

# KPN's XGS-PON Rollout Provides a Hassle-Free, Forward-Looking FTTP Network

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## Introduction

KPN is a leading telecommunications and IT service provider and is the fixed-line incumbent in the Netherlands. KPN has a clear vision that fiber is the future, and the operator's commitment to deploying fiber to the premises (FTTP) is demonstrated by its intention to roll out the technology to around 80% of all households by 2026 together with Glaspoort (a joint venture between KPN and pension fund APG). As part of its ongoing FTTP rollout, the operator has moved to offer XGS-PON across all areas where it has deployed and is deploying a Passive Optical Network (PON) fiber architecture.

KPN initially rolled out point-to-point FTTP but, noting the growing global momentum behind PON, switched to this architecture and connected its first customer to Gigabit Passive Optical Network (GPON) in October 2019. The operator subsequently announced in September 2021 that it would be using XGS-PON across its PON network footprint. As a result, it now uses XGS-PON across its initial GPON footprint, and XGS-PON is exclusively used for all new FTTP coverage areas.

This case study considers the rationale for KPN's move to deploy XGS-PON and the results that have been achieved. It considers how the XGS-PON rollout provides the means for the operator to support higher-speed gigabit and multigigabit packages that will meet regulatory requirements on actual speeds delivered and that will also be robust in the face of growing traffic levels. The case study examines how the ability of XGS-PON to reliably offer gigabit upstream speeds is an important differentiator for KPN versus its cable competitors. In addition, the case study considers how the XGS-PON rollout provides KPN with a worry-free and cost-efficient future for its network. This is because it allows the operator to keep XGS-PON optical network terminal (ONT) equipment in place into the future rather than deploying

GPON ONTs today and later having to swap them for XGS-PON equipment as subscribers' demands increase.

## KPN's XGS-PON rollout allows it to comfortably offer gigabit and multigigabit speeds

KPN offers a retail plan with 1Gbps symmetrical speeds after doubling upstream speeds for FTTP subscribers in July 2021. The launch of symmetrical 1Gbps speeds was an important driver behind the operator's XGS-PON deployment. In the first instance, the 1Gbps plan is a mainstream broadband offering with significant take-up. However, in the Dutch market if an operator markets a particular speed to end customers, regulation dictates that such speeds have to be delivered, a trend which is also increasingly seen in other markets. For example, the Dutch regulator, the ACM, requires that at least 90% of the maximum advertised download and upload speeds on fixed networks must be reached in at least 1 of the 10 measurements that an end user conducts in a single week. Such measurements should be spread out evenly across at least three days of the given week and can be conducted at any hour of the day, although no more than one measurement per hour can be counted. In addition, so-called "normally available" speeds must be higher than 85% of maximum download and upload speeds. The normally measured speed must be achieved in 8 out of 10 measurements.

As a result of these requirements, KPN felt that the 1.25Gbps of shared upstream capacity offered on GPON networks would not be sufficient to offer advertised upstream speeds of up to 1Gbps. KPN is also experiencing annual traffic growth of 30–40%, so as time passes and more subscribers migrate to FTTP it would have become even more challenging to provide real-world speeds in line with marketed speeds without the XGS-PON upgrade.

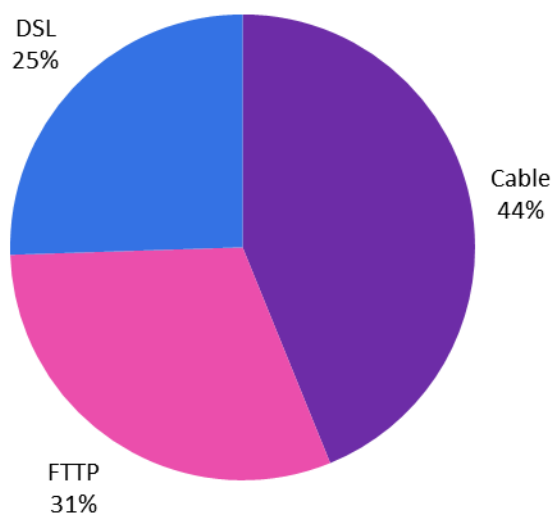
The additional capacity that XGS-PON provides has also been an important enabler for new multigigabit plans. Starting on October 23, 2023, KPN will introduce the highest internet speed in the Netherlands: 4Gbps for both download and upload.

For this combination of reasons the deployment of XGS-PON reflects KPN's desire for a future-proof FTTP network without bottlenecks.

## XGS-PON provides differentiation from cable competitors

Another important reason for KPN's move to deploy XGS-PON is that it provides important differentiation from cable competition. Cable networks in the Netherlands have near-nationwide coverage and hold a sizable part of the market. According to figures from the ACM, cable's share of retail broadband connections stood at 44% at the end of 1Q23.

**Figure 1: Netherlands, fixed broadband subscription market share by technology, 1Q23**



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Source: ACM

However, nationwide cable operator Ziggo currently only offers maximum download speeds of 1Gbps and maximum upload speeds of 100Mbps over its DOCSIS network. KPN's symmetrical 1Gbps retail plan is a significant differentiator, and as discussed, the XGS-PON rollout has been an important enabler of this deployment.

In addition, XGS-PON provides the operator with the flexibility to offer multigigabit speeds, and this gives the company an advantage over cable competitors. Ziggo has tested DOCSIS 4.0, but it has yet to launch the technology, and the shared nature of coaxial networks will continue to place constraints and bottlenecks on the speeds the operator will be able to market and deliver.

## XGS-PON offers KPN an effective solution for segments of the enterprise market

The symmetrical gigabit speeds that XGS-PON can provide are important in enabling KPN to effectively cater to the small and medium-sized enterprise (SME) market, where traffic patterns are typically more symmetrical than in the residential market. KPN has also rolled out XGS-PON to business parks. For example, as part of its Glaspoort joint venture with Dutch pension fund APG, KPN intends to deploy fiber to 750,000 households and 225,000 businesses. While large companies can be served by KPN's point-to-point or dark-fiber offerings, bigger corporate accounts can still choose to use XGS-PON. For instance, retail companies might choose to use XGS-PON connections for retail stores.

## XGS-PON provides KPN with a cost-effective and worry-free FTTP network

KPN notes that it expects its XGS-PON network to have a long lifetime, so XGS-PON ONTs with 10Gbps Ethernet deployed in customers' premises today can stay in place for several years. This leaves the operator with a worry-free deployment.

## Commissioned Research

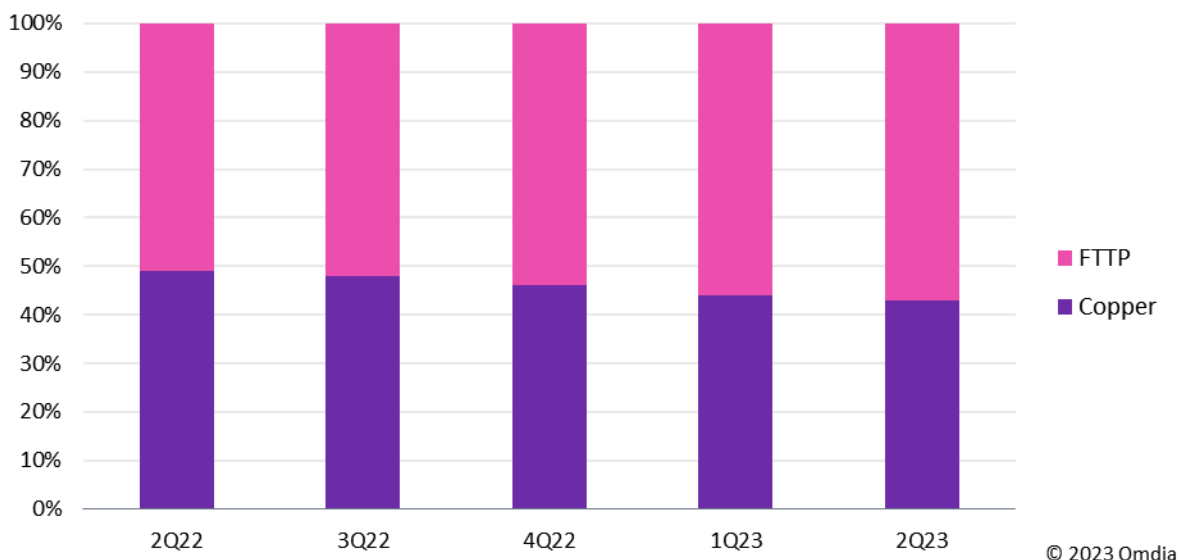
On the other hand, if KPN had continued to deploy GPON ONTs and only rolled out XGS-PON later, it would have become increasingly difficult to swap out already-deployed GPON ONTs with XGS-PON replacements as subscribers' speed demands grew and traffic levels increased. Such a scenario would have been very costly for KPN because of the high cost of the necessary truck roll and the cost of having to deploy both a GPON and then an XGS-PON ONT replacement compared with that of just deploying an XGS-PON ONT from the start. As in other countries, labor shortages in the Netherlands could have further complicated the process of having to swap out already-deployed GPON ONTs. It is also worth noting that having to swap out GPON ONTs for XGS-PON ONTs requires an engineer visit, which might potentially inconvenience a subscriber and increase the risk of their churning to another operator. Combined, these reasons demonstrate that the XGS-PON rollout enables KPN to have a future-proof and bottleneck-free FTTP network.

KPN was also easily and cost-effectively able to upgrade its initial GPON PON network to XGS-PON on the optical line terminal (OLT) side. The operator had already deployed line cards supporting both technologies, so no OLT equipment replacement was required for the XGS-PON upgrade. A further important cost-related point behind KPN's decision to move from its initial GPON PON rollout to XGS-PON was the fact that ONT prices fell considerably in 2020. This made it significantly cheaper than it would previously have been to deploy XGS-PON ONTs to all new customers. XGS-PON ONT cost declines have also continued since 2020.

## The copper-to-fiber network migration of which XGS-PON is a part is delivering results for KPN

KPN notes that its rollout of XGS-PON is a significant part of its overall FTTP deployment strategy and that this strategy is delivering positive results for the company. The operator notes that after FTTP has been deployed in a particular area, its network penetration level has increased by 7–8 percentage points, from 30% to 37%, after 52–78 weeks. Further evidence of the appeal of KPN's retail plans, which use its XGS-PON network, is shown by how quickly the operator's subscription base is shifting from copper to fiber. For example, in the year to end-2Q23, the FTTP share of the operator's retail subscription base increased from 51% to 57% (see **Figure 2**). KPN's deployment of XGS-PON as part of its fiber rollout strategy has also coincided with a decrease in cable broadband retail subscription share from 46% at end-3Q21 to 44% at end-1Q23. In addition to KPN's fiber rollout, this decline has been driven by the fact that other players, including DeltaFiber and ODF, are rolling out fiber.

**Figure 2: KPN, copper and FTTP share of retail fixed broadband subscriptions, 2Q22–2Q23**



Source: KPN

In addition, there are clear benefits to deploying fiber, because consumer fiber ARPUs are around €4 higher than consumer copper ARPUs. This reflects the fact that XGS-PON can support more expensive retail plans that include higher speeds.

Many of the benefits of deploying XGS-PON today will continue to be felt by KPN in the years to come. KPN will continue to experience lower costs as subscribers move to higher speeds and yet will be able to continue to use the same XGS-PON ONTs.

## Appendix

### Further reading

Why XGS-PON? - An overview of the business opportunities (July 2023)

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