Openreach EAD pricing

Review of Openreach proposed new surcharges for EADs and OSAs used for FTTP aggregation

February 2021

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1 Executive summary

1. BT[1] is introducing surcharges on its Ethernet access direct (EAD) and Optical Spectrum access (OSA) prices if those circuits are used to transport traffic from FTTP aggregation points. The surcharge does not apply to traffic from fixed wireless aggregation points, multi-dwelling units (MDUs) and mobile base stations, only to FTTP traffic. The surcharge more than doubles the annual rental for a 10Gbps EAD.

2. BT is also planning to prohibit the use of the forthcoming DFA remedy (in Area 3) for FTTP backhaul.

3. Despite the current product descriptions for EAD and OSA explicitly including backhaul for altnet aggregation points/nodes, BT argues that it can introduce this surcharge as it has no regulatory obligation to supply EADs and OSAs for FTTP traffic aggregation. This is, BT argues, because connections to altnet intermediary nodes are not included in the leased lines access market as defined by Ofcom. BT also claims that as the DFA remedy is applied in that market, it is also not applicable for FTTP backhaul.

4. Altnets across the UK use EADs and OSAs to carry traffic from their aggregation points (often street cabinets). Often the EAD is purchased from a commercial backhaul provider to access internet exchanges, in the vast majority of cases the commercial backhaul providers have no alternative but to purchase the local tails (connecting the altnet aggregation points) from BT.

5. Many altnets are planning to use the new DFA remedy in Area 3 to connect small and remote locations.

6. We have interviewed 4 different altnets to understand their current and planned use of EADs and OSAs and found that there is extensive use of those services in altnet

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networks. Based on our interviews and analysis, we see the likely impact of the surcharges on EADs and OSAs and the usage limitation on DFA as follows:

- The EAD/OSA surcharge will increase the cost-base for a large number of altnets, some in the short term only until the build their own infrastructure, but others on a permanent basis.

- Some locations planned for commercial deployment may no longer be viable, due to increased connectivity costs.

- The surcharges, combined with the usage restriction on the forthcoming DFA remedy in Area 3, could have a significant impact on the viability of connecting small and remote locations, including those covered by the Government's Outside-In programme, potentially causing some altnets to not participate in the programme.

7. Ofcom is interested and would like to receive information about the impact of BT's proposals.

2 Introduction and background

8. BT currently supplies EADs and OSAs to altnets across the country to transport their fixed broadband traffic from aggregation points to other network nodes or as part of carrying that traffic to internet exchanges.

9. BT notified industry on 30 November 2020 that it would be imposing a surcharge on EADs and OSAs used for FTTP traffic aggregation with effect from January 1, 2021.[2] The surcharges are not applied to other forms of traffic aggregation, including traffic from fixed-wireless networks, traffic from multi-dwelling-units (MDUs), or from mobile base stations.

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[2] BT's current EASD and OSA product descriptions explicitly include connectivity to altnet aggregation nodes and we are not sure that BT can change those products unilaterally. That is a legal issue concerning the contractual validity of BT's changes and outside the scope of this report.

10. The surcharges are significant and more than double the annual rental for a 10Gbps EAD circuit.

11. Additionally, BT is proposing to prohibit the use of its new regulated dark fibre access (DFA) product (to be introduced in Area 3), for the purpose of traffic aggregation.

12. BT is arguing that it has no obligation to provide connectivity to altnet aggregation points/network nodes and therefore can set its pricing and restrict usage as it wishes.

13. This report investigates the extent to which the EAD and OSA products are important to altnets deploying new fibre networks and, if so, what the impact of the surcharges and planned usage restriction for the DFA product are likely to be, on altnets and the consumers they serve.

3 Openreach' leased lines products and prices

14. Openreach offers a range of ethernet leased lines services; whilst the main focus of this analysis is the EAD portfolio, the related EBD and OSA products are also relevant (EBD could be a substitute for EADs for FTTP backhaul and Openreach is proposing similar surcharges on the OSA product to those for the EAD product).

3.1 EAD products and prices

3.1.1 EAD product scope and variants

The EAD product scope, as defined in the Openreach product fact sheet, is as follows:

"Ethernet Access Direct (EAD) provides point-to-point data connectivity between sites. It can be used to build and extend customer networks, develop new infrastructure, and meet low & high capacity backhaul requirements (i.e., up to 10Gbps)."

It is described as being able to connect between various nodes in the network (including end-customer sites, BT access nodes and remote altnet sites) as follows:

Connection capabilities

In some configurations, a separate main link product is required to provide the connection between BT nodes. There is also the option of a lower-price product, EADLA, where access is only required as far as the nearest fibre serving exchange. The diagram below illustrates this:

Circuit reach:

Maximum radial distance:

- Via eCo-x EAD 10Mbps and 100Mbps = 25km EAD 1Gbps = 35km
- Via EMP EAD 10Mbps, 100Mbps and 1Gbps = 45km
- EAD 10Gbps = 25km

Maximum route distance:

- Via eCo-x EAD 10Mbps and 100Mbps = 40km EAD 1Gbps = 66km
- Via EMP EAD 10Mbps, 100Mbps and 1Gbps = 86km
- EAD 10Gbps = 40km

EAD Local Access provides access as far as the fibre serving exchange.

How it works

This diagram shows three separate circuits: 1. EAD with a mainlink 2. **EAD where no mainlink is required** and 3. **EAD Local Access (no mainlink).**
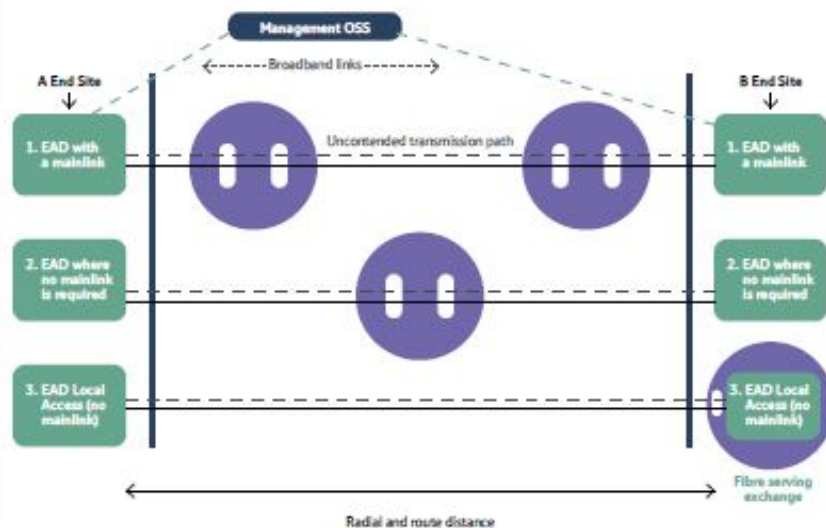
3.1.2 EAD product pricing

| EAD standard charges	60 month	Speed	connection	rental per year	
	EAD1000	1G	1,848	1,944	per circuit
	EAD10000	10G	4,063	4,380	per circuit
	Mainlink			0.18	per metre
	EADLA1000	1G	1848	1566	per circuit
	EADLA10000	10G	4063	3648	per circuit
FTTP supplementary charges from 1-1-2021	EAD1000			560	per circuit
	EAD10000			5,530	per circuit

3.2 EBD products and prices

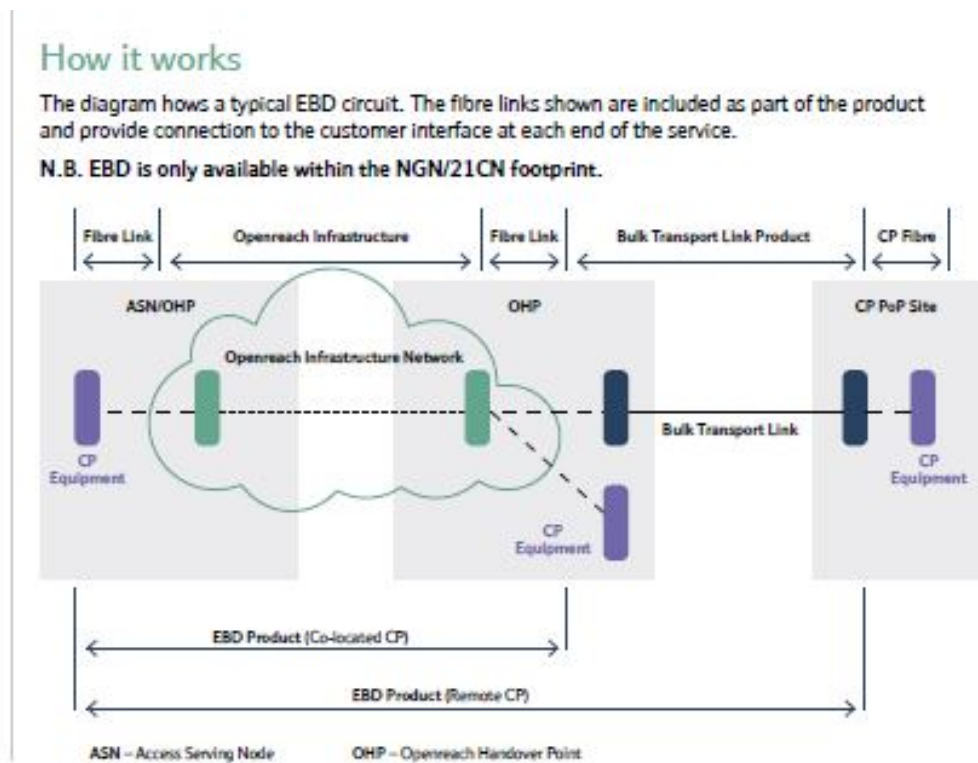### 3.2.1 EBD product scope and variants

The EBD product scope, as defined in the Openreach product fact sheet, is as follows:

"Ethernet Backhaul Direct (EBD) is a highly efficient, cost effective way of delivering large volumes of data, quickly and securely. It delivers permanently connected, uncontended bandwidth from an Access Serving Node (ASN)/Openreach Handover Point (OHP) to an OHP. If your point of presence is not in the exchange but a couple of miles down the road, for example, Bulk Transport Link (BTL) can be used."

It is described as being able to connect between various nodes in the network (including BT access nodes and remote altnet sites) as follows:

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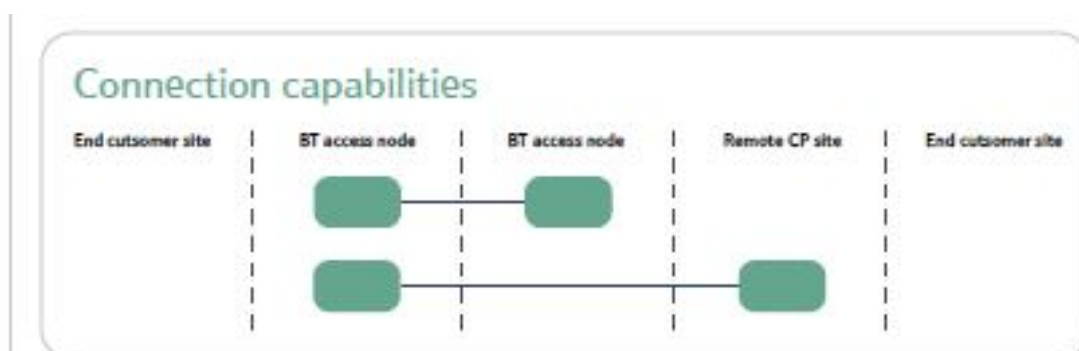
However, it should be noted that sales of the Bulk Transport Link service were discontinued in 2016, and so it seems that EBD circuits can no longer be extended to remote altnet sites in this way. So only the Co-located altnet option in the following diagram remains available:

How it works

The diagram hows a typical EBD circuit. The fibre links shown are included as part of the product and provide connection to the customer interface at each end of the service.

N.B. EBD is only available within the NGN/21CN footprint.

ASN – Access Serving Node   OHP – Openreach Handover Point

3.2.2 EBD product pricing

60 month	connection	rental band A	rental band B	rental band C	
EBD 1G	2,100	2,652	3,000	4,098	per circuit
EBD 10G	7,200	9,773	11,592	16,905	per circuit

Openreach have not announced any surcharges to EBD products used to backhaul FTTP traffic.

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3.3   OSA products and prices

3.3.1   OSA product scope and variants

15. The OSA product scope, as defined in the Openreach product fact sheet, is as follows:

"Optical Spectrum Access (OSA) and Optical Spectrum Extended Access (OSEA) are secure, permanently connected, high speed data circuits that use Dense Wavelength Division Multiplexing (DWDM) technology on dedicated fibre. You can use them to develop Wide Area Network (WAN) and Storage Area Network (SAN) applications and to offer complete end-to-end solutions. "

16. It is able to connect end user sites, BT access nodes and remote CP sites as shown below:
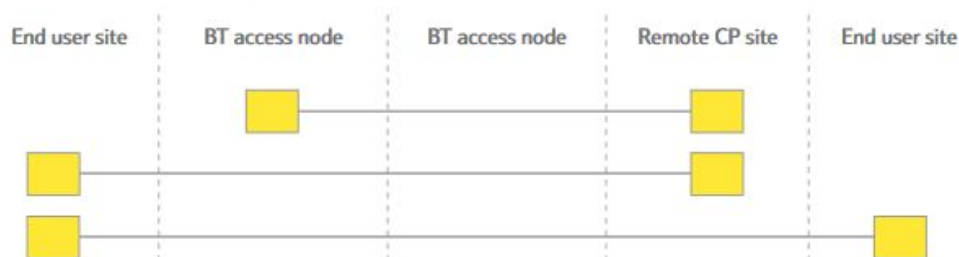
17. The product allows a user to access single or multiple wavelength channels, providing bandwidths per channel of 2.5G or 10G over distances of 35km (or 70km for the extended version).
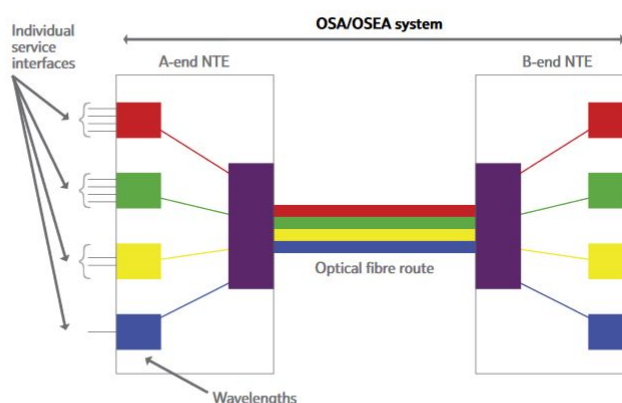
Circuit reach:
- OSA maximum radial distance: 35km
- OSEA maximum radial distance: 70km

Available bandwidths

| 2.5Gb | 10Gb |

How it works:

The diagram above is a simple representation of a DWDM system showing single and multiple service interfaces per wavelength. The customer would connect their equipment to a service interface.
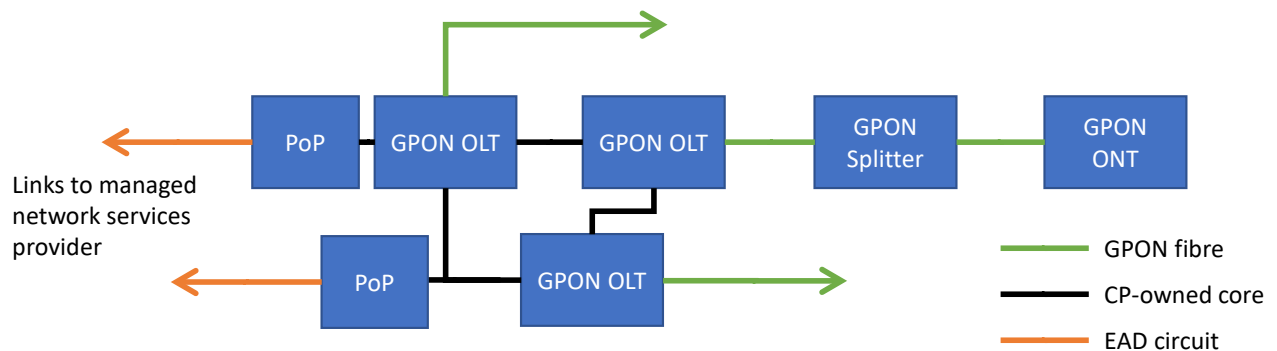
3.3.2 OSA product pricing

OSA standard charges	60 month	Speed	connection	rental per year	
	OSA 8 wavelengths	10G	15,550	7,845	per circuit
FTTP supplementary charges from 1-1-2021				11,060	per circuit

4 Altnet Use cases

18. As part of this analysis, we have performed 5 interviews with altnets that either use or plan to use EADs or OSAs for FTTP traffic aggregation; these have been selected to reflect a variety of different use cases. We examine how they use and plan to use those products and what impact the proposed surcharges would have on them.

4.1 Use case 1 – medium sized town

19. In our first example, EADs are used to provide connectivity as part of a GPON implementation in a medium-sized town.

The GPON network diagram shows the following connected blocks: PoP — GPON OLT — GPON OLT — GPON Splitter — GPON ONT, with a second row of PoP — GPON OLT.

Links to managed network services provider

Legend:
- GPON fibre (green)
- CP-owned core (black)
- EAD circuit (orange)

20. The altnet has a number of OLTs in each town, located in street cabinets. These are connected in a ring configuration by the altnet's own core network, but EADs are typically used to provide links from the PoP sites via a managed network services provider, which uses EADs to connect to its service. Two such connections with different destinations would typically be used, providing resilience.

21. The managed service provider typically does not have any choice of operator to provide these links, apart from BT. The only alternative would be for the altnet itself to build infrastructure, possibly using PIA. This is unlikely to be viable in many cases, though and as the altnet does not use PIA for its main build the use of PIA would come with considerable costs.

22. The near-doubling of EAD pricing will be a significant factor for the altnet, especially as the use of EADs was intended as a long-term solution in the network design (replaced by DFA in Area 3 locations).

4.2   Use case 2 – small towns/villages

23. In this example, the altnet builds GPON networks in small towns/villages, with typically a single OLT site in each. EADs are used to link the PoPs in each town, and also to provide access to managed network services providing internet access.

GPON fibre
CP-owned core
EAD circuit
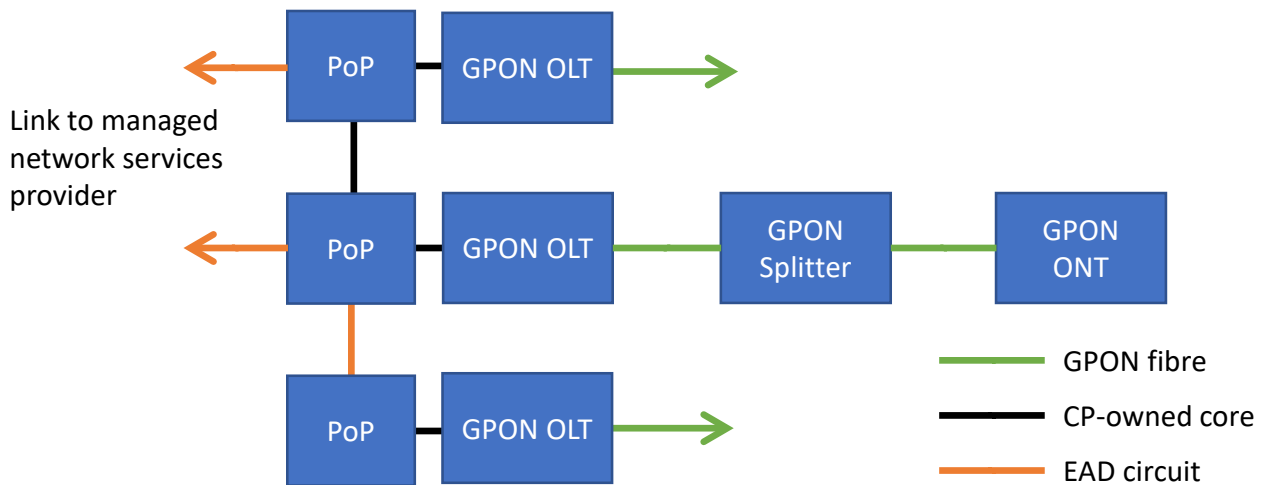
24. The altnet is planning to build its own ring-based core network to link the majority of towns, but in order to speed up deployment of FTTP, EADs are used as an interim measure to connect all the PoPs to the internet exchange and as permanent connection for around 1/3 pf PoPs.

25. The price increase will affect the economics of the build-buy decision for these further towns, with impact on timescale of deployment and likely reduction in coverage.

4.3   Use case 3 – rural settlements

26. In this example, the altnet has built fixed wireless networks in a number of small rural villages. The altnet is now starting to implement FTTP networks in these areas, in order to offer higher speed, higher reliability services.


GPON fibre
CP-owned core
EAD circuit
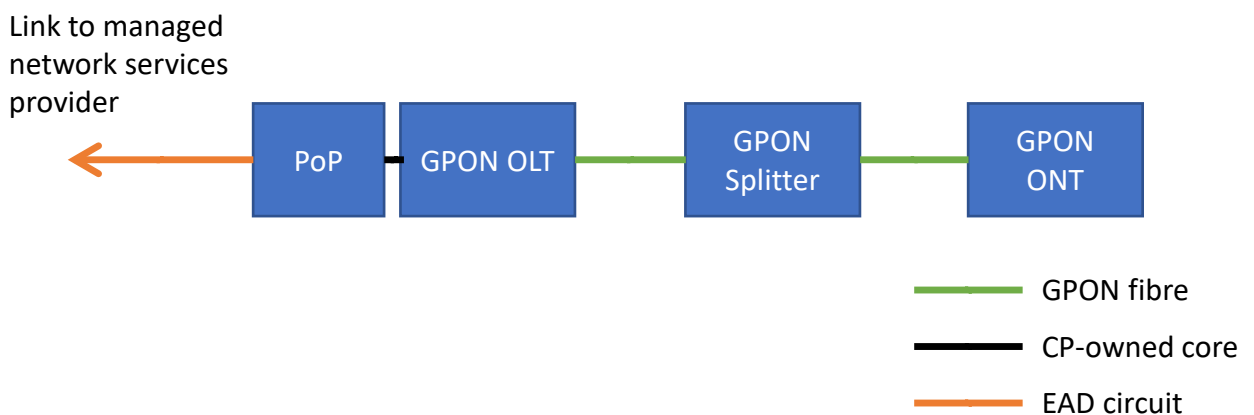
27. EADs have been used in the past to provide connectivity from the fixed wireless network, and the altnet plans to continue to use EADs to provide links to the internet exchange via managed network services.

28. Given the small size of the communities served by the altnet (e.g., 300-400 premises), the economics of deployment will be significantly affected by the EAD surcharge. The only alternative approach would be PIA, which could be significantly more expensive in the short term and introduce long delays.

29. In many locations, the altnet already provides wireless services with high penetration; the further development of these locations to offer FTTP services will be adversely affected. In addition, the extent of the altnet's participation in the Outside In programme is likely to be affected.

4.4 Use case 4 – MDU

30. In this example, the altnet connects MDUs in a cluster of buildings; and EAD circuit is used to connect to the first building, then new-build network is used to connect further buildings.
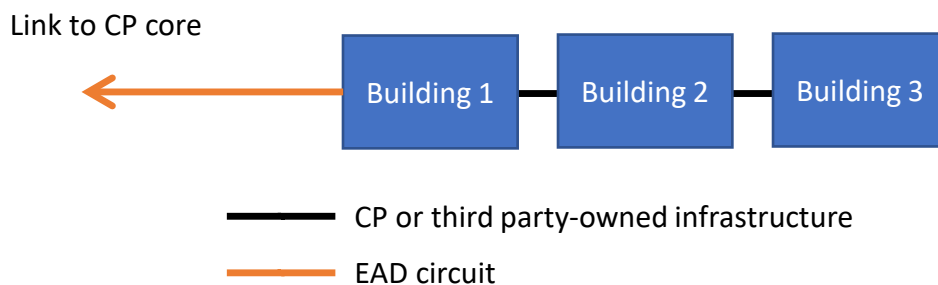
31. Although MDUs comprising a single building are outside the scope of the new surcharge, it appears that Openreach regard this situation, where multiple buildings are served from the same EAD, as within the scope of the surcharge.

4.5 General comments

32. All altnets interviewed expressed concern that their planned participation in the Outside-In programme included reliance on EADs in the access network (i.e., beyond a point of aggregation), due to many communities in the Outside-In programme being small and remote.

5 Comparing EAD with PIA

33. Openreach has referred FTTP providers to PIA is the regulated product for connection of aggregation nodes in FTTP access networks. We note that these products have a very different price structure, and that, in many cases, PIA cannot be considered a reasonable substitute for EAD/OSA[3] connections.

34. The costs of a link constructed using PIA are highly front-loaded with initial capex and vary significantly with the length of the link[4], whereas EAD costs are dominated by the monthly rental, which is independent of length[5]. This is illustrated in the chart below[6],

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[3] In this section we compare EAD and PIA use. Comparison of OSA and PIA use is complex and will vary substantially depending on how the OSA product is used.

[4] The analysis performed to arrive at the cost of the PIA-based link is indicative only. The costs will vary based on a large number of parameters. We believe the assumptions used are reasonable and representative but recommend that the analysis be performed for a number of scenarios, using actual operator data.

[5] The way EADs are used for FTTP aggregation would typically not include a Main Link component, so the pricing is not distance-dependant.

[6] In this analysis the PIA option includes the costs of the operator installing their own fibre in Openreach ducts, costs of building their own ducts for the proportion of the length that Openreach ducts are unsuitable or unavailable, the PIA rental costs (for duct, joint boxes, and manholes), typical network adjustment costs, active electronics for terminating the fibre and repair and maintenance opex. It assumed that PIA and EAD prices are flat in real terms, and a real WACC of 5.5% is assumed. We have assumed that PIA will be available for 75% of the link and the costs used for using PIA and of self-build are taken from Ofcom's fibre costing model. We are collecting costing and PIA availability data from operators and may be able to update and reference the analysis at a later date. We understand that 75% PIA availability is a high assumption, if that is reduced then the cost of the PIA-based link increases further. Other assumptions, including the mix of hard and soft surface for self-build also influence the cost of the PIA-based link. We are also looking for additional data on those parameters.

which compares costs of PIA and 10Gbps EAD for different link lengths over a 10-year period in present value terms.

PIA vs EAD Years 1-10 NPV costs (£) vs distance (km)
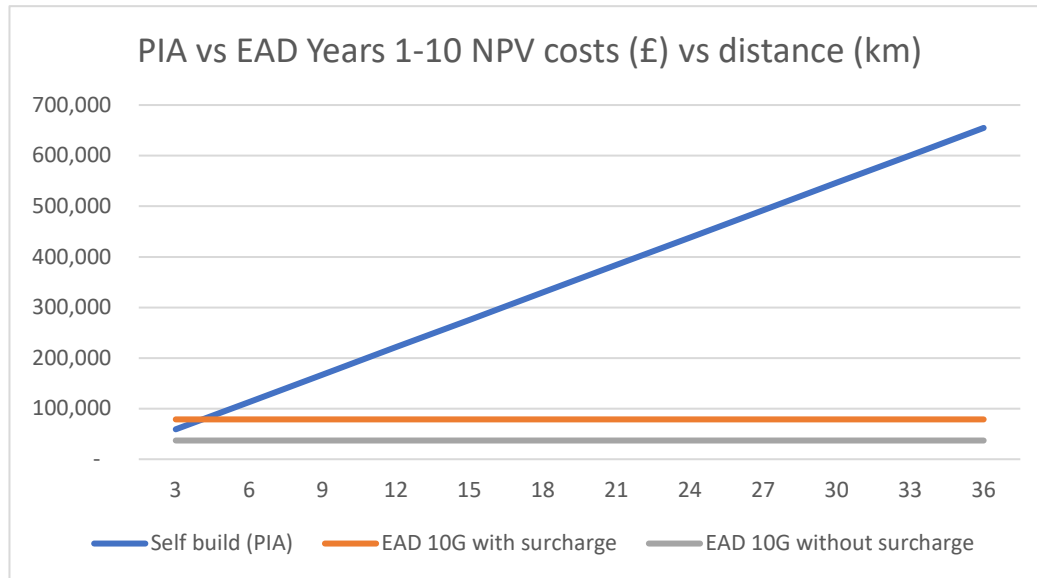
35. We analyse the costs over a ten-year period; investors in new fibre networks would typically wish to see a return on their investment within this period, and so this provides a relevant view of the cost impact on altnet business plans.

36. It can be seen that 10G EAD provides a more cost-effective means than PIA of providing the relevant connections for all but the shortest distances. In many cases, towns and villages are a considerable distance from BT fibre exchanges, and PIA would cost considerably more than EAD, especially so when connecting communities in hard to reach places. The surcharge results in a much higher EAD price, and the increased traffic aggregation costs could render some such communities unviable.

37. The reason PIA is a much higher cost option of these links is that the new link (using PIA) would be built solely for the purpose of transporting the aggregated traffic, whereas the EAD will take up only a portion of one of many fibres in a duct used for many other purposes. Those scale and scope economies make the EAD a much more efficient choice for longer and lower capacity aggregation links.

38. We also note that, apart from cost, there are other factors which affect the choice of PIA or EAD to aggregate FTTP traffic. Using an EAD is often an expedient solution, which

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allows rapid deployment whereas construction of new fibre using PIA has longer lead-times. Additionally, we understand that the use of EADs for traffic aggregation is often built into FTTP business plans as a cost-effective solution while the operator builds its fibre network to connect end users. Once that network is completed and the amounts of traffic generated increase, it can then be cost-effective to use PIA to self-provide the connection. Deferring the decision on whether to self-build in this way is helpful in mitigating the risk of long-term investment in fibre backhaul.

39. In addition to the increased costs of PIA use over pre-surcharge EAD prices, it should be noted that the construction of fibre links between towns or villages may require different technical and planning resources to those used in deploying GPON networks within a town or village, and the need to self-build connectivity from day one may result in deployment delays and the costs may be higher that we have estimated, due to the need to potentially hire different equipment.

6   Impact assessment

40. We have not performed detailed and quantitative impact analysis, but can infer the following categories of impact from the use case studies and our general analysis:

- The EAD/OSA surcharge will increase the cost-base for a large number of altnets, some in the short term only until the build their own links, but others on a permanent basis.

- Some locations planned for commercial deployment may no longer be viable, due to increased connectivity costs.

- The surcharges, combined with the usage restriction on the forthcoming DFA remedy in Area 3, could have a significant impact on the viability of connecting small and remote locations, including those covered by the Government's Outside-In programme, potentially causing some altnets to not participate in the programme.