

European FTTH Forecast, 2013-2018

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Introduction

- **Based on individual analyses of 21 countries, and brief reviews of a further 23 countries**
- **Covers a total of just over 324 million households, 206 million in the EU and 118 million outside the EU**
- **Aggregate forecast slightly down compared to last year**
 - Continuing strong progress in Eastern Europe– Baltics, Bulgaria, Russia, Turkey, Ukraine
 - Better year in Western Europe, with good progress in France, Netherlands, Portugal, Spain, Sweden and Switzerland
 - Balanced by continuing slow progress in Germany, Italy, UK, possible slowdown to come in Netherlands
- **Gap between best and worst performers is still widening**
 - Some Western European countries are over 10 years behind the leaders in terms of FTTH penetration
 - At 2018, we expect household penetration to vary from less than 5% to more than 40%.

Leading Indicator	Developments Over The Year	Potential Developments Over The Next Year
Demand-Oriented Indicators		
Marketing and take-up of third generation broadband services (at 20Mbit/s +)	Positive: Average speed per household continues to rise rapidly, paving the way for FTTH. Speedtest showed average European downstream speed at the end of 2013 around 22Mbit/s, up around 30% on the year	Positive: We expect the rise in average speed will continue in 2013, pressurizing those still reliant on ADSL and first-generation VDSL
Consumer electronics—PCs, digital cameras, HDTV, etc	Negative: 2013 was a slow year for PCs and TVs, though the growth in devices per home, in “connected” TVs and in new-generation games machines have contributed to growth	Negative: number of devices per home will continue to multiply, but no hardware is likely to require FTTH in the near future
Services that drive higher-speed broadband	Neutral: downstream services based on VDSL can support all current services, but the rise in uploading of photos, videos and Cloud services is driving a need for more symmetrical bandwidth	Neutral: although there is no killer app for FTTH in sight, the rise in upstream demand will likely continue.
Supply-Oriented Indicators		
Stated attitudes and plans of incumbent telcos	Positive: a clear improvement in 2013 with stronger performances from Rostelecom, Telefonica, KPN, Turk Telecom, TeliaSonera among others.	Positive: Market share of incumbents will continue to rise as confidence in the FTTH business case grows
Competitive and entrepreneurial telco plans and their impact	Positive: New entrants have had a big impact in Russia, Turkey, Bulgaria, Romania and many of the most dynamic markets, and growth in these countries will continue	Positive: we expect continuing good growth through the next few years in these countries, and some others
Muni and utility plans and their impact	Neutral: Good progress in Denmark and Norway and some progress in Germany, but in general the game is tending to shift towards incumbents.	Neutral: while there will continue to be growth in existing projects, we do not expect major new projects in other countries.
Impact of cable MSOs	Neutral: Cable MSOs had a big impact in 2011 and 2012 with 50-100Mbit/s+ products; many incumbents have responded with VDSL, but it is pushing others to FTTH	Neutral: the VDSL build-out continues for now in many cable-rich territories, but ultimately cable MSOs may force more incumbents to build a true FTTH network
Impact of mobile broadband	Neutral: Some substitution of fixed broadband, and diversion of capital, but counterbalanced by need for fiber backhaul	Neutral: No major change in current situation is foreseen
Green-field housing and construction	Negative: House-building has been hit hard by the recession and remains far below its peak.	Negative: no sign house building will pick up enough in the near term to make any real difference for FTTH
Other Indicators		
Impact of equipment cost and construction trends	Neutral: Although cost of both construction and electronics continues to fall slowly, it is only having a modest impact on decision-making	Neutral: Costs will continue to fall, but without having a major impact on network builder behavior
Impact of copper-based DSL developments	Negative: DSL vectoring, bonding and other developments are leading some operators to consider DSL anew and postpone FTTH	Neutral: Vectoring has still to deliver on its promise to make a real impact here
Regulatory and political changes at European and national level	Neutral: Positive moves at both regional and national level, but Euro-regulation has failed to have a continent-wide impact yet,	Positive: despite limited impact of EU reforms to date, the barriers that have held back many plans are steadily being removed at national level
Macro-economic environment	Neutral: Despite the poor outlook, operators in some badly affected territories like Portugal and Spain have continued to build	Positive: many countries are beginning to emerge from recession.
FTTH development outside Europe and its political & commercial impact	Neutral: although some European countries are falling far behind other world regions, it has had only a muted effect on European politicians and the public to date	Neutral: little sign yet that this is about to really explode as a political issue

Positive Leading Indicators In 2013/2014

- Continuing large-scale build-out in major countries in East, with more builds likely over the next few years: FTTH is the default technology here
- More incumbent involvement in Western European countries including Finland, France, Netherlands, Portugal, Spain, Sweden, Switzerland
- Broadband line speeds continue to rise strongly, up about 30% on average in 2012; connected devices per home also rising
- Capex and opex continue to fall steadily, improving the business case
- Slowly improving macro-economic environment

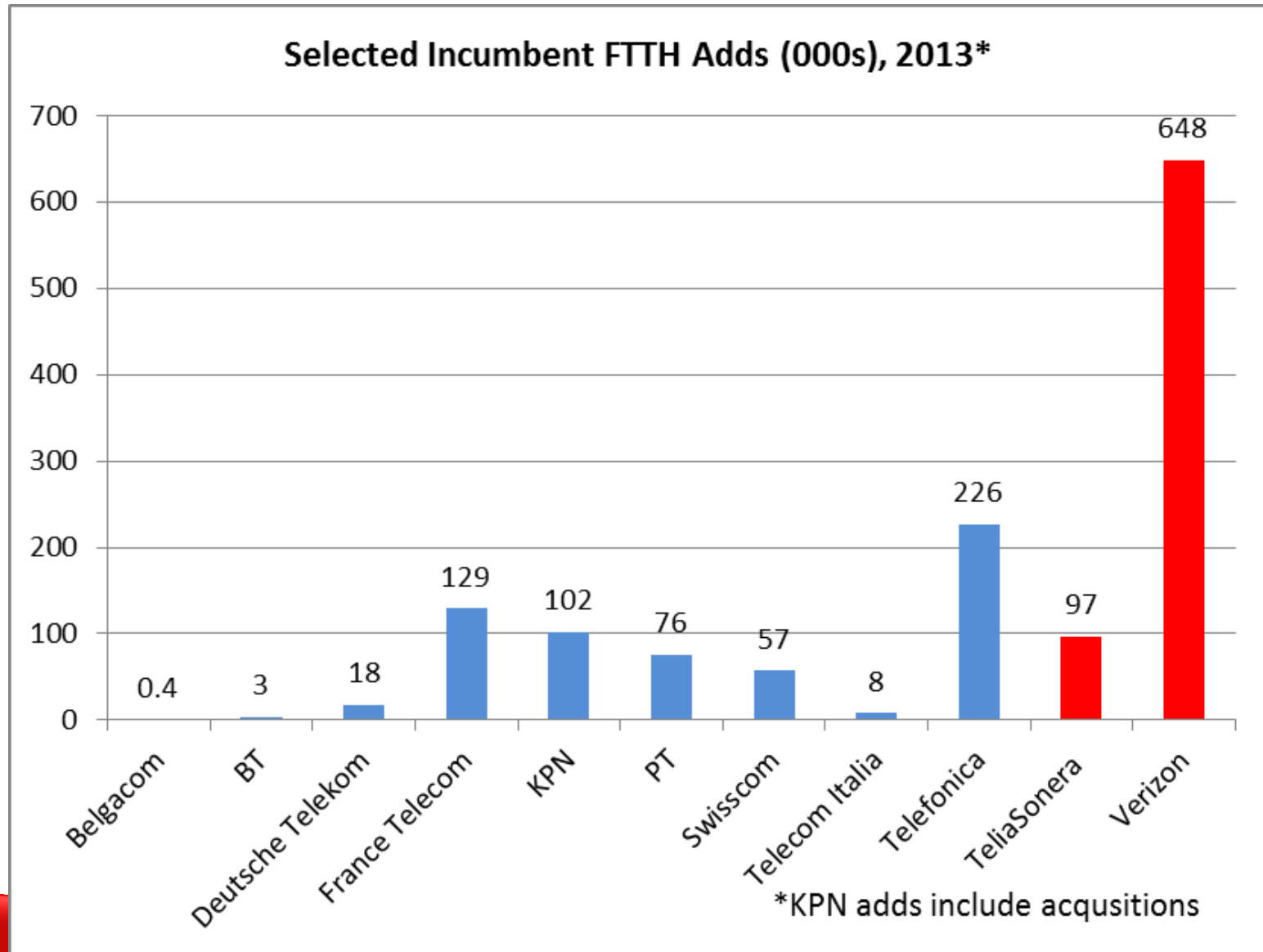
Secrets of Success: The Ten Percent Club

COUNTRY	H-HOLD FTTH PEN, END 2014 (EST)	FACTORS DRIVING SUCCESS
Bulgaria	15.4%	Strong entrepreneurial E-LAN sector; limited DSL; low deployment costs; more recently, large-scale private sector investment
Denmark	16.1%	Strategic decision by regional electricity utilities to invest in FTTH
Estonia	14.2%	Incumbent (owned by TeliaSonera) took strategic decision to shift to FTTH
Latvia	27.9%	Incumbent took strategic decision to shift to FTTH
Lithuania	33.1%	Incumbent took strategic decision to shift to FTTH; multiple other players also building rival fiber networks
Norway	22.8%	Alternative utility-owned telco created highly successful high ARPU triple-play model
Portugal	16.1%	Early entry by two CLECs impelled major shift to FTTH by incumbent; successful build model based on low deployment costs
Russia	19.5%	Very low cost build model based on FTTB and cheap Ethernet switches; little DSL; multiple well-funded entrepreneurial builders
Slovakia	14.2%	Strong competition between incumbent and a well-funded rival
Slovenia	15.4%	Strong competition between incumbent and rival
Sweden	30.7%	Led by municipalities and housing associations, as well as some early entrepreneurial builds, and more recently TeliaSonera

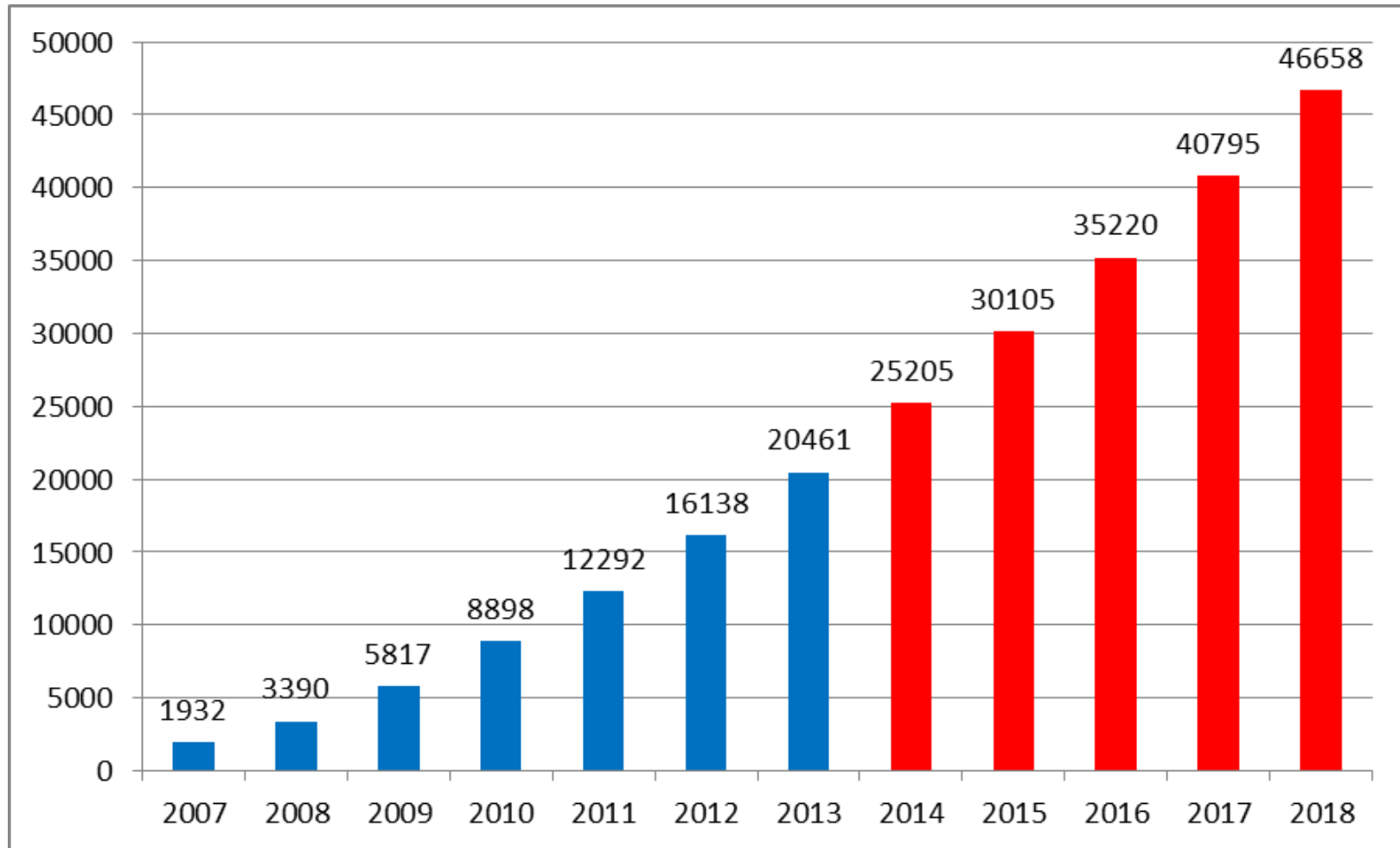
Negative Leading Indicators In 2013/2014

- No single application **requires** FTTH– and there's little sign of such an application is emerging
- Incumbents, especially in Western Europe, looking to vectoring and G.fast as medium-term (even long-term) solutions
- In many countries, alternatives to the incumbent are not deploying FTTH, or lack sufficient capital to do so
- Municipal and utility movement restricted to a few countries in the region
- Little likelihood of major public funding to support builds

European Incumbents vs Verizon

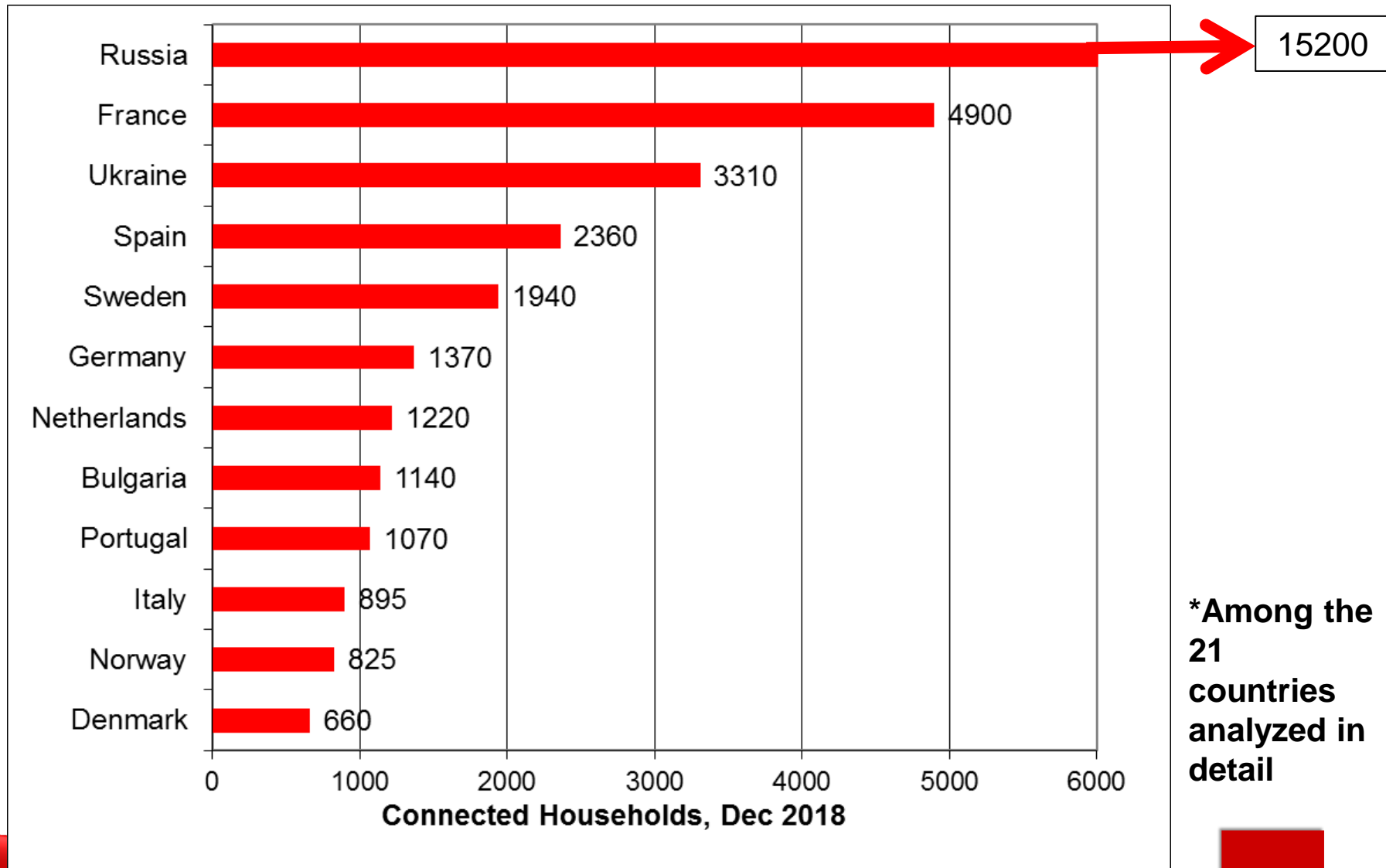


European Region FTTH Forecast

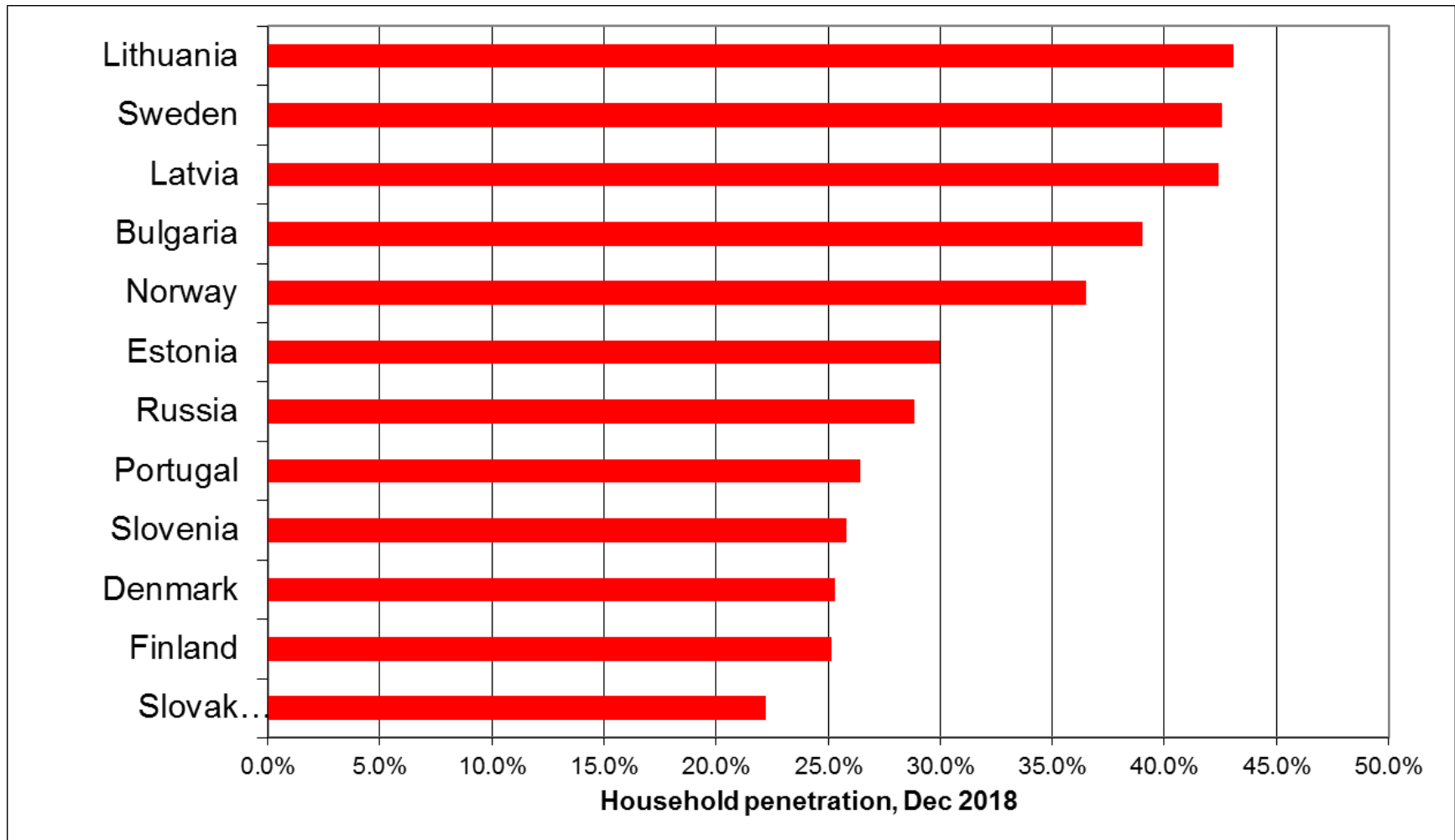


Note: Households connected directly to fiber and apartment connected via basement fiber termination (FTTB)

Top FTTH Countries In 2018*, By Number Of Connected Households

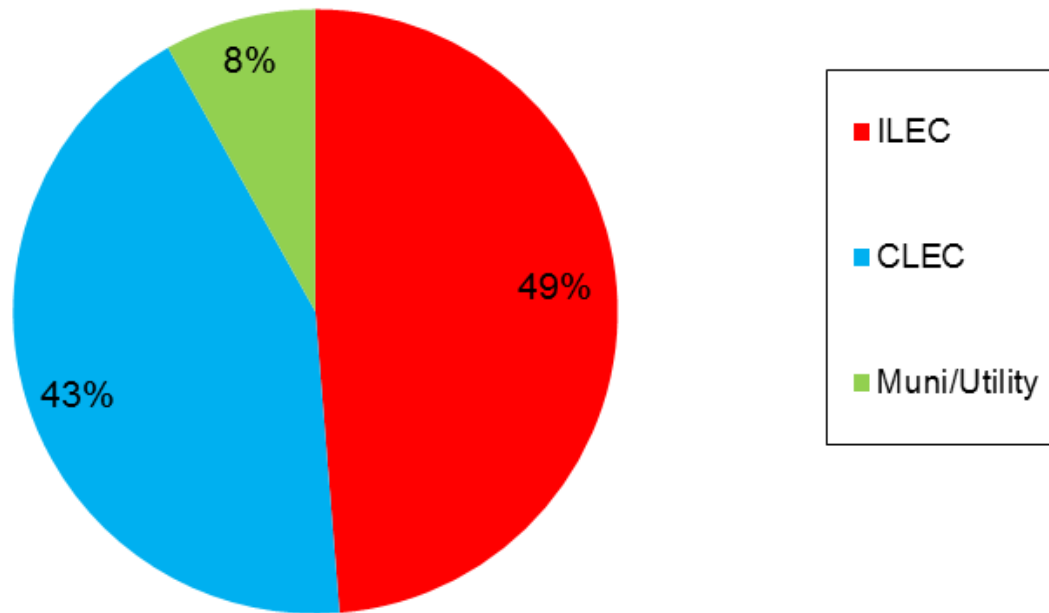


Top FTTH Countries In Europe, 2018*, By Household Penetration



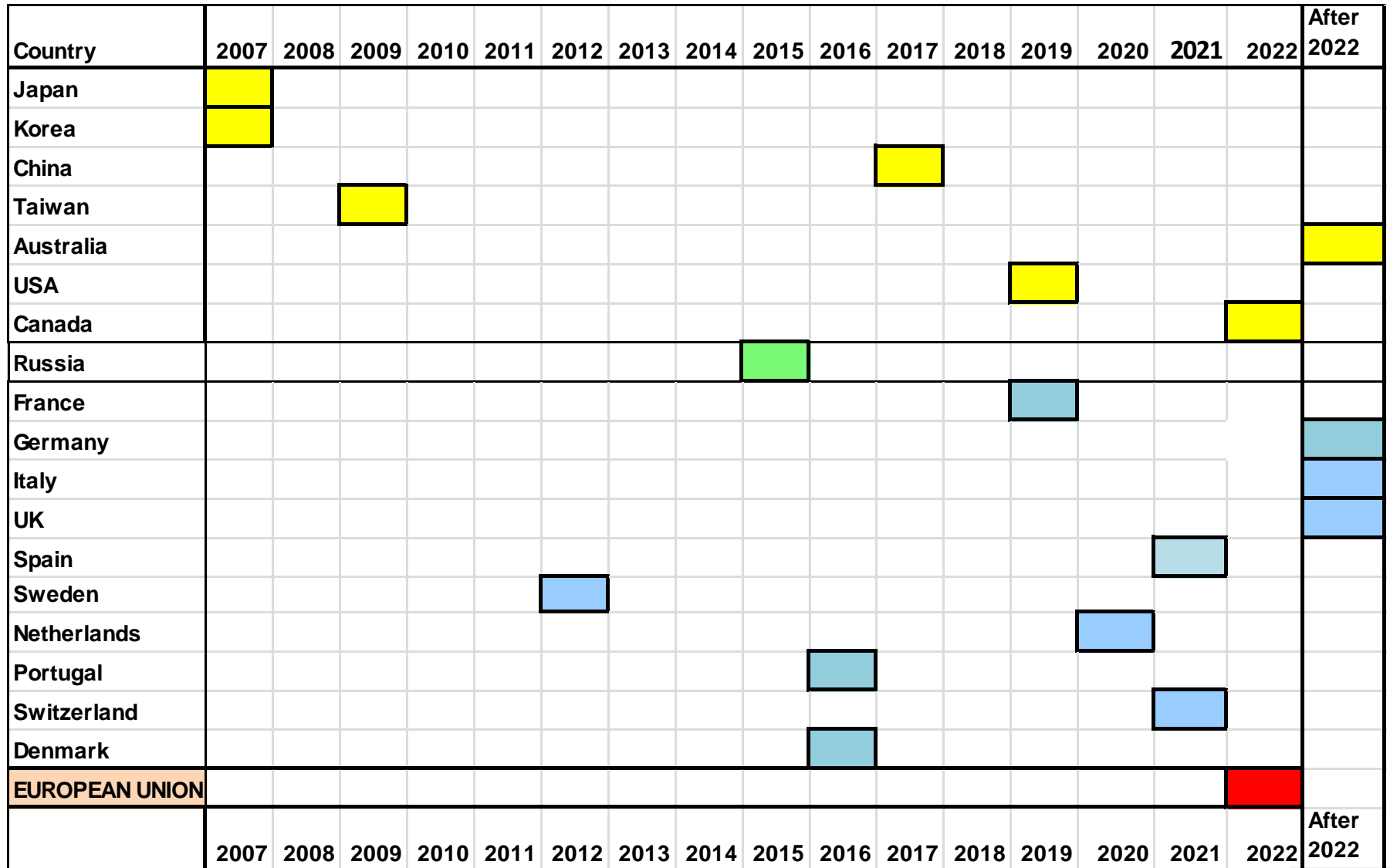
***Among the 21 countries analyzed in detail**

FTTH Connections In Europe, 2018, By Type Of Builder



Note: ILEC = former incumbent monopoly telco (PTT). CLEC = competitive or alternative telco or broadband provider. Muni/Utility = network built by municipal local authority or by a power utility

The Race To FTTH Maturity



Summary

- 46.7m households are expected to be connected to FTTH or FTTB at the end of 2018 in the countries covered by this forecast— this is about 14.4% of all homes in the region
- In the EU only, the total is forecast to be almost 22m, or 10.6% of all homes in the EU
- 12 of the 21 nations individually analyzed should achieve “fiber maturity” (20% penetration) by 2018— Lithuania, Sweden, Latvia, Bulgaria, Norway, Estonia, Russia, Slovenia, Denmark, Finland, Portugal, and Slovak Republic
- Incumbents will account for almost half of all connections at 2018
 - 70% of connections will be to MDUs
 - 57% will be based on PON
- The gap between the EU and non-EU area, is still widening: in 2013, less than 4% of EU households had FTTH, against over 10% in the non-EU area; by 2018, this gap will hardly have closed