

Analysis prepared for EETT, Hellenic Telecommunications & Post Commission

# Assessment of Greece's fixed broadband and telephony ARPU and value for money in an EU context



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### **1** Executive summary

This comprehensive analysis, commissioned by the Hellenic Telecommunications & Post Commission (EETT), presents a pioneering comparison of fixed broadband and telephony markets across twelve Eurozone (or Euro-pegged) EU countries from 2018 to 2023. It analyses key industry metrics such as revenue, technology mix, speed, and data usage using official data from national regulatory authorities, including EETT and its peers.

The analysis derives its insights from actual usage patterns, technology mixes, speeds, and revenues rather than focussing on best-in-market offerings or theoretical service baskets. Careful consideration was given to selecting peer group countries to ensure robust data comparisons, minimising potential distortions such as currency fluctuations. Revenue comparisons are carefully conducted, both with and without adjustments for comparative price levels.

Key findings highlight the following characteristics of the Greek fixed broadband and telephony market:

#### Fixed broadband

- Lowest ARPU among peers, with noticeable growth.
- Lowest share of fibre subscriptions and 100 Mbit/s services.
- Slowest median download speed, with slowest growth.
- Below-median data usage but experiencing the fastest growth.
- Lowest revenue per GB with faster-than-median erosion.

#### Fixed telephony

- ARPU above the median, with a typical rate of decline.
- Highest voice usage in the peer group, with slower-than-median decline.
- Below-median revenue per minute, increasing at a faster rate.

In conclusion, Greek fixed broadband subscribers pay the least, which aligns with slower speeds and fewer high-speed subscriptions. On the other hand, fixed telephony users pay above the median, consistent with the highest voice usage in the peer group. Both markets align with a more-for-more approach and produce logical value-for-money outcomes based on their unique characteristics.

Greece's fixed broadband technology mix is one of the least advanced among its peers, with the slowest median download speed and the lowest share of subscriptions offering 100 Mbit/s or higher. Data usage per subscriber is also below the peer group median. Reflecting this, Greek broadband customers pay the least on average.
However, Greece shows promise, with the fastest growth in both the share of high-speed subscriptions and data usage among the peer group countries.

In contrast, Greek fixed telephony users pay above the median monthly amount, but also have the highest voice usage, resulting in a below-median revenue per minute. While voice usage is declining due to a shift towards mobile and online alternatives, the rate of decline in Greece is slower than the peer group median.

Overall, Greece's value-for-money position aligns with the more-for-more approach.

### 2 Background

This analysis is commissioned by the Hellenic Telecommunications & Post Commission, EETT, and is the first of its kind with focus on Greece.

There are fixed broadband and telephony price benchmarks available globally but the drawback of these is that they compare the currently best available fixed plans sold to consumers online. Due to binding contracts and inertia, most customers are however not on these plans – but on older plans that often are more expensive.

To add to it, such price benchmarks can effectively only assess the pricing on the online *consumer* market. What *business* customers pay is often not public but negotiated directly between the provider and the business in question. Within the consumer market, providers might also have different propositions online than what they e.g. have in their stores or at retailers.

Another weak spot is that the *actual* usage of e.g. data and voice and the *actual* download speed can't be benchmarked – the focus in instead on the theoretical maximum download speed marketed.

To address this, this analysis is instead based on the actual usage of fixed subscribers and the actual revenues that fixed service providers make. It also uses Ookla Speedtest data to assess the delivered download speed.

	This analysis	Price benchmarks
Revenue/pricing	Actual retail revenues derived from fixed users	Best prices of fixed plans or baskets
Segments	Consumer and business	Consumer
Channels	All	Often just one: Online
Fixed data usage	Actual usage	Not considered
Fixed voice usage	Actual usage	Not considered or included in baskets
Download speed	Actual median speed	Theoretical maximum speed

The table below compares this analysis to a typical price benchmark.

Figure 1. Comparison of this analysis and price benchmarks [source: Tefficient].



As input, this analysis relies on officially reported data from twelve European national regulatory authorities (NRAs) and BEREC members:

- HAKOM, Croatia
- Klimadatastyrelsen, Denmark<sup>1</sup>
- ARCEP, France
- EETT, Greece
- ComReg, Ireland
- AGCOM, Italy
- SPRK, Latvia
- RRT, Lithuania
- ILR, Luxembourg
- MCA, Malta
- ACM, the Netherlands
- CNMC, Spain

<sup>&</sup>lt;sup>1</sup> In Denmark it's Erhvervsstyrelsen that is the BEREC member, but Klimadatastyrelsen is responsible for the data reporting.

### **3** Peer group and methodology

Twelve EU countries, all today in the Eurozone or with currency pegged to the EUR<sup>2</sup>, have been selected as the peer group for this analysis:

- Croatia (HR)
- Denmark (DK)
- France (FR)
- Greece (GR)
- Ireland (IE)
- Italy (IT)
- Latvia (LV)
- Lithuania (LT)
- Luxembourg (LU)
- Malta (MT)
- Netherlands (NL)
- Spain (ES)



Figure 2. Peer group countries.

<sup>&</sup>lt;sup>2</sup> Denmark is not in the Eurozone, but the currency (DKK) is pegged to the EUR within a +/- 2.25% range.



The rationality for selecting these are:

- They are all EU countries, subject to a harmonised regulatory framework.
- They are all today<sup>3</sup> having the Euro as currency or with its currency pegged to the EUR which eliminates the risk that currency fluctuations distort trends.
- The NRAs in these countries report the necessary statistics<sup>4</sup> on e.g. fixed data traffic and fixed broadband and telephony service revenues.

The table below shows why the remaining nine Eurozone countries in EU27 weren't selected for the peer group this time.

	NRA doesn't report the necessary statistics
Austria	Reported fixed broadband revenue includes bundled products
Belgium	Reported fixed revenue doesn't breakout broadband and voice
Cyprus	Fixed broadband revenue not reported
Estonia	Fixed broadband revenue not reported
Finland	Reported fixed revenue doesn't breakout broadband and voice
Germany	Reported fixed revenue doesn't breakout broadband and voice
Portugal	Reported fixed broadband revenue includes bundled products
Slovakia	Fixed broadband revenue not reported
Slovenia	Reported fixed revenue doesn't breakout broadband and voice

Figure 3. Reason to why other Euroland countries in EU27<sup>5</sup> weren't selected for the peer group this time [source: Tefficient].

By selecting only Eurozone countries (and Denmark pegged to the EUR) amongst our peer group, we avoided the problem of currency fluctuations that have been vivid in the rest of Europe in the past three years. But although the currency, the Euro (EUR), is the same in our peer group markets, it does not mean that the purchasing power parity and **price levels** are comparable.

When we in this analysis compare revenues, we will hence make two comparisons:

- In EUR *without* compensation for the general comparative price level
- In EUR *with* compensation for the general comparative price level

The general comparative price levels are defined by Eurostat as:

<sup>&</sup>lt;sup>3</sup> Croatia joined the Euro in 2023. For the 2018-2022 period, this analysis uses the average of the daily HRK-EUR exchange rate for each period as reported by ECB. Fluctuation was limited, in part because Croatia, to prepare, joined the ERM II arrangement of multilateral fixed, but adjustable, exchange rates in July 2020 [source]. During the Q1 2018-Q4 2022 non-Euro period in this analysis, the HRK-EUR fluctuation extremes were -1.9% (Q3 2019) and +0.6% (Q2 2020) [source] vs. the official conversion rate of 7.53450 EUR per HRK [source] set in July 2022 when the Council of the European Union approved Croatia's accession to the European. <sup>4</sup> On a few occasions, NRA data with sufficient breakdown isn't available, or not available for the whole time period. If so, the graphs will leave that country out for the metric or period.

<sup>&</sup>lt;sup>5</sup> The remaining EU27 countries Bulgaria, Czechia, Hungary, Poland, Romania, and Sweden are excluded for not being in the Eurozone.



Comparative price levels are the ratio between Purchasing power parities (PPPs) and market exchange rate for each country. PPPs are currency conversion rates that convert economic indicators expressed in national currencies to a common currency, called Purchasing Power Standard (PPS), which equalises the purchasing power of different national currencies and thus allows meaningful comparison. The ratio is shown in relation to the EU average (EU27\_2020 = 100). If the index of the comparative price levels shown for a country is higher/lower than 100, the country concerned is relatively expensive/cheap as compared with the EU average.

The compensation in this analysis is done using <u>Eurostat's values</u>, reported per annum.

Figure 4 compares the latest available, 2023, comparative price levels. The values shown are a ratio in relation to the EU27 average – a value of 100 would mean a comparative price level exactly as the EU27 average.



Figure 4. Comparison of the comparative price levels in 2023 for the peer group countries [source: Eurostat, 17 Sep 2024].

**Greece** had a comparative price level of 87.2 in 2023, meaning that Greek general prices are lower than the EU27 average of 100. Denmark had the highest comparative price level, 143.4. Three peer group countries had a lower comparative price level than Greece: Latvia, Lithuania, and Croatia.

The logic of compensating for the general comparative price level is to take purchasing power parities into account. In a country with high comparative price level, like Denmark, it could logically be expected that the



fixed broadband and telephony revenues would be high – since the purchasing power parity, and hence the general comparative price level, are high.

In contrast, in a country with low comparative price level, like Croatia, it could logically be expected that the fixed broadband and telephony revenues would be low – since the purchasing power parity, and hence the comparative price level, are low.

The comparative price level is calculated on a generic basket of goods and services in a harmonised way across EU countries – but should still be regarded as indicative. Since we in this analysis always make comparisons both with and without compensation for the comparative price level, the reader can easily see what impact the adjustment has.

When interpreting Greece's outcome, the analysis most often refers to the median value of the peer group. Alternatively, averages could have been calculated, but since country outliers with very high or very low values would impact an average value significantly, we have selected the median as the baseline of this analysis.

### 4 Observed data issues and assumptions

#### 4.1 Reporting of different NRAs has different frequency

In an ideal world, the reporting of official telecommunication statistics would be synchronised, but the reality is that the reporting frequency is different. The table below shows how frequently reporting happens – once a year (1), twice a year (2) or every quarter (4).

	Reporting frequency per year, subscriptions and (if reported) traffic (usage)	Reporting frequency per year, revenue
Croatia (HR)	4	4
Denmark (DK)	2	61
France (FR)	4	4
Greece (GR)	2	2
Ireland (IE)	4	4
Italy (IT)	4	1
Latvia (LV)	1	1
Lithuania (LT)	4	4
Luxembourg (LU)	2	2
Malta (MT)	4	4
Netherlands (NL)	4	4
Spain (ES)	4	4

Figure 5. Comparison of the reporting frequency of NRA statistics for the peer group countries [source: Tefficient].

Since it's the least common denominator, we have chosen to compare all metrics on an annual basis.

<sup>&</sup>lt;sup>6</sup> Regretfully not yet reported for 2023.

# 4.2 Fixed broadband technology breakdown not reported in a fully comparable way between countries

In our peer group, all countries today report a breakdown of the fixed broadband subscriptions per technology. For two countries, Greece and Italy, the reported technology data does not go back all the way to 2018, though.

What complicates the comparison is that each country uses different and partly overlapping technology definitions, e.g. FTTH, FTTx, FTTB, FTTC, HFC, VDSL and DSL. This analysis strives to be able to compare the technology split between **four basic technologies by the end of 2023**:

- Fibre (FTTH and fiber-LAN or FTTB),
- Cable TV (HFC),
- DSL (including all variants of DSL), and
- Fixed wireless access (FWA).

Some assumptions have been made to make this comparison possible: Subscriptions reported as FTTC (only done in Greece and Italy) are grouped with HFC. Fixed wireless access subscriptions are not reported by the NRAs in Denmark and the Netherlands. France mixes its technology definitions with supported download speeds which has been commented separately.

The **fibre share of total fixed broadband subscriptions** is, in addition, shown for the whole comparison period 2018-2023 (where data is reported).

# 4.3 Fixed broadband maximum download speeds not reported by all countries and not in a fully comparable way

In our peer group, all countries but Croatia and Malta today report a breakdown of the fixed broadband subscriptions per download speed tier. For Ireland, the data only goes back to 2022.

What complicates the comparison is that most countries use its own way of defining the thresholds of the tracked speed tiers, e.g. above 1000 Mbit/s, above 500 Mbit/s, above 300 Mbit/s, and above 100 Mbit/s just to name a few. In some cases, the defined tiers have also been altered during the comparison period, making comparisons over the whole period 2018-2023 impossible.

It has been able to harmonise the reporting so that a comparison of the **fixed broadband subscriptions** with **100 Mbit/s or higher** can be done, though. This is shown for the whole comparison period 2018-2023 (where data is reported).

# 4.4 Fixed broadband data traffic not reported by all countries and not in a fully comparable way

In our peer group, six countries (Croatia, Denmark, Greece, Ireland, Italy, and Spain) today report the fixed broadband data traffic. The data does not go back to 2018 for Italy and Spain.



What complicates the comparison is that fixed wireless access (FWA) sometimes is excluded from and sometimes included in the reported traffic figures. For certain countries, it's not known whether it is included or not. This is our best understanding of how FWA traffic is reported in relation to fixed broadband traffic:

- Croatia: Included (not broken out)
- Denmark: Excluded (part of mobile data traffic but not broken out)
- Greece: Not clear, but due to the limited FWA base the error should be marginal
- Ireland: Included (and broken out)
- Italy: Included (not broken out)
- Spain: Included (not broken out)

This analysis compares the **fixed data usage per broadband subscription including FWA** for these countries for the whole comparison period (where data is reported). The exception is Denmark where FWA is excluded.

It also compares the **fixed broadband revenue per consumed gigabyte** (GB) of fixed data for these six countries for the whole comparison period (where data is reported). For Denmark, FWA is excluded.

#### 4.5 Fixed broadband service revenue not including FWA in all countries

We have selected our peer group so that all twelve countries report the fixed broadband service revenue. But FWA complicates the comparison also here. Since fixed wireless access subscriptions are not reported by the NRAs in Denmark and the Netherlands, the fixed broadband ARPU (average revenue per user) has been calculated without FWA in these two countries. Whereas the error is marginal in the Netherlands since FWA hardly is offered, all Danish mobile operators offer FWA widely today which could mean the Danish fixed broadband ARPU would be different (likely lower) if FWA was included.

This analysis compares the **fixed broadband ARPU including FWA** for all countries except Denmark for the whole comparison period (where data is reported). For Denmark, FWA is excluded.

#### 4.6 Fixed voice traffic not reported by all countries

Among our peer group, all twelve NRAs report fixed voice service revenue. In the case of the Netherlands, the reporting goes back to 2020. Italy is however not reporting its fixed voice subscription base.

This allows us to in this analysis compare the **fixed voice ARPU** for all countries but Italy for the comparison period (where data is reported).

All but one country, Italy, also report fixed voice traffic (i.e. minutes).

This allows us to in this analysis compare the **fixed voice usage** for all countries except Italy for the whole comparison period.

Combining revenue and usage, this means that we in this analysis can compare the **revenue per minute** for all countries except Italy – with the Netherlands going back to 2020.

### 5 Fixed broadband ARPU

### 5.1 Unadjusted

This analysis has used reported official data from the respective NRAs to calculate the average service revenue per fixed broadband subscription<sup>7</sup> per month – normally referred to as **ARPU** within the industry. Figure 6 below shows the ARPU in EUR.

Subscriptions are included from both consumer and business segments.



Figure 6. Comparison of fixed broadband ARPU [source data: respective NRA, compiled by Tefficient].

We have yet to compare the ARPU to the technology mix, speed, and usage levels to assess value for money but let's first note that **Luxembourg** always have had the highest monthly ARPU, growing to 52.0 EUR in 2023. Since Luxembourg has the third highest comparative price level, see Figure 4, it could possibly explain some of it.

**Denmark**, who has the highest comparative price level had the second highest ARPU.

<sup>&</sup>lt;sup>7</sup> 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.



The monthly ARPU of **Greece** was 10.3 EUR in 2023 which is not just lower than the median (shown with the dotted green line) but lowest of all countries.

The table below compares the long-term trends by calculating the compound annual growth rate (CAGR) from 2018 to 2023. For the Netherlands, CAGR starts in 2020.

Fixed broadband ARPU	HR	DK*	FR	GR	IE	IT	LV	LT	LU	МТ	NL*1	ES	Median
CAGR 2018- 2023	-2%	+4%	+1%	+4%	+4%	0%	+1%	+5%	+2%	+3%	+8%	-1%	+2%

Figure 7. Comparison of the CAGR for fixed broadband ARPU 2018-2023. \*) Excl. FWA 1) 2020-2023 [source data: respective NRA, compiled by Tefficient].

**Greece** is among the 9 countries that had a positive CAGR in its ARPU, +4%. **Netherlands** has had the fastest ARPU growth, +8%, whereas **Croatia** has had the fastest erosion, -2%.

Greece's revenue per fixed broadband subscription is, before compensation for the comparative price level, lowest of all countries.

Greece had a positive CAGR in the ARPU – more positive than the median of the peer group.

#### 5.2 Adjusted to the comparative price level of Greece

Let's now adjust for the comparative overall price level as described in section 3. But before looking at the outcome, let us show how the adjustments have been made:

#### How the price level adjustments were calculated

Figure 4 shows that the comparative price level in Croatia, relative to EU27's 100, was 75.8 in 2023. The comparative price level in Greece was 87.2. When we adjust Croatia to the comparative price level of Greece, we first divide 75.8 with 87.2 and get a quota of 0.87. In other words, the comparative price level of Croatia is 0.87 times that of Greece. To adjust a Croatian fixed service revenue value to the overall comparative price level of Greece, we then divide with 0.87.

	HR	DK	FR	GR	IE	IT	LV	LT	LU	МТ	NL	ES
Divider to Greek price level	0.87	1.64	1.26	1.00	1.63	1.14	1.00	0.94	1.54	1.02	1.35	1.06

Figure 8. Divider to Greek comparative price level, 2023 [source data: Eurostat, compiled by Tefficient].

The table shows the dividers for 2023. Previous years have slightly different values based on Eurostat's annual revision.

Figure 8 below shows the outcome when differences in the comparative price levels – relative to Greece's level – have been applied to Figure 6.

The graph lines for the countries with a divider lower than 1, i.e. Croatia, Latvia, and Lithuania, will move upwards after the adjustment whereas the countries with a divider larger than 1 will move downwards. Greece's line will not move at all as we are adjusting the other countries to the level of Greece.



Figure 9. Comparison of fixed broadband ARPU, adjusted for comparative price level [source data: respective NRA, Eurostat, compiled by Tefficient].

After adjustment to the comparative price level of Greece, **Luxembourg** still has the highest ARPU whereas **France** now is second highest. Denmark with its high comparative price level, fell significantly compared to Figure 6.

The monthly ARPU of Greece was 10.3 EUR in 2023 which still is the lowest of all countries.

We do not repeat the CAGR calculations for the adjusted case as it would be affected by Eurostat's annually revised figures on comparative price level. We hence repeat the conclusion on CAGR from the unadjusted case.

Greece's revenue per fixed broadband subscription is, after compensation for the comparative price level, lowest of all countries.

Greece had a positive CAGR in the ARPU – more positive than the median of the peer group.

### 6 Value for money: Fixed broadband technology mix

We have just concluded our comparison of fixed broadband ARPU and seen significant differences between our peer group countries. Let's now start assessing what fixed broadband users get for that ARPU by comparing it to a number of factors in sections 6, 7, 8, 9, and 10, starting with the **fixed broadband technology mix** in this section.

The notion would be that higher fixed broadband ARPU is correlated with how advanced the fixed broadband technology is: The more of old copper-based broadband, the lower the ARPU? The more of new fibre broadband, the higher the ARPU?

As stated in section 4.2, the international comparison of the technology mix has certain challenges, but with a few assumptions and clarifications, we can compare it for the main four technologies fibre, HFC/FTTC, DSL and FWA in Figure 10 below. The graph is sorted so that it starts with the country with the highest share of fixed broadband subscriptions on fibre, i.e. Spain.



Figure 10. Comparison of the fixed broadband subscription technology mix by end of 2023 [source data: respective NRA, compiled by Tefficient].

In **Spain**, 86% of fixed broadband subscriptions was fibre in December 2023. 8% was HFC, i.e. cable TV-based internet. DSL had a 3% market share and the remaining 3% was left to FWA. This technology mix is the most advanced among our peer group markets.



The country with the least advanced mix, relying the most on DSL, is **Croatia** (HR). Here, 57% of fixed broadband subscriptions are DSL while fibre represents 23% and HFC 16%.

**Greece** too relies on DSL to a high extent, 45%. An approximately as large share, 47%, are reported as FTTC subscriptions. In Greece's case this is not HFC, but part-fibre subscriptions where "the last mile" is copper. Only 8% of the Greek fixed broadband base is pure fibre, the lowest share of all countries.

Realising that there are comparability issues between the technology reporting of different countries, we still try to correlate the adjusted fixed broadband ARPU with the share of fixed broadband subscriptions being fibre, see Figure 11 below.



Figure 11. Fixed broadband ARPU, adjusted for comparative price level vs. fibre share of fixed broadband subscription base, 2023 [source data: respective NRA, Eurostat, compiled by Tefficient].

There is no correlation which is indicated by the trend line's R<sup>2</sup> value being very close to 0. It is e.g. not possible to state that Luxembourg's high adjusted ARPU is linked to a high fibre share in the fixed broadband subscription base. In contrast, Latvia, Lithuania, and Spain have higher fibre proportions but significantly lower adjusted ARPUs.

Because of the lack of correlation, **Greece**'s very low fibre share should not be seen as the explanation to the low fixed broadband ARPU in Greece. We will soon assess other possible explanations.



If comparing how the fibre proportion of the total fixed broadband subscription base has developed, we can see that Spain has overtaken both Latvia and Lithuania during our comparison period.

Figure 12. Comparison of fibre share of fixed broadband subscription base, 2018-2023 [source data: respective NRA, compiled by Tefficient].

It's visible in the graph that France and Ireland have had good growth in fibre's share of subscriptions. If calculating France's CAGR, it's 32% whereas Ireland's is 45% – in both cases much higher than the median of the peer group which is 19%.

Fibre subscriptions of total	HR	DK*	FR	$GR^1$	IE	IT <sup>2</sup>	LV	LT	LU	МТ	NL*	ES	Median
CAGR 2018- 2023	+27%	+12%	+32%	+83%	+45%	+36%	+3%	+2%	+13%	+24%	+15%	+8%	+19%

Figure 13. Comparison of the CAGR for fibre share of fixed broadband subscription base, 2018-2023. \*) Excl. FWA 1) 2022-2023 2) 2019-2023 [source data: respective NRA, compiled by Tefficient].



The highest CAGR is with **Greece**, though: 83%. This value is however just based on data for one year – from 2022 to 2023. That growth is also starting at the peer group's lowest level. Greece remains the country with the lowest share of fibre subscriptions.

The fixed broadband technology mix in Greece is one of the least advanced among the peers with the lowest proportion of fibre subscriptions and a high proportion of DSL subscriptions.

Greece's growth rate in the fibre share of subscriptions is currently the fastest, though.

There's no correlation between the fibre proportion and the ARPU among peer group countries. The low fibre share should hence not be seen as the explanation to Greece's low ARPU.

### 7 Value for money: Fixed broadband speed tier distribution

Following that lack of correlation, we leave the technology mix to move to a comparison of the **speed tier mix**.

The notion here would be that higher fixed broadband ARPU is correlated with the maximum download speed of fixed broadband: After all, customers across Europe do pay for how fast their fixed broadband connection is when it performs at its best.

As stated in section 4.3, the international comparison of the speed tier distribution has certain challenges, but with a few assumptions and clarifications, we can at least compare it for the share of fixed broadband subscriptions offering at least 100 Mbit/s in download, see Figure 14 below.



Figure 14. Comparison of share of fixed broadband subscription base offering at least 100 Mbit/s in download, 2018-2023 [source data: respective NRA, compiled by Tefficient].

This graph is not too different from the fibre share graph, see Figure 12. We still have Spain at the top and **Greece** at the bottom. But fibre isn't the only technology capable of delivering 100 Mbit/s download speed, so countries have moved upwards in this chart.

A benefit of this comparison is that we have full data for Greece which allows a like-to-like comparison of the CAGR.



100 Mbit/s subscriptions of total	HR	DK*	FR	GR	IE	IT	LV	LT	LU	МТ	NL*	ES	Median
CAGR 2018- 2023	n/a	+17%	+27%	+122%	+17%	+19%	+4%	+9%	+13%	n/a	+13%	+10%	+15%

Figure 15. Comparison of the CAGR for share of fixed broadband subscription base offering at least 100 Mbit/s in download, 2018-2023. \*) Excl. FWA [source data: respective NRA, compiled by Tefficient].

The highest CAGR is again with **Greece**: 122%, but now for the whole comparison period. The growth is though from the peer group's lowest level. Greece remains the country with the lowest share of subscriptions supporting at least 100 Mbit/s in download.

But let's now test if there's correlation between the ARPU and the share of subscriptions offering 100 Mbit/s or more. This time, there's some decent correlation.



Figure 16. Fixed broadband ARPU, adjusted for comparative price level vs. share of fixed broadband subscription base offering at least 100 Mbit/s in download, 2023 [source data: respective NRA, Eurostat, compiled by Tefficient].



It supports the view that Greece's low fixed broadband ARPU, at least partly, is explained by the low share of fixed broadband subscriptions offering 100 Mbit/s. Having said that, Latvia and Lithuania have not that much higher adjusted ARPU levels – yet more than 70% of the subscription base have 100 Mbit/s or more.

The fixed broadband subscriber base in Greece has the lowest proportion of subscriptions offering at least 100 Mbit/s.

The CAGR is though the fastest among the peer group.

There's some correlation between the 100 Mbit/s proportion and the ARPU among the peer group countries. The low 100 Mbit/s share could therefore partly be seen as an explanation to Greece's low ARPU.



### 8 Value for money: Fixed broadband median speed

With those 100 Mbit/s findings in mind, we continue the speed track but use another input data source: **Ookla Speedtest**. Let us compare the actual throughput that the median<sup>8</sup> fixed broadband customer get. Since fixed broadband almost exclusively is priced based on throughput, the median throughput is the result of two factors:

- What the broadband connections technically deliver.
- How much the customers have been willing to pay for their connections.

If the first factor dominates, countries with more advanced technology mix would have the best results as fibre generally can deliver the offered speeds at all times whereas HFC and especially DSL seldom do. If the second factor instead is the dominant one, a hypothesis could be that cheaper fast broadband offers in a market leads to higher average throughput – as more households could afford it.

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 for the total country market. Still, Ookla publishes the results of these tests every month for essentially all countries of the world and the results are much in line with the (more limited) reporting of NRAs.

Figure 17 below shows the development of the median speed per country according to the Ookla data from May 2023 to May 2024.

<sup>&</sup>lt;sup>8</sup> Ookla Speedtest have changed from average to median throughput as their primary metric.



Figure 17. Comparison of median download speed, May 2023-May 2024 [source data: Ookla, compiled by Tefficient].

France and Denmark have both been leading in this time period, but **France** is the current leader with **237 Mbit/s**.

The Netherlands had a significant lift in speed in October 2023 – we highlight this as this increase is clearly visible also in the NRA reported data as shown from 2022 to 2023 in Figure 14. It is an indication that Ookla's data is reliable. The increase is an effect of VodafoneZiggo's decision to <u>double download speeds</u> for many customers from 2 October 2023.

Greece is positioned at the bottom of the graph with a median speed of **49 Mbit/s** in May 2024.

The table below shows the year-on-year trend from May 2023 to May 2024 in the Ookla-reported median download speed.



Median download speed [Ookla]	HR	DK	FR	GR	IE	IT	LV	LT	LU	MT	NL	ES	Median
May 2023-May 2024	+40%	+12%	+38%	+8%	+41%	+28%	+19%	+36%	+52%	+18%	+54%	+18%	+32%

Figure 18. Comparison of the year-on-year growth in median download speed, May 2023-May 2024 [source data: Ookla, compiled by Tefficient].

**Greece** has had the slowest growth of all peer group countries: 8%. The median country had 32%.

Let's now test if there's correlation between the ARPU and the Ookla-reported download speed. As another indication of that the Ookla data synchronises well with NRA data, Figure 19 below is not too different from Figure 16, the correlation graph based on the 100 or more Mbit/s share of base.



Figure 19. Fixed broadband ARPU, adjusted for comparative price level, 2023 vs. median fixed broadband download speed in May 2024 [source data: respective NRA, Eurostat, Ookla, compiled by Tefficient].



There's reasonable correlation in this graph. Fixed broadband customers in **Greece**, Latvia, and Lithuania have the lowest adjusted ARPU – and in comparison to Spain, the Netherlands, Denmark, and France, the median download speeds as measured by Ookla are also significantly lower.

Croatia and Italy are outliers: Fixed broadband customers here seem to have higher adjusted ARPU than they should – based on the relatively low median download speed.

Greece had the slowest median download speed according to Ookla data. The year-on-year increase in Greece's speed was, in addition, the slowest of all countries.

There's some correlation between the median download speed and the ARPU among the peer group countries. The low speeds could therefore partly be seen as an explanation to Greece's low ARPU.

### 9 Value for money: Fixed broadband data usage

Now to the value for money assessment where we compare the ARPU with the actual data usage. In Tefficient's <u>mobile report</u> commissioned by EETT, much effort is put into calculating and comparing the data usage and the revenue per gigabyte (GB). Whereas that logic is very relevant when it comes to mobile data – where mobile subscriptions typically are charged according to the number of gigabyte in a plan – it is less relevant when it comes to fixed broadband. With very few exceptions, fixed broadband plans in Europe are *not* charged based on the gigabyte consumption.

Still, we will give it a go here although the peer group, as stated in section 4.4, is limited. Let's first, in Figure 20, compare the data usage per average fixed broadband subscription<sup>9</sup>.



Figure 20. Comparison of data usage per average fixed broadband subscription, 2018-2023 [source data: respective NRA, compiled by Tefficient].

**Denmark** has had the highest data usage during the whole comparison period. In 2023, it was 422 GB per month. **Ireland** follows closely behind, especially during the COVID-19 pandemic start year of 2020 when Ireland's usage was as high as Denmark's.

<sup>&</sup>lt;sup>9</sup> 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.



Among these six countries, **Greece** has had the lowest or second-lowest data usage during the years. In 2023, the average Greek fixed broadband subscriber consumed 237 GB of data. That's higher than Croatia and close to Italy.

By looking at the graph, it becomes obvious that the data usage grows continuously everywhere but let us put numbers on it by calculating the CAGR.

Data usage per average subscription [GB]	HR	DK*	FR	GR	IE	IT <sup>1</sup>	LV	LT	LU	МТ	NL*	ES <sup>2</sup>	Median
CAGR 2018- 2023	+23%	+17%	n/a	+28%	+20%	+19%	n/a	n/a	n/a	n/a	n/a	+13%	+20%

Figure 21. Comparison of the CAGR for data usage per average fixed broadband subscription, 2018-2023. \*) Excl. FWA 1) 2019-2023 2) 2020-2023 [source data: respective NRA, compiled by Tefficient]

The highest CAGR is again with **Greece**: 28%, but not that much higher than the median CAGR which is 20%. The data usage grows, as said, continuously everywhere and Greece is no exception.

We don't have many data points in this section, but let's still test if there's correlation between the ARPU and the average data usage.



\*) Excluding FWA

Figure 22. Fixed broadband ARPU, adjusted for comparative price level vs. data usage per average fixed broadband subscription, 2023 [source data: respective NRA, Eurostat, compiled by Tefficient].

There's only some weak correlation between data usage and ARPU and as the Croatian and Italian adjusted ARPUs are much higher than Greece's without higher average data usage, we refrain from drawing conclusions based on Figure 22.

The average fixed broadband subscriber in Greece consumed less data than the median subscriber across six countries – but the usage growth is the quickest.

### **10** Value for money: Fixed broadband revenue per GB

#### 10.1 Unadjusted

In this section we will compare the fixed broadband revenue to the number of gigabyte consumed. Like in the ARPU section, we start with the unadjusted case.

Figure 23 below shows that the revenue per GB generally has decreased.



Figure 23. Comparison of fixed broadband service revenue per consumed GB [source data: respective NRA, compiled by Tefficient].

Italy had the highest revenue per GB in 2023, 0.13 EUR, with **Denmark** as number two with 0.10 EUR.

Among these six countries, **Greece** has always had **the lowest revenue per consumed GB**. In 2023, it was 0.04 EUR.

By looking at the graph, it again becomes obvious that there's revenue erosion but let us again put numbers on it by calculating the CAGR.



Revenue per consumed GB	HR	DK*	FR	GR	IE	IT <sup>1</sup>	LV	LT	LU	МТ	NL*	ES <sup>2</sup>	Median
CAGR 2018- 2023	-20%	-11%	n/a	-19%	-13%	-17%	n/a	n/a	n/a	n/a	n/a	-12%	-15%

Figure 24. Comparison of the CAGR for fixed broadband service revenue per consumed GB, 2018-2023. \*) Excl. FWA 1) 2019-2023 2) 2020-2023 [source data: respective NRA, compiled by Tefficient].

The median CAGR is -15% with a spread between -11% (Denmark) and -20% (Croatia). **Greece** has had a relatively quick erosion, -19%.

Greece's revenue per consumed GB is, before compensation for the comparative price level, lowest of the six reporting countries.

The erosion in CAGR has been faster than the median.

### **10.2** Adjusted to the comparative price level of Greece

Now to the adjusted case which affects the relative positions of countries.



Figure 25. Comparison of fixed broadband service revenue per consumed GB, adjusted for comparative price level [source data: respective NRA, Eurostat, compiled by Tefficient].

**Italy** is still highest after adjustment, but **Croatia** has now overtaken Ireland and Denmark for second place.

Among these six countries, Greece still had the lowest revenue per consumed GB in 2023.

We do not repeat the CAGR calculations for the adjusted case as it would be affected by Eurostat's annually revised figures on comparative price level. We hence repeat the conclusion on CAGR from the unadjusted case.

Greece's revenue per consumed GB is, after compensation for the comparative price level, lowest of the six reporting countries. The erosion in CAGR has been faster than the median.

### **11 Fixed voice ARPU**

### 11.1 Unadjusted

This analysis has used reported official data from the respective NRAs to calculate the average service revenue per fixed voice subscription<sup>10</sup> per month – referred to as **ARPU** within the industry. Figure 26 below shows the ARPU in EUR, unadjusted.



Both consumer and business segments are included.

Figure 26. Comparison of fixed voice ARPU [source data: respective NRA, compiled by Tefficient].

We have yet to compare the ARPU to the voice usage levels – see sections 12 and 13 – but first let's identify that **Ireland** always have had the highest voice ARPU, 27.6 EUR per month in 2023. Since Ireland has the second highest comparative price level, see Figure 4, that position could perhaps be seen as quite logical. **Denmark** features the second highest voice ARPU. At the other end of the scale, we find **France** which consistently has had the lowest voice ARPU.

<sup>&</sup>lt;sup>10</sup> 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.



The voice ARPU of **Greece** was 14.1 EUR per month in 2023 which is higher than the median.

As mentioned in section 4.6, we do not have revenue or subscriber input data for Italy.

Let's now look at the calculated compound annual growth rate (CAGR) from 2018 to 2023.

Fixed voice ARPU	HR	DK	FR	GR	IE	IT	LV	LT	LU	МТ	$NL^1$	ES	Median
CAGR 2018- 2023	-4%	-3%	-13%	-5%	-3%	n/a	-5%	-1%	-10%	-6%	-13%	-10%	-5%

Figure 27. Comparison of the CAGR for fixed voice ARPU 2018-2023. 1) 2020-2023 [source data: respective NRA, compiled by Tefficient].

All countries had negative CAGR which means that there was erosion in the fixed voice ARPU. **Greece** is no exception and its CAGR, -5%, is the same as the median for all reporting countries. **Lithuania** has had the best ARPU development, -1%, whereas **France** and the **Netherlands** have had the worst, -13%.

Greece's revenue per fixed voice subscription is, before compensation for the comparative price level, above the median.

Greece had a negative CAGR in the ARPU – aligned to the median of the peer group.

### **11.2** Adjusted to the comparative price level of Greece

Let's now adjust for the comparative overall price level as described in section 3.



Figure 28. Comparison of fixed voice ARPU, adjusted for comparative price level [source data: respective NRA, Eurostat, compiled by Tefficient].

After adjustment to the comparative price level of Greece, **Ireland** still has the highest and **France** the lowest fixed voice ARPU. The voice ARPU of **Greece** was 14.1 EUR per month in 2023 which now is the second highest and well above the median.

We do not repeat the CAGR calculations for the adjusted case as it would be affected by Eurostat's annually revised figures on comparative price level. We hence repeat the conclusion on CAGR from the unadjusted case.

Greece's revenue per fixed voice subscription is, after compensation for the comparative price level, well above the median.

Greece had a negative CAGR in the ARPU – aligned to the median of the peer group.

### **12** Value for money: Fixed voice usage

We have just established that Greece has higher than median fixed voice ARPU. Does it have something to do with the usage level?

In Tefficient's <u>mobile report</u> commissioned by EETT, we observed that the mobile voice usage of Greece was the highest among the peer group – and that it increased. The graph below, Figure 29, compares the voice usage per average *fixed* voice subscription<sup>11</sup>. **Greece** has the same position here – with the highest voice usage (174 minutes per month in 2023) – but the trend is the opposite, towards lower usage. Voice minutes hence seem to flow over from the fixed to the mobile domain in Greece.

In most of the other peer group markets, the fixed voice usage is in decline too. The increase in 2020 is associated with the COVID-19 pandemic with its lockdowns and restrictions.



Figure 29. Comparison of average monthly fixed voice usage per average fixed voice subscription [source data: respective NRA, compiled by Tefficient].

<sup>&</sup>lt;sup>11</sup> 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.



When we compare the compound annual growth rate (CAGR) of the mobile voice usage, we can see a decline in the median, -9%.

Fixed voice usage [mins]	HR	DK	FR	GR	IE	ІТ	LV	LT	LU	МТ	NL	ES	Median
CAGR 2018- 2023	-9%	+1%	-13%	-7%	-14%	n/a	-1%	0%	-12%	-21%	-14%	-12%	-9%

Figure 30. Comparison of the CAGR for fixed voice usage 2018-2023 [source data: respective NRA, compiled by Tefficient].

Another contribution to the decline could be that a proportion of fixed voice calls today have moved out of the telecom domain into various online collaboration tools like e.g. Microsoft Teams, Google Meet, or Zoom. The use of such tools are not included in the fixed telephony statistics issued by the NRAs.

**Greece** experienced a 7% decline in its CAGR, somewhat slower than the median decline of 9%. This means that the difference in voice usage between Greece and the median country increased.

Only Denmark and Lithuania (just) have had growth in the average fixed voice usage over the comparison period. This is explained by significant reductions in the fixed voice subscription bases.

Let's now test if there's correlation between the fixed voice ARPU and the average voice usage.



Figure 31. Fixed voice ARPU, adjusted for comparative price level vs. voice usage per average fixed voice subscription, 2023 [source data: respective NRA, Eurostat, compiled by Tefficient].

There's some reasonably good correlation between the fixed voice usage and the fixed voice ARPU in the graph above. Except for Ireland, the fixed voice customers in **Greece** pay more in adjusted ARPU per month than customers of the other countries, but they also have the highest consumption of voice minutes reflecting the trend where a higher minute consumption leads to higher ARPU.

Greece's fixed voice usage per fixed voice subscription is the highest among the peer group. Greece had slower decline in its CAGR than the median of the peer group. There's some correlation between the voice usage and the ARPU among the peer group countries. The high voice usage could therefore partly be seen as an explanation to Greece's high ARPU.

### 13 Value for money: Fixed voice revenue per minute

#### 13.1 Unadjusted

In this section we will compare the fixed voice revenue to the number of fixed voice minutes consumed. Like always, we start with the unadjusted case.

Figure 32 below shows that the revenue per minute generally has been flat or, in some cases, even increasing.



Figure 32. Comparison of fixed voice service revenue per minute [source data: respective NRA, compiled by Tefficient].

The revenue per minute is the highest in **Ireland**, 0.31 EUR in 2023. It has increased much in the past years although the fixed voice ARPU (see Figure 26) declined when the average voice usage (see Figure 29) declined even faster. **France** has the lowest revenue, 0.05 EUR.

**Greece** has a position below the median, with a value of 0.08 EUR per minute, although Greece's fixed voice ARPU is above the median. The explanation to it is that the voice usage in Greece is the highest of all markets.



When we compare the compound annual growth rate (CAGR) in the revenue per minute, we can see that it is flat in the median country – but that it varies a lot between countries.

Voice service revenue per minute	HR	DK	FR	GR	IE	IT	LV	LT	LU	МТ	$NL^1$	ES	Median
CAGR 2018- 2023	+5%	-5%	0%	+3%	+12%	n/a	-4%	-1%	+3%	+19%	-1%	+2%	0%

Figure 33. Comparison of the CAGR for fixed voice service revenue per minute 2018-2023. 1) 2020-2023 [source data: respective NRA, compiled by Tefficient].

The erosion in the revenue per minute was fastest in **Denmark**, -5%, whereas **Malta**'s revenue per minute increased 19%. **Greece** too had an increase, +3%.

Greece's voice service revenue per fixed voice minute is, before compensation for the comparative price level, below the median.

Greece had a faster increase in its CAGR than the median country.

#### 13.2 Adjusted to the comparative price level of Greece

It's time to again adjust for the comparative overall price level as described in section 3.

Figure 34 below shows the outcome when differences in the comparative price levels – relative to Greece's level – have been applied to Figure 32.



Figure 34. Comparison of fixed voice service revenue per minute, adjusted for comparative price level [source data: respective NRA, Eurostat, compiled by Tefficient].

After adjustment to the comparative price level of Greece, **Ireland** still has the highest revenue per minute while **Denmark** now has surpassed **France** for the lowest position. **Greece** is still below the median.

Greece's voice service revenue per fixed voice minute is, after compensation for the comparative price level, below the median.

Greece had a faster increase in its CAGR than the median country.



### 14 Summary and conclusion

This comprehensive analysis, commissioned by the Hellenic Telecommunications & Post Commission (EETT), presents a pioneering comparison of fixed broadband and telephony markets across twelve Eurozone (or Euro-pegged) EU countries from 2018 to 2023. It analyses key industry metrics such as revenue, technology mix, speed, and data usage using official data from national regulatory authorities, including EETT and its peers.

The analysis derives its insights from actual usage patterns, technology mixes, speeds, and revenues rather than focussing on best-in-market offerings or theoretical service baskets. Careful consideration was given to selecting peer group countries to ensure robust data comparisons, minimising potential distortions such as currency fluctuations.

Revenue comparisons are carefully conducted, both with and without adjustments for comparative price levels. When summarising the findings on **Greece** below, we will use a simple table to cover the cases.

#### Fixed broadband ARPU – lowest among peers, with noticeable growth

The fixed broadband ARPU of Greece is the lowest regardless of compensation for the comparative price level.

Fixed broadband	Before compensation for the comparative price level	After compensation for the comparative price level
ARPU	↓ ARPU lowest	↓ ARPU lowest
	↑ CAGR above median	↑ CAGR above median

It is increasing, though: Greece has had a more positive development (CAGR) in its ARPU than most other peer group markets.

#### Fixed broadband technology mix – lowest share of fibre subscriptions

The fixed broadband subscriber base in Greece has one of the least advanced technology mixes among the peer group: Greece has the lowest proportion of fibre subscriptions and a high proportion of DSL subscriptions. Greece's growth rate in the fibre share of subscriptions is currently<sup>12</sup> the fastest, though.

Fibre subscription share				
earrow Fibre share lowest				
↑ CAGR fastest (2022-2023)				

<sup>&</sup>lt;sup>12</sup> Greek data is just for 2022 to 2023.



There's no correlation between the fibre proportion and the ARPU among the peer group countries. The low fibre share should hence not be seen as an explanation to Greece's low ARPU.

#### Fixed broadband speed tier distribution – lowest share of 100 Mbit/s services

Among the peer group, the fixed broadband subscriber base in Greece has the lowest proportion of subscriptions supporting at least 100 Mbit/s in download. Greece's growth rate in the 100 Mbit/s share of subscriptions is the fastest, though.



There's some correlation between the 100 Mbit/s proportion and the ARPU among the peer group countries. The low 100 Mbit/s share could therefore partly be seen as an explanation to Greece's low ARPU.

#### Fixed broadband speed – slowest median download speed

Based on Ookla Speedtest's crowdsourced data, Greece has the slowest median speed on fixed broadband among the peer group. The year-on-year increase in Greece's speed was, in addition, the slowest of all countries.



There's some correlation between the median download speed and the ARPU among the peer group countries. The low speeds could therefore partly be seen as an explanation to Greece's low ARPU.

#### Fixed broadband data usage - below-median data usage but with fastest growth

Greece's fixed broadband data usage is lower than the median (among a limited peer group).



Greece has had the fastest growth in data usage, though.

#### Fixed broadband revenue per GB – lowest with faster-than-median erosion

The fixed broadband revenue per consumed GB in Greece is the lowest among the peer group.

Fixed broadband	Before compensation for the comparative price level	After compensation for the comparative price level
revenue per GB	↓ Revenue per GB lowest	↓ Revenue per GB lowest
	↓ CAGR below median	↓ CAGR below median

Greece has had a faster erosion (CAGR) in its revenue per GB than most other peer group markets.

#### Fixed voice ARPU – above the median, with a typical rate of decline

The fixed voice ARPU of Greece is above the median of the peer group markets before compensation for the comparative price level. After compensation, it's well above the median.

Fixed voice ARPU	Before compensation for the comparative price level	After compensation for the comparative price level
	↑ ARPU above median	↑ ARPU well above median
	○ CAGR close to median	○ CAGR close to median

It is decreasing, though: Greece's CAGR is negative, but aligned to the median of the peer group.

#### Fixed voice usage - highest with slower-than-median decline

Greece's fixed voice usage per fixed voice subscription is the highest among the peer group. The usage is in decline in Greece, but at a slower rate than the median of the peer group.



There's some correlation between the voice usage and the ARPU among the peer group countries. The high voice usage could therefore partly be seen as an explanation to Greece's high ARPU.

#### Fixed voice revenue per minute – below median, increasing at a faster rate

Greece's fixed voice revenue per consumed voice minute is, both before and after compensation for the comparative price level, below the median of the peer group.

Fixed voice revenue per minute	Before compensation for the comparative price level	After compensation for the comparative price level			
	↓ Revenue per min below median	igstarrow Revenue per min below median			
	↑ CAGR above median	↑ CAGR above median			

Greece has had a faster increase (CAGR) in its revenue per minute than most other peer group markets.

#### Conclusion

In conclusion, Greek fixed broadband subscribers pay the least, which aligns with slower speeds and fewer high-speed subscriptions. On the other hand, fixed telephony users pay above the median, consistent with the highest voice usage in the peer group. Both markets align with a more-for-more approach and produce logical value-for-money outcomes based on their unique characteristics.

Greece's fixed broadband technology mix is one of the least advanced among its peers, with the slowest median download speed and the lowest share of subscriptions offering 100 Mbit/s or higher. Data usage per subscriber is also below the peer group median. Reflecting this, Greek broadband customers pay the least on average.
However, Greece shows promise, with the fastest growth in both the share of high-speed subscriptions and data usage among the peer group countries.

In contrast, Greek fixed telephony users pay above the median monthly amount, but also have the highest voice usage, resulting in a below-median revenue per minute. While voice usage is declining due to a shift towards mobile and online alternatives, the rate of decline in Greece is slower than the peer group median.

Overall, Greece's value-for-money position aligns with the more-for-more approach.

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