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Webinar

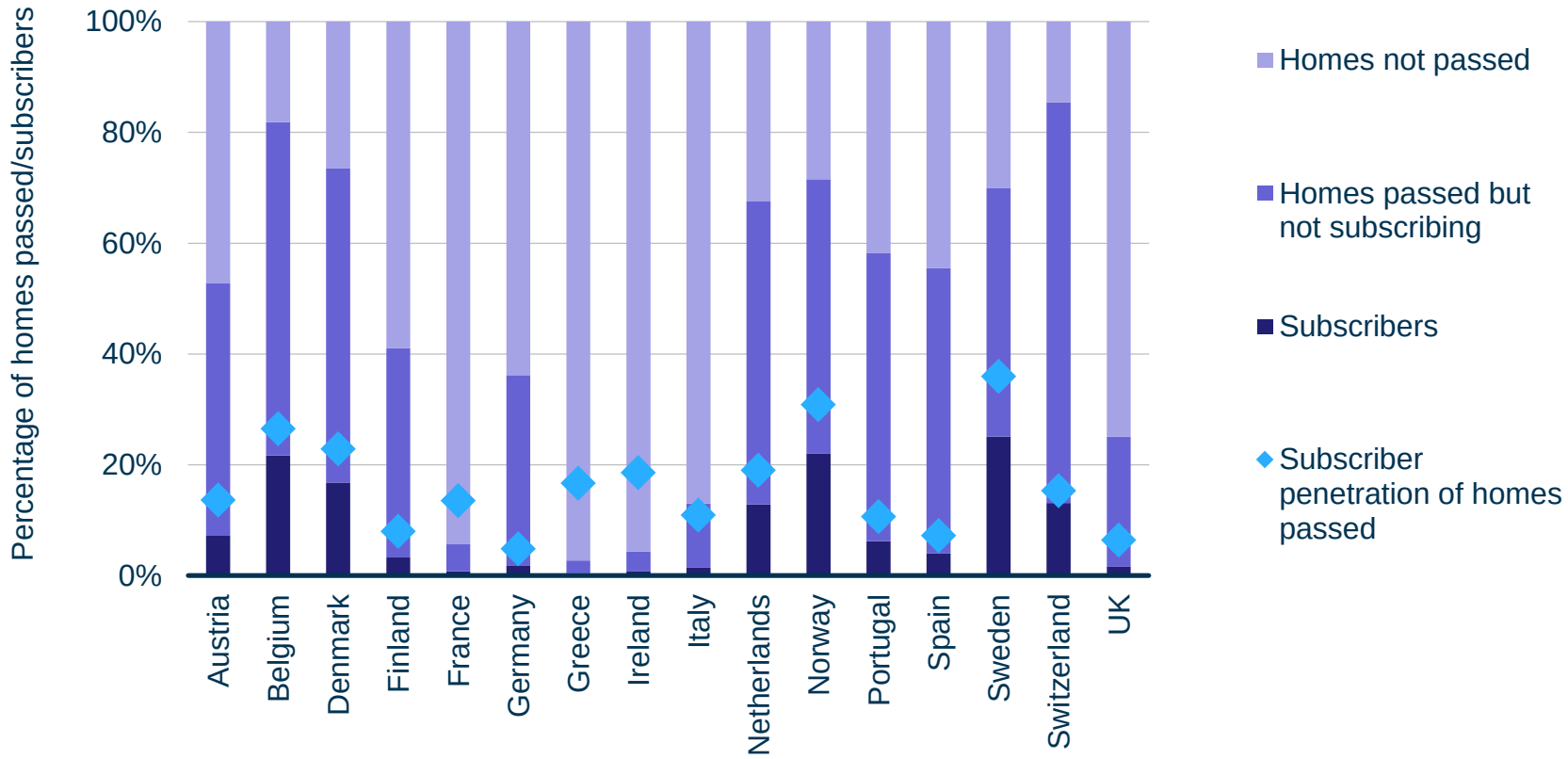
FTTx roll-out and capex forecasts, 2012–2017

25 April 2012

Rupert Wood

Where we are now

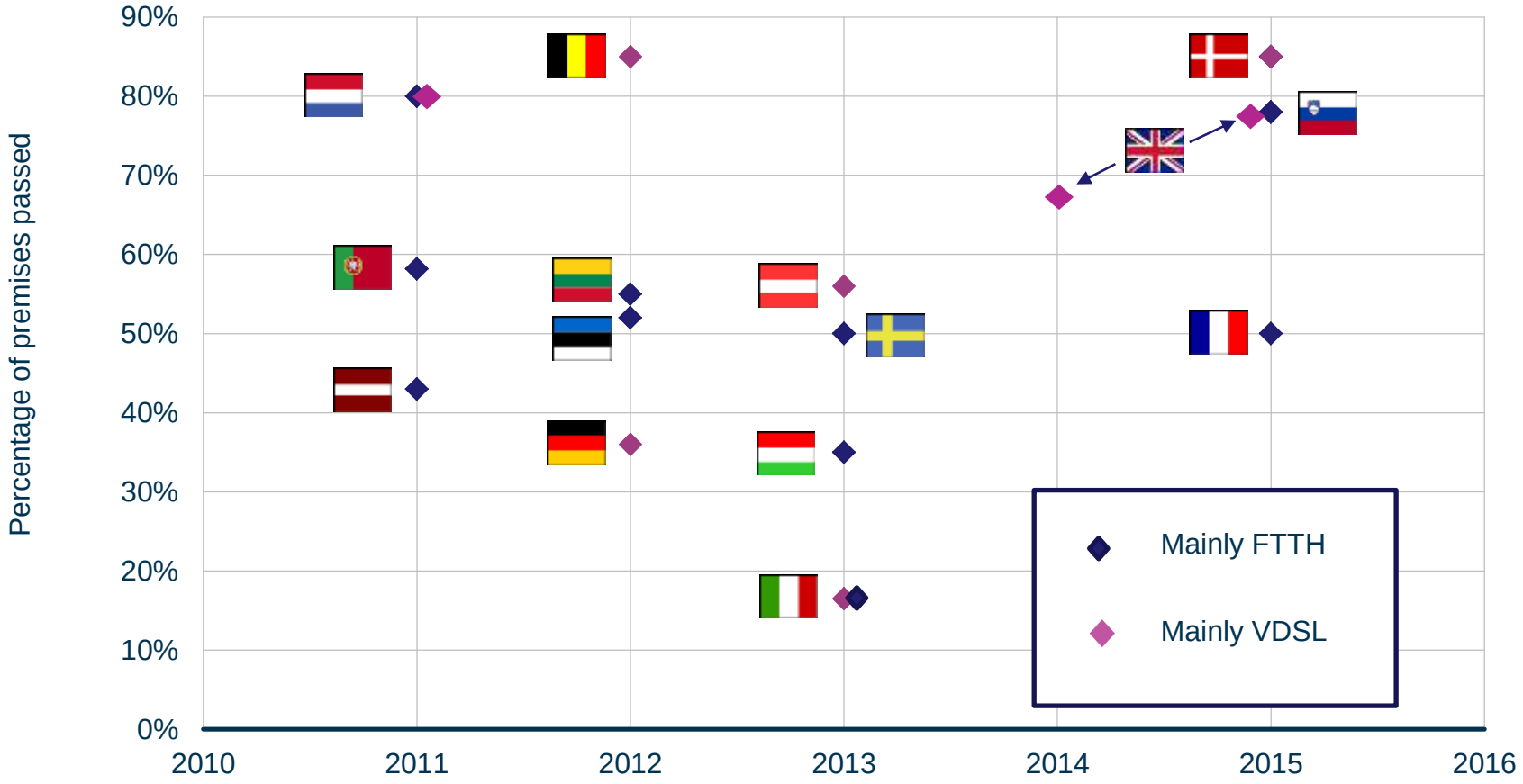
Figure 1: VDSL and FTTH roll-out and take-up by country, Western Europe, December 2011 [Source: Analysys Mason, 2012]



FTTx roll-out and capex in developed economies: forecasts 2012–2017

Incumbent plans for next-generation fixed access vary greatly in ambition

Figure 2: Indicated plans for next-generation access, selected European incumbents, 2010–2016 [Source: Analysys Mason, 2012]



FTTx roll-out and capex in developed economies: forecasts 2012–2017

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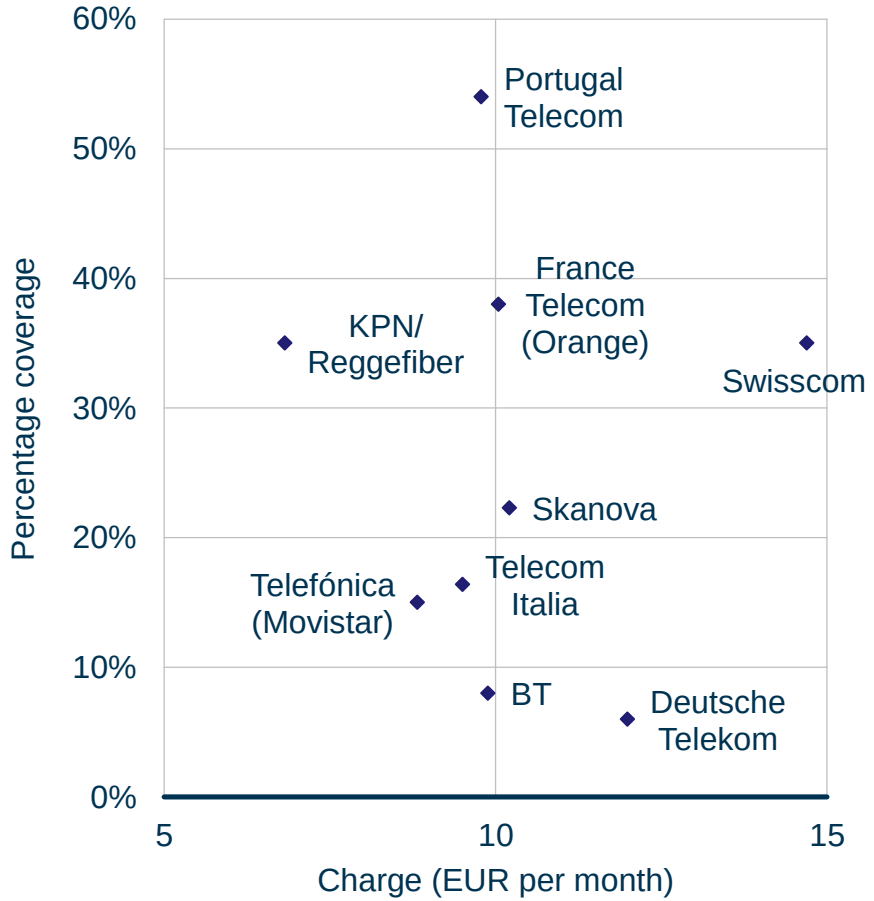
Incumbent ambition appears not to be strongly correlated to the regulated cost of copper

- In October 2011, the EC Commissioner, Neelie Kroes, proposed that LLUB charges should be gradually reduced on what she termed ‘largely depreciated copper networks’
  - easy profits from existing copper disincentivises investing in fibre.
- Incumbent operators argue that such a measure:
  - reduces the value of fixed broadband making it more difficult to invest in fibre
  - encourages end users to keep copper
  - ignores enhanced DSL technology.
- Other factors are more important in determining speed of roll-out.

Figure 3: Forecast FTTH coverage by 2015 and current LLUB charges [Source: Analysys Mason, 2012]



FTTx roll-out and capex in developed economies: forecasts 2012–2017

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Our forecasts for roll-out and capex are based on critical assessments of operator plans

- Forecasts are based primarily on operators' latest announcements (recorded in Analysys Mason's quarterly NGA tracker), and secondarily on our own assessment of what operators will do, given the competitive, demand and economic environments.
- **We take operator announcements at face value unless we have good reason to believe that they are no longer feasible.**
- Capex is measured against our own cost models and includes the cost of roll-out to pass subscribers' premises, plus the cost of subscriber connections. For a network to pass a home, the subscriber must be able to get a connection within 30 days without substantial new build of network.
- We define as a subscriber on an incumbent network, any end user using that physical infrastructure and we therefore include subscribers to third-party retail service providers.

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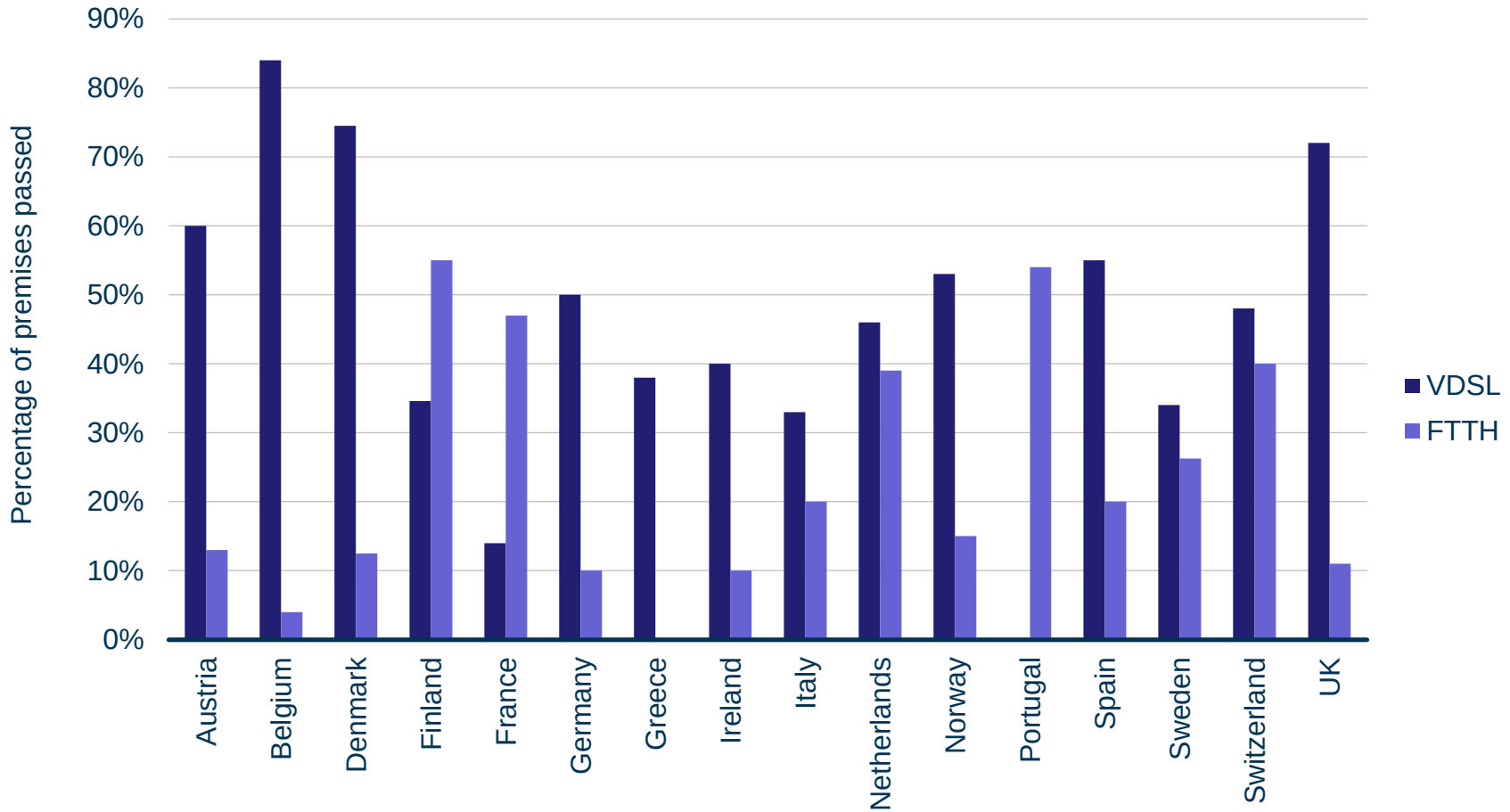
Total coverage in Western European countries will vary greatly by 2017 if operators stick to current plans

Figure 4: Incumbents' roll-out forecasts by technology, Western Europe, 2017 [Source: Analysys Mason, 2012]



FTTx roll-out and capex in developed economies: forecasts 2012–2017

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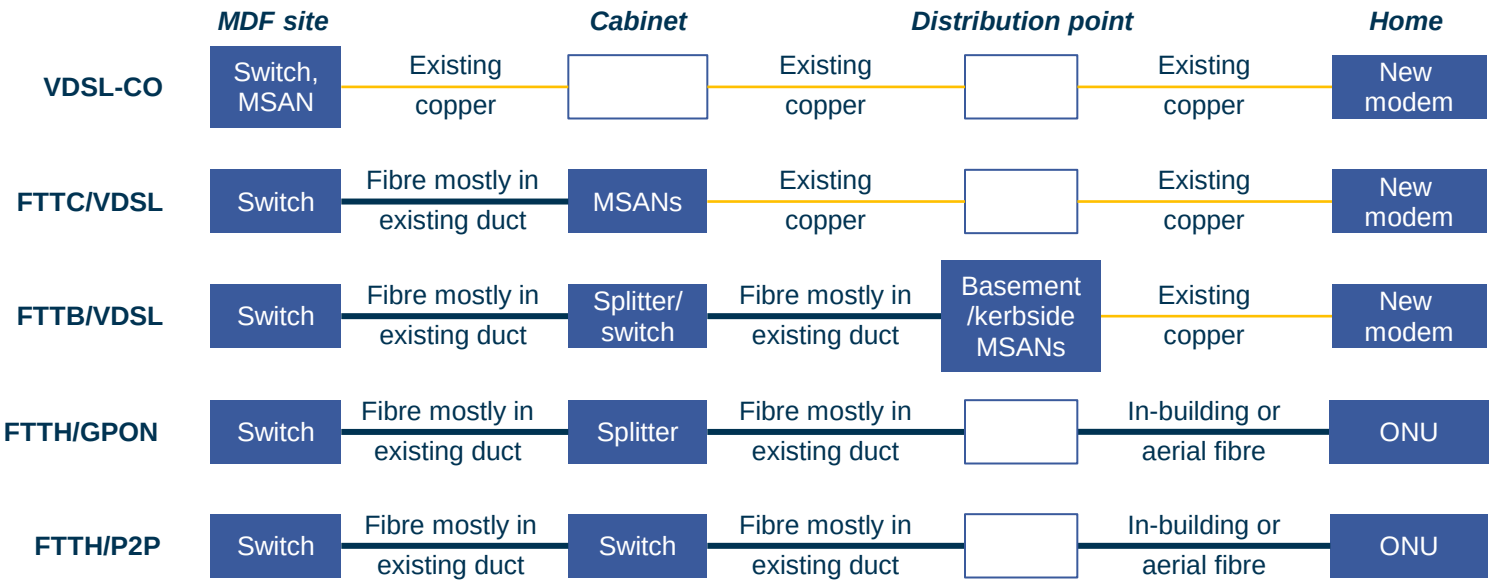
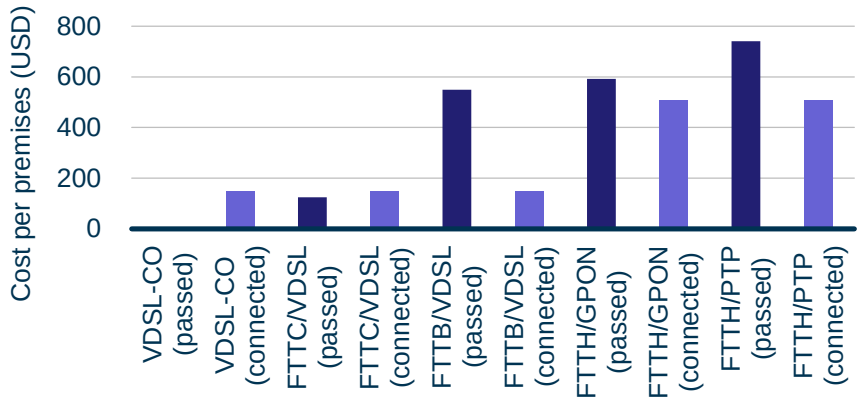
Our capex forecasts are based on five basic roll-out architectures

Figure 5: Base-line architecture for capex forecasts [Source: Analysys Mason, 2012]



Base-line costs are adjusted for three factors [1]

Figure 6: Base-line costs of different architecture



x relative cost per country

x cost erosion over time

x cost multiplier for increasingly expensive geo-types

Base-line costs are adjusted for three factors [2]

Figure 6: Base-line costs of different architecture

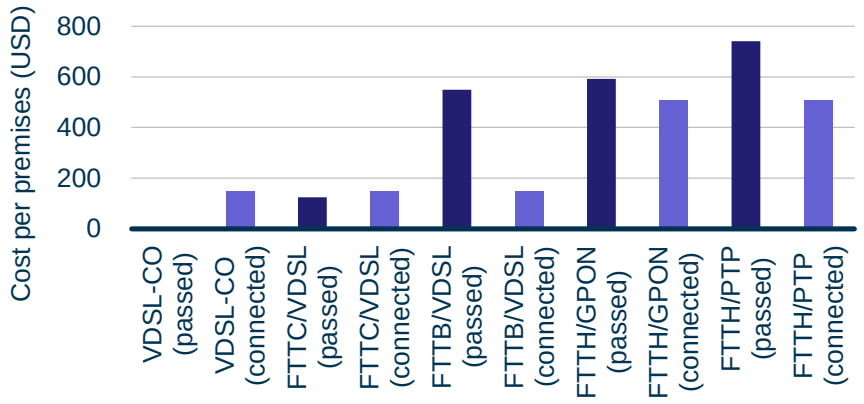
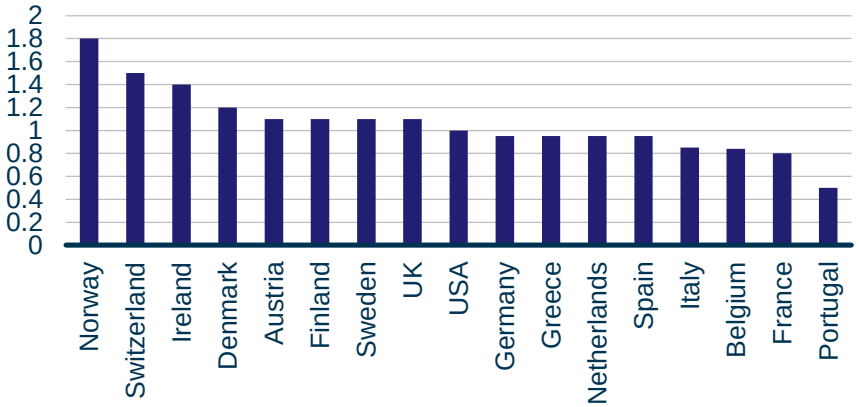


Figure 7: Relative costs (USA=1)



x cost erosion over time

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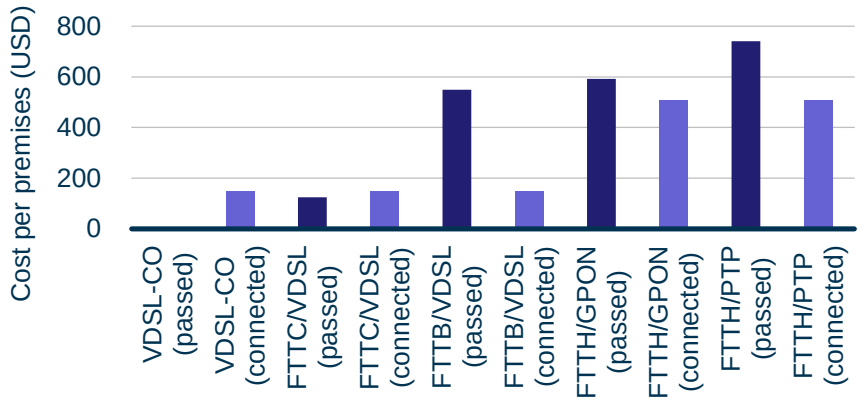


Figure 7: Relative costs

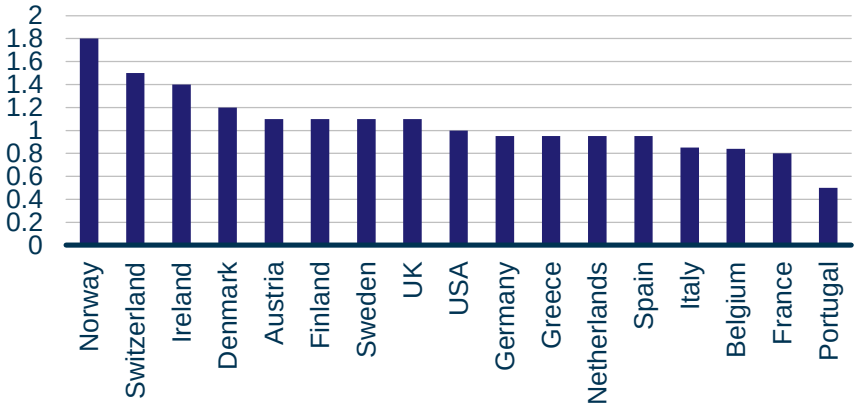
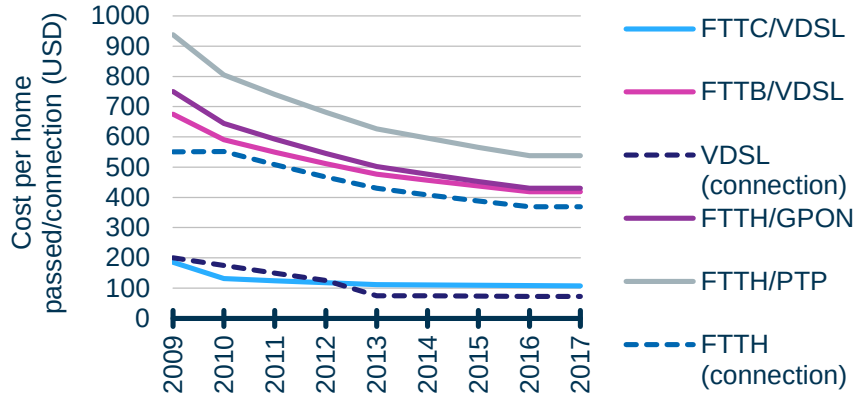


Figure 8: Cost erosion over time



x cost multiplier for increasingly expensive geo-types

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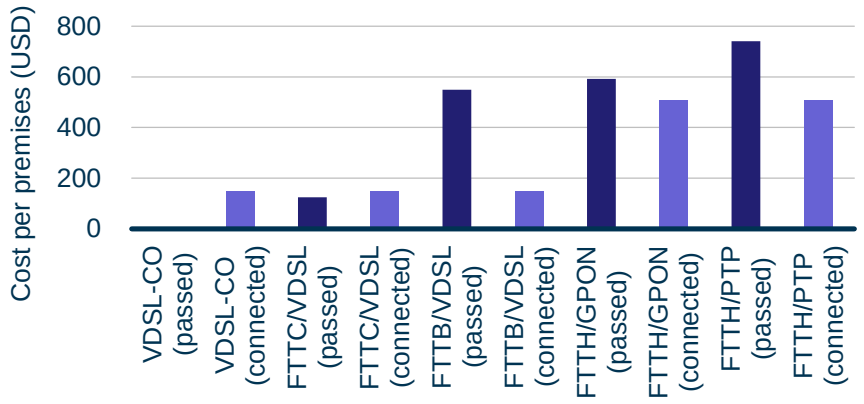

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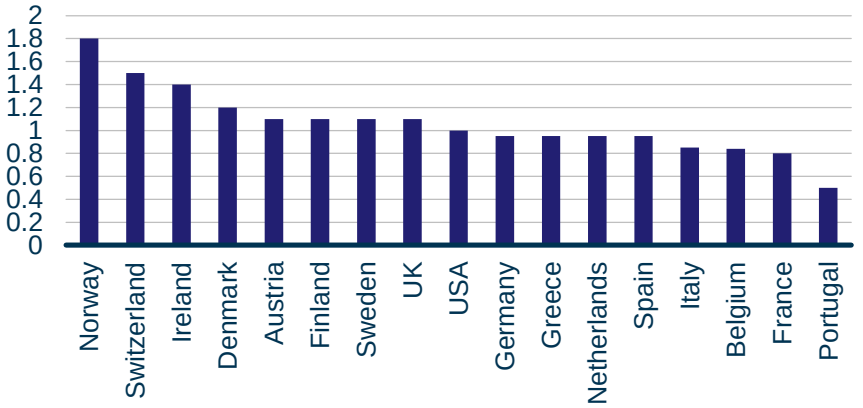

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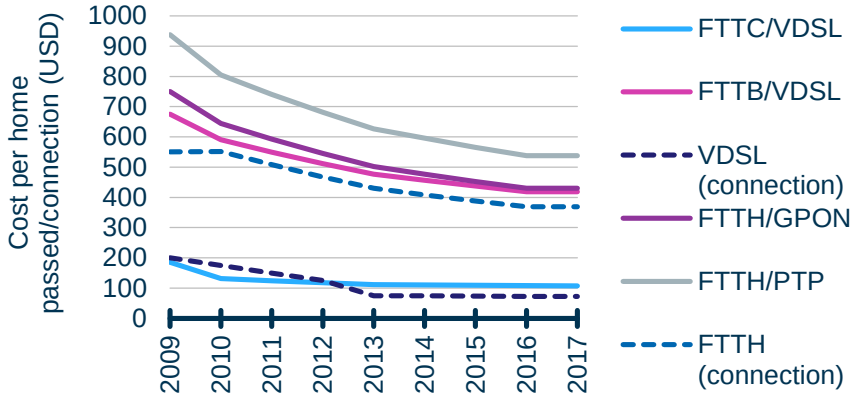
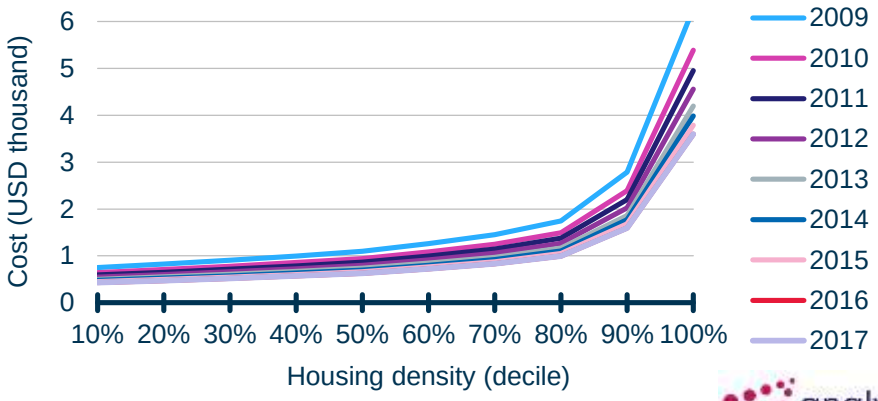


Figure 9: Cost per decile



Roll-out decisions are increasingly based on other factors as well as cost

Figure 10: Example of roll-out modelling from core capex model [Source: Analysys Mason, 2012]

Total FTTH	20.0%	29.1%	32.5%	36.0%	39.0%	42.0%	45.0%	47.5%	50.0%
	to 2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Norway_Decile 10	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Norway_Decile 20	0.0%	4.0%	2.4%	3.5%	0.1%	0.0%	0.0%	0.0%	0.0%
Norway_Decile 30	0.0%	0.0%	0.0%	0.0%	2.9%	3.0%	3.0%	1.1%	0.0%
Norway_Decile 40	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%	2.5%
Norway_Decile 50	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Norway_Decile 60	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Norway_Decile 70	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Norway_Decile 80	0.0%	5.1%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Norway_Decile 90	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Norway_Decile 100	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Telenor *et al*

Mainly Altibox utilities

- The model can be adapted for different, more demand-driven, approaches to roll-out.
- More favourable demand-side aspects of rural roll-out can offset the higher costs
- Richer suburban areas may be better than dense urban areas.
- Some of the areas to which, in pure capex terms, it is the least expensive to roll out also represent the biggest problems in terms of speed of roll-out: tenant agreements.

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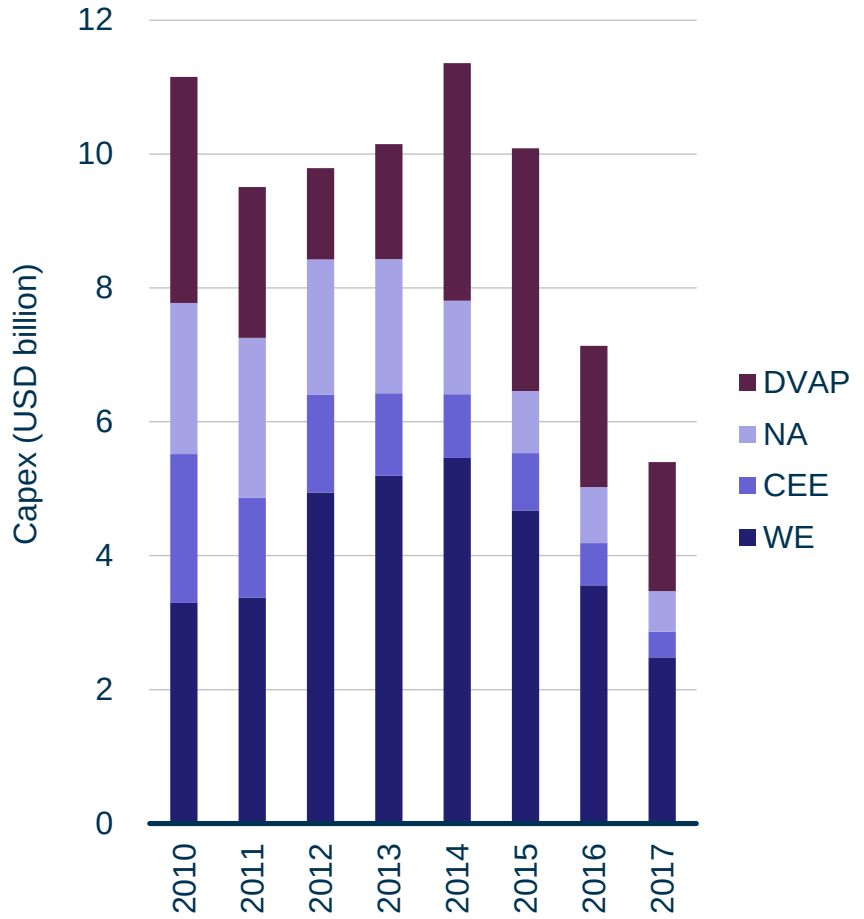
Total NGA capex is about 30–35% of fixed capex budgets until 2015

- We forecast USD26.2 billion capital expenditure on NGA by telcos in Western Europe between 2012 and 2017 inclusive.
- Spend will peak in 2014 under current plans.
- However there is a strong probability that:
  - plans will be delayed and spending postponed
  - some FTTH plans will be modified to FTTB
  - fair take-up rates will encourage planning for further coverage.

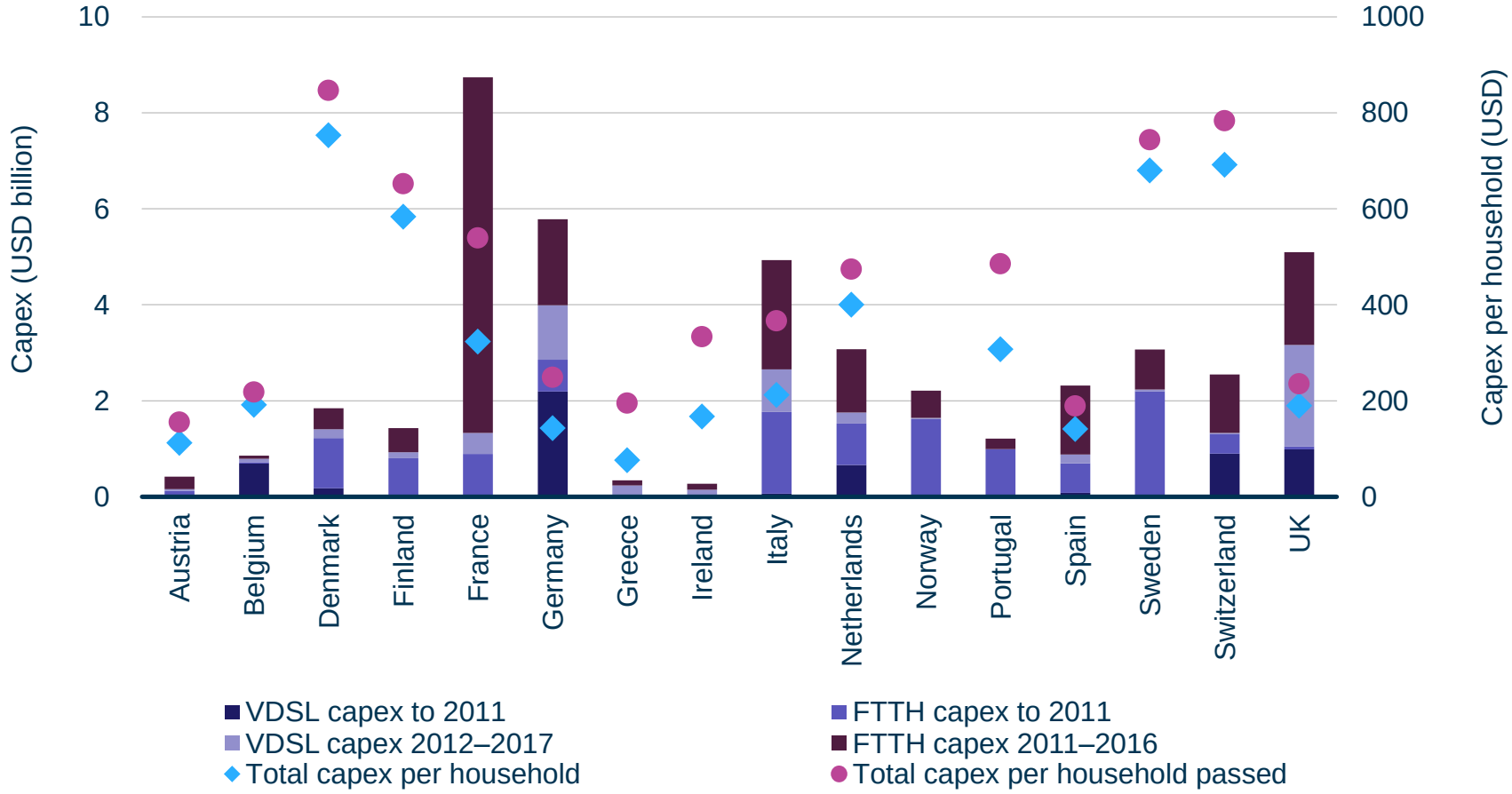
Figure 11: FTTx capex by region, developed markets, 2010–2017 [Source: Analysys Mason, 2012]



FTTx roll-out and capex in developed economies: forecasts 2012–2017

Capital expenditure per premises passed will vary greatly between countries

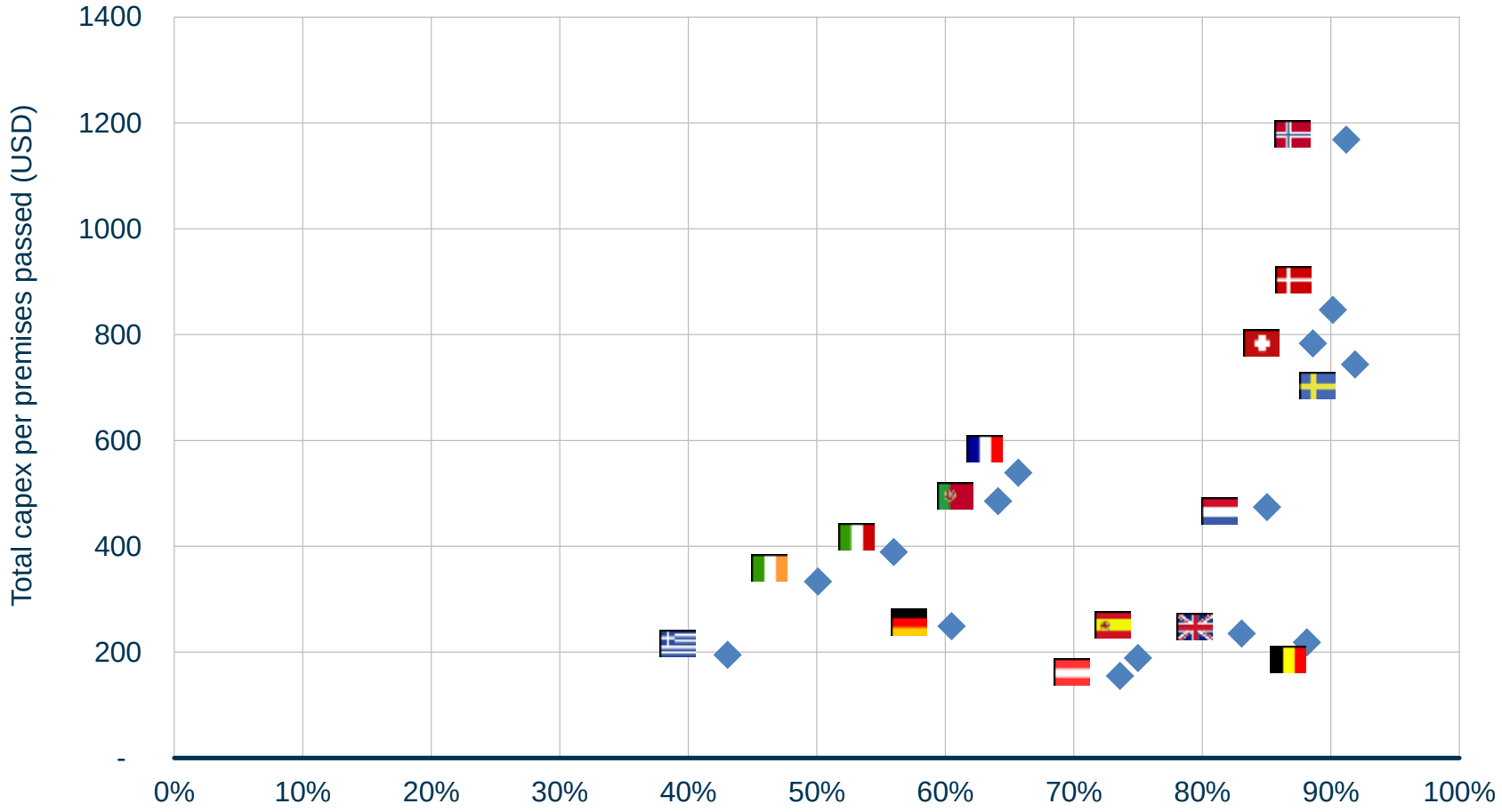
Figure 12: Forecast capex, capex per household and capex per household passed, 2017 [Source: Analysys Mason, 2012]



FTTx roll-out and capex in developed economies: forecasts 2012–2017

When cost per premises passed is mapped against coverage, the political awkwardness of FTTH-only approaches become apparent

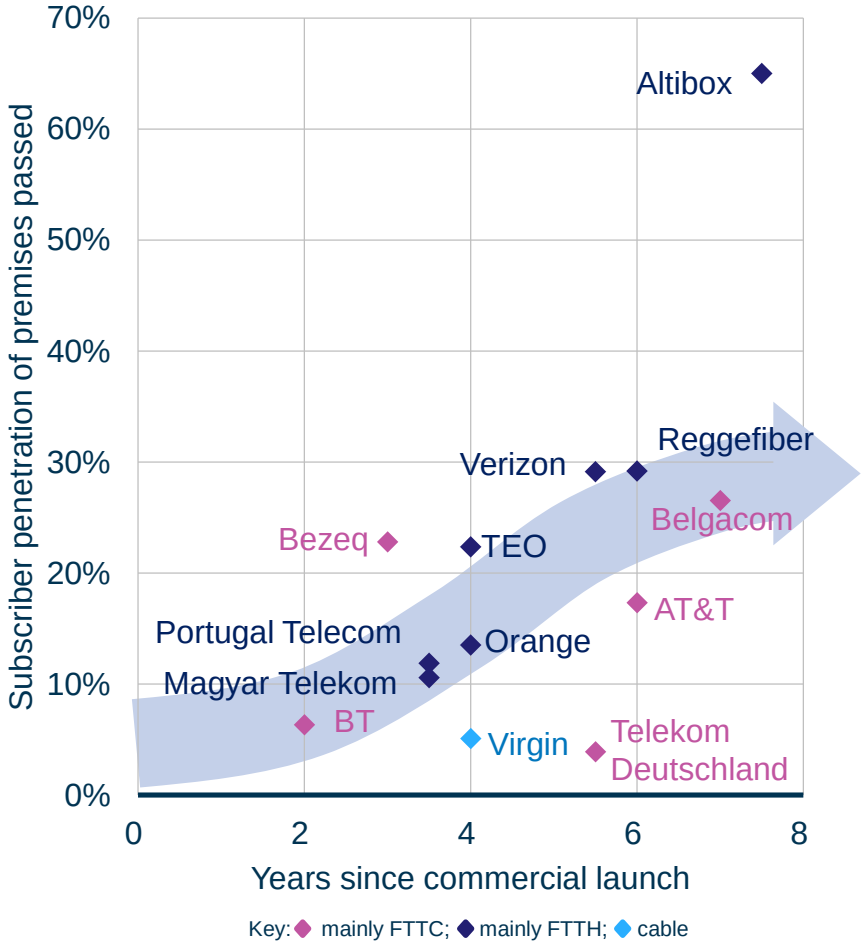
Figure 13: Average cost per premises passed and forecast coverage by 2017 [Source: Analysys Mason, 2012]



FTTx roll-out and capex in developed economies: forecasts 2012–2017

Take-up rates of 25–30% for telcos after 5–6 years should be perfectly achievable

Figure 14: Subscriber penetration since launch, selected NGA operators [Source: Analysys Mason, 2012]



- **Open access** generally appears to drive take-up rates in large populations. Competition between retail service providers works as a driver of take-up.
- **Internet-oriented approaches** generally appear to work better. It makes sense to push the TV element of an FTTx triple-play only if pay-TV offerings in that market are relatively weak.
- Incumbent operators need to be less exclusively cost-focused and to look further at **more selective roll-out** and **demand aggregation**.
- The best take-up rates are, and will probably continue to be, **where existing broadband provision is poor or expensive.**

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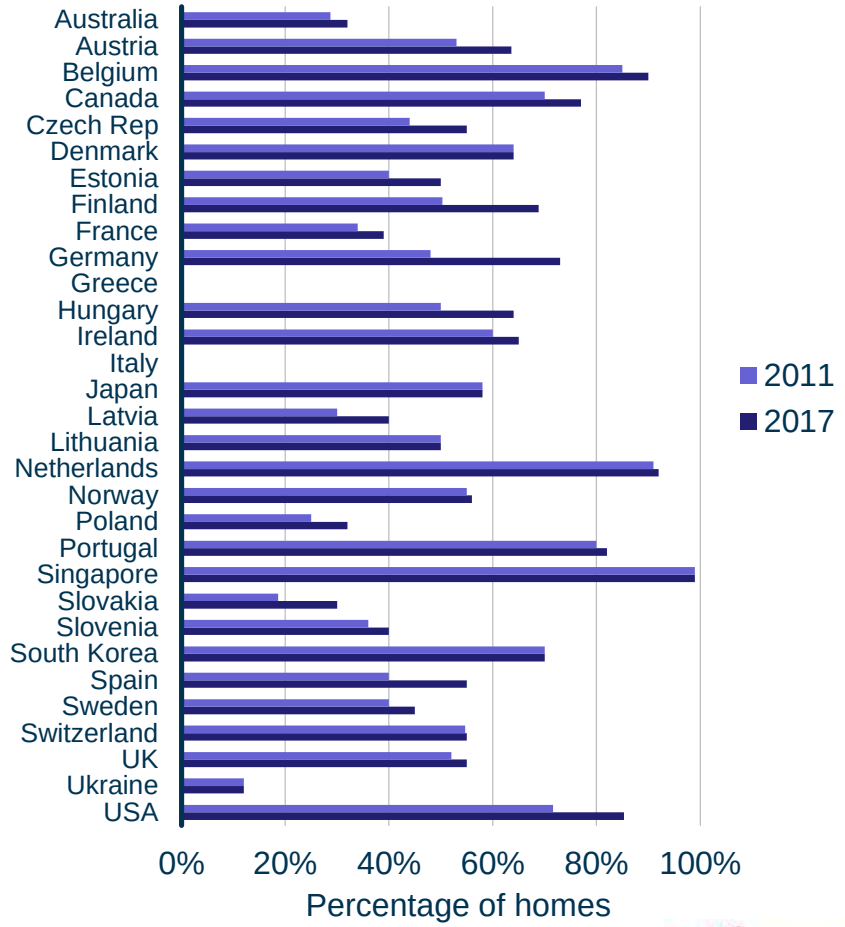
Cable is already the de facto next-generation incumbent in many markets

- The cost per premises passed of a DOCSIS3.0 upgrade is at most USD100.
- Fibre extension and node-splitting are required to support DOCSIS3.0.
- The cost is largely in civil construction, so the difference in fibre deployment costs between cable and telco is not great.

Figure 15: DOCSIS 3.0 coverage as percentage of total homes, 2011 and 2017 [Source: Analysys Mason, 2012]



FTTx roll-out and capex in developed economies: forecasts 2012–2017

LTE-A will represent a real threat to the fixed broadband business if NGA is slow in rolling out

Figure 16: Realistic (cell average, in case of mobile) throughputs, LTE upgrades and xDSL technologies [Source: Analysys Mason, 2012]

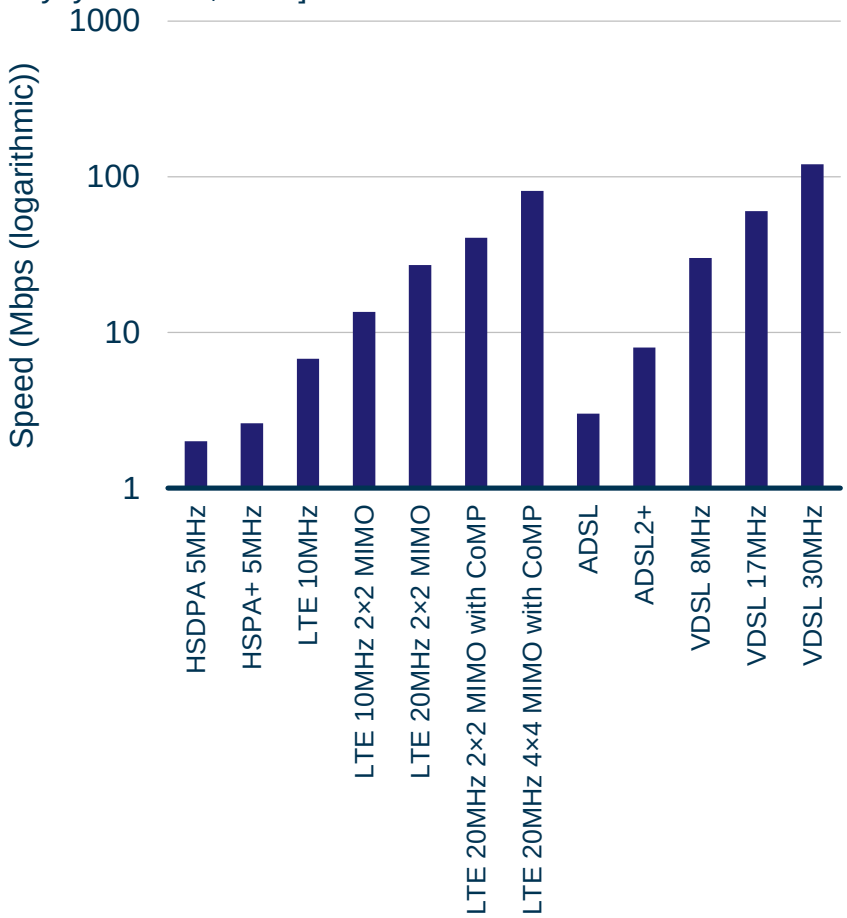
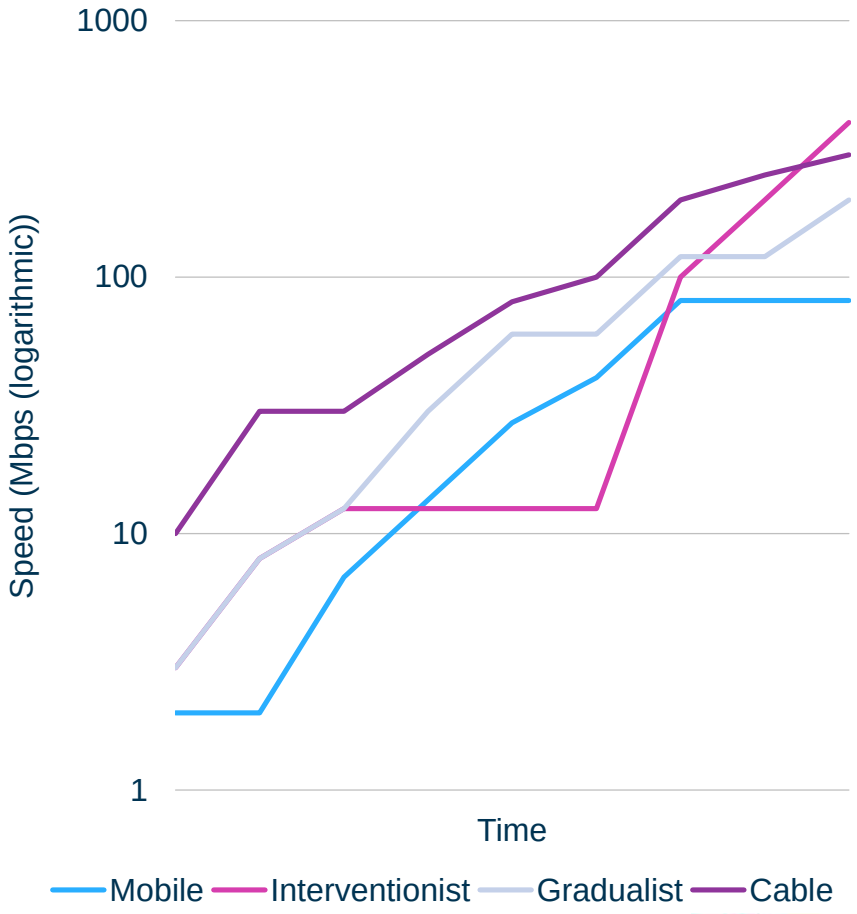


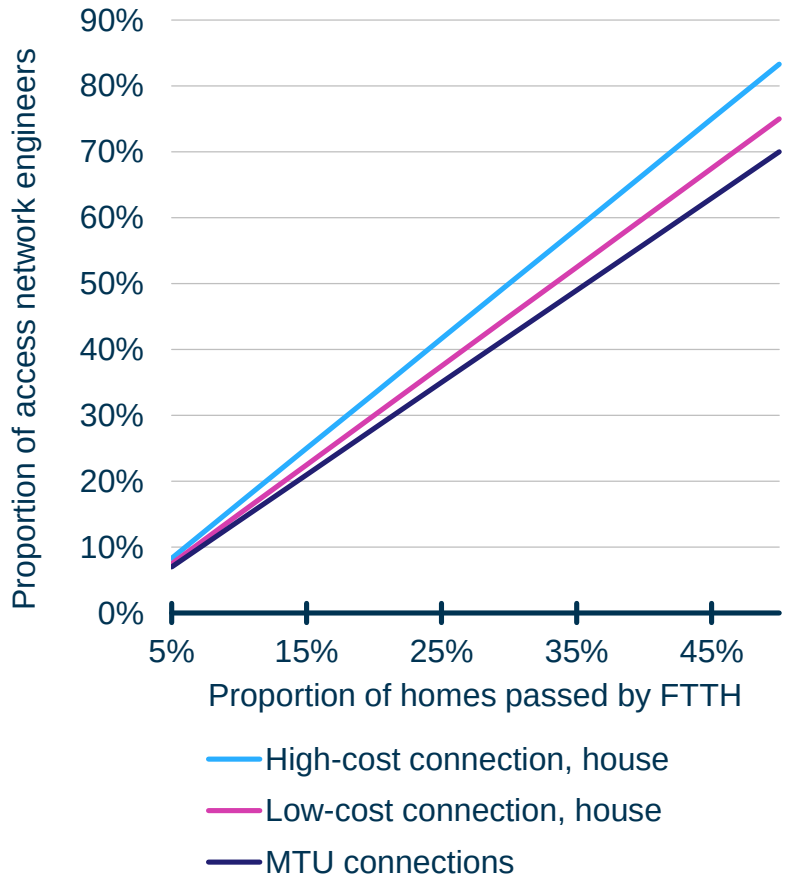
Figure 17: Substitution threat to fixed under gradualist and interventionist approaches [Source: Analysys Mason, 2012]



The time required to roll out and install FTTH is as large a barrier as cost

- For SDUs, time to connect for FTTH is between five and ten hours. A sensible estimate of man-hours per home passed would be about ten. For MDUs the ratio would be more biased towards homes passed
- A five-year plan for 50% coverage of sites by FTTH, with a 25% take-up rate, would tie up between 70% and 80% of a typical incumbent's access network engineers – and the operator would continue to have a copper network to maintain.
- Time to reach agreement on build with MDU owner a major impediment …
- … as are old buildings with no risers.

Figure 18: Typical labour utilisation for FTTH roll-out by proportion of homes passed [Source: Analysys Mason, 2012]



FTTx roll-out and capex in developed economies: forecasts 2012–2017

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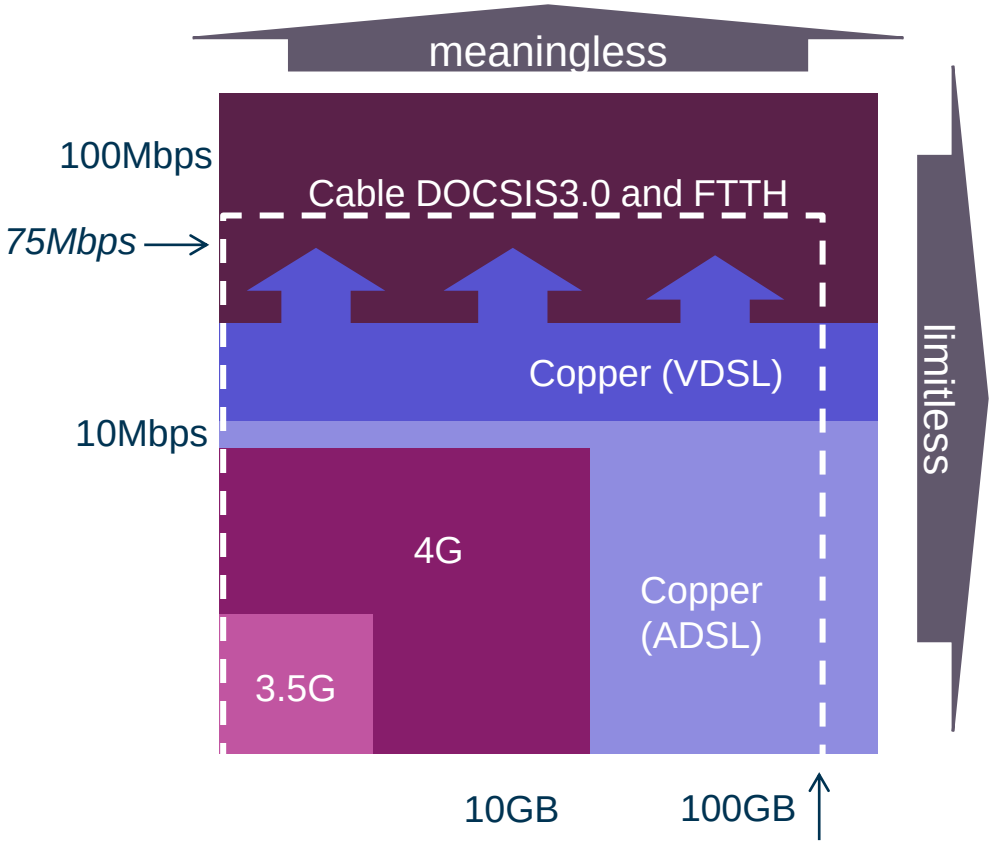
The rate of development of access technology easily outstrips device and service innovation

- There are very few plausible combinations of home services that will require over 100Mbps bandwidth by 2017.
  - Ultra HDTV may create some demand in the future, but trend now is towards smaller screens.
- Supply tends to create demand, but **not necessarily in ways that are helpful to the operator** unless the operator is prepared to take a dumb-pipe utility approach.
  - QoS becomes **less** monetisable with fatter pipes.

Figure 19: End-user access and capacity metrics, broadband technologies [Source: Analysys Mason, 2012]



Fixed Internet traffic worldwide: forecasts and analysis 2011–2016

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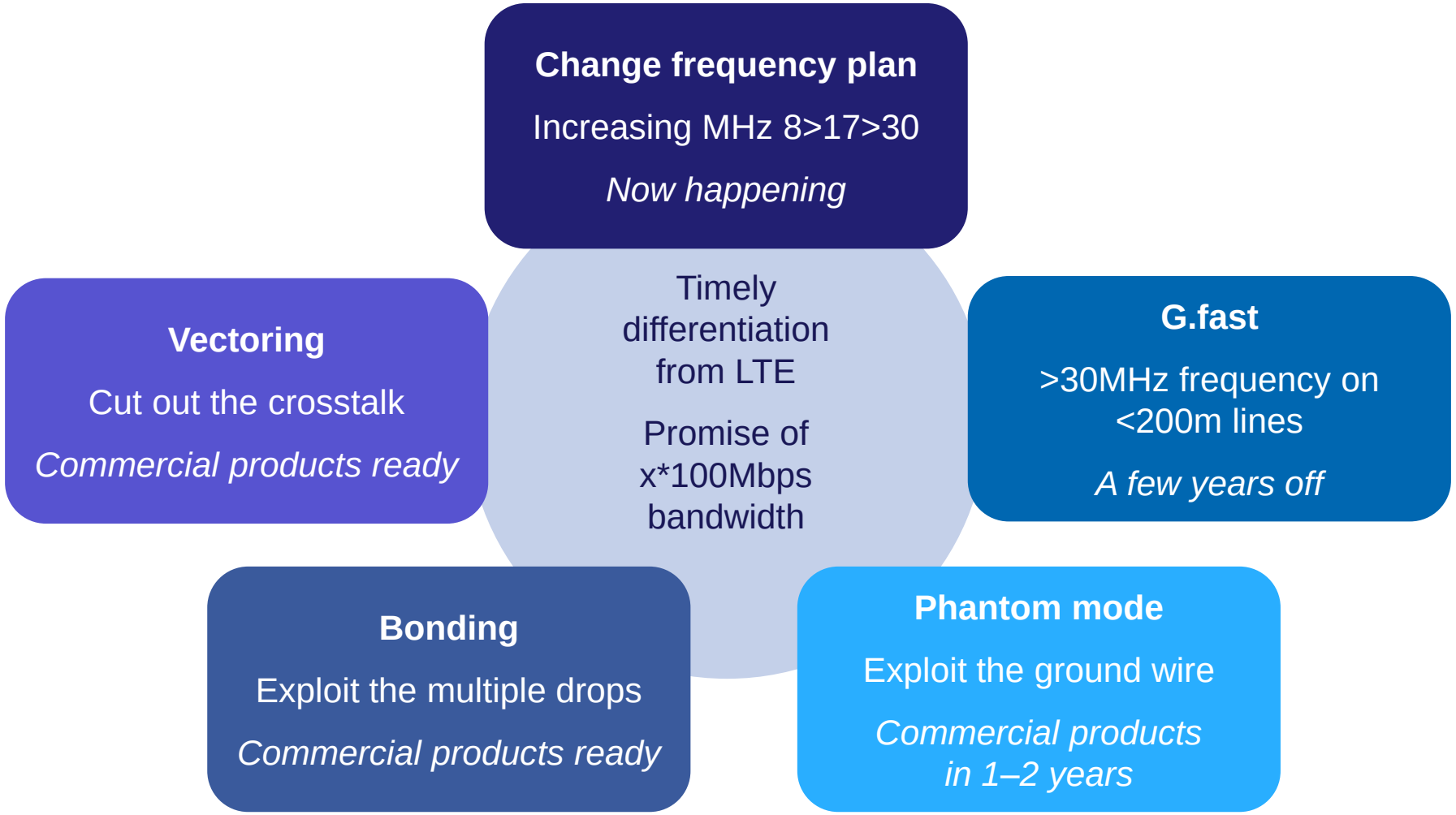
The inclusion of a fibre final drop creates several dangers

- Takes too long to deliver, and cable and mobile may eat into parts of the telco broadband business.
- Costs spiral as in-building problems arise.
  - Agreements with housing associations, tenant associations etc.
  - Old buildings without risers.
  - Excess restoration costs.
- Politically questionable if end-result is an urban elite with FTTH and the rest with legacy ADSL.
- Far-Eastern operators such as NTT and KT have generally used copper in-building up to now.
  - NTT's 10-year upgrade to FTTH in Japanese MDUs only starting now.
  - KT's fixed broadband is in fact mainly VDSL from basement nodes.

Several technologies extend the rate and reach – and hence lifetime – of copper



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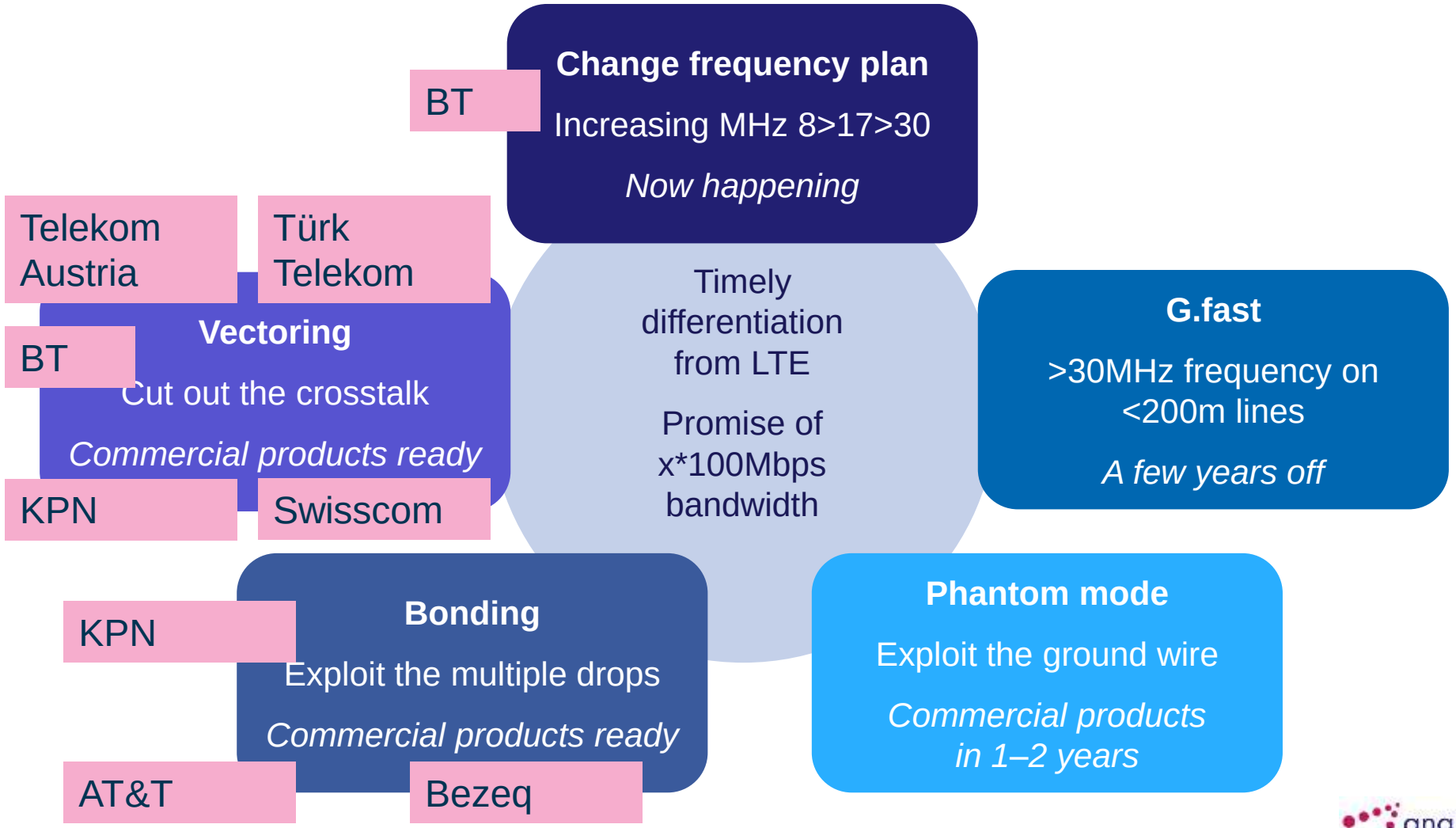
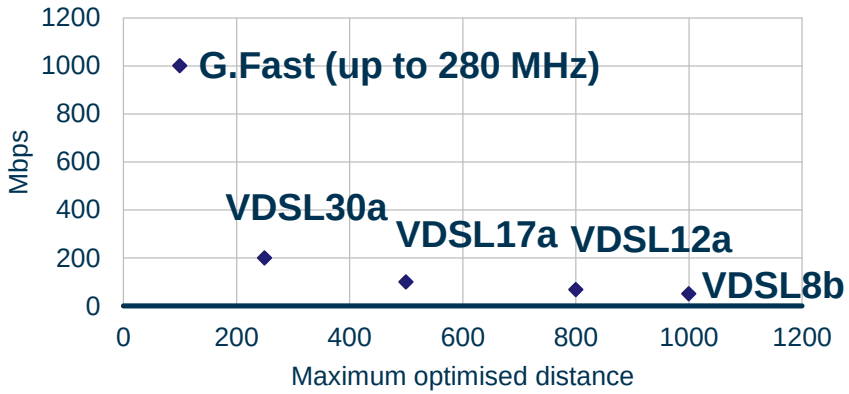


FTTdp and copper could supply bandwidth demands for at least a decade

- G.fast /FTTdp yet to be standardised.
- Huawei has demonstrated 1Gbps on a single 100m copper pair and 500Mbps on a 200m pair using TDD-OFDM.
- If 500Mbps becomes possible on a copper twisted pair over 200m, what/when is the advantage of FTTH?
- Some form of sub-loop unbundling or shared risk/cabinet mutualisation would still be needed for an altnet.
- Would the process of in-building fibre roll-out happen in France if VDSL were mandated?

Figure 20: Characteristics of ratified VDSL profiles and G.fast (FTTdp) [Source: Analysys Mason, 2012]



ITU's main requirements of G.fast/ FTTdp

- High peak data rate – 500Mbps at 100m
- Suited for reverse powering
- Allows customer self-install
- Optimised for short loops – not a substitute for FTTC

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Would mandating VDSL2 shake up the French market?

- Free already has VDSL2-compatible home hubs, and Orange and Bouygues will introduce them later this year.
- Free is arguing for sub-loop unbundling: “Nous souhaitons être présents dans les sous-répartiteurs ”.
- Faster roll-out of FTTB in urban areas without in-building wiring.
- Upgrade to full FTTH when required.
  - French government appears to back public funding of FTTB/C only if it is part of a clear migration path to FTTH.
- Far broader, faster roll-out of superfast broadband to rural France.

Figure 21: VDSL2-compatible home hubs, selected French operators, April 2012 [Source: Analysys Mason, 2012]

Operator	Hub	Frequency	Launch
Free	Freebox Révolution	17MHz (FTTC or FTTB)	December 2010
Orange	Livebox 3 Professionel	30MHz (FTTB)	April 2012
Orange	Livebox 3 Grand Public	30MHz (FTTB)	*Late 2012*
Bouygues	BBox Sensation	30MHz (FTTB)	*June 2012*

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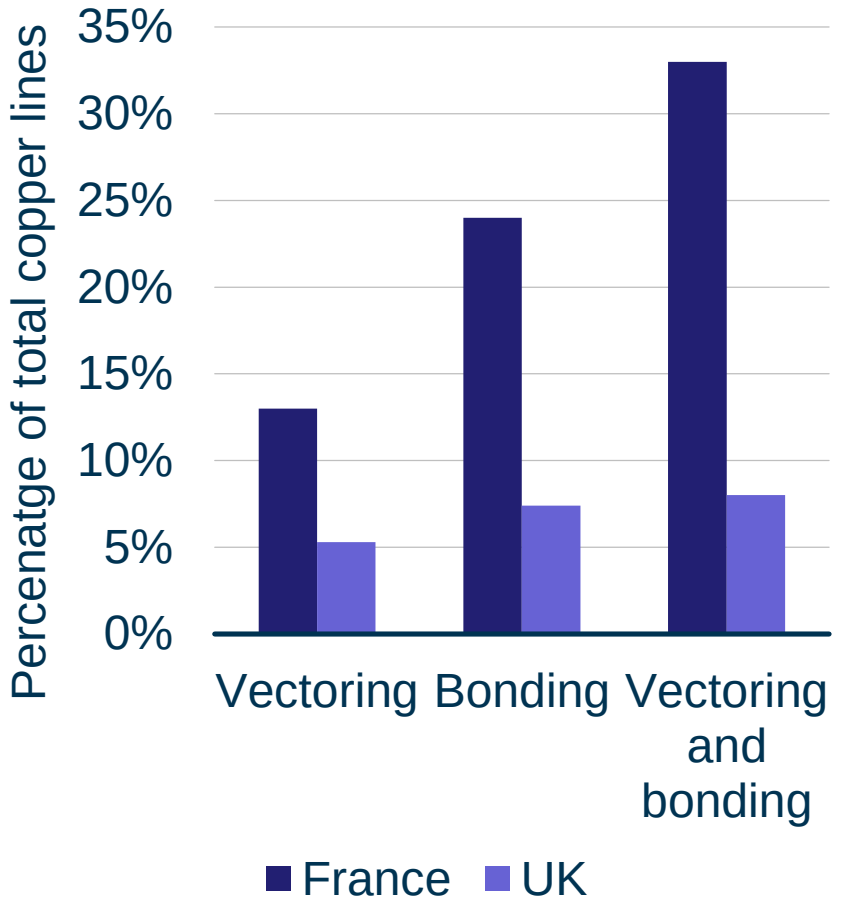
Rural France would also benefit from enhanced DSL

- While information about the topology of the Orange France copper network is incomplete, it is clear that coverage in France would benefit more from accelerated DSL than say the UK (and much more than Germany or Italy).
- French copper networks have longer sub-loops than in the UK or other major European markets.
- Vectoring would mean a further 13% of French premises were covered compared with what is possible with standard VDSL2. Pair bonding – assuming availability of spare pairs – and vectoring would mean another 33% were covered.

Figure 22: Theoretical coverage gains with enhanced DSL technologies, France and UK [Source: Analysys Mason, 2012]



The impact of the deployment of accelerated DSL technologies on meeting EC Digital Agenda targets

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Arguments *against* gradualist and interventionist approaches

Gradualist approach

Adapt to demand and competition

- Stranded assets
- Higher overall costs if FTTH goal
- Slow property release and copper switch-off
- Higher opex
- Not green
- Does not encourage cycle of innovation
- Less net-neutral?

Interventionist approach

Drive demand and competition

- Roll-out too slow
- Labour inflation
- DSL enhancements
- Undermines Telco 2.0 business-case
- May not actually stimulate innovation and demand
- Consumer demand is not moving unequivocally in this direction

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Conclusions

- Gradualism is generally the better option than interventionism.
  - The risks of long-term damage caused by loss of market-share during the lengthy build-out stage is too high.
  - The political outcomes of an interventionist approach will look increasingly unacceptable.
- Many FTTH operators may consider delaying the roll-out of in-building wiring.
- We expect that business decisions concerning the location of FTTH roll-out will depend less exclusively on costing.
- Arguments over the current regulated cost of copper ignore the broader issues affecting speed and type of roll-out.
- Access regulation needs to adapt to new realities.
  - Virtual unbundled local access (VULA) offers must be introduced where they do not exist already for FTTx/VDSL.
  - Accelerated DSL technologies will necessitate further development of WBA and VULA.
  - Sub-loop unbundling may not be dead and buried yet.