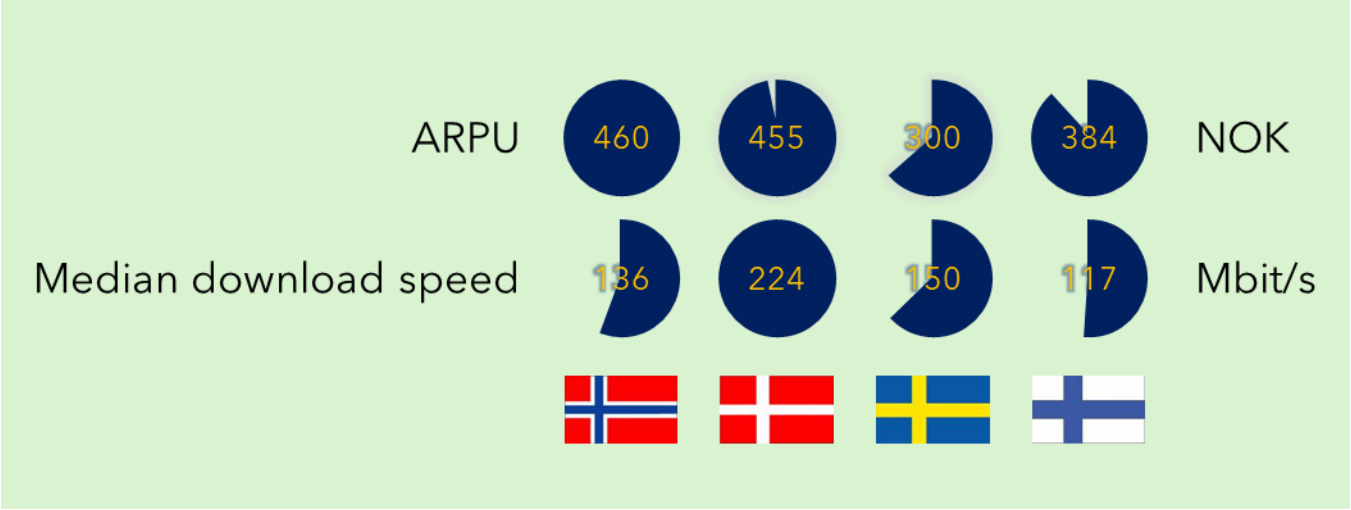
tefficient

Analysis prepared for Digitaliserings- og forvaltningsdepartementet

Assessment of Norwegian fixed broadband pricing in a Nordic context 2024



Contents

1 Executive summary

This report, commissioned by Digitaliserings- og forvaltningsdepartementet (DFD), is the fourth, expanded, and updated edition. It focuses on data up to December 2023, building upon previous analyses that covered data up to June 2020, June 2021, and December 2022.

The analysis employs a variety of metrics, consistently comparing data across four Nordic markets: Norway, Denmark, Sweden, and Finland. These markets are shown to form a nearly perfect peer group.

Regulator data indicates that the average revenue per fixed broadband subscription (ARPU) in Norway—both before and after purchasing power parity adjustment—is higher than in the other three countries. This comparison holds true whether fixed wireless access (FWA) is included or excluded.

Norway has a high share of its fixed broadband base in fibre, but Sweden's is still higher. A close-to-Nordic-average share of Norwegian fixed broadband customers subscribed to 100 Mbit/s or faster services in 2023. Denmark and Sweden had higher shares. Based on these two metrics, Norwegian fixed broadband customers aren't getting the best value for money in the Nordics.

To illustrate current fixed broadband and FWA plan pricing, the analysis compares over 6500 price offers from all the largest providers available specifically to the same 385 sample addresses in the Nordics. This section has been expanded compared to previous editions. The data shows that Norwegian fixed broadband subscriptions are generally much more expensive than same-speed plans in Denmark, Sweden, and Finland. The price gap between Norway and the other countries is about 270-750 NOK per month for fixed broadband and about 200-700 NOK for FWA. Danish and Finnish providers offer the most affordable plans in the Nordics.

When it comes to one-time fees, the Norwegian fees are reasonable when compared like-to-like to the other countries. Since Norwegian FWA providers mandate an installation of an external antenna, Norway is however missing out on the potential of lower one-time fees for FWA. The analysis also shows that, whereas FWA provides a lower-cost option regardless of speed in the other three countries, Norwegian FWA plans seldom function as a lower-cost option.

If combining all fees (recurring and one-off) in a comparison of total 5-year fees, the Norwegian customer will pay a much higher amount than customers in Denmark, Sweden, and Finland. This is the case both for fixed broadband and for FWA.

Norway has fixed broadband networks with high median throughput, but so do Sweden and Finland. Denmark has much faster speeds than Norway. With Norway's much higher subscription fees, the willingness to pay for a faster throughput tier might not be as present as in Denmark.

It is quite common to offer combined, discounted, broadband & TV bundles. In Norway such bundles always come with a much higher average monthly subscription fee than similar plans in Sweden and Finland.

In 2022 and 2023, Telenor Norway and Telia Norway had the highest EBITDA margins in the Nordics, indicating that high operational expenditures are not the cause of higher Norwegian integrated (fixed and mobile) revenue. Lyse Tele had a lower EBITDA margin, closer to the Nordic median when excluding Telenor Norway and Telia Norway.

Norwegian operators invest a larger portion of their integrated revenue in capital expenditures (CAPEX) compared to the median Nordic operator. In 2023, this was particularly true for Lyse Tele, whereas Telenor Norway and Telia Norway's CAPEX to revenue ratios decreased. Despite this, Telia Norway and Telenor Norway's integrated EBITDA-CAPEX (approximately cash flow) margins remain the highest in the Nordics, allowing them to comfortably sustain their current CAPEX levels. Lyse Tele, however, could not cover its CAPEX with its EBITDA in 2023.

The analysis shows that the Norwegian fixed broadband market is about as concentrated as the Nordic average with the concentration index (HHI) having decreased slightly since 2022.

If comparing to the other three markets, possible contributions to Norway’s high broadband prices could be the lack of open fibre networks, the fact that FWA is not provided as a lower-cost option, and that Norwegian broadband providers hide FWA offers when being able to deliver fibre of HFC (cable TV) broadband. Removing the compulsory external FWA antenna could make FWA more affordable in Norway.

2 Background

This report, commissioned by Digitaliserings- og forvaltningsdepartementet (DFD), is the fourth, expanded, and updated edition. Previous versions were dated 23 February 2021 (written to support Kommunal- og moderniseringsdepartementet's white paper to the Norwegian Parliament covering electronic communications issued 9 April 2021[1]), 31 January 2022[2] and 26 September 2023[3]. The historical analyses are focused on data up to June 2020, June 2021, and December 2022 respectively – whereas this analysis is focused on data up to December 2023.

[1] https://www.regjeringen.no/no/dokumenter/meld.-st.-28-20202021/id2842784/

[2] The report can be downloaded from https://www.regjeringen.no/en/dokumenter/assessment-of-norwegian-fixed-broadband-pricing-in-a-nordic-context-2022/id2909628/

[3] Can be downloaded from https://www.regjeringen.no/no/aktuelt/redusert-pris-for-store-datapakkar-men-norske-mobilkundar-betalar-framleis-mest-i-norden/id2991351/ The September version is an update of the initial version, dated 26 June 2023, and replaced the previous model for purchasing power parity adjustment.

3 Peer group

Just like in the previous editions, the peer group consists of the four Nordic countries **Norway, Denmark, Sweden, and Finland**. These four countries form a near-perfect international peer group. All metrics will always[4] be compared between these four countries to allow the reader to understand how one metric may affect another metric.

Below are some high-level indicators to show why Norway, Denmark, Sweden, and Finland – at an integrated (fixed and mobile) level – most often are comparable.

	Norway	Denmark	Sweden	Finland
Mobile				
High smartphone penetration	>90%	>90%	>90%	>90%
High data-only (mbb) penetration incl. FWA excl. M2M	7%	14%	10%	23%
High mobile data traffic [GB per SIM incl. M2M per month]	7.0 excl. FWA 13.0 incl. FWA	18.8 incl. FWA	10.1 excl. FWA 14.3 incl. FWA	36.5 excl. FWA
High contract share of mobile subscriber base excl. M2M	93%	98%	84%	92%
Low/medium mobile churn excl. M2M [per year]	15-25%	15-30%	15-25%	15-20%
Subsidy/instalment model in mobile equipment sales	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
World-class mobile network quality	Yes	Yes	Yes	Yes
High 5G population coverage	94% Telia 81% Telenor Ice n/a	TDC NET 99% Telenor/Telia 93% '3' 90%	Telia 82% Tele2/Telenor 60% '3' 40% Q1 2024	DNA 94% Elisa 92% Telia 90%
Active mobile network sharing	No	Yes	Yes	Yes
Fixed excl. FWA				
High fibre share of fixed broadband base excl. FWA	79%	55%	83%	68%
Medium cable modem share of fixed broadband base	19%	32%	16%	28%
High median download speed [Mbit/s]	142 #37 in the world	230 #9 in the world	157 #28 in the world	122 #41 in the world
Fixed-mobile convergent offers	Yes	Yes	Yes	Yes

Figure 1. Comparison of some high-level business drivers in Norway, Denmark, Sweden, and Finland[5] [source: Tefficient, regulators, operators, Ookla]

This analysis is principally based on three separate sources:

1. **Telecom regulators**: This analysis relies partly on **reported market data from the four Nordic regulators** Nkom, SDFI, PTS, and Traficom to derive metrics on average revenue per user (ARPU) and technology and speed distribution of subscription base. The benefit of using regulatory data is

[4] On a few occasions, regulatory data with sufficient break-down isn't available, leaving out that metric for the country in question.
[5] Subscriber and coverage figures are for December 2023 unless stated differently, usage figures for the whole year of 2023.

that it captures what mobile subscribers actually pay – so-called back book pricing – not the prices of the currently best offers on the market.

2. **Telecom operators**: ARPU is typically also reported by the telecom operators and this analysis also adds that. In addition, telecom operators report their financial performance, and this analysis looks at profitability and investment metrics such as earnings before interest, taxation, depreciation and amortisation (EBITDA) and capital expenditure (CAPEX) to revenue ratios. The following operators are included:

   - Norway: Telenor, Telia, Lyse Tele
   - Denmark: Nuuday/TDC NET, Telenor, Telia, 3
   - Sweden: Telia, Tele2, Telenor, 3
   - Finland: Elisa, Telia, DNA

3. **Current consumer[6] prices, available online**: Although we, for the reason stated, prefer to analyse the back book pricing through regulatory data, this analysis still partly relies on Tefficient's research of the currently best offers available to consumers online – so called front book pricing. This part has been enlarged in comparison to the previous editions of this analysis. The following broadband and fixed wireless access (FWA) providers are included:

   Norway (9 largest[7] providers, representing **77%** of the consumer fixed[8] broadband subscriptions):

   - Telenor **(also FWA)**
   - Telia **(also FWA)**
   - Viken Fiber (Altibox partner)
   - GlobalConnect
   - Lyse Fiber (Altibox partner) **(also FWA)**
   - Eidsiva Bredbånd (Altibox partner)
   - NTE Telekom (Altibox partner)
   - NextGenTel **(also FWA)**
   - Bergen Fiber (Altibox partner)

   Denmark (4 largest providers, representing **68%** of the overall[9] fixed broadband subscriptions and 3 providers for just FWA):

   - Nuuday (former TDC) using YouSee and Hiper as consumer brands **(also FWA for YouSee)**
   - Norlys (incl. previous brand Stofa)
   - Fibia
   - DKTV (owned by TDC NET)

[6] Many consumers, living in apartments, will typically subscribe to broadband services through a group agreement administered by the landlord or the housing association. These agreements are often not public and the pricing of these have therefore not been included in this analysis. Effectively, this means that that the analysis primarily captures the pricing of broadband services delivered to consumers living in detached housing.

[7] Who the largest providers are is derived from official statistics from the respective national telecom regulator – Nkom, SDFI, PTS, and Traficom – for December 2023. For Norway, in addition to the named 9 largest providers, other Altibox partners were checked for addresses outside of the mentioned five largest partners. In total 10 such addresses with online fibre pricing were found, 7 from Bergen Fiber, 2 from Haugaland Kraft and 1 from Afiber.

[8] For Norway and Finland, the percentage includes FWA – not the case for Denmark and Sweden.

[9] Consumer not broken out in the reporting of SDFI and Traficom.

- Telenor **(only FWA)**
- Telia **(only FWA)**
- 3 **(only FWA)**

Sweden (4 largest providers, representing **79%** of the consumer fixed broadband subscriptions and one provider for just FWA):

- Telia **(also FWA)**
- Tele2 **(also FWA)**
- Telenor **(also FWA)**
- Bredband2
- 3 **(only FWA)**

Finland (3 largest providers, representing **85%** of the overall[9] fixed broadband subscriptions):

- DNA **(also FWA)**
- Elisa **(also FWA)**
- Telia and Telia Dot **(also FWA)**

The methodology for how to gather the pricing of offered fixed broadband subscriptions has been improved and expanded compared to previous editions of this analysis. Each municipality has been given a certain number of addresses based on the share of the country population living in that municipality. To exemplify, Oslo municipality had 709037 inhabitants in January 2023, 13% of Norway's total. With an ambition to have **100 Norwegian addresses covered**, Oslo has therefore been given 13 random addresses, Bergen has been given 6, Trondheim 4 etc. until the municipality of Klepp (one address) – which is the last municipality required to reach **at least 70% of the population**.

To reach all the largest municipalities covering at least 70% of the population requires **88 addresses in Denmark, 105 addresses in Sweden and 92 addresses in Finland**.

For all addresses – 385 in total – all broadband offers fulfilling our definitions available on that specific address has been documented and all prices gathered. The same unique addresses have of course been used for all covered providers. In total, **6500 offers have been documented for these 385 addresses**.

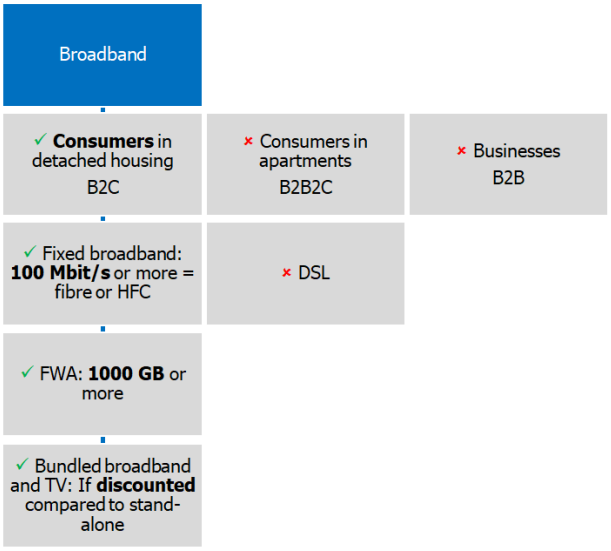
Recurring subscription fees as well as one-off fees have been gathered and documented. For fixed broadband (not FWA), a threshold of **100 Mbit/s** in download throughput has been applied, effectively ruling out most of DSL-based broadband[10], leaving **hybrid fibre coax** (HFC) and (pure) **fibre** options in.

For FWA, no download throughput threshold has been applied, but instead a threshold of at least **1000 GB** of full speed allowance per month as the data usage of a modern household easily can reach 500 GB per month with the use of streaming services, videoconferencing and downloading of software to connected devices such as game consoles and PCs.

[10] 100 Mbit/s-capable DSL subscriptions are included but only Elisa Finland was found to offer these.

The pricing of fixed broadband or FWA plans that **bundle in basic TV services** have also been gathered – if that bundling provides the consumer with a lower price than buying broadband and TV separately.

The following figure summarises these thresholds and limitations:



All prices have been gathered between 17 June and 1 July 2024.

4 Observed data issues

4.1 Regulatory revenue data for Denmark and Finland not yet available for 2023

Finland's telecom regulator, Traficom, and Denmark's telecom regulator, SDFI, have not yet issued revenue statistics for 2023. Since all operators in Finland and Denmark publicly report mobile service revenues, there is a work-around by summing up these and add a reasonable share for MVNOs and others. Comparison with previous years – for which both datasets are available – show that numbers tend to match well.

4.2 Fixed broadband revenue not reported in a fully comparable way

The Finnish regulator Traficom does not report the pure fixed broadband revenue but includes also fixed voice telephony in its reported figure. We are however of the opinion that the error is small since fixed voice telephony for a long time hasn't been an asked-for service in Finland.

4.3 FWA not defined and reported in a comparable way

The Nordic regulators are split in how they classify fixed wireless access (FWA). Whereas FWA is classified and reported as a fixed broadband service in Norway and Finland, it is classified as a mobile broadband service in Denmark and Sweden.

The FWA revenue is reported only for Norway. The Finnish regulator Traficom includes it under fixed revenues, but it is not broken out so that it could be eliminated to make it comparable to Denmark and Sweden. In these two countries, regulators have included FWA revenues in mobile revenues, but not broken it out which would have allowed a comparison with Norway and Finland.

On top of the difference in what is reported on FWA revenues, there's not full harmonisation in the definition of FWA between the three reporting Nordics regulators.

- Norway's Nkom and Finland's Traficom define FWA as a fixed installation sold to a specific address, but not necessarily with an outdoor antenna (only in practice). There should also be a certain resource reservation in place, e.g. a dedicated frequency band, a share of the capacity on a base station or network slicing, so that the FWA provider can guarantee an adequate level of service for an individual FWA subscription. A minimum speed should be communicated, not just a maximum speed.
- In its data questionnaire for providers, Sweden's PTS defines two types of FWA where the stricter is defined similarly as in Norway and Finland – but the more relaxed definition is that it is just sold to a specific address with a minimum speed. Since the currently reported Swedish FWA numbers are so large, the FWA data reporting of PTS – subscriptions and traffic – is believed to rely on the latter, relaxed, definition.

How these issues have been dealt with is described in section 5.

4.4 No breakdown of revenue per operator for Denmark and Finland

The Danish and Finnish regulators do not report a breakdown of the revenue per broadband operator. In the market concentration (HHI) section, this analysis for these two countries therefore must be based on fixed broadband subscriptions rather than fixed broadband revenue.

4.5 Address-based pricing

Most fixed broadband providers are only stating prices after a **specific address** has been inputted. This is done to make sure a provider can deliver services to the exact address but also since the pricing may depend on who (the provider or a regional infrastructure partner) is delivering the underlying broadband infrastructure. Although 6500 price points have been gathered, we can't guarantee that every single address would be covered pricing-wise.

4.6 New build connection fees hard to find

New build connection fees (for new connections into homes) are more difficult to find than monthly subscription fees. The reason is that they vary according to region and neighbourhood. With growing fibre adoption and network reach, it has become increasingly difficult to find an address to a house which is a prospect for a new build. For none of the checked 105 Swedish addresses, a new build connection fee was communicated. Since FWA today is widely offered by providers as an alternative, it could also be so that providers rather promote FWA in its online channels than promote an expensive new build fibre connection. Such cases are perhaps rather dealt with on an area-by-area basis with e.g. door-to-door sales.

In Sweden and Finland, consumers could apply for a **tax reduction** on certain new build connection fees. Such tax reductions have not been considered; the analysis will always show the full price before any possible tax reduction. We realise though that such tax reductions could affect how providers decide to distribute fees in between e.g. recurring subscription fees and one-time installation fees.

4.7 Currency fluctuations

If the four countries had the same currency, this would not be an issue. Since the Danish krone (DKK) is pegged to the Euro (+-2.25%), two currencies, EUR, as used in Finland, and DKK are however closely linked. This means that the comparisons we make between Danish and Finnish ARPU levels in the following two sections aren't much affected by currency fluctuations.

The Norwegian krone (NOK) has been volatile and has weakened vs. the Euro during 2023, see Figure 2.

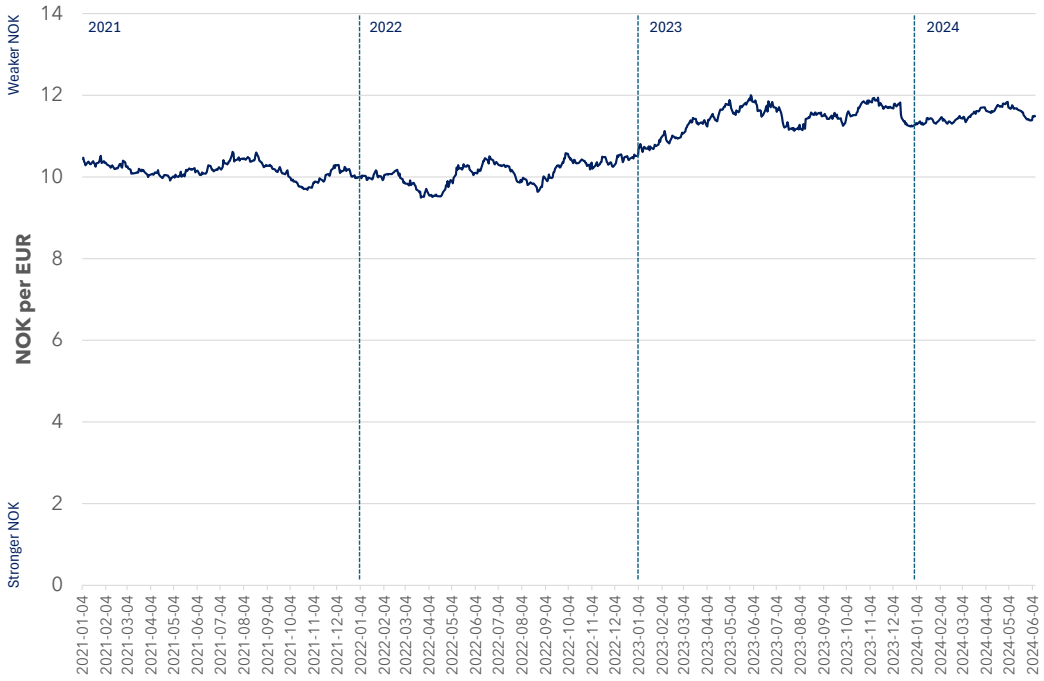


Figure 2. Development of the daily exchange rate between NOK and EUR from 2021 to date [source: ECB]

The Swedish krona (SEK) has followed the NOK around a 1:1 rate, see Figure 3. This means that also the SEK has weakened vs. the EUR during 2023.

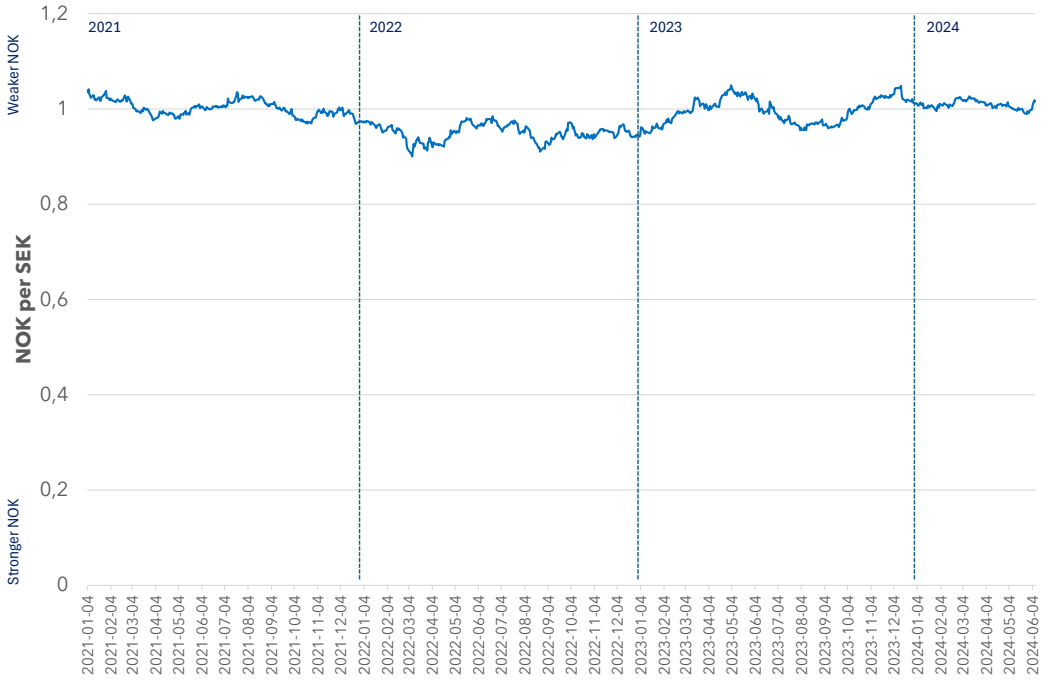


Figure 3. Development of the daily exchange rate between NOK and SEK from 2021 to date [source: ECB]

When we soon compare average revenue per user (ARPU) in Norwegian kroner we should hence have in mind that the relative weakness of the NOK and the SEK vs. EUR (and thereby DKK) will make Danish and Finnish ARPUs look higher when compared to Norwegian and Swedish ARPUs. The same goes for prices compared from section 8 onwards.

4.8 PPP fluctuations

Although many telecom parameters, as shown in Figure 1, are similar across our four countries, the purchasing power differs. It hence makes sense to try to adjust for it to end up with **purchasing power parity** (PPP).

In this analysis, most revenue and pricing diagrams are therefore produced in two versions:

- A comparison in NOK *without* adjustment for purchasing power
- A comparison in NOK *with* adjustment for purchasing power

An introduction to PPP is given in the box below[11].

Measuring economic activity in a country is difficult, since 'the economy' is a complex system with lots of moving parts. A common way to deal with this is to focus on aggregate indicators, such as total national output: "the monetary value of all goods and services produced within a country (or region) in a specific time period". That's what economists call the Gross Domestic Product (GDP).

GDP is measured using prevailing national prices to estimate the value of output. In other words, GDP is calculated using local currency units. This means that in order to make meaningful cross-country comparisons, it is necessary to translate figures into a common currency – i.e. use a consistent 'unit of measure'.

One option is to simply translate all national figures into one common currency (for instance, US dollars) using exchange rates from currency markets. But because market exchange rates do not always reflect the different price levels between countries, economists often opt for a different alternative. They create a hypothetical currency, called 'international dollars', and use this as a common unit of measure. **The idea is that a given amount of international dollars should buy roughly the same amount – and quality – of goods and services in any country**.

The exchange rates used to translate monetary values in local currencies into 'international dollars' (int-$) are the 'purchasing power parity conversion rates' (also called PPP conversion factors).

In this analysis, we turn to OECD/Eurostat for their PPPs. The input (and for 2023 also output) parameters for the PPP adjustment are shown in Figure 4 below.

[11] From Our World in Data: https://ourworldindata.org/what-are-ppps

	Input: Purchasing power parity (PPP) Total, National currency units per US dollar 2021 - estimate	Input: Purchasing power parity (PPP) Total, National currency units per US dollar 2022 - estimate	Input: Purchasing power parity (PPP) Total, National currency units per US dollar 2023 – "flash" estimate	Output: Exchange rate adjusted to Norwegian purchasing power level [national currency to PPP NOK] 2023
Norway	8,962043	8,418371	8,894996	1
Denmark	6,232205	6,153561	6,106244	0,95001908
Sweden	8,311676	8,363085	8,509281	1,050262214
Finland	0,782813	0,769643	0,764142	1,018876673

Figure 4. Comparison of purchasing parity (in international USD) in Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023 and the PPP adjusted exchange rates used for 2023 [source: OECD[12]]

Since purchasing power parity (PPP) is calculated on a generic basket of goods and services – not specifically for mobile services – it should be regarded as indicative. Different institutes, e.g. OECD, IMF, and the World Bank report different PPP conversion rates. The rates are revisited and adjusted meaning that historical values might be changed. In OECD's case, at the time of writing, PPPs have been fixed up to 2020 whereas 2021 and 2022 still are estimates to be revised in 2025. The 2023 PPPs are so-called "flash" estimates – where normal estimates for 2023 only will be reported in 2025. There was a major adjustment done to the Norwegian 2023 "flash" value in June.

For this reason, we do not fully trust the 2023 "flash" estimate for Norwegian PPP and encourages the reader to rather study the graphs without adjustment for purchasing power.

[12] Derived from https://data-explorer.oecd.org/vis?lc=en&fs[0]=Topic%2C1%7CEconomy%23ECO%23%7CNational%20accounts%23ECO_NAD%23&fs[1]=Topic%2C2%7CEconomy%23ECO%23%7CNational%20accounts%23ECO_NAD%23%7CGDP%20and%20non-financial%20accounts%23ECO_NAD_GNF%23&pg=0&fc=Topic&snb=53&df[ds]=dsDisseminateFinalDMZ&df[id]=DSD_NAMAIN10%40DF_TABLE4&df[ag]=OECD.SDD.NAD&df[vs]=&pd=%2C&dq=A.AUS%2BAUT%2BBEL%2BCAN%2BCHL%2BCOL%2BCRI%2BCZE%2BDNK%2BEST%2BFIN%2BFRA%2BDEU%2BGRC%2BHUN%2BISL%2BIRL%2BISR%2BITA%2BJPN%2BKOR%2BLVA%2BLTU%2BLUX%2BMEX%2BNLD%2BNZL%2BNOR%2BPOL%2BPRT%2BSVK%2BSVN%2BESP%2BSWE%2BCHE%2BTUR%2BGBR%2BUSA...PPP_B1GQ.....&to[TIME_PERIOD]=false&vw=tb 4 July 2024

5 Fixed broadband ARPU per country

We have used regulator data from the four national regulatory agencies Nkom, SDFI, PTS and Traficom to calculate the average service revenue per fixed broadband subscription[13] per month – normally referred to as **ARPU** within the industry. Figure 5 below shows the ARPU excluding FWA in NOK[14].

As usual, regulatory data is not entirely harmonised. FWA revenue and subscriptions can't be excluded for Finland[15]. The Finnish revenue is also including revenues from fixed voice services[16]. The revenue has not yet been reported for 2023 for Denmark and Finland, but Tefficient has been able to calculate it based on operator data.

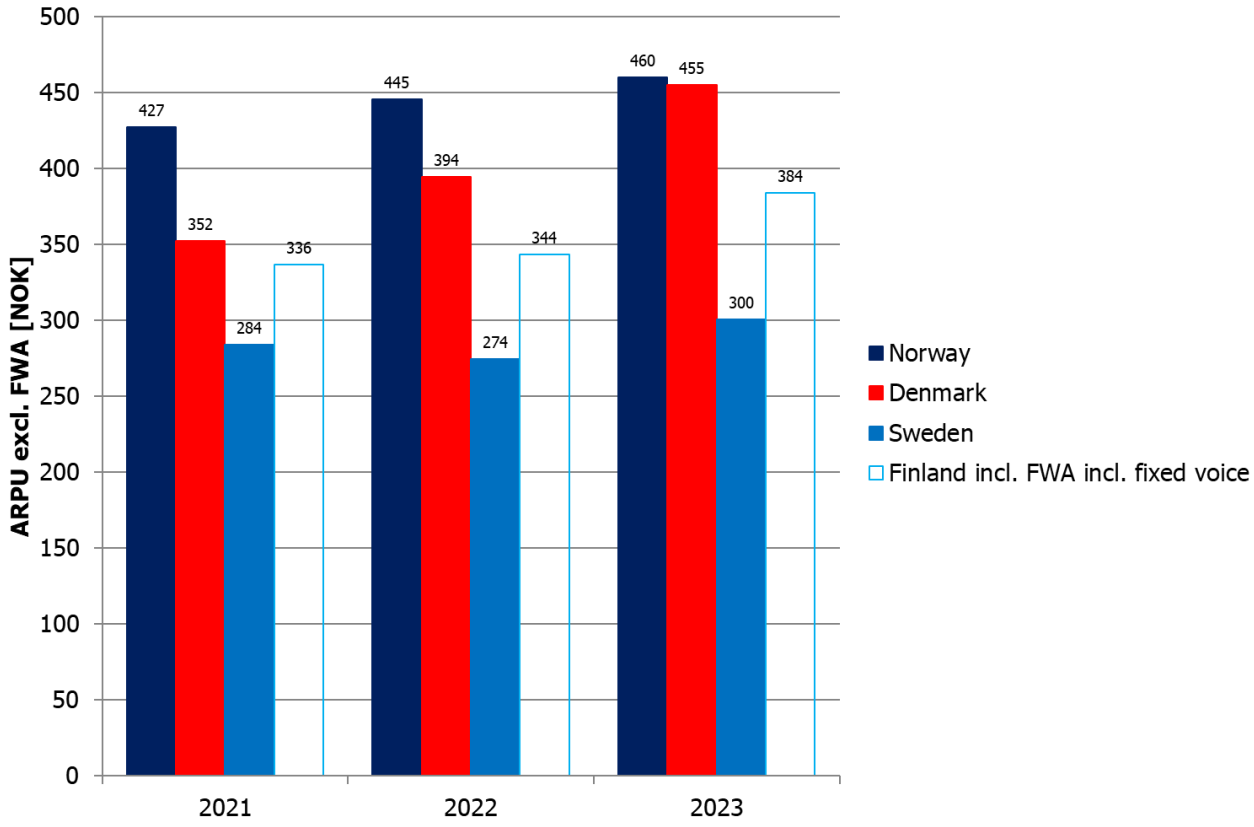


Figure 5. Comparison of fixed broadband ARPU excl. FWA in Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. Finland is just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue].

Norway's fixed broadband ARPU was **460 NOK** in 2023, higher than in 2022 (445 NOK) and in 2021 (427 NOK). The other three countries had lower ARPU but with the same increasing trend. Although the

[13] Average number of subscriptions in the period calculated as the average of the number of subscriptions at the start of the period and the number of subscriptions at the end of the period.
[14] Using the average of the daily exchange rate from ECB. For 2023: 0.65217 DKK per NOK, 1.00472 SEK per NOK, 0.087529 EUR per NOK.
[15] Since the Finnish regulatory, Traficom, applies a strict definition of FWA, leading to less than 50k broadband subscriptions being classified as FWA, the impact is likely not significant.
[16] With a very low usage of fixed voice in general, the impact is likely not significant.

weakening of the NOK vs. the DKK and EUR in 2023 makes the ARPU growth in Denmark and Finland look stronger, it seems clear that fixed broadband prices generally have increased in the Nordics during these years.

To compensate for the differences in overall purchasing power, the ARPUs of Denmark, Sweden and Finland have been recalculated into purchasing power parity NOK (PPP NOK), see Figure 6.

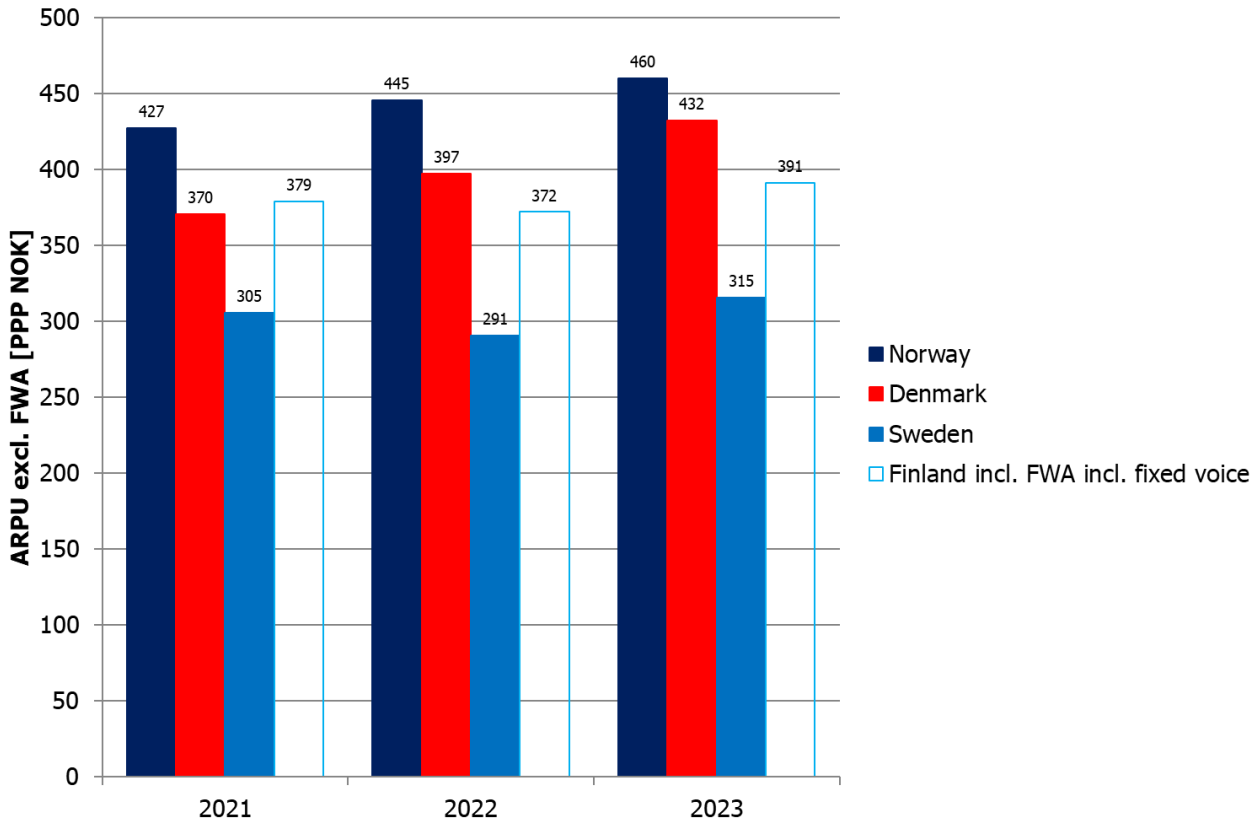


Figure 6. Comparison of PPP fixed broadband ARPU excl. FWA in Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. Finland is just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, OECD, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue].

The PPP adjustment does not affect Norway, but changes the positions of Denmark, Sweden, and Finland. Also in PPP terms, Norway had a higher fixed broadband ARPU than the other countries.

The Norwegian revenue per fixed broadband subscription excluding FWA is, both before and after compensation for differences in purchasing power, higher than in the other countries.

Let's now include FWA revenues and subscribers and see how that changes the ARPU levels. Regretfully this leaves out Denmark and Sweden since FWA revenues aren't reported and hence can't be included. The comparability has though increased vs. Finland since FWA is included there. The issue of fixed voice revenues being included in Finland is still there, though.

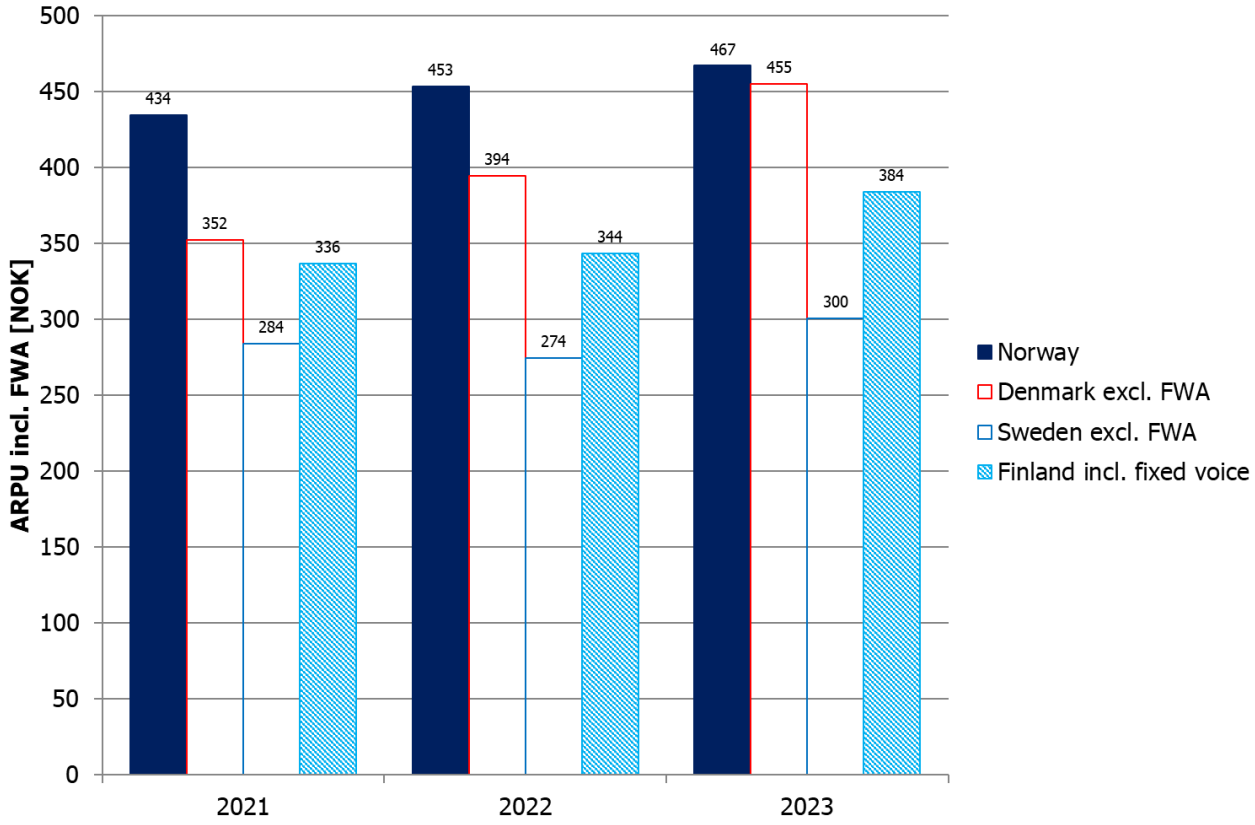


Figure 7. Comparison of fixed broadband ARPU incl. FWA in Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. Denmark and Sweden are just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue].

Norway's fixed broadband ARPU incl. FWA was **467 NOK** in 2023, more than in 2022 (453 NOK) and in 2021 (434 NOK). The other three countries had lower ARPU but with the same increasing trend. Although the weakening of the NOK vs. the DKK and EUR in 2023 makes the ARPU growth in Denmark and Finland look stronger, it seems clear that fixed broadband prices generally have increased in the Nordics during these years.

The next graph is recalculated into purchasing power parity NOK (PPP NOK).

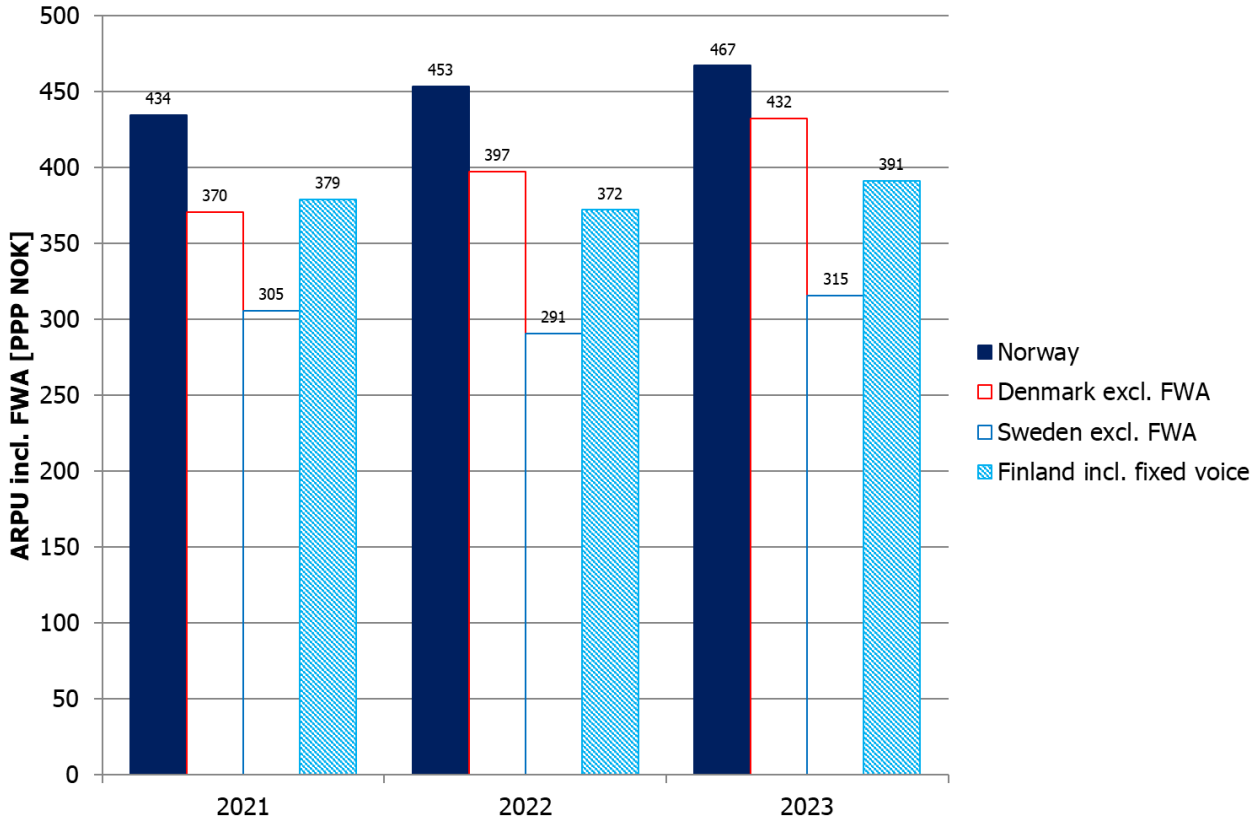


Figure 8. Comparison of PPP fixed broadband ARPU incl. FWA in Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. Denmark and Sweden are just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, OECD, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue].

Also in PPP terms, Norway had a higher fixed broadband ARPU than the other countries when including FWA.

The Norwegian revenue per fixed broadband subscription including FWA is, both before and after compensation for differences in purchasing power, higher than in the other countries.

6 Value for money: Fixed broadband: ARPU vs. technology and speed tier mix

The previous section showed that the average Norwegian fixed broadband customer paid more per month than fixed broadband customers of the other Nordic countries. Is it because Norwegian fixed broadband customers are using more modern technologies or have purchased subscriptions supporting higher speeds? We will in this section do our best to answer those questions based on regulatory data.

Let's first compare the technology mix, starting with Norway.

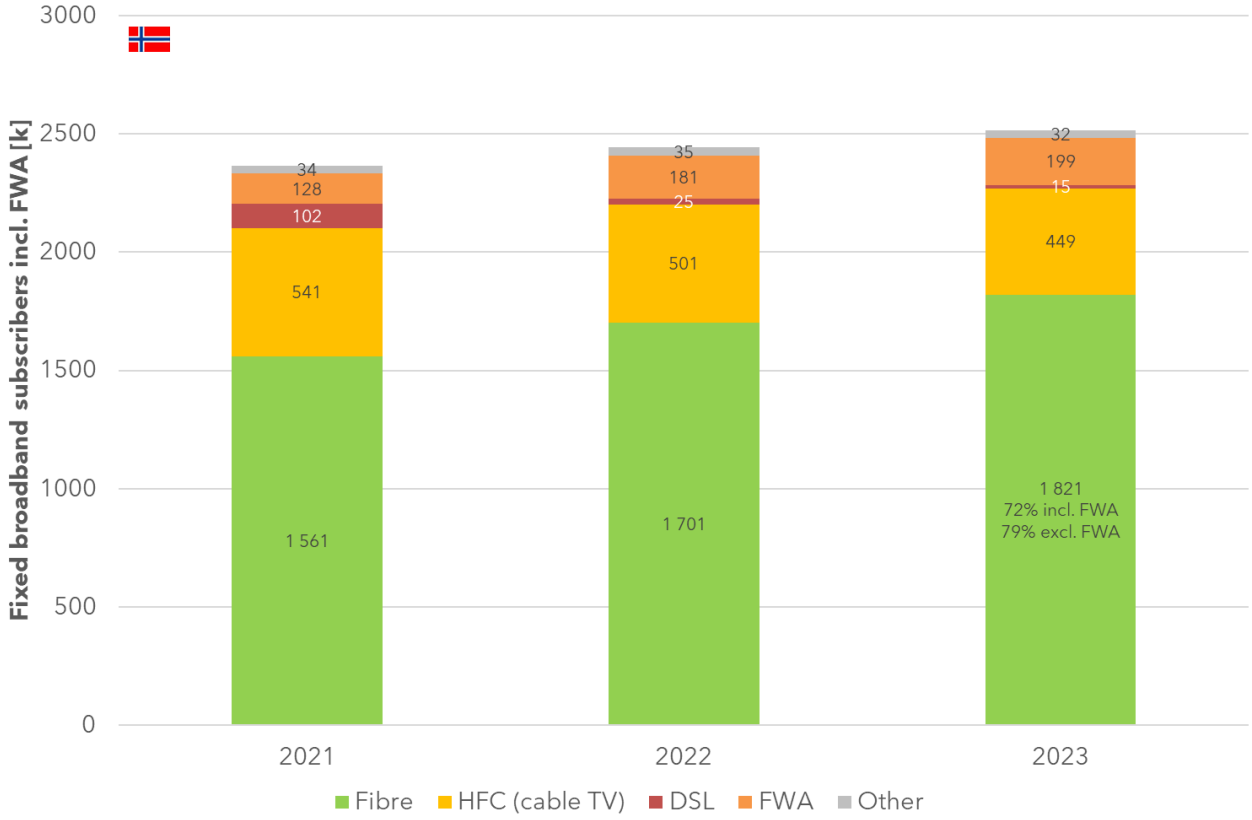


Figure 9. Broadband subscriptions per technology incl. FWA, Norway, 2021, 2022 and 2023 [source: Nkom].

By the end of 2023, Norway had more than 2.5 million fixed broadband subscriptions including FWA. Fibre subscriptions had grown to more than 1.8 million of these. HFC (cable TV) declined quite quickly and there were just 15k DSL subscriptions left. FWA had grown to 199k subscriptions.

It makes sense to regard a high share of subscriptions on fibre as an indication of a "modern" technology mix. By the end of 2023, Norway's share of broadband subscriptions being fibre was 72% if including FWA and 79% if excluding FWA. In an international comparison, this is a high share, but in a Nordic comparison it is not the highest.

Denmark clearly has a less "modern" technology mix. The graph for Denmark excludes FWA as there are no reported FWA numbers for Denmark.

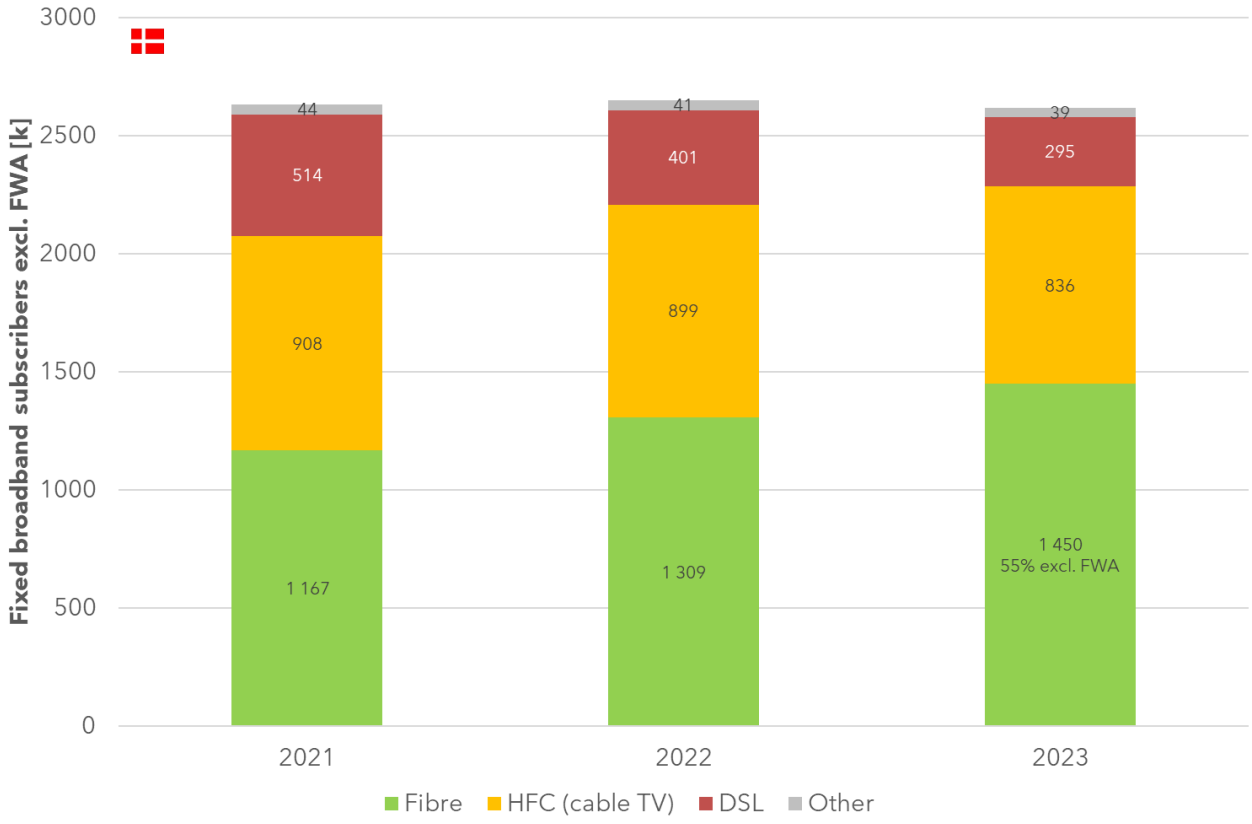


Figure 10. Broadband subscriptions per technology excl. FWA, Denmark, 2021, 2022 and 2023 [source: SDFI].

By the end of 2023, Denmark had more than 2.6 million fixed broadband subscriptions excluding FWA (unlike the other countries, that total number is actually in decline). Fibre subscriptions had grown to more than 1.4 million of these. HFC (cable TV) declined quite quickly in 2023 and there was still a relatively large base of DSL subscriptions, 295k.

By the end of 2023, Denmark's share of broadband subscriptions being fibre was 55% if excluding FWA. It is the lowest share among our peer group markets and it's somewhat surprising as Denmark today has overtaken Norway and Sweden as the country with the widest fibre reach in the share of households passed.

If a high share of broadband subscriptions being fibre is what defines "modern", then Sweden has the most modern technology mix with 78% if including FWA and 83% if excluding FWA. Sweden has more than 4.5 million fixed broadband subscriptions where fibre grew to 3.6 million. HFC stands up well in Sweden while there were just 53k DSL subscriptions left by the end of 2023. FWA – with a more relaxed definition than Norway and Finland – counted 288k subscriptions.

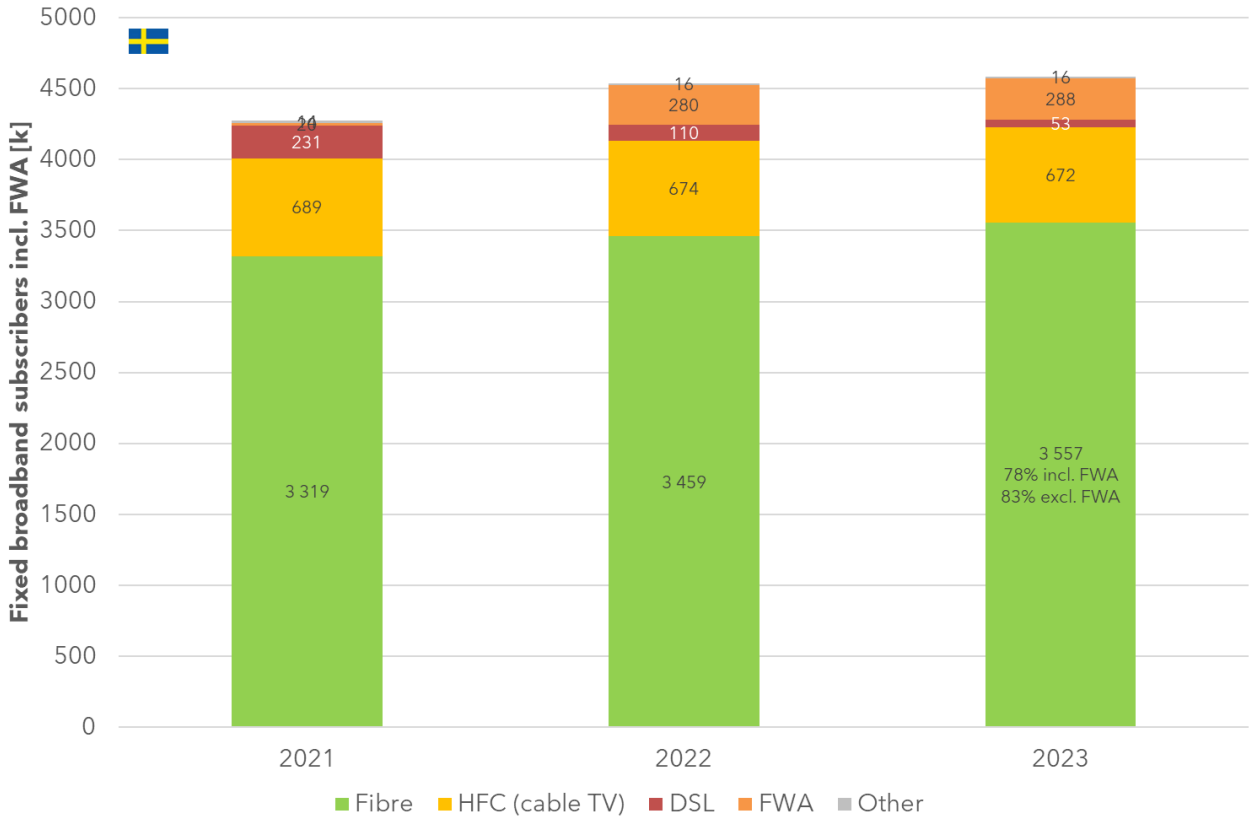


Figure 11. Broadband subscriptions per technology incl. FWA, Sweden, 2021, 2022 and 2023 [source: PTS]. The definition of FWA was relaxed from 2021 to 2022, hence the significant growth.

Finally, Finland with just less than 2 million fixed broadband subscriptions as many households rely entirely on mobile data (without being counted as FWA as regulator Traficom applies a strict definition on FWA).

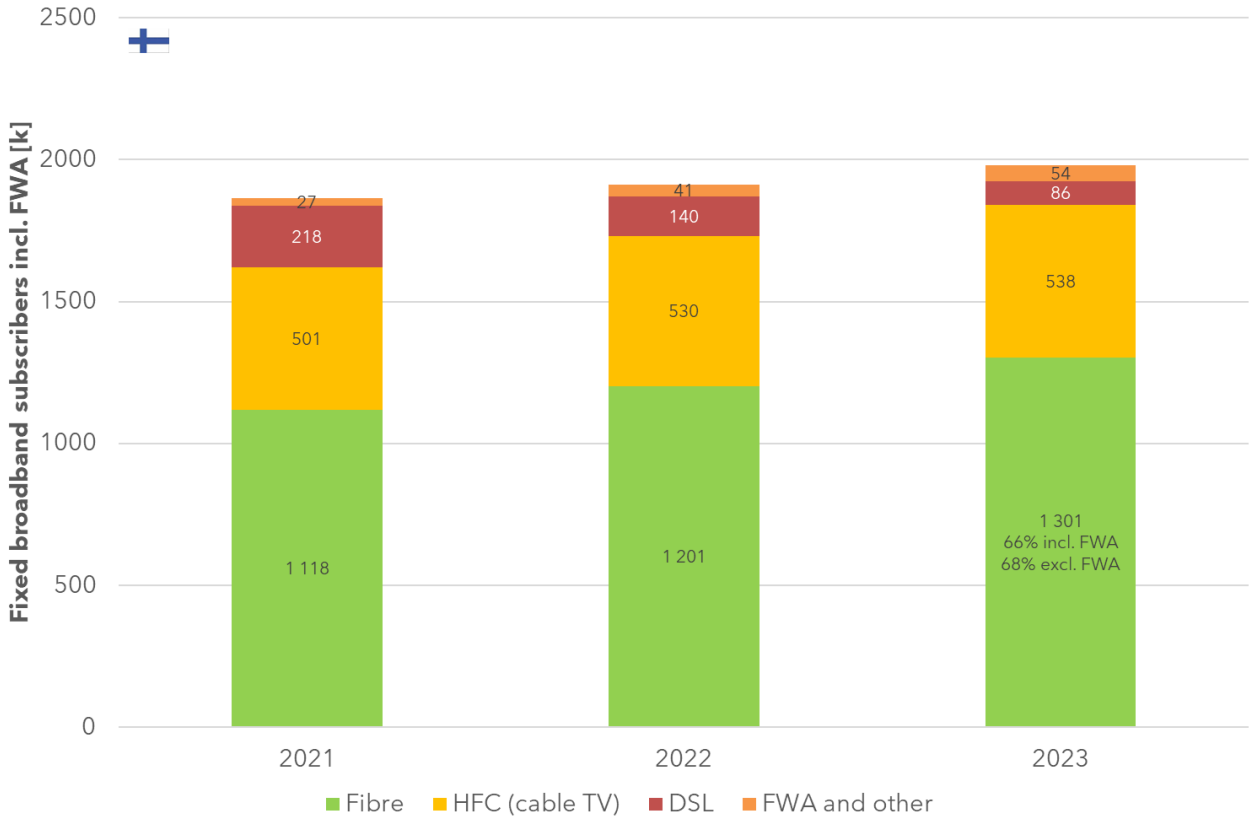


Figure 12. Broadband subscriptions per technology incl. FWA, Finland, 2021, 2022 and 2023 [source: Traficom].

1.3 million of these are fibre. Unlike the other Nordic markets, HFC still grew base in Finland. 86k DSL subscribers remained by the end of 2023.

The table below compares the share of fibre in the fixed broadband base with the ARPU.

	Fibre share of fixed broadband base (excl. FWA)	Fixed broadband ARPU (excl. FWA)
Norway	79%	460 NOK
Denmark	55%	455 NOK
Sweden	83%	300 NOK
Finland – incl. FWA	68%	384 NOK

Figure 13. Comparison of fibre's share of the fixed broadband base (excl. FWA) and the fixed broadband ARPU (excl. FWA) for Norway, Denmark, Sweden, and Finland [source: Nkom, SDFI, PTS, Traficom, compiled by Tefficient].

The high share of fibre in Norway's fixed broadband base doesn't explain Norway's high ARPU; Sweden has a yet higher share of base, but still the lowest fixed broadband ARPU in the Nordics.

Norway has a high share of its fixed broadband base in fibre, but it does not explain Norway's high ARPU since Sweden has a yet higher share and the lowest ARPU.

Remains to test if Norwegian fixed broadband customers subscribe to higher download speeds and therefore generate higher ARPU.

Unlike the regulators in Denmark, Sweden and Finland, Norway's Nkom does not report the share of fixed broadband subscriptions per sold speed tier.

But if restraining us to just one threshold, 100 Mbit/s, we can refer to the Nordic/Baltic statistics[17] to find a figures for Norway.

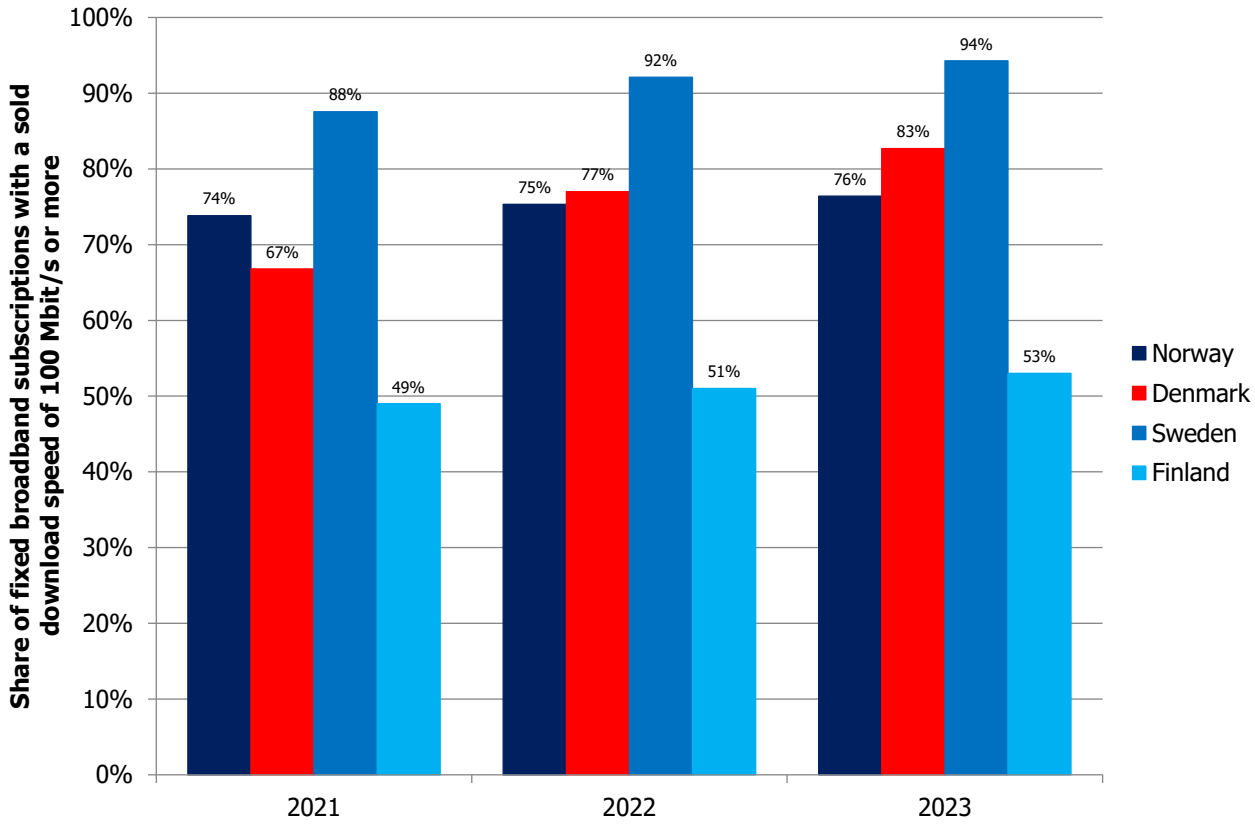


Figure 14. Comparison of the share of fixed broadband subscription base being sold with a download speed of 100 Mbit/s or more in Norway, Denmark, Sweden and Finland [source: Nkom, SDFI, PTS, Traficom].

[17] https://statistik.pts.se/telekom-och-bredband/nordic-baltic-telecom-market/. As not yet issued for 2023, Tefficient asked Nkom for the 2023 number for Norway. According to Nkom, the calculation method is modified compared to previous years.

By the end of 2023, 94% of Swedish fixed broadband subscriptions had been sold with a download speed of 100 Mbit/s or more. Denmark follows with 83%. Norway had 76% and Finland was last with just 53% of fixed broadband subscriptions being sold with a download speed of 100 Mbit/s or higher.

The high fixed broadband ARPU of Norway can't be explained by that Norwegian fixed broadband customers subscribe to higher download speeds. The Danish and Swedish ARPUs are lower although the "100 Mbit/s or more" shares are higher.

A close-to-Nordic-average share of Norwegian fixed broadband customers subscribed to 100 Mbit/s or faster services in 2023. The Danish and Swedish ARPUs are lower although their shares are higher. Norway's high fixed broadband ARPU can thus not be explained by Norwegian customers buying faster connections.

For Denmark, Sweden, and Finland there's additional speed tier information available, see Figure 15.

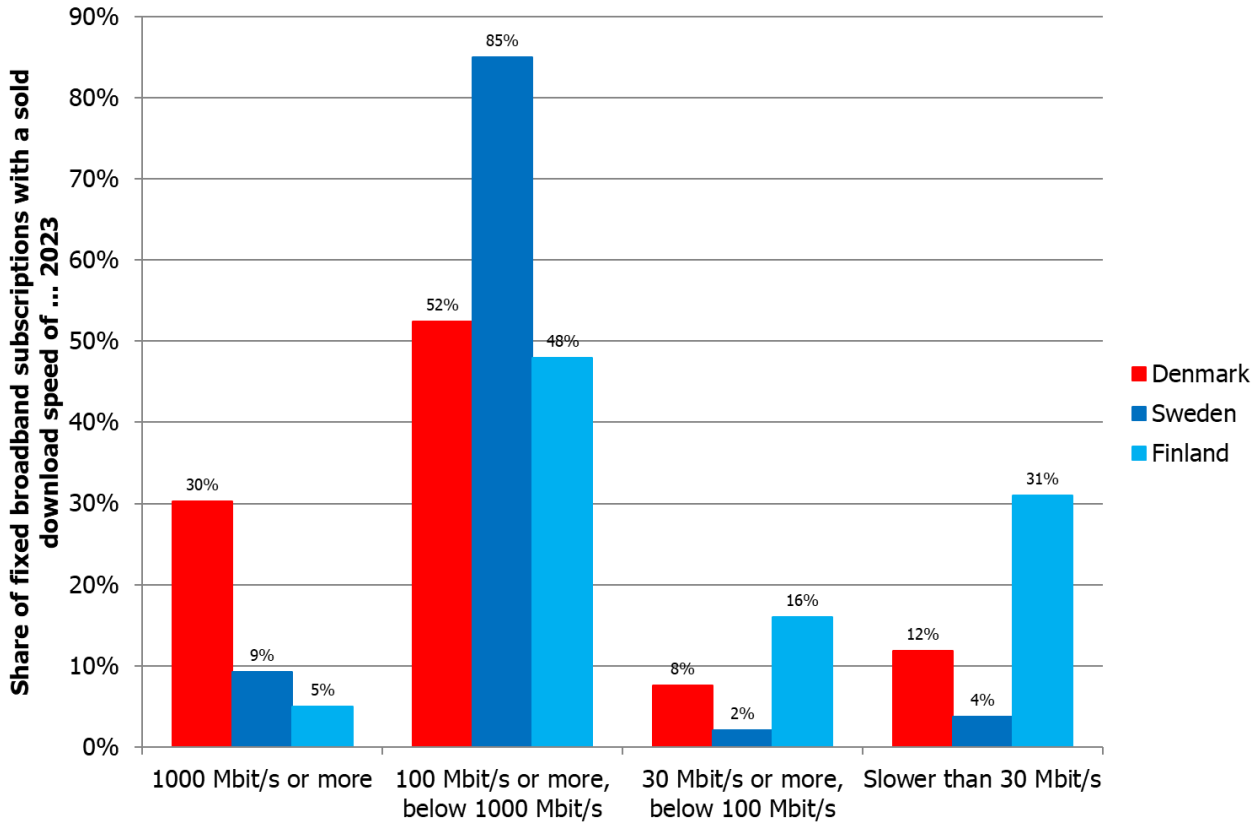


Figure 15. Comparison of the share of fixed broadband subscription base being sold with a download speed of 100 Mbit/s or more in Denmark, Sweden and Finland [source: SDFI, PTS, Traficom].

Starting with Denmark, an unusually high share, 30%, of the fixed broadband base subscribes to 1000 Mbit/s or higher speeds. But as shown, Denmark also has the highest remaining share of base on DSL which means that a relatively high share of the base, 12%, is subscribing to speeds slower than 30 Mbit/s.

The spread in Sweden is much smaller: 85% of the base subscribe to speeds of 100 Mbit/s or more, but still lower than 1000 Mbit/s. Compared to Denmark, few subscribe to the highest, 1000 Mbit/s or more, speed tier - but there are also significantly less in the slowest speed tier.

Finland clearly has the least modern speed tier distribution: A high 31% share of the fixed broadband base subscribe to speeds slower than 30 Mbit/s.

Summarising this value for money section, we conclude that Norwegian fixed broadband customers averagely pay the most in the Nordics without receiving the full value from it expressed as fibre's share of fixed broadband base as well as in share of subscriptions with a download speed of 100 Mbit/ or more.

Norwegian fixed broadband customers are not getting the best value for money in the Nordics: ARPU is the highest, but fibre's share of base is not. Norway doesn't have the highest share of base subscribing to 100 Mbit/s or higher.

7 Fixed broadband: ARPU per reporting operator

Before continuing the pricing comparison with one-time fees and total fees, let's look at what the operators in the four Nordic countries report as their average revenue per broadband subscriber per month, i.e. the ARPU. Although the exact definition of what different operators include in their reported broadband APRU isn't clear, we believe it well represents what the average broadband subscriber pays per month and is comparable with the average monthly subscription fee just covered[18].

Figure 16 shows the development in fixed broadband ARPU in NOK for the nine reporting operators in our four markets.

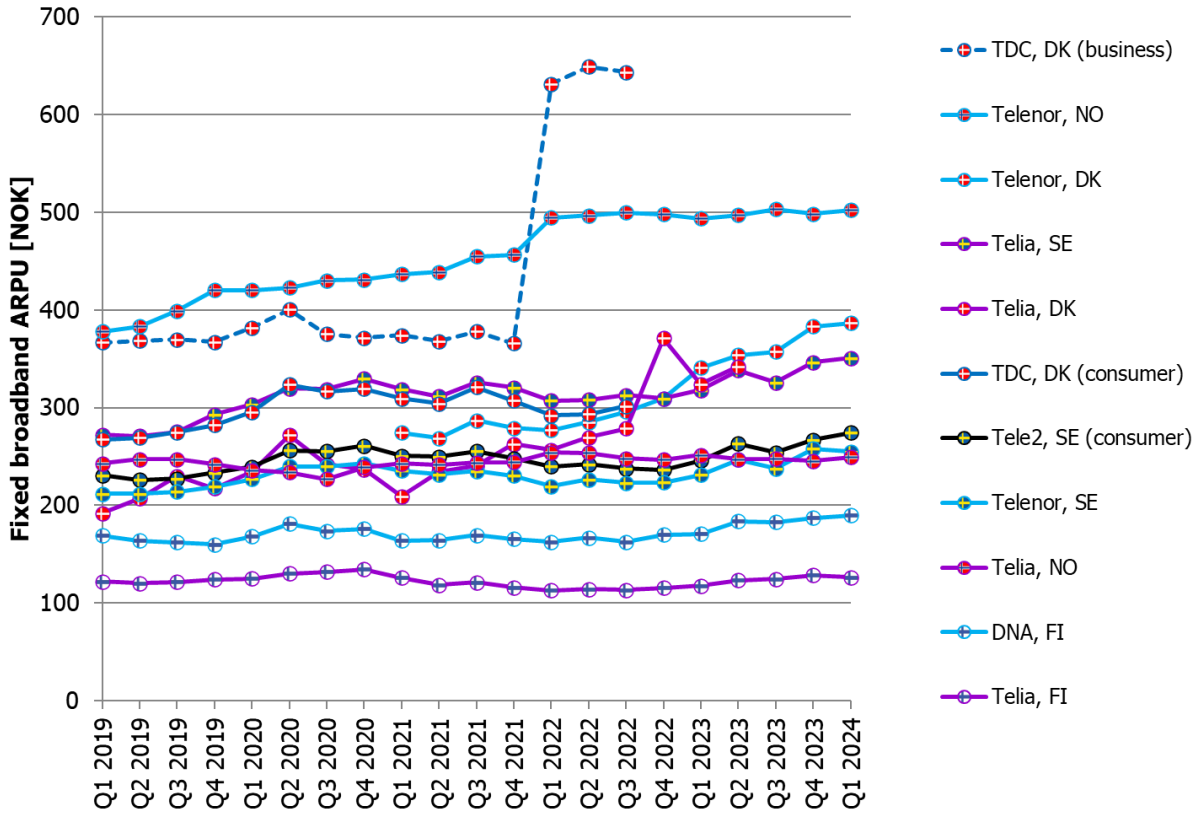


Figure 16. Comparison of reported fixed broadband ARPU in NOK among providers in Norway, Denmark, Sweden and Finland [source: operators' financial reporting].

We first need to comment to the fixed broadband APRU of TDC in their B2B segment which almost doubled in Q1 2022. It is as reported and TDC did not comment it. TDC has since been split into two companies, Nuuday and TDC NET. Nuuday has not continued to report ARPU, hence the last data point is for Q3 2022.

If disregarding TDC's B2B ARPU, **Telenor Norway** reports the highest fixed broadband ARPU. It increased 38 NOK in Q1 2022 which Telenor didn't comment, but possibly has something to do with Telenor's

[18] Have in mind though that the pricing information on fixed broadband in this analysis is limited to download throughput of 100 Mbit/s and higher – whereas the reported ARPU include slower connections such as DSL. This, together with collective group agreements, explains why ARPU levels generally are lower than the average monthly subscription fees in the previous section.

accelerated DSL discontinuation in 2022. Telenor's ARPU is twice that of Telia Norway, the only other Norwegian provider reporting broadband ARPU.

Based on data from the Norwegian regulator, Nkom, the fixed broadband ARPU in 2023 was 460 NOK if excluding FWA and **467 NOK** if including FWA[19], suggesting that the ARPU of Telenor is more representative for Norway than the ARPU of Telia.

The ARPU comparison is not always like-to-like as e.g. Tele2 Sweden only reports its B2C ARPU when others include also B2B in its ARPU reporting. One reason to Telenor Norway's high broadband ARPU might be a larger share of B2B customers in its base compared to e.g. Telia Norway that entered fixed broadband via the acquisition of the more consumer-oriented cableco Get. Denmark's TDC breaks down its ARPU on B2B and B2C and it's an example of that the B2B ARPU is higher (especially since Q1 2022).

Applying purchasing power parity does not change the findings.

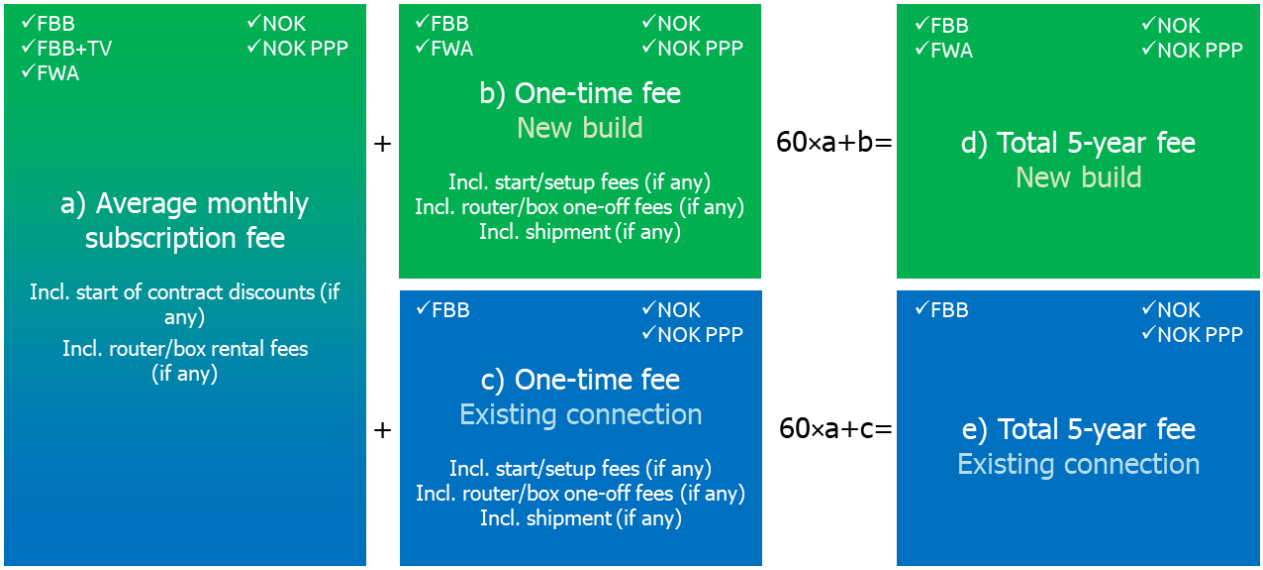
Telenor Norway reports the highest fixed full-base (B2C and B2B) broadband ARPU among reporting Nordic operators. Telia Norway reports a much lower level – more comparable with Denmark, Sweden and Finland. This is the case also after compensation for differences in purchasing power.

Another comparability issue is how different operators split revenues from customers who subscribe to bundled broadband & TV services. For that reason, we will towards the end of the analysis, see section 19, look also at reported TV ARPU.

[19] Telenor includes FWA in its reported broadband ARPU.

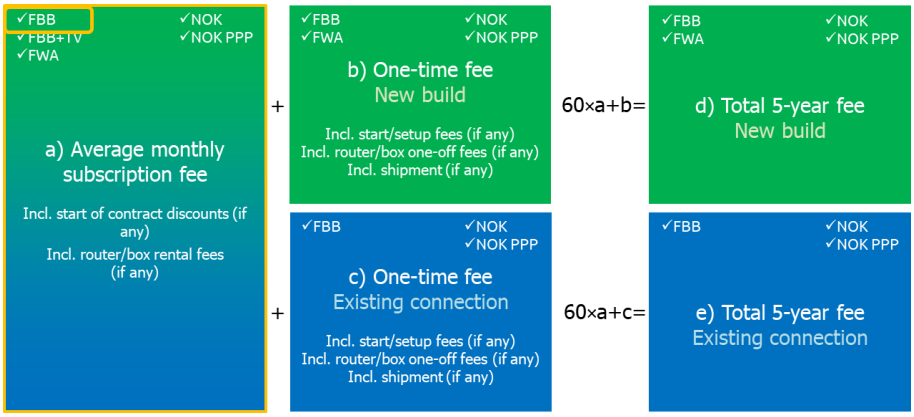
8 Overview of pricing analysis

The following image will be used in the analysis to help the reader navigate between all price comparisons:



The area currently analysed will be highlighted in the beginning of each pricing section.

9 Fixed broadband: Average monthly subscription fee



Broadband providers are generally innovative in making monthly subscription prices look low. The most usual practice is to discount the price during a limited time: We have found providers giving up to 50% time-limited discount – over periods of 1, 3, 6, 12, 24 and 36 months.

This habit to have different fees during different stages of a customer engagement means that it makes a significant difference for the price comparison if we compare the prices during first month of an engagement – or further into an engagement. To make the comparison as fair as possible, this analysis defines a **comparison period of 5 years (60 months)**. We have calculated how much it will cost a customer during that time – and based on that calculated an **average monthly subscription fee** – valid for the first 60 months.

A few fixed broadband providers in Norway (but rarely elsewhere) charge an additional monthly subscription fee for customers who need a **router**. In this analysis, we have taken it into account only when it's mandated. In e.g. the case of Telenor Norway, customers are recommended to use Telenor's router at a subscription price of 49 NOK per month, but as Telenor doesn't require it, it's has not been included. Many other operators require their customers to use the router of the provider, but don't charge a monthly subscription fee for it[20].

Without exceptions, all researched fixed broadband plans in the four Nordic countries come *without* limits on the volume of data usage (GB). The defining parameter for the monthly service subscription price is instead the download throughput – measured in **Mbit/s**.

Figure 17 below compares the average monthly subscription fee[21] in Norwegian kroner (NOK) of offered fixed[22] broadband subscription plans to the maximum download throughput. The prices in Denmark, Sweden and Finland have been recalculated into NOK[23].

[20] Often, they charge a shipping fee, though, something this analysis takes into account when comparing the total 5-year fees.
[21] Excluding connection one-off fees, equipment one-off fees and other one-off fees (if any). The total costs will be compared later in the analysis. All prices include VAT (valid throughout the analysis).
[22] Fixed wireless access (FWA) excluded; compared separately later in the analysis.
[23] Using the exchange rates of 1 July 2024: 1 DKK = 1.53303 NOK, 1 SEK = 1.00645 NOK and 1 EUR = 11.4349 NOK.

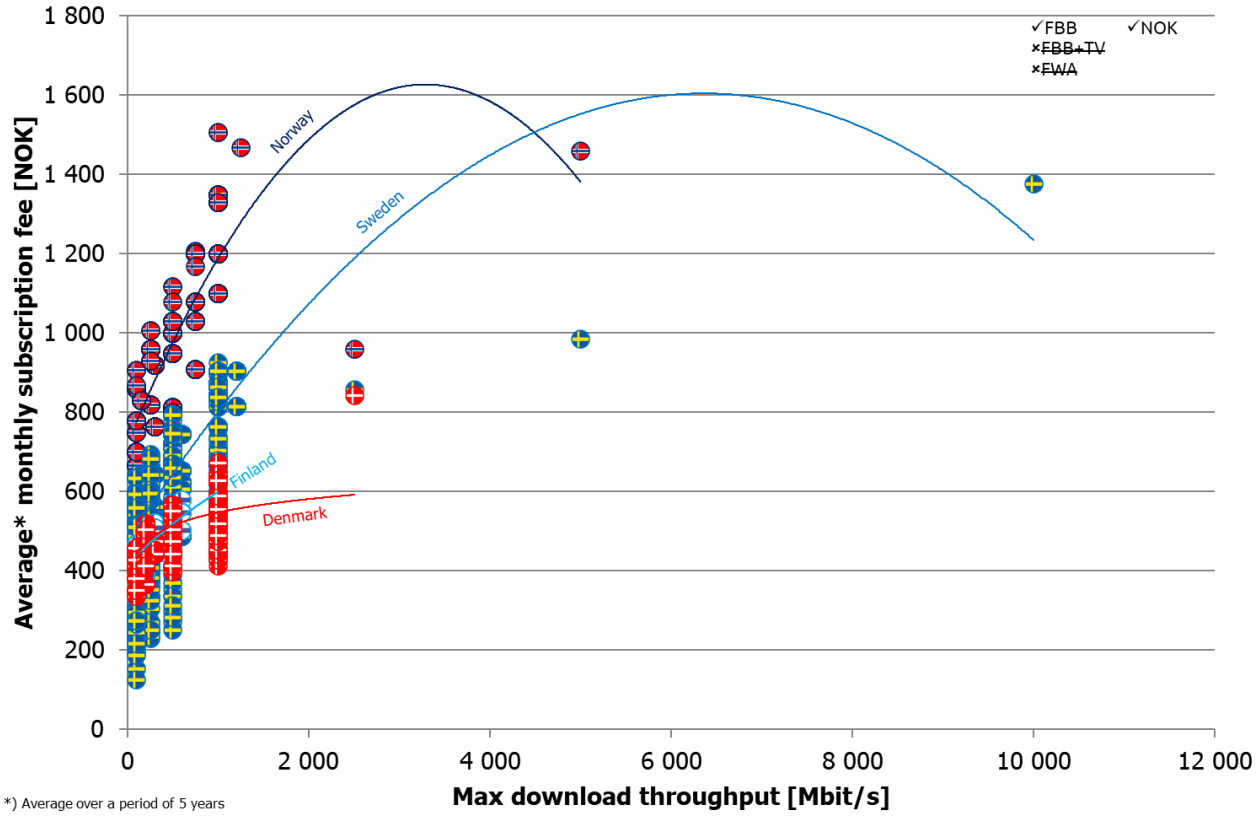


Figure 17. Comparison of the average monthly subscription fee for fixed broadband in NOK during 5 years among major providers in Norway, Denmark, Sweden, and Finland based on address searches representing the municipalities where 70% of the population lives, June-July 2024 [source: providers' webpages and pricelists].

To easier compare what is typical for each country, trend lines have been added to the graphs.

The readability of the graph suffers since there are a few subscriptions with very high maximum download throughput. In Norway, Denmark, and Sweden, there are a few 2500 Mbit/s subscriptions. In Norway and Sweden there are also a few 5000 Mbit/s subscriptions and in Sweden even a 10000 Mbit/s subscription. To better visualise the differences in the more common speeds up to about 1000 Mbit/s, we will hereafter truncate the horizontal scale. The superfast subscriptions still influence the trend lines even if the horizontal axis is truncated.

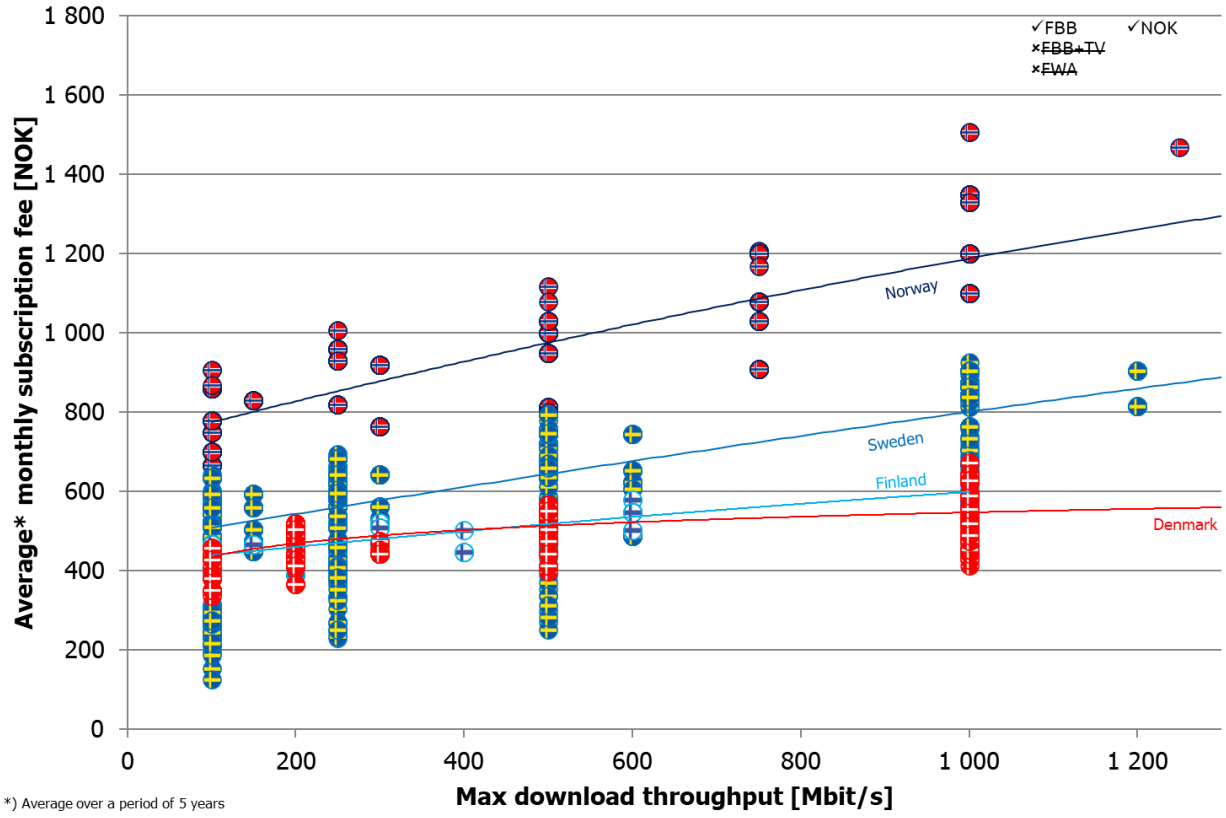


Figure 18. Comparison of the average monthly subscription fee for fixed broadband in NOK during 5 years among major providers in Norway, Denmark, Sweden, and Finland based on address searches representing the municipalities where 70% of the population lives, June-July 2024, visualised for plans up to 1300 Mbit/s [source: providers' webpages and pricelists].

By observing the positions of the trend lines in Figure 18 we can see that Norwegian fixed broadband plans – for the same download throughput and before compensation for purchasing power – generally have much higher average monthly subscription fees than plans in the other countries. The price differential is about 270-750 NOK per month. Sweden has the second highest position whereas Finland and Denmark have the lowest subscription fees.

Let's now compensate for purchasing power differences. Since the purchasing power of the other three countries is adjusted to the level of Norway, the prices in Denmark, Sweden, and Finland will change a bit in these graphs, but the position of Norwegian prices will not change.

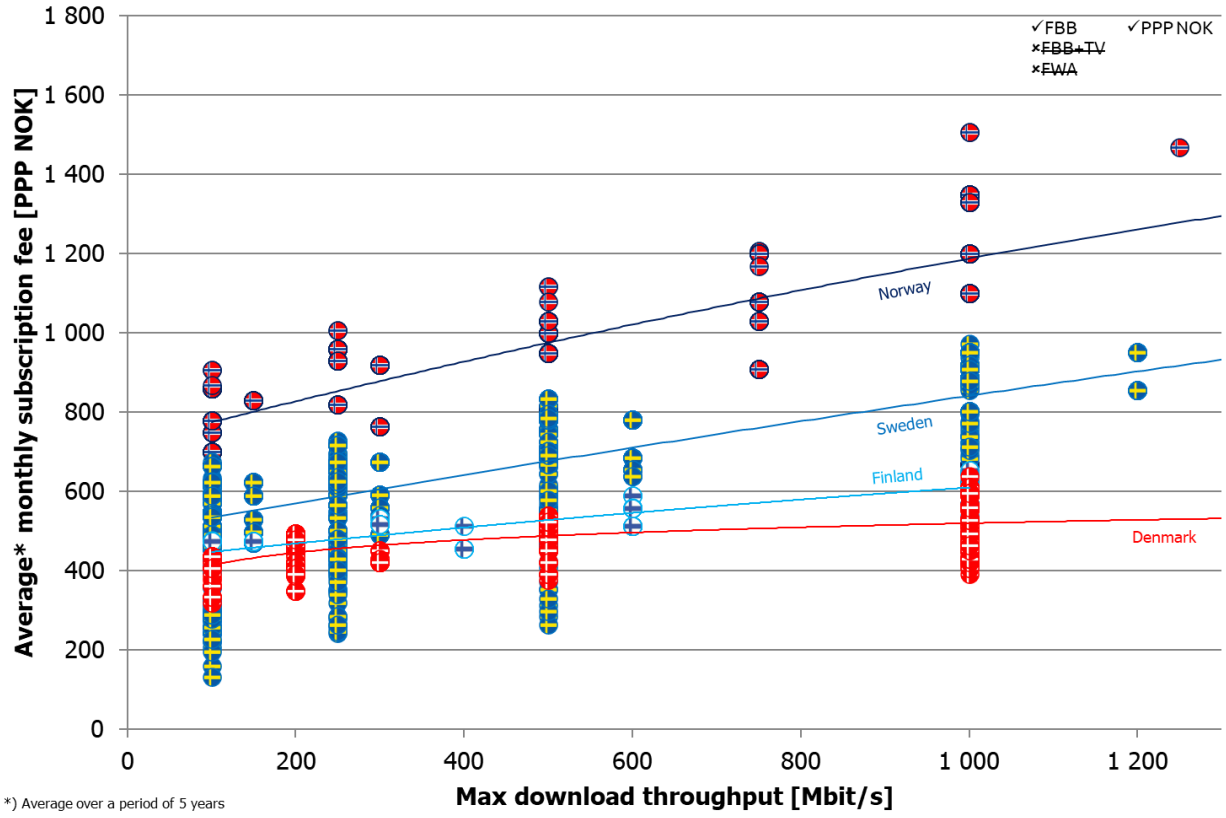


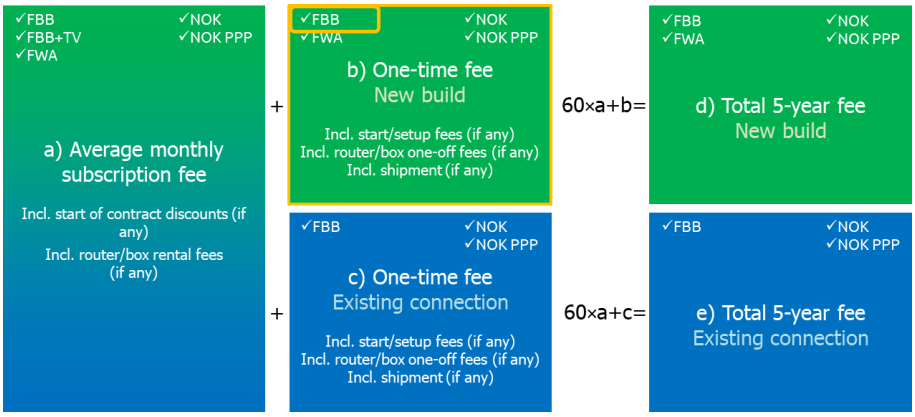
Figure 19. Comparison of the average monthly subscription fee for fixed broadband in PPP NOK during 5 years among major providers in Norway, Denmark, Sweden, and Finland based on address searches representing the municipalities where 70% of the population lives, June-July 2024, visualised for plans up to 1200 Mbit/s [source: providers' webpages and pricelists, OECD[24]].

Although the trend curves of Sweden, Finland, and Denmark moved a bit in Figure 19 compared to Figure 18 it's visible that, also after compensation for purchasing power, Norwegian fixed broadband plans – for the same download throughput – generally have much higher average monthly subscription fees than plans in the other countries. The price differential is about 250-780 PPP NOK per month.

The Norwegian fixed broadband plans are, before and after compensation for differences in purchasing power, generally much more expensive than same-speed plans in Denmark, Sweden, and Finland.

[24] The purchasing power parity adjustment is based on OECD's "flash" figures for 2023 since 2024 isn't available yet. This is valid throughout this section of the analysis.

10 Fixed broadband: One-time fee – new build



As mentioned, new build connection fees (for new connections into homes) are more difficult to find and track than monthly subscription fees. The main reason is that they vary according to region and neighbourhood. In all our countries, broadband providers can balance the requirement to rollout a fibre network of their own with **commercial agreements to offer services over partner networks**. So called open fibre networks are common in Sweden, Finland and Denmark – but not yet in Norway. But this is about to change: Regulator Nkom and Altibox, Norway's largest fibre brand (in number of broadband subscribers), have communicated[25] that Altibox will open its fibre to other providers. At present, Telenor is – together with providers that received state aid – regulated to offer access to its fibre network for other providers. But Nkom has conducted a new market analysis (which has been revised once)[26] which recommends that nine providers – Telenor, Enivest, Neas, Tafjord, Tussa and four Altibox partners (Eidsiva, Haugaland Kraft, Lyse and NTE Telekom) – in 12 regional markets (of 22) should be obliged to open their networks to competition.

When tracking the pricing of the Nordic operators, you might also – on top of this – get a sense of that the information on the **new build connection fees deliberately are kept out of the public domain**. They seem to be used during negotiations to convince new customers to accept e.g. binding contracts or a subscription to a higher throughput tier.

This analysis researched 385 addresses in the four countries. One-time fees were stated or indicated[27] in only four Norwegian address cases associated with 31 different broadband plans. There are four Finnish cases all having the same fee and binding period – but not a single Swedish case. Most of the cases (209 plans) are instead Danish.

The following comparison of the one-off cost to connect a detached home to a fibre[28] network is hence not based on many cases and should be read with caution.

Since the connection fees aren't dependent on the subscribed throughput of the connection, we here correlate it to the binding period of the contract instead.

[25] https://nkom.no/aktuelt/bedre-tilgang-i-bredbandsnettet
[26] https://nkom.no/ekom-markedet/nye-analyser-av-bredbandsmarkedene/horing-av-markedsanalyse
[27] With "from" fees.
[28] No new build fees for HFC or other 100 Mbit/s capable fixed networks have been found.

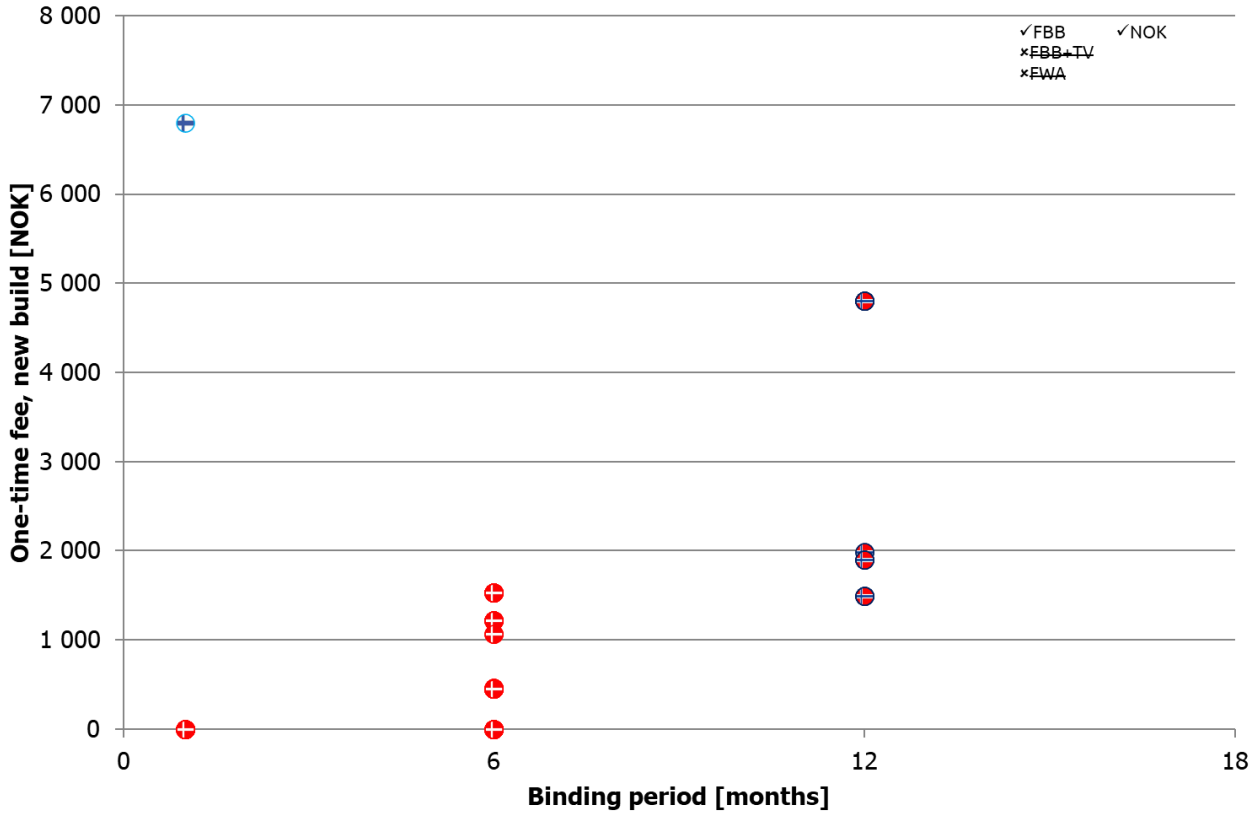


Figure 20. Comparison between one-time fees in NOK for new fibre broadband into a detached home among providers in Norway, Denmark, Sweden, and Finland based on address searches representing the municipalities where 70% of the population lives, June-July 2024 [source: providers' webpages and pricelists].

In **Norway**, the one-time fee for a new build is 5000 NOK or lower – if, in these Altibox cases, if signing up for a contract with 12 months binding period. When comparing the one-time fees, we note that the requirement in Norway most often is that the house owner is responsible for any digging on own grounds. This is typically included in the one-time fees in Sweden and Finland and most often in Denmark.

Denmark operates with one-time fees that tend to be lower (at around 1500 NOK or less) than what is typical for Norway although the binding time is shorter since the maximum allowed binding period in the Danish consumer market is 6 months. There are also non-binding cases (here visualised as one month) in Denmark.

The few Elisa examples from **Finland** are more expensive than in Norway – but without binding.

Applying purchasing power parity does not change the findings.

The Norwegian new build one-time fees of 5000 NOK or lower are reasonable in comparison to the Finnish examples. Denmark generally operates with lower new build one-time fees. This is the case also after compensation for differences in purchasing power.

We must again question how important the new build one-time fees are for the average broadband subscriber of today. According to "Telecommunications Markets in the Nordic and Baltic Countries 2022[29]", most fixed broadband subscriptions were already fibre in Norway (70%), Sweden (81%) and Finland (63%) in December 2022. Only Denmark with its 49% was lower – in part explained by HFC (coax) network generally having wider spread.

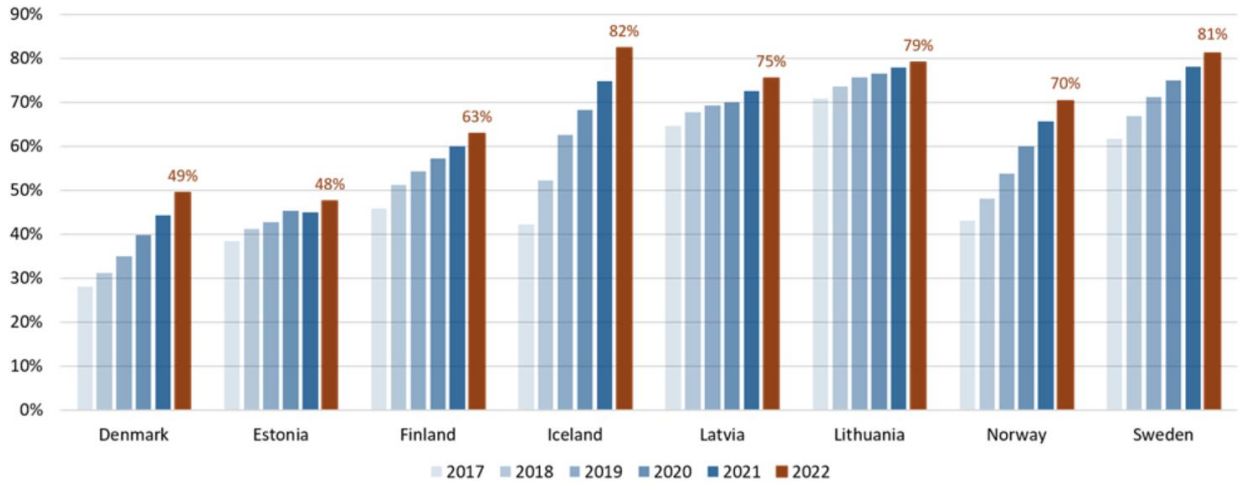
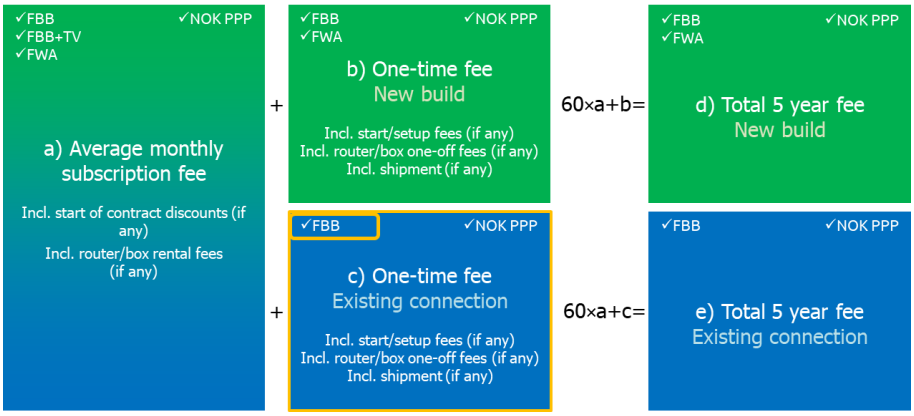


Figure 21. Share of fibre subscriptions per Nordic and Baltic country, December 2022 [source: PTS].

Many of these fibre subscriptions are delivered to apartments, though. The take-up in detached homes is lower since the *homepass* (how many homes that could get fibre would they like to) generally, due to the cost to build networks, is much lower in detached housing areas than in apartment housing areas. Taking the yet unconnected detached homes into account, it makes sense to also compare the total fees – including the new build one-time fee – over our selected 5-year period. That comparison follows, but first the one-time fees for existing connections.

[29] https://statistik.pts.se/en/telecom-and-broadband/nordic-baltic-telecom-market/documents/. The 2023 version was not yet available at the time of writing.

11 Fixed broadband: One-time fee – existing connection



With the growing adoption of fibre, the likelihood of a house or apartment already having a fibre connection is increasing. When a new owner moves in, he/she typically doesn't need to pay as high one-off fee as in the new build case – since the fibre is already installed and pulled into the house.

The graph below compares the one-time fees for an existing connection against the binding period of the contract.

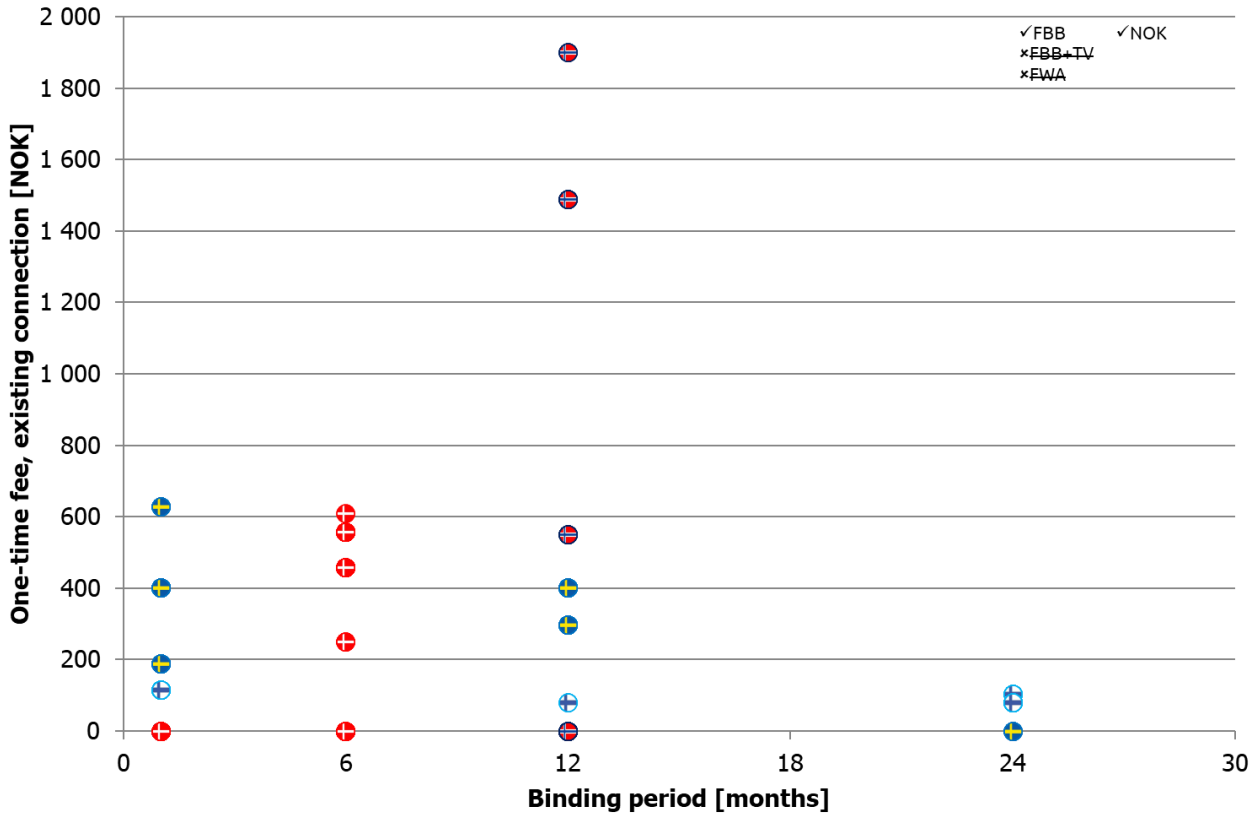


Figure 22. Comparison between one-time fees in NOK for broadband reconnection of a home among providers in Norway, Denmark, Sweden, and Finland based on address searches representing the municipalities where 70% of the population lives, June-July 2024 [source: providers' webpages and pricelists].

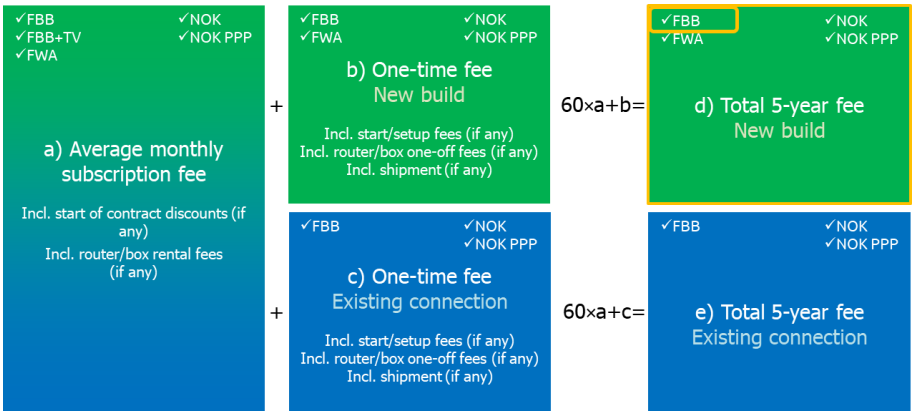
The first take-out is that the **one-off fees for existing connections often are lower** than for new builds. Many providers don't charge anything whereas some providers see an opportunity to recover some of the cost of administrating a new customer although the connection is already established. The binding periods vary – Figure 22 could suggest that providers are keener to charge low existing connection fees when binding periods are longer.

In a couple of Norwegian cases, the one-time fees for an existing connection are higher than what can be expected.

Applying purchasing power parity does not change the findings.

One-time fees for existing connections are often lower than for new build. They are also modest in comparison to the subscription fees over a longer period. This means that it's not a very important cost component in the bigger picture.

12 Fixed broadband: Total 5-year fee – new build



With focus on connecting the unconnected, we are now adding the new build one-time fee to the monthly subscription fee for 60 months to get the *total* fee for a customer that decides to install fibre into a home and then subscribe to a broadband service for 5 years.

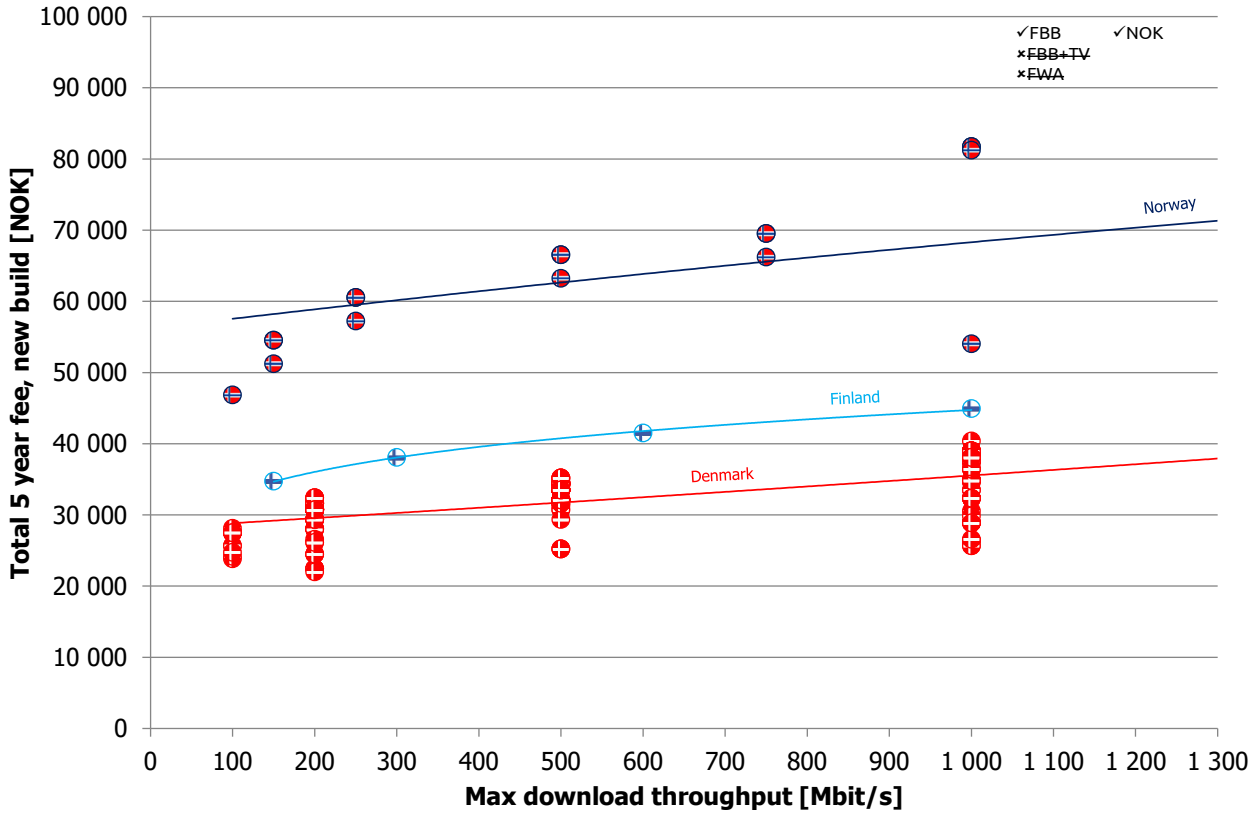


Figure 23. Comparison of the total fee (new build) for fixed broadband in NOK during 5 years among providers in Norway, Denmark, Sweden, and Finland, based on address searches representing the municipalities where 70% of the population lives, June-July 2024, visualised for plans up to 1300 Mbit/s [source: providers' webpages and pricelists].

As explained in section 10, Sweden lacks representation in this category as for none of the checked 105 addresses, a new build fee was communicated.

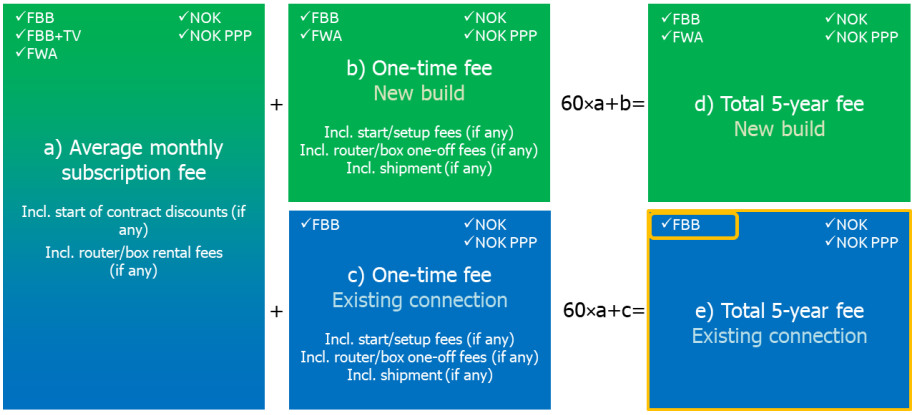
Figure 23 shows that the high monthly subscription fees in Norway dominate over the reasonable new build one-time fees so that the total cost during a 5-year period always becomes the highest. Finland's cases bring lower total costs than Norway while Denmark operates with the lowest total fees.

Based on the trend lines, the total 5-year fees for a Norwegian broadband household are about 30000 NOK higher than in Denmark.

Applying purchasing power parity does not change the findings.

When summing up the total fees during a 5-year period, the Norwegian new build customer will pay a much higher amount than a Finnish or Danish customer. This is the case also after compensation for differences in purchasing power.

13 Fixed broadband: Total 5-year fee – existing connection



As mentioned in section 10, most homes are however already connected to fibre today. The previous section made sense for the unconnected homes only.

Let's now make the same comparison of total fees but for customers that **already have an existing connection** into the home. A usual case is when people move – unless it's an entirely new house, the previous owner had likely made sure that a broadband connection was installed into the house. But this comparison also makes sense in open networks when the customer decides to change broadband provider.

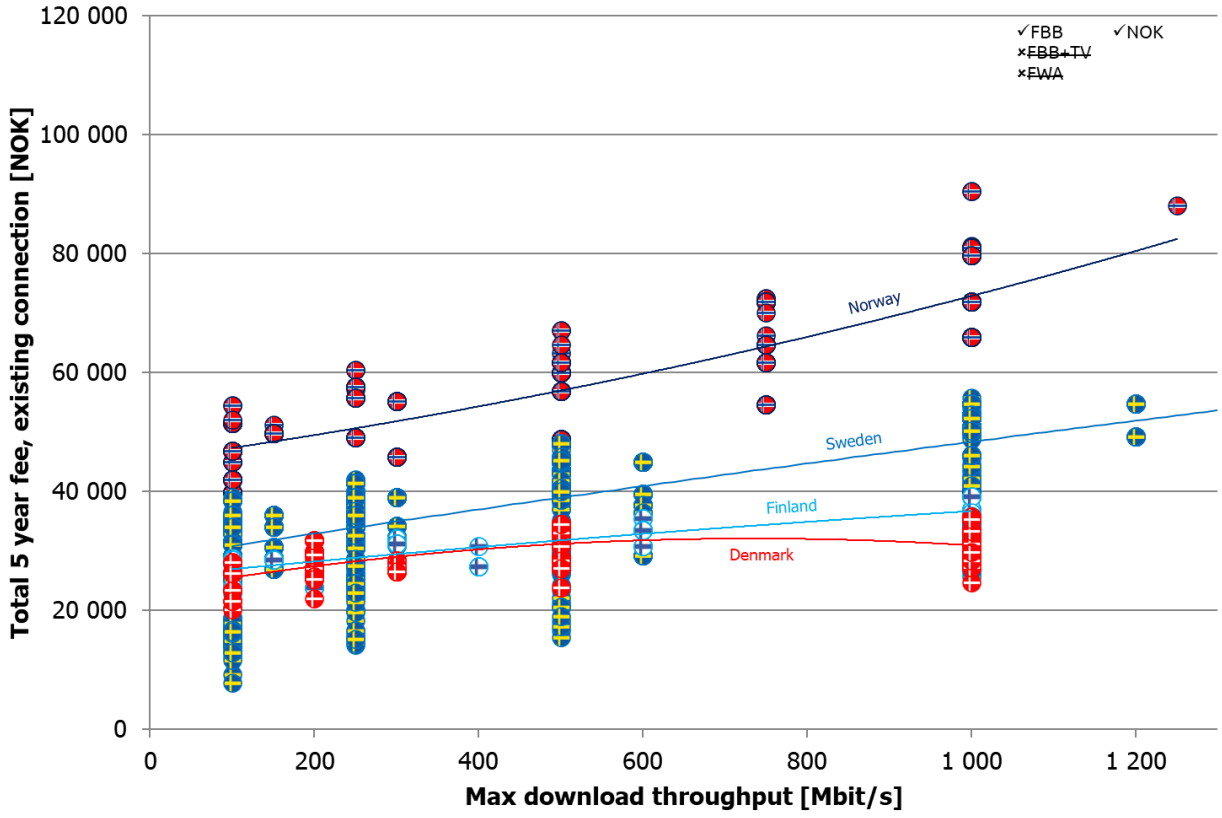


Figure 24. Comparison of the total fee (existing connection) for fixed broadband in NOK during 5 years among providers in Norway, Denmark, Sweden, and Finland, based on address searches representing the municipalities where 70% of the population lives, June-July 2024, visualised for plans up to 1300 Mbit/s [source: providers' webpages and pricelists].

As shown in Figure 24, Norwegian total fees are, with few exceptions, the highest also when based on an existing connection. The high monthly subscription fees in Norway dominate over the reasonable one-off fees for an existing connection.

Sweden is second-ranked whereas Finland and Denmark have the lowest total 5-year fees for an existing connection. Denmark is particularly affordable in the higher speed range. Based on the trend lines, the total 5-year fees for a Norwegian broadband household are about 20000-40000 NOK higher than in the other three countries.

In the next graph, purchasing power adjustments have been done.

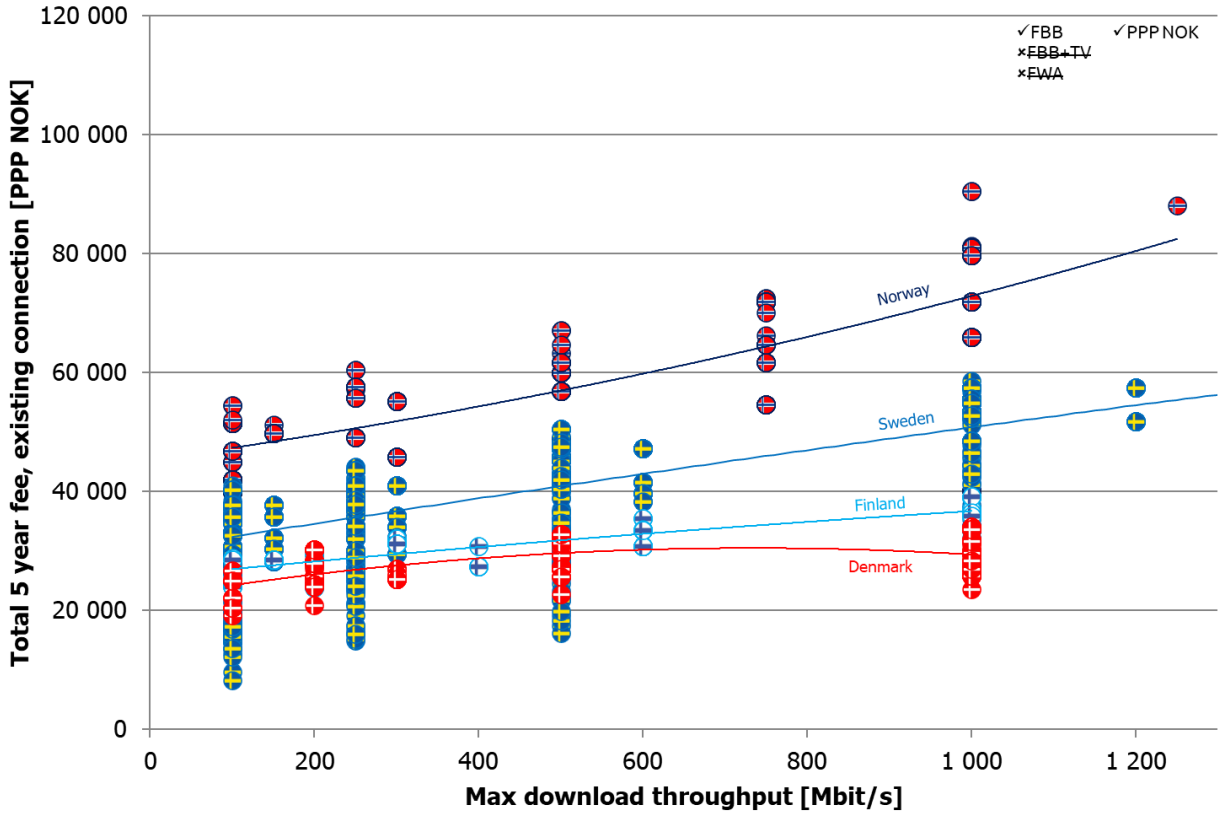


Figure 25. Comparison of the total fee (existing connection) for fixed broadband in PPP NOK during 5 years among providers in Norway, Denmark, Sweden, and Finland, based on address searches representing the municipalities where 70% of the population lives, June-July 2024, visualised for plans up to 1300 Mbit/s [source: providers' webpages and pricelists], OECD].

The adjustments only change the trend lines marginally and the conclusion is therefore the same.

When summing up the total fees during a 5-year period, the Norwegian existing connection customer will, with few exceptions, pay a much higher amount than customers in Denmark, Sweden, and Finland. This is the case also after compensation for differences in purchasing power.

14 Quality for money: Fixed broadband: Actual throughput

We have now analysed fixed broadband pricing in depth. Before going into FWA and packages with TV, let's look at the actual throughput that fixed broadband customers in our countries averagely get. Since fixed broadband is priced based on throughput, this is a combination of two factors:

- What the broadband connection technically delivers
- How much the customers have been willing to pay for the connection

The Nordic and Baltics statistics issued for 2022[30] show how large share of the overall fixed broadband base that subscribe to plans with marketed throughput of 100 Mbit/s or more:

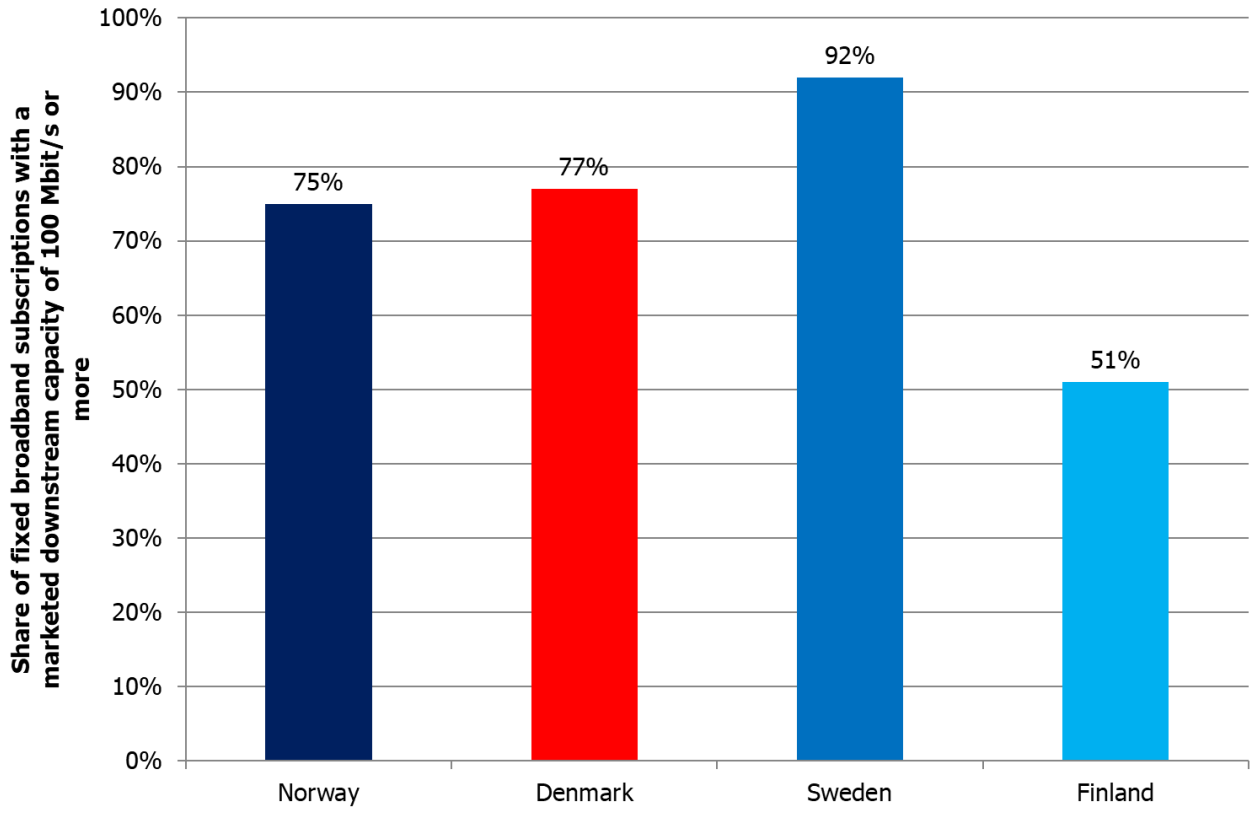


Figure 26. Share of fixed broadband subscriptions with 100 Mbit/s or more marketed download throughput in Norway, Denmark, Sweden and Finland, December 2022 [source: PTS, compiled by Tefficient]

This graph could suggest that Sweden would have the highest actual throughput of these four countries – and Finland the lowest. We don't know how the speeds distribute *within* the 100 Mbit/s or more category, though. As shown, plans with e.g. 500 or 1000 Mbit/s are quite a common offering today.

To try to figure out, we turn to Ookla Speedtest. Ookla uses crowdsourced data based on tests actively done by broadband users. The drawback is that we don't know how representative these tests are. In addition, the throughput measured by these tests is affected by the throughput tier paid for by the customers. Finally,

[30] https://statistik.pts.se/nordic-baltic-telecom-market/. Statistics for 2023 is not yet available.

they cover *all* available broadband technologies – including DSL which otherwise isn't in the scope of this analysis.

With these words of caution, let's compare the latest available median download throughput in our four countries:

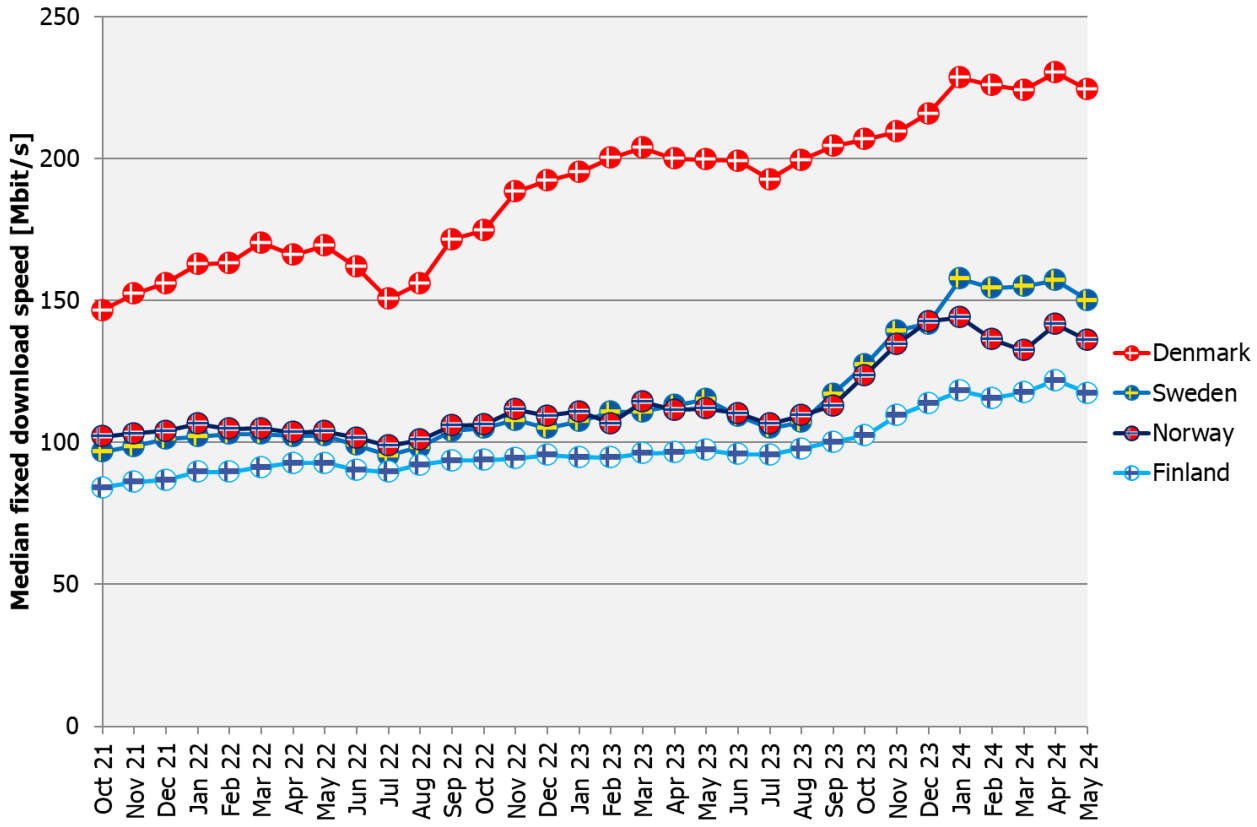


Figure 27. Median fixed broadband download speed across all technologies and subscription types for Norway, Denmark, Sweden, and Finland per month Oct 2021-May 2024 [source: Ookla Speedtest]

Perhaps surprisingly, Denmark – with the lowest share of fibre connections[31] and a near-Nordic-average 77% of broadband users subscribing to 100 Mbit/s or more – has the highest median download throughput[32]. The speed discrepancy to Norway doubled to almost 100 Mbit/s during the period shown in Figure 27. A key reason to it is that the Danish cable TV networks are well distributed and generally deliver high fixed broadband speeds. The level of competition in Denmark has increased with new players (and TDC NET) aggressively rolling out fibre while gradually expanding open fibre concepts allowing for several providers to sell internet on top of each physical fibre network.

Finland is having the slowest fixed broadband. A likely explanation is that with unlimited mobile data totally dominating mobile subscriptions in Finland (85% of non-M2M subscriptions were unlimited in December 2023) the willingness to pay for higher fixed broadband speed tiers is not present in Finland.

[31] 49% in 2022 according to the Nordic and Baltic statistics for 2022 – with Finland 63%, Norway 70% and Sweden 81%.
[32] Denmark was number 10 in the world (of 181 countries) in May 2024. Sweden was #35, Norway #38 and Finland #45.

Norwegian fixed broadband connections are fast – the median value was **136 Mbit/s** in May 2024 – but the median Danish fixed broadband connection is much faster: 224 Mbit/s. The table below compares these speeds with the broadband ARPU[33] in PPP NOK.

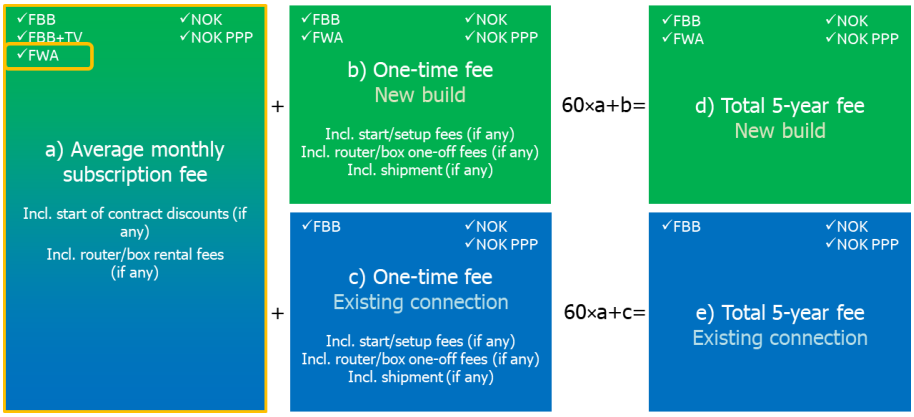
Country	Median download throughput, May 2024, Ookla [Mbit/s]	Average revenue per fixed broadband user (ARPU), 2023, PPP NOK
Norway excl. FWA	136	460
Denmark excl. FWA	224	455
Sweden excl. FWA	150	300
Finland incl. FWA and fixed voice revenue	117	384

Of these four countries, Norway has the highest ARPU but significantly slower median throughput than Denmark – and a median throughput in between Sweden and Finland, who have lower ARPU in PPP NOK. This suggests that the average Norwegian user chose to subscribe to a slightly lower throughput tier than the average Danish user. Price could of course be a driver for that choice.

Norway has fixed broadband networks with high median throughput, but so have Sweden and Finland. Denmark has a much faster speed than Norway. With Norway's much higher subscription fees, the willingness to pay for a faster throughput tier might not be as present as in Denmark.

[33] Based on data reported by regulators Nkom, SDFI and PTS respectively

15 FWA: Average monthly subscription fee



In fixed wireless access (FWA), mobile operators can use their regular mobile networks to deliver fixed broadband-replacing connectivity in areas where fixed broadband networks aren't available. In a Norwegian perspective, where Telenor has phased out its traditional copper network, FWA was promoted as a solution that could deliver faster broadband than DSL and, at the same time, avoid an expensive fibre rollout to households and small businesses.

Although FWA is possible already with 4G, the vast amount of spectrum that **5G** offers is making the FWA prospect more interesting. Since an FWA customer today uses more than 300 GB of data per month[34] – where the average Norwegian non-M2M, non-FWA, mobile user consumed 11.3 GB per month in 2023 – the fear was always that FWA users would negatively impact the network experience for regular mobile phone users. In the future, 5G will not just offer more spectrum but also the possibility to separate different types of traffic from each other and control the quality for different services independently of each other – so called *network slicing*.

Until 2019, Norwegian providers were careful in offering FWA, but it is now sold as a broadband solution in certain areas. And according to Nkom data, the take-up has been good, but slowed in 2023, see Figure 28.

[34] In 2023, the average FWA customer of Telenor Norway used 343 GB per month while the average Swedish FWA customer used 321 GB. FWA traffic is not available for Denmark and Finland.

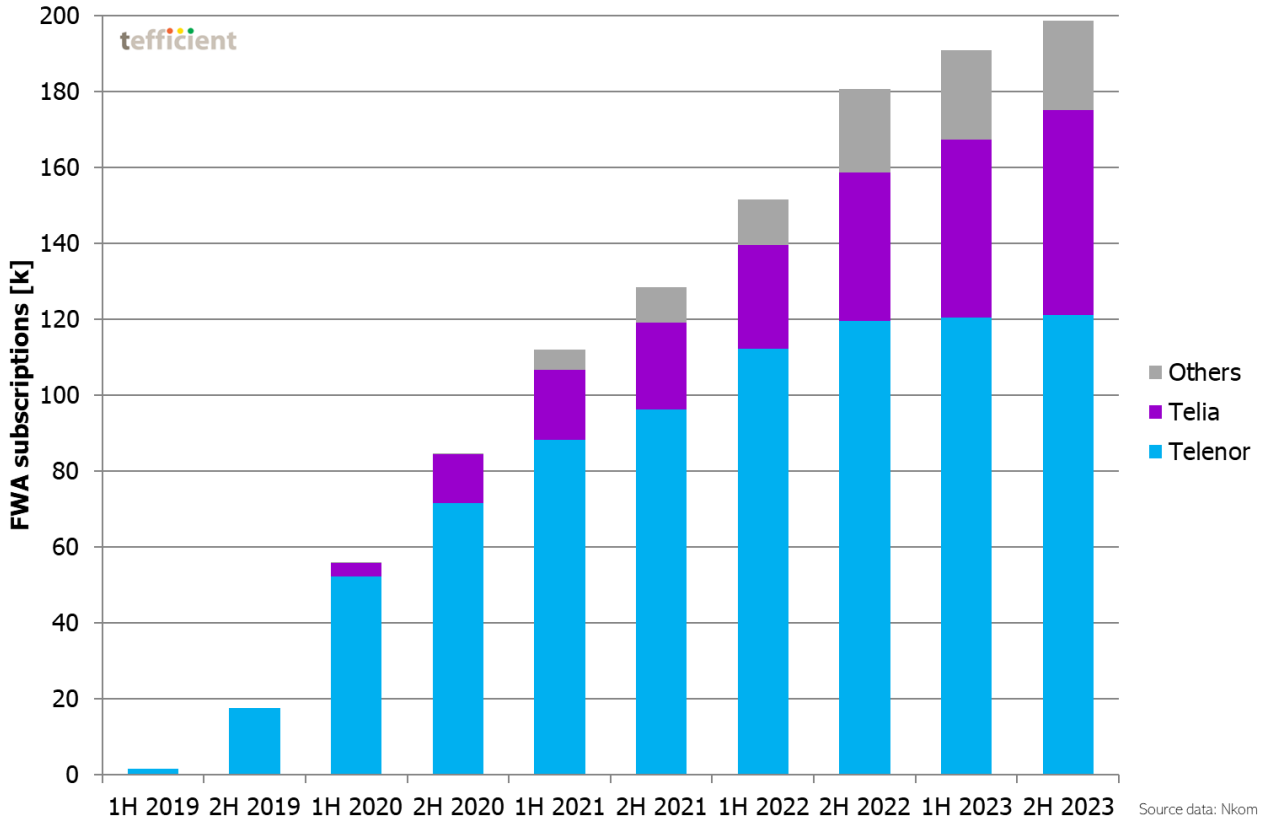


Figure 28. Development in the number of FWA subscribers in Norway 1H 2019-2H 2023 [source: Nkom, compiled by Tefficient]

In December 2023, there were almost **199k FWA subscriptions** in Norway, 61% of them with Telenor, 27% with Telia and 12% with others (mainly NextGenTel and Allente). FWA subscriptions represent close to **8%** of the total broadband base in Norway. FWA is therefore a success in Norway, fuelled by Telenor's decommissioning of the copper network. In Norway, Nkom has defined FWA as a fixed installation sold to a specific address – with a certain resource allocation in place e.g. a dedicated frequency band, a share of the capacity on a base station or network slicing, so that the FWA provider can guarantee an adequate level of service for an individual FWA subscription. A minimum speed should be communicated, not just a maximum speed.

Danish and Swedish providers generally made a later and more cautious market entry. In February 2019, the Danish mobile-only provider '**3**' however launched "Internet til hjemmet" for a set price of 230 DKK to anyone who wants to use 3's mobile network to connect the home to internet. The other Danish mobile network operators, YouSee/TDC, Telia and Telenor followed, launching FWA in conjunction with their 5G launches. The Danish regulator doesn't report FWA base for Denmark – neither do the Danish operators.

FWA eventually also made it into the offerings from the Swedish operators Telia, Tele2, Telenor and '3'. The Swedish regulator, PTS, reported **288k FWA subscriptions** in December 2023. It's a high number but it is likely based on a more relaxed definition compared to Nkom's definition for Norway. It's sufficient that it is sold to a specific address with a minimum speed.

In contrast to how FWA historically was addressed in Norway, Denmark and Sweden, **Finnish providers have for a long time offered FWA** over 4G networks to any household or business *regardless of location*.

The use of an external antenna was, in most cases, up to the end-user[35]. Finnish operators have however lately started to offer FWA subscriptions sold to a specific address with resource reservation – like the Norwegian definition[36]. At the end of 2023, there were about **50k such FWA subscriptions** in Finland.

There are many more regular unlimited data-only subscriptions in Finland, though. In December 2023, **23%** of the Finnish non-M2M mobile subscription base was data-only or FWA compared to 7% in Norway, 14% in Denmark and 10% in Sweden. The high share of data-only subscriptions in Finland has contributed to that the Finnish mobile data usage is among the highest in the world[37].

After this introduction to the Nordic FWA market, let's look at the comparison of the average monthly subscription fee (over 5 years) for FWA services in our countries. First in NOK:

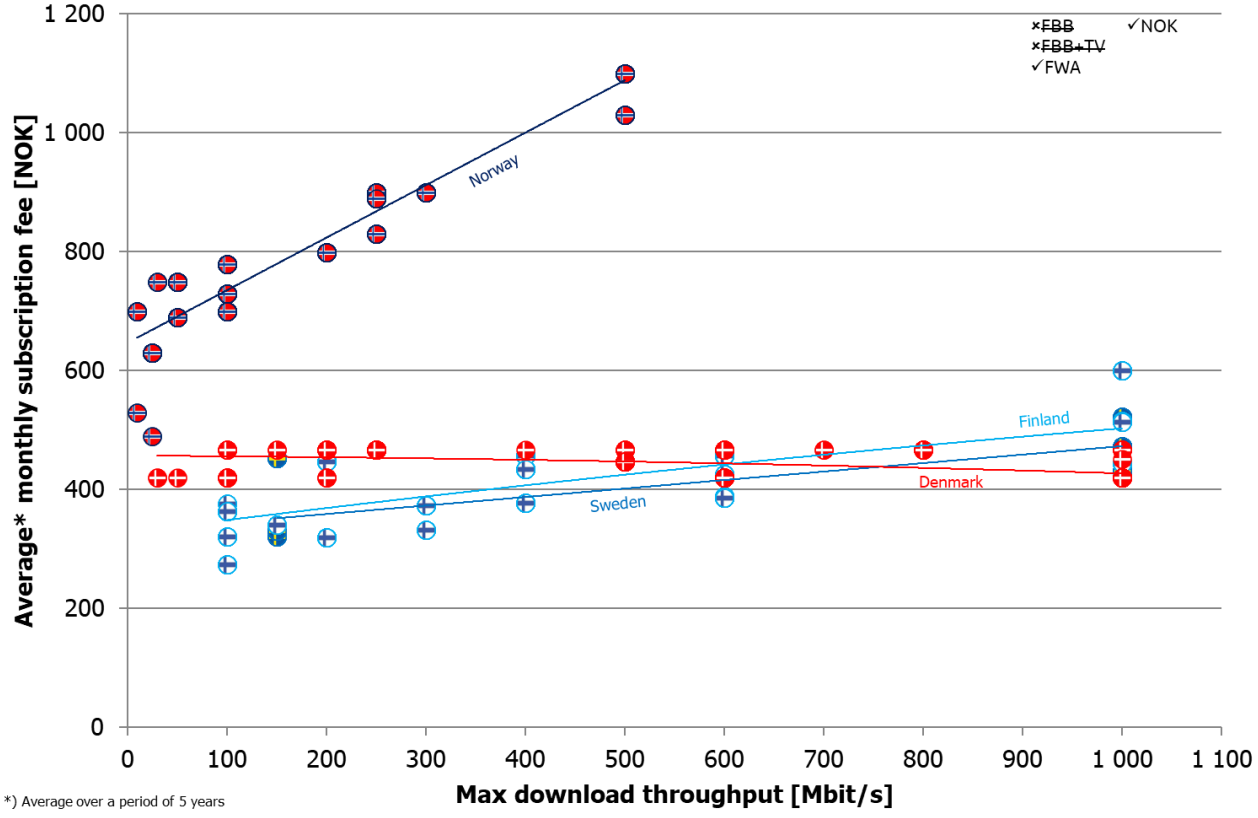


Figure 29. Comparison of the average monthly subscription fee in NOK during 5 years for FWA plans with at least 1000 GB of data per month among providers in Norway, Denmark, Sweden, and Finland, based on address searches representing the municipalities where 70% of the population lives, June-July 2024 [source: providers' webpages and pricelists].

The maximum download throughput should to a much higher extent than what is the case for fixed broadband be seen as *indicative* for FWA as the mobile capacity is shared between several users.

[35] In essence, this is mobile broadband but as there are no limitations on mobile data usage and no speed throttling after a certain monthly consumption, end-users have been able to use them to substitute fixed broadband.

[36] The Finnish operator Elisa has even utilised 5G stand-alone and network slicing in 2024 to launch a premium Omakaista ("own band") FWA service.

[37] https://tefficient.com/data-only-drives-traffic-the-same-cant-be-said-for-5g/

In Norway and Finland, all providers are using **speed tiers**, i.e. selling FWA subscriptions with a price that links to a certain maximum throughput. Also 3 in Sweden offers two speed tiers. The remaining Swedish providers are just communicating one, defined, maximum download throughput. The Danish FWA providers aren't monetising speed tiers but most of them communicate a calculated maximum download throughout for each specific address. Hence, as shown by the Danish trend line in Figure 29, there's no price differential with higher speeds – the trend line is flat.

Norwegian FWA subscriptions are much more expensive than FWA plans in the other countries. The price differential is about 200-700 NOK per month. Finland has the lowest fees in the lower, 100-500 Mbit/s, end of the graph whereas Denmark's fixed FWA pricing wins at the highest end of the graph.

Applying purchasing power adjustments does not change this.

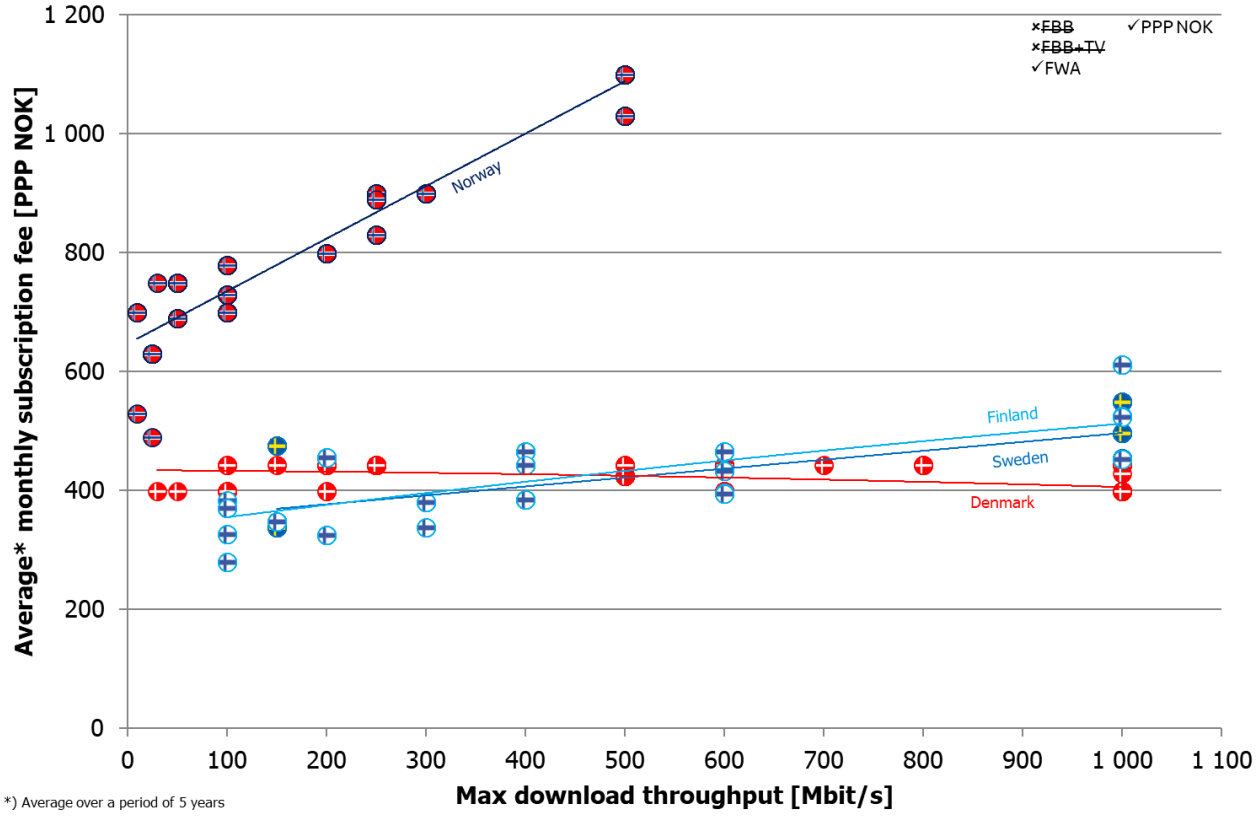


Figure 30. Comparison of the average monthly subscription fee in PPP NOK during 5 years for FWA plans with at least 1000 GB of data per month among providers in Norway, Denmark, Sweden, and Finland, based on address searches representing the municipalities where 70% of the population lives, June-July 2024 [source: providers' webpages and pricelists, OECD].

The Norwegian FWA plans are much more expensive than same-speed plans in Denmark, Sweden, and Finland. This is the case also after compensation for differences in purchasing power.

Since the price difference between Norway and the other countries seems more accentuated for FWA than for fixed broadband, is there actually a price premium for FWA compared to fixed broadband in Norway?

To answer that, we are in Figure 31 below comparing the average monthly subscription fee for FWA to that of fixed broadband.

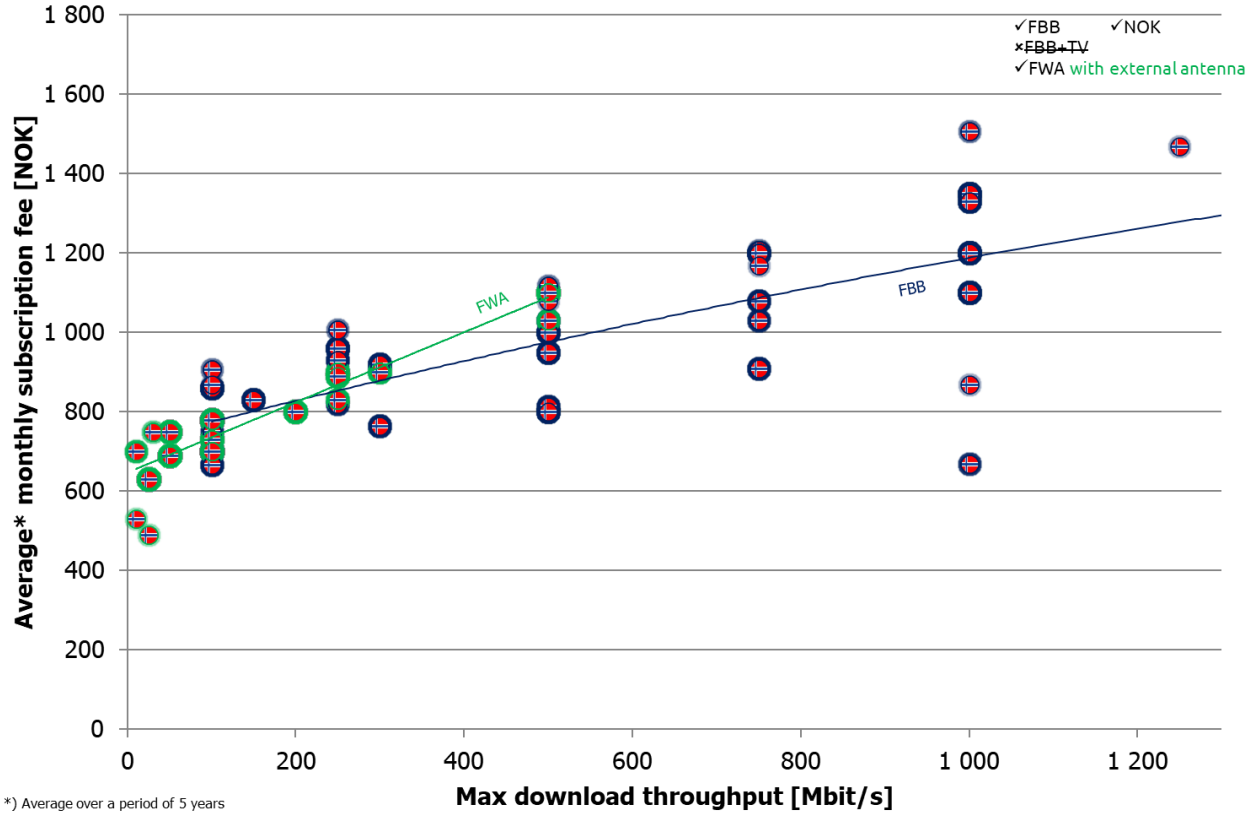


Figure 31. Comparison of the average monthly subscription fee between FWA plans with at least 1000 GB of data per month (green) and fixed broadband (blue) in NOK during 5 years among major providers in Norway based on address searches representing the municipalities where 70% of the population lives, June-July 2024, visualised for plans up to 1300 Mbit/s [source: providers' webpages and pricelists].

FWA fees are shown with the green trend line whereas fibre fees are shown with a blue trend line. Figure 31 is showing that with a maximum speed of 200 Mbit/s or higher, **FWA is priced as high or with a premium** when compared to same-speed fixed broadband. At 500 Mbit/s, FWA is about 100 NOK more expensive than fixed broadband. In the other end, at 100 Mbit/s, FWA is though about 50 NOK cheaper than fixed broadband.

If we do a parallel graph for Finland, see below, we can see that fixed broadband comes with a clear price premium regardless of speed. Finnish FWA subscriptions are about 100 NOK cheaper per month than fixed broadband – for the same speed.

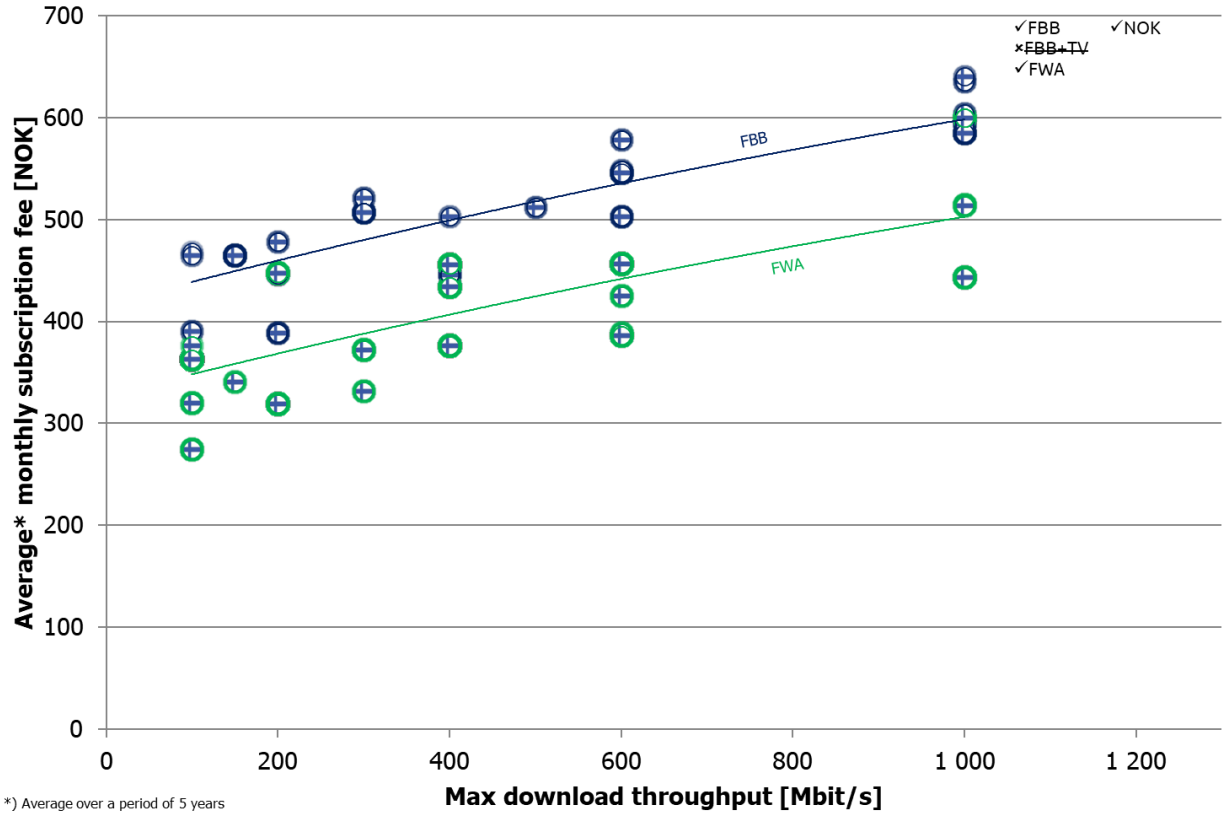


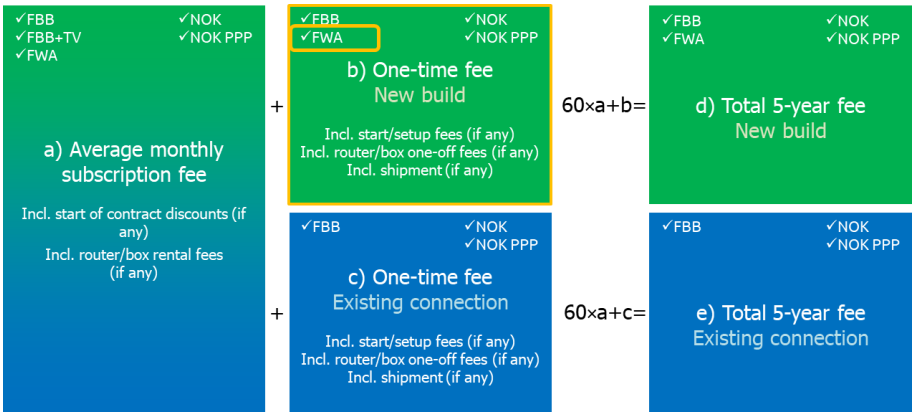
Figure 32. Comparison of the average monthly subscription fee between FWA plans with at least 1000 GB of data per month (green) and fixed broadband (blue) in NOK during 5 years among major providers in Finland based on address searches representing the municipalities where 70% of the population lives, June-July 2024 [source: providers' webpages and pricelists].

Since FWA in both Norway and Finland comes with speed tiers, it makes best sense to compare the price differential between FWA and fixed broadband in these two markets. Similar graphs as Figure 31 and Figure 32 could of course be done also for Denmark and Sweden but as the FWA speeds there mainly are best effort, i.e. you get what the network can supply at the address in question, it is more risky to believe that FWA speeds in reality can be compared to fixed broadband. Hence, we do not include these graphs here. (But these graphs too – just like Finland – show that FWA comes with a lower price compared to fixed broadband).

To conclude, FWA isn't a lower-cost option in Norway unless speed is low. This distinguishes Norway from the other Nordic markets – where FWA always is a lower-cost option. This is bad news for the Norwegian households that can't get fibre: On top of that disappointment, they must pay about as much for FWA.

Norwegian FWA plans with 200 Mbit/s or higher maximum speed are priced as high or with a premium over same speed fixed broadband plans. FWA plans are cheaper only at slow speeds. In the other Nordic markets, FWA provides a lower-cost option regardless of speed.

16 FWA: One-time fee – new build



In Norway, FWA currently always comes with a requirement of an **external antenna** which is wall or roof mounted. In Sweden and Finland[38], an external antenna is sometimes an option, but not a requirement[39]. Since the one-off fee for an external antenna and installation can be as high as 5000 NOK in Norway[40] and sometimes even higher in Finland, we need to separate between plans that require an external antenna and plans that don't when comparing the one-time fees.

Since the connection fees aren't dependent on the maximum throughput of the FWA connection, we here correlate it to the binding period of the contract instead.

[38] But no longer in Denmark.
[39] For a customer living in an area with good mobile coverage, an external antenna is not necessarily adding much to the network experience. A FWA customer without an external antenna also has higher mobility as he/she can take the router with him/her if moving to another location permanently or temporarily.
[40] Telia and NextGenTel are today offering a free self-install option.

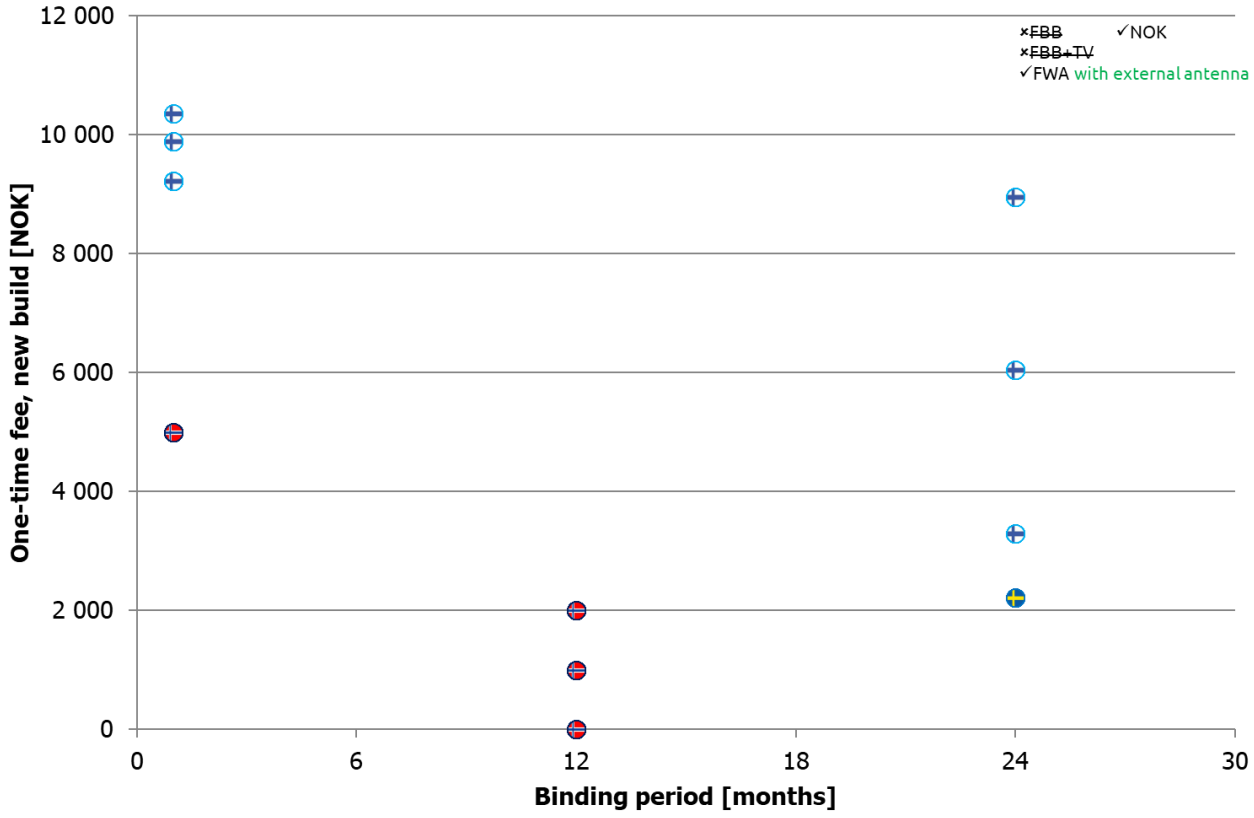


Figure 33. Comparison between one-time fees in NOK for new build FWA with external antenna among providers in Norway, Denmark, Sweden, and Finland, based on address searches representing the municipalities where 70% of the population lives, June-July 2024 [source: providers' webpages and pricelists].

In **Norway**, the one-time fee for a new build FWA with external antenna is at around 2000 NOK or lower – if signing up for a 12-month binding contract. Telenor also offers a non-binding option (here shown as 1 month) for around 5000 NOK.

Of the Swedish FWA providers, only Telenor mandates the use of an external antenna – and then only on selected addresses. The installation fee is about 2200 NOK. The binding period is though as long as 24 months.

In Finland, the one-time fees for FWA are higher than in Norway. The highest fees come on non-binding (1 month) contracts whereas fees on contracts with 24-months binding are somewhat more reasonable.

None of the Danish providers mandates (or even offers) an external antenna.

Norway's one-time fees compare reasonably well with the one-time fees in Sweden. The one-time fees in Finland are often significantly higher than in Norway[41].

Applying purchasing power parity does not change the findings.

[41] Finnish consumers can get a tax deduction for up to 500 EUR, but such tax deductions are excluded in this analysis

The Norwegian new build FWA <u>with external antenna</u> one-time fees at around 2000 NOK or lower for binding options are lower than in Sweden and Finland. The fees at around 5000 NOK for non-binding options are lower than in Finland. This is the case also after compensation for differences in purchasing power.

There are, as pointed out, no FWA options *without* external antenna in Norway. Figure 34 is therefore without Norwegian representation.

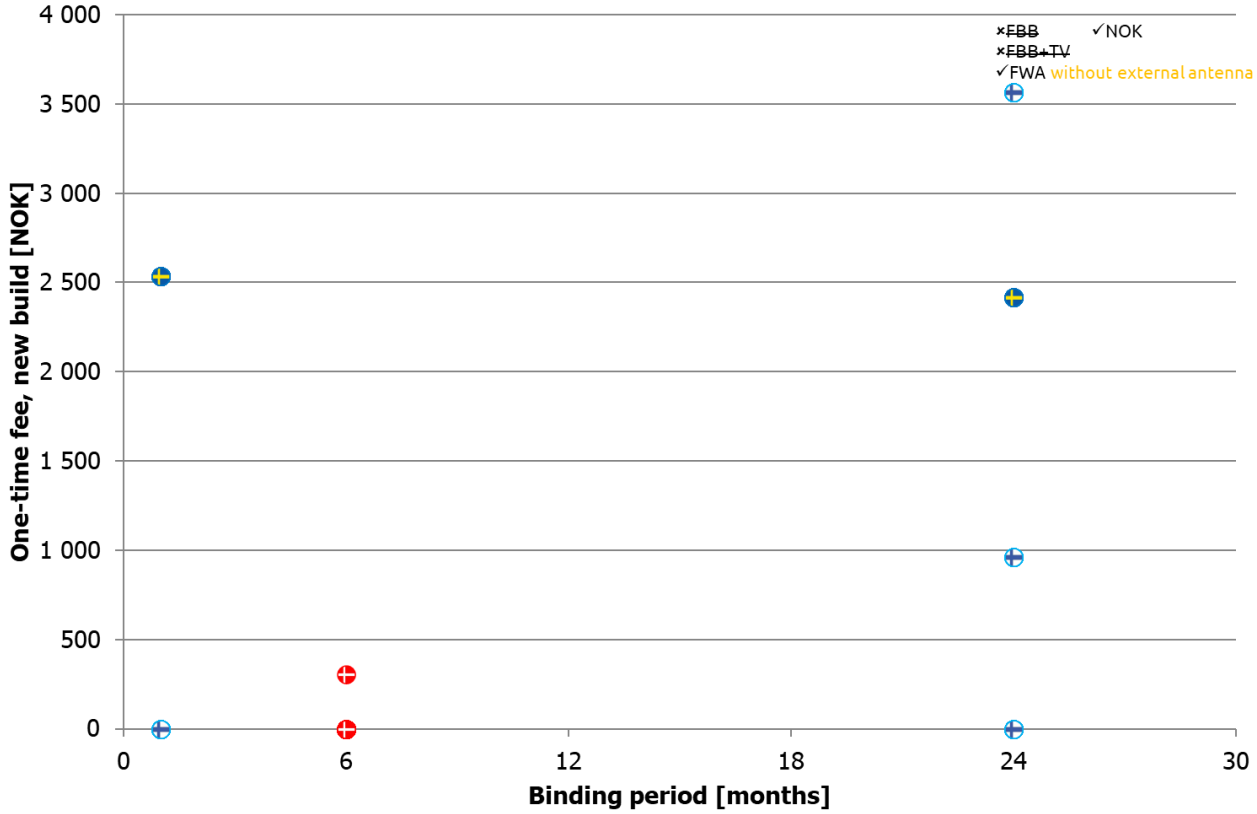


Figure 34. Comparison between one-time fees in NOK for new build FWA <u>without</u> external antenna among providers in Norway, Denmark, Sweden, and Finland, based on address searches representing the municipalities where 70% of the population lives, June-July 2024 [source: providers' webpages and pricelists].

The one-time fees when choosing a FWA plan without external antenna should logically be lower than with an external antenna, but some providers in Sweden and Finland charge the full cost[42] of a 5G router in some offers. All Danish providers today loan the 5G router to a FWA customer for as long as he/she subscribes to the service – but only YouSee charges a one-time fee of 200 DKK (306 NOK) for it.

A FWA plan without an external antenna provides the consumer with an **added location flexibility** as the router can be moved permanently or temporarily. That would however mean that the provider no longer has control over where the traffic is generated. This could be the reason to why Norwegian providers so far have avoided to offer FWA options without external antenna. The experience from Finland – where this location-

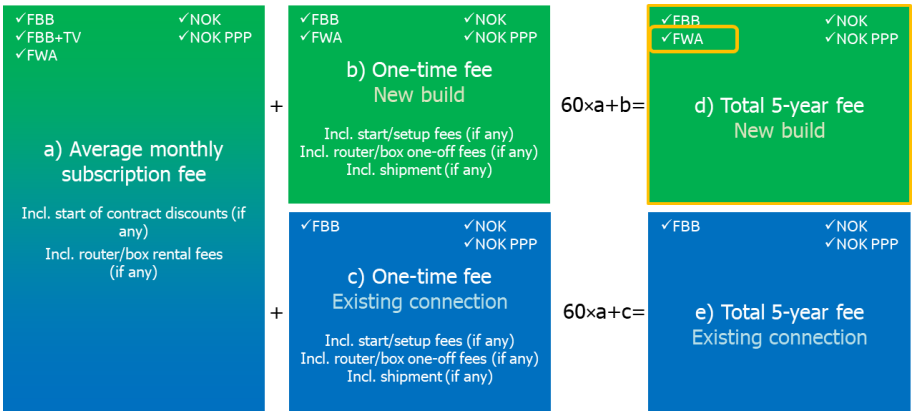
[42] Could, as an option, be paid in installments over a period of e.g. 24 or 36 months.

flexible FWA alternative totally dominates – is however that providers have been able to manage this in their networks.

The new build FWA without external antenna one-time fees have the potential to be lower than with an external antenna, but so far, no such options are offered in Norway.

Since the "existing connection" option doesn't always exist for FWA – the reuse of an existing FWA installation would be technically challenging if the new house owner selects another FWA provider – we assume that the one-time fees are the same as in the new build case and move immediately into comparing the total 5-year fees.

17 FWA: Total 5-year fee



We are now adding the new build FWA one-time fee to the monthly FWA subscription fee for 60 months to get the *total* fee for a customer that decides to install FWA into a home and then subscribes to a FWA service for 5 years.

First, we compare the total fees with external antenna, in NOK. Since Denmark doesn't have any offers with external antenna, it is missing in this chart.

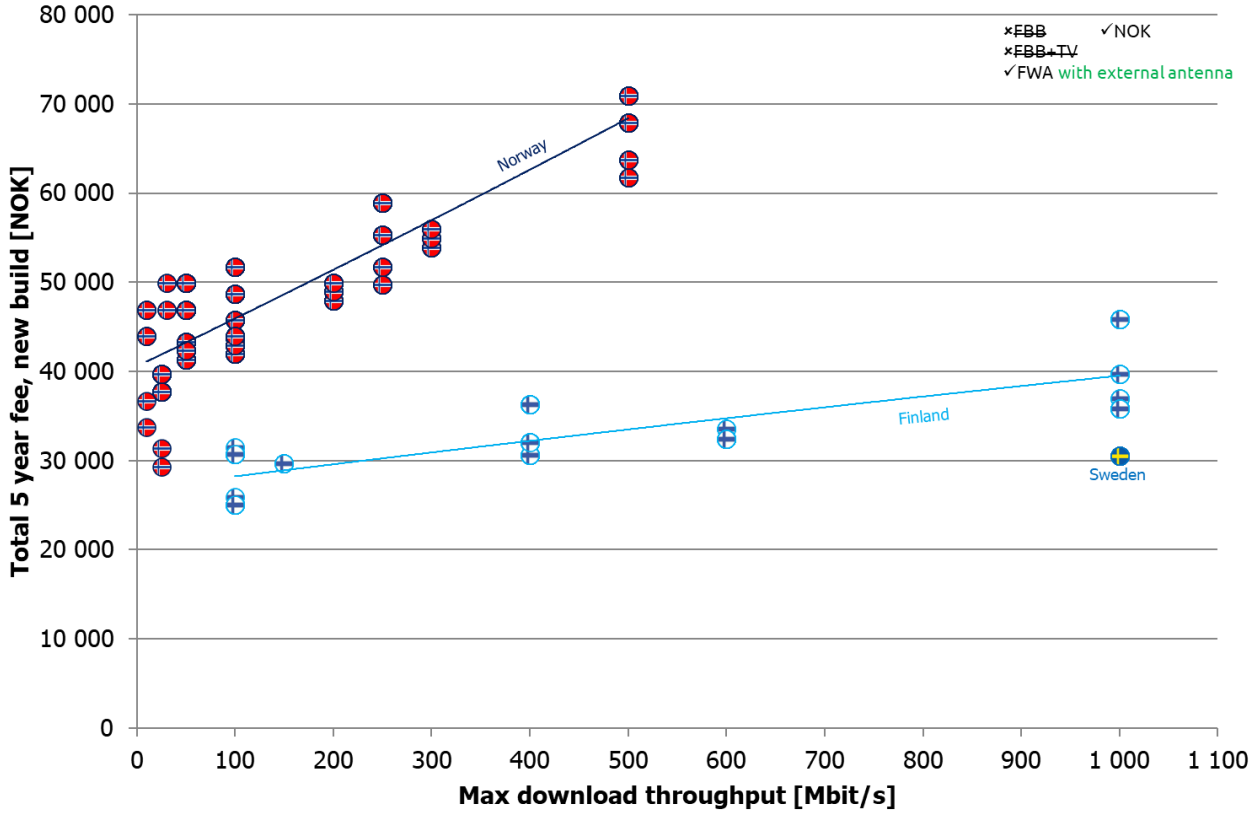


Figure 35. Comparison of the total fee (new build FWA with external antenna with at least 1000 GB of data per month) in NOK during 5 years among providers in Norway, Denmark, Sweden, and Finland, based on address searches representing the municipalities where 70% of the population lives, June-July 2024 [source: providers' webpages and pricelists].

When comparing the options with an external antenna, i.e. how FWA currently is sold in Norway, it's visible that the total cost of installing and using FWA in Norway always is higher than in Sweden and Finland. For the same speeds, the fee differential vs. Finland is about 15000-35000 NOK over five years.

Applying purchasing power adjustments does not change the finding.

When summing up the total fees during a 5-year period, the Norwegian FWA customer with external antenna will always pay a higher amount than all Swedish and Finnish customers for the same speed. This is the case also after compensation for differences in purchasing power.

As mentioned, we have only included FWA plans with 1000 GB or more in this pricing comparison. As shown in Figure 36, **all Danish operators but '3' today offer 1000 GB**[43] – but the policy on what happens next differs: Telia throttles the speed to 6 Mbit/s, YouSee to 1 Mbit/s whereas Telenor doesn't communicate what happens after 1000 GB.

Initially upon launch, the Norwegian standard – as introduced by Telenor – was 2000 GB with 5 Mbit/s thereafter. Telenor and Telia have since changed its policy to now offer unlimited. **NextGenTel is still using the 2000 GB limit** – after which the communication continues with 5 Mbit/s.

All Finnish and Swedish operators provide unlimited data without any speed degradation beyond a certain usage level.

This is in line with how fixed broadband works across the Nordic. If FWA should be perceived as a true replacement to fixed broadband, providers should refrain from imposing allowances on FWA. A very significant majority of customers will never reach these allowances anyhow.

[43] Telia has stopped communicating 1000 GB, but it is believed still to be around.

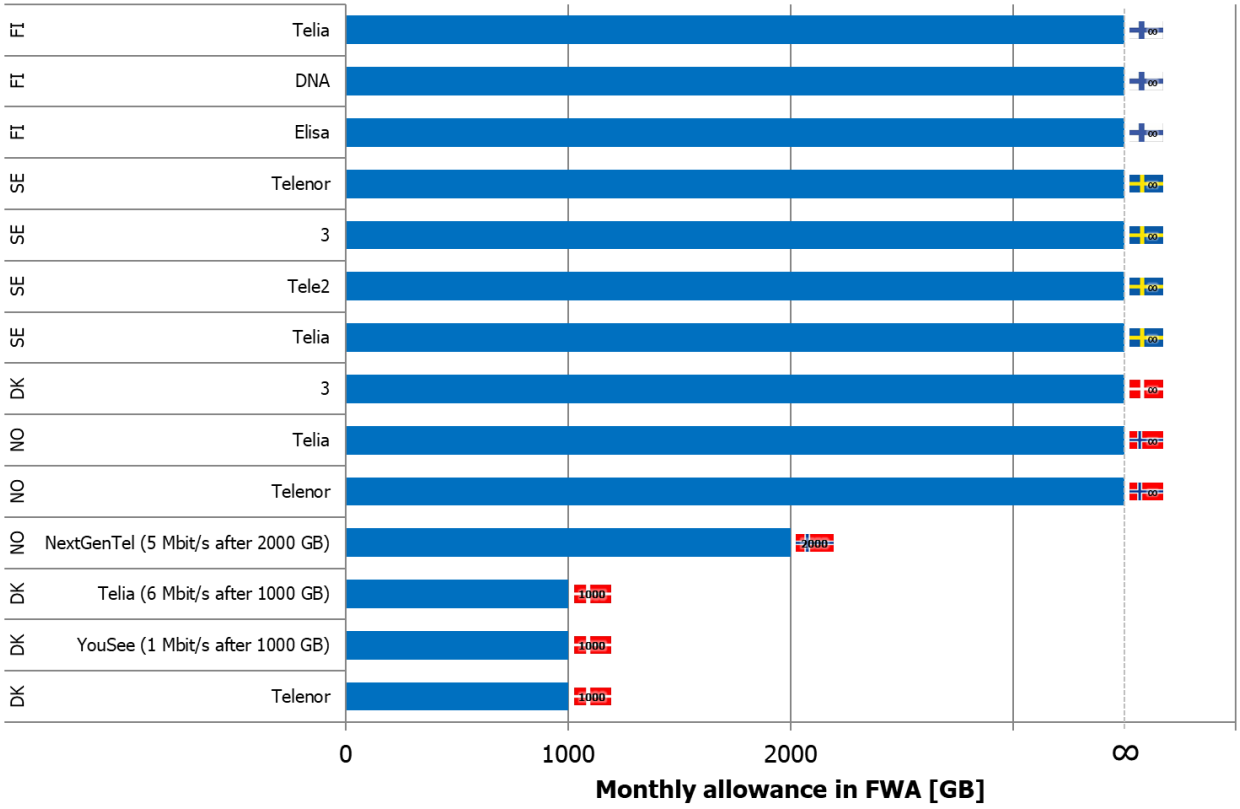


Figure 36. Comparison of the monthly data allowance in FWA plans among providers in Norway, Denmark, Sweden, and Finland, June-July 2024 [source: providers' webpages and pricelists].

NextGenTel's FWA plans are still limited to 2000 GB of full-speed data per month. Although more than sufficient for households today, it is a restriction compared to fixed broadband plans. Most providers in the Nordic have by now decided to make also FWA plans unlimited.

To end this section, we present the total fees without external antenna – although Norway lacks representation in this graph.

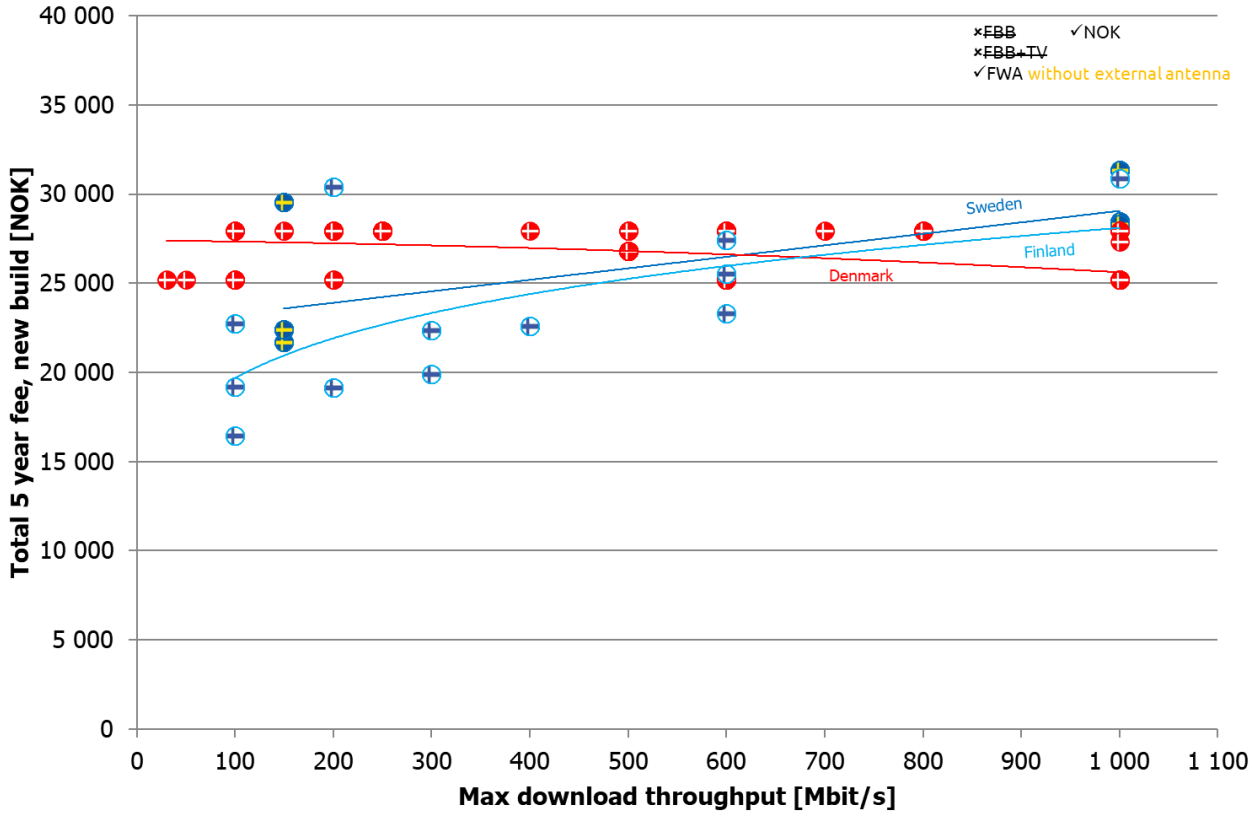
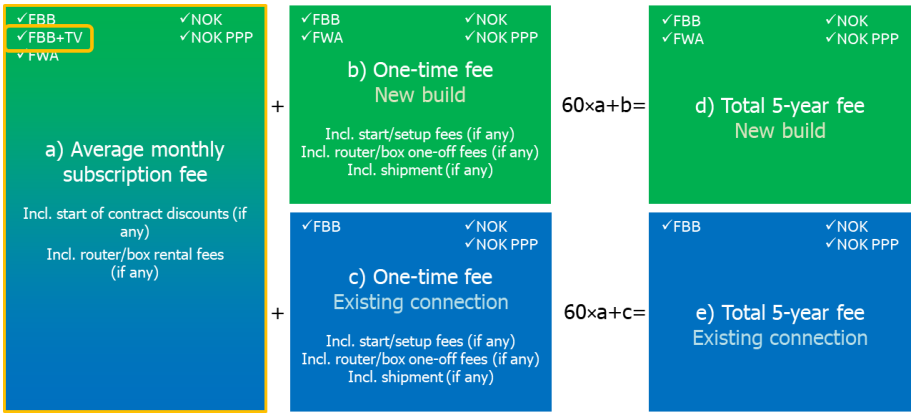


Figure 37. Comparison of the total fee (new build FWA without external antenna with at least 1000 GB of data per month) in NOK during 5 years among providers in Norway, Denmark, Sweden, and Finland, based on address searches representing the municipalities where 70% of the population lives, June-July 2024 [source: providers' webpages and pricelists].

If comparing with Figure 35, total fees in Sweden and Finland are generally lower without an external antenna. One way of closing some of the fee differential between Norway and the other three countries could thus be to introduce FWA offers without external antenna also in Norway.

18 Broadband & TV bundle: Average monthly subscription fee



Some broadband providers offer customers a *discounted* bundle between broadband and TV. As TV services today can be delivered over broadband with high quality, broadband providers see TV services as a method to increase the revenue from one and the same customer. Telecom providers are also taking market share in TV from traditional TV providers such as terrestrial TV and cable TV players. At the same time the whole TV market is undergoing a rapid change when streaming providers such as Netflix, Max and Disney+ challenge the traditional TV.

It is today very easy for a consumer with a broadband connection to subscribe to the content (TV and streaming) that he/she wants. This means that fewer consumers see the need for telecom or TV providers to create packages of channels for them. Whereas the traditional telecom and TV providers have had the tendency to lock customers in on long binding contracts, the new streaming providers have, in contrast, made it easy for customers to flexibly come and go, committing only to one month at a time.

Hence, we have in this analysis, as mentioned, only captured broadband plans that bundle TV services if that bundling **provides a discounted price** to the customer. Otherwise, that bundle isn't providing any additional value; the customer can do that bundling him/herself whenever he/she feels for it.

Figure 38 shows the average monthly subscription fee during the first 5 years. The exact TV content will of course vary between countries and between providers, but we have selected the **basic, entry level, TV option** for all providers. Typically, that means all free-to-air national channels plus 10-15 additional TV channels and occasionally also one streaming service.

Denmark is no longer offering broadband & TV bundles with a discounted price and is therefore not in Figure 38.

Note that FWA plans with bundled TV are included in Figure 38.

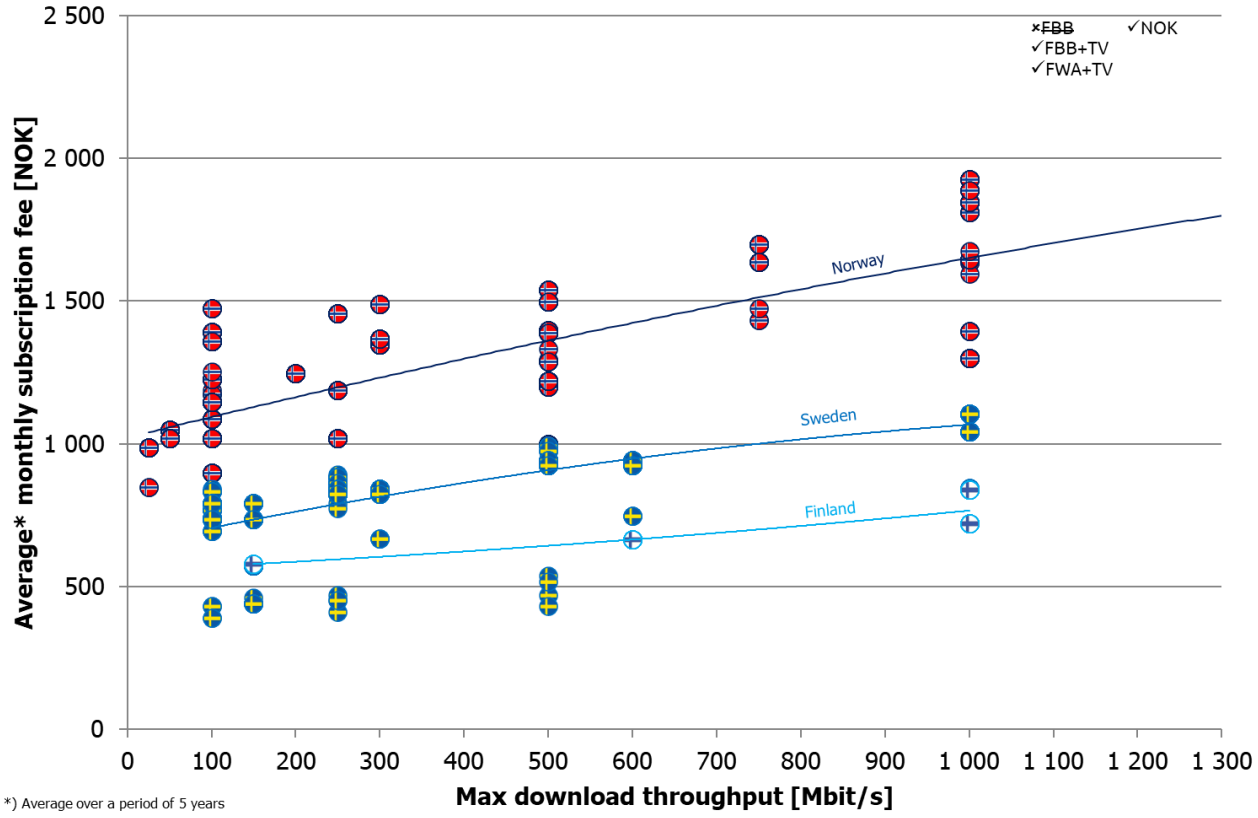


Figure 38. Comparison of the average monthly subscription fee for a discounted broadband & TV bundle in NOK during 5 years among providers in Norway, Denmark, Sweden, and Finland, based on address searches representing the municipalities where 70% of the population lives, June-July 2024 [source: providers' webpages and pricelists].

Like how it looked for pure fixed broadband, see Figure 18, Norway's broadband & TV bundles are more expensive – for a given throughput – than similar bundles in Sweden and Finland. The TV content will, as said, differ between the markets but we can see that it's **the broadband component that explains the difference in price** as the trends are similar to Figure 18.

The price differential is about 400-900 NOK.

Applying purchasing power adjustments does not change the finding.

Norwegian bundled broadband & TV plans always come with a much higher average monthly subscription fee than similar plans in Sweden and Finland. This is the case also after compensation for differences in purchasing power.

19 TV: ARPU per reporting operator

As with fixed broadband, some Nordic providers report TV ARPU (average revenue per user per month)[44]. It provides an additional comparison to the just-concluded comparison of average monthly subscription fees for broadband & TV bundles.

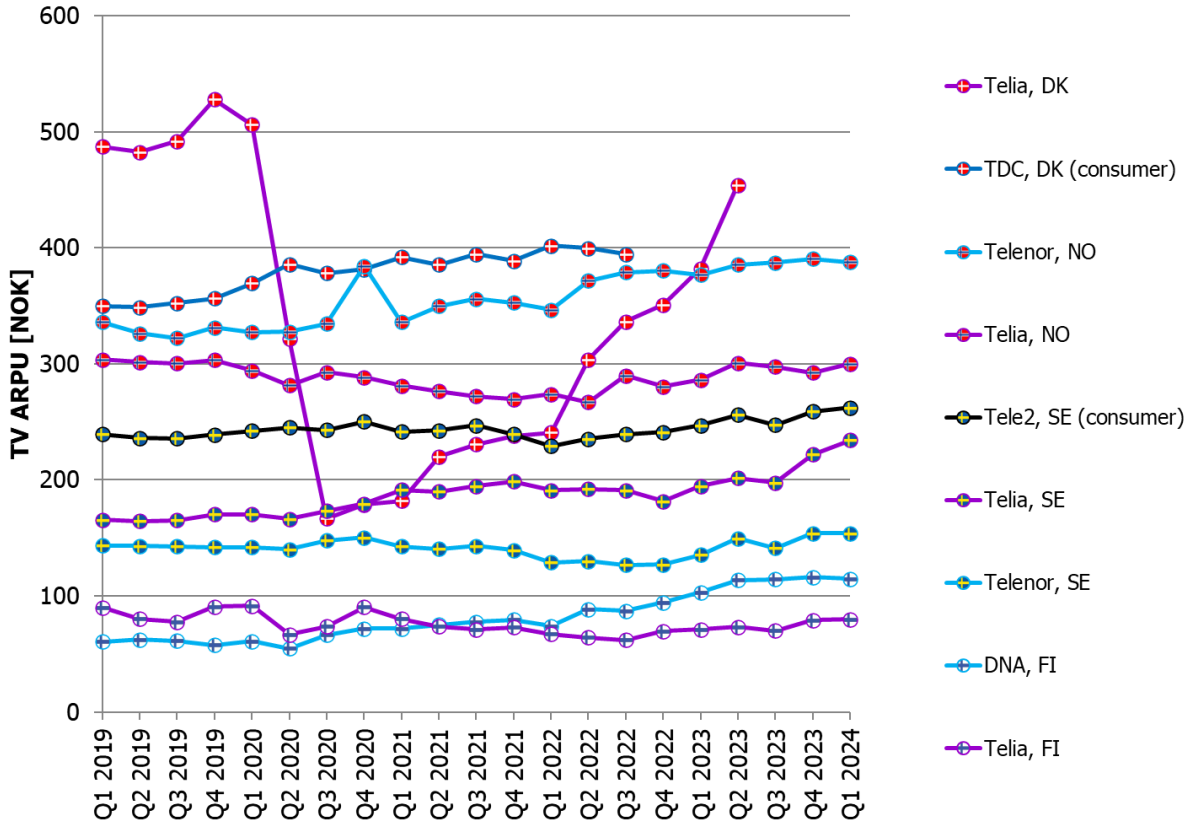


Figure 39. Comparison of reported TV ARPU in NOK among providers in Norway, Denmark, Sweden, and Finland [source: operators' financial reporting].

When Telia Denmark stopped to be reported, in Q2 2023, it had the highest TV ARPU. Telia's TV base is small and the reported ARPU has historically had strange swings. From mid-2020 to Q3 2022, another Danish operator, TDC, had the highest TV ARPU. Ever since, TDC is no longer reported due to the split into Nuuday and TDC NET[45].

Of operators reporting today, Telenor Norway has the highest TV ARPU, 388 NOK in Q1 2024. Telia Norway follows with 300 NOK. If comparing to the broadband ARPU (Figure 16), where Telenor Norway had the highest ARPU (if disregarding TDC's historical B2B ARPU) and Telia Norway a broadband APRU lower than the median for the Nordics, Telenor's position is less extreme whilst Telia's now is above the median. This

[44] Since broadband and TV sometimes are bundled together, operators are distributing part of the bundle revenue into broadband ARPU and part into TV ARPU.
[45] Nuuday has not continued to report ARPU in its reporting.

again speaks for that it's the broadband component – more than the TV component – that explains Norway's position in the previous section (Figure 38).

Applying purchasing power adjustments does not change the finding.

Telenor Norway has the highest TV ARPU among Nordic operators that report today. Telia Norway is at a lower level – still above the Nordic median. This is the case also after compensation for differences in purchasing power.

20 EBITDA margin per reporting operator

In sections 5, 7 and 19, we concluded that Norwegian operators generally enjoy high ARPU. Does this trickle down to high profitability too?

First, we will look at what remains of revenue after having paid recurring OPEX: The adjusted EBITDA (earnings before interest, tax, depreciation, and amortisation). The adjusted EBITDA margins of the integrated operations of the major operators in Norway, Denmark, Sweden, and Finland are shown in Figure 40.

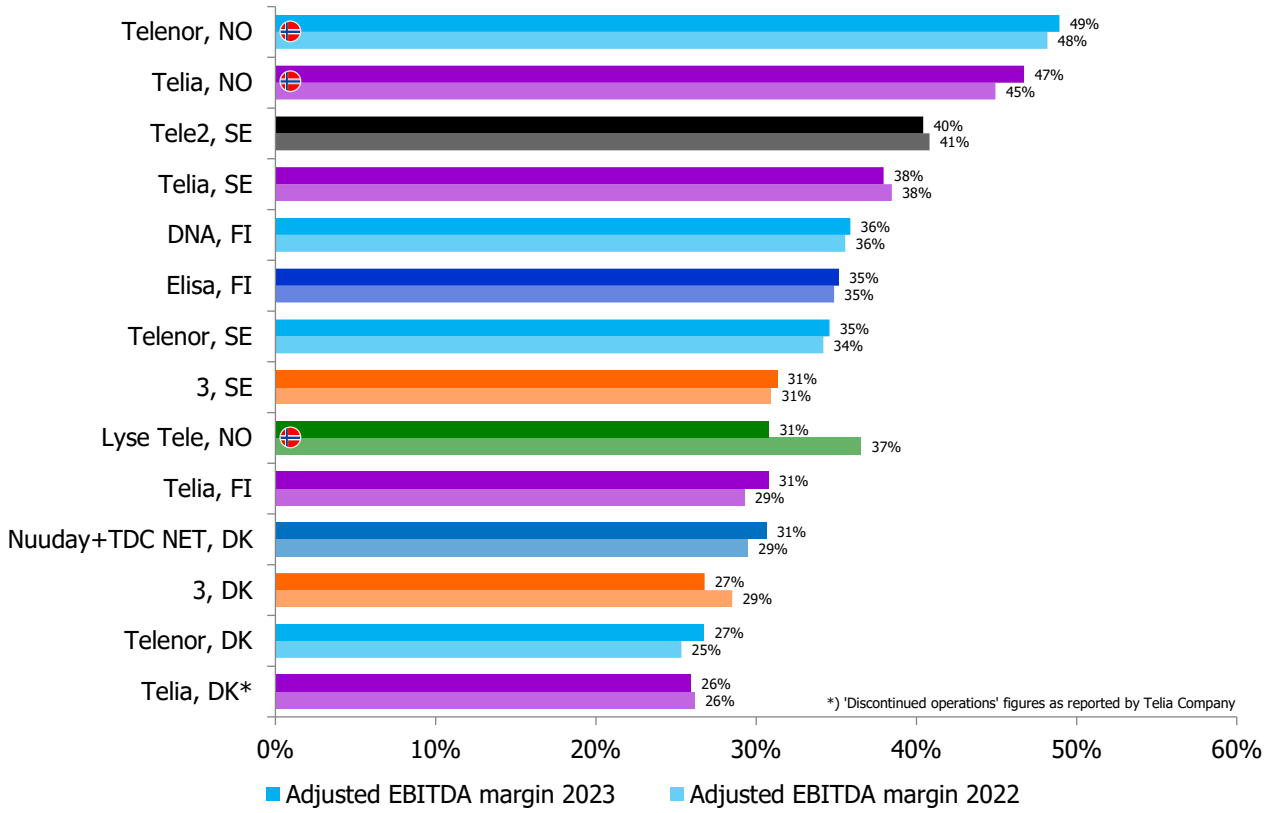


Figure 40. Adjusted EBITDA margin for the integrated operations of the major operators in Norway, Denmark, Sweden, and Finland 2022 and 2023. Note that operators report their EBITDA for their complete business which most often is wider than just mobile; two operators are pure mobile: 3 Sweden and 3 Denmark. Nuuday and TDC NET are today two separate companies under the same ownership, but to make it comparable with other operators, their figures have been summed up [source: operator reports, compiled by Tefficient].

The two established Norwegian operators, **Telenor** and **Telia**, have the highest adjusted EBITDA margins in these four countries. This is true both for 2022 and 2023. The adjusted EBITDA margins of Telenor and Telia increased in 2023.

Lower down in the chart, we identify **Lyse Tele** that acquired and incorporated **Ice** by 30 March 2022. The EBITDA margin of Lyse Tele was 31% in 2023 which is lower than Telenor and Telia. The margin fell significantly in 2023, mainly explained by Ice not being part of Lyse for the whole year of 2022.

Telenor Norway and Telia Norway having the strongest adjusted EBITDA margins is an indication of:

1) That their revenue is unusually high, or

2) That their OPEX is unusually low, or

3) Both

Neither Telenor Norway nor Telia Norway has a problem with high OPEX in their integrated business. If so, their EBITDA margins wouldn't be best in class and improving. Lyse Tele has a lower EBITDA margin, close to the Nordic median if excluding Telenor Norway and Telia Norway.

21 EBITDA-CAPEX (cash flow approximation) margin per reporting operator

There are other costs than OPEX, though. We also need to take CAPEX into account. Figure 41 compares the CAPEX to revenue ratios for our operators. In 2023, **Lyse Tele** was the operator that invested the most in CAPEX given the revenues it had – 33%.

TDC in Denmark is today split between the "ServCo" Nuuday and the "NetCo" TDC NET but we have here summed them up to be able to compare it with the other operators. Nuuday+TDC NET used 20% of its revenues on CAPEX in 2023.

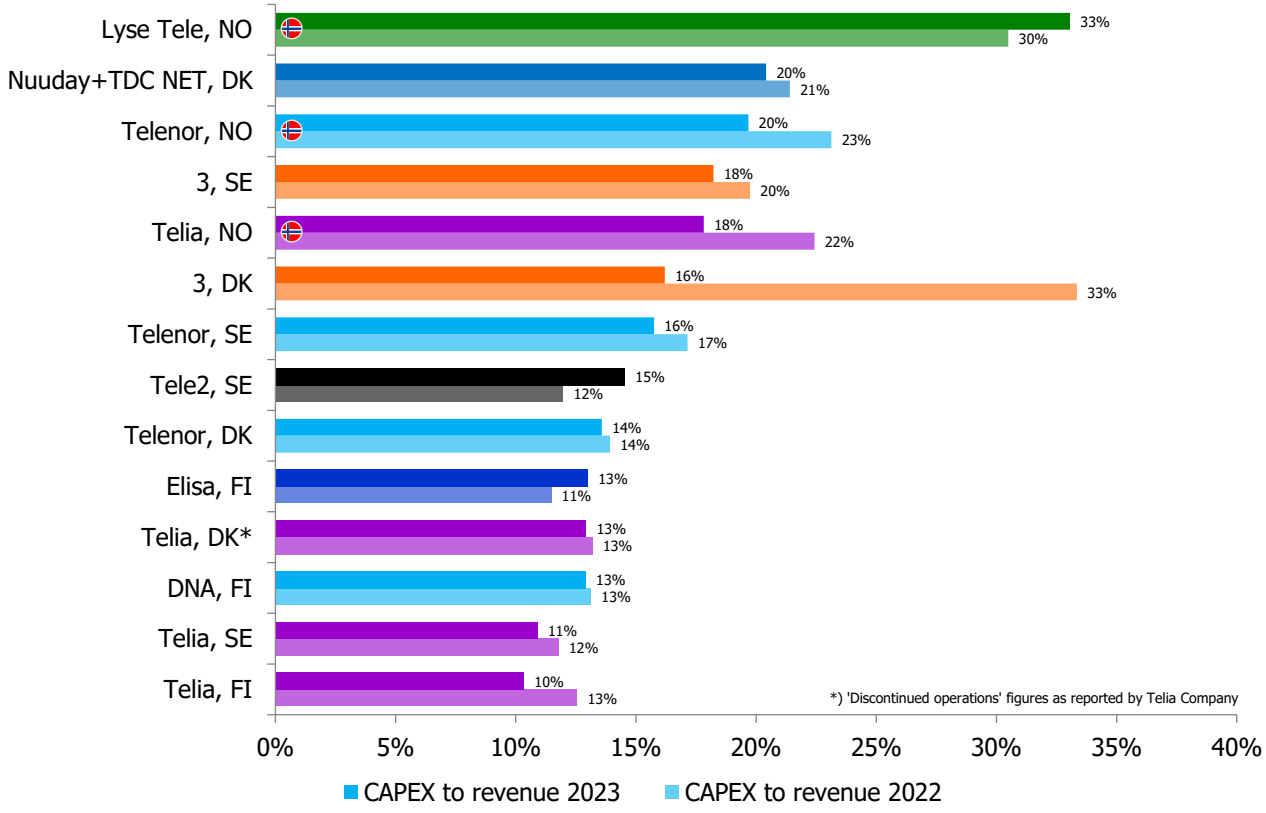


Figure 41. CAPEX to revenue for the integrated operations of the major operators in Norway, Denmark, Sweden, and Finland. Note that operators report their CAPEX for their complete business which most often is wider than just mobile; two operators are pure mobile: 3 Sweden and 3 Denmark. Nuuday and TDC NET are today two separate companies under the same ownership, but to make it comparable with other operators, their figures have been summed up [source: operator reports, compiled by Tefficient].

Third-ranked **Telenor** Norway also invested 20% of its 2023 revenues. **Telia** Norway is as well investing a bit more than what is common in the Nordics; 18% of revenues in 2023. Most of the Norwegian investments are in fixed and fibre (63%) rather than in mobile networks (32%)[46]. But since all Norwegian operators end up in the upper part of the chart, there's merit in the claim that **Norwegian operators invest more**.

[46] Based on 2023 statistics from Nkom. The remaining 5% is other investments.

Norwegian operators all invest more – as share of total revenue – than the median Nordic operator.

Does the generally high CAPEX in Norway then negatively influence the cash flow of the operators? Here we make an approximation when subtracting the CAPEX from the EBITDA and calling it the cash flow. It shows what remains of revenue after having paid recurring OPEX and CAPEX.

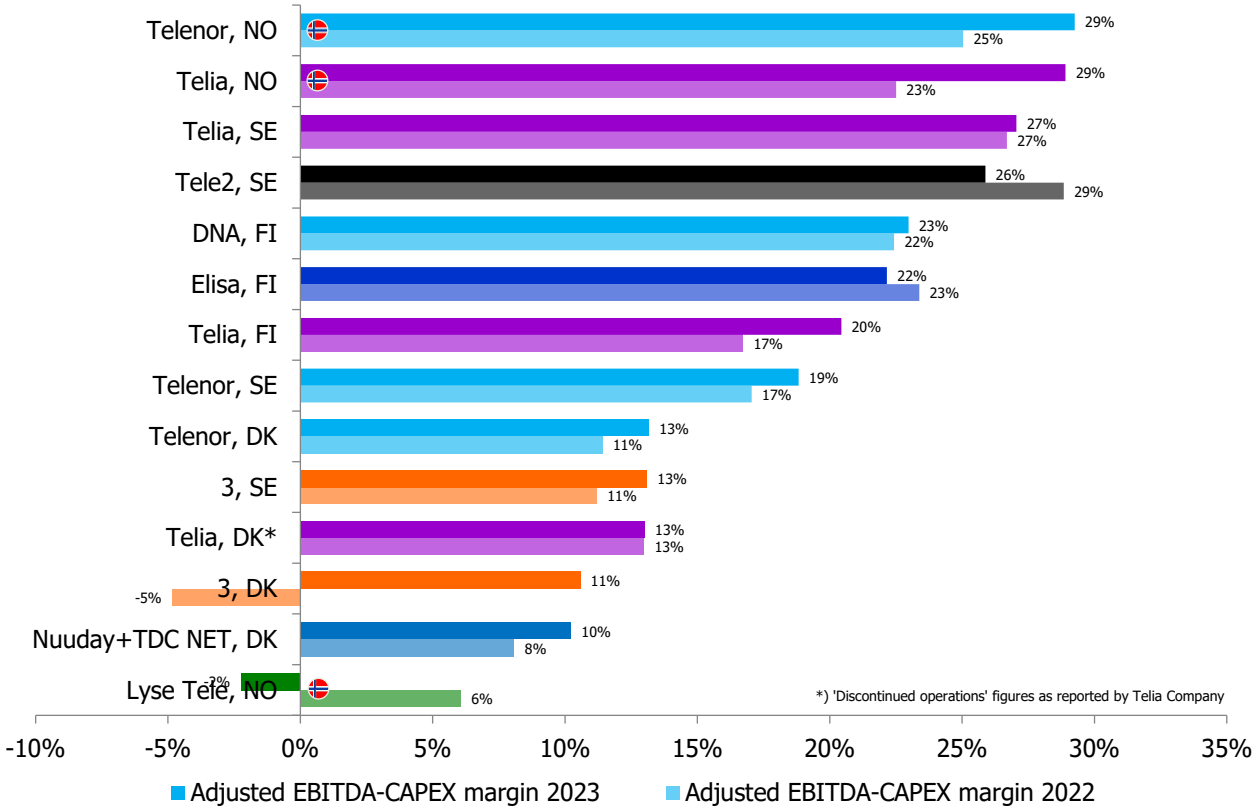


Figure 42. Adjusted EBITDA-CAPEX margin for the integrated operations of the major operators in Norway, Denmark, Sweden, and Finland. Note that operators report their EBITDA and CAPEX for their complete business which most often is wider than just mobile; two operators are pure mobile: 3 Sweden and 3 Denmark. Nuuday and TDC NET are today two separate companies under the same ownership, but to make it comparable with other operators, their figures have been summed up [source: operator reports, compiled by Tefficient].

At the top of the graph, we again find **Telenor** Norway and **Telia** Norway. So, although they both spend more of their revenue in CAPEX than the median Nordic operator, their leading EBITDA margin is so high that it returns the highest EBITDA-CAPEX margin. Thanks to the improvement in the EBITDA margin from 2022 to 2023 and the reduction in CAPEX to revenue from 2022 to 2023, both Telenor Norway and Telia Norway have had significant improvements in their EBITDA-CAPEX margins in 2023.

At the other end of the chart, we find **Lyse Tele**. Although its EBITDA margin isn't bad, its very high CAPEX to revenue makes EBITDA-CAPEX negative in 2023. Lyse Tele has invested more in CAPEX in 2023 than its business generated in EBITDA.

Neither Telenor Norway nor Telia Norway has a problem with high OPEX+CAPEX. If so, their EBITDA-CAPEX margins wouldn't be the highest in the Nordics. The situation for Lyse Tele is different: In 2023, Lyse Tele could not cover its CAPEX with its EBITDA.

22 Fixed broadband: Market concentration and HHI per country

As shown in section 7, Telenor Norway's reported fixed broadband ARPU is high not just in a Nordic perspective, but also vs. Telia Norway. There is however reason to believe that also Altibox has high ARPU. If summing up the Altibox partner companies, Altibox is today having the leading market share in fixed broadband subscriptions. This trickles down to revenues – see Figure 43 where the more than 30 Altibox partners collectively had the market-leading market share of 34.8% in 2023[47].

Telenor follows with 29.9% - a market share that has contracted since 2021 likely due to Telenor's decommissioning of the copper network which FWA in that case hasn't been able to compensate for since Figure 43 includes FWA.

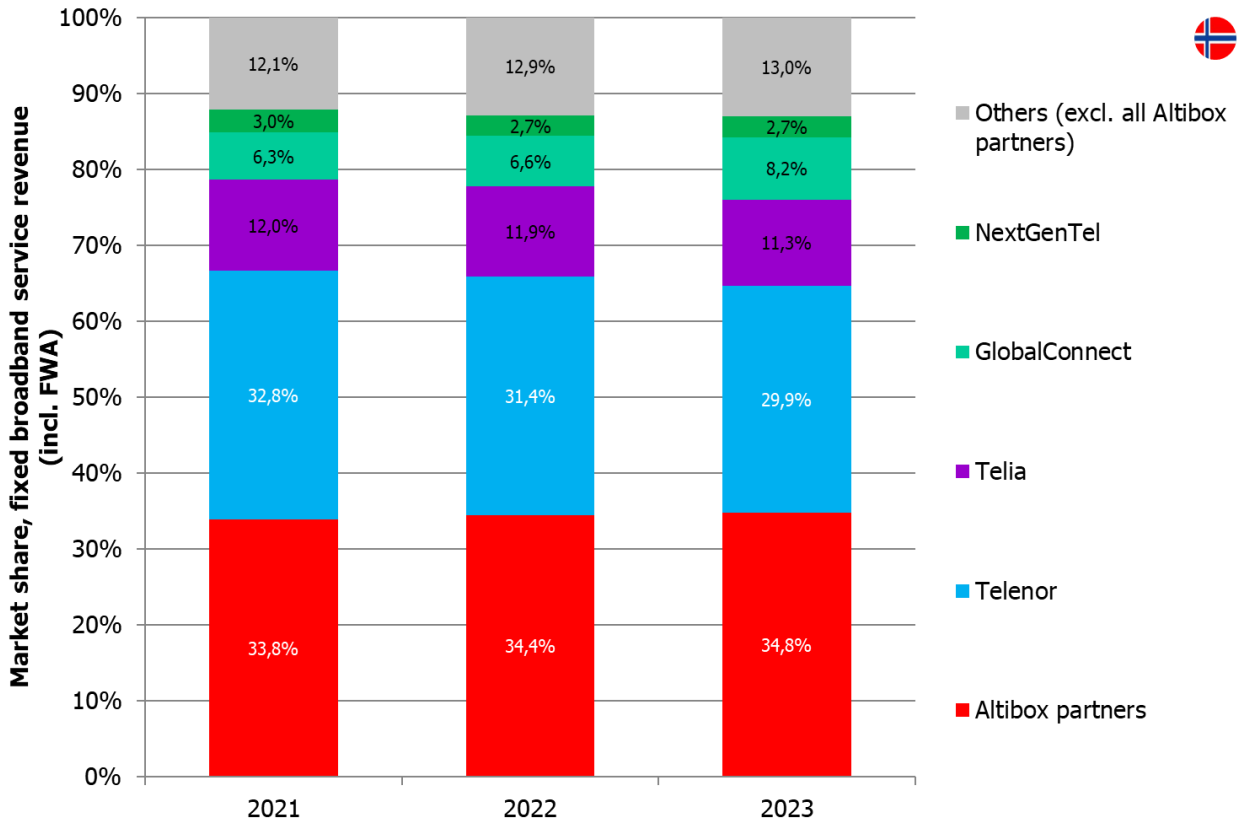


Figure 43. Market share in fixed broadband service revenue (incl. FWA), Norway [source: Nkom].

The market share for Telia was 11.3%. GlobalConnect had 8.2% and NextGenTel 2.4%. All the other, smaller, providers collectively had 13.0%.

[47] It could be argued that the Altibox partner companies should not be regarded as one. Their offering and pricing are not always identical, and they can act as independent companies. Having said that, the different Altibox partners are not competing, but have their own regional coverage areas in which they meet no competition from other Altibox partners.

When Nkom's new recommended regulation focussing on regional, not national, market dominance (see section 10) comes into play, market shares should perhaps no longer be compared on a national level as in Figure 43, but it offers a straight-forward comparison with Denmark, Sweden, and Finland.

Since the Danish regulator SDFI does not break down the fixed broadband revenue per provider – and since the Danish operators do not report such a detailed breakdown, Denmark's market share graph is based on fixed broadband subscriptions – for the providers broken out in SDFI's reporting[48].

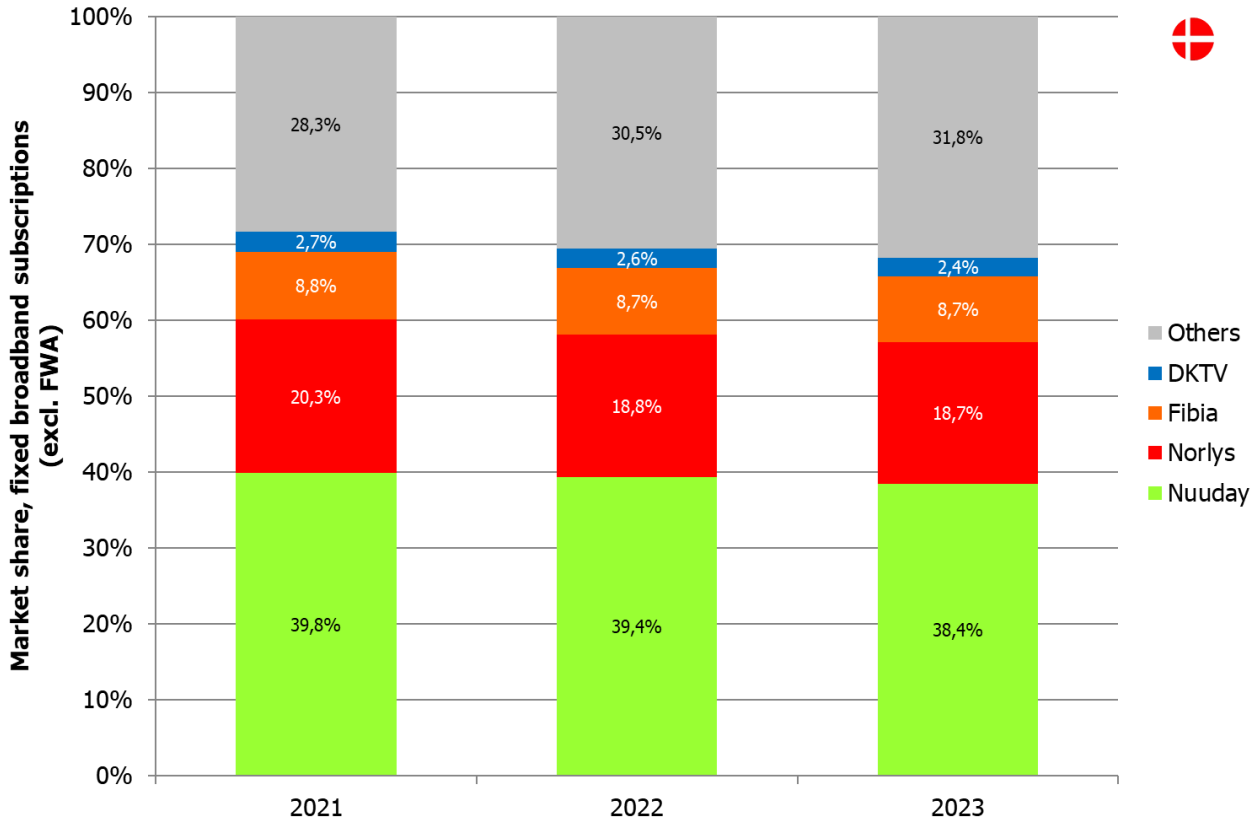


Figure 44. Market share in fixed broadband subscriptions (excl. FWA), Denmark [source: SDFI].

The former incumbent Nuuday (formerly TDC) had a significant subscription market share of 38.4% in 2023. (If adding DKTV's 2.4%, it becomes even higher, 40.8%). In Denmark, it's the market share of "Others" – which includes Telenor and Telia but also the smaller fibre operators – that grew the fastest.

The graph for Sweden follows below. Just like with Norway, reported regulatory data allow a graph based on revenue.

[48] Hiper has been added to Nuuday, since it is a brand within Nuuday. DKTV is owned by TDC NET which is a separate company under the same ownership as Nuuday. The former Stofa brand has been added to Norlys.

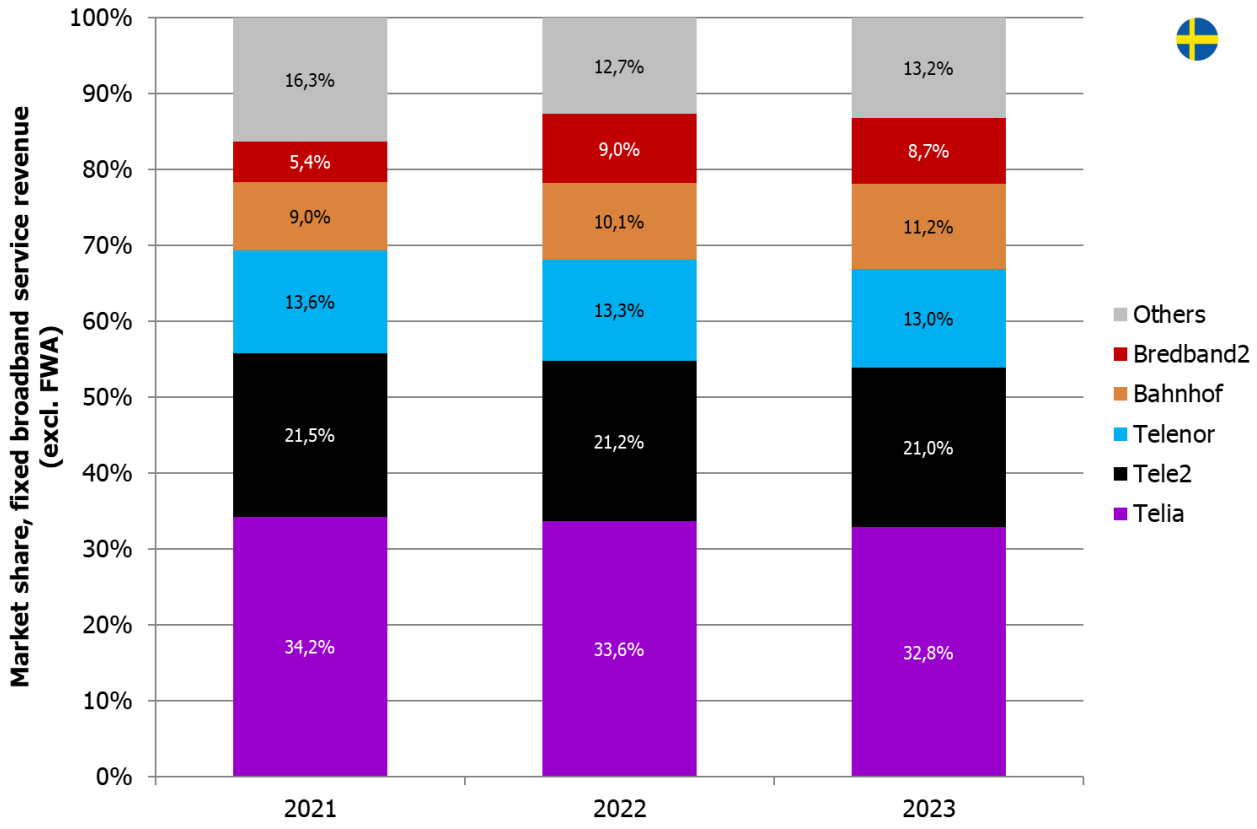


Figure 45. Market share in fixed broadband service revenue (incl. FWA), Sweden [source: PTS].

The incumbent in Sweden, Telia, had **32.8%** revenue market share in 2023. Due to the copper sunset, Telia lost market share since 2021. The copper phase-out is now more or less finished in Sweden; there were just 53k DSL subscriptions left in December 2023. Bahnhof and Bredband2 have taken market share – in Bredband2's case in part due to the acquisition of A3.

Finally, the graph for Finland. Like with Denmark, regulatory or operator data does not allow a calculation of fixed broadband revenue. It is therefore based on subscriptions for the providers broken out in Traficom's reporting.

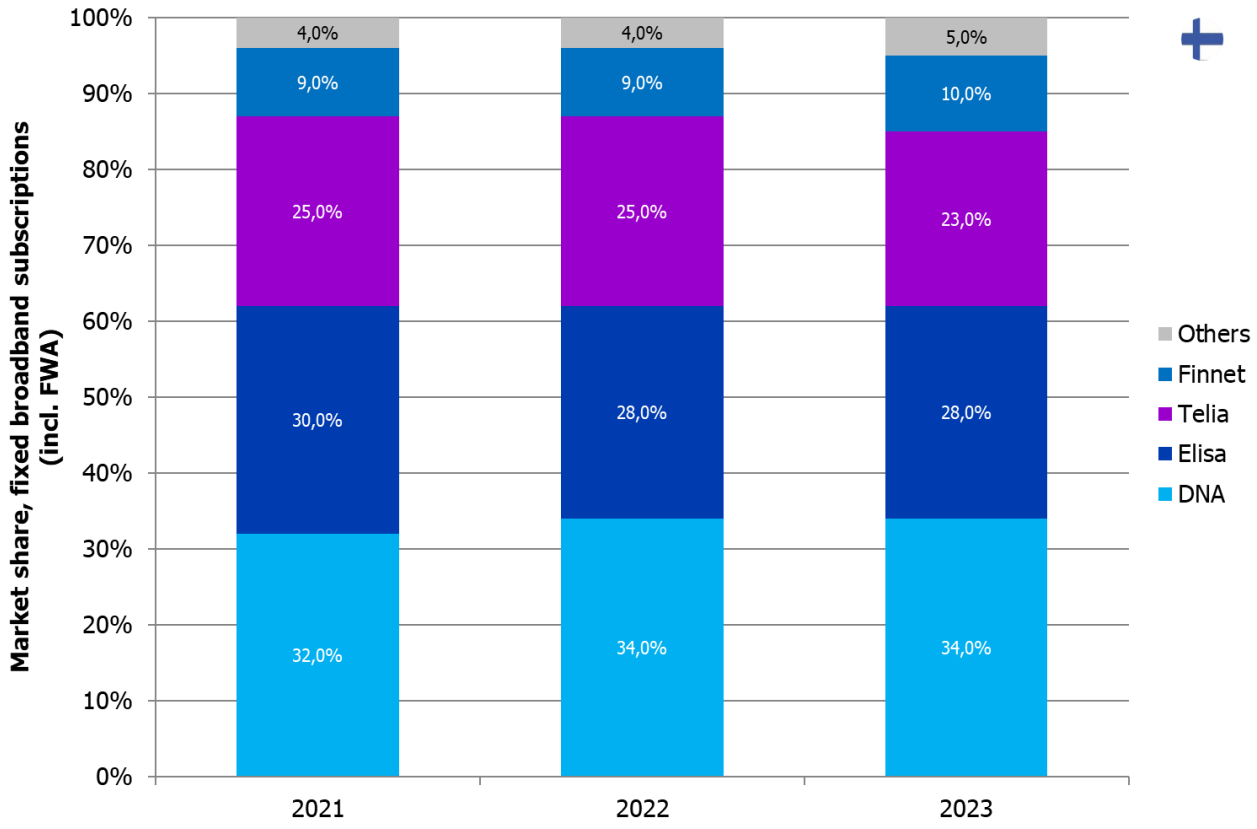


Figure 46. Market share in fixed broadband subscriptions (incl. FWA), Finland [source: Traficom].

The largest operator in Finland, DNA, had a fixed broadband subscription market share of **34.0%** in 2023.

The table below summarises the market shares of the incumbent in each other markets – and calculates the concentration index HHI for the individual mobile markets.

What is HHI?

The Herfindahl-Hirschman Index is a simple and widely applied economic concept that often is used in regulation and antitrust matters. It is defined as the sum of the squares of the market shares of the companies competing in a market. A monopoly would thus get an index of $100^2 = 10000$ which is the maximum value and depicts a fully concentrated market.

Where the line should be drawn between a moderately concentrated and a highly concentrated market is obviously debatable but the U.S. Department of Justice has in its merger guidelines stated that a HHI value above 2500 should be considered highly concentrated.

The mobile business, with its limited number of licences, is often having higher HHI values than 2500, though.

	Market share of largest player 2023	Herfindahl-Hirschman Index (HHI) 2023 [0-10000][49]
Norway - revenue	34.8% (Altibox)	2478 (-53)
Denmark - subscriptions	38.4% (Nuuday)	2917 (+-0)
Sweden - revenue	32.8% (Telia)	2066 (-36)
Finland - subscriptions	34.0% (DNA)	2594 (-68)

Figure 47. Comparison of incumbent market shares in fixed broadband revenue or -subscriptions for Norway, Denmark, Sweden, and Finland – as well as HHI for the whole fixed broadband market, 2023 (change from 2022 within parentheses) [source: Nkom, SDFI, PTS, Traficom, compiled by Tefficient].

The Norwegian fixed broadband market is – if treating Altibox as one – quite typically concentrated for a Nordic market. This is true both when comparing the revenue market share of the largest player as well as when comparing the HHI. The HHI has also decreased 53 points since 2022.

Altibox's contribution to the HHT of Norway is **49%** (1213 of 2478 HHI points). In comparison, Nuuday's contribution to the Danish HHI is 51%, Telia's is 52% to the Swedish HHI and DNA's is 45% to the Finnish HHI.

The Norwegian fixed broadband market is about as concentrated as the Nordic average. Altibox's collective revenue market share explains 49% of Norway's HHI which is about as high as the largest player in the other three markets. Norway's concentration – as well as Sweden's and Finland's – decreased a bit since 2022.

[49] 'Others' is treated as one which increases HHI a bit in all markets

23 What could explain Norway's high broadband prices?

As seen in both the ARPU comparisons and the fixed broadband pricing comparisons, Norway has higher fixed broadband revenue and prices than the other three Nordic markets. Adjusting for purchasing power does not change that. It's unlikely that market concentration explains the high prices; the concentration is roughly as high in the other markets.

One factor that distinguishes Norway is, as mentioned, that fibre networks aren't yet open so that any internet service provider (with an agreement) can sell its services on top of a fibre access network. Open fibre networks are today the norm in Sweden and Denmark whereas Finland are taking steps in that direction. It has led to more broadband providers being able to offer their services in a wider geography which increases the level of competition – but open fibre networks could also be negative for the rollout of fibre as it would discourage one fibre owner to overbuild another.

Another factor that distinguishes Norway from most operators in Denmark and Sweden (but not Finland) is that FWA isn't offered by the providers to an address where the provider can deliver fibre or HFC broadband. Norwegian operators are not allowing their own FWA to compete with their own fixed broadband. With the current pricing of FWA in Norway – where it essentially costs the same as fixed broadband – this is likely not affecting competition too much, but if Norwegian FWA would come down in price, to levels seen in Denmark, Sweden, and Finland, it could be good for competition if providers would not hide their FWA offers just because they can deliver fibre or HFC broadband. It should ultimately be up to the consumer to decide on broadband technology.

Making the use of an external FWA antenna optional rather than compulsory could be key in making FWA more affordable in Norway. Of 3830 gathered address-based FWA offers in the other three countries, only 492 (or 12%) came with a compulsory external antenna. This can be replicated in Norway.

Market concentration is an unlikely explanation of Norway's high broadband prices. The lack of open fibre networks in Norway could contribute, though. Another possible contribution is that FWA is not provided as a lower-cost option in Norway – and that broadband providers hide FWA offers when being able to deliver fibre or HFC broadband. Removing the compulsory external FWA antenna could make FWA more affordable in Norway.

24 Summary and conclusion

In summary, the findings of this edition of the analysis are:

Fixed broadband: ARPU

- The Norwegian revenue per fixed broadband subscription is higher than in the other countries.
- This is the case both if including and excluding FWA and both before and after compensation for differences in purchasing power.

Fixed broadband: Technology and speed tier mix (value for money)

- Norway has a high share of its fixed broadband base in fibre, but Sweden's is still higher.
- A close-to-Nordic-average share of Norwegian fixed broadband customers subscribed to 100 Mbit/s or faster services in 2023. Denmark and Sweden had higher shares.
- Norwegian fixed broadband customers are, based on these two metrics, not getting the best value for money in the Nordics.

Fixed broadband: ARPU

- Telenor Norway has the highest fixed full-base (B2C and B2B) broadband ARPU among reporting Nordic operators.
- Telia Norway has a much lower level – more comparable with Denmark, Sweden and Finland.

Fixed broadband: Subscription fee

- Norwegian plans are generally much more expensive than same-speed plans in Denmark, Sweden, and Finland.
- This is the case both before and after compensation for differences in purchasing power.

Fixed broadband: One-time fee – new build

- The Norwegian new build one-time fees of 5000 NOK or lower are reasonable in comparison to the Finnish examples. Denmark generally operates with lower new build one-time fees. No new build cases were found for Sweden.
- This is the case both before and after compensation for differences in purchasing power.

Fixed broadband: One-time fee – existing connection

- One-time fees for existing connections are often much lower than for new build. They are also modest in comparison to subscription fees over a longer period. This means that it's not a very important cost component in the bigger picture.

Fixed broadband: Total 5-year fee – new build

- The Norwegian new build customer will pay a much higher amount during a 5-year period than a Finnish or Danish customer. No new build cases were found for Sweden.
- This is the case both before and after compensation for differences in purchasing power.

Fixed broadband: Total 5-year fee – existing connection

- The Norwegian existing connection customer will, with few exceptions, pay a much higher amount than customers in Denmark, Sweden, and Finland.
- This is the case both before and after compensation for differences in purchasing power.

Fixed broadband: Actual throughput (quality for money)

- Norway has fixed broadband networks with high median throughput, but so have Sweden and Finland. Denmark has a much faster speed than Norway.
- With Norway's much higher subscription fees, the willingness to pay for a faster throughput tier might not be as present as in Denmark.

FWA: Subscription fee

- Norwegian FWA plans are much more expensive than same-speed plans in Denmark, Sweden, and Finland.
- This is the case both before and after compensation for differences in purchasing power.
- Norwegian FWA plans with 200 Mbit/s or higher maximum speed are priced as high or with a premium over same-speed fixed broadband plans. FWA plans are cheaper only at slow speeds. In the other Nordic markets, FWA provides a lower-cost option regardless of speed.

FWA: One-time fee – new build

- Norwegian new build FWA with external antenna one-time fees at around 2000 NOK or lower for binding options are lower than in Sweden and Finland. The fees at around 5000 NOK for non-binding options are lower than in Finland.
- This is the case both before and after compensation for differences in purchasing power.
- The new build FWA without external antenna one-time fees have the potential to be lower than with an external antenna, but so far, no such options are offered in Norway.

FWA: Total 5-year fee

- The Norwegian FWA customer with external antenna will always pay a higher amount than all Swedish and Finnish customers for the same speed.
- This is the case both before and after compensation for differences in purchasing power.
- Some Norwegian FWA plans are still limited to 2000 GB of full-speed data per month – a restriction compared to fixed broadband plans. Most providers in the Nordic have by now decided to make also FWA plans unlimited.

Broadband & TV bundle: Subscription fee

- Norwegian bundled broadband & TV plans always come with a much higher average monthly subscription fee than similar plans in Sweden and Finland.
- This is the case both before and after compensation for differences in purchasing power.

TV: ARPU

- Telenor Norway has the highest TV ARPU among Nordic operators that report today.

- Telia Norway is at a lower level – still above the Nordic median.
- This is the case both before and after compensation for differences in purchasing power.

EBITDA

- Neither Telenor Norway nor Telia Norway has a problem with high OPEX. If so, their EBITDA margins wouldn't be best in class and improving.
- Lyse Tele has a lower EBITDA margin, close to the Nordic median if excluding Telenor Norway and Telia Norway.

CAPEX

- Norwegian operators all invest more – as share of total revenue – than the median Nordic operator.

Cash flow approximation (EBITDA-CAPEX)

- Neither Telenor Norway nor Telia Norway has a problem with high OPEX+CAPEX. If so, their EBITDA-CAPEX margins wouldn't be the highest in the Nordics.
- The situation for Lyse Tele is different: In 2023, Lyse Tele could not cover its CAPEX with its EBITDA.

Market concentration

- The Norwegian fixed broadband market is about as concentrated as the Nordic average.
- Altibox's collective revenue market share explains 49% of Norway's HHI which is about as high as the largest player in the other three markets.
- Norway's concentration decreased a bit since 2022.

Other possible explanations to Norway's high broadband prices

- The lack of open fibre networks in Norway could contribute to Norway's high broadband prices.
- Another possible contribution is that FWA is not provided as a lower-cost option in Norway – and that broadband providers hide FWA offers when being able to deliver fibre or HFC broadband.
- Removing the compulsory external FWA antenna could make FWA more affordable in Norway.
