How neutral host TowerCos strengthen Europe's wireless connectivity and competitiveness

A report for the European Wireless Infrastructure Association

June 2025

EY Parthenon

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Contents

Context

EY-Parthenon teams and the European Wireless Infrastructure Association (EWIA) have consistently published reports on the European neutral host wireless infrastructure sector. This series commenced in March 2015 and has been updated periodically with refreshed editions in 2019, 2020, 2022 and 2024. Additionally, a March 2023 report focused on the sustainability contributions of the sector complemented this series. The current report provides an update on the economic contributions of the European wireless infrastructure sector, with its previous version published in May 2024. For convenience, the neutral host wireless infrastructure is commonly referred to as neutral host TowerCos or simply "TowerCos."

The sector has continued to attract interest from policymakers and investors as mobile network operators (MNOs) have outsourced more mobile infrastructure and 5G network rollouts are well progressed.

EY-Parthenon teams and EWIA have refreshed the 2023 data provided in the study in May 2024 to reflect developments in the market up to December 2024 (e.g., developments in market share based on acquisitions and associated capital release facilitated by neutral host TowerCos).

The overall objective of the study remains the same: to foster a better understanding of the benefits that neutral host TowerCos can provide in generating investment and promoting efficient use of communication infrastructure, the role they can play in delivering the Digital Decade vision by 2030, and other government targets.

The report is based on a combination of publicly available data, information that has been provided by EWIA members and interviews with market participants, as well as EY-Parthenon teams' extensive experience in advising the wider mobile infrastructure sector.

In this report, Europe is defined as EU-27, the United Kingdom and the European Free Trade Association (EFTA) unless stated otherwise.

Figure 1: EWIA timeline

By laws mentioning the eight founding companies: WIG, EI Towers, Cellnex Telecom, ATC , NOVEC/ALTHIO, Arqiva, Towercom, AXION*

TDF joins EWIA

Digita joins EWIA

2014 — 2015 — 2016 — 2017 — 2018 — 2019 — 2020 — 2021 — 2022 — 2023 — 2024

Year of creation for EWIA

Phoenix Tower joins EWIA

Vantage Towers and INWIT join EWIA

*Note: Arqiva and Axion left the association in 2020 and 2022 respectively

About the EWIA

The European Wireless Infrastructure Association (EWIA) is the European trade association of neutral host TowerCos, which provide open access to their shared wireless infrastructure. EWIA has 11 members operating in 19 countries (Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Malta, the Netherlands, Poland, Portugal, Romania, Spain, Sweden, Switzerland, and the United Kingdom). Figure 1 illustrates the timeline of EWIA memberships. EWIA members invest in and operate wireless infrastructure essential to the delivery of mobile voice, wireless broadband and other wireless networks.

EWIA advocates for policies that encourage the network infrastructure investment and deployment necessary to make advanced wireless broadband available everywhere for consumers, businesses, health care organizations, public safety agencies and the countless other sectors that rely on always-on wireless connections.

About EY-Parthenon and EY teams

EY member firms provide professional services to the telecom sector, serving all the top 20 telecom operators ranked by market capitalization. EY-Parthenon teams' strategy and transaction services are based on deep tower infrastructure and telecommunications sector experience. The organization has a large pool of tower infrastructure knowledge derived from its presence across the globe with offices in over 90 countries and the extensive range of telecommunication assurance, consulting, and strategy and transactions clients in the sector.

Executive summary

Outsourcing passive wireless infrastructure to neutral host TowerCos is a global trend that provides compelling benefits to MNOs, the wider wireless sector and, ultimately, the consumer:

1 Halfway through the Digital Decade, TowerCos have released €53b of capital to operators to help enhance their 4G/5G networks.

2 Outsourcing to neutral host TowerCos is on track to deliver a predicted €31b in economic savings (2019–29) from increased sharing and operating efficiency.

3 To realize the EU's Digital Decade ambition to provide mobile data connectivity everywhere people live, work, travel and gather, an investment of around €100b will be needed, of which approximately €25b is TowerCo infrastructure.

4 Private investment is crucial, with neutral host TowerCos expected to invest typically more than €2.5b annually.

5 An effective passive infrastructure market enables downstream competition among active networks and among retail service providers by decreasing the barriers to entry and by lowering operating costs through sharing and efficient management.

6 Consumers and technology-enabled businesses are expected to be the ultimate beneficiaries of a functional and competitive wireless mobile infrastructure market through both price benefits and a high level of service quality.

7 The Gigabit Infrastructure Act (GIA) has improved the regulatory framework by simplifying administrative procedures and enhancing access to infrastructure, although local planning is a key hurdle.

Delivering the Digital Decade ambition requires substantial private and public funding. Neutral host TowerCos play an integral role by directly contributing private capital investment, releasing private capital to MNOs and fostering an investment-friendly ecosystem. TowerCos also bring operating efficiencies and sustainability benefits, enable downstream competition, and ultimately benefit consumers with improved service and prices.
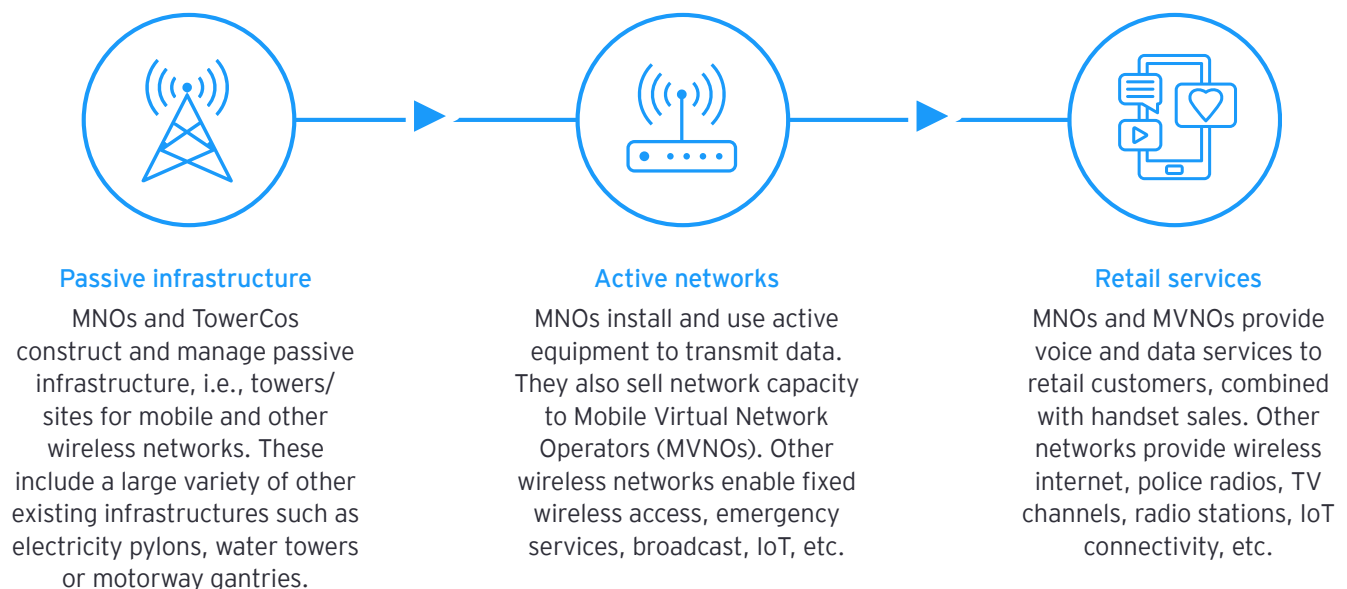
Wireless infrastructure foundations

Wireless infrastructure provides an important element for the operation of wireless network services, including mobile networks, fixed wireless access broadband, emergency services, TV and radio broadcast, and Internet of Things (IoT). The largest user segment of wireless infrastructure (towers) is the MNOs.

Over the last few decades, tower ownership has increasingly been transferred from MNOs to tower companies (TowerCos), which can take the form of an internal division within an MNO, a separate entity controlled by an MNO or a neutral host entity.

TowerCos have developed robust business models around the building and management of ground-based towers (GBTs) and rooftop towers (RTTs), on which space is offered to multiple customers.

To understand the economic benefits that TowerCos provide, it is important to understand the provisioning of wireless networks. The value chain consists of three key segments: passive infrastructure, active networks and retail services. Towers are part of passive infrastructure, and access to them is traded on the wholesale wireless infrastructure market. MNOs, for example, install radio access network (RAN) equipment such as antennas, radios and baseband units on towers to transmit mobile signals. The active networks and passive infrastructure together enable an MNO to provide voice and data services to retail customers. This mobile network service value chain is illustrated below.

Figure 2: Value chain for wireless network services

Passive infrastructure
MNOs and TowerCos construct and manage passive infrastructure, i.e., towers/ sites for mobile and other wireless networks. These include a large variety of other existing infrastructures such as electricity pylons, water towers or motorway gantries.

Active networks
MNOs install and use active equipment to transmit data. They also sell network capacity to Mobile Virtual Network Operators (MVNOs). Other wireless networks enable fixed wireless access, emergency services, broadcast, IoT, etc.

Retail services
MNOs and MVNOs provide voice and data services to retail customers, combined with handset sales. Other networks provide wireless internet, police radios, TV channels, radio stations, IoT connectivity, etc.

Towers can be split into two main types: ground-based towers and rooftop towers

The key element of MNOs' RANs are macro antennas with up to several kilometers of signal range, typically hosted on macro towers. There are two main types of macro towers – ground-based and rooftop. Ground-based macro towers, which are typically freestanding structures, are more prevalent in less densely populated areas. Rooftop macro towers are (usually) set up on pre-existing buildings or structures and are typically located on the roof, roofing pavement or high windows (e.g., in the case of a church bell tower being used as a rooftop tower). All statements, numbers and figures in this report refer to both tower types, unless stated otherwise.

In addition to macro towers, TowerCos also develop wholesale small cell platforms for high-density outdoor capacity or distributed antenna systems (DAS) for indoor coverage. These small cells also use existing structures, such as lamp posts, CCTV poles or building facades, but the antenna units are much smaller than on rooftop tower installations. In such cases, the wholesaler retains ownership and responsibility for the operation of the active infrastructure and can facilitate multiple operators collocating on a single active infrastructure site. TowerCos provide the design of the solution, develop and maintain the network, and manage the relationship with the real estate owner and with any other site users. This report primarily focuses on macro mobile telecom towers.
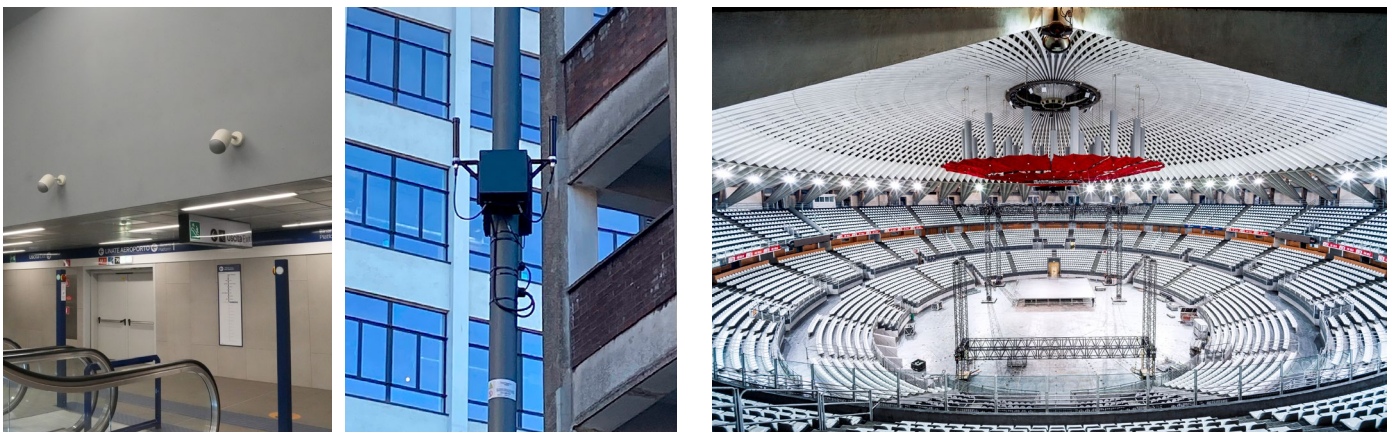
Figure 3: Typical tower types

Ground-based towers

Rooftop towers

Small cells (indoor small cells, distributed antenna systems, outdoor small cells)
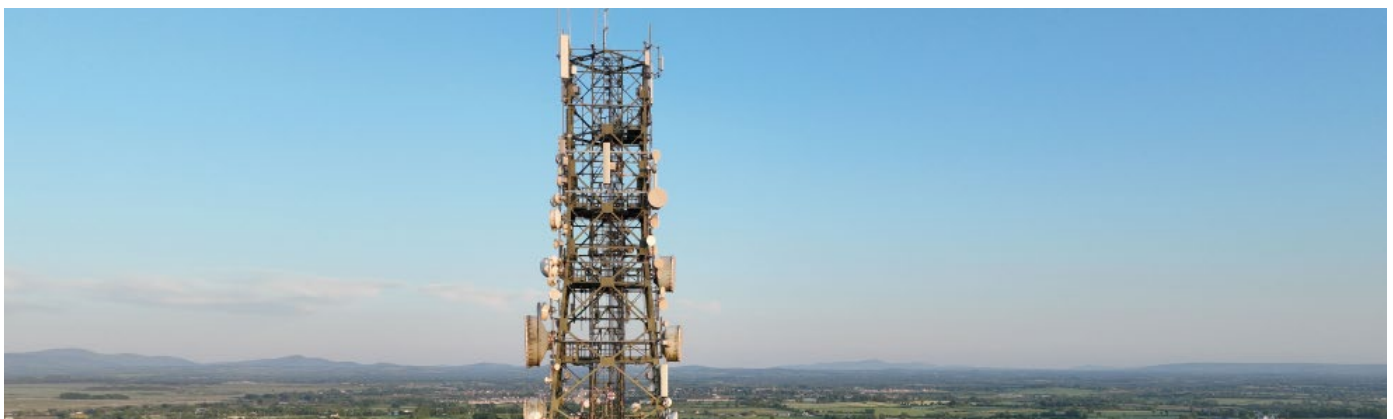
Synopsis of the economic assessment and sustainability contribution

The economic assessment in the previous report highlights the significant role of neutral host TowerCos in enhancing the efficiency and effectiveness of wireless infrastructure across Europe. The following summarizes the several key findings:

1. Market dynamics: The tower market has evolved to show a disparity in investment between urban and rural areas, with rural regions often lacking high-quality communication services. Neutral host TowerCos are crucial in addressing this imbalance by optimizing the use of passive infrastructure.

2. Cost efficiency: By outsourcing to TowerCos, MNOs can lower infrastructure costs, enabling faster and more economical rollouts. This not only benefits MNOs by freeing up capital for further investments but also delivers socioeconomic advantages to consumers and the broader market.

3. Economic benefits: There are various economic benefits derived from greater outsourcing to neutral host TowerCos, including:

   ■ Reduced infrastructure costs and limited duplication

   ■ Capital released to MNOs, allowing for reinvestment in network improvements

   ■ Enhanced coverage in underserved rural areas, contributing to bridging the digital divide

   ■ Increased market entry opportunities for non-MNO tenants, fostering competition and innovation

   ■ Better network quality in terms of higher speeds as well as lower prices for end consumers

4. Operational efficiencies: Neutral host TowerCos typically achieve higher co-location ratios (2.1 vs. 1.3x) and lower operating expenditures, resulting in a more efficient cost structure compared with MNOs. This efficiency translates to a typical point of presence managed by a TowerCo being 46% more efficient than one managed by an MNO.

5. Projected savings: The analysis predicts that greater outsourcing to TowerCos could yield economic savings of approximately €31b between 2019 and 2029. This potential is based on scenarios projecting the proportion of towers owned by neutral host TowerCos at 50%.

6. Capital release: The analysis predicts that increasing the outsourcing rate could release significant capital for MNOs, estimated at an additional €28b, which could be reinvested in network enhancements and the rollout of new technologies, including 5G. Actual capital released by neutral host TowerCos has outperformed this estimate at €53b (2019–2024) due to wider and quicker adoption than predicted.

7. Sustainability benefits: Our previous report estimated that if TowerCos could manage 50% of all tower deployments by 2030, approximately 109,000 fewer towers would be constructed. This could lead to a significant reduction in CO_2 emissions, avoiding 4 million tons of CO_2 annually, which is equivalent to removing about 200,000 cars from the roads each year.

In summary, the economic assessment underscores the critical role of neutral host TowerCos in driving efficiency, reducing costs and facilitating investment in wireless infrastructure, ultimately benefiting consumers and the economy.

Review of the last 10 years

Review of the sector and EWIA's role over the last 10 years

Over the past decade, the European mobile sector has undergone significant transformations, marked by technological advancements, regulatory changes and evolving market dynamics. Mobile network operators have increasingly recognized the value of their passive infrastructure. Many have carved out their tower assets and sold them to neutral host TowerCos, enabling them to focus on their core competencies while unlocking capital for further investments. This trend has led to a more efficient market structure, with neutral host TowerCos playing a vital role in managing and enhancing passive infrastructure.
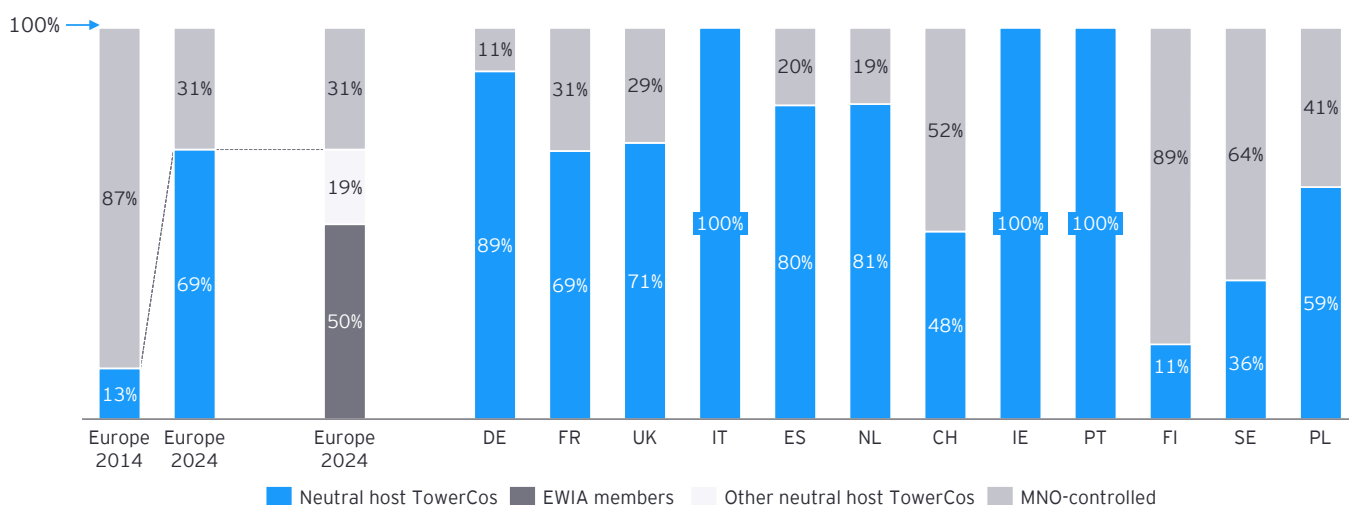
Investors value the benefits of the TowerCo model

Recent tower deals show continued strong M&A activity, with more than €71b in tower deals (since 2019), driven both by MNO tower carve-outs and strong acquisition-led growth pursued by neutral host TowerCos.

Neutral host TowerCos represent 69% of towers across Europe

Recent years have seen MNOs carving out their infrastructure, where today 69% of towers in Europe are owned by neutral host TowerCos and 31% are MNO controlled. Of the controlled towers, 16 percentage points are held by separate TowerCo business units with the intention of undertaking a future capital event or to capture some of the operational benefits of "independent" management.

Figure 4: Share of towers held by TowerCos, by country, 2024 (%)

Source: EWIA member companies, analyst reports, TowerXchange, EY-Parthenon analysis, 2024

Contribution of TowerCos and EWIA members

Neutral host TowerCos, especially those that are members of the EWIA, have supported in shaping the landscape of the European mobile sector over the past decade, making material contributions to the industry:

Capital released

Since 2019, neutral host TowerCos have facilitated the release of approximately €53b in capital through the sale of tower portfolios to neutral host TowerCos and new investors; EWIA members represent €40b of this figure. This capital could then be reinvested into network improvements, enabling MNOs to enhance coverage and service quality.

Annual capex investment

Since 2021, EWIA members have typically invested more than €2.5b annually in new deployments, site reinforcement and maintenance. This ongoing investment is crucial for the sustainability and resilience of the wireless infrastructure, particularly as demand for mobile connectivity continues to grow.

Efficient passive infrastructure sharing

Neutral host TowerCo co-location ratios, an indication of the efficiency of passive wireless infrastructure utilization, are higher than MNO-controlled co-location ratios, driven by MNO points of presence (PoPs) as well as other PoPs, including PoPs of emergency services networks (also known as public protection and disaster relief (PPDR)), fixed wireless access providers, IoT networks and broadcasters on mobile network towers. The main reason is the TowerCo business model, which fully focuses on building and operating neutral infrastructure and then attracting as many tenancies as possible.
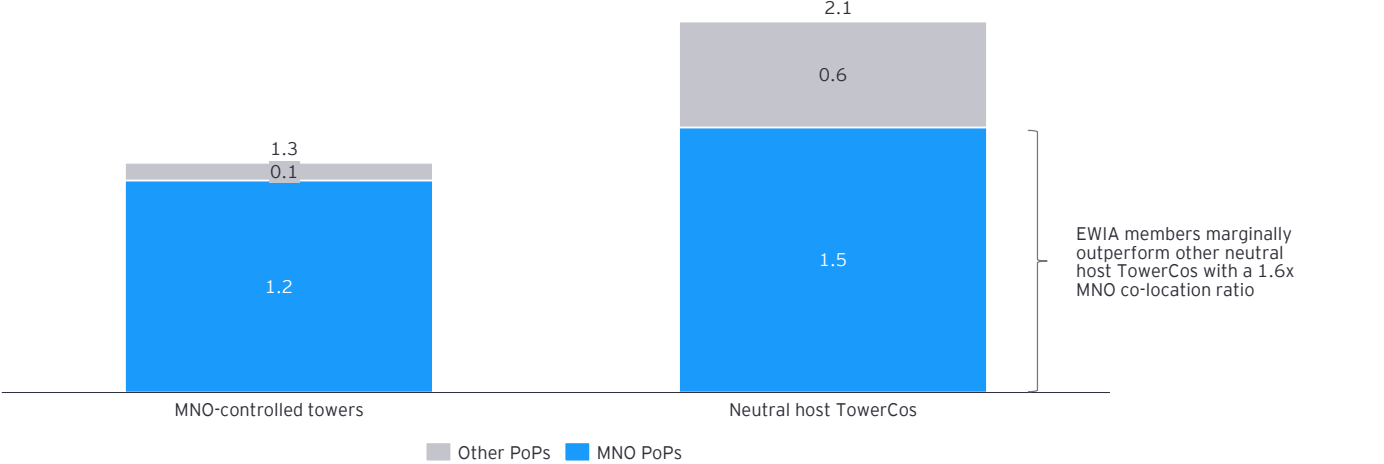
Economics savings delivered

Outsourcing to neutral host TowerCos is on track to deliver a predicted €31b in economic savings (2019–29), driven by the market's alignment with the underlying assumptions of the TowerCo-led scenario. Over the past few years, the proportion of towers owned by TowerCos has increased beyond the 50% target outlined in the scenario to 69%. The increased efficiency in tower management, coupled with higher rates of co-location and reduced operational costs, will continue to contribute to realizing the estimated €31b in economic savings by 2029. These developments underscore the critical role of neutral host TowerCos in advancing wireless infrastructure and supporting the EU's connectivity goals.

Initiatives to bridge the digital divide and enhance connectivity

Neutral host TowerCos and EWIA members have played a pivotal role in bridging the digital divide and enhancing connectivity in rural areas, on main transport routes, and indoors. By building additional sites and deploying Distributed Antenna Systems (DAS) and outdoor small cells, they have improved mobile coverage and capacity in locations where people everywhere people live, work, travel and gather.

Figure 5: Average co-location ratio, Europe, 2024

EWIA members marginally outperform other neutral host TowerCos with a 1.6x MNO co-location ratio
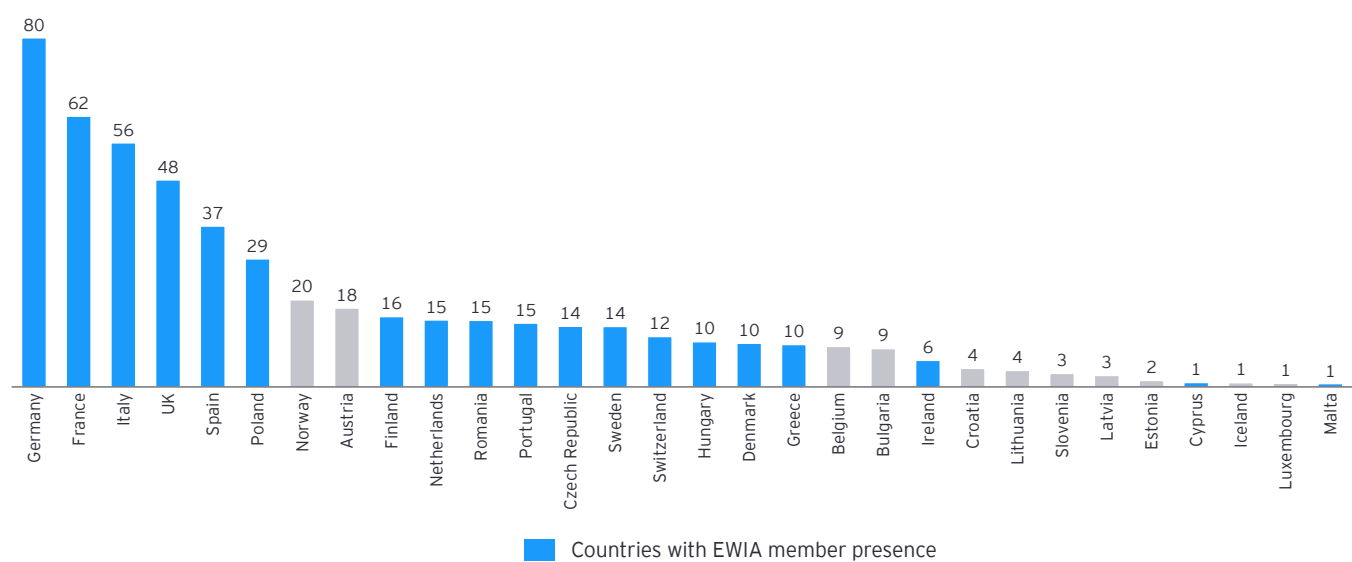
Other PoPs ▮ MNO PoPs

Market landscape today

There are currently around 526k macro tower sites in Europe, including rooftops and other larger structures that are used for wireless communication (excluding small cells and DAS). This number has grown by nearly 5% (2023 to 2024), of which 3% is an organic increase in new site deployments and 2% is attributable to an upward correction driven by improved accuracy in the underlying data definition and collection. In countries such as France, Spain, the UK and Germany, MNOs are increasing coverage in rural areas, resulting in new tower build programs that are often linked to coverage obligations in 5G licenses. Continued 5G rollouts are expected to drive further densification, in turn driving tower growth forecast at approximately 1% to 3% annually for the next five years.

Figure 6: European tower counts by country, 2024 (thousands)

Germany 80, France 62, Italy 56, UK 48, Spain 37, Poland 29, Norway 20, Austria 18, Finland 16, Netherlands 15, Romania 15, Portugal 15, Czech Republic 14, Sweden 14, Switzerland 12, Hungary 10, Denmark 10, Greece 10, Belgium 9, Bulgaria 9, Ireland 6, Croatia 4, Lithuania 4, Slovenia 3, Latvia 3, Estonia 2, Cyprus 1, Iceland 1, Luxembourg 1, Malta 1

■ Countries with EWIA member presence

Source: EWIA member companies, analyst reports, TowerXchange, Ofcom, interviews, research and analysis, 2024

Table 1: Key players in the European TowerCo sector, 2024

Market	Tower sites (thousands)	Sites controlled by neutral hosts	Key wireless infrastructure owners (EWIA member or over 10% market share)	MNOs
Germany	80	89%	**Neutral host TowerCos:** ATC, Phoenix Tower International, DFMG, Vantage Towers	Deutsche Telekom, Vodafone, Telefonica, 1&1 Drillisch
France	62	69%	**Neutral host TowerCos:** ATC, Cellnex, Phoenix Tower International, TDF **MNO controlled:** TOTEM	SFR, Bouygues, Free, Orange
Italy	56	100%	**Neutral host TowerCos:** Cellnex, EI Towers, Phoenix Tower International, INWIT	TIM, Vodafone, WindTre, Illiad
UK	48	71%	**Neutral host TowerCos:** Cellnex, Wireless Infrastructure Group, Cornerstone **MNO controlled:** MBNL	VMO2, Vodafone, EE, Three (Vodafone and Three have been granted regulatory approval to merge)
Spain	37	80%	**Neutral host TowerCos:** ATC, Cellnex, Vantage Towers **MNO controlled:** TOTEM	MasOrange, Telefonica, Vodafone, Digi
Poland	29	59%	**Neutral host TowerCos:** Cellnex **MNO controlled:** NetWorks!	Orange, Play, Plus, T-Mobile
Finland	16	11%	**Neutral host TowerCos:** Digita **MNO controlled:** Telia Towers, DNA Tower	Elisa, DNA, Telia
Netherlands	15	81%	**Neutral host TowerCos:** Cellnex, NOVEC/ALTHIO, Wireless Infrastructure Group	VodafoneZiggo, T-Mobile, KPN
Portugal	15	100%	**Neutral host TowerCos:** Cellnex, Vantage Towers	Meo, Vodafone, NOS, Digi (Digi is a new entrant as of November 2024)
Sweden	14	36%	**Neutral host TowerCos:** Cellnex **MNO controlled:** Telia Towers, Net4Mobility	Telia, Telenor, Tele2, Tre
Switzerland	12	48%	**Neutral host TowerCos:** Cellnex	Swisscom, Sunrise, Salt Mobile
Denmark	10	57%	**Neutral host TowerCos:** Cellnex **MNO controlled:** TT-Network	TDC, Telenor, Telia, 3
Ireland	6	100%	**Neutral host TowerCos:** Cellnex, Phoenix Tower International, Towercom, Wireless Infrastructure Group, Vantage Towers	Eir, Vodafone, Three
Others	125			
Europe	526			

Source: EWIA member companies, analyst reports, TowerXchange, EY-Parthenon analysis, 2024

Outlook

Market outlook

> **The next five years are pivotal to meeting the EU Digital Decade ambitions for a Gigabit Society**

The rollout of 5G across Europe is still in progress, with significant efforts required to achieve coverage in all populated areas and major transport paths to connect people and objects. While initial deployments have been successful, further work is needed to provide comprehensive 5G coverage, particularly in rural and underserved areas. This ongoing expansion is crucial for meeting the EU's connectivity goals and supporting the digital transformation of a wide range of sectors.

To achieve these targets, substantial funding continues to be necessary, with a particular focus on the role of passive infrastructure in supporting coverage and capacity extension. Public and private financing will play a crucial role, with private sources providing capital for a balanced approach to network expansion.

Neutral host TowerCos are expected to play a pivotal role in this process by facilitating additional capital release injected into telco's economics and making significant annual investments in passive infrastructure. These investments are a key source of private capital, driving the expansion of network capacity and coverage, and keeping Europe at the forefront of digital connectivity.

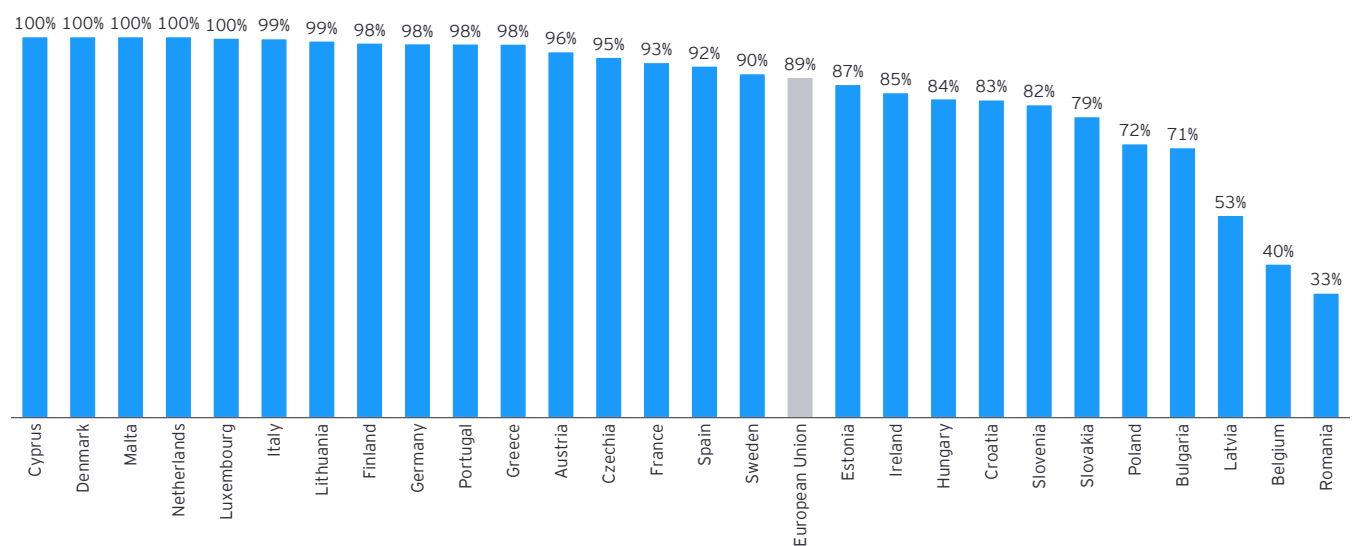<div style="border-left: 6px solid #1a9fff; padding-left: 1em;">

Uninterrupted 5G coverage everywhere people live, work, travel and gather

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Achieving full coverage and capacity is a key objective for the European Union, with specific policy targets aimed at delivering comprehensive connectivity across rural areas, indoor environments and key transport routes. These targets are essential for providing high-quality mobile services to all citizens and supporting the EU's broader digital transformation goals.

As of today, the 5G population coverage in Europe varies significantly between countries, with some nations achieving extensive coverage while others lag. The EU's goal is for all rural areas have access to high-speed mobile connectivity, aiming for comprehensive 5G coverage by 2025. This objective is critical for bridging the digital divide and ensuring that rural communities can benefit from the same level of connectivity as urban areas.

Figure 7: 5G household coverage

Source: European Commission, 2024

The performance quality over 5G networks varies greatly, making the 3.4 GHz to 3.8 GHz frequency band (the 5G primary band) crucial for high throughput and better service. Europe's network rollout averages only 50.6% coverage in this band, while spectrum assignments have been delayed in some Member States, this still highlights the significant investment needs going forward.

Figure 8: 5G household coverage in the 3.4 GHz to 3.8 GHz band

Source: European Commission, 2024

Indoor mobile coverage in Europe also shows considerable variation, with many buildings, particularly older structures, experiencing poor signal strength. The EU aims to improve indoor coverage so all citizens have reliable access to mobile services within their homes, workplaces and public buildings. Enhancing indoor coverage is essential for supporting the increasing reliance on mobile connectivity for both personal and professional activities.

Coverage along key transport routes, such as highways, railways and major transit hubs, is another priority for the EU. Currently, coverage along these routes is inconsistent, with some areas experiencing significant gaps. The EU's goal is to achieve uninterrupted 5G coverage along all major transport routes by 2025, providing travelers with

continuous access to high-speed mobile services. This is crucial for supporting the mobility of people and goods and enhancing the overall efficiency of the transport network.

The average download speed for mobile networks in Europe varies, with some countries achieving higher speeds than others. The European Union has set a goal of achieving an average download speed of 100 Mbps for mobile networks by 2025. This target is designed to ensure that all citizens have access to high-speed internet, supporting the increasing demand for data-intensive applications and services. Achieving this goal will require significant investments in network infrastructure and ongoing efforts to enhance network capacity.

Case study

TowerCos accelerate time to market when covering challenging areas

The emergence of the neutral host TowerCo model, which enables hosting multiple MNOs on one site, also results in increased investment capacity and expertise to cover challenging areas in a timely manner.

For instance, the multi-operators' coverage in 4G and 5G of the brand-new metro and urban rail lines in Grand Paris Express L15, L16, L17 and L18 is planned from the onset and made possible thanks to projects led by three different neutral host TowerCos.

Grand Paris Express is a major transport infrastructure project bringing 200 km of new automatic metro lines and 68 stations from 2024 to 2031. Neutral host TowerCos have the expertise to integrate seamlessly inside the global project design, during the civil works execution and guarantee and validate the overall performance in tunnels, trenches and stations.

Each line requires the deployment of hundreds of distributed antenna systems designed for multi-MNO use, bringing in the end increased consumer satisfaction and choice.

Source: Grand Paris Express, EWIA members' publications

Further funding required for 5G wireless networks

Meeting these ambitious targets will require significant funding from both public and private sources. The total investment needed for the necessary wireless infrastructure is estimated to be €100b[1], of which approximately €25b[2] is expected to relate to passive infrastructure. Public-private cooperation will be essential to mobilize the required capital and ensure that investments are directed toward areas with the greatest need.

In addition to network investment, to realize the full benefits of next-generation mobile networks will require access to secure, resilient and sustainable energy and access to high-speed fiber backhaul.

Incremental funding for other public service networks

There is a growing need for incremental funding to support the deployment of private networks tailored for industrial applications, such as the Future Railway Mobile Communication System (FRMCS) for railways and other public service use cases. As industries increasingly rely on advanced connectivity solutions to enhance operational efficiency and safety, the demand for dedicated, high-performance networks is expected to rise significantly. The implementation of FRMCS, which aims to provide seamless communication for railway operations, requires substantial investment in infrastructure that can support low-latency, high-reliability connectivity. Additionally, public service sectors, including emergency services and public safety agencies, necessitate robust communication networks to facilitate effective response and coordination.
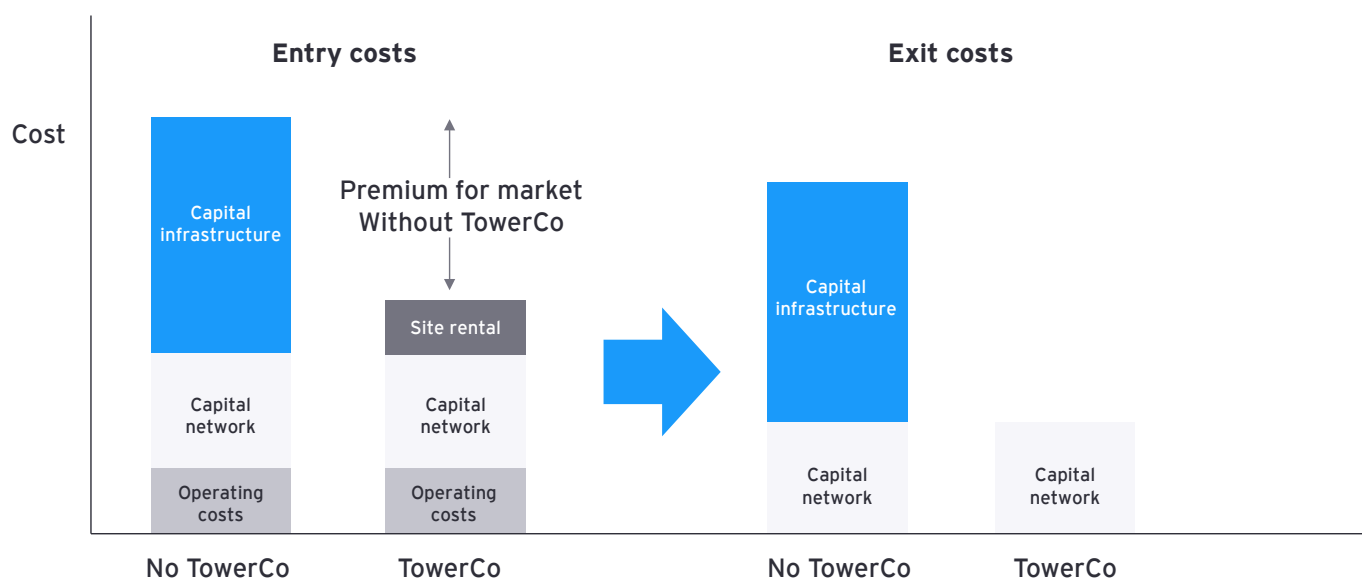
While some of these demands can be supported through 5G wireless networks, private access networks are expected to be required for specialized applications that require very high availability and stringent security.

1. The estimate, which ranges from €65b to €135b, is based on upgrades and new deployments required to deliver 5G stand-alone to the EU-27, the United Kingdom and the European Free Trade Association (EFTA) countries. Estimates include network upgrades at €35b, main transport route coverage from €30b to €85b, and incremental rural coverage at €15b. Incremental rural coverage estimates are based on achieving 99% landmass coverage for 4G. Source: EY-Parthenon research and analysis; "Investment and funding needs for the Digital Decade connectivity targets," European Commission (12 July 2023).
2. The estimate ranges from €10b to €40b and relates to the passive infrastructure required to support network upgrades, transport coverage and incremental rural coverage.

Competition and consumer benefits

Neutral host TowerCos enable competition in several ways. They lower the cost of entry and time to market for MNOs into mobile markets by removing the most significant part of capital expenditure, the infrastructure on which the networks are built. Rather than making substantial investments in infrastructure that takes a long time to recover, operators can opt for lower operating expenditures by leasing access to towers. This also de-risks market entry by reducing the cost of unsuccessful ventures, effectively reducing the barriers to exit.

Figure 9: Entry and exit cost assessment with and without TowerCos

This reduction in entry cost and time to market levels the playing field between large and smaller MNOs, promotes new entrants and fosters increased competition for consumers on a retail level and MVNOs on a wholesale market level. European MNOs that share networks have subsequently offered reduced prices and improved coverage and quality.

The development of the TowerCo business model has led to increased availability and quality of mobile connectivity, increased competition intensity, reduced price of mobile connectivity, increased uptake of mobile connectivity, improved service quality and greater digital inclusion. These benefits are particularly significant for consumers from disadvantaged backgrounds.

Shared mobile towers can also reduce the marginal cost of mobile connectivity services by supporting a drop in operating expenditure for MNOs. Part of these savings on marginal cost can be passed on to consumers as a drop in price, depending on the prevailing intensity of competition in the downstream market. Estimates vary, but pass-through rates of cost reductions to consumers can be expected to be up to 70%.[3]

In a study by Koutroumpis, Castells and Bahia (2023), it was found that European operators that entered into network sharing agreements or a TowerCo market presence led to increased downstream competition between MNOs benefiting consumers in terms of higher network quality, higher speeds, as well as lower prices. Smaller operators tended to benefit the most in terms of cost savings that allowed them to reduce prices and improve and expand their networks.

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3.   Industry sources estimate the cost reductions pass-through rate at consumers at 30%–65%, while economic research by Duso and Szücs (2017) estimates that cost pass-through from a network level to retail tariffs in the case for energy markets to be 60%–70%.

Case study

Digi entry into the Portugal market

Neutral host TowerCos played a crucial role in enabling Digi's entry into the Portuguese telecommunications market by providing shared infrastructure solutions. This collaboration facilitated rapid network deployment, reduced costs and enhanced connectivity, benefiting end customers through increased competition and lower prices.

Digi launched commercial operations as an MNO in Portugal in November 2024 supported by a long-term strategic partnership with Cellnex to deploy 2,000 points of presence. Cellnex Portugal's investments are part of its efforts across 12 countries to support the swift and economical introduction of 5G, enhancing mobile communications coverage and quality of service for both incumbents and new entrants.

By granting Digi access to existing towers and small cells, neutral host TowerCos allowed for quick and cost-effective network deployment. The use of shared infrastructure curtailed capital expenditure and environmental impact, while providing comprehensive coverage in rural areas, transport routes and indoor venues. This strategic support enabled Digi to establish a strong network presence without the need for extensive capital investment in new infrastructure.

"This partnership is a testament to the pro-competitive nature of the Cellnex wholesale, neutral and independent industrial positioning, allowing Portugal to enjoy a more economically rational utilization of its telecom infrastructures," said Nuno Carvalhosa, Managing Director of Cellnex Portugal.

Source: Cellnex website, market participant interviews

Technology evolution

Technological advancements in the mobile sector have been pivotal in supporting the achievement of connectivity targets set by the EU where neutral host TowerCos play a key role in enabling efficient deployment of new technologies. The evolution from 4G to 5G has significantly enhanced network capabilities, offering faster speeds, lower latency and greater capacity. These improvements are crucial for meeting the EU's Gigabit Society ambitions, which aim for universal high-speed internet access and comprehensive 5G coverage.

The ongoing development of 5G technology, including the deployment of small cells and the integration of edge infrastructure and cloud RAN, further supports the expansion of network capacity and coverage. Additionally, advancements in radio technology and the anticipated transition to 6G will continue to drive innovation, enabling new use cases and improving service quality.

Overall, these technological evolutions are essential for achieving the policy targets of full coverage and capacity, particularly in rural and underserved areas, and for keeping Europe competitive in the global digital economy.

■ Radio technology

Successive technological developments have driven mobile usage and data consumption. The rollout of 5G is still underway but has already driven data demand growth by providing new use cases for mobile services. The main benefits of 5G include faster speeds, lower latency and higher network capacity. The industry is starting to consider the role that satellite communications (also called non-terrestrial networks (NTNs)) can play in augmenting rural mobile coverage and the shape 6G networks will take.

The key differentiator for 5G (vs. 4G) is that it enables deployment of more spectrum for mobile, while making mobile networks more adaptive thanks to a high degree of software and virtualization. 6G is expected to continue this trend with a significantly expanded spectrum and new approaches such as dynamic digital twins of the surrounding environment and AI-generated waveform optimization.

Quantum radio technology is being defined and experimented with. It is expected to enhance signal reception capability with several potential benefits, including lower energy consumption and expanded mobile network coverage.

Whatever new radio technologies are emerging in the future, terrestrial networks using large antennas on ground and rooftop towers will likely prevail as the backbone of mobile connectivity.

The full benefits of future mobile connectivity are interlinked with successful fiber optic wireline networks that can be used for mobile backhaul and interconnections, as well as access to reliable and sustainable energy.

Table 2: Mobile technology overview

Metric	4G/LTE at launch	4G LTE Advanced	5G at release	5G Advanced	6G expectations
Year	2010	2018/2019	2019/2020	2022 onward	2030 onward
Downlink speed	100 Mbps	1 Gbps	10 Gbps	20 Gbps	1,000 Gbps
Latency	100 ms	10 ms	1–10 ms	1–10 ms	<1 ms
Spectrum range	800 MHz to 2.6 GHz	800 MHz to 2.6 GHz	700 MHz to 3.5 GHz	2.1 GHz to 3.6 GHz, and 26/42 GHz	7 GHz to 16 GHz; 100 GHz to 300 GHz

Source: Ericsson, 3GPP, GSMA, Qorvo, EY interviews and analysis

Neutral host TowerCos' towers are well suited to accommodate additional 5G active equipment
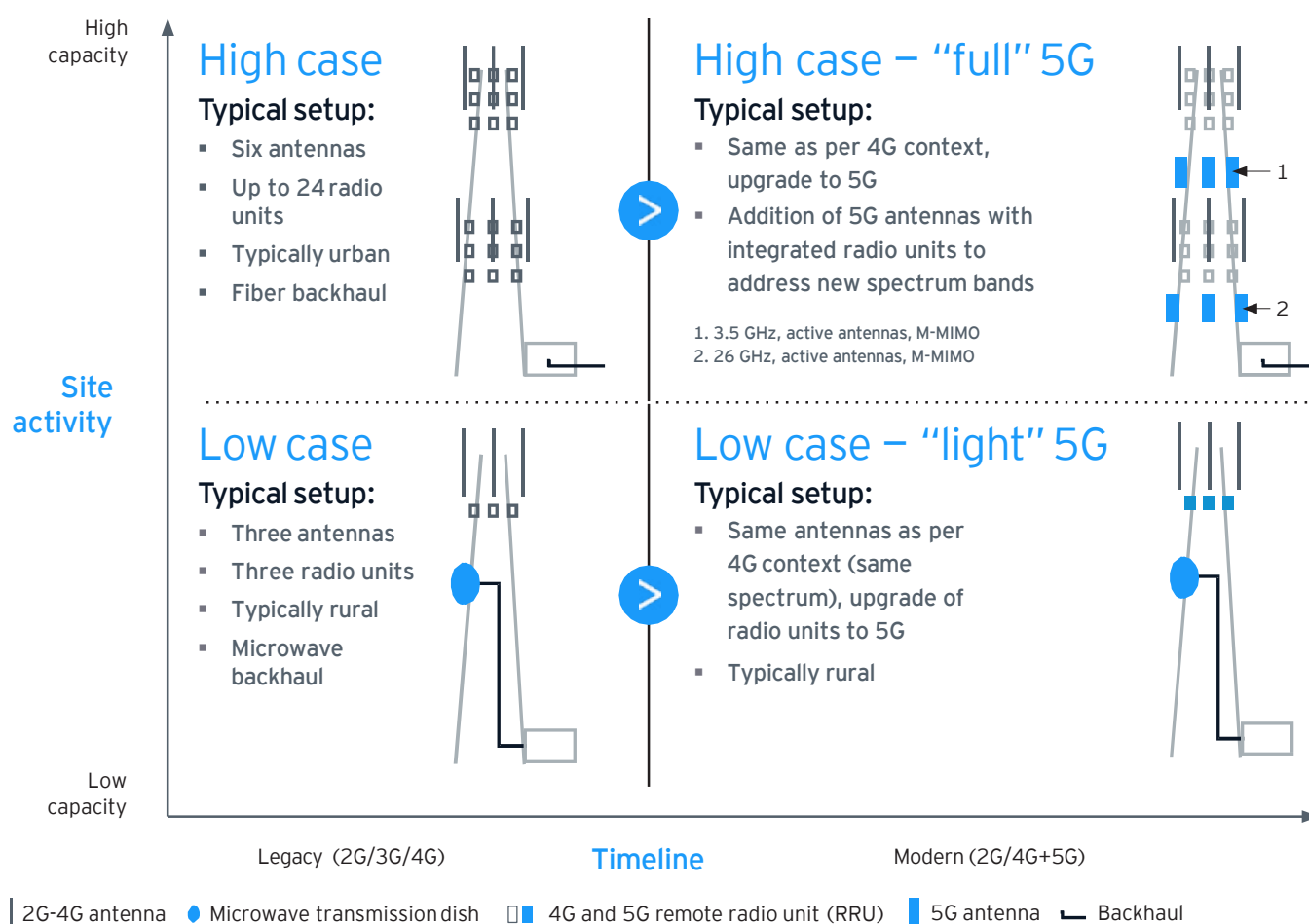
The impact of the transition to 5G will depend on the activity at a given site. In most cases, MNOs will need to install new 5G equipment, except where they deploy "light" 5G; neutral host TowerCos' towers are better suited than MNOs to accommodate this additional active equipment.

At low-capacity sites (which are typically located in rural areas), an upgrade of radios to the 5G New Radio standard may suffice, leading to limited increases in equipment. However, high-capacity sites (typically located in urban areas) already have a significantly higher density of active equipment hosted (antennas and remote radio units).

This density is expected to increase further going forward, as additional 5G antennas and radios will need to be installed.

Neutral host TowerCos' towers are typically built to accommodate multiple MNOs with multiple antennas, whereas MNOs' towers are typically not built to host many antennas and radios. TowerCos, therefore, will be able speed up the rollout of 5G (and lower the rollout cost), particularly in dense areas, as MNOs will likely not be able to deploy the number of additional antennas and radios needed on their own towers without fortifying them.

Figure 10: Indicative 5G antenna upgrades, by site activity

High case
Typical setup:
- Six antennas
- Up to 24 radio units
- Typically urban
- Fiber backhaul

High case − "full" 5G
Typical setup:
- Same as per 4G context, upgrade to 5G
- Addition of 5G antennas with integrated radio units to address new spectrum bands

1. 3.5 GHz, active antennas, M-MIMO
2. 26 GHz, active antennas, M-MIMO

Low case
Typical setup:
- Three antennas
- Three radio units
- Typically rural
- Microwave backhaul

Low case − "light" 5G
Typical setup:
- Same antennas as per 4G context (same spectrum), upgrade of radio units to 5G
- Typically rural

Site activity

High capacity / Low capacity

Legacy (2G/3G/4G) — Timeline — Modern (2G/4G+5G)

Legend: 2G-4G antenna | Microwave transmission dish | 4G and 5G remote radio unit (RRU) | 5G antenna | Backhaul
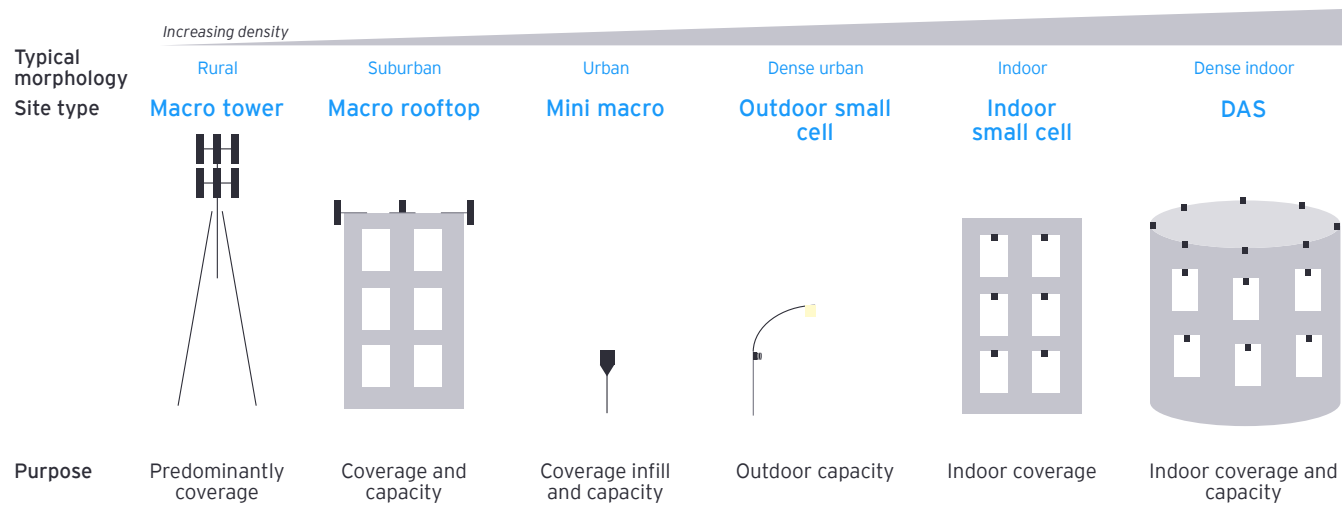
Source: EY professional interviews and analysis

Distributed antenna systems and small cells are opportunities for TowerCos to offer neutral host active networks

Small cells and DAS technologies are used by MNOs to supplement macro networks where additional macro sites would be inadequate or cost-prohibitive to maintain reliable coverage in buildings, on campus-type settings or in dense urban areas.

In essence, small cells and DAS are smaller antennas used to augment and densify existing networks.

Figure 11: Site types and their role in network architecture

	Rural	Suburban	Urban	Dense urban	Indoor	Dense indoor
Typical morphology						
Site type	Macro tower	Macro rooftop	Mini macro	Outdoor small cell	Indoor small cell	DAS
Purpose	Predominantly coverage	Coverage and capacity	Coverage infill and capacity	Outdoor capacity	Indoor coverage	Indoor coverage and capacity

Increasing density

Source: EY-Parthenon

Small cells differ from DAS in both the operating model and use case

Small cells are individual, low-power radio elements and typically serve a single MNO but can serve more under a neutral host model. The indoor variant is typically used in small and midsize buildings − commercial venues with limited footprint but still significant usage volume (e.g., branch offices, restaurants, retail stores).

DAS serve multiple MNOs and are typically suited to high-profile, multi-operator environments characterized by high user density subscribed to several different operators (e.g., airports, stadia, convention centers, shopping malls).

DAS are provided by multiple players, including TowerCos, and specialist neutral host operators.

Edge infrastructure and cloud RAN are emerging concepts in mobile network architecture

Edge computing involves processing data closer to end-user devices or local networks. Unlike traditional centralized computing models, where data is sent to distant data centers, edge computing brings computational resources nearer to end users. This approach reduces latency and bandwidth use.
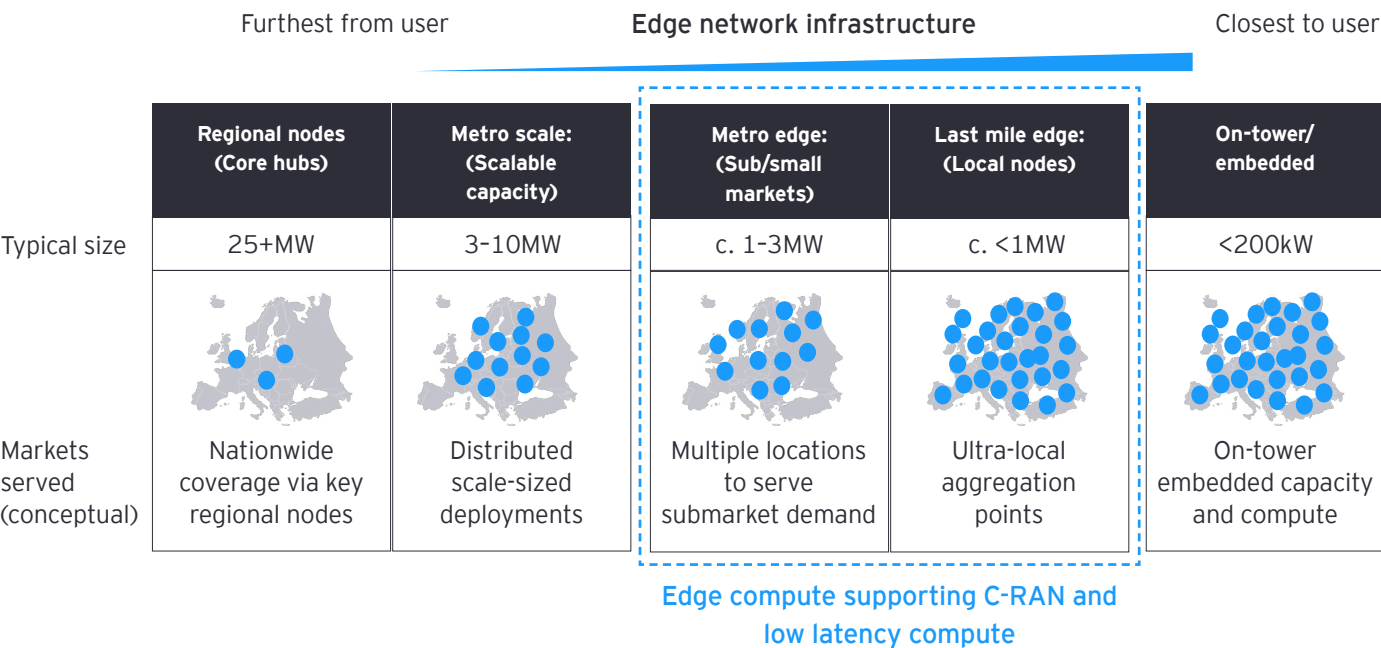
Artificial intelligence (AI) is also expected to have an impact on the need for edge infrastructure across multiple dimensions. Most notably, AI inference (i.e., AI models that are run in production) will fall along a spectrum of performance and latency requirements similar to traditional workloads. Some of these AI inference workloads will need to be hosted closer to end users and devices. Additionally, AI relies upon the constant feedback loop of new data and end-user feedback to improve over time. As more data will be collected from end users and devices, the need for data processing at the edge will increase.

Other applications, such as autonomous vehicles, real-time video analytics, augmented reality (AR), virtual reality (VR) and smart city technologies, also benefit from edge computing. These applications rely on rapid processing to function effectively, necessitating the use of edge computing for real-time data analysis and output.

Traditionally, mobile sites have been equipped with computers that manage signal modulation, while more substantial computing tasks are performed in centralized data centers.

Edge computing and Cloud RAN (C-RAN) are complementary concepts in the evolution of mobile networks. C-RAN centralizes the radio access network's processing at a local node that supports multiple towers, which enhances resource allocation and efficiency. Edge computing decentralizes data processing and compute, bringing it closer to end users from regional nodes and metro scale data center facilities. Together, they represent a dual approach to enhancing network performance and efficiency, with C-RAN focusing on improving radio network operations and edge computing on reducing latency and bandwidth for data-intensive applications. TowerCos frequently implement shelters and small offices close to the tower as part of the infrastructure solution that could become a natural place to host computing equipment needed for both edge computing and C-RAN.

Figure 12: Edge architecture

Furthest from user — Edge network infrastructure — Closest to user

	Regional nodes (Core hubs)	Metro scale: (Scalable capacity)	Metro edge: (Sub/small markets)	Last mile edge: (Local nodes)	On-tower/ embedded
Typical size	25+MW	3–10MW	c. 1–3MW	c. <1MW	<200kW
Markets served (conceptual)	Nationwide coverage via key regional nodes	Distributed scale-sized deployments	Multiple locations to serve submarket demand	Ultra-local aggregation points	On-tower embedded capacity and compute

Edge compute supporting C-RAN and low latency compute

Source: Wolf, Olivier; Loewer, Ulrich, et al, *The Edge: Are you ready for a new age of edge infrastructure?* EY publication, 22 November 2023

Digital TowerCo

Artificial intelligence, improved imaging and computational technologies are already driving the rise of "digital TowerCos" leveraging the powerful use cases of digital twins. AI, like in most businesses, stands to have far-reaching impacts on the TowerCo sector within Europe. Three areas where this influence could be most noticeably felt are:
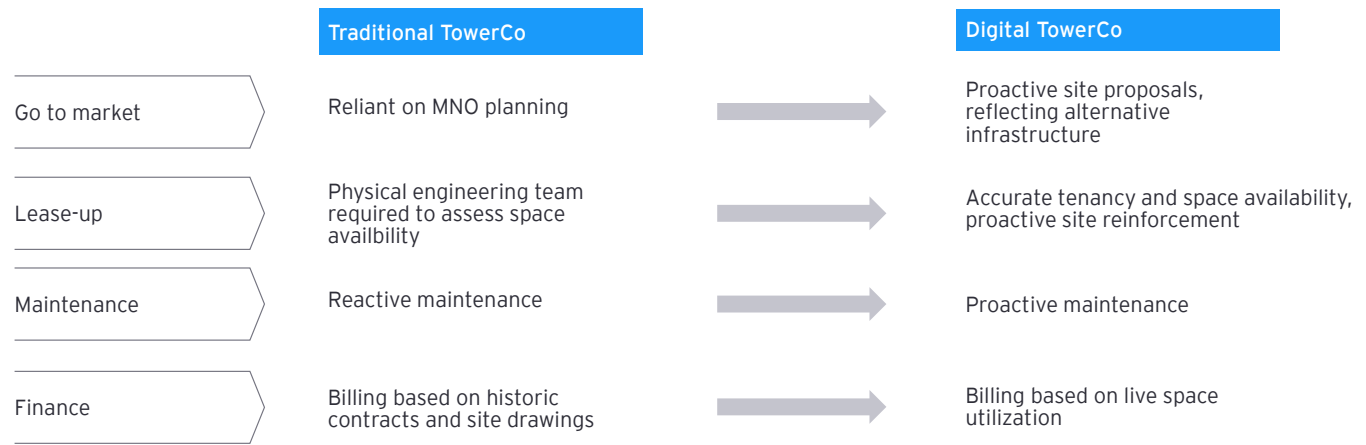
1. Back-office operational efficiency could be impacted. AI could be leveraged to automate many day-to-day activities, freeing up human resources for tasks requiring higher cognitive skills and strategic decision-making.

2. AI can be leveraged for real-time monitoring and adjustment of TowerCo operations and execution, leading to lower operational costs.

3. Predictive maintenance powered by AI could enhance infrastructure management. With AI's ability to process and analyze large amounts of data, potential operational issues and faults can be identified before they occur. Timely maintenance actions can prevent faults from escalating into major problems, potentially preventing the disruption of services, lowering overall maintenance and repair costs.

However, the specific impact of AI on the TowerCo sector will depend heavily on the nature and extent of AI deployment across the industry, which may vary widely. Digital twins are virtual replicas of physical objects, systems or processes designed to simulate, monitor and analyze their real-world counterparts in real time. This is done through the re-creation of 3D computerized "living models" through advanced imaging and integration of data from databases, sensors, cameras, IoT devices and others.

Digital twins of physical tower assets provide numerous benefits to tower operators:

1. Digital TowerCos can unlock new revenue streams through improved, more accurate and more accessible understanding and analysis of physical space and usage on tower assets.

2. Digital twins can improve infrastructure stability through predictive maintenance, reducing the costs of unexpected downtime.

3. Organizations can improve the efficiency of their operations by leveraging real-time data.

Figure 13: Digital TowerCo comparison

	Traditional TowerCo		Digital TowerCo
Go to market	Reliant on MNO planning	→	Proactive site proposals, reflecting alternative infrastructure
Lease-up	Physical engineering team required to assess space availbility	→	Accurate tenancy and space availability, proactive site reinforcement
Maintenance	Reactive maintenance	→	Proactive maintenance
Finance	Billing based on historic contracts and site drawings	→	Billing based on live space utilization

Similar AI and digital twin approaches applied to other sectors are estimated to multiply the data volumes that the MNO networks will have to manage. TowerCos have a fundamental role in the construction of robust infrastructure that can support the increased traffic.

"

In the realm of digital TowerCos, AI emerges as the architect of efficiency, transforming data into strategic foresight and operational agility, paving the way for a future where digital twins and predictive intelligence redefine the landscape of infrastructure management.

Leonardo Torres
VP Chief Commercial Officer Europe at ATC

Regulatory outlook

Overview: how regulation impacts market and technology evolution

Regulatory frameworks play a crucial role in enabling market and technology evolution within the European mobile sector. The European Electronic Communications Code (EECC) is the key regulatory instrument that has shaped the European telecom market to date, with the Gigabit Infrastructure Act and forthcoming Digital Networks Act (DNA) paving the way for the next wave of high-speed connectivity and 5G network rollouts.

The EECC has successfully promoted competition, encouraged investment in very high-capacity networks, and established consistent principles for spectrum assignment and network sharing. These measures have created a predictable regulatory environment that fosters co-investment and the development of wholesale-only business models, facilitating the expansion of network infrastructure into suburban and rural areas.

The GIA is intended to extend the previous regulations in order to ease the rollout of Very High Capacity Networks (VHCNs), specifically fiber and 5G services. As well as streamlining and accelerating the permitting process for high-speed broadband rollout, the GIA includes an obligation on landrights-holders to negotiate with network operators (including TowerCos) "in good faith."

The DNA was identified as a key priority for the new European Commission as part of its 2025 Competitiveness Compass, building on the recommendations of the Draghi report on EU competitiveness and Letta report on development of the EU single market. These reports highlight the need for fresh regulatory measures to close the innovation gap in Europe, underscoring the importance of simplifying (rather than simply expanding) regulations to drive innovation, attract investment and keep Europe competitive in the global digital economy.

The GIA grants TowerCos new rights of access while reflecting the neutral host sector's natural business practices

An agreement on the GIA was reached in February 2024, after the trilogue between the European Commission, the European Parliament and the European Council. Following this, the GIA came into force on 11 May 2024 and will be fully applicable from November 2025.

The GIA seeks to address the main shortcomings of the Broadband Cost Reduction Directive (BCRD) by extending many of the rights and obligations granted to communication providers to cover "associated facilities" (such as TowerCos) as well. Potential benefits to TowerCos include:

- Reduced barriers to the deployment of wireless infrastructure by streamlining local permitting and permissions. A persistent complaint among network operators and associated facilities providers (such as TowerCos) was the continued difficulty and cost of obtaining permits and coordinating public works.

- Access to existing public infrastructure (such as buildings, rooftops, ducts and poles) on fair, reasonable and nondiscriminatory terms, making it easier for neutral host TowerCos to install the additional rooftop infrastructure to support the densification of 5G networks.

- Access to private buildings and rooftops in remote and rural areas, provided that there is no VHCN of the same type operating in the area and no existing physical infrastructure that would be suitable for the network operator to use instead.

- Requirements for land managers to negotiate access to any acquired land "in good faith," providing a measure of protection for existing infrastructures and investments (e.g., reducing the ability for speculators to demand "ransom rents").

- In addition, the fees public authorities charge for permits are to be capped at their administrative cost, while compensation is to be awarded to network operators for damages caused if public authorities fail to meet the deadlines the GIA sets out.

At the same time, many of the obligations on physical infrastructure owners set out in the GIA align naturally with the incentives of a neutral host TowerCo, which seeks to maximize co-location by providing MNOs with access to physical infrastructure at prices that beat self-supply. For example:

- Article 3(1) of the GIA specifies that network operators (including TowerCos) must meet any reasonable request for access to their physical infrastructure on fair and reasonable terms and conditions (including pricing).

- Article 3(2) explains that, when it comes to setting fair and reasonable prices, access providers must be given a fair opportunity to recover their costs (including investment costs and depreciation), while giving due consideration to market conditions, different business models and the access provider's business plans. Business models may vary among undertakings that primarily provide associated facilities and offer physical access to more than one undertaking that provides, or that is authorized to provide, public electronic communications networks.

"

EWIA members are already playing an active role with our shared telecom infrastructure model, a key enabler to achieve the significant investments needed in an efficient and sustainable way.

We are ready to mobilize more investment. The era of hyper-connectivity is here.

Marco Patuano
Chair of EWIA and Chief Executive Officer of Cellnex

The DNA is identified in the EU's 2025 Competitiveness Compass report as a key strategic pillar for closing the innovation gap, fostering incentives to build the networks of the future

Building on the recommendations set out in both the 2024 Draghi report, *The future of European competitiveness,* and the 2024 Letta report, *Much more than a Market,* the Commission's new competitiveness roadmap, *A Competitiveness Compass for the EU,* highlights the importance of balanced and adaptable regulations that keep up with technological advancements to boost Europe's competitiveness in the global market.

The Draghi report on EU competitiveness focuses on obstacles to innovation and growth within the European Union, calling for a supportive and flexible regulatory framework to foster an environment that encourages innovation. Similarly, the Letta report advocates for regulatory simplification rather than expansion, finding that excessive regulation can create unnecessary barriers for businesses, particularly in the digital sector.

The Competitiveness Compass also emphasizes the importance of state-of-the-art digital infrastructure for productivity – including the need for more fiber, satellite, 6G and cloud computing solutions – and hence considers how to encourage investments in secure, fast, reliable connectivity. Recognizing that Europe is far behind its own Digital Decade targets, it names the forthcoming Digital Networks Act as a key tool to help correct course and unlock growth in the EU's digital ecosystem.

Slated to be released in the fourth quarter of 2025, the Commission's proposal for a Digital Networks Act is expected to transform the regulatory landscape for electronic communications in Europe, replacing the existing EECC directive with a new regulation that addresses several key challenges in the current regulatory framework, including:

- **Market fragmentation:** The 27 EU Member States currently represent separate telecom markets with different regulatory frameworks, leading to subscale communications providers. The DNA is expected to forge an integrated, single market for connectivity to boost European operators' global competitiveness.

- **Spectrum management:** Radio spectrum is currently licensed separately in each member state, making it more challenging to scale across borders. By facilitating a more coordinated EU spectrum policy, the DNA is expected to create economies of scale for cross-border operators and stimulate investment in 5G and future 6G networks.

- **Convergence:** The EECC treats providers of similar services differently depending upon the technology they are using (e.g., cloud providers vs. telecom providers), leading to inefficiencies. With regulatory convergence, the DNA is expected to increase incentives to build advanced digital networks by reducing complexities and compliance costs.

Conclusions

As the end of the Digital Decade approaches, Europe faces a continued challenge in terms of global competitiveness. Secure, robust, future-proofed digital networks are recognized as a key enabler of innovation and growth by European and Member State policymakers alike, who have proposed a range of measures to facilitate the continued rollout of VHCNs.

However, public policy alone may not plug the gap. Delivering on Europe's connectivity targets requires substantial private and public funding, and neutral host TowerCos play an integral role, with significant investment that releases capital back to MNOs, fostering a more innovative ecosystem. This, in turn, brings operating efficiencies and sustainability benefits that promote competition among MNOs, ultimately benefiting consumers with improved service and lower prices.

The growth of the neutral host TowerCos business model is an established global trend; finally, Europe is catching up. Recent changes to the regulatory landscape, such as the extension of access rights to TowerCos under the GIA, have started to acknowledge and leverage the neutral host TowerCos' positive contribution to Europe's connectivity and competitiveness.

As it shapes the forthcoming Digital Networks Act, the Commission should consider the needs and incentives of passive infrastructure providers equally, alongside those of the traditional (and emerging) communications providers, if Europe is to unlock the full scope of economic, competition and sustainability benefits that neutral host TowerCos have to offer.

> "
>
> The neutral host TowerCo sector has reached critical mass in Europe, becoming an essential source of investment to support the rollout of 5G and advanced wireless networks. The TowerCo business model is playing a key role in improving connectivity with its clear commercial incentive to enable as many networks as possible to use its neutral host infrastructure.
>
> **Scott Coates**
> CEO Wireless Infrastructure Group

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Appendices

Appendix 1

TowerCo fundamentals

TowerCos operate "passive" infrastructure enabling wireless networks to provide services

TowerCos develop, acquire and operate mobile network towers. They invest in mobile network towers, small cell networks, and associated utility and real estate rights for the purpose of providing wholesale access to MNOs and other network operators on a shared basis. This provides an alternative to MNOs managing their own passive infrastructure. For MNOs, outsourcing passive wireless infrastructure to TowerCos helps to free up capital.

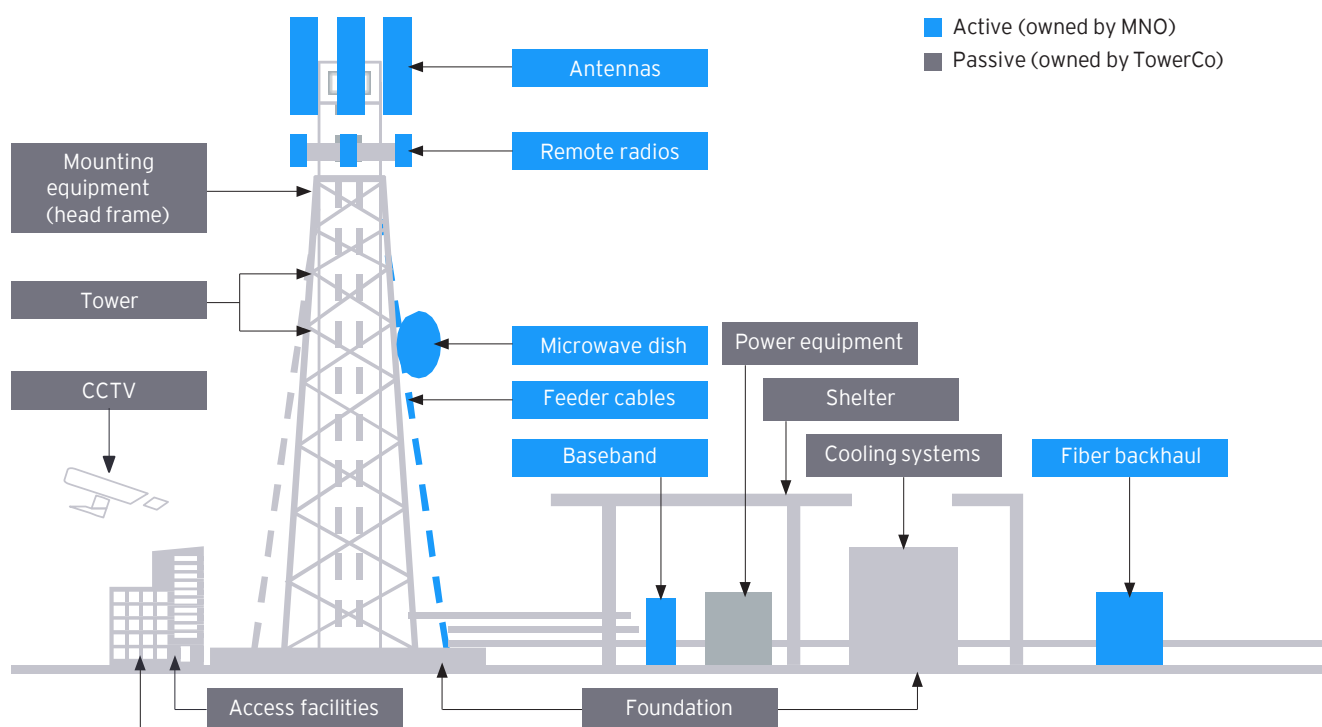When offering passive infrastructure services to MNOs, TowerCos' responsibilities typically include:

- Provision of the physical site/rooftop and maintenance of related real estate contracts
- Installation and management of the passive infrastructure, including tower structure, civil works, fences, shelters, and, in some cases, power supply and cooling systems

- Health and safety compliance at the site
- Access to infrastructure space and provision of services to MNOs and other network operators

Meanwhile, MNOs and other network operators' responsibilities include:

- Rental of passive infrastructure from TowerCos to install active equipment, including radio units, baseband units and other equipment
- Ownership of the feeder cables connecting antennas with radio equipment and the fiber connection to the backhaul/core network, although dark fiber backhaul access is increasingly provided by TowerCos as a value-added service (among other things)

Figure 14: Illustration of active and passive equipment on a typical ground-based tower site

Legend:
- Active (owned by MNO)
- Passive (owned by TowerCo)

Labels: Antennas, Remote radios, Mounting equipment (head frame), Tower, CCTV, Microwave dish, Feeder cables, Baseband, Power equipment, Shelter, Cooling systems, Fiber backhaul, Access facilities, Foundation
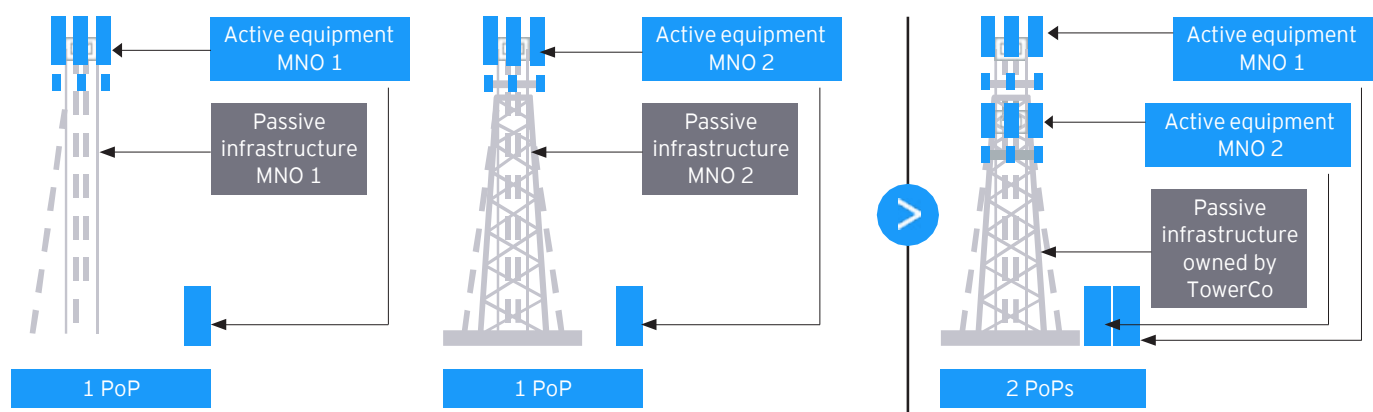
Legal rights to occupy the area of the site with passive infrastructure

TowerCos add value by reducing the duplication of infrastructure

Where MNOs can share passive infrastructure, there is less need to build multiple towers at the same geographical location. TowerCos operate the passive infrastructure and can accommodate multiple MNOs, which then focus on operating the active equipment at the site.

Figure 15: TowerCo role in infrastructure sharing (conceptual)

A point of presence is defined as a site where an MNO is "present" and provides a network signal. If an MNO provides multiple networks (e.g., 2G, 3G and 4G) from the same site, this presence is still counted as one PoP. The co-location (or tenancy) ratio for a single tower is defined as the number of PoPs hosted on that tower.

For instance, in the left-hand part of Figure 15, each MNO operates one site that hosts its own active equipment. A typical macro-PoP entails three panel antennas and three radios. In this case, each tower is defined as having one PoP (and a co-location ratio of 1).

However, a tower can have multiple PoPs; for example, in the right-hand part of Figure 15, the TowerCo hosts two MNOs on its infrastructure. In this case, the tower is defined as having two PoPs (and a co-location ratio of 2). When looking at the overall portfolio of an MNO or a TowerCo, the co-location ratio is a key performance metric, e.g., if a TowerCo operates 1,000 towers and hosts 2,100 PoPs, it has a co-location ratio of 2.1.

Neutral host TowerCos will also often have a presence of "other" PoPs located on their towers. These other PoPs include PoPs of fixed wireless access providers, emergency services networks, IoT providers, broadcast antennas, etc.

TowerCo merger and acquisition markets are actively enabling capital release, capital recycling, liquidity and a wide spectrum of investor participation

Table 3: Selected European TowerCo deals, 2019–24

Year	Country	Seller	Buyer	Tower count	Deal value (€)
Capital released to MNOs through transactions involving a Neutral Host TowerCo					
2024	Serbia, Bosnia & Herzegovina and Montenegro	Telekom Srbija	Actis	1,800	N/A
2024	Pan-European	Vodafone (stake in Vantage Towers)	KKR and GIP	62,500	1,300
2024	Italy	Vodafone and TIM	Ardian	25,000	250
2024	Ukraine	Turkcell	DVL Telecom	1,200	483
2024	Luxembourg	Proximus	InfraRed Capital	267	108
2023	Pan-Europe	Vodafone	KKR and GIP	45,900	500
2023	Malta	Go	BMIT Technologies	280	47
2023	Bulgaria, Croatia, Slovenia	United Group	TAWAL	4,800	1,220
2023	UK	Liberty Global	GLIL Infrastructure	-	413
2023	Belgium	Telenor Communications	Cordiant Capital	25	5
2022	Pan-Europe	Vodafone	KKR & GIP, PIF	45,900	4,900
2022	Italy	Vodafone and TIM	Ardian	25,000	1,300
2022	Germany, Austria	Deutsche Telekom	Brookfield & DigitalBridge	40,500	8,925
2022	Belgium	Telenet	Digital Bridge	3,322	745
2021	Pan-Europe	Vodafone	*Public markets sale	45,900	2,300

Appendix 1: TowerCo fundamentals

2021	Iceland	Siminn	Ardian	500	520
2021	Germany, Spain, Latam	Telefonica/Telxius	ATC	31,000	7,700
2021	Poland	Polkomtel	Cellnex	7,000	1,600
2021	Netherlands	Deutsche Telekom	Cellnex	3,150	450
2021	Malta & Cyprus	Monaco Telecom	Phoenix Tower International	830	200
2021	Iceland	Sýn and Nova	ÍslandsTurnar	367	91
2020	Austria, Denmark, Ireland, Italy, Sweden, UK	Hutchison	Cellnex	24,600	10,000
2020	Poland	Iliad	Cellnex	7,000	800
2020	Portugal	Nos	Cellnex	2,000	375
2020	Portugal	OMTEL	Cellnex	3,019	800
2020	Ireland	eir	Phoenix Tower International	650	300
2020	Italy	Vodafone and TIM	Ardian and others	25,000	1,600
2020	Italy	Vodafone and TIM	*Public markets sale	25,000	800
2020	Italy	Vodafone	INWIT	11,000	2,140
2019	Aggregated transaction value from 2019			12,200	2,960
					€53b

Capital released to MNOs through a financial sponsor (incl. sale of a non-controlling interest)

2022	Sweden	Telia	Brookfield/Alecta	3,800	505
2021	Norway and Finland	Telia	Brookfield/Alecta	4,700	1,524
					€2b

*Estimated deal value

Appendix 1: TowerCo fundamentals

Year	Country	Seller	Buyer	Tower count	Deal value (€)
Trade deals					
2025	Ireland	Cellnex	Phoenix Tower International	1,900	971
2024	Czech Republic, Bulgaria, Hungary, Serbia	GIC	PPF Group	10,223	550
2024	Slovenia	T2	Telemach	300	90
2024	Austria	Cellnex	Consortium comprising Vauban Infrastructure Partners, EDF Invest, MEAG	4,639	803
2023	Denmark, Sweden	Cellnex	Stonepeak	4,600	730
2023	UK	WHP Estates	Cellnex	55	15
2023	Germany	NOVEC	Phoenix Tower International	220	1,200
2023	Ireland	Infrabridge	John Laing Group	409	1,000
2023	Poland	ATC	Emitel	65	368
2022	France	Cellnex	Phoenix Tower International	3,226	631
2021	Czech Republic, Bulgaria, Hungary, Serbia	PPF Group	GIC	10,223	550
2021	Czech Republic	Large capital private equity investor	Cordiant Capital	800	540
2021	Spain, France, Germany	ATC	Allianz & CDPQ	25,274	530
2021	France	KKR/Altice	Cellnex	10,500	5,200
2021	Italy	EI Towers	Phoenix Tower International	2,400	-
2020	Spain	AMP Capital	Asterion Industrial Partners	635	200
2019	Aggregated transaction value from 2019			9,992	2,964
					€16b

Source: TowerXchange, EWIA members, broker reports, EY-Parthenon analysis as of March 2025

TowerCos have attracted a wide range of investor types (trade, private equity, infrastructure, pension funds) with an active mergers and acquisitions (M&A) market generating more than €71b in tower deals (since 2019).

Appendix 2

Economic assessment

The market for towers has developed such that rural areas tend to see less investment in high-quality communications services. In this context, neutral host TowerCos play a key role in enabling a more efficient use of infrastructure.

There are high fixed costs associated with building towers, with differing cost structures in rural areas vs. urban areas. The revenue opportunities are also different in rural and urban areas; the business case for a cell site can be more challenging in rural areas due to lower population density and potentially lower average incomes. Revenue projections for MNOs indicate muted growth. Most MNOs operate a mix of profitable and unprofitable cell sites so that they can provide adequate coverage to their customers. However, there is still a link between population density, the cost of rollout and potential revenues for MNOs. As a result, the market has developed in such a way that there are multiple overlapping communications networks, with various operators and networks present in economic areas and an undersupply in uneconomic (usually rural) areas. Rural areas therefore tend to see less investment in communications infrastructure and can lack the coverage and service quality seen in urban areas. Digital connectivity in rural areas in Europe is one of the key aspects included in the European Union long-term vision.

Neutral host TowerCos can play a key role in enabling the telecom industry to make the most efficient use of its passive infrastructure. The higher utilization rates of TowerCos reduce the cost per user, lowering the threshold at which it becomes profitable to improve service coverage. Public-private cooperation in infrastructure deployment in rural areas that includes not only the MNOs but also the neutral host TowerCos is essential to the success of the universalization of European connectivity.

TowerCos deliver a range of economic benefits

Greater outsourcing to neutral host TowerCos lowers the costs of infrastructure, which enables faster and cheaper rollouts, delivering a range of socioeconomic benefits for consumers and the wider market. Outsourcing also benefits MNOs by freeing up more capital for investment in coverage and capacity. Benefits include:

1 More efficient market structure

Infrastructure can be delivered at a lower cost, and unnecessary duplication of infrastructure is reduced.

2 Capital released for MNOs

Sales of towers to neutral host TowerCos release capital for investment in existing network and new services.

3 Investment in capacity and coverage

Cheaper and faster rollout to rural areas helps to address the digital divide.

4 Facilitating market entry

Non-MNO tenants have more choice, lowering barriers to entry, and may benefit from a neutral host.

5 Environmental benefits

Due to co-location, fewer towers are needed to meet demand, reducing the carbon emissions and visual impact of new towers.

(Please refer to "**The sustainability contribution of the European independent TowerCos sector,**" March 2023, on the sustainability contribution of the European neutral host TowerCo sector for a more detailed assessment)

Outsourcing is advantageous both for consumers and the wider market

Outsourcing to neutral host TowerCos can improve coverage in rural areas and capacity in congested areas. At the same time, the wider market benefits from diversity in tower ownership and supply.

Bridging the digital divide

The economics of network rollout means that urban areas tend to benefit from the best coverage, while rural areas can be left behind. This is particularly relevant to the rollout of new technologies, which starts in the most densely populated areas before extending to other parts of the country. EWIA welcomes rollout obligations on 5G licenses concerning rural areas, to achieve the proper quality service even if it is not economical to serve the area. Neutral host TowerCos can reduce the cost of delivering infrastructure, which enables faster and cheaper rollout to areas and households that otherwise could miss out. Outsourcing can also release capital to MNOs to invest in improving coverage and services.

Improving service quality

Upgrading towers to provide more capacity also involves high fixed costs. By lowering the costs of infrastructure, outsourcing to neutral host TowerCos can make upgrades more economic, improving service quality for consumers.

Other wireless networks

Diversity in the supply of communications towers supports more use cases for other wireless network operators, such as fixed wireless access (FWA) and IoT providers, facilitating market entry. In turn, this can drive innovation in the services offered to consumers.

Case study

Filling coverage gaps

Established through a 2018 government initiative, the New Deal for Mobile was inaugurated in France. At the time France had over 10,000 rural villages in which 4G coverage was absent, while more than 500 villages had no network coverage at all. The New Deal for Mobile's mission was to bridge this gap by supporting the opening of over 5,000 4G cell sites in France by 2027. By the end of Q3 2024, approximately 2,600 of the 5,000 sites were in operation.

The New Deal for Mobile is supported by other regional network deployment. ATC deployed 2,875 sites in rural areas since 2020, all of which use at least one frequency band associated with 5G (700MHz, 2.1 GHz and 3.5 GHz). TDF built more than 200 towers along transportation axes, in rural areas and in other network white spots in 2018.

This included setting up 50 new macro sites in 2021 along the Rennes Le Mans trainline to facilitate the provision of 3G and 4G service to commuters.

These sites also have the potential to be upgraded to provide 5G coverage. In 2019, more than 300 additional masts were erected.

"The New Deal for Mobile is an example of trust-based cooperation between local authorities, telecoms operators and the state, designed to satisfy the day-to-day needs of people in France. We committed to putting 5,000 cell towers in service by 2027 to eradicate white areas." – Jean-Noël Barrot, Minister of State for Digital Transition and Telecommunications.

Source: EWIA member companies

Neutral host TowerCos can realize efficiencies that result in a lower cost per point of presence

Opex efficiencies

Neutral host TowerCos, whose core business is the management of the passive elements of towers, typically have more expertise in identifying efficiencies and reducing operating expenditure, for instance, in contract negotiations for the site and in limiting maintenance costs. EY teams assume, based on experience of working with MNOs and TowerCos, the opex efficiencies delivered by neutral host TowerCos compared with MNOs to be 10%. The impact of this efficiency on overall cost per user for TowerCos compared with MNOs is -3%, as illustrated in Figure 16.

Cost of capital savings

Neutral host TowerCos are typically able to attain financing at slightly lower cost of capital than MNOs. MNOs in the US and Europe typically have a weighted average cost of capital (WACC) that is 1.1% higher than that of equivalent European TowerCos. The difference in WACC could reflect a range of factors. TowerCos may be seen as a lower risk, given their greater experience in operating towers. While a tower may be a depreciating asset for an MNO, it is a potential source of long-term revenue from multiple sources for a TowerCo. Additionally, TowerCos supply a higher number of MNOs, so their returns are less dependent on the success of individual MNOs at the retail level.

Higher rates of co-location

Neutral host TowerCos tend to have a higher number of users sharing towers (co-location ratios). On average, TowerCos have a co-location ratio of 2.1. In contrast, MNOs have an average co-location ratio of 1.3. Increased co-location has a major impact on reducing the cost per user, as it means the significant fixed costs per tower are shared among multiple network operators.
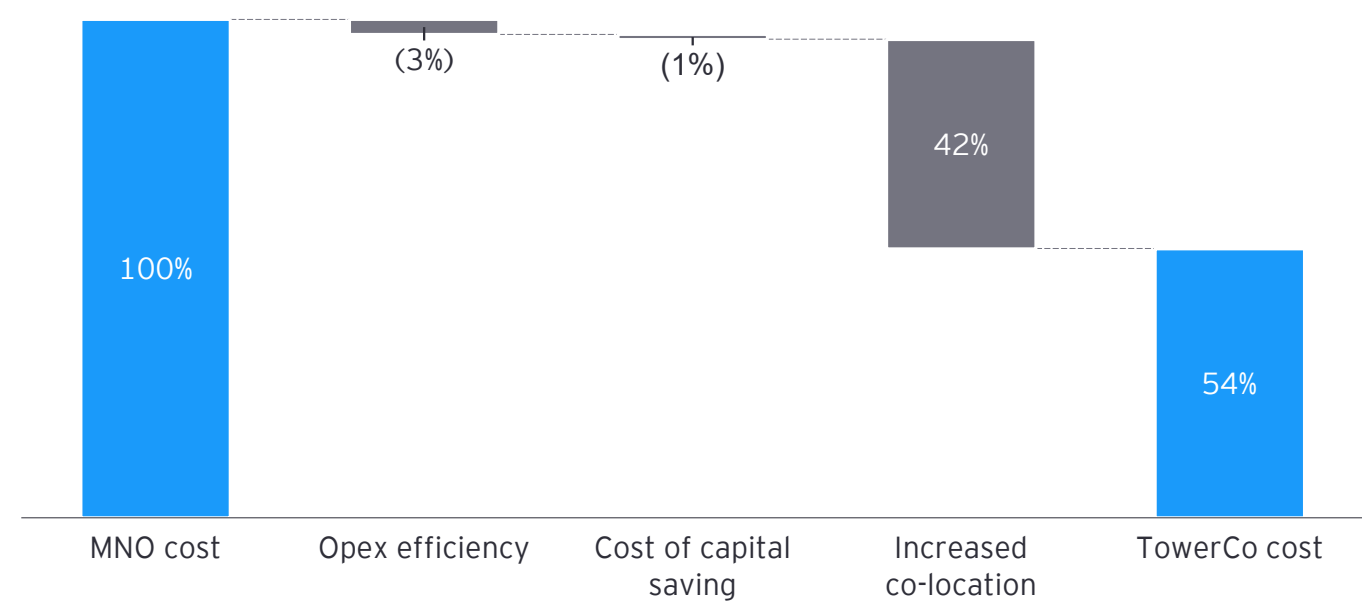
Increase in PoP management efficiency

The cost of tower use for a single network is referred to as the cost of providing a "point of presence." Due to a combination of opex efficiencies, cost of capital savings and higher rates of co-location, a typical PoP managed by a neutral host TowerCo is 46% more efficient than one managed by an MNO. The ability of TowerCos to achieve higher rates of co-location is the primary driver of the differences in efficiency between neutral host TowerCos and MNOs, as seen in Figure 16.

This analysis considers the cost of construction of a tower (including financing over a 10-year period), with the cost discounted back to a present value and shared between the users of a given tower.

The distribution of the cost savings from neutral host TowerCos may depend on the pricing strategies of the MNOs and the TowerCos. Either the MNOs or the TowerCos could benefit, depending on the level of markup that the neutral host TowerCos are able to charge on their costs.

The scope for excessive markups will be constrained by continued competition between TowerCos (MNO-controlled and neutral host) and the need for neutral host TowerCos to maintain a price advantage compared with own-built infrastructure. With continued retail competition between MNOs, economic theory and empirical research show that the cost benefits from the use of TowerCos should ultimately be passed through to retail consumers, either through lower retail prices or higher-quality services.

Figure 16: TowerCo cost saving as a percentage of MNO cost per PoP (%)

Note: We have included MNO-controlled towers, April 2019, in the category "MNOs" for this calculation.
Source: EY-Parthenon analysis

Greater tower outsourcing could result in savings of €31b between 2019 and 2029
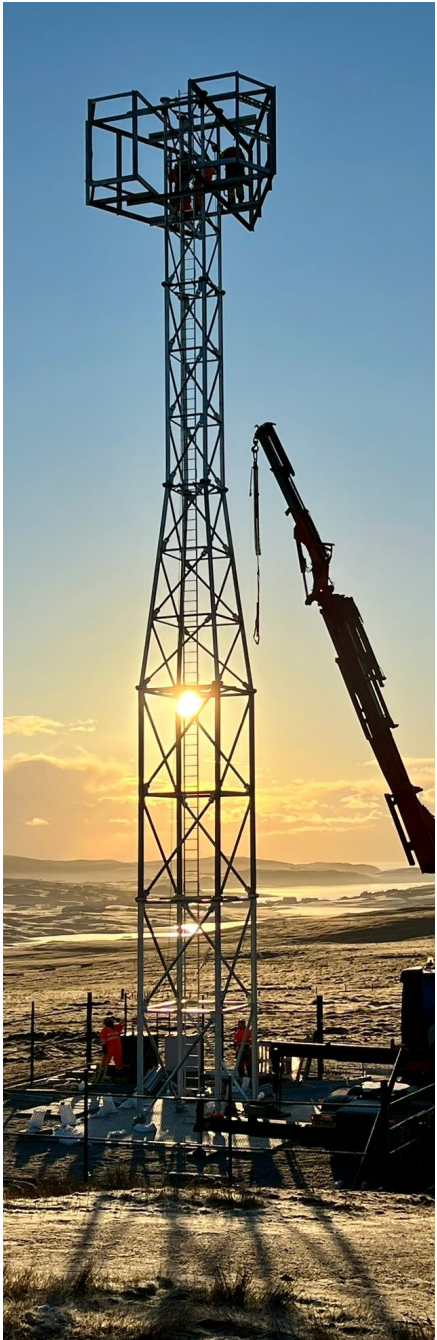
Our analysis and assumptions

Our analysis assumes 3% annual net growth in points of presence over the next 10 years. We have assessed the below two scenarios to understand the economic savings of greater outsourcing to TowerCos.

MNO-led scenario

Proportion of towers owned by neutral host TowerCos:
17% – assumes that the proportion of towers owned by TowerCos remains the same as in 2018.

New towers required to meet predicted demand: c. 220,000.

Total lifetime cost per new point of presence: €106,567.

TowerCo-led scenario

Proportion of towers owned by neutral host TowerCos: 50% – assumes that a large proportion of towers that are controlled by MNOs today are outsourced to TowerCos but that those towers that are part of a joint venture are more difficult for MNOs to outsource. Also assumes that MNOs sell more of their ground-based towers – 70% of the towers acquired from the MNOs by the neutral host TowerCos are assumed to be ground based.

New towers required to meet predicted demand: c.107,000.

Total lifetime cost per new point of presence: €70,500.

Economic savings

Based on the above analysis and assumptions, the aggregate benefit to the economy of the increase in outsourcing to TowerCos has a present value of €31b over the next decade.
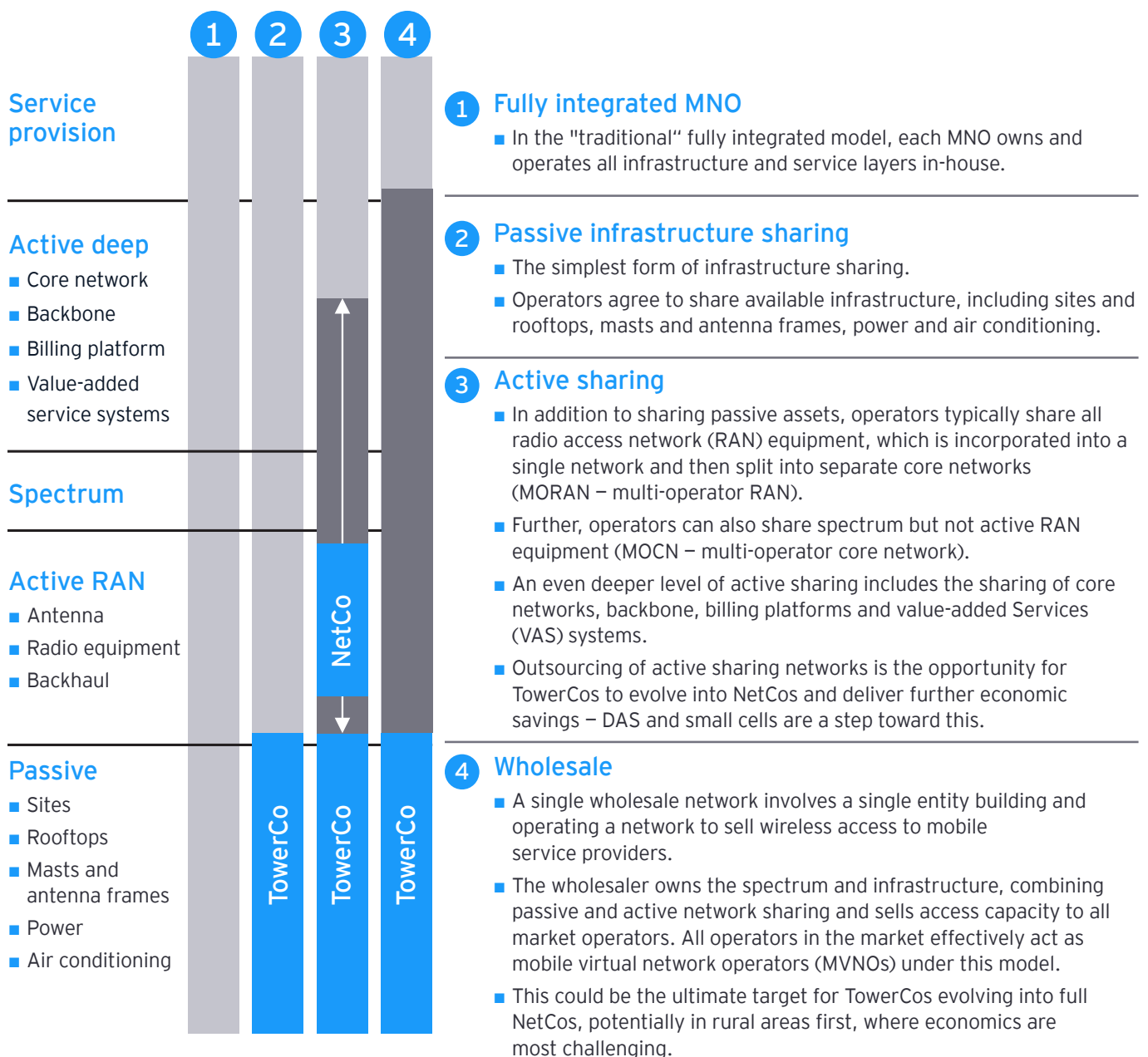
€31b

Appendix 3

Active sharing

Active sharing opens new opportunities for TowerCos to operate active equipment
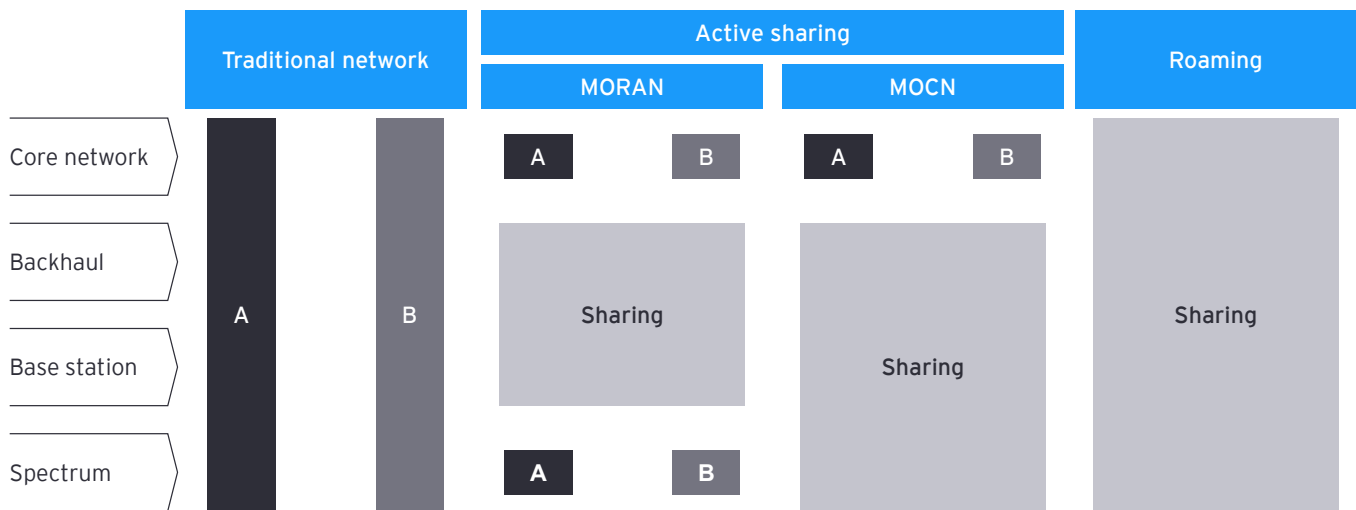
MNOs use two principal operating models for infrastructure sharing: passive and active. In passive sharing, MNOs share "passive" infrastructure elements such as tower masts, civil works, fences, shelters, power supply and cooling systems. In active sharing, MNOs share "active" elements such as RAN equipment. TowerCos can play a role on all sharing models.

Figure 17: Types of MNO infrastructure sharing (conceptual)

1 Fully integrated MNO

- In the "traditional" fully integrated model, each MNO owns and operates all infrastructure and service layers in-house.

2 Passive infrastructure sharing

- The simplest form of infrastructure sharing.
- Operators agree to share available infrastructure, including sites and rooftops, masts and antenna frames, power and air conditioning.

3 Active sharing

- In addition to sharing passive assets, operators typically share all radio access network (RAN) equipment, which is incorporated into a single network and then split into separate core networks (MORAN − multi-operator RAN).
- Further, operators can also share spectrum but not active RAN equipment (MOCN − multi-operator core network).
- An even deeper level of active sharing includes the sharing of core networks, backbone, billing platforms and value-added Services (VAS) systems.
- Outsourcing of active sharing networks is the opportunity for TowerCos to evolve into NetCos and deliver further economic savings − DAS and small cells are a step toward this.

4 Wholesale

- A single wholesale network involves a single entity building and operating a network to sell wireless access to mobile service providers.
- The wholesaler owns the spectrum and infrastructure, combining passive and active network sharing and sells access capacity to all market operators. All operators in the market effectively act as mobile virtual network operators (MVNOs) under this model.
- This could be the ultimate target for TowerCos evolving into full NetCos, potentially in rural areas first, where economics are most challenging.

Active sharing has three forms:

■ MORAN, where some infrastructure RAN equipment and passive infrastructure is shared, but separate core network and spectrum are used.

■ MOCN, where, in addition to sharing the same infrastructure as MORAN, operators pool and share their spectrum. Regulations around spectrum sharing must be considered.

■ National roaming, where the hosting operator provides its own spectrum and capacity to a visiting operator in specific areas.

Figure 18: Methods of increasing sharing

Source: GSMA

Some benefits of active sharing include limiting network duplication and cost of operation and maintenance services, especially beneficial in hard-to-reach rural areas. It can also help increase network deployment by operators.

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