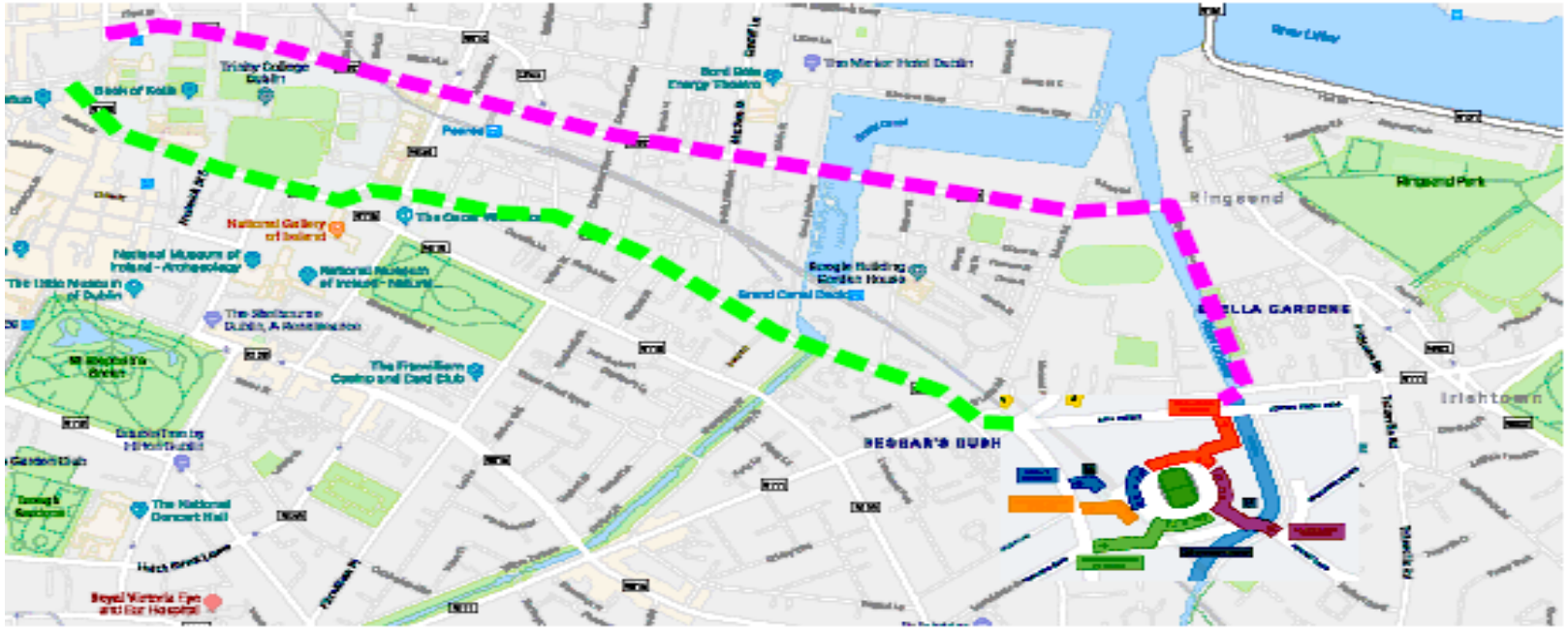
5G plans in Dublin

- Network Equipment deployment – Indoor and Outdoor
- Heritage / Tourism Trial – AR
- Smart Buildings / IoT
- UEFA Euro2020

Tourism / Heritage Trail – AR

5G IA

INFRASTRUCTURE ASSOCIATION



UEFA EURO 2020™

DUBLIN

HOST CITY

DUBLIN

DUBLIN ARENA

UEFA EURO 2020™

DUBLIN

HOST CITY

GROUP STAGE

Match 10: Group E: Monday 15 June 2020

Match 21: Group E: Friday 19 June 2020

Match 34: Group E: Wednesday 24 June 2020

ROUND OF 16

Match 44: 1D v 2F, Tuesday 30 June 2020

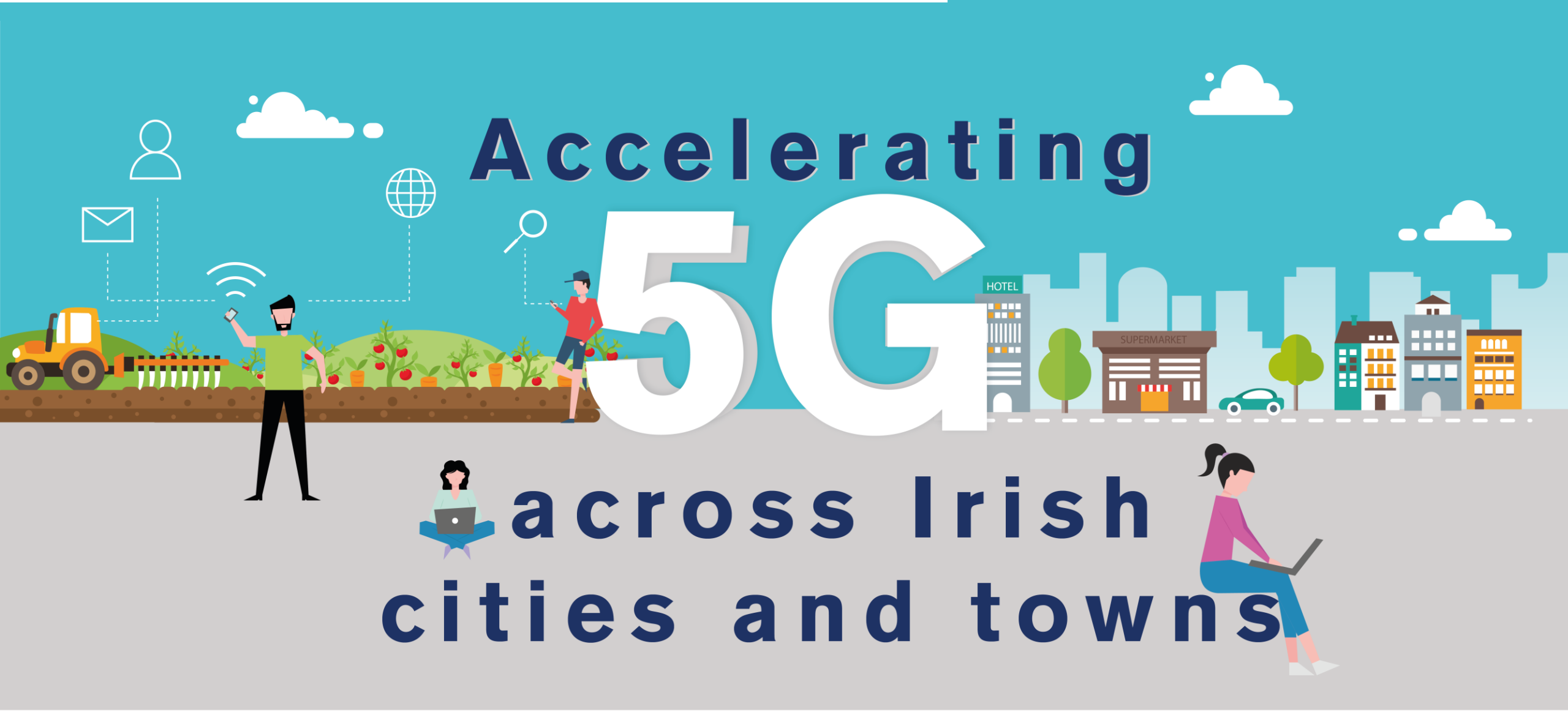
SMART DOCKLANDS
A Smart Dublin District

5G – Euro2020

- Backhaul for public WiFi network – no city fibre needed
- Sponsorship stands in Fanzones
- Fan experience in fanzones

MINISTER VISIT WITH 5G RESPONSIBILITY

5G Whitepaper for Irish Government



An Roinn Forbartha Tuaithe agus Pobail
Department of Rural and Community Development

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

SLIGO COUNTY COUNCIL
COMHAIRLE CHONTAE SHLIGIGH

Challenges

- Avoid multiple small cells on one asset
- Power challenges with that
- Decorative structures
- Structural integrity of pole
- Boring mundane challenges to make it a reality
  - Mapping assets
  - Does it have power, earthed?
  - Unmetered? Flat rate for power? Elexon (UK) implications

5G

An Emerging Framework for Irish Cities & Towns

An Roinn Forbartha Tuaithe agus Pobail
Department of Rural and Community Development

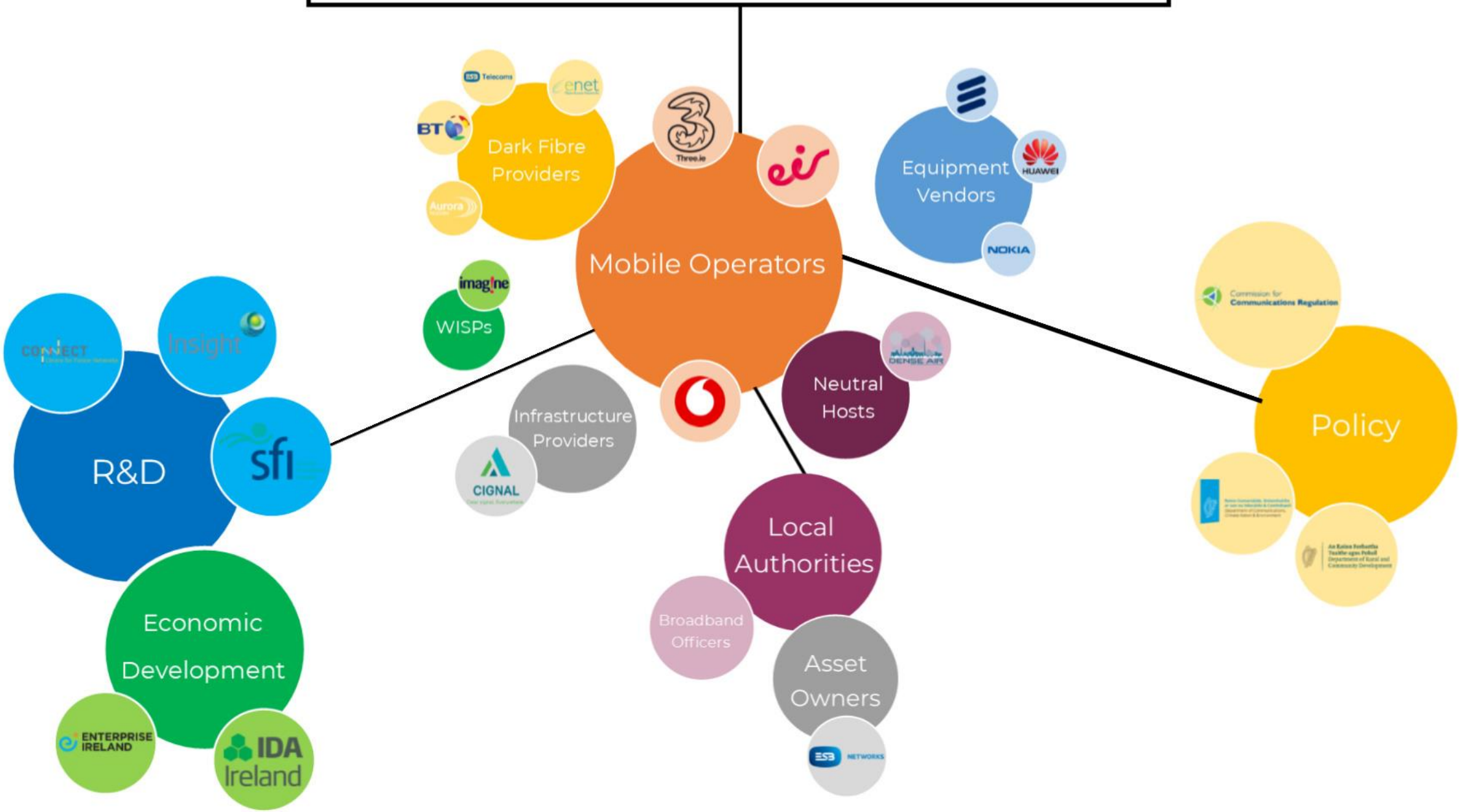
SLIGO COUNTY COUNCIL
COMHAIRLE CHONTAE SHLIGIGH

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

An Emerging Framework for Irish Towns and Cities

1. 5G in Ireland
2. Deployment Models for Small Cells
3. Challenges

The 5G Ecosystem in Ireland



The 5G Journey in Ireland

2017

ComReg assigns 350 MHz of spectrum in the 3.6 GHz band, a pioneering medium for sub-6 GHz 5G, to five winning bidders.

2019

Ireland's mobile operators commence the 5G journey, deploying the 3.6 GHz band atop existing 4G macrocells in high traffic hotspots across Irish cities.

2019

Consumer adoption of 5G is limited - the high cost of entry and small device ecosystem is prohibtive.

2020

ComReg completes the largest multi-band award in its history, releasing the 700 MHz band to enable pervasive 5G.

2020

UEFA EURO 2020 showcases 5G, urban coverage expands.

2021

5G, urban coverage expands.

2021

Mid to High-end handsets are graced with 5G modems, the application ecosystem explodes.

2021

Low-band deployment brings 5G to rural Ireland, massive densification begins in cities.

2022

The limitations of the macrocell grid become more apparent.

2022

Investment pivots to small cells - a new revenue opportunity emerges for local authorities.

2023

Sharing of small cells reduces cost and visual pollution while increasing attainable density.

2023

The density of fibre at the edge increases, supporting small cells.

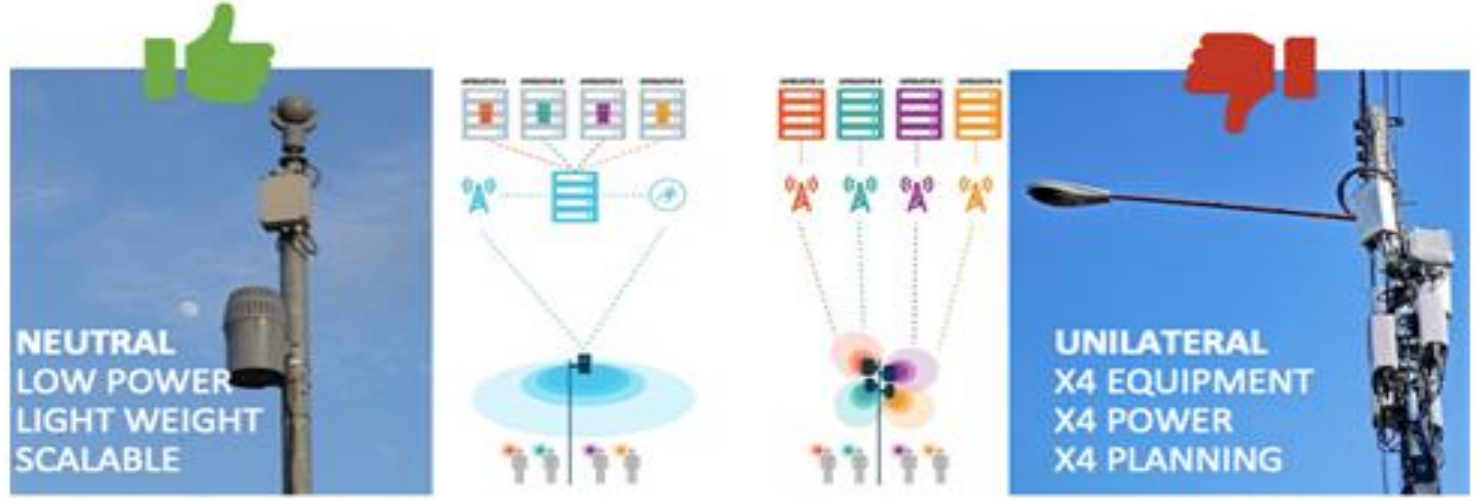
2024

Mobile operators exploit mmWave spectrum in dense environments to deliver a dramatic uplift in capacity.

An Example of Urban Disruption caused by trenching. Credit: WPLN/Tony Gonzalez

An example of active equipment duplication and the resulting impact on visual pollution.

Credit: Shutterstock/kriang phromphim



Examples of under-utilised street furniture that could support mobile network infrastructure.

Deployment Model for 5G

1. Macro Cell Upgrade
2. Shared Infrastructure
3. Neutral Host
4. Concession

Evaluation of Small Cell Deployment Models against LA Key Priorities

	MNO Macrocell Upgrade	Shared Infrastructure	Neutral Hosting	Concession (Explicit Exclusivity)
Visual Pollution	Macrocells are a major source of visual pollution in urban environments, and densification will only exacerbate this.	Shared Infrastructure models can contribute to visual pollution and disruption because each MNO needs to deploy its own antenna on a shared asset.	Neutral Host models minimise visual pollution and urban disruption because MNOs share active infrastructure.	Concession models can contribute to visual pollution when the concessionaire offers passive infrastructure sharing to MNOs.
Ownership retention by LA of the facilitating asset	Macrocells are usually located on private property, with MNOs paying a site rental fee.	Shared Infrastructure models enable LAs to retain their assets.	Neutral Host models enable LAs to retain their assets, whether the operator is the LA or a third-party.	Concession models may enable LAs to retain their assets, but a period of exclusivity can sterilise the asset.
Co-ordinated approach	Macrocells are deployed on an independent basis by MNOs. There is a lack of cross-MNO and cross-LA collaboration.	Shared Infrastructure models promote collaboration between LAs, public sector bodies and the private sector for mutual benefit.	Neutral Host models promote collaboration amongst involved parties including the LA, wholesale operator and MNOs.	Concession models simplify collaboration between the LA and concessionaire, but this may consequently block out third-parties.

	MNO Macrocell Upgrade	Shared Infrastructure	Neutral Hosting	Concession (Explicit Exclusivity)
Cost effective deployment and ongoing maintenance	Macrocells are CapEx and OpEx intensive when there is an absence of network sharing. However, they offer a very large coverage footprint.	Shared Infrastructure models can reduce TCO by distributing install costs amongst MNOs. However, the duplication of active equipment is unfavourable.	Neutral Host models can deliver major cost synergies by preventing the duplication of active infrastructure across MNOs.	Concession models may place a large cost burden on the concessionaire when there is an inability to share costs amongst multiple parties.
Potential for new revenue model	Macrocells located on LA assets may offer a recurring revenue stream for LAs, with MNOs and/or wholesale infrastructure providers paying a site rental fee.	Shared Infrastructure models enable LAs and public sector bodies to monetise access to their assets with a simple fee.	Neutral Host models may enable revenue sharing between LAs and the third-party wholesale operator, but this hinges on take-up by multiple MNOs.	Concession models are dependent on revenue sharing between LAs and the concessionaire. High costs and small-scale deployments hinder the potential for revenue generation.

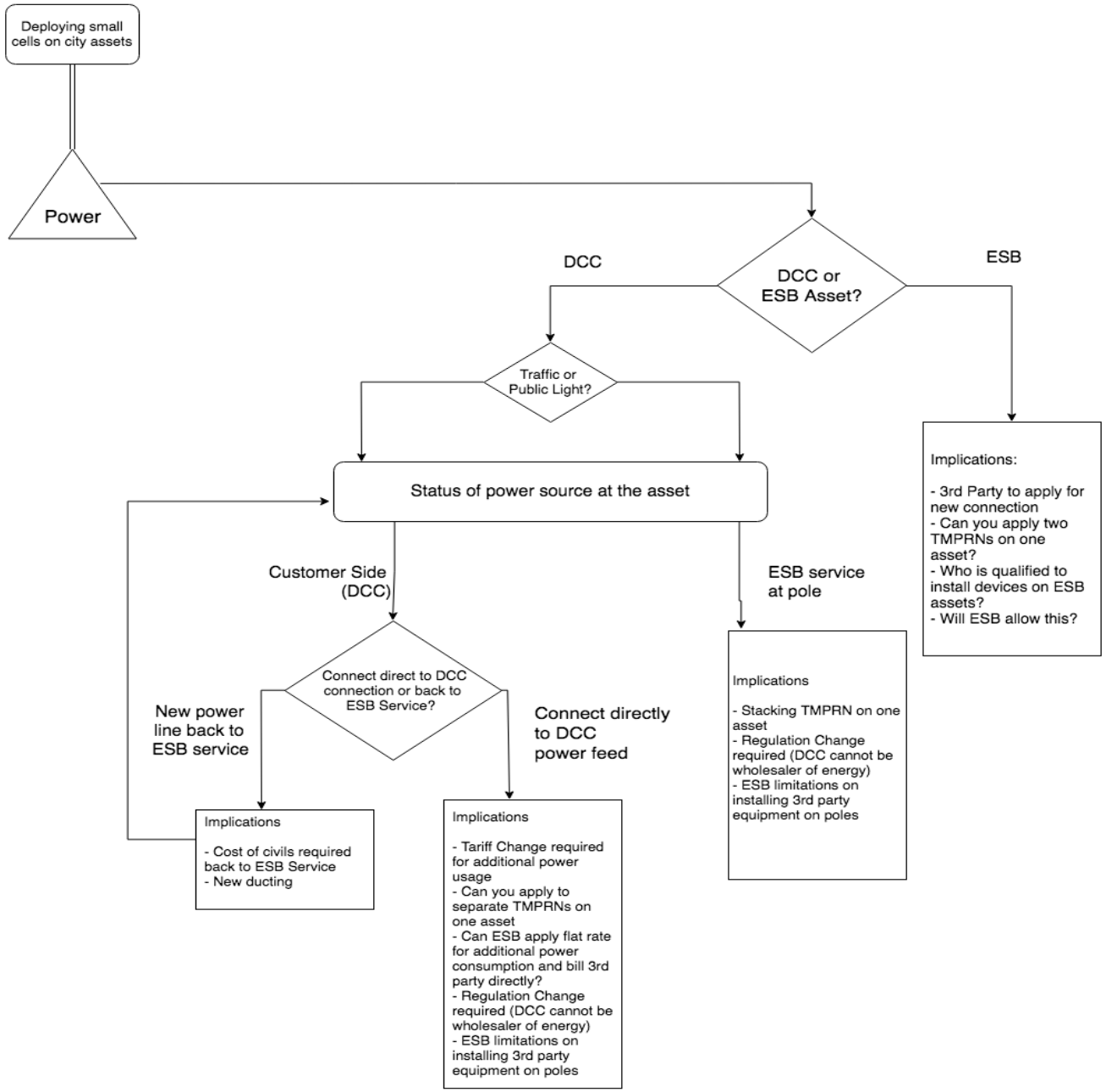
Analysing Small Cell Deployment Challenges

	MNO Macrocell	Shared Infrastructure	Neutral Hosting	Concession
Complimentary to MNO Macro Cell upgrade	The upgrading of existing macrocells and deployment of new sites will provide a low-band coverage with 5G NR, enabling outdoor availability.	Shared Infrastructure models enable MNOs to install antennae on passive infrastructure where densification is required to enhance coverage and/or capacity.	Neutral Host models enable MNOs to provide on-demand coverage and capacity to complement the macrocell network.	Concession models enable the concessionaire to enhance street-level connectivity, whether for itself or for third-party MNOs.
Volume of Installations (Predicted)	Macrocells will be the first network layer to undergo upgrade work with 5G NR, enabling wide-area coverage with low and mid-band spectrum. However, high-costs and space constraints will prohibit new macrocell installations in dense urban areas.	Shared Infrastructure models, by very nature of active infrastructure duplication, will require a large volume of installations.	Neutral Host models necessitate adoption by a number of MNOs to warrant installation, at which point, a snowball effect is likely to accelerate the volume of installations.	Concession models limit the volume of installations that are commercially viable by the exclusive concessionaire.
CAPEX	Macrocells will	Shared	Neutral Host	Concession models

	MNO Macrocell	Shared Infrastructure	Neutral Hosting	Concession
CAPEX investment by MNO's (Predicted)	Macrocells will continue to form a large part of MNO CapEx as active equipment is upgraded and replaced to support 5G NR. However, virtualisation of the RAN will reduce required CapEx.	Shared Infrastructure models will require MNO CapEx investment to purchase active equipment. However, the most significant cost driver – installation – will be reduced thanks to the cooperative providing passive infrastructure.	Neutral Host models are not likely to be afforded a large proportion of MNO CapEx since much of the burden falls on the wholesale operator and active equipment is shared.	Concession models place a CapEx burden on concessionaires during the period of exclusivity, and this will be passed on to MNOs. However, net CapEx across MNOs may be limited given the fact that the volume of installations is likely to be small.
Can deliver required Site Density	Macrocells, due to their size and high power output, will not be able to deliver the required site density. They will support a 5G	Shared Infrastructure models enable densification of the site grid. However, the duplication of active equipment amongst MNOs	Neutral Host models enable very high site density in space-constrained high footfall areas by eliminating the	Concession models grant exclusivity to the concessionaire, and thus ensure a large volume of LA assets can be leveraged for site grid densification.

Deployment Challenges

1. Power
2. Access to assets
3. Fibre
4. New business models / processes



Credit: Martin Vorel

Power Challenges

Meter & Billing

- ESBn can't separate energy bill between LA and telco
- LA can't pass on energy bill – regulation – wholesaler of energy
- Can't have two unique IDs (TMPRN) on one asset e.g. Street Light
- LA's not allowed to install on 3rd party assets on LA assets (ESB guidelines)

Operational

- Not currently permitted to connect to LA-side connection, has to be ESB source
- Mini-pillar per small cell adds €000's per site – kills business model
- Very limited number of contractors permitted access to work on ESB and LA assets

Power

GAP and Cost-Benefit analysis is carried out, taking into consideration each of the following:

1. The cost to deploy small cells.
2. The total time to deploy small cells.
3. The impact on the public realm.
4. The impact on above and below-ground infrastructure.
5. The impact on city traffic.

To determine what is the quickest and most cost-effective method to deploy small cells across Ireland while

- maximising the benefit for all involved parties
- minimising the impact on cities and towns

Final doc by end of October

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