

FTTH in Europe: Forecast & Prognosis, 2016-2019

**Prepared for the FTTH Council Europe by
Graham Finnie, Independent Consultant
graham@finnie.com**

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Introduction

- Based on individual analyses of 22 countries, and brief reviews of a further 22 countries
- Covers a total of just over 335 million households, 221 million in the EU and 114 million outside the EU
- Most countries (and the region as a whole) will have passed the 20% “fibre maturity” household penetration line by 2019
 - 15 out of the 22 analysed in detail will have hit this mark; 11 will be over 30% penetration
 - 5 of the 22 will still be below 5% penetration

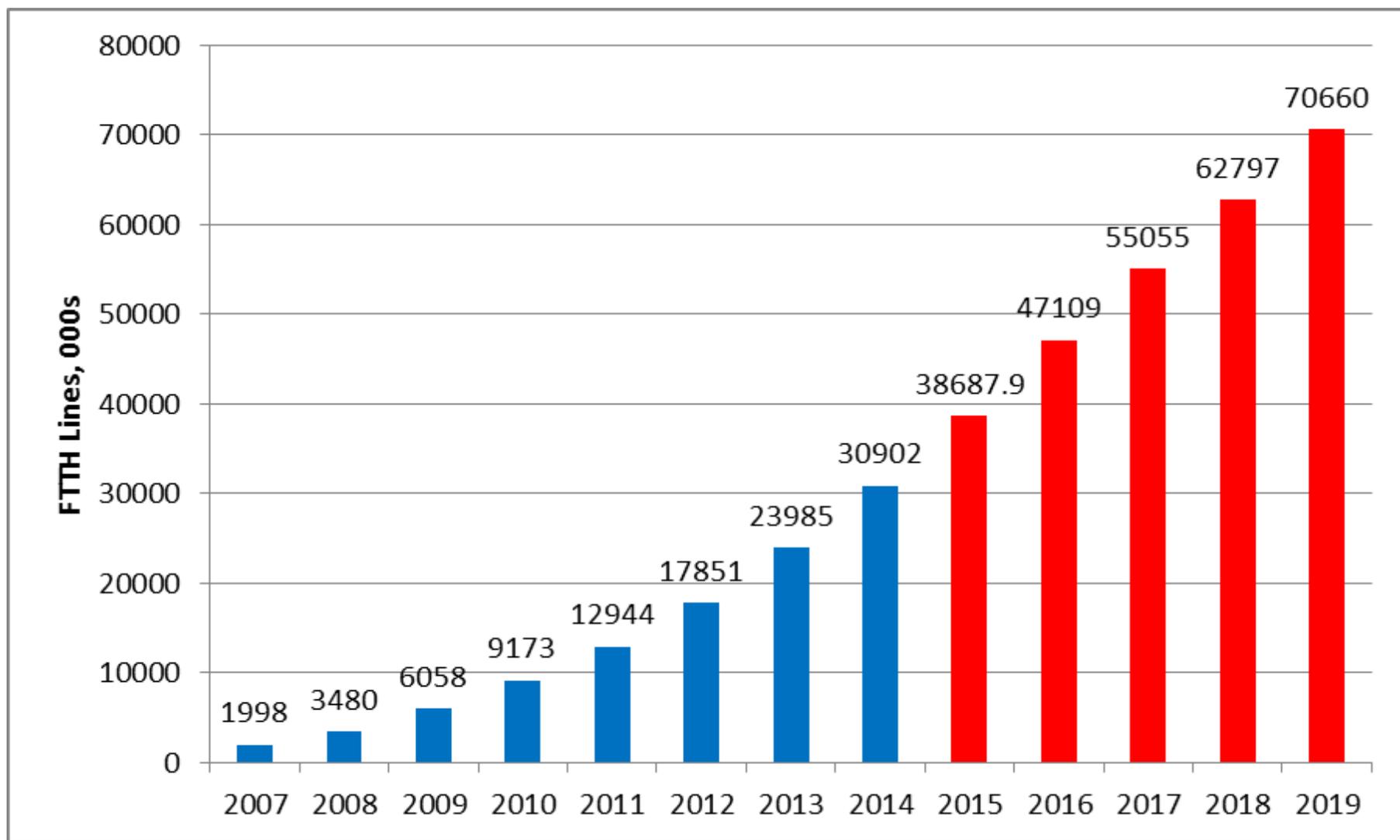
Positive Indicators

- Line speeds continue to rise steadily, pushing network operators towards FTTH; 4KTV, smart TVs, video streaming and device proliferation are key factors
- Many incumbents have shifted strategy towards FTTH
- Eastern Europe generally is leaving DSL behind
- Competing (and collaborative) builds are important catalysts in many countries
- Cable operators are pushing other types of telcos to higher speed technologies
- A better regulatory environment is speeding builds and lowering costs
- Technology innovation (e.g. microtrenching) is also helping to reduce costs

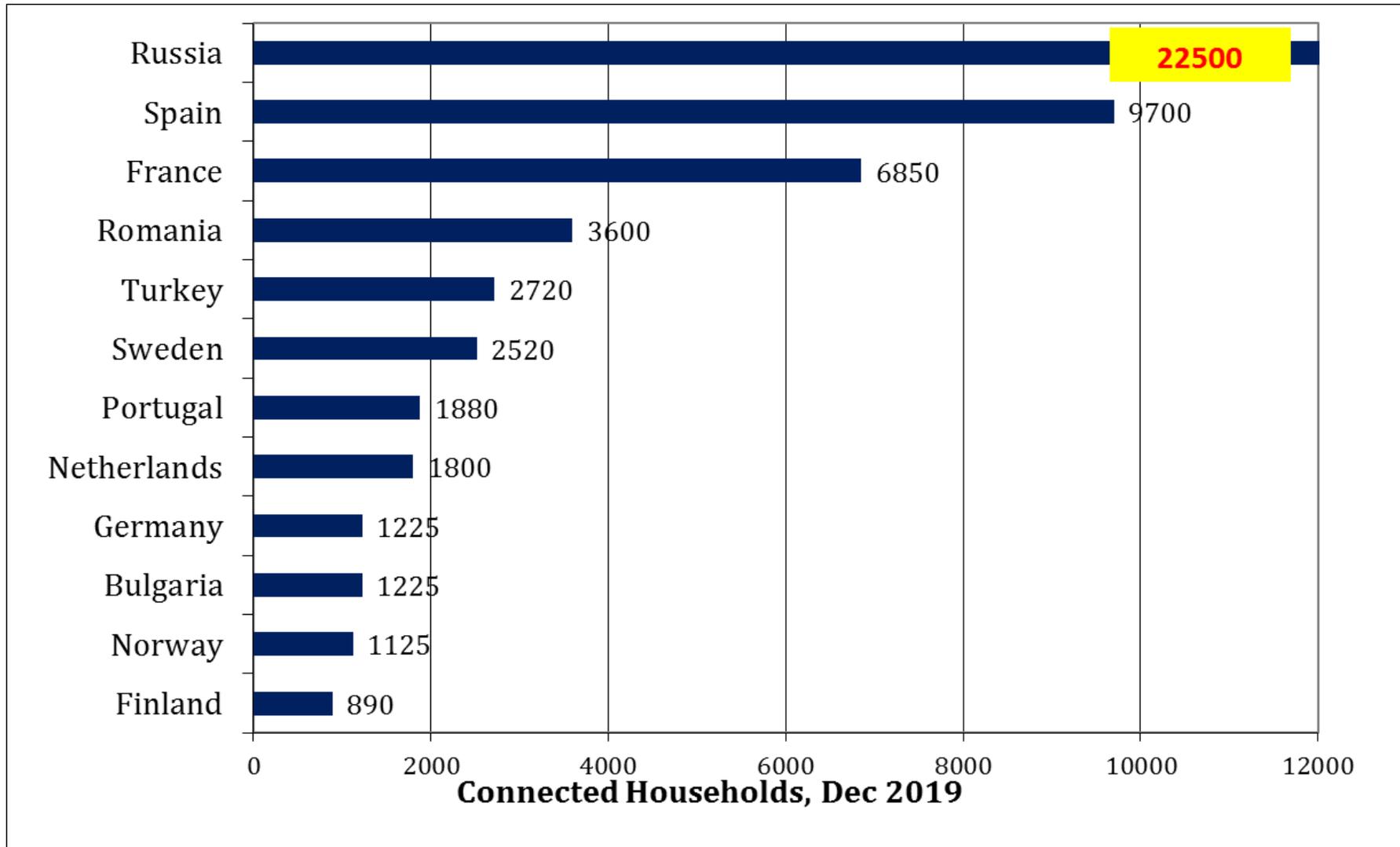
Negative Indicators

- Still no clear mass-market killer app for FTTH
- Vectoring has been successfully deployed, and new variants, along with G.fast, could enable operators to delay FTTH, or use mixed-build strategies
- Many muni and utility builds have faltered and many other projects are behind schedule or have been put on hold
- As penetration rises, the business case in harder-to-cable areas could become tougher; public funding may not be available to fill the gap
- Substitution by enhanced 4G may affect penetration—though 4G can have positive effects too

European FTTH Forecast, 2016-2019

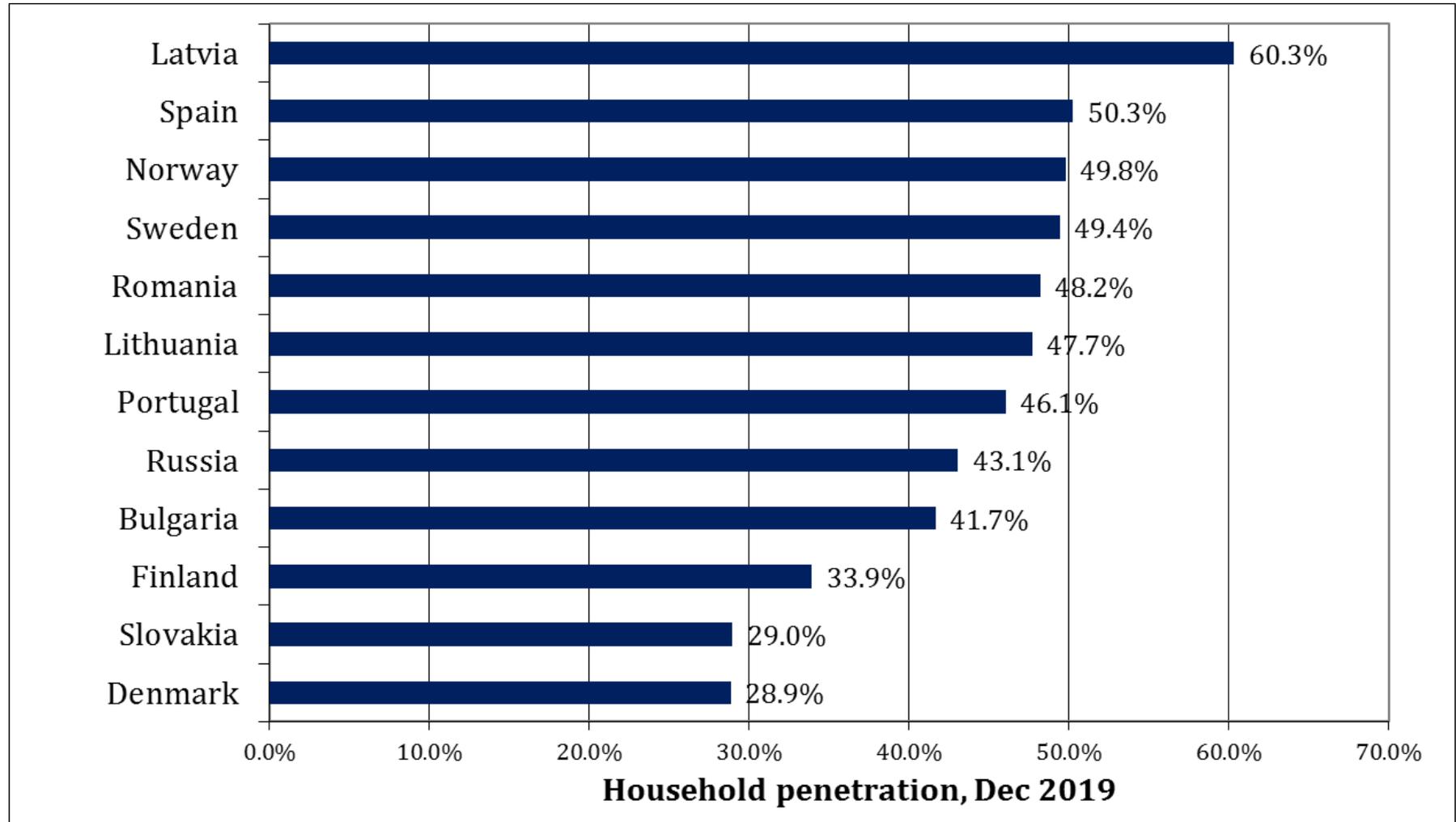


Top 12 FTTH Countries 2019*, By Number of Connected Households



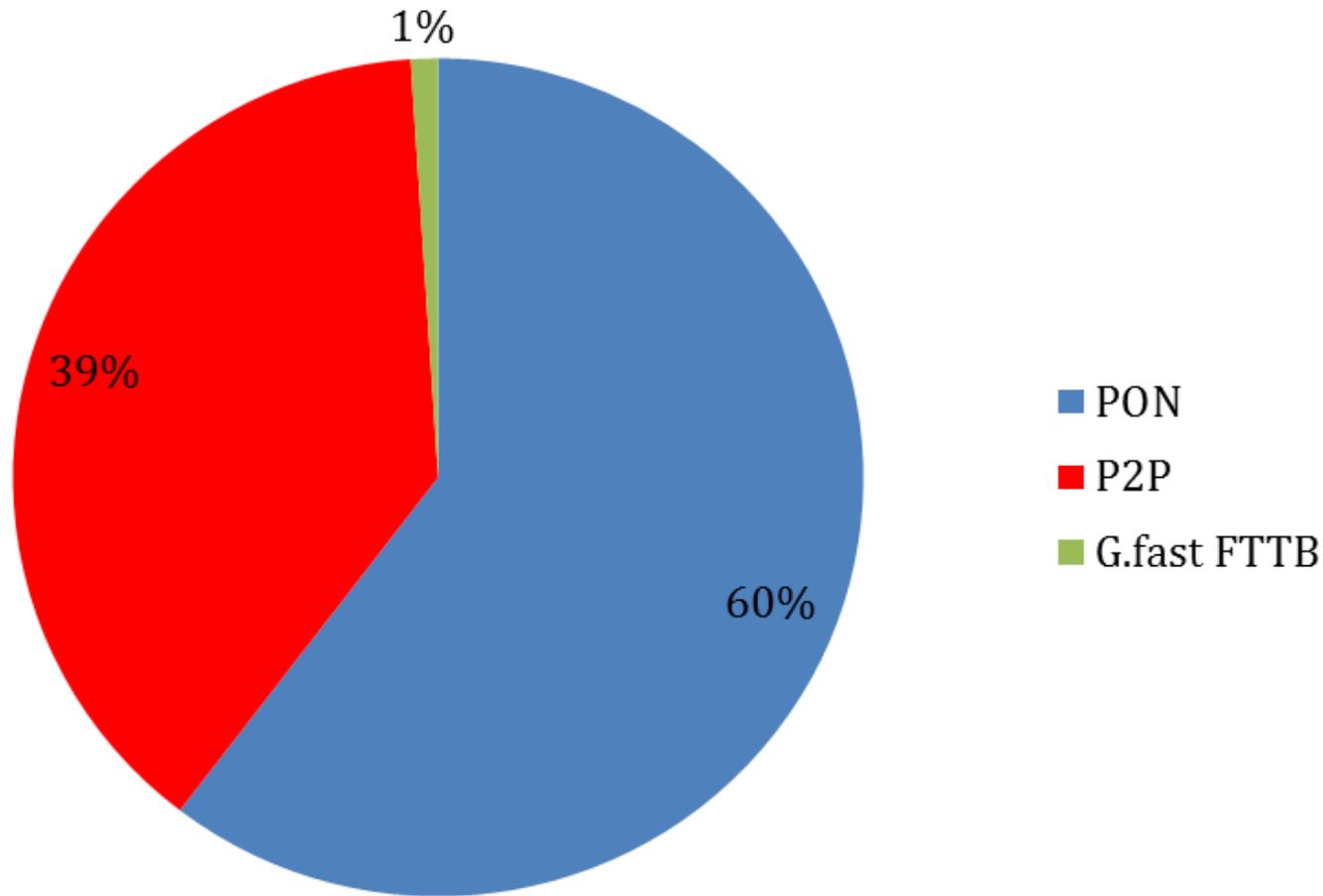
***In the 22 countries covered in detail**

Top 12 FTTH Countries 2019*, By Household Penetration

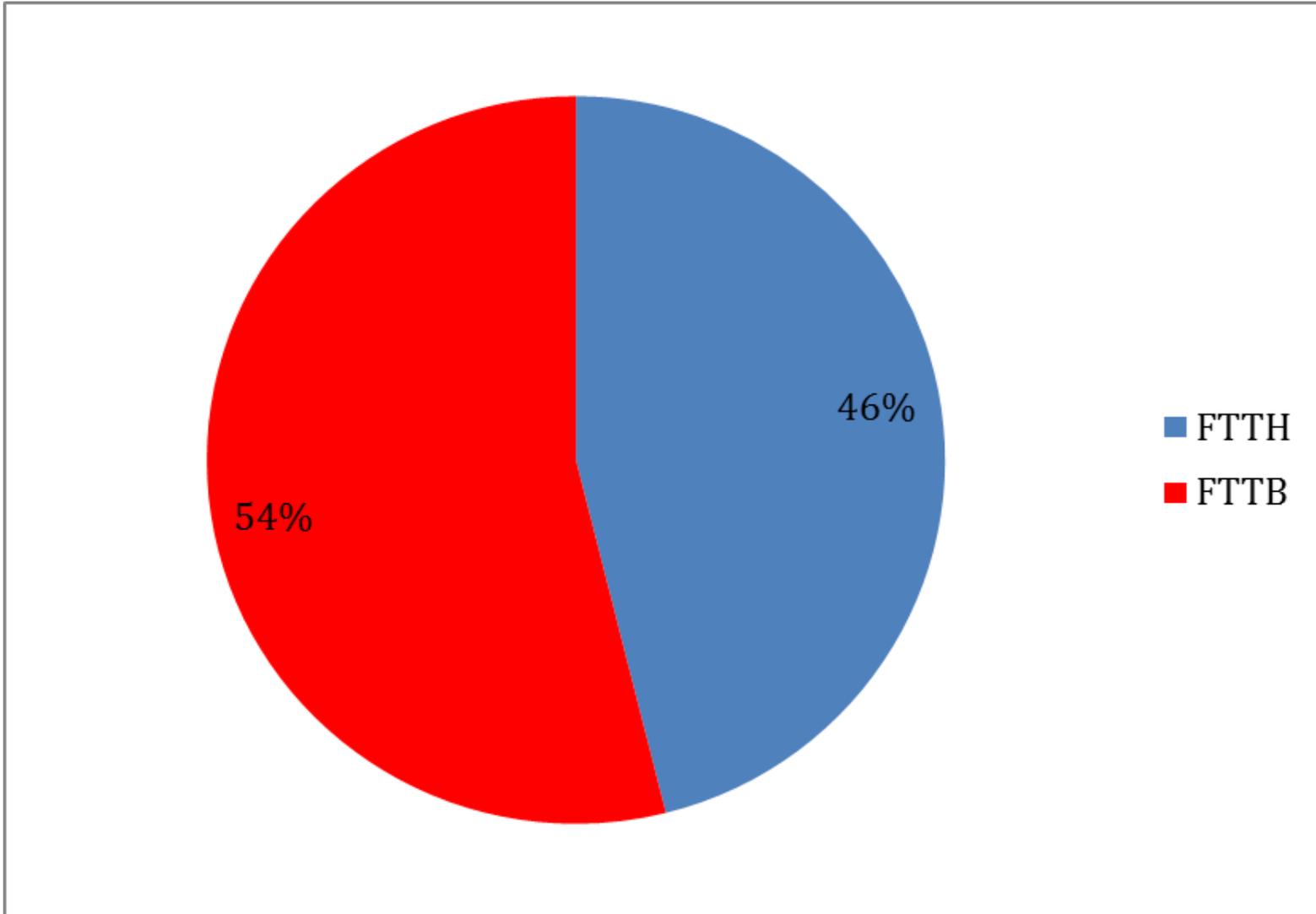


***In the 22 countries covered in detail**

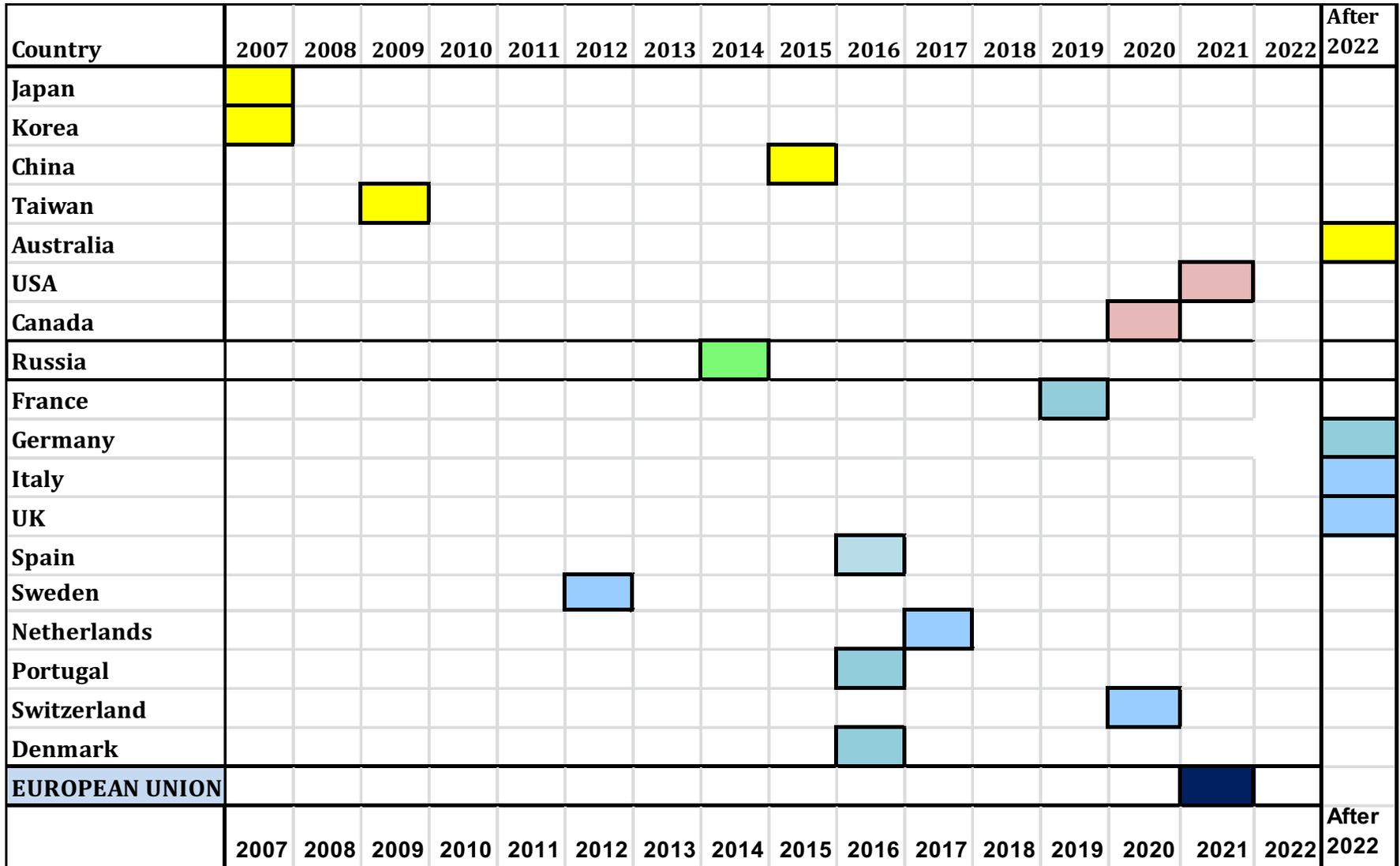
FTTH Connections in 2019 by Technology



FTTH Connections in 2019 by Type of Connection



The Race to “FTTH Maturity”*



* Defined as 20 percent FTTH Household Penetration

Summary

- Nearly 71 million households connected to FTTH or FTTB at the end of 2019, about 21% of all homes in the region
- In the EU, 36.4m homes connected, or 16.5% of all homes
- Three countries– Russia, Spain and France- will account for more than half the installed base
- The gap between the most and least penetrated will be very wide – at least ten years
- PON penetration is gradually rising; G.fast is emerging
- FTTH and FTTB evenly balanced, but shifting towards FTTH
- Market gradually shifting to ex-incumbents, but they will still account for less than half of installed FTTH lines at 2019
- Big differences from country to country will persist

Appendix

Factors Taken Into Account in Forecast

| LEADING INDICATOR | DEVELOPMENTS OVER THE PAST 12 MONTHS | POTENTIAL DEVELOPMENTS OVER THE NEXT 12 MONTHS |
|---|--|---|
| Demand-Oriented Indicators | | |
| Marketing and take-up of third generation broadband services (at 20Mbit/s +) | Average speed per household continues to rise at about 25-30%, with 20% of households already getting more than 30Mbit/s. | We expect the rise in average speed will continue, putting pressure on operators to shift to deeper fibre strategies. |
| Consumer electronics—PCs, digital cameras, HDTV, etc | The last two years have seen high sales of both 4KTVs and Smart TVs which generate higher bandwidth requirements. A steady rise in connected devices per household, including HD-enabled smartphones, is stoking demand | 4K video will continue to spread as all TVs use the standard, and the number of devices and streams per household will also increase—taking high-end households above 100Mbit/s |
| Services that drive higher-speed broadband | There has been an explosion in the use of video streaming of all kinds over the Internet, now usually HD and increasingly in future 4K | 4K will continue to spread and TV will increasingly be delivered on-demand, increasing bandwidth needs. |
| Supply-Oriented Indicators | | |
| Stated attitudes and plans of ex-incumbent telcos | Major builds in France and Spain, re-commitments in other countries such as Portugal and Slovakia. However there are also some big hold-outs and slow-downs too | Market share of incumbents will continue to rise gradually, and incumbent FTTH should continue to make good progress overall |
| Competitive and entrepreneurial telco plans and their impact | Competitive operators such as Orange and Vodafone have become more important in many countries in the past couple of years, with lots of new funding committed. | Overall, the involvement of non-incumbents looks set to rise in Western Europe, while in most of Eastern Europe they remain important players |
| Muni and utility plans and their impact | Continue to be important in Scandinavia; elsewhere activity is patchy, with many projects behind schedule. | Could become more important if there is better progress in countries like France and especially Germany. But we expect overall share to decline |
| Impact of cable MSOs | Cable MSOs have had a mixed impact, forcing some telcos to opt for VDSL as a faster means to respond, while others move on to FTTH to gain a clearer advantage. | The availability of DOCSIS 3.1 enables operators to offer Gigabit services, and this could give a boost to FTTH deployment in a year or two in some countries |
| Impact of mobile broadband | Some substitution of fixed broadband and diversion of capital has occurred, but this is counterbalanced by need for 4G fibre backhaul | No major change is foreseen, with the good and bad impact of mobile broadband cancelling each other out |
| Green-field housing and construction | House-building has been depressed in many countries since 2009. However, incumbents now routinely pull fibre to any housing development over a certain size | Deployment of FTTH to new build housing will modestly contribute to the overall FTTH build-out in the next few years |
| Other Indicators | | |
| Impact of equipment cost and construction trends | Cost of both construction and electronics continues to fall slowly, gradually improving the business case | Costs will continue to fall as builds mature, but the higher cost of builds in less dense regions could be a barrier |
| Impact of copper-based DSL developments | DSL vectoring is enabling some operators to delay FTTH and others to use it alongside FTTH. New variants at higher speeds emerging, and G.fast attracting strong interest | Vectoring is making good progress in Europe and will have some adverse effect on FTTH. G.fast is coming in 2017 but will have mixed impact. |
| Regulatory and political changes at European and national level | There has been a gradual improvement in the FTTH regulatory environment, though without an EU-wide commitment to FTTH. The Juncker plan is adding some funding | A continuing improvement is expected, though without any decisive impact on FTTH build-out except in some specific national markets |
| Macro-economic environment | The poor economic outlook in many places has had little clear impact on FTTH builds | The economic outlook remains uncertain, and public indebtedness may prevent massive subsidized builds |

Countries Covered in This Forecast

| Individual Forecasts Created | Included in Aggregate Forecast |
|------------------------------|--------------------------------|
| Western Europe | |
| Austria | Andorra |
| Denmark | Belgium |
| Finland | Cyprus |
| France | Greece |
| Germany | Iceland |
| Italy | Ireland |
| Netherlands | Israel |
| Norway | Luxembourg |
| Portugal | Malta |
| Spain | |
| Sweden | |
| Switzerland | |
| UK | |
| Eastern Europe | |
| Bulgaria | Armenia |
| Estonia | Belarus |
| Latvia | Croatia |
| Lithuania | Czech Republic |
| Poland | Hungary |
| Romania | Kazakhstan |
| Russia | Macedonia |
| Slovak Republic | Moldova |
| Turkey | Montenegro |
| | Romania |
| | Serbia |
| | Ukraine |