



The corporate price of high-speed broadband

– a comparative study between five European cities

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1. Executive Summary

The purpose of this study is to analyse the monthly price for broadband and dark fibre services available to companies across four major capitals in Europe, in comparison with Stockholm. In line with this, United Minds has examined the average monthly price for access to 100 Mbit/s, 1 Gbit/s, and dark fibre connections.

Overall, internet connection prices seem to be substantially lower in Stockholm than in any of the other four cities considered in the scope of this study, for all three scenarios (100 Mbit/s, 1 Gbit/s, dark fibre). Berlin, on the other hand, is substantially more expensive than any of the other four cities, for two of the scenarios (100 Mbit/s, 1 Gbit/s), and none of the Berlin providers could deliver dark fibre commercially.

1.1. Results overview

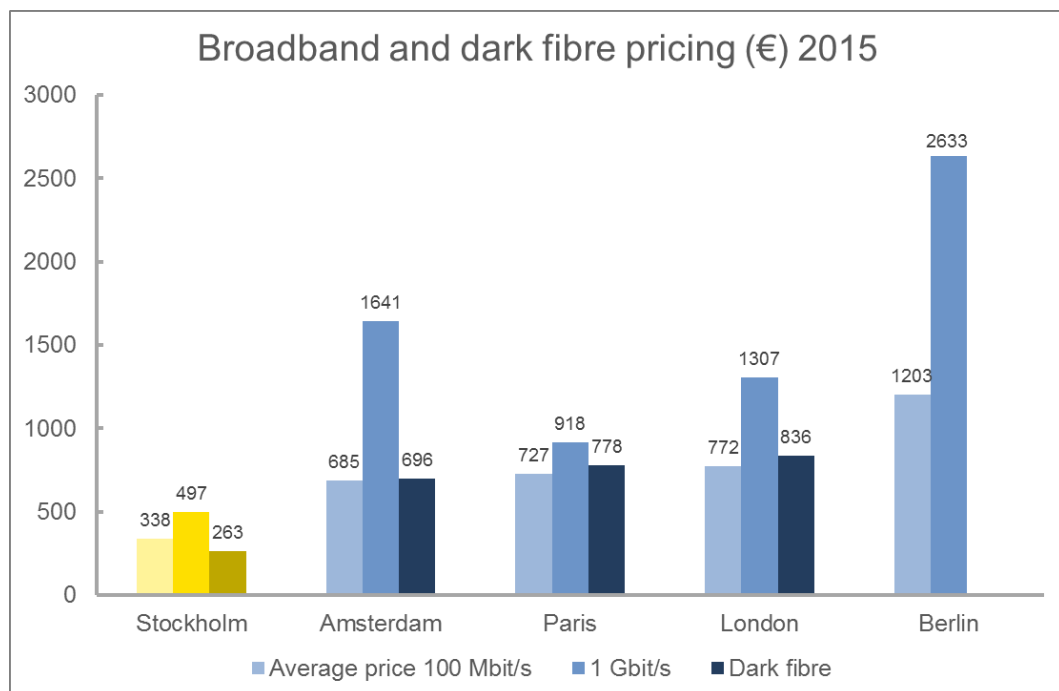


Figure 1: Average price per month (EUR) based on 36 monthly fees and connection fee – 100 Mbit/s, 1Gbit/s, and dark fibre.

	Stockholm	Amsterdam	Paris	London	Berlin
100 Mbit/s	100	203	215	228	356
1 Gbit/s	100	330	185	263	530
Dark fibre	100	265	296	318	-

Table 1: Price index based on 36 monthly fees and connection fee – 100 Mbit/s, 1Gbit/s, and dark fibre.

1.1.1. 100 Mbit/s

The study shows that of the five compared cities, Stockholm is by far the least expensive market for 100 Mbit/s with an average price at EUR 338. This is approximately half of the average price in Amsterdam, Paris, and London – which are all three on comparable levels. Berlin is the most expensive market by far.

1.1.2. 1Gbit/s

All except two providers in Paris and one in Berlin were able to offer 1 Gbit/s contracts. However, the relative pricing of 1 Gbit/s did not always follow the same pattern as for 100 Mbit/s. Indeed, while Stockholm remains the least expensive market (EUR 497) and Berlin the most expensive (EUR 2,633), Paris, Amsterdam, and London face larger cross-city differences in pricing than for 100 Mbit/s.

1.1.3. Dark fibre

For dark fibre, Stockholm is here again the least expensive market out of the compared cities at roughly one third of the price as compared to Amsterdam, Paris, and London. In 2015, internet providers in Berlin were still not able to offer dark fibre contracts to companies.

1.2. General observations and implications

The continuous success of Stockholm in providing high speed internet at internationally competitive price levels as well as several other indications (see below), suggest that the market structure in Stockholm is functioning well and underpins the commercial development of the city market region. Further research could further investigate the relative impact of having a neutral, non-subsidised public market player in the fibre market, as compared to other alternatives.

Based on the analysis found in this study, the researchers would like to highlight the following findings and invitations for further research:

- Internet providers in London, Paris, Amsterdam and Berlin all show substantial price differences between 100 Mbit/s and 1 Gbit/s connections. Such differences could be the consequence of a **relatively underdeveloped fibre infrastructure**. Indeed, when there is a lack of fibre infrastructure available to internet providers, they are in turn incentivised to adopt **pricing strategies** which steer customers to choose 100 Mbit/s instead of the investment heavy 1 Gbit/s alternative, which they cannot or can only partially deliver. This calls for further research on the state of the fibre infrastructure (state, development, ownership and access) in the cities included in this study, and the pricing strategies which result from this.
- The **high price of dark fibre** in London, Paris, and Amsterdam in comparison to Stockholm may suggest operators in these cities are competing on markets where the owner of the fibre infrastructure is also a competing internet provider on the commercial broadband market. In such a scenario, the vertically integrated operator has little to no incentives to let other actors (who then compete for end users) to sub-lease fibre network access to then offer services to their own customers on an open market basis. Furthermore, having control of the infrastructure at the start of the value chain gives the vertically integrated actor (serving as both infrastructure owner and commercial internet provider) a considerable market advantage towards other competitors. Further research should uncover the nature of the competitive environment in different cities and assess its impact on the fibre internet value chain.
- The fact that no operator could offer dark fibre in Berlin (or are reluctant to do so based on the inquiry in this study) suggests that there is a **lack of transparency and that it is difficult to enter the market** as an internet provider. Such a lack of competition is often coupled with a fibre infrastructure development that is purely motivated by the commercial interest of the monopolist actor (or oligopoly). As a consequence, the fibre infrastructure becomes geographically biased towards profit areas where the monopolist actor already operates or identifies most commercial profit. Such monopolist actors become incentivised to steer infrastructural development merely according to their own interests. Further studies should look at the impact of vertical integration of actors on the geographic infrastructural development of fibre networks.
- **Finally**, as the demand for high speed internet increases both on the business and the consumer side, it will be valuable to follow how market structures, infrastructural developments, and pricing strategies adjust accordingly, over time, and across the European single market.

2. Methodology

2.1. Overview

United Minds contacted internet providers across five cities; Stockholm, Amsterdam, Berlin, London and Paris. All cities covered in this report were also included in a global study carried out by United Minds on behalf of Stokab in 2011. In the interviews, United Minds asked for internet prices as a potential corporate customer, not an operator. The interviews conducted with internet providers were carried out via phone and email.

All providers received the same inquiry, including whether they can provide symmetrical connection (same bandwidth on both up- and downstream), to centrally located addresses in the respective cities. For bandwidth connections, the providers have been asked to supply total costs/pricing for connection fees as well as monthly usage fees for a 36 month contract period.

All providers were also asked whether they could provide a dark fibre connection, that is; a dedicated fibre connection between two central addresses in the respective cities. Addresses were chosen according to criteria of being 2 km apart and located in areas with pre-identified fibre access. Where providers could offer such connections, pricing details were inquired for connection fees for both fibre connected facilities and facilities without existing connections but with connections in neighbouring facilities within close vicinity. Monthly fees were also gathered for a 36 month contract.

The study has not taken into account how large a single supplier's network is or how many addresses that a given price applies to. For further studies it would be of great interest to examine the proportion of corporations in a given city that could actually receive a contract to a given price.

2.2. Comparability of research data

In the gathering and analysis of the gathered data, pricing details have been treated so as to enable comparison between data points.

Among 1Mbit/s and 1 Gbit/s providers, actors with solely consumer offerings have been omitted from the analysis. This report focuses strictly on broadband prices for companies. Also, it is worth highlighting that the end consumer prices for broadband are all generally lower than that of corporate service contracts.

While calculating average pricing for each provider, connection fees and the 36 months subscription fees have been added up and then divided by the number of months (36) so as to attain comparable numbers for the total monthly cost. This in order to account for variations between pricing models, where some actors choose to include a larger part of connection cost in the subscription fee and vice versa.

Pricing has been converted into Euro according to Appendix table 2.

Results are shown also detailing price variations so as to indicate also differences in pricing variations between the surveyed cities.

2.3. Data gathering comments

During the previous study carried out in 2011, lead times for even attaining a pricing or cost proposal varied greatly between providers as well as cities. In some cases, getting cost indicators could take up to two months from the time of the initial inquiry. During this 2015 survey, broadband providers were generally much faster, with lead times up to one week in almost all cases. However, as regards to dark fibre pricing in the 2015 survey, many providers were unwilling or reluctant to provide pricing details for dark fibre rental. As with the 2011 survey, time-to-access has not been surveyed.

Furthermore, many providers also demanded exact physical addresses in order to be able to offer pricing for both dark fibre but also 100 Mbit/s and 1 Gbit/s subscription – indicating that pricing transparency is generally low.

One aim at the outset of the study was also to include the providers from the 2011 survey to the utmost possible extent. This was also found problematic, partly because of an increased consolidation within many markets, but also due to the before mentioned increased reluctance to respond to this type of inquiries.

3. Results and analysis

City	100 Mbit/s <i>Price average €</i>	1 Gbit/s <i>Price average €</i>	Dark Fibre <i>Price average €</i>
Stockholm	338	497	263
Amsterdam	685	1 641	696
Paris	727	918	778
London	772	1 307	836
Berlin	1 203	2 633	n/a

Table 1: Average price per month (EUR) based on 36 monthly fees and connection fee – 100 Mbit/s, 1Gbit/s, and dark fibre.

Average pricing consists of connection costs and costs for a 36 months contract, divided so as to yield a monthly average price including the start connection fees.

As indicated by the above summary table, Stockholm is by far the least expensive market compared with the other cities and Berlin is by far the most expensive.

Notably, price averages for the other three cities are rather similar with regards to 100 Mbit/s contracting while prices are both relatively expensive and vary greatly – between as well as within – these three cities when it comes to 1 Gbit/s as well as dark fibre.

Results by connection type in the following subchapters (3.1-3.3) below.

3.1. Average prices - 100 Mbit/s

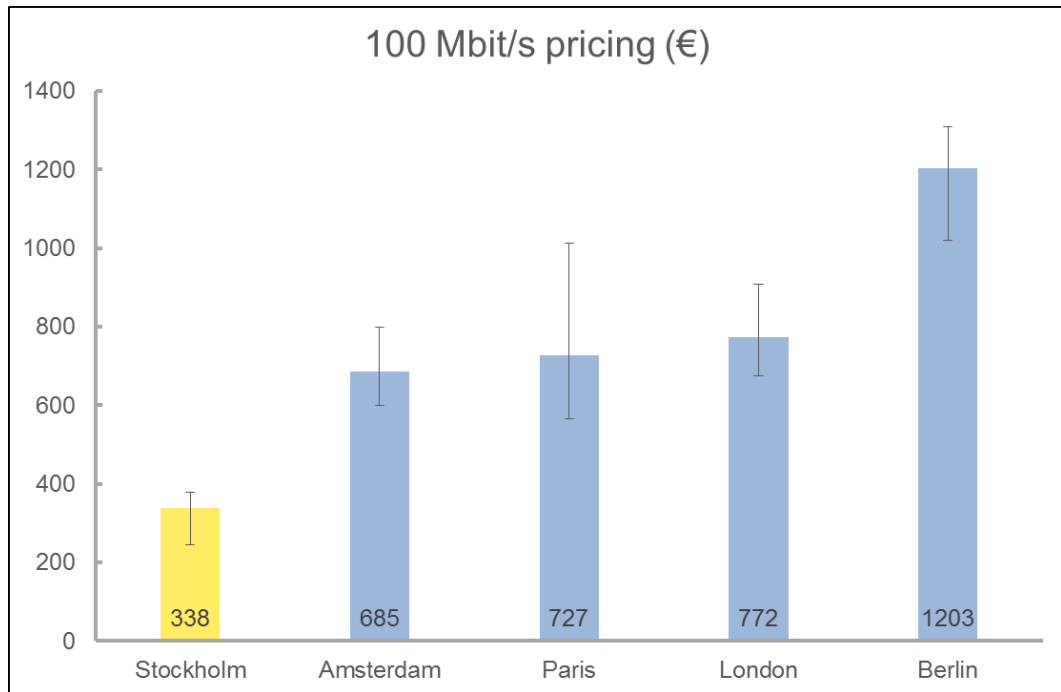


Figure 2: Average price per month (EUR) for 100 Mbit/s, based on 36 monthly fees and connection fee.

Comparing 100 Mbit/s pricing between the cities, Stockholm has substantially lower prices as compared to other cities, while Berlin's prices stand out as comparatively high. The other three cities, Amsterdam, Paris and London all lay on similar price levels and Paris shows a large variation between the highest and lowest given price for 100 Mbit/s.

3.1.1. 100 Mbit/s – 2011-2015 comparison

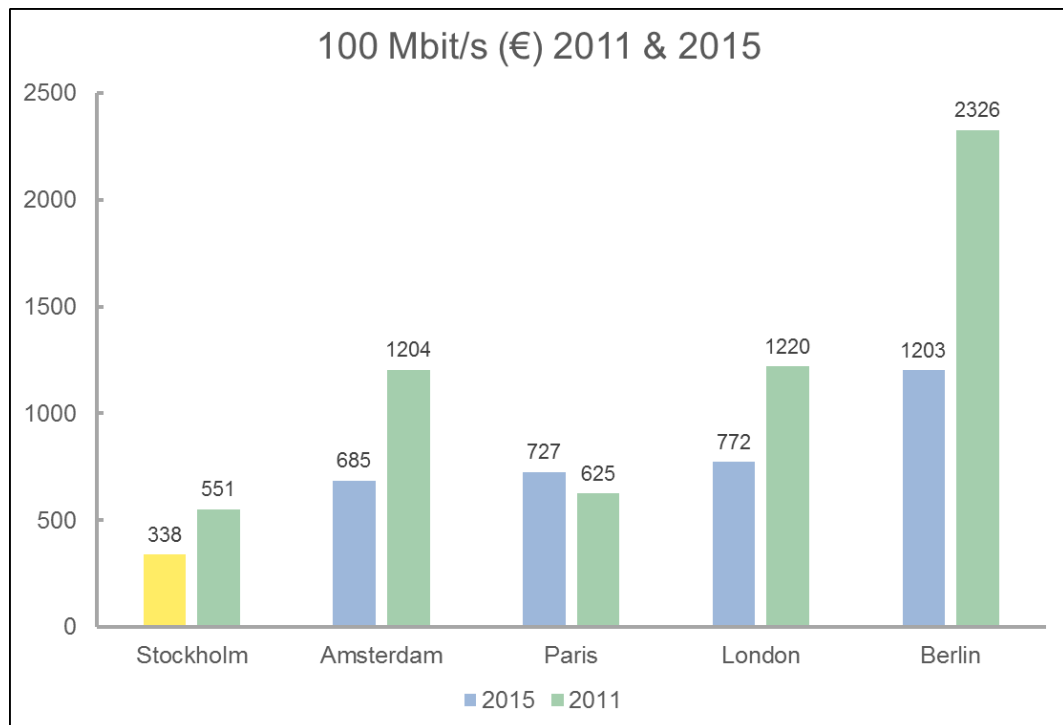


Figure 3: Average price per month (EUR) for 100 Mbit/s, based on 36 monthly fees and connection fee – from cheapest to most expensive. Comparison between 2015 and 2011.

When comparing average pricing between 2011 and 2015, it is clear that prices have dropped significantly in all markets except Paris where the average price is somewhat higher than in the 2011 study. The price has increased by 16.3 per cent between 2011 and 2015. This pricing difference may suggest a high price variation between operators in Paris. Regardless, the results indicate that there has been no significant reduction in the prices for 100 Mbit/s in Paris since 2011.

Stockholm maintains the lowest average price for corporate contracts for 100 Mbit/s internet connection and shows a decrease by 39 per cent between 2011 and 2015. The average decline for all cities over the period was 31 per cent. Absolute price differences have decreased since 2011, where relative prices have dropped more extensively from higher levels in some case, notably in Berlin (minus 48 per cent). Berlin prices were 422 per cent higher than those of Stockholm in 2011, but are as of 2015 down to 355 per cent times higher.

Even though overall price differences are still great, differences have dropped in both real terms and relative terms since 2011.

3.2. Average prices – 1 Gbit/s

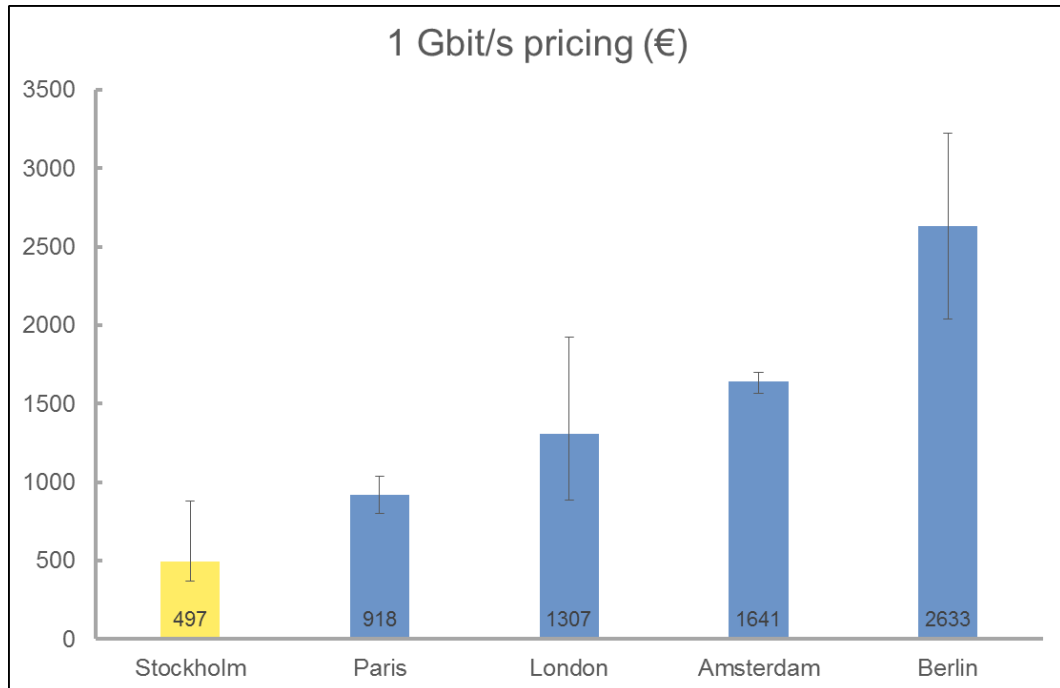


Figure 4 – Average price per month (EUR) for 1 Gbit/s, based on 36 monthly fees and connection fee – shown from cheapest to most expensive.

Stockholm is lowest in terms of 1 Gbit/s average pricing, with an average monthly cost corresponding to 497 EUR. Operators offer relatively similar prices, except one operator offering a substantially higher cost than the other five operators responding from Stockholm.

Comparing with the other cities, prices increase rapidly with Paris in second place at an average price that is 85 per cent higher than price leader, Stockholm. Prices differ 430 percent between the lowest (Stockholm) and highest (Berlin) average market prices.

Like with the 100Mbit/s price comparison, Berlin offers the highest prices for 1 Gbit/s contracts. There are big differences between Paris, London and Amsterdam with regards to 1 Gbit/s contracts, both in relative and in real price terms. It is worth noting that the price variations are very low within Amsterdam, and quite high in London and Berlin.

It is worth noting that 1 Gbit/s is often attained through fibre infrastructure. Investments in this infrastructure are expensive for operators and may be a reason for why prices are so high – operators want to steer market demands to 100 Mbit/s, which requires a much less demanding infrastructure, and therefore keeps infrastructural investments low.

Due to technological developments between 2011 and 2015, prices for 1 Gbit/s were not available in 2011.

3.3. Average prices - dark fibre

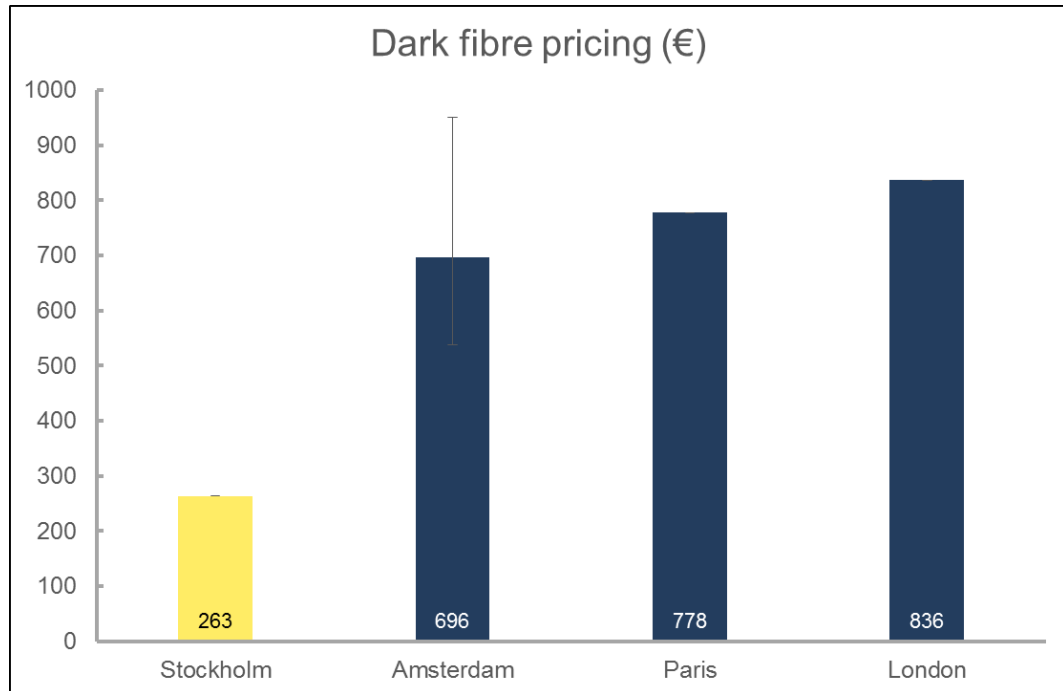


Figure 5 – Average price per month (EUR) for dark fibre, based on 36 monthly fees and connection fee – shown from cheapest to most expensive.

Stockholm has the lowest prices for dark fibre with EUR 263 per month, which is less than 40 per cent of the average of the next least expensive city; Amsterdam. Prices are quite similar between Amsterdam, Paris and London. No operator that was interviewed in Berlin was able to provide dark fibre.

In Amsterdam, Paris, and London, only a few operators offered details as to where dark fibre access could be obtained and among those responding, several providers were reluctant to submit pricing details without first signing a non-disclosure agreement. Furthermore, several operators in these cities recommended alternative services for obtaining internet access instead of directly offering access to a dark fibre line. This tendency was highest in monopolistic markets (Paris, London).

This underlines the power monopolies hold over their competitors and the markets when there is a lack of fair competition in the fibre infrastructure. It is difficult and expensive for competitors to compete, leaving the monopoly with a strong advantage throughout the value chain.

3.3.1. Dark fibre – 2011-2015 cost comparison

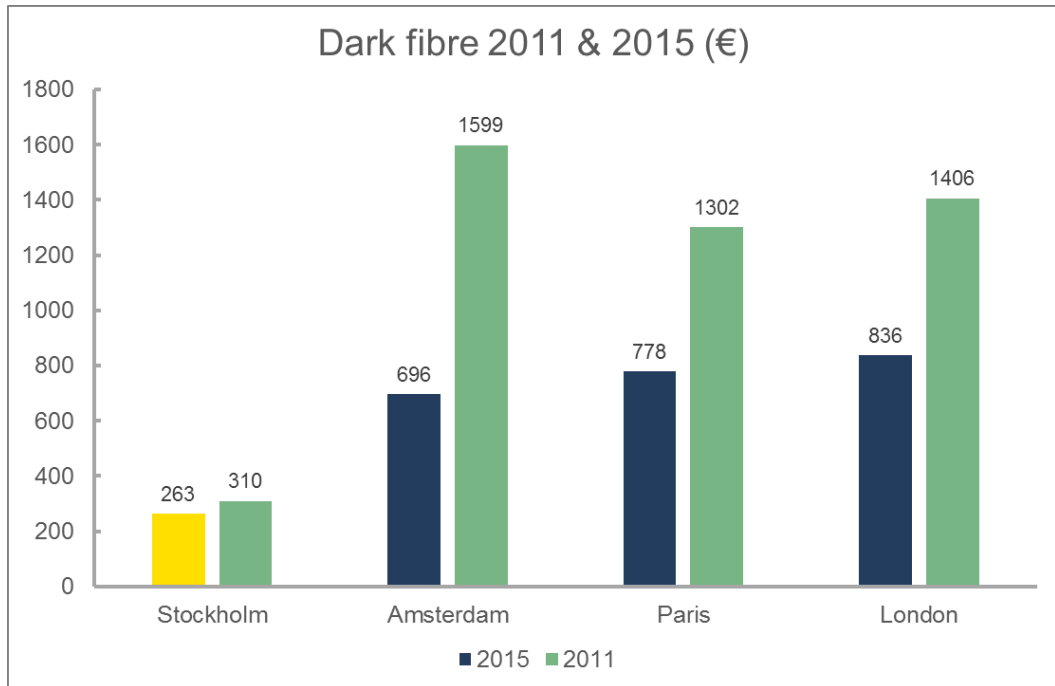


Figure 6: Average price per month (EUR) for dark fibre, based on 36 monthly fees and connection fee – from cheapest to most expensive. Comparison between 2015 and 2011.

Comparing dark fibre between 2011 and 2015, it is clear that prices have decreased substantially in all four cities supplying dark fibre (no supplier could provide dark fibre in Berlin).

Amsterdam experienced the largest decrease in the average price between 2011 and 2015 with a 56 per cent decrease. Prices are now more similar between Amsterdam, Paris and London. Berlin still has no dark fibre commercial providers and Stockholm remains the least expensive city by far.

4. Appendix

4.1.1. About broadband connections

100 Mbit/s and 1 Gbit/s

With connections at speeds of 100 Mbits/s or faster, most services can be delivered. The choice of speed is more dependent on the total capacity required by the company. This type of high-speed connection will neither limit nor be an obstacle to most companies' business.

Such connections also open up the possibility, in principle, of using almost all Cloud services, and that outsourcing would be unproblematic from a technical point of view. With access to these kind of connections at a reasonable cost, the opportunities open up for companies to develop their business.

Dark fibre

Dark fibre is the designation of the fibre optic cables needed to deliver different kind of services, from broadband, telephone to TV. Dark fibre is a base connection, only the fibre itself without any electronic equipment connected to it. In order to be able to deliver a service, the operator must have access to dark fibre. With this access the operator will by itself be able to choose quality and technical specifications of the active device, meaning that the operator will not be correlated to the equipment any other operator (competitor) has chosen.

4.1.2. Results tablesOverview of survey results 2015

Operator	100 Mbit/s	1 Gbit/s	Dark fibre
London 1	736	1 110	N/A
London 2	675	888	N/A
London 3	907	1 923	836
Amsterdam 1	601	1 568	538
Amsterdam 2	656	1 656	600
Amsterdam 3	799	1 699	950
Berlin 1	1 021	2 041	N/A
Berlin 2	1 278	3 225	N/A
Berlin 3	1 309	N/A	N/A
Paris 1	566	800	N/A
Paris 2	629	N/A	N/A
Paris 3	700	N/A	778
Paris 4	1 012	1 036	N/A
Stockholm 1	356	382	N/A
Stockholm 2	371	467	N/A
Stockholm 3	244	372	N/A
Stockholm 4	378	500	N/A
Stockholm 5	356	382	N/A
Stockholm 6	326	878	N/A
Stockholm 7	N/A	N/A	263

Appendix Table 1: Average price per month in EUR based on 36 monthly fees and connection fee.

Currency correlations 2015-09-25

Currency	Correlation (to EUR)
GBP	12,8106
SEK	9,41988

Appendix Table 2: Currency conversions to EUR, 2015-09-25.

4.1.3. About Stokab

Stokab is owned by the City of Stockholm, and is an independent actor that provides passive infrastructure in the form of optical fibres that do not have active termination equipment, known as dark fibre. Ever since its inception in 1994, the goal of the company has been to build a competition-neutral infrastructure capable of meeting future communication needs, spur economic activity, diversity and freedom of choice, as well as minimising disruption to the city's streets.

www.stokab.se

4.1.4. About United Minds

United Minds is an analysis and strategy company consisting of around 20 consultants, with different backgrounds and specializations. Head Office is located in Stockholm, with an additional office in Mumbai. United Minds is also part of the global communication group Weber Shandwick with offices in over 80 countries worldwide.

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