



Final report for DCCAE

## Review of pricing and access arrangements for the MANs

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# 1 Executive summary

## 1.1 Background, scope and methodology of the work

The government-owned metropolitan area networks (MANs) in Ireland are operated by enet under a long-term concession agreement, on behalf of the Department of Communications, Climate Action and Environment (DCCAIE).

enet is related to a 'sister' business, enet Telecommunications Networks Ltd (ETNL), which was separated from enet in 2015. ETNL also provides wholesale products and services, using its own infrastructure and in some cases combining these with wholesale inputs bought from enet.

DCCAIE has received several complaints questioning whether the MANs are being operated on a transparent and non-discriminatory basis, and whether enet is leveraging its concession-based MANs business to provide an unfair advantage to its non-MANs business (ETNL).

DCCAIE has commissioned Analysys Mason to review whether enet is operating the MANs in compliance with its obligations under the Code of Practice in the MANs concession agreements to provide open access to the MANs on an equality of treatment, non-discriminatory and transparent basis. This report presents the results of our review and provides our opinion on *the changes that should be made to the way enet operates the MANs, to:*

- *improve the transparency of pricing*
- *ensure non-discrimination between ETNL and other Internet service providers (ISPs)*
- *increase separation from ETNL*
- *encourage further take-up on the MANs.*

To undertake the review, we have analysed information from the following sources:

- Interviews with the enet senior management team and department heads
- Detailed extracts of enet's sales, operations and financial systems
- Requests for input from enet's customers (ISPs)
- Complaints received by DCCAIE.

## 1.2 High-level options for our recommendations to DCCAIE

The situation for DCCAIE regarding enet, ETNL and the other ISPs in Ireland is unique to the specific features of the MAN concession arrangements. However, understanding can be gained from looking at other jurisdictions, and the approach taken elsewhere to ensuring non-discriminatory behaviour between internal parts of a business and external customers. We have considered the following high-level options:

1. Full structural separation of the enet business, with activities, control and ownership separate from other parts of the business which currently buy services on the MANs or conduct other telecommunications sector activities
2. Functional separation of internal processes and resources, with equivalence of inputs (EoI) in the provision of services from the MANs to ETNL
3. Improved processes, procedures and checks to better promote fair, transparent, non-discriminatory and equal treatment of ISPs, enet and ETNL
4. Maintain current processes and procedures (do nothing).

A summary of our assessment of the pros and cons of each option is shown in Figure 1.1.

*Figure 1.1: Summary of pros and cons of high-level options to ensure adherence to the Code of Practice [Source: Analysys Mason, 2017]*

No.	Option	Pros	Cons
1	Full structural separation	Removes risk of cross-subsidy and incentives for vertical margin squeeze and discrimination	Costly to unwind the integrated business, removes economies of scope, creates a concessionaire with narrow incentives for operating and improving the MANs
2	Functional separation and EoI	As above, while maintaining some economies	Potentially more costly and difficult than Option 1, due to the complexity of the functional and transactional rules to be designed
3	Improved processes, procedures and checks	A relatively small cost and impact on enet's current operations; maintains economies of scope between enet and ETNL	Likely to require more detailed monitoring and reporting to ensure compliance. Some further safeguards may be needed or adjusted as monitoring progresses
4	Do nothing	No cost or impact on enet's business	Would not address concerns with enet's adherence to the Code of Practice

The analysis presented in this report shows a range of areas in which enet should improve its adherence to the Code of Practice, and therefore Option 4 (do nothing) is not suitable. However, we also recognise that enet has a unique situation compared to similar broadband infrastructure operators in other jurisdictions: enet is a comparatively small wholesale-only operator, and faces competition for its services. Given this situation, we consider that Option 1 and Option 2 would not be proportionate at the current time. We recommend that DCCAE should reassess the situation and potentially reconsider all four options in two years' time.

**Our recommendation to DCCAE is to adopt our proposed improved processes, procedures and checks (Option 3).** These recommendations are summarised in the following section.

## 1.3 Recommendations

### 1.3.1 Cost of connecting to the MANs

We recommend:

1. enet should update its published price lists to explain that upfront and spread-out options are available for paying the connection fee for any product. enet should also publish the existence of any discounts that are available for connection fees.
2. enet should update its assumptions used in preparing the desktop survey (DTS) estimate for the cost of the building 'drop connections', and prepare a report showing that there is an improvement in the reliability (on average) between the DTS and the corresponding field survey (FS).

### 1.3.2 Pricing and discounting

We recommend:

3. enet continues to publish prices its maximum prices, not its actual prices (due to it facing competition for its services).
4. enet and DCCAE should discuss price changes for dark fibre, sub-duct and duct which will ensure that wholesale customers do not find it more expensive, on average, to buy passive products than comparable managed service products.
5. enet should make single strands of dark fibre available, at a price which is lower than the price of dark fibre pairs.
6. enet should *document* all of its discounting schemes and adhere to these to ensure that it offers the same type and level of discounts to all requesting operators.

### 1.3.3 Intercompany pricing and accounting

We recommend:

7. enet should not sell end-to-end national managed service connections at a price lower than the price for the MAN component (the list price, plus any documented discount).
8. enet should create a transfer price – paid by ETNL to enet – for the MAN component of national end-to-end managed services based on its published MAN price lists, plus any documented discounts for MAN managed services.
9. enet should update a number of key elements within the legal framework of the separated accounts annually.

### 1.3.4 Physical access to MAN infrastructure

We recommend:

10. enet should permit operators to 'core drill' into a specified point of a MAN chamber, under supervision.
11. enet should prepare a report on the allocated occupancy of passive equipment (dark fibre, duct, sub-duct, co-location) by ISPs, including that used by ETNL for national circuits. The report should compare the current occupancy to the maximum levels set out in the Code of Practice.

### 1.3.5 External communications

We recommend:

12. enet should make a range of minor improvements to its external communications, including its relationship with service providers, and ensuring clarity of communication regarding services.

### 1.3.6 Measures to improve take-up

We recommend:

13. In addition to our previous recommendations (many of which will serve to reduce barriers to take-up on the MANs), we also recommend that DCCAE should work with enet to consider offering a discount for products on specific MANs where take-up is low.

## 2 Introduction

### 2.1 Background to the work

#### 2.1.1 Context and ownership of the MANs

The government-deployed metropolitan area networks (MANs) in Ireland are state-owned, open-access fibre networks in 94 regional towns and cities. Access to the MANs is offered to retail telecommunications service providers (also known as Internet Service Providers, ISPs) and other operators on a wholesale basis. The MANs offer duct space, dark fibre, managed services and co-location facilities to these ISPs and other operators.

The deployment of the MANs was co-financed by Central Government, local authorities and the European Union (EU). Physical ownership of each MAN is entrusted to the local authority in which each MAN resides. Beneficial ownership is entrusted to the Department of Communications, Climate Action and Environment (DCCA).

#### 2.1.2 Operation of the MANs

The MANs are operated on behalf of DCCA under a concession agreement by a private company. Two concession agreements were awarded, reflecting the two phases in which the MANs were built:

- Following an open tender process, e-Nasc Eireann Teoranta (enet) was appointed in July 2004 as the Management Service Entity (MSE) for a 15-year term under a Concessionaire contract to manage, market, maintain and operate on behalf of the State the MANs constructed under Phase I (28 MANs in cities and larger towns).
- In July 2009, following another open tender process, enet was also awarded a separate 15-year contract to manage the Phase II MANs (60 MANs covering 66 smaller towns) under a second Concessionaire contract.

The two contracts have now been made co-terminus.

### 2.2 enet's business model

#### 2.2.1 Overview of the business model

enet, operating as the MSE, sells the various wholesale products that are available on the MANs. These include duct and sub-duct rental, dark fibre, managed services and co-location. enet sells the services on a wholesale basis, to other telecoms service providers looking to use the MANs infrastructure in providing their own services to end users.



The MANs are located near to the end users in their respective towns and cities, and usually only a 'drop connection' between the end user and the MAN is required. However, additional connectivity is required from each MAN to other destinations (e.g. other MANs, Dublin, and/or the global internet). Without these 'backhaul' connections, the MANs would be islands of connectivity with limited usefulness.

There are a range of backhaul providers in Ireland that offer connectivity to each MAN. These providers may also purchase services on the MANs. One of these backhaul providers, enet Telecommunications Networks Limited, was separated from enet in 2015. For clarity, in the remainder of this report we will refer to these two separate companies as enet and ETNL.

In addition to offering MANs-only services (as per its role under the concession agreement), enet also offers MANs-plus-backhaul (i.e. MANs-plus-non-MANs) products as combined wholesale end-to-end national connectivity solutions. enet sells the end-to-end solutions on behalf of ETNL.

enet and ETNL are owned by the same parent company, and produce separate financial accounts. There is also some sharing of staff functions, and cross-charging for activities and shared facilities.

### 2.2.2 Concerns with the current business model

Under the concession agreement, enet must treat all its customers in a transparent, non-discriminatory and equal way. Given that ETNL and its backhaul business is a related company of enet, enet may have an incentive and the ability to discriminate against customers who buy only MAN products in favour of customers who buy MANs-plus-backhaul products. Other opportunities for discrimination may include discriminating against customers who buy lower value dark fibre MAN products compared to those that buy higher value MANs-managed service products.

DCCAIE has received several complaints questioning whether the MANs are being operated on a transparent and non-discriminatory basis, and whether enet is leveraging its concession-based MANs business to provide an unfair advantage to its non-MANs business (ETNL).

We have considered these concerns and whether the current levels of demarcation between enet and ETNL are sufficient to meet the requirements of the concession agreement Code of Practice.

### 2.2.3 enet's freedoms under the concession agreement

It is relevant to highlight that the concession agreement between DCCAIE and enet is not like a conventional arrangement between a regulator and a regulated entity. DCCAIE is not a regulator and enet is not regulated (beyond the terms of the concession agreement) in the same way as incumbent operators who are found to have significant market power. DCCAIE can only enforce the terms of the concession agreement. It cannot, for example, set the prices charged by enet.

It is also important to note that enet faces competition for its services (mainly for its managed services, from eir). While enet publishes maximum prices, its actual prices (which may include discounts) are commercially sensitive due to the competitive pressure it faces.

## 2.3 Scope and methodology of the work

The concession agreement Code of Practice (see Section 2.4 below) sets out the way in which enet must operate the MANs to meet the requirements of transparency, non-discrimination and equality. DCCAIE has commissioned Analysys Mason to review whether enet is operating the MANs in accordance with the Code of Practice.

This report presents the results of our review, and provides our opinion on the changes that should be made to the way enet operates the MANs to:

- improve the transparency of pricing
- ensure non-discrimination between ETNL and other ISPs
- improve separation between enet and ETNL
- encourage further take-up on the MANs.

To undertake the review, we have analysed data from the following sources:

- Interviews with the enet senior management team and department heads
- Detailed extracts from enet's sales, operations and financial systems
- Request for input from enet's customers (ISPs)
- Previous complaints received by DCCAIE.

## 2.4 Overview of the Code of Practice

The Code of Practice is focused on the principles of open access. enet must ensure:

- products are sold on a fair, transparent, non-discriminatory and equal basis to all parties (ISPs, enet and ETNL)
- the same rules, criteria and guidelines are applied to all parties (ISPs, enet and ETNL)
- procedures should be clear, precise and uniform, not waived in favour of any party (ISPs, enet or ETNL)
- decision making should be objective and transparent
- access to information is also available to ISPs, including routes, distances and chamber locations.

## 2.5 High-level options to support adherence to the Code of Practice

The assessment of vertical integration, horizontal leverage, bundling and product portfolios is a standard activity in regulated telecommunications markets. We have observed that these activities – and their potential solutions – are becoming more widespread in relation to new high-speed broadband infrastructure and services. Numerous authorities are investigating the questions of state intervention in broadband infrastructure, particularly in the segment for 'last-mile' access or in areas where commercial incentives do not appear to be delivering investment to satisfy consumer desires. The situation for DCCAIE regarding enet, ETNL and the other ISPs in Ireland is unique to the

specific features of the MAN concession arrangements, but understanding can be gained from other jurisdictions considering the issues introduced above and their chosen solutions.

We have considered four high-level options (including pros and cons) for ensuring that enet adheres to the principles of open access:

- Option 1: Full structural separation
- Option 2: Functional separation and equivalence of inputs (EoI)
- Option 3: Improved processes, procedures and checks
- Option 4: Do nothing.

These four options are discussed in the sections below.

### 2.5.1 Option 1: Full structural separation

This option involves the full structural separation of the enet and ETNL businesses into two separate operations. Activities and control of the MANs would be totally separate from other parts of the group which currently buy services on the MANs or conduct other telecommunications sector activities. This would include separate people, separate systems, separate offices and legally separate companies.

A relevant example of this type of separation is the retail function of Airspeed (a company that was recently acquired by enet's group). The retail function has been fully structurally separated from the wholesale function (the wholesale function is now part of ETNL).

#### *Pros*

This option largely eliminates the risk of cross-subsidy and incentives for vertical margin squeeze and other forms of discrimination.

#### *Cons*

It would be very costly to unwind the integrated business into two parts. The option would also remove the economies of scope between the backhaul and MANs business, which are likely to have been an important factor in encouraging take-up on the MANs.

### 2.5.2 Option 2: Functional separation and EoI

This option would involve functional separation of internal processes and most resources. EoI procedures would then be required in the provision of services from the MANs to ETNL, i.e. ETNL would buy MANs services from enet in an *equivalent* way to external wholesale providers.

*Pros*

Option 2 also presents a low risk of cross-subsidy and discriminatory behaviour, while maintaining a small number of economies of scope (e.g. same offices, same senior management).

*Cons*

This approach is potentially more costly and difficult than Option 1, due to the complexity of the functional and transactional rules that would need to be designed<sup>1</sup>. For example, systems and procedures would need to be designed so that staff working in the same office building could only access information from their own part of the business.

**2.5.3 Option 3: Improved processes, procedures and checks**

This option considers improved processes, procedures and checks to better promote transparent, non-discriminatory and equal treatment of ISPs, enet and ETNL.

*Pros*

Compared to the first two options, Option 3 would incur a relatively small cost and impact on enet's current operations. The option also maintains the economies of scope between enet and ETNL: the ETNL backhaul business provides an incentive to also sell connectivity on the MANs, therefore supporting take-up on the MANs.

*Cons*

Compared to the status quo, Option 3 is likely to require more detailed monitoring and reporting to ensure compliance with the new measures. Enhanced reporting is required to demonstrate that enet sales staff treat all operators equally.<sup>2</sup> Some further safeguards may be needed or adjusted as the monitoring continues.

**2.5.4 Option 4: Do nothing**

Option 4 would involve maintaining the current processes and procedures (i.e. do nothing).

*Pros*

This option would have no cost or negative impact on the operation of the MANs or enet's business.

<sup>1</sup> Additional costs and complexity would arise from the need for access controls on IT systems, permanent internal 'Chinese walls', regular reviews to make sure information was not being passed, additional training, creation of a supervisory access board to ensure equivalence, etc. Many of these measures would not be required in a simply separated company (e.g. option 1).

<sup>2</sup> For the avoidance of doubt, we have not found anything in our review to suggest that enet sales staff are not treating customers equally. Our concern is about being able to demonstrate that this requirement is adhered to.

### Cons

This option would not address any current concerns with enet's adherence to the Code of Practice.

### 2.5.5 Overall conclusion

The analysis presented in the remainder of this report shows a range of areas in which enet should improve its adherence to the Code of Practice, and therefore Option 4 (do nothing) is not suitable. However, we also recognise that enet has a unique situation compared to other operators which face similar obligations: it is a comparatively small wholesale-only operator, and faces competition for its services. Given this situation, we consider that Option 1 and Option 2 would not be proportionate at the current time. We recommend that DCCAE should reassess the situation and potentially reconsider all four options in two years' time.

**Our recommendation to DCCAE is to adopt our proposed improved processes, procedures and checks (Option 3).**

**Our recommendations for improved processes and procedures are set out in the remainder of this report. A summary of the recommendations is highlighted at the start of each section.**

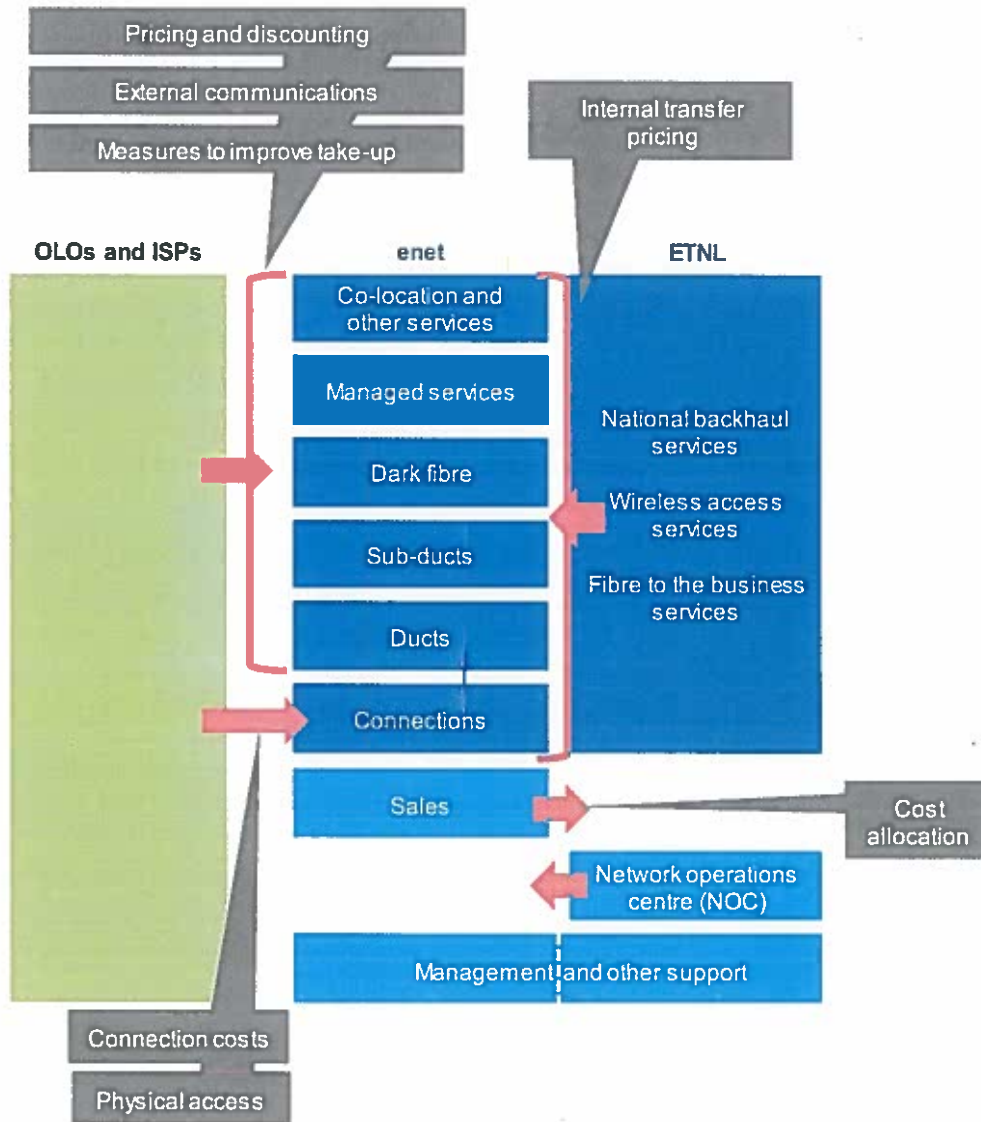
## 2.6 Overview of our recommendations

Our recommendations for implementing Option 3 are grouped into six themes:

1. Cost of connecting to the MANs
2. Transparency of pricing and discounting
3. Intercompany pricing and accounting
4. Physical access to MAN infrastructure
5. Communications and branding
6. Measures to improve take-up.

Many of our recommendations are applied to specific parts of enet's business, as shown in Figure 2.1, and set out in the remainder of this report.

Figure 2.1: Summary of the recommended improvements [Source: Analysys Mason, 2017]



### 3 Cost of connecting to the MANs

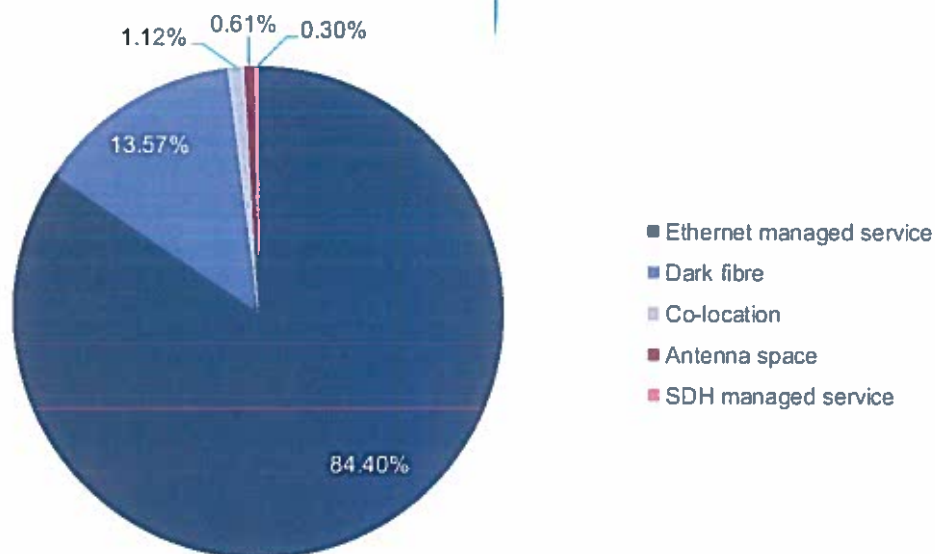
#### 3.1 The fee charged to operators for connecting to the MANs

**enet should update its published price lists to explain that upfront and spread-out options are available for paying the connection fee for any product. enet should also publish the existence of any discounts that are available for connection fees.**

##### 3.1.1 Preference for different types of MAN wholesale products

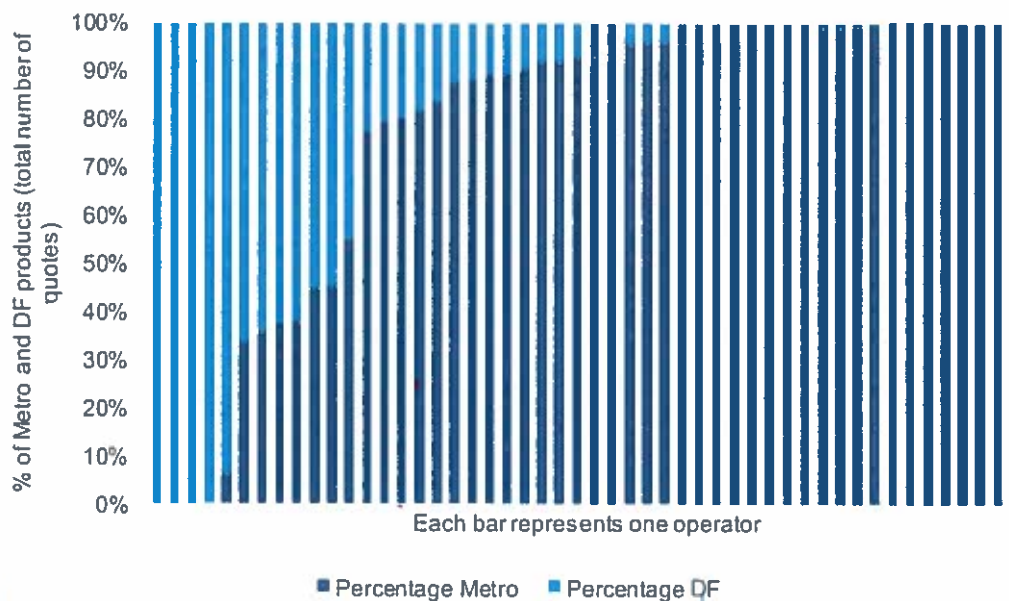
enet offers a range of wholesale services on the MANs, including duct, sub-duct, dark fibre, managed services, co-location and antenna space. Our analysis of the quotes that enet has provided by type of product from 2004 to date is shown in Figure 3.1.

*Figure 3.1: Analysis of proportion of quotes by product provided by enet for MANs services from 2004 to date [Source: Analysys Mason, 2017]*



The analysis of the quotes shows that most of the requests from operators are for dark fibre and managed services, with the other available products comprising a very small proportion of the total. Focusing on these two main products, we see that there is distribution of operators between those which request dark fibre (passive service) quotes, those which request managed (active) service quotes, and operators which request both passive and active service quotes, as shown in Figure 3.2.

Figure 3.2: Analysis of the preference to request a quote for dark fibre and managed services by different operators (top 50 dark fibre-requesting operators) [Source: Analysys Mason, 2017]



### 3.1.2 enet's approach to charging for the cost of connection

When an ISP takes a wholesale service on the MANs, a 'drop connection' must be laid between the MAN and the end-user premises (we also use the term 'lead-in' for this connection) unless that premise is already connected. The laying of the lead-in involves:

- digging a trench between the MAN and the end-user premises
- laying new plastic duct in the trench
- filling in the trench (and repairing the road surface)
- installing fibre-optic cable in the duct
- connecting the new fibre-optic cable to the MAN fibre and the end-user premises fibre terminal
- the installation of manholes or smaller footway junction boxes may also be required.

The cost of this connection must be met by either the ISP or by enet (or some combination of the two). enet has a range of ways to charge for the cost of the lead-in:

- Full cost of the lead-in charged up front (e.g. normal practice for dark fibre)
- Part cost of the lead-in charged up front (e.g. the published EUR1250 connection charge for managed services, which is normal practice for this product)
  - enet recovers any remaining part of the lead-in cost from the ongoing rental charge
- No charge for connection. enet recovers all of the lead-in cost (if any) from the ongoing rental charge
- Cost of the lead-in is spread out over the term of the contract (we understand that customers can request this, though the availability of this option is not published).



In some circumstances, the end-user premises may already be connected to the MAN, and no lead-in infrastructure or associated expenditure is required.

The connection cost is recorded in the enet sales database at four stages of the sales process:

<i>DTS</i>	The desktop survey (DTS) is an initial estimate of the lead-in construction cost, created using enet's network planning software.
<i>FS</i>	The field survey (FS) is a revised estimate of the lead-in construction cost, following inspection of the end-user location by a field engineer.
<i>CC</i>	The connection charge (CC) is the actual connection fee quoted to the operator.
<i>POCC</i>	The purchase order connection charge (POCC) is the connection fee received from the operator.

Figure 3.3 and Figure 3.4 show our analysis of the average value of the connection costs and fees for dark fibre and managed services respectively. It should be noted that the analysis does not include instances where the connection cost is zero or not charged up front.<sup>3</sup>

Figure 3.3: Analysis of average connection costs/fees for dark fibre [Source: Analysys Mason, 2017]

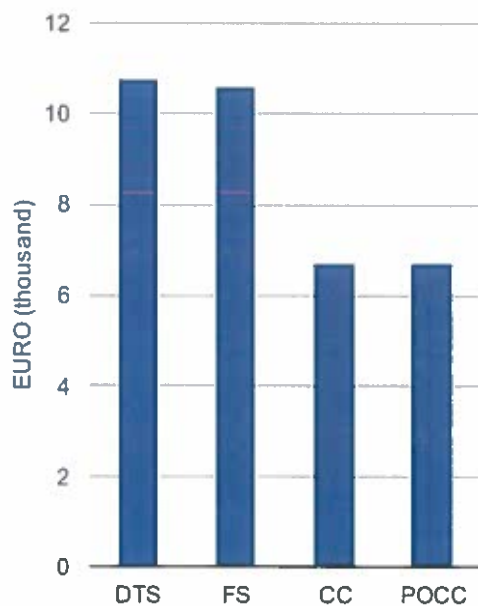
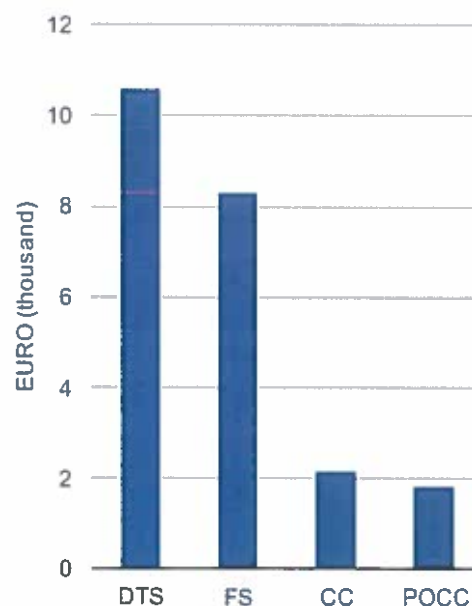


Figure 3.4: Analysis of average connection costs/fees for managed services [Source: Analysys Mason, 2017]



Our analysis shows a systematic difference in the way that enet charges operators for connecting to the MANs. There is a large difference between the FS and CC charges. This is because enet often doesn't pass on the full FS cost to clients. However, the extent to which this is passed on is different

<sup>3</sup> enet records zero and spread-out connection charges in the same way: with a '0' in the sales database.

between managed services and dark fibre. Connections for a managed service are more likely to receive a reduced connection fee compared to connections for dark fibre. This finding is supported by enet's explanation of the way it treats connection fees for different products: because it earns more revenue from managed services than dark fibre and faces competition from cir for managed service connections, it is more likely to offer a reduced connection fee on managed services than it is on dark fibre.

### 3.1.3 Our conclusions and recommendations

We make the following recommendations:

- enet should update its published price lists to explain that upfront and spread-out options are available for paying the connection charge for *any* product
- enet should also publish the existence of any discounts that are available for connection charges
- enet should document its rules for choosing the amount of connection cost that is charged for each type of product, including the way the charge is made (i.e. upfront or spread-out) and document any discounts available on connection charges (e.g. due to term and volume commitments). The documents should be made available upon request for review by DCCAE or its nominated adviser.
- enet should prepare a report on an annual basis demonstrating compliance with these recommendations. The report should be made available upon request for review by DCCAE or its nominated adviser.

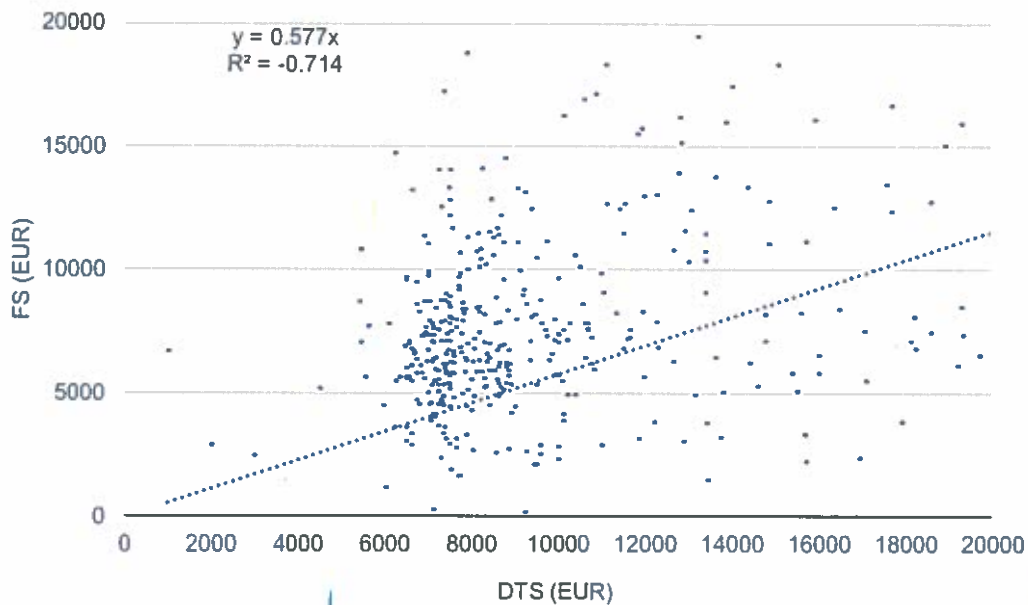
## 3.2 Procedures for the DTS and FS

**enet should update its assumptions used in preparing the DTS, and prepare a report showing an improved average reliability between the DTS and FS.**

### 3.2.1 Analysis of the accuracy of the DTS compared to the FS

We have analysed the accuracy of the DTS compared to the FS, as shown in Figure 3.5.

Figure 3.5: Analysis of the accuracy of the DTS compared to the FS, excluding FS over EUR20 000 and excluding 114 instances of DTS = EUR5000 [Source: Analysys Mason, 2017]



Our analysis shows that there is a high degree of inaccuracy between the DTS and the FS, and that the FS on average turns out to be materially *lower* than the DTS.

Our investigation has also found the systematic use of a EUR5000 DTS estimate, particularly in cases where the FS (if requested) turns out to be substantially below EUR5000.

### 3.2.2 Our conclusions and recommendations

The DTS and (if requested) the FS are hurdles faced by operators to connect customers to the MANs. It is important that these hurdles are not overestimated.

We recommend that enet update its approach to the DTS as follows:

- enet should update its assumptions used for the DTS (i.e. average digging costs, potential for (avoiding) road openings) to better align the DTS to the FS, based on the last two years of FS data points.
- enet should prepare a report on an annual basis showing the DTS outputs and accuracy relative to the FS, and demonstrate an improvement in accuracy over time. The report should be made available upon request for review by DCCAE or its nominated adviser.
- We suggest that FS average should fall within +/-10% of the DTS average within 12 months, excluding connections where FS >EUR20 000.

## 4 Pricing and discounting

### 4.1 The basis of enet's published prices

**We recommend that enet continues to publish prices on a 'maximum' basis, due to it facing competition for its services.**

#### 4.1.1 enet's current pricing scheme

enet currently publishes a series of *maximum* prices for its managed services, dark fibre and duct-related products.<sup>4</sup> Before an operator makes an enquiry to enet, it will only know the maximum level of price it may be quoted and will not know how much lower the actual price may be. There is a concern about whether the current pricing scheme is sufficiently transparent.

#### 4.1.2 Our conclusions and recommendations

Although publishing *maximum* prices is not as transparent as publishing *actual* prices, we accept that enet can continue to operate a scheme of published *maximum* prices, as enet faces competition to a greater or lesser extent for all its services.

### 4.2 The level of enet's prices

**enet and DCCAIE should discuss price changes for dark fibre, sub-duct and duct that will ensure that customers do not find it more expensive, on average, to buy passive products than comparable managed service products.**

#### 4.2.1 enet's current price levels

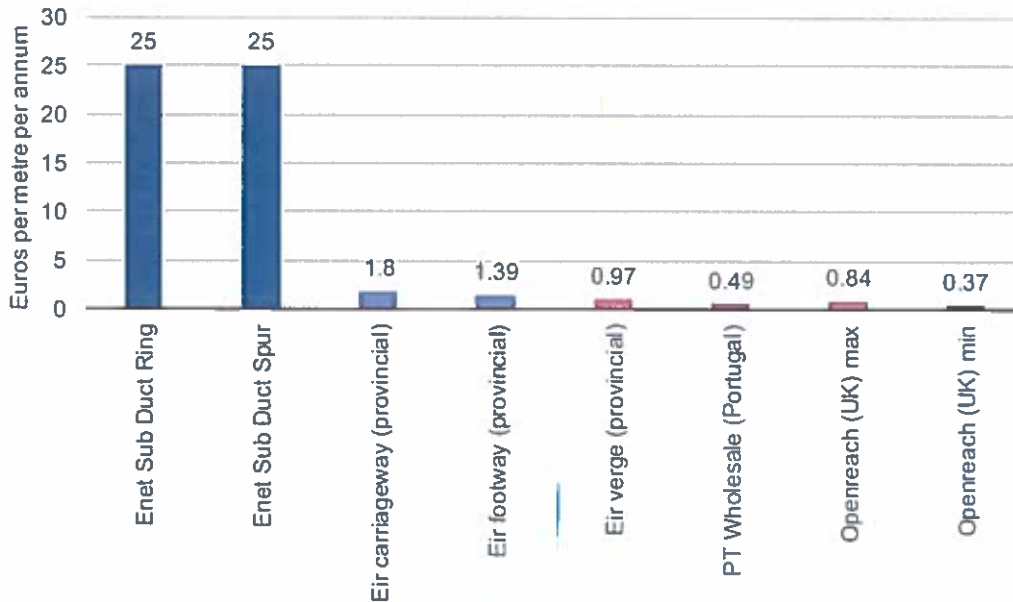
We have analysed how enet's published prices compare against other similar products in Ireland and elsewhere. These are discussed in the sections below.

<sup>4</sup> <http://www.enet.ie/wholesale-pricing.html>

*Duct and sub-duct*

A benchmark of duct and sub-duct products is shown in Figure 4.1.

Figure 4.1: Benchmark of prices for 25mm sub-duct [Source: Analysys Mason, 2017]



It should be noted that the eir product (imposed as a remedy by ComReg) is referred to as *duct* access. However, the price per metre of *sub-duct* is used to set the prices.<sup>5</sup>

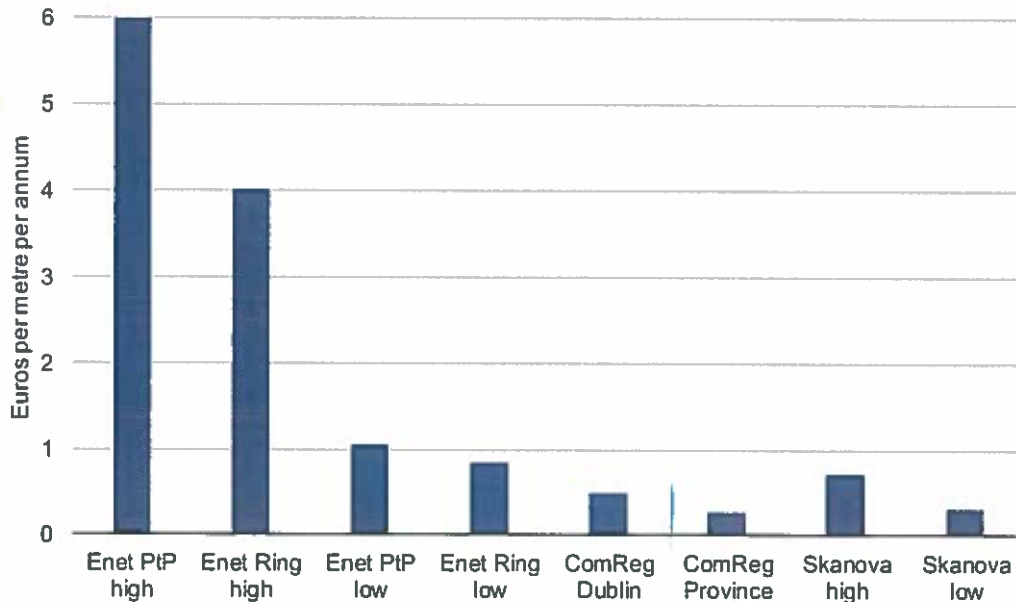
It should also be noted that most other duct and sub-duct offers, including those in our benchmarks, are based on incumbent operators' access networks, and are designed to primarily support the deployment of residential broadband networks. Therefore, they could be considered to have limited comparability to the MANs network, which was built relatively recently, in the centre of towns, and primarily to serve business customers. However, the benchmarks do suggest that enet's maximum prices appear high. We note that the actual prices paid (not shown here for commercial confidentiality reasons) are much lower than the maximum price following the application of discounting.

<sup>5</sup> [https://www.comreg.ie/csv/downloads/ComReg\\_1639.pdf](https://www.comreg.ie/csv/downloads/ComReg_1639.pdf)

## Dark fibre

A benchmark of dark fibre products is shown in Figure 4.2.

Figure 4.2: Benchmark of dark fibre pair prices [Source: Analysys Mason, 2017]



Benchmarks of dark fibre prices are not widely available. Dark fibre wholesale offers are not common, and those that are available do not often have published prices. It should be noted that the ComReg Dark Fibre remedy is not widely implemented in practice. The remedy is only to be used where duct or sub-duct is not available.<sup>6</sup> The Skanova prices are from a published reference offer in Sweden. The prices vary according to different areas of the country, and are based on a relatively large fixed fee and a much smaller price per metre. The Skanova per-metre prices shown above are based on a fibre pair 1000m long.

It is difficult to make direct comparisons across the dark fibre offers, since the circumstances associated with each operator are different. However, it does appear that the upper limit of prices for enet's dark fibre are high.

The highest prices for enet's dark fibre are for short duration terms and with a small proportion of the ring used. This is shown for a single fibre pair in Figure 4.3 and Figure 4.4.

<sup>6</sup> It should be noted that the prices published by ComReg are for single fibres, but enet's pricing is based on fibre pairs. To make a fair comparison, the figures labelled as ComReg in the chart are the published price multiplied by 2 to create the cost of a fibre pair.

Figure 4.3: enet's maximum prices for dark fibre ring  
[Source: Analysys Mason, 2017]

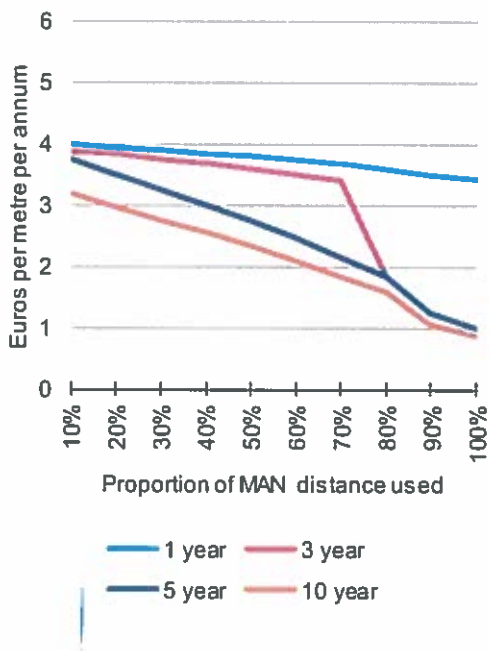
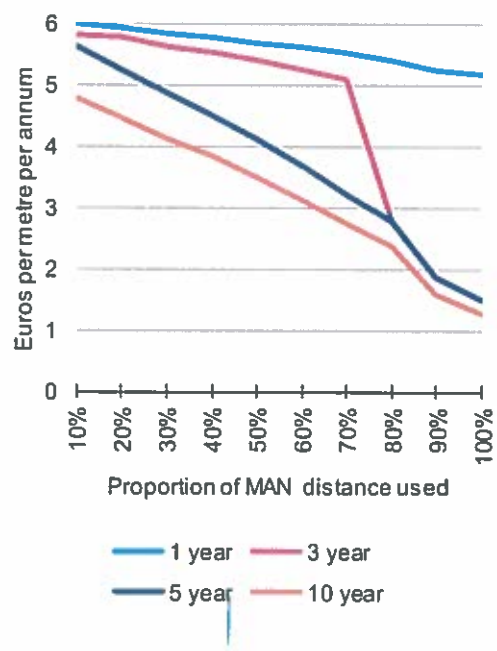


Figure 4.4: enet's maximum prices for dark fibre PtP  
[Source: Analysys Mason, 2017]

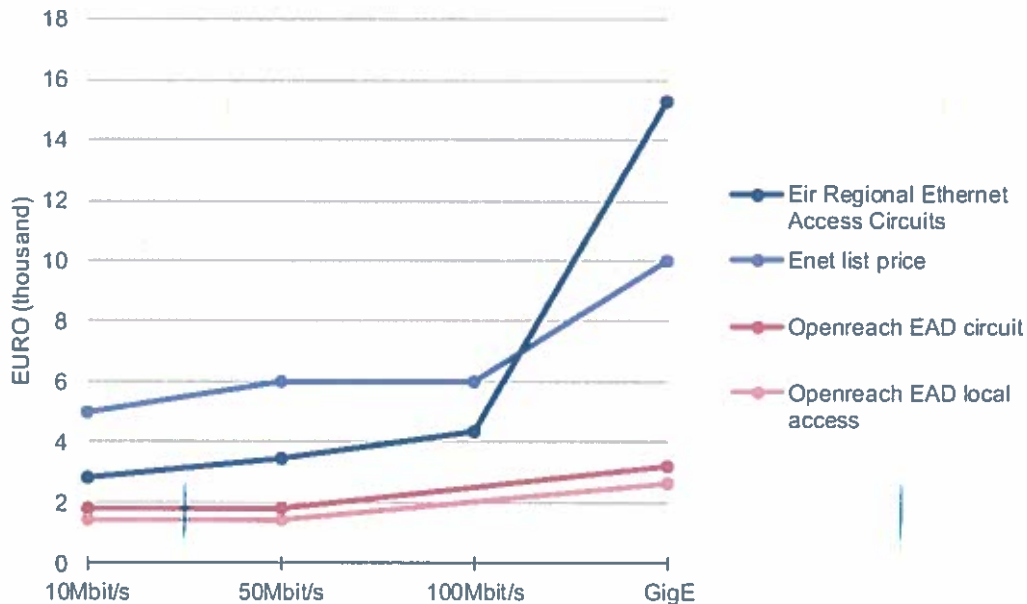


The analysis shows that the price per metre is strongly affected by the term of the contract and the proportion of the MAN distance used. In the case of the three-year contract, there is a large discontinuity between 70% and 80% use of the MAN distance.

### Managed services

A benchmark of managed service products is shown in Figure 4.5.

Figure 4.5: Benchmark of managed service annual rental prices [Source: Analysys Mason, 2017]



enet's maximum prices for MANs products appear higher than the equivalent eir product<sup>7</sup> for 10–100Mbit/s, but are lower for 1Gbit/s.

#### 4.2.2 Our conclusions and recommendations

We have considered whether the level of enet's maximum prices should be changed because of our review. To do so, we discuss how enet's prices compare to benchmarks, and discuss the relative pricing of enet's active services and passive layer services.

##### Comparison of product prices to benchmarks

enet's unique circumstances mean that it is difficult to argue that the maximum prices should be reduced by referring to benchmarks. Very few other operators have the same operation as enet, namely fibre-based MANs in mostly rural towns. There is also a lack of reliably comparable benchmarks for dark fibre, sub-duct and ducts prices in rural towns (elsewhere in Ireland and in comparable European countries).

<sup>7</sup> We have compared enet's MANs-only products to eir's Wholesale Regional Ethernet Access (WREA) product. The WREA product provides a connection from a customer site to the nearest Regional Core Node. eir also has a Wholesale Symmetrical Ethernet Access (WSEA) product. This product allows connectivity between a customer site and a handover point at a remote core node. For this reason, we think the WREA product is more comparable to enet's MANs-plus-backhaul product offering.



### *Comparison of product prices to each other*

We have considered whether a check on the relative pricing of enet's active services and passive services can inform our opinion on whether any particular prices should be changed.

Reference to other product prices is common practice in telecoms regulation and investigations: for example, the use of 'retail-minus' test to set the gap between the retail price of a service and the wholesale product, or a margin-squeeze test. However, the situation of DCCAE and enet is specific:

- DCCAE is not a regulator and cannot set the prices of enet
- There is no obligation on enet under the concession agreement to explicitly consider the relativity between the prices of the MAN products.

However, we consider that the principles of pricing relativity are useful to provide an indication of price fairness, as explained below.

---

*We start with the price of managed services. enet faces direct competition from eir for this product, and therefore the market should ensure that the prices for managed services are set at about the right level (indeed, our benchmarks suggest enet's prices, after discounts, are similar to eir's).*

*Next, we consider dark fibre. In principle, it should not be more expensive, on average, to buy dark fibre than managed services. An operator would have to incur the additional cost of its own active electronics when buying a dark fibre service, to provide the functionality of a managed service. However, dark fibre and managed services are priced on different bases: cost per metre and cost per connection. Therefore, we have developed the following logic to give an indication of whether the prices for dark fibre are too high:*

- *The corresponding managed service product is the 1Gbit/s product. This will be an increasingly important and popular product as bandwidth demands increase. There are 88 MANs and the cost of a 1Gbit/s managed service is EUR10 000 per annum. The cost of buying a 1Gbit/s managed service on all 88 MANs is therefore EUR880 000 per annum.*
- *Our price comparison then considers the cost of buying a dark fibre pair ring on all 88 MANs to serve the same set of customers: this cost should be no more than EUR880 000 per annum.*
- *As dark fibre is sold on a per-metre basis, we need to estimate how many metres would be needed to create a similar grade of connectivity as the managed service. The MAN network covers 1012km, including all rings and spurs. However, 88 'average' customers, one per MAN, would not need to use all the MAN distance to receive a resilient ring-based connection: many of the spurs and rings (if there are more than one) will not be needed for one average customer. We estimate, based on a sample of maps of the MANs, that the average customer will require on average one third of the MAN distance to create a resilient dark fibre ring connection similar to a managed service. This gives 337km of dark fibre to create an 'average' customer connection ring on every MAN.*

- *Given that the total cost must be no more than EUR880 000 per annum, and the distance required is 337km, we estimate that the cost of a dark fibre pair should be no more than EUR2.60 per metre per annum.*
- 

Figure 4.2 and Figure 4.3 show that enet's cost per metre of dark fibre is above EUR2.60 per metre in some circumstances.

We have also considered whether the maximum prices for sub-duct and duct are too high. Similar to the previous check, it should not be more expensive to purchase sub-duct than several dark fibres, and it should not be more expensive to purchase duct than several sub-ducts. Since all the products are priced on a per-metre basis, the checks are more straightforward.

---

*Regarding sub-duct, our consideration is as follows:*

- *The Code of Practice states that no more than 20% of the total dark fibre strands in the original MAN fibre infrastructure can be rented by one operator.*
- *If an operator needs more capacity, it should be able to rent a full sub-duct (and deploy its own fibre cable). It should not be more expensive to rent the sub-duct than the bundle of dark fibres.*
- *The cost of sub-duct should be, on average, no more than the cost of renting 20% of the fibres plus one pair in a cable, in complete rings.*

*Regarding duct:*

- *The Code of Practice states that no more than two sub-ducts can be rented by one operator.*
  - *If an operator needs more capacity, it should be able to rent a full duct (and deploy its own sub-ducts).*
  - *The cost of duct should be no more than the cost of renting two plus one (i.e. three) sub-ducts.*
- 

The example checks above are designed to give an indication of whether the maximum prices should be revised. Again, we highlight that enet does not have an explicit obligation to set the prices of its products relative to each other, and DCCAE does not set the prices charged by enet. However, our analysis suggests to us that a reduction to the upper-end of prices for dark fibre would be appropriate.

In summary, we recommend that enet and DCCAE discuss price changes for dark fibre, sub-duct and duct that will ensure that customers do not find it more expensive, on average, to buy passive products than comparable managed service products.

### 4.3 Single dark fibre pricing

**enet should make single strands of dark fibre available, at a price which is lower than the price of dark fibre pairs.**

#### 4.3.1 enet's current use of fibre

Although the Code of Practice and the published prices refer to dark fibre being sold in fibre *pairs*, enet makes use of single strands of dark fibre when offering managed services.

#### 4.3.2 Our conclusions and recommendations

We recommend that enet make single fibre strands available to operators, at a price lower than that for a fibre pair. This recommendation will require a change to the Code of Practice.

### 4.4 Discounting and transparency

**enet should *document* all its discounting schemes and adhere to these to ensure that it offers the same type and level of discounts to all requesting operators.**

#### 4.4.1 enet's current approach to discounting managed services, dark fibre, sub-duct and duct, and the mass access facility (MAF)

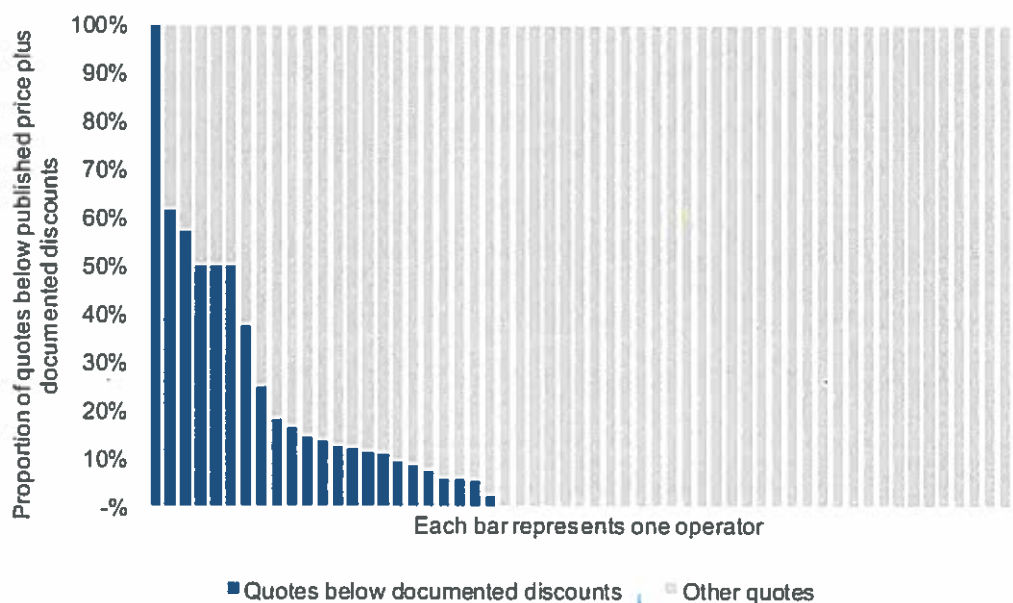
##### *Managed services*

enet's published price list explains that "discounts are available based on term and volume" for managed service rental charges, though no information on the level of discount is provided.

enet has internally documented only part of its discounting scheme for managed services: the discounts offered by term. Other discounts are given on a case-by-case basis for volume and/or other factors.

We have analysed the extent to which enet is quoting for managed services at a price which is lower than the maximum, *plus documented discounts*. The results of this analysis are shown in Figure 4.6.

Figure 4.6: Analysis of how often enet quotes below its published prices plus documented discounts, ordered by requesting operator [Source: Analysys Mason, 2017]



The analysis includes quotes issued after 1 November 2015 (i.e. commensurate with the date of the current price list).

The analysis shows that enet deviates from its partially documented pricing discounting schemes, and appears to quote below the documented discounts for some operators more than others.

#### *Dark fibre*

The dark fibre price list sets out a reducing price per metre for increased term, an increased number of fibre pairs, and/or an increased proportion of a ring.

enet does not record the proportion of each ring that has been calculated when it is quoting for dark fibre, so it is not possible for us to check the quoted price against the documented pricing and discount structure. However, we did observe a small number of examples of where a price per metre lower than that available on the price list was quoted.

#### *Sub-duct and duct*

There is no published indication of discounts being available for duct and sub-duct services.

We observed a small number of examples where enet quoted a price per metre for sub-duct and duct services lower than the prices on the price list.

*Mass access facility (MAF)*

There is no published indication of discounts being available for the MAF product.

**4.4.2 Considerations of enet’s ability to compete**

enet offers services in three areas, as shown below.

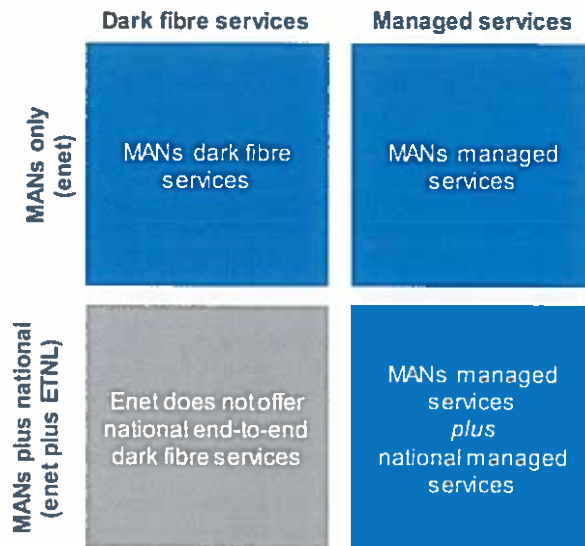


Figure 4.7: Summary of markets in which enet sells services [Source: Analysys Mason, 2017]

Our recommendations are guided by the following considerations:

- enet faces a degree of competition in all three areas, and must have a commercial ability to compete
- enet’s ability to compete may be hampered if its full discounting schemes are published
- enet may require flexibility to define new MAN discounting schemes if it is to continue to compete for large multi-site contracts in the MANs-dark fibre, and MANs-plus-national managed service markets.

**4.4.3 Our conclusions and recommendations**

Our recommendations are as follows:

- enet should document (but not necessarily publish) *all* its MAN product discounting schemes, so that their application throughout the year to quotes and renegotiations starting from published maximum prices can be audited at the end of each year. This should be done for all MAN products, recurring and one-time fees and connection charges. The rationale for each discounting scheme, and any changes to each, should also be documented. The documentation, including discount metrics, rationale and any changes, should be made available upon request for review by DCCAЕ or its nominated adviser.

- enet should publish the *availability* of all discounts in a qualitative sense, e.g. making public the basis of all possible discounts. enet does not need to make public the quantitative value of the discounts.
- enet should update its published documentation *immediately* if new products are offered.
- enet should update its published documentation *immediately* if new discounts are offered.
- enet's discounts should be progressive and reasonably smooth, i.e. without obvious discontinuities in the discounting.<sup>8</sup>
- enet should not offer any MAN product discounts which are not documented.
- enet should not offer different MAN product discounts which are based on different conditions or criteria to similarly situated operators.
- enet should not offer any MAN product discounts which are based on non-MANs business.

<sup>8</sup> We consider the price discontinuity highlighted in Figure 4.3 and Figure 4.4 to not be progressive nor reasonably smooth

## 5 Intercompany pricing and accounting

### 5.1 Sale of national services by enet

**enet should not sell end-to-end national managed service connections at a price lower than the price given for the MAN component (list price, plus any documented discount).**

#### 5.1.1 enet's current approach to selling national services

enet is the sales agent for ETNL; it is ETNL which provides all the non-MANs business including national connectivity and end-to-end national circuits.

We have conducted an analysis which compares the total cost of end-to-end national circuits to the documented price of managed services on the MANs. We have analysed circuits sold since 1 November 2015 (when the latest price list was introduced).

Our analysis shows that on some occasions, enet sells end-to-end national circuits at a price below the associated MANs component. We found that since 1 November 2015, enet had sold ■ end-to-end national circuits, of which ■ were sold below the *documented* price (i.e. the published maximum price and documented discounts) of the MAN managed service component. Thus 4.4% of these circuits were sold below the documented price of managed services on the MANs. This shows that enet gives discounts for MANs products which are not documented.

#### 5.1.2 Our conclusions and recommendations

There is a conflict between the economies of scope in a geographically integrated company, and the risk of distortion of the competitive national backhaul market. It is beneficial to the operation of the MANs for enet to also offer national backhaul services. MANs would be 'islands' of connectivity without national backhaul, and enet can offer an integrated MANs-plus-national solution which may be attractive to some ISPs. However, enet has the ability to use the profit generated from the MANs to potentially offer a lower price for national backhaul. The concession agreement between DCCAE and enet must not provide enet with a distortive advantage to sell products in the national backhaul market (on behalf of ETNL).

Therefore, we make the following recommendations:

- To ensure that other operators can purchase MAN connectivity and compete with enet in the provision of the national backhaul component, enet should not sell the total end-to-end MANs-plus-national connection at a price lower than that given by the MAN component list price plus any documented discount.

- enet should keep a record of the details of all of its national managed service sales to demonstrate that it has not sold below the corresponding MANs price. The record should be made available upon request for review by DCCAE or its nominated adviser.

## 5.2 Transfer pricing between enet and ETNL

**enet should create a transfer price – paid by ETNL to enet – for the MAN component of national end-to-end managed services based on enet’s published price lists, plus any documented discounts for MAN managed services.**

### 5.2.1 enet’s current approach to transfer pricing

Transfer pricing is an accounting mechanism whereby one part of a business pays another part for some products or services. The accounts simply record an additional cost on one side (the part of the business buying the product or service) and an additional revenue on the other side (the part of the business selling the product or service).

To create its separated accounts, enet uses a transfer payment from ETNL to enet for the MAN component of any national end-to-end sales.

enet has explained to DCCAE that it applies a discount to its list price to create the transfer payment. enet derived this discount based on eir’s prices (minus a further percentage) which is assumed to represent the prices offered to its largest customer.

### 5.2.2 Our conclusions and recommendations

We consider that the current approach does not comply with the concession agreement Code of Practice. enet should use its documented prices, not the prices of its competitor, to create the transfer prices. Also, the MAN Services Agreement between enet and ETNL defines the “Fee Schedule” as “prices for the works and services offered by enet which can be viewed at enet.ie”.

We therefore make the following recommendations:

- enet should create a transfer price for the MAN connection and rental component of national end-to-end managed services based on its published price lists, plus any documented discounts for MAN services.
- enet may consider ETNL to be a large buyer of MAN services, and therefore the transfer prices may include documented MAN service discounts offered externally to other large MAN service buyers. enet should not base its transfer price discounts on externally offered MAN discount schemes which require advanced payment or other commitments, unless ETNL makes a similar advanced payment or honoured commitment to enet.
- enet should apply a transfer price for connection, dark fibre, ducts, co-location and one-time fee activities (including surveys) using the prevailing list prices, plus any documented discounts.



- enet should make the details of its calculation of transfer prices available upon request for review by DCCAE or its nominated adviser.

### 5.3 Cost allocation and the separated accounts

**We recommend that a number of key elements within the legal framework of the separated accounts are updated by enet and ETNL annually.**

#### 5.3.1 enet's current approach to cost allocation and the separated accounts

The current relationship between enet and ETNL was established on 1 May 2015, when backhaul and related assets were transferred from enet into the separate company ETNL. enet is the MSE and ETNL offers wholesale solutions using a combination of its own network assets and MAN services. As a result, ETNL is a major purchaser of MAN products and services, which it settles using the transfer price for the MAN services purchased. Both enet and ETNL are authorised electronic communication service providers.

In addition to the transfer prices discussed above, enet has a series of 'arms-length' agreements in place which set out how cost is allocated and cross-charged between enet and ETNL:

- The enet team also provides some support functions to ETNL. An agreement sets out how much ETNL pays enet for this effort (the Services Agreement).
- The ETNL network operations centre (NOC) provides the management and fault handling (amongst other NOC functions) for both the ETNL and MAN networks. An agreement sets out how much enet pays ETNL for this function (the NOC Services Agreement).
- The enet sales force provides wholesale quotes and makes wholesale sales of some services on behalf of ENTNL. An agreement specifies how much ETNL pays enet for this sales activity (the Agency Agreement).

These agreements are designed to be arms-length agreements which would reflect the independent commercial priorities of the two separate companies enet and ENTNL, even though they share some staff (e.g. the management team) and facilities. As a result of the shared staff and facilities, some cost centres (e.g. accommodation) are divided into the two companies using allocation percentages. The accounts of enet and ETNL are audited as set out in the Directors' reports and financial statements for each company.

This separation was approved by the DCCAE.

#### 5.3.2 Our conclusions and recommendations

We recommend that a number of key elements within the legal framework of the separated accounts are updated annually:

- Schedule 2 of the Services Agreement (which includes the assumptions to allocate certain shared costs between enet and ETNL) should be updated annually, and the basis of the calculation documented. We suggest that the Allocation Percentages should be updated based on the same year of audited accounts and enet activity, and expanded to fully include any other substantial non-MANs activities. The updated agreement and supporting documentation should be made available upon request for review by DCCAE or its nominated adviser.
- Schedule 2 of the NOC Services Agreement (which includes the assumptions to allocate shared NOC costs between enet and ETNL) should be updated annually, and the basis of the calculation documented. The updated agreement and supporting documentation should be made available upon request for review by DCCAE or its nominated adviser.
- Schedule 1 of the Agency Agreement (which includes the basis of the additional fee paid by ETNL to enet to administer turnover) should be updated annually, and the basis of the calculation documented. We do not agree that the proportion of gross profit generated is a fair basis for allocating sales costs because efforts undertaken to make better (discounted) offers lead to a lower profit allocation not reflective of the greater effort required. We instead recommend using a proportion of gross revenue, or number of sales of each component (MANs and non-MANs). The updated agreement and supporting documentation should be made available upon request for review by DCCAE or its nominated adviser.

## 6 Physical access to MAN infrastructure

### 6.1 Requirement for a separate chamber

**enet should permit operators to 'core drill' into a specified point of a MAN chamber, under supervision.**

#### 6.1.1 Current approach for operator owned drops

The Code of Practice outlines three types of drop ownership models:

- [enet] Installed on behalf of operators at customers' premises
- Operator installed – operator owned
- [enet] Installed – publicly owned.

The Code of Practice currently provides the following guidance for operators looking to access enet's chambers, potentially as part of providing their own drop connections:

*"Operators shall have no unauthorised and/or unsupervised physical access to any enclosures or chambers that form part of the MANs at any time. [enet] may facilitate authorised access, by an Operator, to a co-location facility and shall implement supervision procedures as it deems necessary."*

There is a lack of clarity in the Code of Practice as to whether an operator-owned drop should be via a separate 'stand-off' chamber or if the operator (upon approval) can connect directly into enet's chamber. When enet installs a drop connection, we understand that enet is not required to build itself a stand-off chamber (unless it is technically impossible to connect without doing so).

Our understanding of an enet installed, publicly owned lead-in (drop connection), and an operator installed lead-in (requiring an additional stand-off chamber) are shown in Figure 6.1 and Figure 6.2.

Figure 6.1: enet installed, publicly owned lead-in [Source: Analysys Mason, 2017]

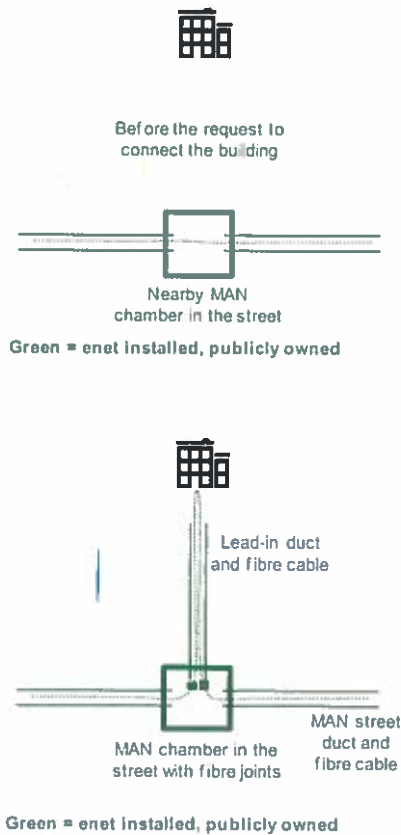
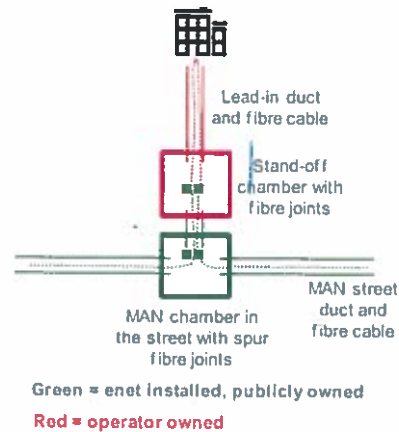


Figure 6.2: Operator installed lead-in [Source: Analysys Mason, 2017]



### 6.1.2 Our conclusions and recommendations

Despite only a minor proportion of connections being affected by this issue, enet should permit operators to core drill into a specified point of a MAN chamber, under supervision, and avoid the need for a separate stand-off chamber and extra fibre splicing, and subject to the following conditions:

- the duct and sub-duct up to the chamber is owned and maintained by the operator (the boundary of ownership of assets is at the edge of the MAN chamber)
- enet will undertake the work to connect the operator sub-duct to the specified MAN sub-duct, and/or splice the fibre pair(s) identified
- the costs of install, supervision and connection will be met by the operator.

We consider this to be a reasonable and efficient way of improving physical access to the MANs for the benefit of end users as has been recently implemented for open eir (see: open eir, Duct Access Product Description, version 2.0 section 3.2<sup>9</sup>).

## 6.2 Occupancy of passive equipment

**enet should prepare a report on the occupancy allocation of passive equipment (dark fibre, duct, sub-duct, co-location), including that used by ETNL for national circuits. The report should compare the current occupancy to the maximum access levels set out in the Code of Practice.**

### 6.2.1 Current approach to occupancy of passive equipment

The Code of Practice places various limits on the maximum occupancy of passive equipment assets (e.g. dark fibre, duct, sub-duct and co-location).

### 6.2.2 Our conclusions and recommendations

We make the following recommendations:

- enet should prepare an annual report on the occupancy of passive equipment (dark fibre, duct, sub-duct and co-location), including that used by ETNL for national circuits. The report should compare the current occupancy to the maximum access levels set out in the Code of Practice. The report should be made available upon request for review by DCCAIE or its nominated adviser.
- If ETNL or another operator is occupying more than the permitted capacities, then the report should provide justification and evidence that spare capacity is still available for new seekers, and/or that plans are in place to add additional capacity.

<sup>9</sup> [http://www.openeir.ie/Products/Data/Pole\\_and\\_Duct\\_Access/](http://www.openeir.ie/Products/Data/Pole_and_Duct_Access/)

## 7 External communications

**enet should make a range of minor improvements to its external communications, including managing its relationship with service providers, and ensuring clarity of communication regarding services.**

### 7.1 Relationship with retail service providers

We make the following recommendations in relation to enet's relationship with the market:

- enet should continue to operate its brand, name or identity (e.g. stylisation) *without any link* to any retail provider of any service. This should extend to any partner brands such as Airspeed Retail.
- enet should be prohibited from sharing resources or a common board (i.e. enet economies of scale or scope) with any retail provider of any service.
- enet should implement a documented process for responding to enquiries from end users received via website or telephone, and this should include recording the list of retail ISPs recommended by enet in response to each query. The list of recommendations should be made available upon request for review by DCCAE or its nominated adviser.

### 7.2 Clarity of communication regarding services

#### 7.2.1 Availability of network information

Section 2.3b of the Code of Practice requires that enet make the following information available:

*"details of individual Networks, including routes, distances and chamber locations"*

enet should make up-to-date digital maps of routes and chambers available to all licensed operators, independent of any specific quotation request. This could be provided via enet's sales portal to maintain security. enet should make it known on its website that the data is accessible for any licensed operator.

#### 7.2.2 Clarity of service availability on different MANs

Most of the MANs are part of the DCCAE-funded programme, and ownership resides with the relevant local authority. However, enet has built a small number of MANs, and their ownership therefore resides with enet. On these enet-owned MANs, enet does not offer the full range of open-access products, e.g. duct and dark fibre.

We recommend that enet should make clear on its website which MANs (or which specific parts of MANs) are privately owned, and therefore do not feature the full range of open-access products.

## 8 Measures to improve take-up

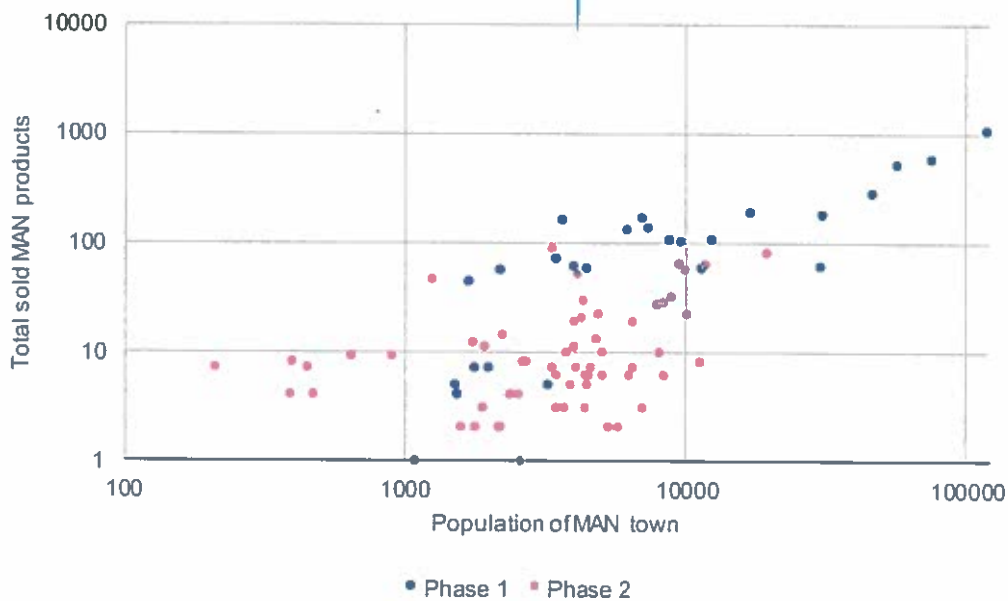
**Many of our previous recommendations will serve to reduce barriers to take-up on the MANs. In addition, we also recommend that DCCAE should work with enet to consider offering a discount for products on specific MANs (where take-up is low).**

### 8.1 Analysis of the current demand on the MANs

We have considered issues that may be affecting take-up on the Phase 1 and Phase 2 MANs.

Figure 8.1 shows a plot of the number of sold MAN products on the Phase 1 and Phase 2 MANs, vs. the population of each MAN town.<sup>10</sup> We have assumed that population provides a reasonable indication of the likely number of businesses that could request services delivered over the MANs.

*Figure 8.1: Number of sold products vs. population of MAN towns across Phase 1 and Phase 2 MANs, on a log-log scale [Source: Analysys Mason, 2017]*

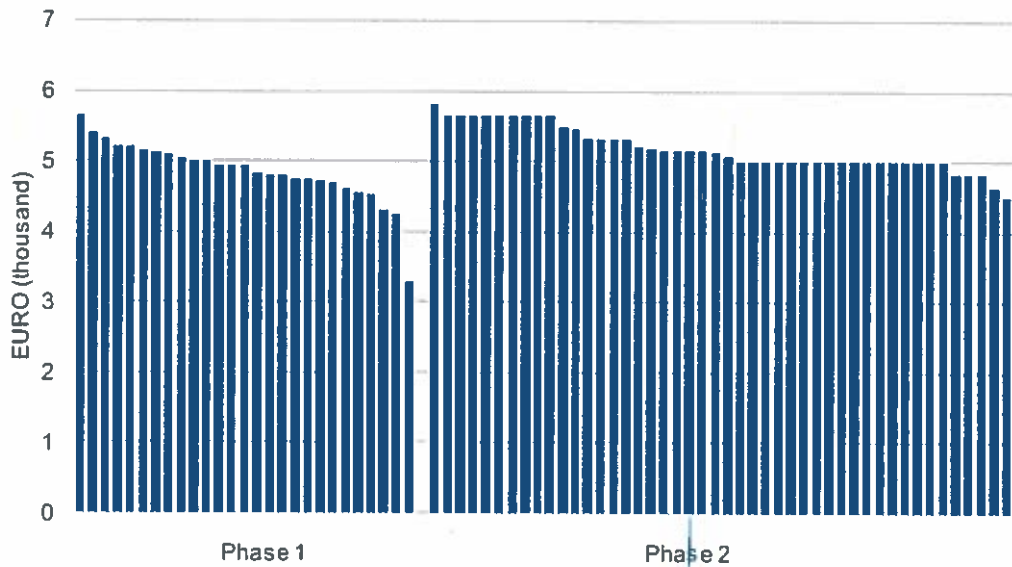


<sup>10</sup> Where data is available, only the 'urban', 'town' or 'city' portion of the population in the local area was used. Where this breakdown was not available, the analysis assumes that the majority of the population is located in the centre of the local area, and therefore within the area addressable by the MANs. Population figures are sourced from Eurostat, the Irish Central Statistics Office and [www.citypopulation.de](http://www.citypopulation.de).



Figure 8.2 shows the average 10Mbit/s managed service revenue (10Mbit/s managed services are chosen as these are the most popular product).

Figure 8.2: Average 10Mbit/s revenue across Phase 1 and Phase 2 MANs [Source: Analysys Mason, 2017]



Based on the above two charts, it can be seen that:

- There is clear variation in take-up by MAN across the two phases of deployment.
- There is limited variation in the average prices charged, highlighting that in smaller towns, there may be limited end users that can afford MANs connectivity and/or less intense competition for service.

Our analysis shows that there does not appear to be a significant take-up limitation on Phase 1 MANs, although some Phase 2 MANs show a lower level of take-up than might be expected given the size of the local population.

## 8.2 Our conclusions and recommendations

Many of our recommendations made elsewhere in the report may increase the take-up on the MANs. If prices are revised, and if the existence of discounts is made more transparent, then this could encourage take-up.

DCCAЕ should work with enet to consider offering a discount on certain MANs to encourage take-up (to spread the benefit of the MANs project derived from high-utilisation areas). Specific town discounts could be offered, for example, so that average prices in such areas can be more affordable to local end users.

## Annex A Glossary

<i>Arms-length</i>	An agreement formed as if the parties were independent.
<i>Backhaul</i>	The transmission link connectivity from a MAN to the national data centres and international Internet links, primarily in Dublin, and beyond to the World Wide Web
<i>CC</i>	Connection charge. The fee quoted to the operator for connecting the end user premise to the MAN
<i>Core drill</i>	This is the activity of using a large mechanical drill to make a hole in the side of a concrete or brick chamber (for example beneath a man-hole) so that a new plastic duct pipe from the end-user premises can be pushed through the chamber wall, and used to feed in/out sub-duct tubes and fibre cables



<i>DCCAE</i>	Department of Communications, Climate Action and Environment
<i>Drop connection</i>	The additional fibre and duct deployment needed to connect a new premise to the nearest MAN chamber, possibly including a new stand-off chamber if required. We also describe this as a building or premise 'lead in'
<i>DTS</i>	Desktop survey. enet's fibre planners use a digital map of the area of the proposed building connection to estimate the cost of the connection (distance, potential road openings, etc.)
<i>EoI</i>	Equivalence of inputs. The arrangement whereby an internal division of an integrated company requests and obtains network services on an identical basis to external wholesale access seekers
<i>FS</i>	Field survey. Engineers visit the proposed building connection to assess the location, suitability and route of the building connection, including obstacles and road crossings, resulting in a connection cost estimate
<i>GPON</i>	Gigabit passive optical network. This is a type of fibre-to-the-premise network where multiple end users are connected to a single fibre tree. The fibre signal (and broadband capacity) is shared between multiple end users using signal splitters at each branch in the tree

<i>Horizontal leverage</i>	Horizontal leverage: a firm using a (strong) position in one service value chain, to gain a stronger position in an adjacent service value chain (e.g. a fixed network service provider targeting mobile network service provision)
<i>ISP</i>	Internet service provider. A retail service provider who uses (MAN) network connectivity products to build up an internet service for the end user
<i>Lead-in</i>	See 'drop connection'
<i>MAF</i>	Mass access facility. This is a MAN product designed to connect multiple access locations to a single MAN fibre (e.g. using a GPON architecture)
<i>MAN</i>	Metropolitan area networks
<i>MSE</i>	Managed service entity. The company that is contracted to manage and operate the MANs under the concession agreement (i.e. enet)
<i>NOC</i>	Network operations centre. Oversees the running of active network equipment, and monitors faults and errors on the active and passive equipment
<i>OLO</i>	Other licensed operator. A potential buyer of enet's wholesale services
<i>POCC</i>	Purchase order connection charge. The connection fee received from the operator
<i>SDH</i>	Synchronous Digital Hierarchy. A networking protocol to carry digital data across an optical fibre network
<i>Transfer pricing</i>	An internal accounting mechanism whereby one part of a business pays another part for a product or service
<i>Vertical integration</i>	A firm offering a series of products from the same value chain, e.g. ducts, dark fibre, lit fibre, wholesale managed metro service, wholesale managed national service, retail internet service