

## **Mobile data usage in 2024, capacity limits 2024-2030 and many other competitiveness metrics for 173 mobile network operators present across 50 EU & OECD mobile markets**

December 2024

A comprehensive analysis and database of mobile network operator and mobile market competitiveness metrics. The database includes mobile subscribers, mobile subscriber shares, deployed radio sites, radio site density, spectrum holdings per band, mobile network data volume, average data usage per subscriber, average data usage per person, spectrum usage, average BusyHour throughput per sector, radio network capacity utilization and radio network capacity limits in 2024 and in 2030.

## **Contrary to CMA's provisional speculative view – the entry of a new 4<sup>th</sup> MNO – is the only effective remedy for the Vodafone / Three merger.**

September 2024

Contrary to CMA's current speculative view – the entry of a new 4th MNO – is the only effective remedy for the Vodafone / Three merger. The CMA Chief Executive, Alex Chisholm, categorically stated in the open letter he wrote to the European Commission during the 2016 investigation of the 4 to 3 Three / O2 merger in the UK that "Absent of a new 4th MNO entry the only option available to the Commission is prohibition."

Rewheel's open letter to CMA regarding effective remedies for the Vodafone / Three merger 2024

CMA's open letter to European Commission regarding effective remedies for the Three / O2 merger 2016

Rewheel's open letter to CMA - the Vodafone / Three merger will NOT lead to higher capacity & quality 2024

## **Network performance and speed are NOT higher in more concentrated mobile markets. Mobile mergers do NOT lead to better networks, they only lead to higher prices.**

September 2024

While monthly prices are several times higher in more concentrated mobile markets – statistically significant correlations with confidence intervals as high as 99.99% – network performance and average download speed are NOT higher in more concentrated mobile markets.

## **The state of mobile and broadband pricing – 1H2024**

April 2024

Monthly prices are 2-3x higher and gigabyte prices are 5-6x higher in markets with only 3 mobile network operators. The effective competition in markets with 4 mobile network operators not only leads to much lower mobile prices, but as well to substantially lower fixed broadband prices. In markets with only 3 mobile network operators, consumers not only pay 3x more for mobile plans with 100 gigabytes they also pay 60% more every month to buy fixed broadband plans with Gigabit speeds.

## **The 4 to 3 Vodafone / Three mobile merger in the UK will lead to substantial 26% to 51% monthly price increases**

February 2024

if the merger is approved without the upfront creation of a new 4th mobile network operator. Consumers in the UK could see their monthly bills rise by 26% to 51% in average. Those that subscribe to mobile plans with large or unlimited data could see their monthly cost double after the expiration of their current contracts.

## Wireless markets and mobile network operator competitiveness – 2023

December 2023

50 wireless markets and 168 mobile network operators. A comprehensive analysis and database of mobile network operator and wireless market competitiveness metrics. The database includes mobile subscribers, 5G Standalone, 5G-4G radio sites, radio site density, spectrum holdings, network data traffic load, data usage, spectrum usage, radio network capacity utilization, capacity limit, capacity potential, network performance, prices for 5G-4G voice plans, 5G voice plans, 5G fixed wireless broadband plans and many more wireless competitiveness metrics.

## The state of broadband (FBB&FWA) pricing – 1H2023

June 2023

5G fixed wireless access (FWA) broadband plans are marketed and priced as equal or better alternatives compared to non- pure fibre based broadband plans. In 9 out of 50 countries (e.g., in the UK and Switzerland) plans with the lowest monthly price, for 100 Mbit/s download speed, were 5G FWA rather than fixed broadband plans. While broadband prices are higher in more expensive countries mobile prices are not. Mobile monthly prices are, in average, 2-3 times lower in 4 vs. 3 MNO markets.

## The state of 4G and 5G pricing, 1H2023 – Inflation edition

March 2023

4G&5G smartphone plan prices – for new contracts – continued to fall across most EU and OECD countries despite near double-digit inflation figures. The near-double-digit inflation in 2022 had a moderate price increase effect in markets where only 3-MNOs are present while it had no significant impact in markets where 4 MNOs are present. In almost all 4-MNO markets monthly prices fell or were flat despite an average inflation of ~9%.

## The state of 4G and 5G pricing, 1H2022 - country rankings

May 2022

Prices of 4G&5G smartphone plans continued to fall in EU in 1H2022. The median monthly price of smartphone plans in EU fell to 19 EUR in 1H2022. The median price of 4G plans fell to 15 EUR while the median price of 5G plans fell to 28 EUR. Prices of 5G plans continued to fall faster than 4G plans (~18% per annum versus ~12%). The Canadian wireless market, a de-facto network duopoly, was again ranked as the most expensive market among 50 European, American, Asia Pacific, Middle East and African countries.

## Mobile data usage in 2021 and 4G & 5G operator capacity potential

March 2022

When will mobile network operators run out of 4G capacity and how many more gigabytes per subscriber per month can they carry with 5G? A study of 170 mobile network operators from 50 European, American, Asian Pacific, Middle East and African countries. Zain Kuwait had the highest mobile data usage per subscriber in 2021 – 86 gigabytes per subscriber per month. Elisa Finland has the highest 4G & 5G untapped capacity potential – as much as a terabyte per subscriber per month.

## Mobile prices are 2x to 5x lower in markets with 4 or more MNOs

January 2022

What are the factors that significantly affect mobile prices? Market concentration has a statistically significant effect on mobile prices. The lower the market concentration (HHI) the lower price. The number of mobile network operators (MNOs) has an even stronger statistically significant effects on mobile prices. The higher the number of MNOs the lower the price. The presence of a maverick (disruptive firm) has as well a significant lowering effect on mobile prices.

## The Greek mobile market is the most expensive market in EU

November 2021

The Greek mobile market where only 3 mobile network operators (3-MNOs) are present, was once again, ranked as the most expensive mobile market in EU and as one of the most expensive markets in the world. Even after excluding the mobile telephony tax Greek minimum monthly prices of smartphone plans with 1, 3 or 5 gigabytes were the highest in EU. And while telecom regulators in EU's remaining 3-MNO tight oligopoly markets are taking steps to remedy effective competition – see recent 4th MNO entry in Portugal and ANACOM's social tariff (30 gigabytes for 6 EUR) decision – the Greek telecom regulator EETT is in denial and has done little to remedy the apparent market failures in Greece.

## The state of 4G and 5G pricing, 2H2021 – operator rankings

October 2021

Vodacom's South Africa monthly price for 100 gigabytes was 19x higher than Pelephone's Israel (~126 vs. ~6 EUR). Latest and historic (2014-2021) 4G and 5G prices from 172 operators in 50 European, American, Asia Pacific, Middle East and African countries.

## The state of 4G and 5G pricing, 2H2021 - country rankings

October 2021

Prices of 5G smartphone, mobile broadband and wireless broadband plans continue to fall sharply in EU in 2H2021. While the share of plans with UNLIMITED data volume continue to increase the rate of increase slowdown in 2H2021. The median gigabyte price of 4G&5G smartphone plans in the Israeli 4-MNO market fell to 0.04 EUR. 4G and 5G prices from 172 operators in 50 European, American, Asia Pacific, Middle East and African countries.

## Canada needs a new maverick mobile network operator

April 2021

Canada has among the highest wireless prices in the world. The merger of Rogers and Shaw, if approved as notified, will be the final nail in the coffin of infrastructure-based competition in Canada. The only effective remedy for the merger is the upfront creation of a new maverick mobile network operator.

## The state of 4G and 5G pricing, 1H2021 – operator rankings

April 2021

4G and 5G prices from 179 operators in 51 European, American, Asia Pacific, Middle East and African countries. Who are the operators with the highest and lowest monthly prices in the world?

## Is Greece the most expensive mobile market in EU?

April 2021

Even after excluding the mobile telephony tax Greek prices – of smartphone plans with 1, 2 or 3 gigabytes – were the highest in EU. For 4 gigabytes Greek prices were the most expensive among 51 European, American, Asia Pacific, Middle East and African countries. Greek consumers pay 5 to 6 times more per month than French consumers to buy smartphone plans with, 1, 2, 3 or 4 gigabytes!

## Is Canada the most expensive wireless market in the world?

April 2021

Canada has, if not the highest, among the highest wireless prices in the world. The minimum monthly price for a smartphone plan that includes 20 gigabytes in Canada is the highest among 51 European, American, Asia Pacific, Middle East and African countries. Consumers in Canada pay 7x more every month than consumers in France for 20 gigabytes.

## The state of 4G and 5G pricing, 1H2021 - country rankings

April 2021

Monthly prices of 4G and as well 5G plans in EU continue to fall. Plans with unlimited data volume continue to spread. 4G and 5G prices from 179 operators in 51 European, American, Asia Pacific, Middle East and African countries.

## 5G capacity potential - more than 500 gigabytes/subscriber/month

March 2021

When will mobile network operators run out of 4G capacity and how many more gigabytes per subscriber per month can they carry with 5G? A study of 169 European, American, Asian Pacific and African operators.

## 1&1 Drillisch's 4th MNO entry in Germany - Will it work?

February 2021

1&1 Drillisch's MVNO business in Germany would become unprofitable when 5G goes mainstream, so investing in spectrum was 1&1 Drillisch's only choice to keep its business afloat. 1&1 Drillisch's 4th MNO business case will be positive if BNetzA intervenes and mandates competitive national data roaming rates.

## 4G&5G prices are 2x to 4x lower in markets with four MNOs

December 2020

What are the factors that determine mobile prices? Market concentration (no. of MNOs) has a statistically significant effect on 4G&5G monthly and gigabyte prices. The higher the no. of MNOs the lower the price.

## 4G&5G connectivity competitiveness 2020

November 2020

Elisa Finland had overall the most competitive 4G&5G connectivity monthly prices in 2H2020 among 168 mobile network operators present in 48 European, American, Asia Pacific and African countries.

## The state of 4G&5G broadband pricing – 2H2020

October 2020

The share of smartphone, mobile and wireless broadband plans with unlimited data volume continued to grow, gigabyte allowances of finite data volume plans continued to grow – but overall monthly and gigabyte prices continued to fall. Monthly prices of smartphone and wireless broadband plans with unlimited data volume fell in EU in 2H2020!

## The state of 4G&5G pricing in Latin America, August 2020

August 2020

Mobile data prices in Latin American 4-MNO markets are competitive and broadly on par with European and other OECD 4-MNO market prices. Mobile data prices in Latin American 3-MNO markets are sub- or non-competitive (i.e. significantly higher than 4-MNO market prices).

## 4G & 5G prices in Germany, Italy, France, Spain and UK – June 2020

July 2020

Monthly prices of plans with unlimited data volume and as well gigabyte prices of plans with data caps continue to be significantly higher in the 3-MNO German versus the 4-MNO Italian, French, Spanish and UK markets.

## **The state of 4G & 5G pricing, 1H2020**

April 2020

The share of smartphone and mobile/wireless broadband plans with unlimited data volume continues to grow, gigabyte allowances of finite data volume plans continue to grow – but overall monthly prices continue to fall.

## **Review of mobile data connectivity competitiveness in Greece within the wider context of digital economy competitiveness**

March 2020

Rewheel research study commissioned by the Hellenic Competition Commission.

## **Unlimited mobile data – Why Finland is different**

February 2020

... and why operators in other markets can't easily replicate the Finnish model.

## **Rolling out 5G fibre-through-the-air under the exceptionally strict Swiss EMF radiation limits**

December 2019

In December 2019 Sunrise invited Rewheel to try its 5G based home broadband solution in Switzerland. Rewheel had previously provided consulting support for Sunrise in preparation for the 5G spectrum auction that was held in early 2019. After the modelling work and conceptual sessions, we were eager to go back to Switzerland to see how Sunrise's engineers managed to turn theory into practice.

## **3.6 GHz 5G spectrum valuation in Poland**

December 2019

The value of 3400-3800 MHz 5G band is substantially higher in Poland than in other large EU markets. The spectrum valuations of the four Polish operators are highly asymmetrical.

## **The state of 4G & 5G pricing, 2H2019: more-for-less**

October 2019

The introduction of 5G has supercharged the transition to a basically unlimited everything model. But despite all the more-for-more buzz gigabyte allowances continue to grow while monthly prices continue to fall.

## **Competitiveness of Czech mobile data prices – April versus September 2019**

October 2019

The Czech government commissioned Rewheel to review the state of competitiveness of Czech smartphone mobile data tariffs, ahead of the upcoming 5G-centric spectrum auction where a frequency package is to be reserved for a new, 4th entrant mobile operator.

## **2018 capacity utilization and 5G capacity potential of mobile operator existing macro cell site grids**

October 2019

When will EU28 & OECD operators run out of 4G capacity and how many more gigabytes per subscriber per month can they carry with 5G? A Rewheel research PRO-study of 143 European, US, Canadian, Japanese, Korean and Australian operators

## **Contrary to the claim made by ICLE, T-Mobile and Sprint - the US mobile mavericks - have undeniably constrained the prices of Verizon and AT&T the last 5 years**

September 2019

Public flash research note

## **Root cause of weak competition in the Canadian wireless market**

September 2019

The Canadian wireless market is ruled by provincial mobile network duopolies and monopolies. While in some provinces regional operators increasingly challenge the incumbents, at the national level, Canada is a de-facto network duopoly.

## **4G era – Who got the most out of it?**

May 2019

5-year mobile service revenue trends for 143 operators present in EU28 & OECD markets. Finnish operators that executed ‘unlimited everything’ strategies were the undisputed champions of the 4G era.

## **German 5G spectrum auction – back to 4 MNOs?**

Live tracker and Rewheel analysis

April 2019

Free to download Rewheel spreadsheet analysis of the bids, updated continuously.

## **The state of 4G pricing – 1H2019 – Digital Fuel Monitor 11th release**

April 2019

What is wrong with competition in the Canadian, Japanese and US markets? Gigabyte prices in 4-MNO markets continue to fall faster than in 3-MNO markets.

## **Site density is key to LTE network performance – and critical for 5G**

February 2019

Rewheel-Tutela research study. Analysis of 99 mobile networks across EU28, Norway and Switzerland, key network performance drivers and implications on 5G infrastructure and spectrum investment strategies.

## **4G prices in Germany versus the UK, France and Italy – a universe apart!**

February 2019

In-depth comparison of 4G prices and gigabytes in the 3-MNO consolidated German versus the 4-MNO UK, French and Italian markets – implications for the German 5G market.

## **4G prices as a function market concentration, no. of MNOs, operator subscriber share, position, group affiliation, country general price level**

January 2019

The less (3 versus 4) mobile network operators present in a market the higher (2x) the market price. The higher the mobile market concentration the higher the market price.

## **Iliad's 4th MNO venture into Italy – Will it pay off?**

January 2019

Can Iliad make money by charging only €7.99 per subscriber? What is the minimum ARPU level that Iliad will need in order to break even in a reasonable period?

## **T-Mobile and Tele2 4 to 3 mobile merger in the Netherlands – Competition concerns, network efficiencies and effective remedies**

November 2018

Are there any remedies that can remove the short and long term competitions concerns entirely?

## **The state of 4G pricing – 2H2018 – Digital Fuel Monitor 10th release**

October 2018

With special focus on US prices ahead of the planned 4 to 3 consolidation. How many 4G gigabytes €5, €10, €15, €20, €25, €30, €40, €50, €60, €70 and €80 could buy in EU and OECD markets on smartphone and data-only plans.

## **Capacity utilization and fixed-to-mobile broadband substitution potential with existing macro site grids – 2017**

A study of 80 European, US, Japanese, Korean, Australian and New Zealand mobile operators. Topical for operators contemplating fixed-to-mobile broadband substitution ahead of upcoming 700, 1400 (SDL), 2300, 3400-3800 MHz spectrum auctions.

## **First impressions from the world's first commercial 5G network**

August 2018

In June 2018 Elisa became the first operator in the world to launch commercial service over its 5G (3.5 GHz) network in Tampere Finland and Tallinn Estonia. Elisa invited Rewheel to try its 5G network.

## **The 4 to 3 consolidation effect – Ahead of the Commission's merger ruling Tele2 increased prices in the Netherlands**

July 2018

Four months after Deutsche Telekom announced the acquisition of Tele2 by T-Mobile in the Netherlands and few days before the parties notified the 4 to 3 mobile merger to the European Commission Tele2 unexpectedly increased prices.

## **The state of 4G pricing – 1H2018 – Digital Fuel Monitor 9th release**

May 2018

How many 4G gigabytes €5, €10, €15, €20, €25, €30, €40, €50, €60, €70 and €80 could buy in EU and OECD markets on smartphone and data-only plans. What a difference a 4th mobile network operator makes!

## **The massive MIMO effect: has the 3.4-3.8 GHz TDD spectrum become more valuable than 800 MHz (and 700 MHz) FDD?**

April 2018

Paradigm change in mobile technology leads to paradigm change in spectrum valuations (observations after the UK auction).

## **Gigabyte price development in 4 to 3 consolidated versus 4-MNO European markets – September 2013 to March 2018**

April 2018

As we asserted back in 2015 the merger mandated so called ‘capacity’ MVNOs did not become effective competitors.

## **The state of 4G pricing – 2H2017 – Digital Fuel Monitor 8th release**

November 2017

After a comeback in 2016 unlimited mobile data has spread further during 2017.

## **Unlimited mobile data and near zero marginal cost – a paradigm shift in telco business models**

September 2017

European winners and losers in 4.5G and 5G – study of 30 operators. Will mobile network CAPEX stay flat in the long run? Spectrum valuation implications.

## **Digital Fuel Monitor 7th release, 1H2017**

May 2017 (updated 22.05.2017)

The state of 4G pricing, mobile data usage, spectrum usage, network capacity utilization and fixed-to-mobile broadband substitution. After its comeback in 2016, in 2017 unlimited mobile data goes viral and spreads to 22 countries. And while in competitive markets such as France and Denmark consumers can buy 100 or unlimited gigabytes for less than €30, in tight mobile oligopoly markets such as Portugal, Greece and Hungary €30 hardly buys any gigabytes.

## **O2 – Ready to disrupt the German tight oligopoly market**

April 2017

In March 2017 Telefonica O2 Germany announced 3.5 GHz (they have 83 MHz) Massive MIMO (= very high capacity LTE macro sectors) field trials with Huawei for wireless home broadband and 4K video. Our models predict that O2's macro site grid and spectrum resources (FDD+TDD) could allow it to drive fixed-to-mobile broadband substitution in Germany by connecting millions of households with HD TV service on its high capacity LTE network.

## **Capacity utilization and fixed-to-mobile broadband substitution potential – A study of 64 European operators**

March 2017

When LTE base stations are upgraded to 'Gigabit' speed the gigabyte volume capacity of the networks also greatly expands. We modelled LTE network capacity based on existing FDD and TDD spectrum holdings (and potential acquisitions in 2.3 and 3.4-3.8 GHz bands) and sizes of the macro site grids. Without and with Massive MIMO in the TDD bands. Topical for operators contemplating fixed-to-mobile broadband substitution ahead of upcoming 700, 1500 (SDL), 2300, 3400-3600 MHz spectrum auctions.

## **Four year comparative study of unit prices in 4-MNO and in the 4 to 3 consolidated German & Austrian markets**

January 2017

The gap between gigabyte prices in the 4 to 3 consolidated Austrian & German markets and prices in 4-MNO markets where no consolidation has taken place had substantially increased by September 2016



## **Tight oligopoly mobile markets in EU28 in 2016**

December 2016

Fixed-line broadband interest, zero-rating video and big telco ownership impedes competition in mobile markets

## **Hutchison Austria quadrupled data allowances after national regulatory authority's intervention on zero-rating video**

December 2016

The regulator intervened along the EU net neutrality rules and BEREC guidelines that prohibit differential throttling when the internet-access data cap is exhausted.

## **Is spectrum usage harmonised across the EU28 national mobile markets?**

November 2016

Spectrum harmonisation: the key to 5G? Rewheel's material presented on the ECTA Regulatory Conference 2016

## **The Commission proposed wholesale data roaming cap of €8.5/GB is anomalous and will distort competition in North-Eastern mobile markets where retail gigabyte prices are competitive**

October 2016

UPDATED with DG Competition's response to Rewheel's concerns. How low should the wholesale data roaming cap be in 2017 to avoid the distortion of competition in North-Eastern domestic mobile markets where retail gigabyte prices are competitive?

## **Unlimited mobile data is back — The state of 4G pricing and spectrum usage, 2nd half 2016 Digital Fuel Monitor 6th release**

2016dfmonitorspectrumdata-capspricingmobile-firstzero-ratingroamingnetworkeconomics

October 2016

Full release report for Digital Fuel Monitor-PRO clients

## **Effective structural remedies for Hutchison-WIND 4 to 3 Italian mobile merger**

September 2016

This research report was submitted to Commissioner Vestager and DG Competition on 30th May 2016, three months prior to the European Commission's announcement (link) of approving the merger subject to remedies.

## **Zero-rated apps in EU28 and OECD mobile markets in 2014, 2015, 2016**

August 2016

## **EU's 5G competition challenge**

July 2016

A handful of big telco groups – with vested interests in fixed-line broadband – impose very restrictive mobile internet usage caps. This raises serious concerns that these telco groups – that tightly control most EU national markets – will not be incentivised to sell competitively priced 5G internet access.

## How many 4G LTE smartphone GBs EU28 operators sell for €35 - July 2016

July 2016

## O2 nearly triples GB volume allowances (for the same price) after the Commission blocked the 4 to 3 merger in the UK

July 2016

Before the blocked merger £25 bought O2 customers 8 gigabytes. Now O2 customers get three times more gigabytes i.e. 25GB by spending £25

## The EC proposed wholesale data roaming cap of €8.5/GB is much higher than domestic retail prices across most EU states

June 2016

The Commission proposed wholesale data roaming cap of €8.5/GB appears to be carefully calibrated to protect the very high domestic retail prices charged by operators in tight oligopoly markets (e.g. Germany, Spain) while penalizing operators with competitive much lower domestic retail prices (e.g. Finland, Denmark, Poland)

## Mobile data usage (gigabyte volume) in Finland is set to overtake fixed-line broadband usage in Germany in 2016

May 2016

In 2016 mobile data volume consumption per person in Finland is set to exceed fixed-line broadband volume consumption per person in Germany. Anecdotal evidence reported by WDR (German public media) indicated that younger users are frustrated by very restrictive smartphone plan volume caps.

## The State of 4G Pricing - first half 2016, Digital Fuel Monitor 5<sup>th</sup> Release

May 2016

Public release summary

## Telenor Denmark – Turnaround strategy

April 2016

Telenor's Danish strategy is in tatters. Telenor's 4 to 3 consolidation attempt was blocked by the European Commission while its 'me too' strategy has been a failure dragging down its profitability. Can Telenor turn the business around and return to profitability?

## Three years after the 4 to 3 merger €25 buys Austrians only half the gigabyte allowance than it did before the merger approval

March 2016

Before the merger Austria was ranked as the 3rd most competitive mobile market among EU28. Three years after the merger Austria has fallen to the 10th place.

## **The approval of the 4 to 3 Telefonica E-Plus merger with ineffective MVNO remedies made Germany the least competitive market in EU28**

February 2016

Denmark vs Germany. Decoupling of mobile internet access prices and gigabyte consumption.

## **Hutchison has increased prices in Austria by up to 92% after the 4 to 3 merger was approved with Mickey Mouse MVNO remedies**

February 2016

Unit prices (retail price / GB volume allowance) ≠ Unit revenues (revenues / actual GB consumption)

## **Price competition intensified in Denmark in the run-up to the Commission's decision and after the 4 to 3 merger was blocked**

February 2016

The average gigabyte price in Denmark is now 63% lower than it was in April 2015 when the European Commission opened an in-depth investigation

## **Effectiveness of MVNO wholesale access remedies**

January 2016

Comprehensive analysis of commercial and merger mandated MVNO wholesale access frameworks and assessment of their efficacy in restoring effective competition in 4 to 3 mobile mergers

## **Hutchison defies Vestager and increases prices, ahead of its planned acquisition of o2 in the UK, for the fourth time**

January 2016

Hutchison appears to be confident that price increases will not deter the European Commission from approving the 4 to 3 merger

## **Tight oligopoly mobile markets in EU28 in 2015**

January 2016

Comprehensive analysis of factors that give rise to unilateral anti-competitive effects leading to non-competitive outcomes and consumer harm in tight mobile oligopolies.

## **KPN's message to Liberty Global: Swallow the remedies and complete the merger or else I go "truly mobile" and disrupt the market with mobile-only play**

November 2015

The statement above is our interpretation of the motive behind the launch by the KPN group in one of its markets of "truly mobile" smartphone plans with enough mobile internet gigabytes to "live completely mobile".

## **Consolidated tight oligopolies versus competitive mobile markets, Digital Fuel Monitor 4th Release, 2H2015**

November 2015

Public release summary

### **The competition effect – After Telenor’s and TeliaSonera’s merger was blocked a Danish operator doubled its smartphone plan cap from 20 to 40 gigabytes**

September 2015

Before the planned merger a Danish operator was selling in Denmark a 4G LTE smartphone plan with 100 gigabytes for €39. Ahead of the planned merger the operator slashed the gigabytes down to 20 while keeping the price the same. After the merger was blocked the operator doubled the maximum gigabytes on its smartphone plans by launching a plan that packs 40 gigabytes.

### **The 4 to 3 consolidation effect – Hutchison Three Italy halved the gigabytes in its flagship smartphone plan and launched its own zero-rated film store**

September 2015

- Ahead of its planned merger with Wind in Italy Hutchison Three has halved the gigabytes in its flagship 4G LTE smartphone mobile internet access plan and launched its own zero-rated (unlimited gigabytes at €0/GB) film store.

### **The 4 to 3 consolidation effect – Hutchison Three UK doubled the price of its flagship smartphone plan**

August 2015

Ahead of its planned merger with Telefonica O2 in the UK Hutchison Three has more than doubled (+113%) the price of its flagship 4G LTE smartphone plan.

### **Tight oligopolies and the need for ex ante regulation – Why BEREC is right and ETNO is wrong**

August 2015

There are substantial empirical market evidences supporting the notion that close to half of EU’s mobile markets exhibit tight oligopoly non- or sub-competitive market outcomes.

### **Europe's first 700 MHz radio spectrum auction ended in Germany. Digital Fuel Monitor was live tracking the bids here**

May-June 2015

### **UK and French 4-network-operator competitive mobile markets versus the consolidated German protected oligopoly – 2Q 2015**

June 2015

Triggered by the planned mergers in the UK, Commissioner Vestager’s assertion that “In fact, infrastructure investment can be stimulated by competition” and by the court challenge filed by Airdata AG against the Commission’s unlawful approval of Telefonica E-Plus German merger we take a closer look at effective competition and in particular 4G LTE mobile internet access (smartphone plan) prices and hotspot/tethering restrictions in the consolidated German protected oligopoly, UK and France.

## **10 gigabyte 4G basket EU28 & OECD country and operator rankings**

June 2015

In this premium research note we present the 10 gigabyte basket EU28 & OECD country and operator ranking for 4G LTE unlimited (>1,000) minute & SMS smartphone plans that include hotspot/tethering functionality for the entire volume. MVNOs are not competitive!

## **Affordably priced 100 or unlimited gigabyte 4G LTE smartphone plans with tethering – Trouble is brewing for cable and fixed-line operators**

June 2015

4G LTE smartphone plans with 100 or unlimited gigabyte volume are promoted by European mobile operators as the ultimate packages for connecting computers and tablets and streaming movies while at home. Affordably priced 100, 200, 500 or unlimited gigabyte 4G LTE data only home broadband plans - Cheaper than cable.

## **Europe's mobile internet divide is widening – Digital Fuel Monitor 3rd release, 1H2015**

May 2015

Public release summary

## **The 4 to 3 consolidation effect – The Austrian mobile market has fallen considerably behind in competitiveness in EU28**

May 2015

Smartphone tariff price competitiveness snapshots between December 2012 and May 2015. Before the price hikes that followed approval of Hutchison's and Orange's merger Austria used to rank as the country in EU28 with the second lowest 4 gigabyte smartphone tariff basket price. Now prices doubled and Austria has fallen to the fourteenth place.

## **The 4 to 3 consolidation effect – Telefonica Germany's so called 'upfront capacity MVNO' deal with Drillisch is in essence a retail minus deal**

May 2015

In April 2015 Drillisch launched a new portfolio of smartphone tariffs in many of its retails sub-brands.

## **The 4 to 3 consolidation effect – In Denmark the prices of mid range and high gigabyte usage smartphone plan baskets edged higher**

April 2015

While in the neighbouring Swedish 4 operator competitive market gigabyte allowances doubled for same prices (40, 50 and 100 gigabyte smartphone plans are now available and on some Swedish networks 30% of the residential smartphone customers are now on the 20, 50 or 100 gigabyte plans) in Denmark two operators started moving in the opposite direction.

## **What Telefonica does not want EU competition and regulatory authorities to know**

April 2015

Telefonica published (link here) on their public policy blog a review of the Digital Fuel Monitor methodology. Telefonica's critical review of the Digital Fuel Monitor methodology is based on a review (link here) conducted by a consulting firm called Solchaga Recio & Associates (SR). In this 2-pager research note we respond to Telefonica's criticism. The note also includes the copy of our first reactions posted under the Telefonica blog post.

## **The competition effect – In Sweden, a 4 operator market, 4G smartphone volume caps doubled (for same prices)**

April 2015

Northern Europeans get 50 times more gigabyte allowance on mass affordable tariff plans than consumers in non-competitive EU member states such as Greece

## **The 4 to 3 consolidation effect – Hutchison Three UK increases prices, again!**

April 2015

Three UK has now more than doubled the price of its flagship SIM-only smartphone plan. Hutchison appears confident that price increases will not deter the European Commission from approving its planned acquisition of o2 in the UK with an ineffective upfront 'throughput÷capacity' based MVNO remedy.

## **The dubious consolidation economics of Frontier Economics**

March 2015

In its report 'Assessing the case for in-country mobile consolidation', prepared for the GSMA, Frontier Economics claimed "...that there is no evidence that prices increased following the merger" in Austria. According to Frontier's dubious methodology unit prices fall even when consumers are asked to pay more Euros every month to purchase the same amount of goods. The fact is that before the merger, in December 2012, Austrian consumers paid €11 to purchase a smartphone plan with at least 1,000 minutes/SMS and 2 gigabytes. By February 2015 the price has doubled to €22.

## **The UK mobile internet access market in 1Q 2015 ahead of planned consolidation**

March 2015

In February 2015 EE increased mobile internet smartphone plan prices by 27%.

## **In 4 to 3 consolidated markets average mobile internet access prices rose by up to 56%**

March 2015

In 4 to 3 consolidated markets and in a market where consolidation is on the making the average price of the 5 gigabyte mobile internet access basket rose by up to 56% while the lowest available price rose by up to 68%. In markets that went from 3 to 4 operators and in a 4-player market where consolidation was blocked the average price of the 5 gigabyte mobile internet access basket fell by up to 37% while the lowest available price fell by up to 40%.

## **EU vs US Perspectives on Net Neutrality**

[Open Forum Europe round table discussion in the European Parliament]

March 2015

## **Drillisch, the MVNO that helped clear Telefonica's acquisition of E-Plus in Germany raised mobile internet gigabyte prices by 138%**

February 2015

Meanwhile Telefonica, post merger, also raised mobile internet smartphone plan prices by double digit percentage.

## **The real threat to the open Internet is zero-rated content**

[External guest blog, World Wide Web Foundation]

February 2015

In this two-part guest blog for the World Wide Web Foundation, Antonios Drossos of Rewheel discusses the potential threats of price discrimination. Download as PDF: » [here](#)

## **In the Netherlands, where zero-rating is banned, KPN just doubled (free of charge) the mobile internet volume caps to encourage a carefree usage of its online videos**

February 2015

This is the first empirical evidence of the pro-competitive benefits of real net neutrality rules that ban price discrimination (zero-rating) – it leads to lower internet usage prices and higher volume caps!

## **Telenor launched a vertically price discriminated internet video service in a European market**

February 2015

Unlike all other vertically price discriminated telco mobile TV and film store video services Telenor's service is not zero-rated but the price is massively discounted. Telenor charges 10 times less per Gigabyte when consumers watch its own internet video service over its mobile network compared to the price it charges consumers for open mobile internet access!

## **36 leading US scholars, in a letter addressed to the FCC, have called for the ban of paid prioritisation, including zero-rating**

January 2015

This is the first letter by leading scholars that unequivocally supports a bright-line ban on all forms of paid prioritization (including zero-rating).

## **Canada's media and telecom regulator bans positive price discrimination (zero-rating) of mobile TV**

-ratingCanada

January 2015

"A decision relating to the future of mobile television content"

## **The Dutch regulator has fined Vodafone for violating national net neutrality law by zero-rating HBO mobile video streaming**

January 2015

On the 27th January 2015 ACM, The Netherlands Authority for Consumers and Markets has fined Vodafone for violating the Dutch net neutrality law.

## **Slovenian telecom regulator orders mobile operators to stop zero-rating**

January 2015

Slovenian regulator has found that zero-rating internet apps is violating the non-discrimination clause of the Slovenian national net neutrality law.

## **Price discrimination (zero-rating), if allowed, will erect a new insurmountable barrier to EU's Digital Single Market**

January 2015

The suggestion by the Presidency of the EU Council to omit from the scope of net neutrality regulation the potentially anti-competitive practice of price discrimination (e.g. zero-rating) and allow instead Member State legislative discretion will balkanise internet access and prevent the creation of a European Digital Single Market.

## **New Republican Bill Is Network Neutrality in Name Only**

[External article, Stanford Law Review, by Barbara van Schewick & Morgan N. Weiland]

January 2015

On closer examination, the bill is so narrowly written that it fails to adequately protect users, innovators, and speakers against blocking, discrimination, and access fees. Citing Digital Fuel Monitor research.

## **The net neutrality study prepared by J. Scott Marcus for the European Parliament conveniently missed the elephant in the room – Price discrimination (zero-rating)**

January 2015

Although the author referred to its work as “analytical” the study made no reference whatsoever to the most important and wide spread economic net neutrality violation – application based price discrimination such as zero-rating.

## **The splinternet**

[External article, The Economist GE Look ahead]

January 2015

Net neutrality and why it matters (or not) for the digital economy. Based on Rewheel quotes and Digital Fuel Monitor analysis.

## **The European Commission unlawfully approved Hutchison's acquisition of Orange in Austria by knowingly accepting 'ineffective' commitments**

January 2015

The Commission was well aware at the time it approved the Austrian merger (December 2012) that Hutchison's Final Commitments (MVNO wholesale access) could not remove the competition concerns entirely.

## **Mobile consolidation on Denmark's doorstep**

December 2014

Will consolidation lead to higher consumer prices for mobile internet access in Denmark as it did in the Austrian and German markets?

## **UPC Austria finally launches as an MVNO on Hutchison's network**

December 2014

Two years after the merger of Hutchison and Orange the European Commission's presumed “effective” MVNO remedy is finally implemented – and as we predicted it is proven toothless



## **How much do EU consumers pay to use a Gigabyte of mobile internet on their smartphone while roaming in EU28?**

December 2014

Analysis of smartphone mobile internet access roaming prices in EU28 in Q4 2014

## **Net neutrality is about the price of open internet access, more and more EU governments realize**

December 2014

On the 27th November 2014, last Thursday, on the European Council the representatives of the 28 EU Member States discussed, among other topics, the proposed Europe-wide regulation of net neutrality. The Dutch representative stressed that the regulation should explicitly ban vertical price discrimination of specific internet services, content and applications. Slovenia, Hungary and several other Member States have endorsed the Dutch proposal and asked for the explicit ban of price discrimination in the context of the net neutrality regulation.

## **Google, telcos and the push for a vertically integrated non-neutral internet – Friends, not foes**

November 2014

Vertical integration of internet access with telcos' specialized services (e.g. telco TV) and vertical integration of dominant search engines with internet search specialized services (e.g. Google Flights) are both severely restricting consumer choice, foreclose competition and harm the open internet

## **Flash note: Norwegian telecom regulator unambiguously states that zero-rating violates net neutrality**

November 2014

20th November 2014: this week we saw two notable net neutrality developments in Europe.

## **EU28 & OECD mobile internet access competitiveness report Q4 2014 (Digital Fuel Monitor 2nd Release)**

November 2014

Major price movements on both sides of the Atlantic between Q1 and Q4 2014. Smartphone internet usage price rankings, price changes and internet access speeds EU28, OECD, 41 countries, 69 operator groups, 136 operators, 40 operator discount brands and 84 MVNOs.

## **Neelie Kroes's Specialized Services are a giant Net Neutrality loophole**

October 2014

Telco 'access' Specialized Services are no different from Google's anticompetitive 'search' Specialized Services

## **List of 75 zero-rated, potentially anti-competitive mobile applications/services, violating net neutrality, in EU28**

October 2014

## Deutsche Telekom's T-Mobile launches an 'a la carte' mobile internet model in Hungary

October 2014

In this public research note we present the latest net neutrality violations in Hungary, examine the adverse structural impacts that such 'a la carte' models pose to mobile internet access and conclude by highlighting the need for erecting a 'Chinese spectrum wall' between internet access over licensed mobile spectrum and discriminatory proprietary telco services ('Specialized Services').

## US and EU legislators question zero-rating

September 2014

FCC refocuses the US net neutrality debate on zero-rating over wireless networks while in Europe national telecom regulators and the European Parliament are taking a closer look.

## German telecom regulator: Zero-rating (volume discrimination) violates net neutrality

September 2014

Zero-rated content or apps are applications or services that allow the end-user to consume unlimited Gigabyte volume of selected content without depleting their inclusive open mobile internet volume allowance (source: Wikipedia)

## The consolidated Austrian mobile market in Q3 2014

September 2014

The price of mobile internet in Austria, following the 2013 hike, surged again in Q3 2014. A profound structural change is in the making in the Austrian mobile data access market.

## Hutchison Three – No longer a challenger?

September 2014

The price of mobile internet went up notably in the UK during the 2H of 2014. The price of mobile internet also went up notably in Austria after the 4 to 3 mobile operator merger. The Austrian competition authority has already opened an investigation.

## Reducing Wireless Competition in Europe

[External article, The New York Times]

July 2014

A recent decision by European regulators to approve the merger of two cellphone companies in Germany will significantly reduce competition and encourage further consolidation in the industry. Citing Digital Fuel Monitor research.

## Smartphone internet usage price ranking of EU28 & OECD mobile network operators - Q1 2014 (Digital Fuel Monitor 1st Release)

June 2014

This is the first release of the Digital Fuel Monitor rankings of all EU28 and OECD mobile network operators by the gigabyte price they charge for using internet on smartphones.

## **Collateral damage to infrastructure based competition and investments caused by Almunia's refusal to enforce EU antitrust law and block harmful mobile mergers (in Austria, Ireland, ... Germany?)**

June 2014

A flash research note reacting on European Commission's decision granting conditional approval for the Hutchison-Telefonica merger in Ireland.

## **A government ruled for net neutrality. Too bad it wasn't your government**

[External article, The Guardian]

June 2014

In America and Europe, the internet is going mobile out of convenience. In the developing world, mobile is the internet. Here's what happens when companies take advantage of that. Citing Digital Fuel Monitor.

## **Still not convinced that some EU telcos are trying to foreclose the mobile cloud storage market?**

June 2014

In this insight we take a closer look at telcos' own zero-rated mobile cloud storage apps in Europe. What makes the mobile cloud storage market interesting from antitrust point of view is the fact that it is a well established, growing market with billions of Euros in annual revenues. A number of big internet companies like Google, Microsoft, Apple, Amazon and a plethora of start-ups such as Dropbox, Box, SugarSync, Mozy, CloudMe, justcloud, Carbonite, livedrive, Tresorit, Hightail, TeamDrive, Inifit, etc. are fighting for consumer attention in a competitive open market. However, the mobile cloud storage market in Europe is just about to stop being open and competitive.

## **A critical look into the uncertain future of open mobile internet access in Europe**

May 2014

This report has been commissioned by Viestintävirasto, the Finnish Communications Regulatory Authority.

## **Telefonica's Mickey Mouse commitments are irrelevant and ineffective**

May 2014

Will Almunia succumb to Merkel's pressure and clear Telefonica/E-Plus merger with toothless Austrian like remedies (leased 2600MHz spectrum, WiFi, MVNOs) or stand firm, enforce the law and prohibit the merger?

## **List of potentially anti-competitive zero-rated apps launched by EU's incumbent telcos**

April 2014

On Gigaom: Forget fast lanes. The real threat for net-neutrality is zero-rated content

Incumbent European telcos are favouring their own or their OTT partners' messaging, communication, music streaming, video streaming, mobileTV, cloud storage applications by zero-rating the generated volume i.e. volume generated by these applications does not deplete the end-user's open internet gigabyte volume allowance. Zero-rating is essentially potentially blunt anti-competitive price discrimination. It favours telcos' own, or their partners', applications and services thereby placing those offered by other competitors at a competitive disadvantage. In markets where big telcos face no challengers, such as Germany, and where the gigabyte prices for open mobile internet access are prohibitively expensive, price discrimination in favour of telcos' own applications could be a game changer.

## Why do some telcos charge over twenty times more for gigabytes on smartphones than on data-only plans?

April 2014

One possible reason could be to make their own zero-rated traffic heavy smartphone apps more appealing to the end consumers. We compared the pricing of incremental gigabytes of Vodafone, Deutsche Telekom, Telefonica, Orange and Hutchison across their EU & OECD footprints.

## US vs EU & OECD: prices, network performance, consumption, penetration

April 2014

In this flash insight we benchmarked key mobile internet connectivity competitiveness metrics in the United States against EU Member States and other OECD countries. In addition we show Deutsche Telekom (T-mobile) prices and network performance (measured by OpenSignal) in US vs different EU Member States.

## Telcos are killing net-neutrality with overly restrictive Gigabyte quotas, anyway

March 2014

How much of its 4G and 5G radio spectrum capacities Europe should keep for open mobile internet access? How much for telcos' and their business partners' 'walled garden' video, cloud and m-health services (i.e. 'specialised services'). In those EU markets where competition between telecom operators can be best described as friendly net-neutrality is already on protracted coma – and the planned no-blocking & throttling rules of Neelie Kroes's Connected Continent package will be no panacea. In protected telecom oligopolies (where no challenger mobile operator is present) all parallel fixed-line and mobile infrastructures and radio spectrum have already been or soon are to be consolidated in the hands of few friendly voice-era incumbent telecom groups with vested interests in protecting valuation of their fixed-line assets. In these markets telcos have already started to collectively restrict the maximum volume of open-internet on affordable smartphone tariff plans to just few Gigabytes. In contrast, in genuinely competitive markets, such as the UK, Finland and Austria, consumers could choose affordable (€15-€30) smartphone tariff plans that include very large (>10GB) or unlimited Gigabyte volume allowance.

## Spectrum use in Finland and the UK versus Germany

March 2014

According to data reported by the national regulatory authorities and presented in the first release (1H2014) of the Digital Fuel Monitor the average monthly mobile data consumption per capita varies greatly across EU28. In 2012 the Finnish consumed on average 1.49 Gigabyte every month while the British 0.38 Gigabyte. The Germans on the other hand consumed a dismal 0.15 Gigabyte every month. Why do consumers in competitive markets (where a challenger operator is present) consume up to 10 times more mobile data than consumers in protected markets such as Germany? Are Germans less eager users of the internet?

## Price level drives mobile connectivity adoption and use

March 2014

The high, in many cases unaffordable, Gigabyte prices commanded by operators in protected markets where challengers are not present are effectively suppressing mobile broadband penetration and most importantly mobile data consumption.

## Competition in France & UK versus Germany

December 2013

Inefficient operators that cannot make a healthy return on €20 mass market 10 GByte all-you-can-eat minute & SMS smartphone tariffs will soon become telco road kills in Europe's competitive markets.

## Mobile network operator consolidation in Germany

November 2013

Telefonica's acquisition of E-Plus, if approved, will turn Germany into a fiercely competitive market.

## Rewheel's input to public consultation of the European Parliament

November 2013

On the 4th of November 2013 Rewheel has submitted its contributions to the public stakeholder consultation launched by the ITRE Committee of the European Parliament on the European Commission's proposal on a telecoms regulation titled 'Connected Continent'.

## Pre-Christmas price hike in the Greek protected oligopoly

October 2013

While in EU's competitive mobile markets consumer prices are falling and gigabyte allowances are increasing, in protected oligopolies, such as Greece, operator pricing practices are defying economic logic. Between October and December 2013, so just ahead of the most important pre-Christmas sales season, all three Greek mobile operators have simultaneously hiked the prices of their mass market post-paid smartphone tariffs.

## Debunking false claims of ETNO: EU is NOT falling behind in 4G

October 2013

Contrary to GSMA's and ETNO's unsubstantiated claims echoed by Vice President Neelie Kroes Commissioner for EU's Digital Agenda, European 3G/4G consumers pay 5x less and use more mobile data at faster connections speeds than US consumers.

## Smartphone tariffs with unlimited minute & SMS in EU28-US-CH-NO

October 2013

Mobile internet access represents the fuel of the digital economies, the price of gigabytes is analogue to the price of energy (€/kWh) for traditional industries. Proliferation of all you can eat voice & SMS tariffs exposes non-competitive mobile internet pricing practices.

## Post-consolidation price hike in Austria

September 2013

In this flash report we follow up on our EU27 mobile data cost competitiveness report May 2013 by reflecting on three recent market developments: consolidation in Austria (prices went up by over 60% on average), the planned acquisition of KPN E-Plus in Germany and EU's single telecom market regulation.

## EU27 mobile data cost competitiveness report - May 2013 (Rewheel's second extensive EU-wide mobile data cap and pricing analysis)

May 2013

EU's single telecom market is threatened by the lack of mobile network infrastructure based competition within the national borders of half of EU's member states and from the noticeable absence of pan-European retail operators offering borderless European tariffs.

## **EU27 smartphone tariff competitiveness report - December 2012 (Rewheel's first extensive EU-wide mobile data cap and pricing analysis)**

January 2013

Smartphones represent the vehicles and their tariff plans the fuel of the digital economy. Our research reveals alarming differences in the absolute price level and affordability of smartphone tariffs across the EU27 member states. Moreover, our analysis shows that in the affected member states high prices are already suppressing mobile internet adoption. The impacts of E5 Group presence are also addressed.

## **To offload or not to offload? The existential dilemma of mobile operators**

February 2011

Public WiFi networks are popping up like mushrooms in crowded spots where always connected geeks seek shelter for a frappuccino and a facebook update. This should be good news for mobile operators desperate from capacity shortfalls: they can now offload part of their data traffic to less expensive wholesale WiFi bit pipes – or they can even catch a free ride. So should mobile operators embrace the symbiosis and integrate externally cultivated WiFi hotpots in their business models?

## **E-Plus Germany mobile data impact analysis — showing way forward for challenger operators?**

November 2010

Up until late 2009 E-Plus had been following a low cost challenger strategy primarily targeting customers with no or very light mobile data needs. But late 2009, when it became apparent that fast mobile data is not a niche offering any longer but is becoming an essential need of the mass consumer base in Germany and in other developed telecoms markets, they swiftly declared a new, “voice+data” strategy.

## **Operator profits CAN be sustained even with twentyfold surge in mobile data traffic**

September 2010

Market saturation, eroding voice ARPU and climbing data capacity upgrade costs are threatening the sustainability of mobile operators' historically high profitability. We show that by taking timely actions on both the retail and network cost fronts smart operators can sustain their profitability while redefining their business to serve the increasingly data centric life style of their customers.

## **Are cellular operators running out of spectrum?**

August 2010

There is a common opinion in the industry that 3G/HSPA mobile data networks are congested because operators are running out of their spectrum resources. Considering the traffic demand, likely traffic geo-distribution, daily profile and the constraints of HSPA and LTE technology our models show that in typical mature mobile telecommunications markets spectrum scarcity alone does not cause a capacity crunch yet.

## **LTE - turning point in telecom infrastructure sourcing models**

February 2010

The budget of operators' LTE investments is being squeezed by the challenging mobile data business case. In order to make economic sense, the cost of rolling out an LTE network cannot be more than a fraction of the money that has been spent on 3G rollouts. Moreover, the price of incremental capacity upgrades needs to be at least ten times lower than the typical price of adding comparable capacity to HSPA networks.