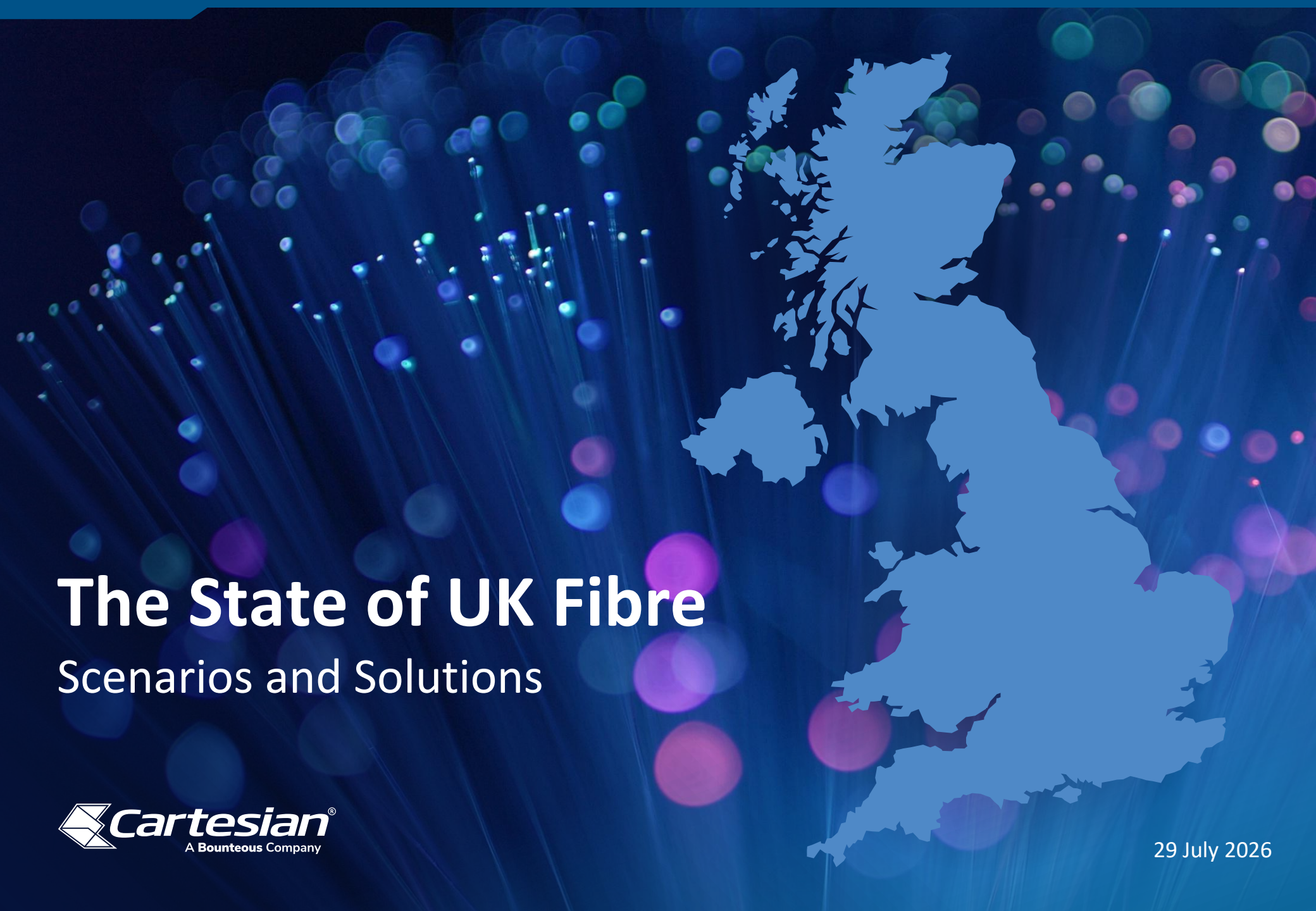




The State of UK Fibre

Scenarios and Solutions

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Summary

- **The UK fibre market is often heralded a success story** as FTTP coverage has progressed at pace. However, the path towards full coverage and take-up with sustainable network competition is proving challenging given some significant market issues.
- **Key market characteristics posing issues for alternative network operators** (altnets) are 1) a highly fragmented infrastructure market with growing overbuild - 47% of the UK now has more than 1 FTTP network 2) a concentrated retail market with the top 3 ISPs having over 70% market share and 3) very aggressive wholesale and retail pricing.
- Collectively these make it **challenging for alternative network operators to create sustainable business models.**
- The **market needs to consolidate to improve economies of scale but this is taking longer than expected** given valuation gaps, capital structure misalignment and funding issues.
- Our scenario M&A trajectories illustrate that, while the planned nexfibre acquisition of Netomnia would be a significant step forward in consolidating the market, **there remain many moving parts to the consolidation path – it is very difficult to give specific predictions.**
- Ultimately, **we can still envisage a range of long-term outcomes on a 10-year view of the market** – from persistent fragmentation through to a 3 operator or 2 operator state.
- In addition to the uncertainty surrounding the path to consolidation, **there are also uncertainties on rural coverage and copper switchover.**
- **Fibre economics are more challenging in rural areas** because of the higher cost of build – this can make the business case very challenging if there are 2 or more operators competing for network share in these areas.
- However, the **copper switchover framework proposed by Ofcom includes an Openreach exchange coverage threshold at a fixed percentage (90% or 100%)** before its copper price controls are lifted. This threshold **may drive Openreach to overbuild existing rural altnets** on its copper switchover path.
- The proposed framework therefore risks **wasted investment in these high cost of build areas**, and poses a risk for the sustainability of existing rural alternative network operators, as the economic case only supports 1 network and even in some cases public funding has been used.
- Our analysis indicates 1) around **1m rural FTTP premises could see uneconomic overbuild if Openreach is required to meet a high exchange coverage threshold** for copper switchover and 2) achieving a 90% coverage threshold of all existing and published planned exchanges, **would consume nearly all of Openreach's 30m FTTP ambition, potentially leaving up to 1600 Openreach exchanges on copper** (unless Openreach extends its FTTP ambitions beyond 30m or uses alternative technologies).
- **Potential solutions include adapting the regulatory framework** to allow Openreach to include alternative FTTP networks (as in Greece) or technologies (e.g. satellite) in meeting the coverage threshold or to focus on ultrafast solutions for remaining copper customers rather than FTTP coverage.
- **Coupled with this we could envisage Openreach partnering**, whether through an aggregator model or directly with another operator, to leverage alternative networks and / or technologies, while maintaining consumer ISP choice through Openreach.
- Overall, our view is that each operator, acting independently and according to its own circumstances, should look to ensure that its pricing and customer-experience strategy sustainably covers its own cost of capital; to move forward with M&A with caution and pragmatically (e.g. with like for like mergers if cash deals are out for now), and to consider alternative paths such as partnering especially in higher cost areas to avoid uneconomic overbuild.



1 | Context

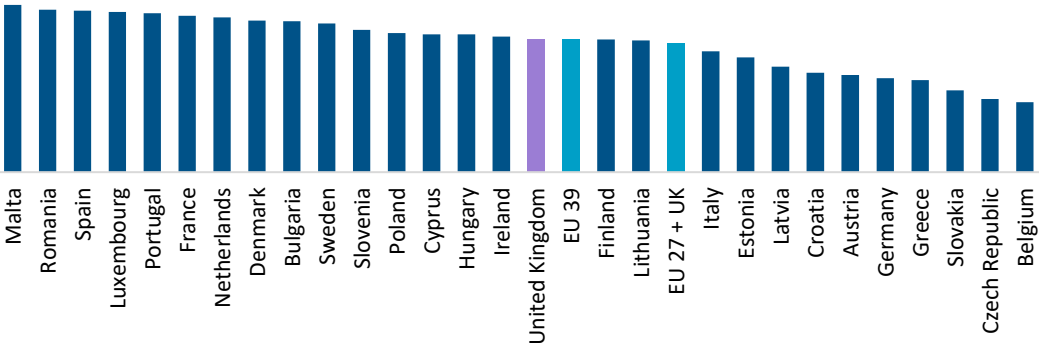
2 | Consolidation

3 | Rural Coverage

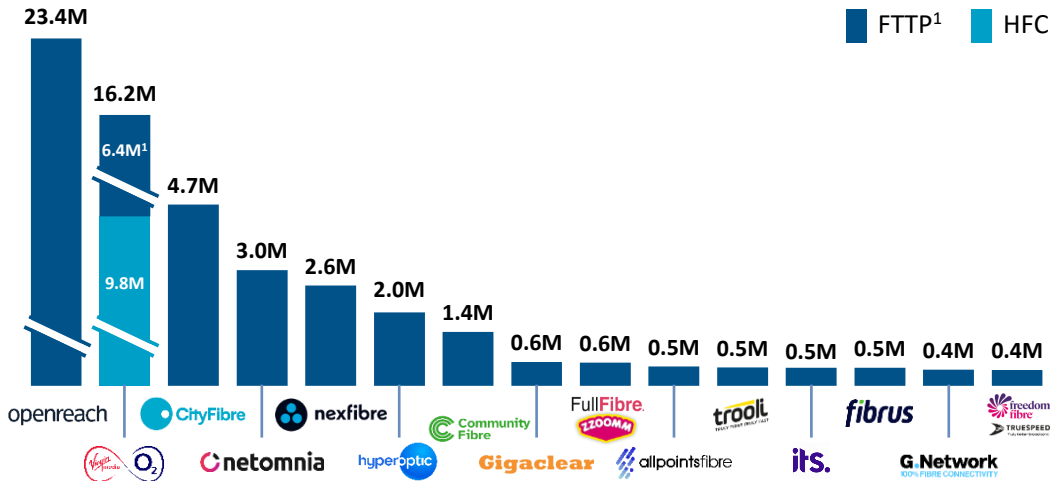
4 | Summary

Coverage: The UK has reached 91% Gigabit coverage driven by a highly fragmented market of network operators

UK FTTP coverage now sits above the EU average (FTTH Council Europe, Sept 2025)



UK Gigabit coverage is highly fragmented with over 50 fibre operators – a more established pack is emerging above c.0.4m premises passed



- UK FTTP coverage is now at 85% and Gigabit coverage is 91% (July 2026, thinkbroadband) after a period of rapid fibre footprint expansion, driven by Openreach, VMO2 / nexfibre and alternative networks
- Chart shows UK FTTP coverage above EU average - ten years ago, the UK lagged European peers due to prevalence of cable and copper-based technologies
- The UK market is now highly fragmented with over 50 fibre operators
- Openreach is a strong leader with 23.4m FTTP premises passed, expansion of 4-5m premises passed / year and an ambition to reach 30m premises passed by 2030 (c.90% UK)
- VMO2 is overlaying its cable network with FTTP and is the anchor tenant for nexfibre’s greenfield expansion
- Behind these, there are numerous altnets with a range of business models (rural / urban; national / regional; wholesale / retail) and varying degrees of scale
- Consolidation has been widely anticipated for a few years but has been slower to materialise than expected, driven by valuation gaps between buyers and sellers, differences in capital structure and challenges around financing

Market Implications

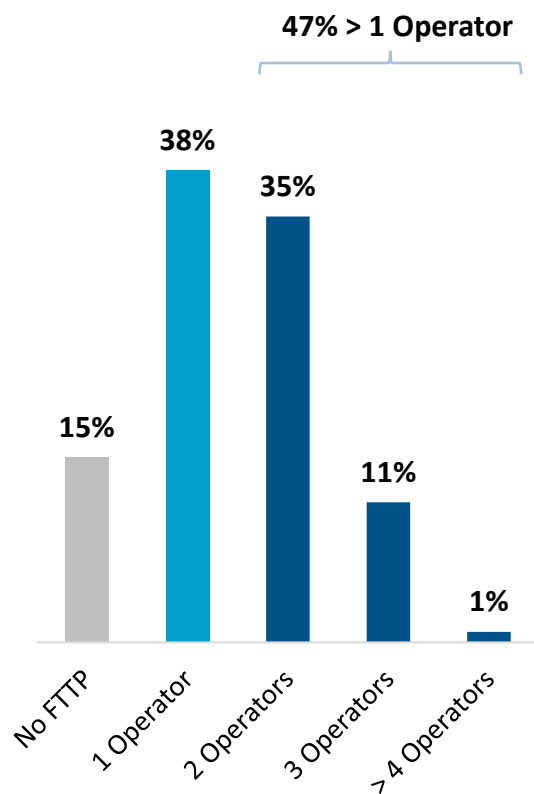
- The market cannot support such a fragmented market structure and remains unstable
- Further consolidation is needed to achieve sustainable infrastructure competition

1: Includes FTTP and VMO2 RFOG (Radio Frequency over Glass)
 Source: Company data, thinkbroadband, FTTH Council Europe, IDATE, ISPreview, Cartesian
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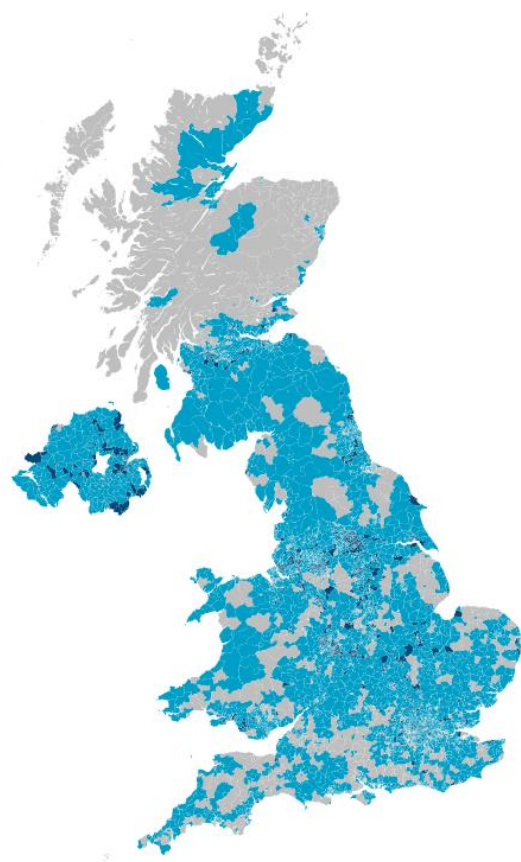
Network overbuild is increasing mainly driven by Openreach's rapid footprint expansion

FTTP overbuild: 47% of UK premises are served by more than 1 operator

% of UK Premises with FTTP by Number of Operators



Mean number of operators serving a postcode across each MSOA



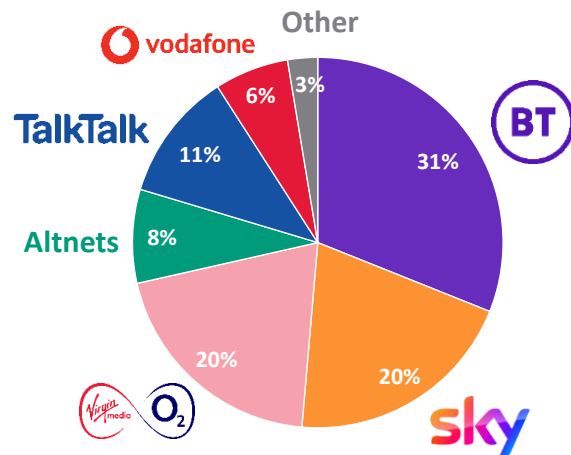
- Some FTTP deployments have overbuilt existing FTTP footprints, with 47% of UK premises served by more than one operator
- These tend to be urban areas with cheaper cost of build and faster deployment timeframes due to higher density of premises (though London rollouts can be expensive and slow due to congestion)
- Typically overbuild is between Openreach and VMO2/nexfibre plus an altnet
- The combined FTTP network build across all operators is now 49m premises passed (total UK premises c.34m)
- This is expected to rise further, driven mainly by Openreach's ongoing FTTP expansion and VMO2's FTTP overlay
- Most altnets have now shifted away from organic footprint expansion and towards driving connections / take-up with an M&A strategy to supplement footprint

Market Implications

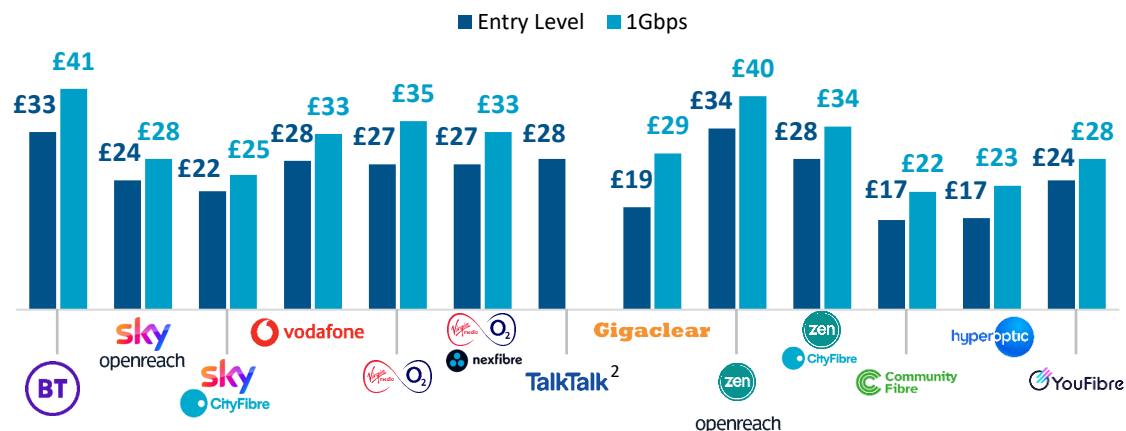
- Lower cost urban areas may support overbuild of 2 or even 3 networks (illustrated with simple unit economics on slide 9)
- However, too much overbuild, especially in more expensive areas, puts pressure on the business case as operators may struggle to gain sufficient share to generate sustainable cashflows
- This creates market instability, as operators may compete aggressively with unsustainable pricing / discounts, restructure to cut costs, and / or consolidate or liquidate

The retail broadband market is concentrated in the top 3 ISPs, pricing is very competitive and Sky prices differently depending on network provider

ISP market share: Top 3 ISPs are BT, Sky and VMO2 – these hold over 70% combined broadband market share



ISP pricing¹: Pricing is very competitive with some operators offering geographic price variations dependent on their network provider



1: Pricing as of 10/07/2026

2: Price refers to TalkTalk U Smart Wi-Fi adaptive speed package

Source: Cartesian, Company reports, Company websites, PointTopic, ISPreview

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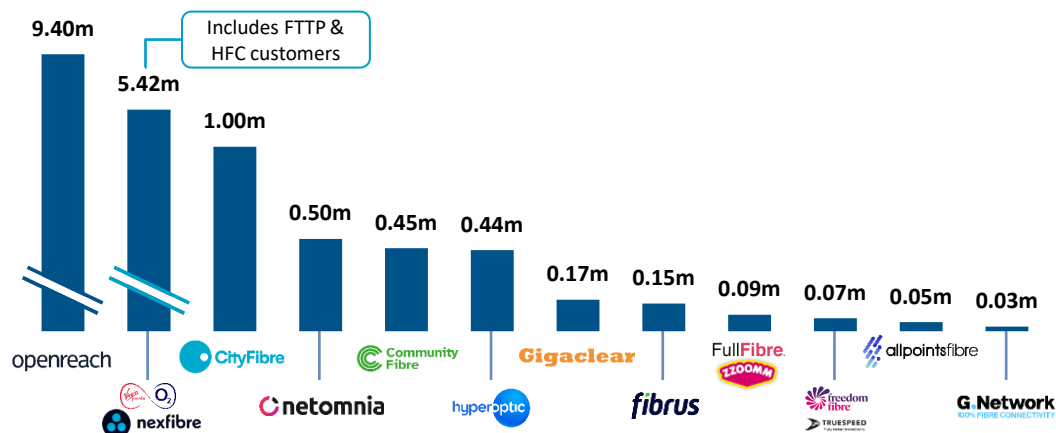
- UK broadband market shares remain concentrated in a small group of large ISPs – BT, Sky, VMO2 collectively hold just over 70% market share
- TalkTalk and Vodafone remain important challengers, but their customer bases are materially smaller than the three largest retail ISPs
- Altnets collectively have just over 2m retail broadband customers, showing material gains in recent years, though still only representing 8% market share of the UK overall
- Retail pricing is aggressive and varies materially across providers, with the retail ISPs of altnets typically pricing well below the incumbent BT, particularly at entry-level speeds
- Sky's tariffs are cheaper on CityFibre's network than on Openreach's

Market Implications

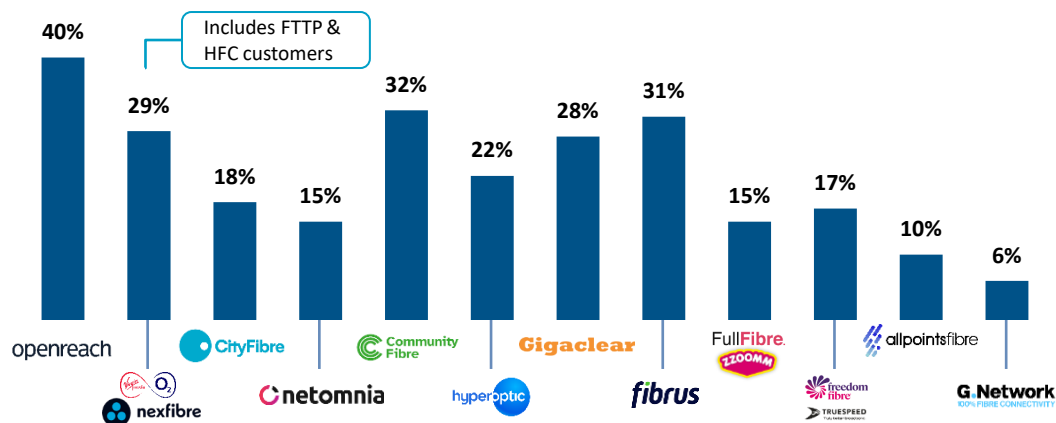
- The combination of concentrated retail market share and fragmented infrastructure gives large ISPs significant negotiating power when selecting which wholesale networks to use outside of Openreach (Openreach offers terms on an equivalent basis)
- This has led to very aggressive wholesale pricing in the market (CityFibre has commented on pricing c.30-40% below Openreach)
- Low wholesale pricing is underpinning very aggressive retail pricing and geographic price variations as ISPs compete to retain / gain market share, and pass through wholesale cost savings
- For wholesale only operators, securing Sky has become important to gain sufficient share, given BT only buys from Openreach, VMO2 from VMO2 / nexfibre (BT + VMO2 combined share >50%)
- Vertically integrated altnets support their network economics by driving take-up through their own ISP - often pricing very aggressively to compete with the larger brands

Price competition is driving take-up of fibre with some (not all) altnets gaining meaningful penetration / share

Subs on Gigabit networks by operator¹: CityFibre has now reached 1m customers on its network



Take-up % by operator: Openreach is achieving strong take-up driven by compelling wholesale pricing



- Openreach penetration on FTTP is highest and continues to grow, driven by compelling Equinix pricing
- Altnet penetration varies widely, with some reaching in the 10–25% range, and the highest tipping over 30%
- Approach to driving take-up varies and those with strong ISP branding (whether vertically integrated or via wholesale agreements) and / or regional presence appear to have most success (albeit hard won / gradual in some cases)
- CityFibre – 18% blended penetration, mature cohorts exceed 30% - wholesale model with Vodafone, TalkTalk, Sky brands (plus long tail of ISPs)
- Community Fibre, Hyperoptic, Gigaclear, Fibrus – vertically integrated ISPs with regional focus (effective marketing)
- Netomnia – broad network, cherry picked for low build cost, reduces contiguity and regional presence, but strength through ISP brand (YouFibre) (note Netomnia is earlier in its trajectory)
- Blended take-up rates are shown – some altnets report mature cohorts reaching 30% or more

Market Implications

- Scale of Openreach and its ISPs make them tough competitors for altnets to gain share from (whether wholesale or retail)
- Altnets are now intensely focused on driving take-up (not footprint expansion), given the need to generate cashflows
- While wholesale business models benefit from a range of ISP brands, vertically integrated models have control over retail pricing and marketing to push aggressively in targeted areas
- Altnets are moving up the penetration curve, though in our opinion increasing overbuild and current pricing levels mean some individual altnets may find it challenging, on their own economics, to reach the penetration or ARPU needed to make a return on their investments

1: Subs on either FTTP networks or on VMO2's cable network – does not necessarily mean subs are buying 1 Gb/s packages

Source: Company data, ISPReview, Cartesian

Illustrative altnet economics highlights the business case challenge in covering cost of capital and exposes market challenges

Illustrative unit economics for an altnet: 44% penetration required for wholesale only altnet to reach 10% ROCE (urban PIA¹ build)

	Wholesale only altnet	Retail altnet (vertically integrated)
Build Cost £ / Premise Passed (PP)	500	500
Connection Cost £ / Premise Connected (PC)	300	300
Penetration required to achieve 10% ROCE	44% ²	33% ²
Total Cost of Build £ / PC	1,440 ³	1,800 ³
ARPU £ / line / m	16.00	30.00
EBIT Margin	75%	50%
EBIT £ / line / m	12.00	15.00
EBIT £ / line / year	144	180
Return on Capital Employed (ROCE)	10% ⁴	10% ⁴

- Illustration shown is “what you need to believe” on assumptions to achieve a 10% ROCE for a wholesale only altnet and a vertically integrated altnet, based on build costs shown (represents an average urban build using Openreach ducts and poles)
- Business models vary greatly - cost of build ranges from £250 / premise passed (£/PP) (selective urban PIA build) to over £1,000 / PP (rural build) – meaning penetration and ARPU required to generate a return vary greatly (rural case shown later)
- Illustrative unit economic analysis indicates that on these assumptions:
- 44% take-up required for wholesale altnet to reach 10% ROCE
- 33% take-up required for retail altnet to achieve 10% ROCE

Market Implications

- **Economic case generally breaks in triple overbuild areas** as take-up cannot reach sufficient levels – **unless cost of build significantly cheaper** than shown (e.g. selective urban build)
- **Wholesale only case requires a strong anchor tenant ideally with one of the top 3 ISPs** in order to reach penetration required. BT and VMO2 buy from their NetCo's, so outside of those the wholesale only altnets generally seek to attract Sky (if residential focus)
- Pricing (retail and wholesale) needs to underpin ARPUs at least at the levels shown in the illustration – challenging in today's market
- **Altnets predominantly funded by debt have a challenge to cover cost of capital** (often >10% interest cost) – business cases were created when interest rates and overbuild risk were lower. Equity funded cases have greater focus on exit value so have more time
- **Some operators are restructuring debt / equity mix, writing down equity value and restructuring around debt** – effectively reduces capital employed in the illustration to create sustainable economics that cover the cost of capital
- **Asset sellers are holding out for cash deals** rather than equity

1: PIA – Passive Infrastructure Access, access to Openreach ducts and poles

2: Penetration rate solved by iteration to achieve 10% ROCE

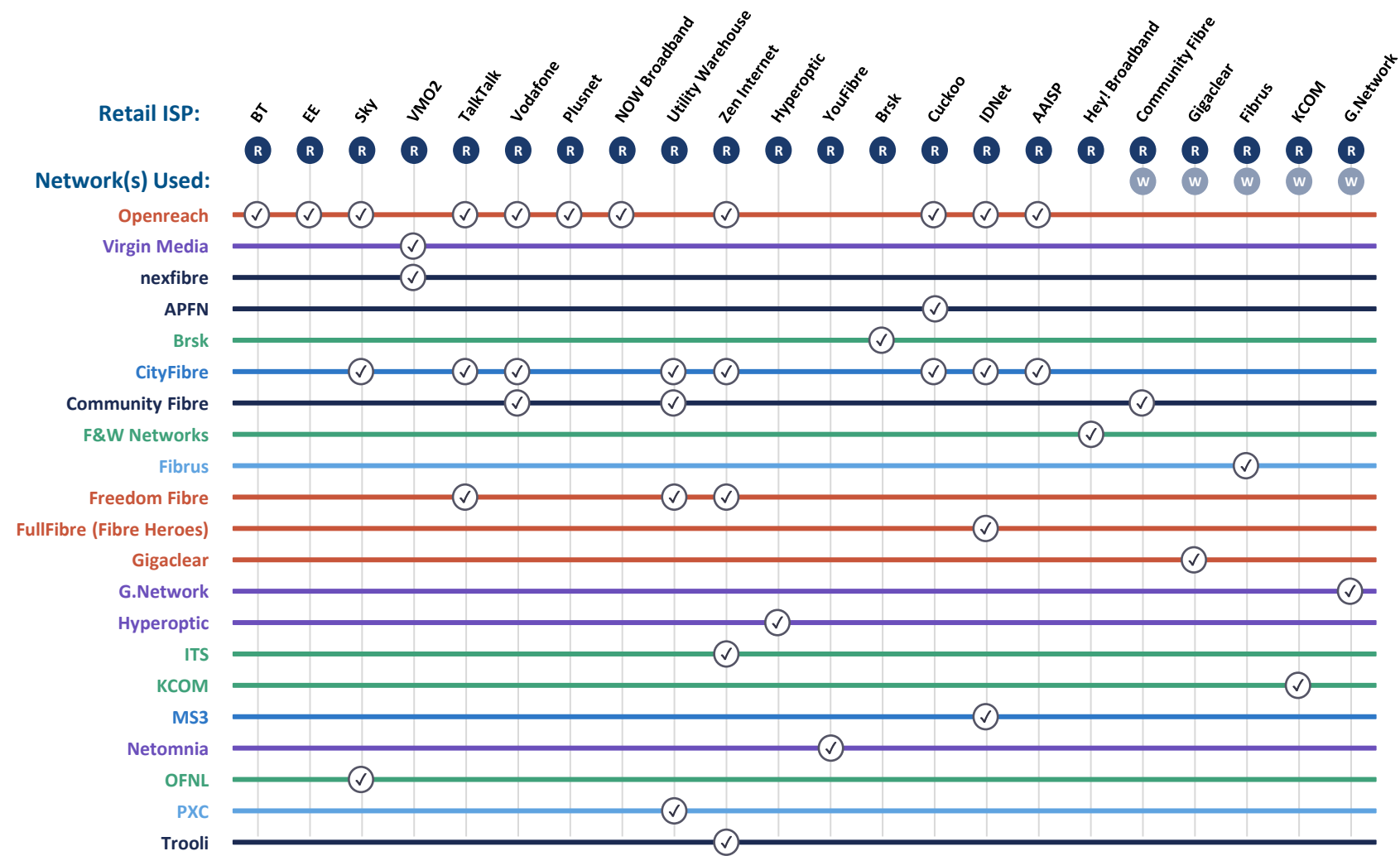
3: Rounded; Calculated by spreading the footprint build cost over penetration, and adding in connection cost i.e. for the wholesale illustration with an assumed penetration of 44%, total capital employed per connection is (£500 / 44%) + £300 = £1,440

4: ROCE = EBIT / capital employed i.e. for the wholesale altnet illustration, £144/£1,440 = 10%

Source: Cartesian

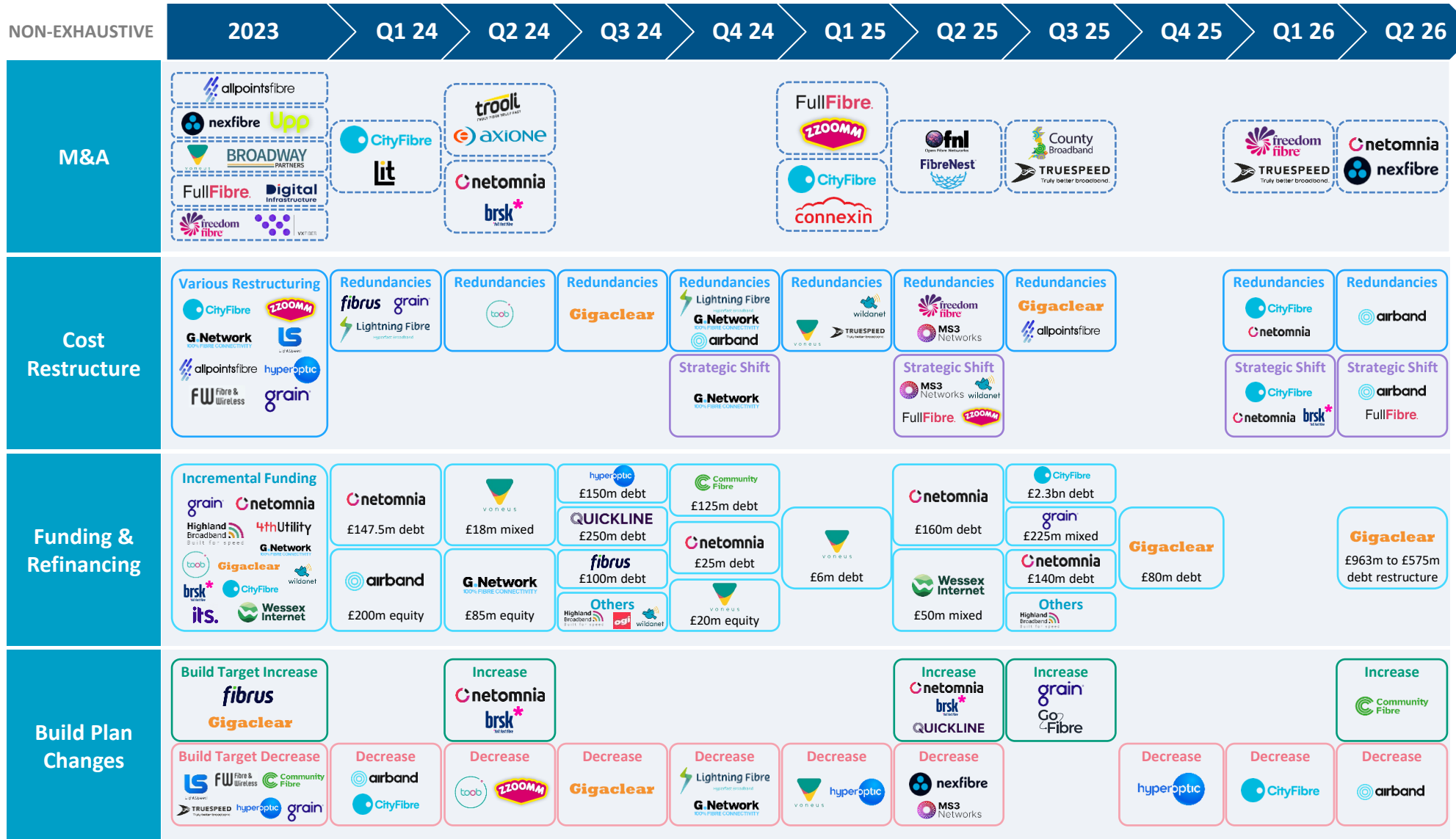
Given the scale challenge, ISPs and operators are maximising coverage and take-up through wholesale partner agreements

Mapping of retail ISP to wholesale network used (thinkbroadband): BT uses Openreach's network; VMO2 uses VMO2 and nexfibre; whereas Sky, Vodafone and TalkTalk use multiple networks through wholesale partner agreements



Source: thinkbroadband chart "The State of Broadband" Sept 2025, (Cartesian only reformatted the chart)
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Events timeline: M&A has been slower than expected but is happening; altnets are refinancing but this often requires restructuring; altnet build plans on hold





1 | Context

2 | Consolidation

3 | Rural Coverage

4 | Summary

M&A Context: The highly fragmented market is gradually consolidating and needs to consolidate further

UK fibre M&A can be categorised into three types of transactions

Tier 1 acquirors of Tier 2/3 assets,
Cash



Tier 1 acquirors of Tier 2/3 assets,
Paper



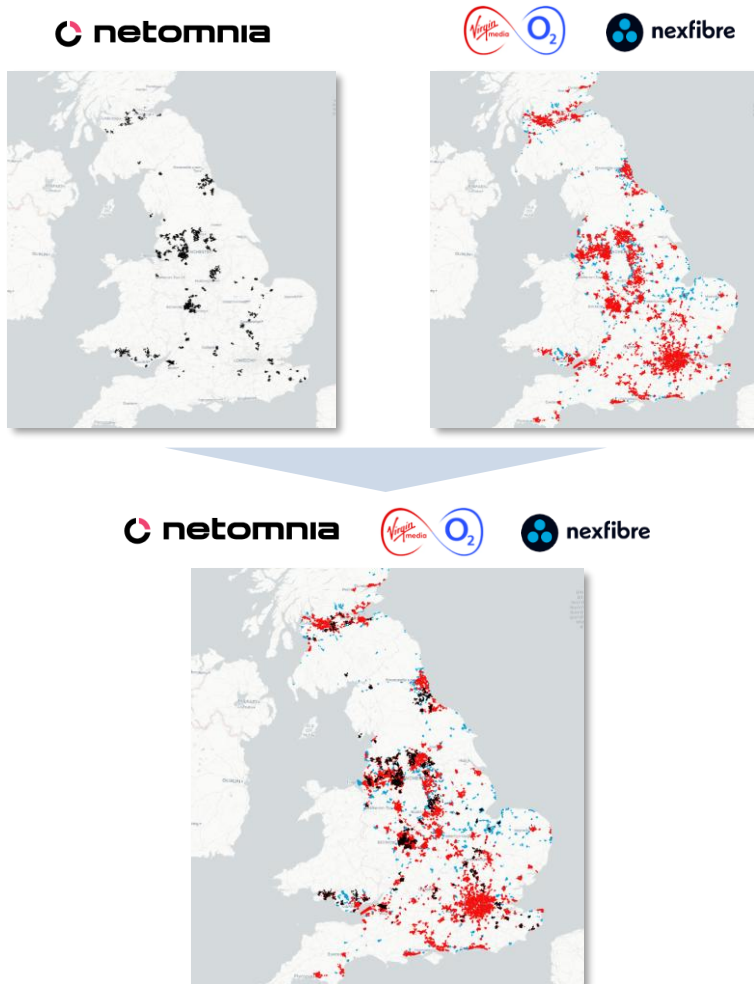
PE roll ups and Tier 2/3 mergers



- Highly fragmented market structure and challenging economics mean the market needs to consolidate
- M&A trajectory to date has been slower than anticipated given a valuation gap between buyers and sellers, capital structure disparity (debt/equity mix) and funding issues
- This has led to numerous paper-based mergers of Tier 2/3 assets and some assets rolling up under common shareholders, with relatively few acquisitions by Tier 1 acquirors – nexfibre and CityFibre
- Altnet acquisitions offer potential suitors incremental footprint and capabilities, e.g. rural network; ISP brand; wholesale capability
- Tier 2/3 mergers often have complimentary footprints with common anchors in structure and / or approach e.g. Zzoomm and FullFibre focus on market towns; Netomnia and Brsk vertically integrated, urban and similar size
- nexfibre and CityFibre are targeting greater network scale through M&A and are prepared to restructure acquisitions into a split of network and ISP if needed e.g. CityFibre sold back Lit Fibre retail ISP to founders
- The nexfibre Netomnia deal is a transformative deal (subject to CMA review) for the M&A trajectory and the future market scenarios – therefore forms a key consideration in our scenario analysis

nexfibre acquisition of Netomnia is a major deal for the sector – Netomnia adds FTTP footprint and increases likelihood of a Sky or Vodafone wholesale deal

Netomnia acquisition increases VMO2 / nexfibre FTTP footprint



- nexfibre to acquire Substantial Group (Netomnia + YouFibre) from Advencap, DigitalBridge, and Soho Square for £2bn – awaiting CMA phase 2 investigation
- Netomnia footprint 3.4m premises passed, with 500k customers (by deal completion)
- **Deal implies £544 / premise passed for network (£500/PP when adjusted for connection capex of 500k customers), after £150m sale of YouFibre ISP to VMO2 – seen as attractive valuation for Netomnia given low cost of build footprint** (urban areas, cherry picked, use of Openreach ducts and poles => estimated £250 / PP build cost excluding connection costs)
- **Estimated 84% Gigabit and 36% FTTP footprint overlap between Netomnia and VMO2/nexfibre (estimates of overlap may vary¹)**
- Deal rationale has multiple layers rather than straight build vs buy (given estimated cost of overlaying cable with FTTP is relatively low²). In our view, rationale includes:
 - **Wholesale opportunity** – nexfibre is committed to wholesaling to more ISPs – greater FTTP network scale is attractive for larger ISPs to justify onboarding / any increased complexity
 - **Time to market** – propels nexfibre's footprint faster than self build and adds a robust build machine (may support the VMO2 FTTP overlay programme)
 - **Brings disruptive ISP competitor inside VMO2** – YouFibre gaining share in VMO2's footprint - VMO2 plans to retain this brand so deal brings it within VMO2, it doesn't remove it from the market
- **Competition and Markets Authority (CMA) review has entered Phase 2 investigation, due for completion Dec 2026** (nexfibre requested a move to Phase 2 before waiting for Phase 1 to complete, to reduce the risk of waiting until 2027)
- Key lessons learned are in how Netomnia positioned itself to create a balance of power in negotiations:
 - ✓ Sizeable footprint (helped by previous merger with Brsk) created scale
 - ✓ Strong ISP brand created retail disruption
 - ✓ Cheap cost of build created compelling economics (sustainable disruption)
 - ✓ Quality of build eases integration costs / time
 - ✓ Robust build engine evidenced by pace of build to date (augments VMO2 engine)
 - ✓ Capital structure / low debt gave shareholders and management time

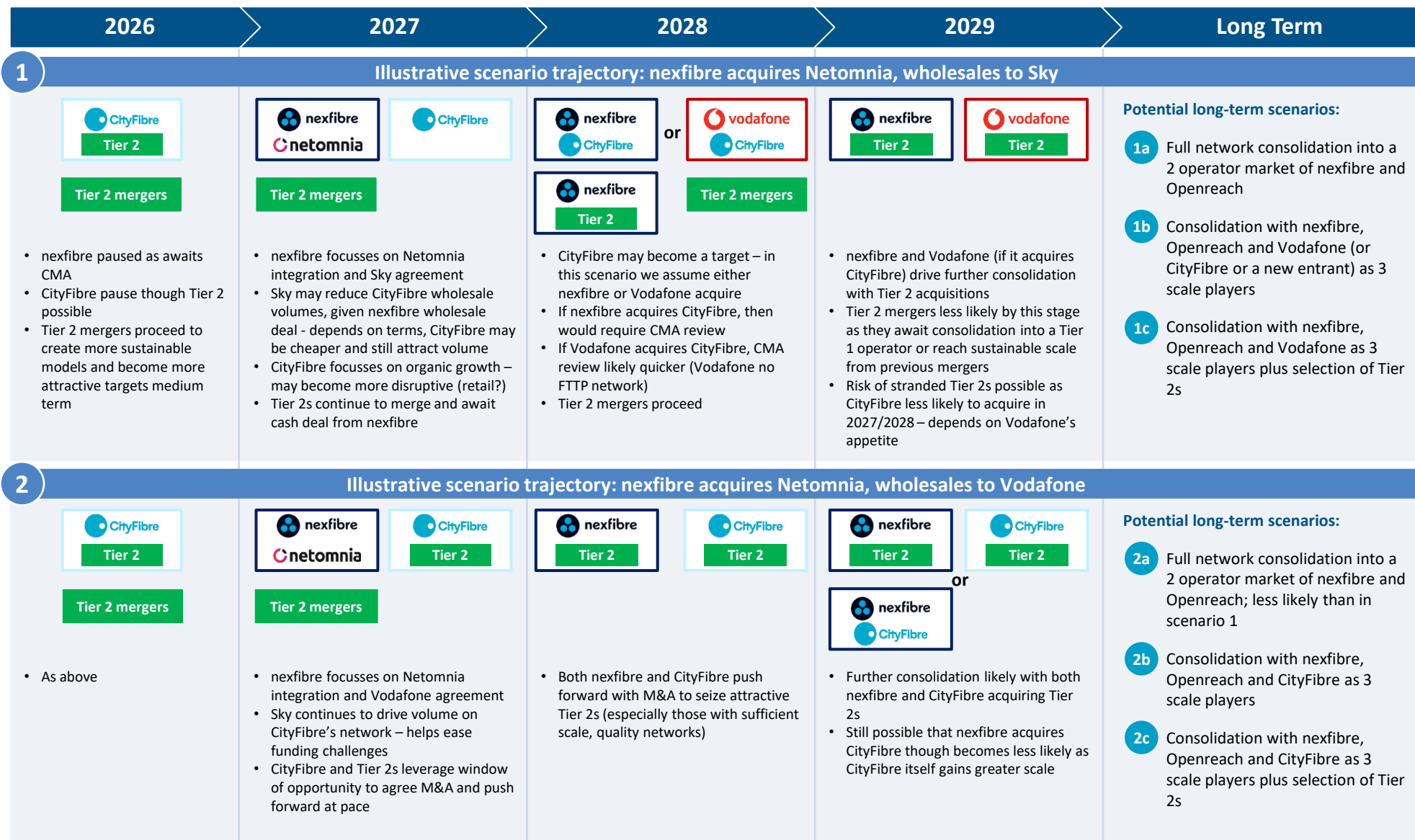
1: Calculations based on most recent Point Topic data; variations incorporate adjustments for e.g. under-reporting of footprints; premise vs postcode level data

2: In 2021, VMO2 announced a cost of FTTP overlay at £100 / premise passed plus installation costs; actual cost of build may have changed since

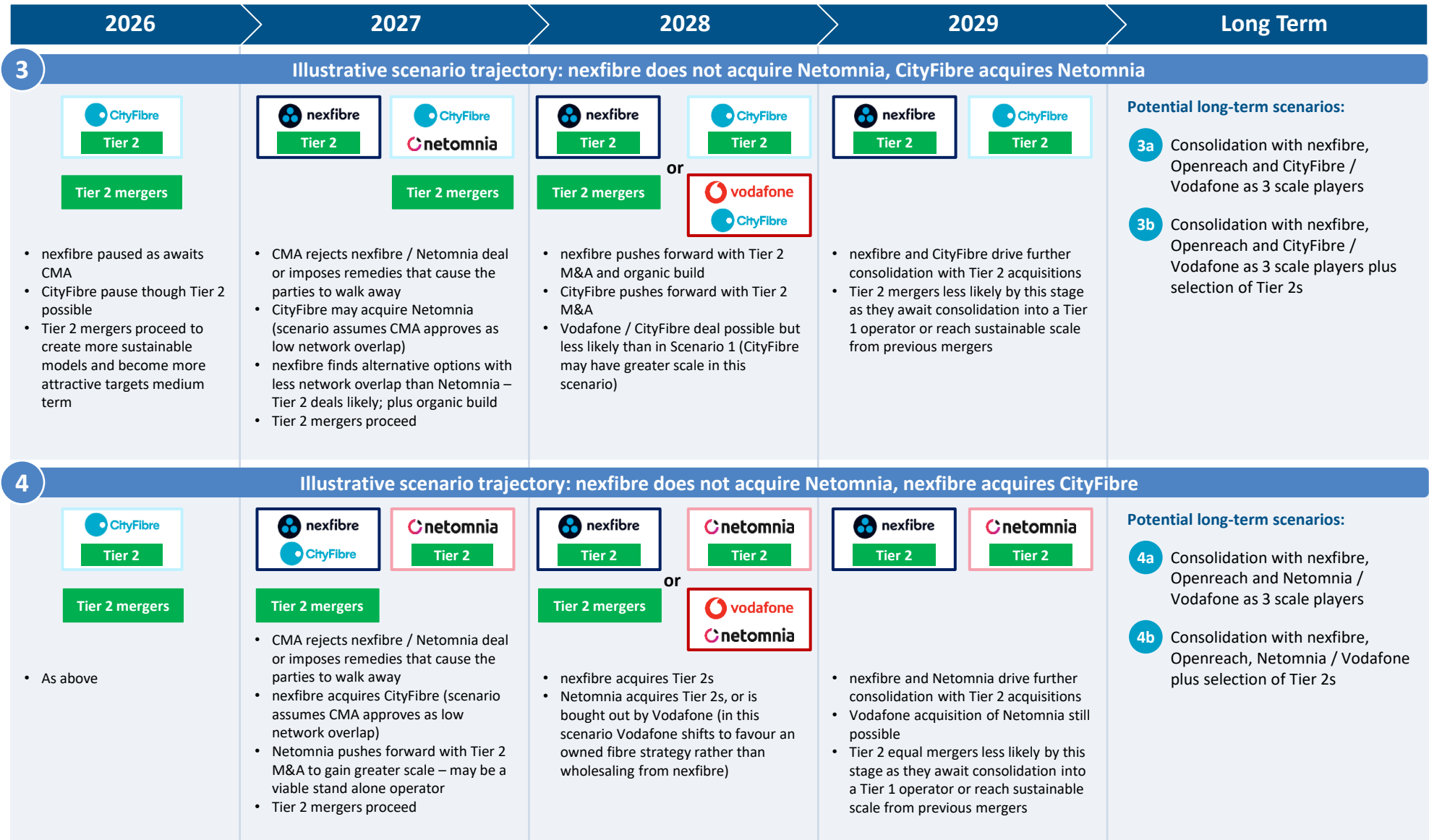
Source: PointTopic, Company reports, Cartesian

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M&A scenarios 1 & 2: If nexfibre's acquisition of Netomnia clears CMA, there are numerous scenarios that could follow



M&A scenarios 3 & 4: If nexfibre does not acquire Netomnia, it may acquire CityFibre instead, leaving Netomnia as a stand alone operator



M&A summary: There are still a range of long-term outcome scenarios and it will take time for the market to consolidate

Long-term outcome scenarios:

Scenario A: Fragmentation (Illustrative¹)	
Scenario B: Mixed competition	
Scenario C: 3 player state	
Scenario D: 2 player state	

- UK fibre M&A has paused in recent months, due to persistent issues in deal making (valuation gaps, capital structures, funding) as well as the CMA review of nexfibre's acquisition of Netomnia
- Working through some scenario trajectories for the next few years, suggests that there are still many moving parts – it is very difficult to give specific predictions
- As a result, we can still envisage a range of long-term outcomes (long-term inferring a 10-year view of the state of the market) ranging through:
 - Persistent fragmentation (illustrated in scenario A)
 - Mixed competition with several operators ranging in size, including a third scale operator (scenario B)
 - 3 player state with a 3rd scale operator behind Openreach and VMO2 / nexfibre. This 3rd player could be CityFibre or Vodafone (if Vodafone acquires CityFibre) or even another operator / new entrant (scenario C)
 - 2 player state with Openreach and VMO2 / nexfibre (scenario D)
- It is likely that it will take a number of years for the market to consolidate into a stable state
- In the meantime, operators are seeking to drive scale organically and through partnering, as well as through M&A

1: Illustrative only - we are not giving a view or prediction as to which operators may exist in a long-term state of persistent fragmentation



1 | Context

2 | Consolidation

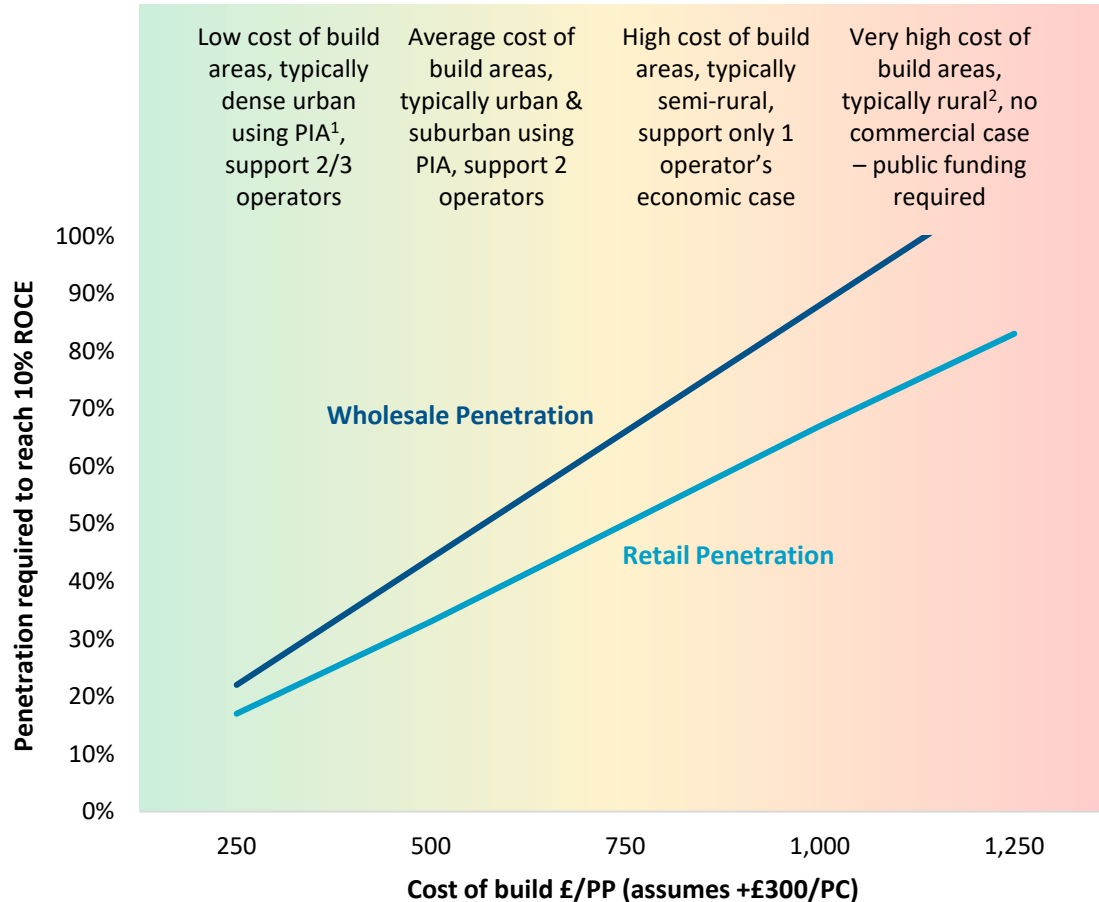
3 | Rural Coverage

4 | Summary

Fibre business case becomes uneconomic for more than 1 operator to build in semi-rural / rural areas and requires public funding in very high-cost areas

Penetration required to achieve 10% ROCE at different build costs:
Rural build costs mean >50% penetration required

Penetration required for 10% ROCE at different build costs



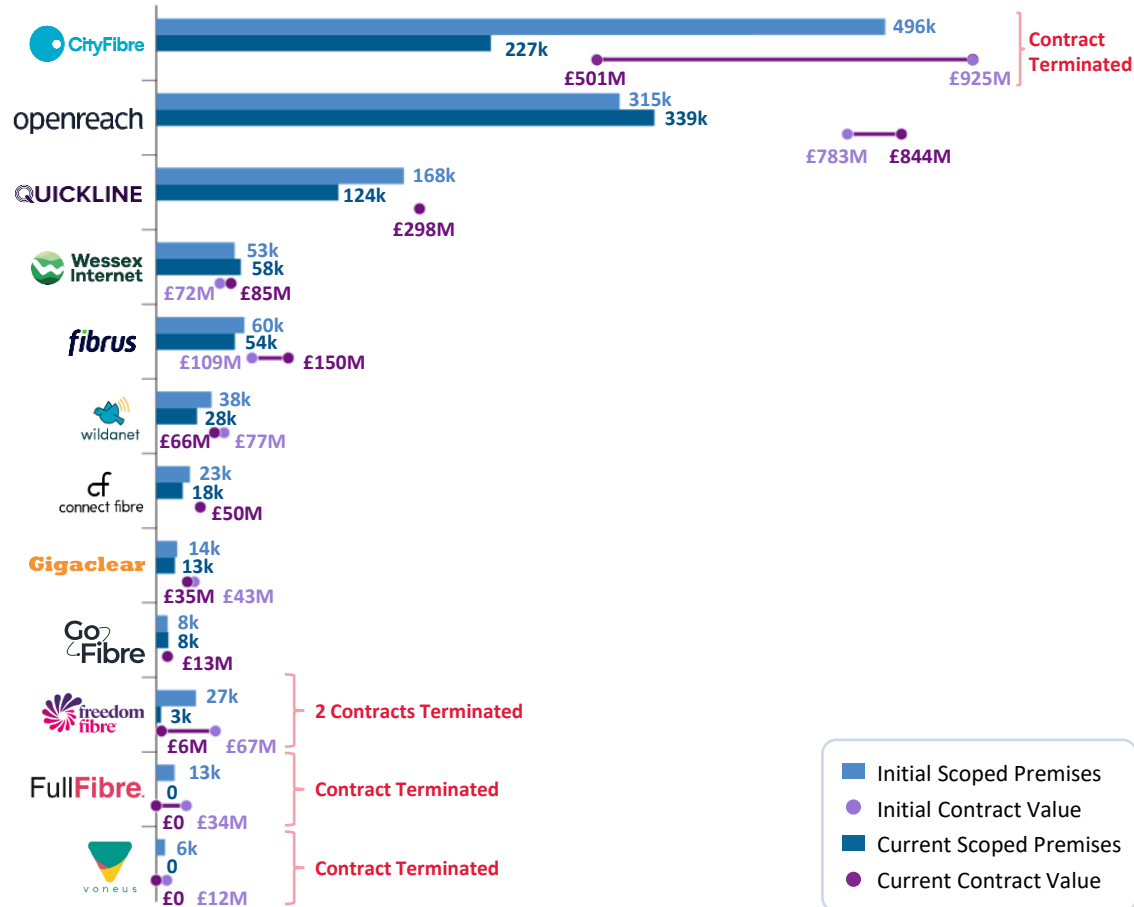
- Earlier we showed the penetration required to reach 10% Return on Capital Employed for an urban build, with cost of £500 / premise passed plus £300 connection cost
- As cost of build increases, for example in semi-rural and rural areas², the penetration required to cover the cost of capital and make a return increases – as shown in the chart
- On our unit economic assumptions (shown in slide 9):
 - Above c.£600 / PP and £300/PC, the penetration required exceeds 50% (wholesale case), meaning only 1 operator may have an economic case to build
 - Above c.£1100/PP and £300/PC, the penetration required exceeds 100% (wholesale case), meaning there may be no economic case for build even for 1 operator, and public funding is required
- Openreach cost of build tends to be lower than altnet cost of build, given scale economies and lessons learned – so Openreach may make a commercial case to build in higher cost areas, even if there is overbuild

Market Implications

- We estimate c.20% of UK premises have cost of build above the level at which it makes economic sense for 2 operators to overlap
- In some of these areas, an altnet has already built based on a model of being the only fibre operator and achieving very high penetration as a result. Rural operators include Gigaclear, Fibrus, Wessex Internet
- If Openreach overbuilds in these areas, then the altnet and / or Openreach may be challenged to make a return or to cover their cost of capital

BDUK provides public funding to support build in areas where there is no commercial case – more than 1m premises and £2.5bn public funding so far

BDUK lots by operator – some contracts have been descope given challenge of building in rural areas and / or Openreach commercial build



Figures shown exclude Fibrus' Northern Ireland lot and GoFibre's Scotland lots

- BDUK is a £5bn public funding programme, set up to subsidise hard-to-reach premises that would fall outside of operators' commercial gigabit rollout plans
- The UK Government, through Project Gigabit and BDUK, is targeting 99% gigabit coverage by 2032
- BDUK focuses on the most challenging part of the fibre cost curve, typically rural areas where low population density weakens the investment case or in some urban spots where congestion and access issues makes build complex
- To date, more than 1m premises have been contracted, representing around £2.5bn of subsidy, with approximately 250k premises built as of April 2026
- The evolution of BDUK contracts is a live indicator of rural fibre economics under pressure. The remaining premises are proving harder and more expensive to reach or may have already been captured in Openreach's commercial build plans (recognising Openreach cost of build may be less than an altnet's cost of build given economies of scale and lessons learned)
- The upside surrounding the subsidised areas is also narrowing, with BDUK-adjacent commercial build likely captured in Openreach's build plan
- As a result, several contracts have been descope, withdrawn or terminated, with affected premises either reallocated or absorbed into Openreach call-offs

Market Implications

- For the UK to achieve 99% gigabit coverage by 2032, effective use of public funding is required

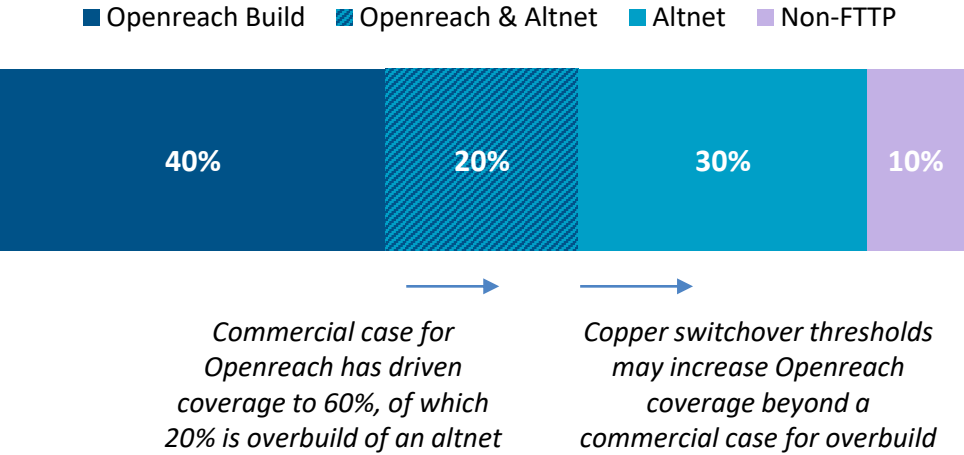
In areas which support one commercial build, Openreach may need to overbuild an altnet to meet copper switchover thresholds

Ofcom has set thresholds to provide a framework for Openreach’s copper switchover – the second threshold is being re-evaluated

First threshold	Openreach 75% FTTP coverage	Stop sell of copper products
Second threshold	Openreach 100% / 90% FTTP coverage	Removal of copper price controls
Third threshold	TBD – max. X% lines remain on copper	Removal of copper regulation

- In Ofcom’s Telecoms Access Review (TAR), effective April 2026 – March 2031, Ofcom has confirmed its initial framework to support copper switchover
- An additional consultation is underway regarding the second threshold. This proposes a second threshold for Openreach to reach 90% FTTP coverage in an exchange area (10% exclusions from 100%), before the removal of copper price controls in that area
- Many industry participants are not in favour of a set % of coverage as this forces overbuild in some uneconomic areas, yet also risks leaving a percentage of each exchange area without fibre

Illustrative rural exchange: Openreach would need to overbuild an altnet to reach copper switchover thresholds



- We show an illustrative exchange area with 60% Openreach coverage, 50% altnet coverage (partially overlapping) and 10% non-FTTP
- Openreach’s commercial expansion to reach 30m premises passed is increasing overbuild – in this illustration, Openreach has a commercial case to cover 60% of the exchange area, leaving 30% of the exchange covered only by an altnet, and 10% non-FTTP / requiring public funding
- If copper switchover requires 90% Openreach coverage, then Openreach may overbuild up to the 90%
- This represents wasted capex as the area is already served and the economic case does not support overbuild by 2 operators – meanwhile the 10% remains non-FTTP
- This overbuild risk could be avoided if, for example, existing alternative operator FTTP build is taken into account in the second threshold (an option discussed later), as is the case in Greece
- Avoiding overbuild could save capex that could be reinvested into the areas unserved by fibre, possibly reducing the public funding burden and delivering broader coverage sooner

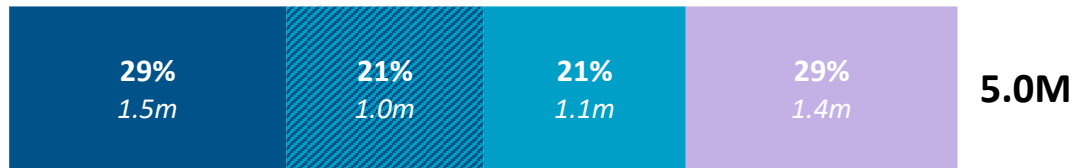
1: Ofcom’s Telecoms Access Review includes 100% Openreach FTTP coverage target for Threshold 2 with allowable exclusions; the additional consultation published 17 March 2026 “Approach to the copper retirement second threshold calculation” proposes allowing 10% exclusions, meaning the second threshold would be achieved once Openreach reaches 90% FTTP coverage of an exchange area
Source: Cartesian, Ofcom

Analysis indicates the UK has 5m premises in rural exchange areas, c.1m of which are currently served only by an altnet and at risk of Openreach overbuild

We estimate 5.0m premises are in rural exchange areas, with 1.5m covered by Openreach only, 1.1m by an altnet only, 1.0m covered by Openreach and an altnet, 1.4m non-FTTP¹

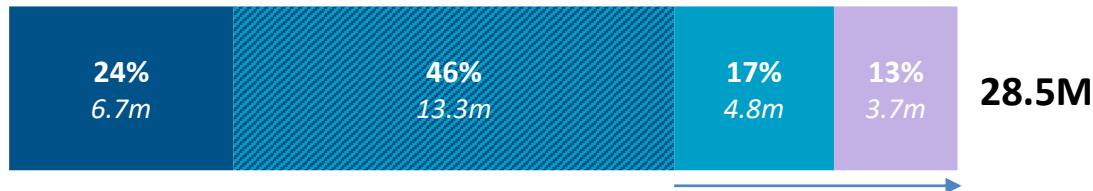
■ Openreach Build ■ Openreach & Other FTTP ■ Other FTTP ■ Non-FTTP

Rural Exchanges:



c.1m premises in rural exchanges are at risk of overbuild if Openreach pushes towards 90% coverage of each exchange it covers

Urban Exchanges:



Build economics make it more viable for Openreach to push coverage to a higher completion threshold in urban areas (except in highly congested spots or complex cases)

- Exchanges have been classified by percentage of rural vs urban premises (as defined by ONS/Scottish Government):
 - 2017 urban exchanges:** <75% rural premises
 - 3591 rural exchanges:** >75% rural premises
- Overlay of Openreach and altnet build using thinkbroadband data

- We use ONS data to split Openreach exchange areas into urban / rural categories and overlay Openreach's current build and altnet current build using thinkbroadband data
- We estimate 5.0m premises can be categorised as served from a rural exchange²
- These areas typically have a higher cost of build than urban areas and often the fibre business case requires more than 50% take-up – overbuild is often not economic
- Openreach currently covers 2.5m premises from rural exchanges, of which 1.0m overlap with an altnet
- Currently altnet only coverage stands at 1.1m premises – this is the footprint at risk of Openreach overbuild if it is required to achieve 90% / 100% FTTP coverage for copper switchover
- Currently 1.4m premises from rural exchanges are unserved by fibre. These areas require an ultrafast solution with options being:
 - Openreach or altnet commercial FTTP
 - Openreach or altnet build supported by BDUK funding
 - Alternative technologies e.g. satellite or FWA – preferably supplied by a wholesale access provider (e.g. Openreach) or an aggregator to provide consumers with ISP choice
- Capex saved from overbuilding an existing network, could be redeployed to these areas, potentially achieving broader coverage of rural areas sooner than if Openreach overbuilds

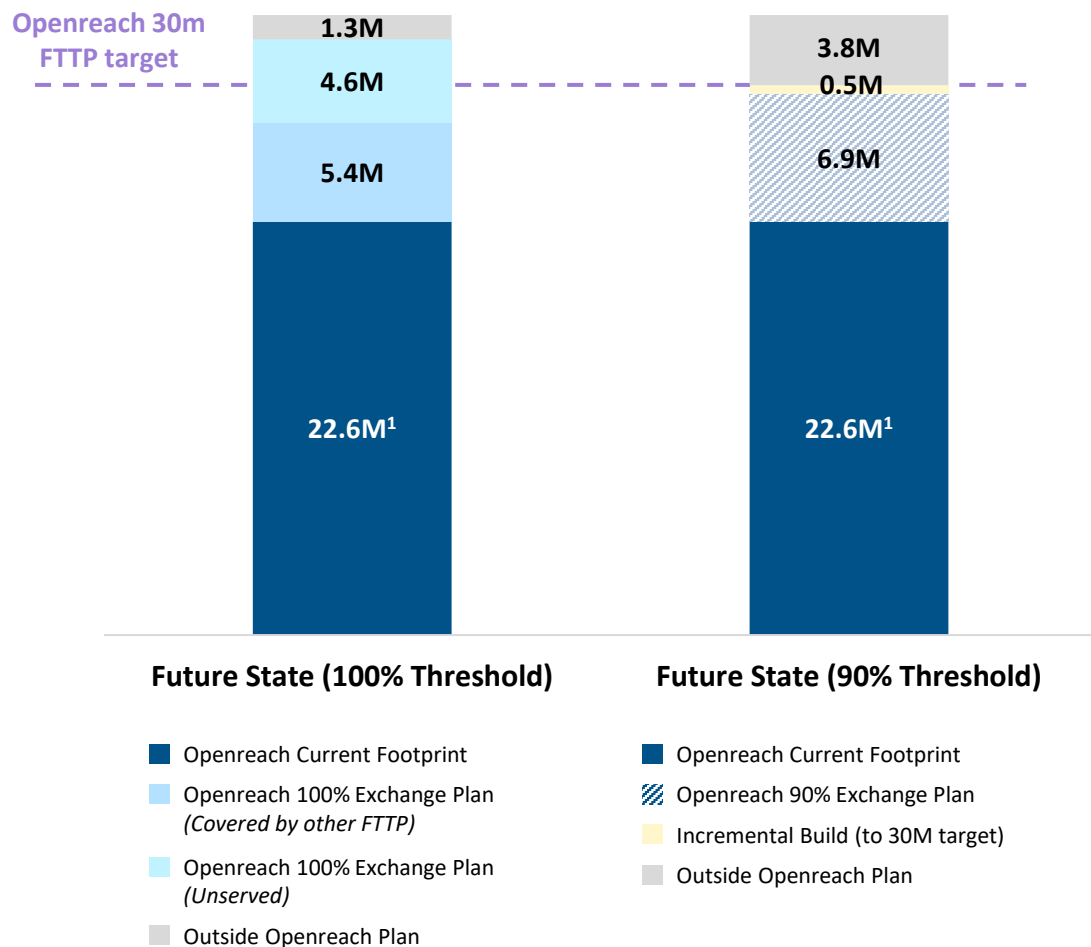
1: Current state volumes are taken from PointTopic – therefore total Openreach footprint shown is lower than reported

2: Not comparable with Openreach's stated c.6.2m rural / semi-rural build ambition given definitional differences

Source: Cartesian, Openreach, PointTopic, ONS, NISRA, Scottish Government data, thinkbroadband

Openreach releases future exchange build plans – if all current and planned exchanges are 90% covered this would consume nearly all of its 30m FTTP target

Openreach future build scenarios: 100% exchange coverage versus 90% exchange coverage of current and published planned exchanges¹



- Openreach publishes FTTP coverage plans at an exchange level – spanning Fibre First Towns, Cities and Boroughs, Market Towns and Villages, and Stop Sell build programmes
- If Openreach covers all current exchanges and its published planned exchanges to 100% FTTP, this would take total build to 32.5m premises passed – beyond Openreach’s stated 30m ambition
- If Openreach covers these exchanges to 90% FTTP, this would take total build to 29.5m, consuming nearly all of Openreach’s 30m FTTP target
- Some of this 90% coverage may represent wasted capex as it is overbuild in areas where the economic case only supports one operator
- This capex could be invested in other areas, potentially achieving greater FTTP coverage for the UK overall by covering exchanges outside of the current published plans
- We estimate 1600 exchanges fall outside of Openreach’s published FTTP plans² (currently serving c1.2m premises passed with copper)
- With the current copper switchover thresholds, these exchanges may be at risk of being left on copper, unless Openreach increases its FTTP ambitions or uses alternative technologies to switch customers over from copper
- Consumers in these areas may opt for satellite or FWA options even today, but an Openreach served option may bring consumers greater ISP choice and enable full copper switchover
- We discuss options in the following slides

1: Current state volumes are taken from PointTopic – therefore total Openreach footprint shown is lower than reported
 2: Published FTTP plans includes Fibre First Towns, Cities and Boroughs, Market Towns and Villages, and Stop Sell build programmes
 Source: Cartesian, Openreach data and reports, PointTopic
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Potential solutions: Regulatory thresholds could consider altnet build in coverage requirements or be adapted to directly consider copper customers

1

Adapt regulatory thresholds: Include altnet build and / or alternative technologies (e.g. satellite) in Threshold 2

What would it look like?	Benefits	Risks and considerations
Adapt Ofcom's regulatory thresholds for copper switchover as follows - Threshold 1: Retained at 75% coverage to issue stop sell on copper - Threshold 2: Adapt for Openreach to include altnet build and / or alternative technologies (e.g. satellite) while making it 100% coverage threshold, before removing copper price controls - Threshold 3: To be confirmed (TBC) maximum % of Openreach lines remaining on copper, before removing all copper regulation (and therefore Openreach's obligation to provide copper)	- Focuses Openreach on maximising ultrafast coverage and reduces no of premises reliant on superfast copper - Creates a framework for Openreach to partner with alternative networks and / or use alternative technologies - Gives Openreach the option to avoid wasted overbuild capex that can be invested elsewhere - Avoiding Openreach overbuild in uneconomic areas helps to protect existing altnet build and may be supportive of a broader competitive fibre market	- May reduce fibre options for some customers - Alternative networks and technologies e.g. satellite should still allow consumer choice via a range of ISPs (e.g. an Openreach satellite proposition) - Use of alternative technologies to achieve Threshold 2 may reduce long-term Gigabit coverage targets - Analysis and consultation required to understand implications and views; and clarity is still needed on the third threshold - May introduce complexity for Openreach and its ISPs - Conversely Openreach may seek to cover each exchange with FTTP regardless, therefore may not remove overbuild risk

2

Adapt regulatory thresholds: Change Ofcom's threshold 2 to focus on a maximum % of copper customers, not coverage

What would it look like?	Benefits	Risks and considerations
Adapt Ofcom's regulatory thresholds for copper switchover as follows - Threshold 1: Retained at 75% coverage to issue stop sell on copper - Threshold 2: Adapted to a maximum X% of Openreach lines remaining on copper, before removing copper price controls (e.g. 20%) - Threshold 3: TBC maximum % of Openreach lines remaining on copper, before removing all copper regulation (and therefore Openreach's obligation to provide copper)	- Focuses on end customers rather than coverage and may reduce risk of customers being stranded on copper / force migrated - Releases Openreach from its FTTP coverage requirements once 75% achieved, meaning it could leverage alternative networks or technologies (e.g. satellite) to serve remaining copper customers - Potentially accelerates Openreach's take-up of ultrafast products - Reduces overbuild risk in uneconomic areas	- May reduce fibre options for some customers - Focuses Openreach towards driving take-up, so coverage milestones may take longer and may slow copper switchover - Analysis and consultation required to understand where Threshold 2 should be set; and clarity is still needed on the third threshold - May introduce complexity for Openreach and its ISPs if it uses alternative networks or technologies to drive customers off copper - Conversely Openreach may seek to cover each exchange with FTTP regardless, therefore may not remove overbuild risk

Potential solutions: Partnering could underpin wholesale access meaning end users still have ISP choice

3

Indirect Partnering: Leverage aggregator model

What would it look like?	Benefits	Risks and considerations
- Openreach becomes a wholebuy operator, buying indirectly i.e. from an aggregator with access to alternative networks e.g. Zen, APFN - Openreach wholebuys where it is more economic to buy than overbuild – it continues to build where the business case makes economic sense considering both cost of build and take-up - Openreach continues to offer wholesale local access on equivalent terms, with no geographic pricing differentiation - Ofcom retains Threshold 2 as a coverage threshold at c.100%, including areas where Openreach wholebuys	- Reduces risk of overbuild in uneconomic areas, as Openreach wholebuys from existing altnet footprints - No or little negotiation of terms required, as aggregator wholesale terms already exist - Avoids wasted capex from overbuild in rural areas, which could be used to drive coverage elsewhere - Continues focus on FTTP, achieving maximum coverage for UK in fastest timeframes - Brings forward copper switchover by incorporating altnet build into Threshold 2 - Minimises no of premises left without fibre for an extended time	- Adds an operational layer of complexity for Openreach - Adds commercial complexity and risk, if altnets have different quality of service levels - These could be overcome contractually with the altnet, ISPs and end users - Alters financial profile of Openreach, reducing build capex and increasing opex - Further analysis and consultation required - Openreach may cover each exchange with FTTP regardless, therefore may not remove overbuild risk

4

Direct Partnering: Openreach wholebuy

What would it look like?	Benefits	Risks and considerations
- Openreach becomes a wholebuy operator, buying directly from an alternative network operator - Openreach wholebuys where it is more economic to buy than overbuild – it continues to build where the business case makes economic sense considering both cost of build and take-up - Openreach continues to offer wholesale local access on equivalent terms - Openreach may agree with Ofcom a geographic pricing model specifically where it wholebuys, to help offset the impact of wholebuy pricing in rural areas - Ofcom retains Threshold 2 as a coverage threshold at c.100%, including areas where Openreach wholebuys	- Reduces risk of overbuild in uneconomic areas, as Openreach wholebuys from existing altnet footprints - Avoids wasted capex from overbuild in rural areas, which could be used to drive coverage elsewhere - Continues focus on FTTP, achieving maximum coverage for UK in fastest timeframes - Brings forward copper switchover by incorporating altnet build into Threshold 2 - Minimises no of premises left without fibre for an extended time	- Negotiation of wholesale terms required with a rural alternative network operator - Adds an operational layer of complexity for Openreach - Adds commercial complexity and risk, if altnets have different quality of service levels - These could be overcome contractually with the altnet, ISPs and end users - Alters financial profile of Openreach, reducing build capex and increasing opex - Further analysis and consultation required - Openreach may cover each exchange with FTTP regardless, therefore may not remove overbuild risk

Summary scenarios: Alternative options may improve uneconomic overbuild and / or copper customer protection, but may slow copper switchover

		Pace of Copper Switchover	Uneconomic FTTN Overbuild	Copper Customer Protection
Indicative Red/Amber/Green impact assessment				
Current Proposed: Threshold 2 – Openreach must reach fixed % FTTN coverage	Current: Openreach not partnering			
	Indirect partnering: Openreach wholebuys from an aggregator in uneconomic areas			
	Direct partnering: Openreach wholebuys directly from another operator			
	Openreach does not partner			
Adapt Regulation: Threshold 2 to include alternative fibre networks and / or alternative ultrafast technologies (e.g. satellite)	Indirect partnering: Openreach wholebuys from an aggregator in uneconomic areas			
	Direct partnering: Openreach wholebuys directly from another operator			
	Openreach does not partner			



1 | Context

2 | Consolidation

3 | Rural Coverage

4 | Summary

Summary

- **The UK fibre market is often heralded a success story** as FTTP coverage has progressed at pace. However, the path towards full coverage and take-up with sustainable network competition is proving challenging given some significant market issues.
- **Key market characteristics posing issues for alternative network operators** (altnets) are 1) a highly fragmented infrastructure market with growing overbuild - 47% of the UK now has more than 1 FTTP network 2) a concentrated retail market with the top 3 ISPs having over 70% market share and 3) very aggressive wholesale and retail pricing.
- Collectively these make it **challenging for alternative network operators to create sustainable business models.**
- The **market needs to consolidate to improve economies of scale but this is taking longer than expected** given valuation gaps, capital structure misalignment and funding issues.
- Our scenario M&A trajectories illustrate that, while the planned nexfibre acquisition of Netomnia would be a significant step forward in consolidating the market, **there remain many moving parts to the consolidation path – it is very difficult to give specific predictions.**
- Ultimately, **we can still envisage a range of long-term outcomes on a 10-year view of the market** – from persistent fragmentation through to a 3 operator or 2 operator state.
- In addition to the uncertainty surrounding the path to consolidation, **there are also uncertainties on rural coverage and copper switchover.**
- **Fibre economics are more challenging in rural areas** because of the higher cost of build – this can make the business case very challenging if there are 2 or more operators competing for network share in these areas.
- However, the **copper switchover framework proposed by Ofcom includes an Openreach exchange coverage threshold at a fixed percentage (90% or 100%)** before its copper price controls are lifted. This threshold **may drive Openreach to overbuild existing rural altnets** on its copper switchover path.
- The proposed framework therefore risks **wasted investment in these high cost of build areas**, and poses a risk for the sustainability of existing rural alternative network operators, as the economic case only supports 1 network and even in some cases public funding has been used.
- Our analysis indicates 1) around **1m rural FTTP premises could see uneconomic overbuild if Openreach is required to meet a high exchange coverage threshold** for copper switchover and 2) achieving a 90% coverage threshold of all existing and published planned exchanges, **would consume nearly all of Openreach's 30m FTTP ambition, potentially leaving up to 1600 Openreach exchanges on copper** (unless Openreach extends its FTTP ambitions beyond 30m or uses alternative technologies).
- **Potential solutions include adapting the regulatory framework** to allow Openreach to include alternative FTTP networks (as in Greece) or technologies (e.g. satellite) in meeting the coverage threshold or to focus on ultrafast solutions for remaining copper customers rather than FTTP coverage.
- **Coupled with this we could envisage Openreach partnering**, whether through an aggregator model or directly with another operator, to leverage alternative networks and / or technologies, while maintaining consumer ISP choice through Openreach.
- Overall, our view is that each operator, acting independently and according to its own circumstances, should look to ensure that its pricing and customer-experience strategy sustainably covers its own cost of capital; to move forward with M&A with caution and pragmatically (e.g. with like for like mergers if cash deals are out for now), and to consider alternative paths such as partnering especially in higher cost areas to avoid uneconomic overbuild.

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experience helping internet service providers, operators, investors, industry groups, and state governments navigate the changing, competitive landscape of broadband internet access and network investment.

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- ▶ Deliver insightful data and reporting to key teams and stakeholders

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