

Kabel vs. Glasfaser Internationale Perspektiven auf den Wettbewerb zweier Technologien

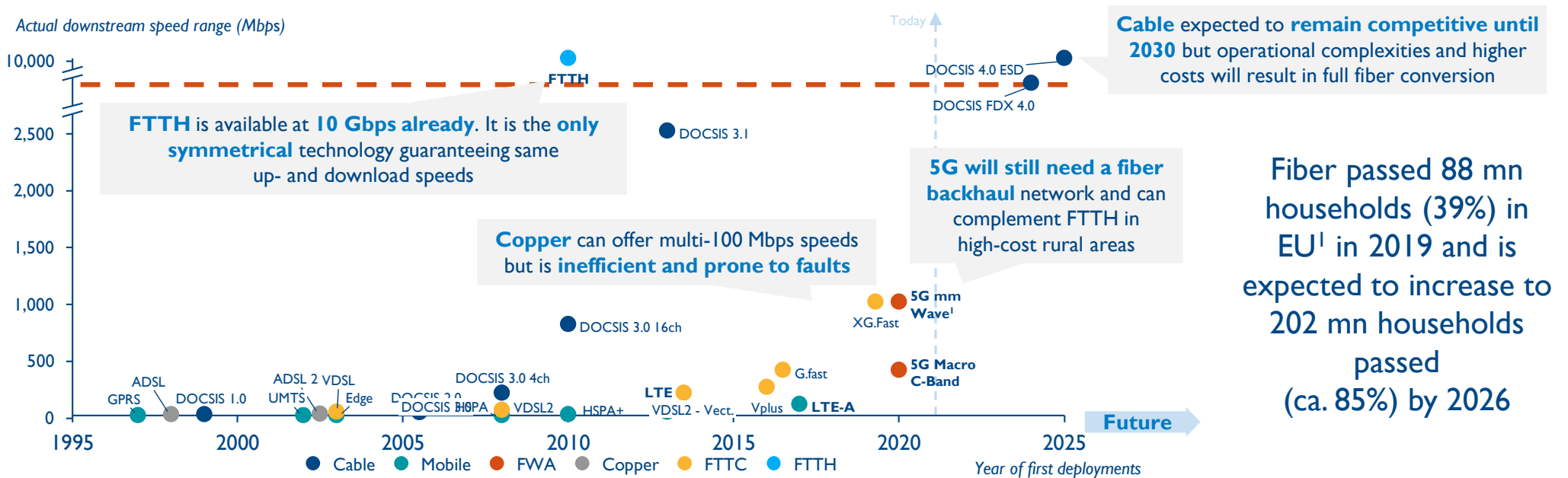
Impulsvortrag – Cable Days Compact 2021

October 7th 2021

Dr. Nejc Jakopin

Fiber-based broadband is best suited to support the gigabit needs of our society, making copper technologies obsolete and redundant

Broadband access technology roadmap



Fiber is a future-proof technology compared to copper and cable and will also support and complement 5G roll-outs. The future of telecom networks will rely on fiber resulting in sunsetting of copper-based solutions

¹) Including United Kingdom
 Source: Alcatel, Cablelabs, equipment vendors, ITU, FTTH Council Europe, Arthur D. Little

Asian incumbents have preempted the competitive squeeze that DSL incumbents are facing in Europe – today from cable and FOA next up

European Markets

Asian Markets

01 DSL Incumbents



- **Defensive position** aimed at utilizing previous investments and gradual transition
- **Increasing pressure and threat** from cable and new fiber players

- **Early, proactive investments** into fiber networks supported by governments limiting the threat of cable operators and alternative FOA



02 Cable Players



- **Consolidation** wave with Liberty Global selling to different players in Europe and Sky acquired by Comcast
- Cable players positioning as new heavyweight in ultra-broadband

- **Difficult position** against progressive incumbent operators
- In Singapore, cable network shut down in favor of ubiquitous fiber



03 Fiber Open Access¹



- **Major roll-out plans** leveraging available **funding** – valuations skyrocketing
- Retail models **extending into wholesale** and mixed scenarios

- **Incumbent / government lead nation-wide rollouts** of open access fiber networks



Source: Arthur D. Little
1) Fiber Open Access = FOA

Several conditions enable and drivers alleviate the FTTH evolution ...

FMC take-up

- New players requiring „owner economics“ in fixed business
- Mobile players that had to rely on expensive wholesale before now have to defend against integrated incumbents

New funding

- Political pressure and governmental digitalization targets spur **new subsidy programs**
- **Low-risk infrastructure funds available at scale**

Technological and economic advantages

- Improved deployment technologies and access to experienced construction capacity

Lack of incentives for incumbents

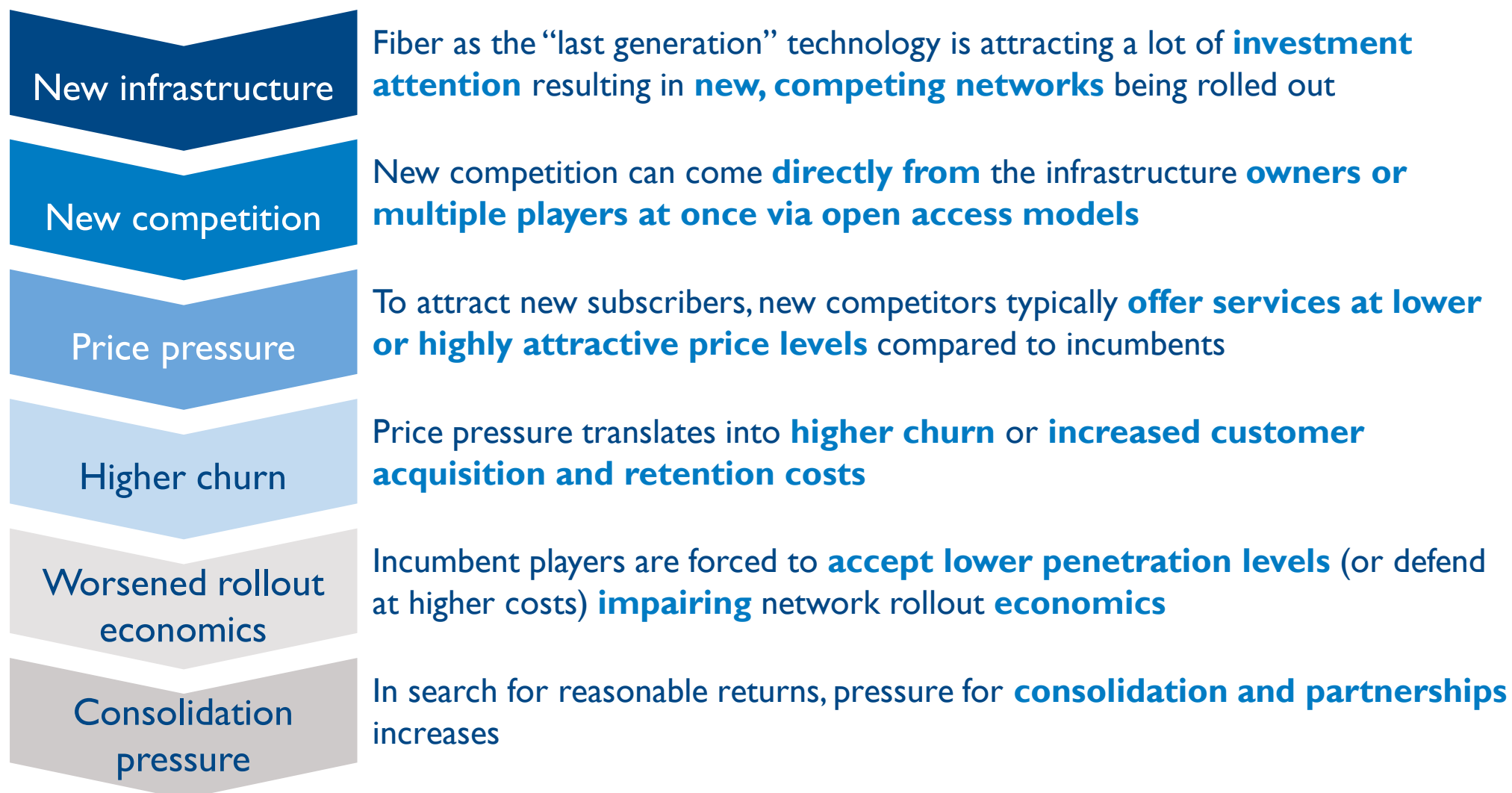
- Incumbent operators not incentivized to deploy new infrastructure
- Focus on “sweating out” existing networks



New business models

- Flexible rollout-focused entrants
- Focus on developing underserved areas and “out of focus” footprints

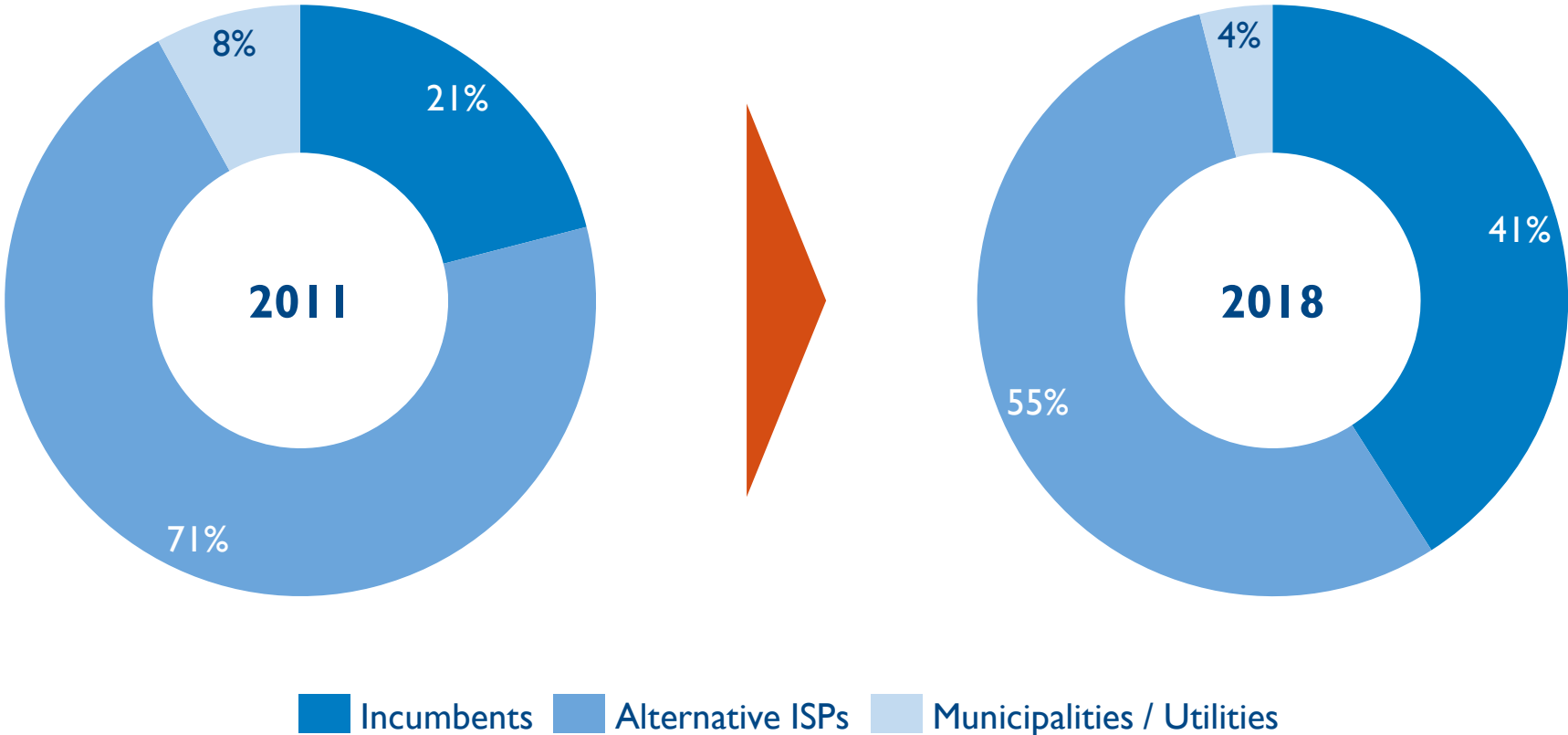
.. with alternative / new players' fiber rollouts in particular severely impacting incumbent operators and cable players alike



Source: Arthur D. Little

Incumbents have realized the threat and started deploying fiber to protect their market position

Breakdown of FttH/B deployment by type of player
Europe, 2011–2018, in %

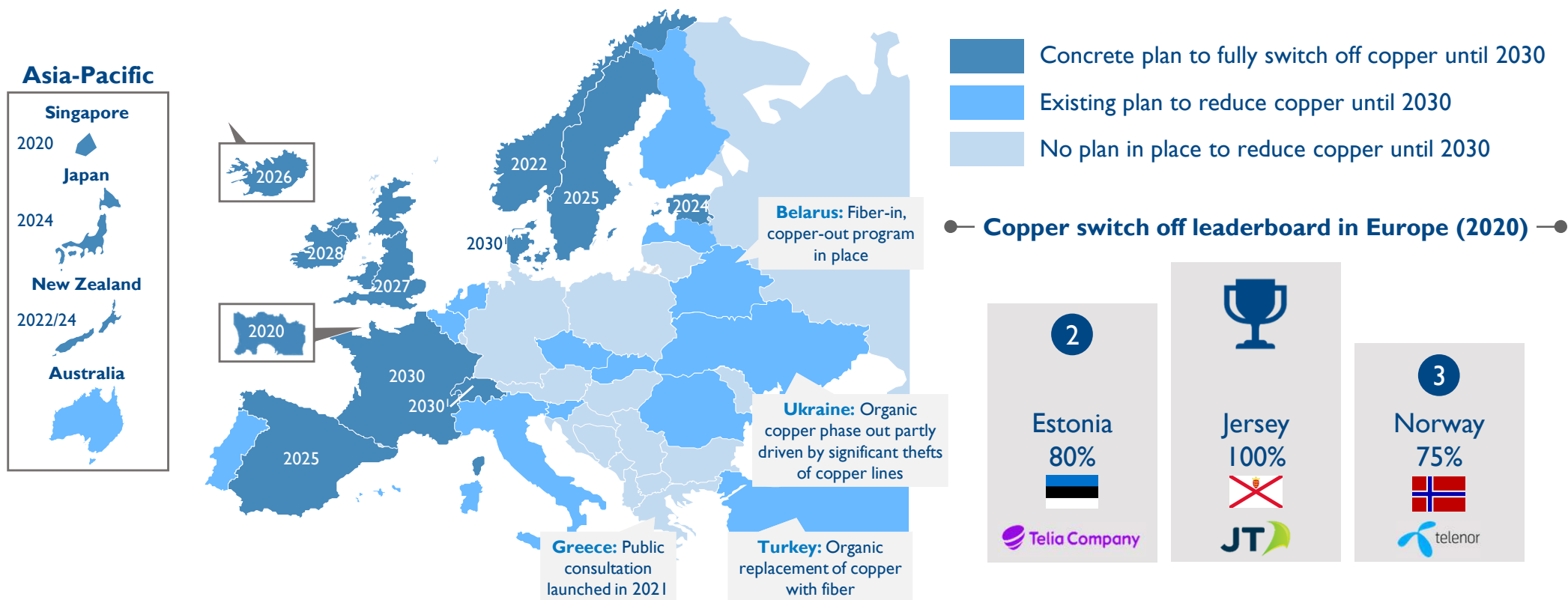


Source: FttH Council Europe, Arthur D. Little

Consequently, incumbents started decommissioning copper networks – Singapore and Jersey already done with more countries expected by 2030

Copper decommissioning status quo in Europe and Asia-Pacific

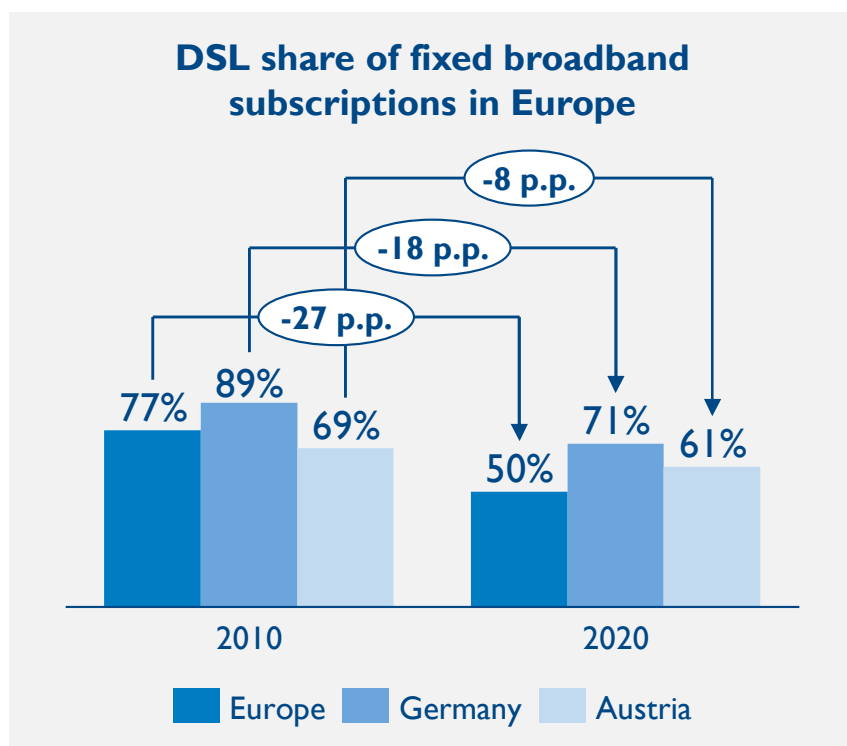
NON-EXHAUSTIVE



1) No commitment announced yet (Arthur D. Little expert estimate)
Source: WIK, BEREC, Arthur D. Little

As a result, share of DSL subscribers in EU is steadily decreasing (-27 p.p. since 2010) – Germany (-18 p.p.) & Austria (-8 p.p.) are among the laggards

DSL subscription development in Europe



Key findings



Frontrunners such as Spain or Sweden **decreased their DSL subscription share by ~66 p.p. and ~45 p.p.** respectively over the past 10 years (Jun 2010 – Jun 2020)



Significant time lag between pre-defined EU goals and realized **member state internet performance levels** (availability and speed of internet access)



EU only **provides strategic guidelines** without reinforcing the requirements, **no stringent strategy** from all member states



Funds provided by EU (EUR 15 bn for 2013-2020) to support the roll-out of faster internet for households have **not been fully used for full fiber (FTTH) solutions**

Incumbents are in a favorable position to leverage existing copper networks for fiber deployment – copper switch-off brings additional benefits

Operator benefits of copper decommissioning

Inherited benefits of copper networks



1. Savings in deployment

- Ability to reuse ducts and permits of the already fully amortized copper network for fiber deployment
- If already upgraded to VDSL/FTTC, the copper infrastructure already provides fiber in the primary network decreasing the amount of fiber to be deployed



2. De-risking fiber roll-out

- Migration of the copper subscriber base to fiber rather than new and expensive customer acquisition
- Paying copper subscriber base during the fiber network roll-out resulting in a profitable connectivity product lifecycle

Additional benefits of copper decommissioning



1. Reduced customer churn

- Lower fault rates (50-75% fewer faults than on copper), increased satisfaction and hence lower churn



2. Operational savings

- Energy¹ (55-85% savings) and space saving
- Customer & network² operations (60% fewer costly truck rolls)
- Monetization of extracted copper³, reduced copper theft



3. Competitiveness

- Increased competitiveness with better services and faster internet lines vis-à-vis cable and FWA
- Prevention of new entry of fiber challengers






Freed-up capital and resources for next-gen technologies

▶ **The future of fixed broadband is today still in the hands of the incumbents. However, they have to act in order to maintain this position also in the future**

1) Helps meet green corporate agendas; 2) Operators often pay large premiums to post-retirement copper engineers just to be able to keep the copper networks running
 3) Estimated at approx. 5-10% of the total CAPEX for FTTH roll-out. Orange FR expects to scrap approx. 110 mn km of copper cables. Some 80,000 tones have been already scrapped
 Source: WIK, Arthur D. Little

When preparing for decommissioning, incumbents need to be prepared to face challenges preventing them from kick-starting switch-off programs

Key challenges in copper decommissioning

Regulatory / competition	Migration / CEX	Technology	Organizational	Investment
 <ul style="list-style-type: none"> ■ Obligation to provide regulated wholesale services ■ Managing multiple stakeholders including municipalities and wholesale customers 	 <ul style="list-style-type: none"> ■ Managing each and every customer upgrade ■ Logistical nightmare – CPEs / customer connections ■ Managing PR impact 	 <ul style="list-style-type: none"> ■ Fiber is not always cost-economical ■ Potential for FWA ■ Organizational silos ■ Timing of roll-out vs. switch-off ■ Maintaining customer experience 	 <ul style="list-style-type: none"> ■ Stakeholder management (fixed & mobile) ■ Communication management ■ Organizational alignment ■ Transformation program management 	 <ul style="list-style-type: none"> ■ Self cannibalization of copper services ■ Insufficient funding for fiber roll-out ■ New wholesale business models ■ Shareholder management

1) The incumbent does not switch off the copper network until it is fully overbuilt by own fiber
 Source: JT, Arthur D. Little

Incumbents have three paths to follow in decommissioning their legacy copper network

Scenarios for copper decommissioning

Capital intensity¹⁾



1 SELF DISRUPTION

Finance own last mile fiber roll-out leveraging the FTTC network and maximize opportunities to use open access fiber infrastructure of competitors to avoid overbuild
Examples: JT Global in Jersey, Orange in France, Telia in Sweden and Baltics, Telenor in Norway



2

PRIVATE CO-FINANCING

Raise equity from external private funds to accelerate fiber roll-out that would allow to eventually decommission the copper network
Examples: TDC in Denmark, CETIN in Czechia, Chorus in New Zealand



3

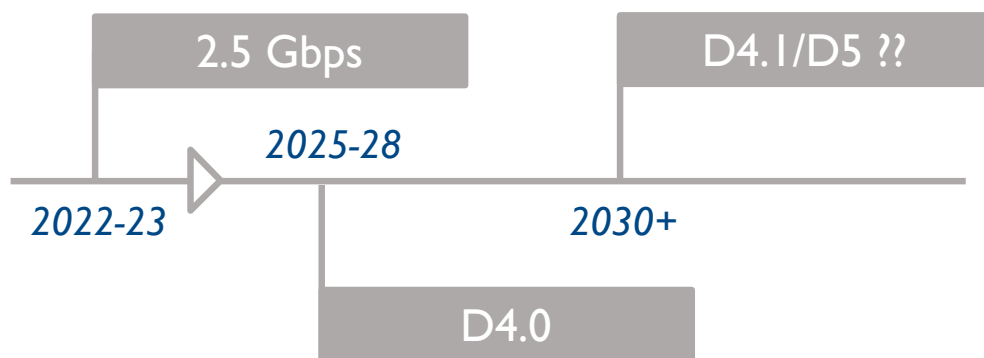
FIXED NETWORK SPIN-OFF

Separate the last mile copper network and spin it off offering equity stakes to private investors
Examples: FiberCop (Telecom Italia and KKR) in Italy, Orange in Poland



1) Of own capital
 Source: Arthur D. Little

Although their HFC networks should remain at par for the next decade, CableCos are losing their strategic advantage



- Extended Spectrum Docsis (ESD)¹ enabling 10+Gbps/1.4Gbps (1.8GHz upgrade but no FTTLA)
- CPP to upgrade cable to D4.0 is around 50-300 €/HP, function of current state of network (3.0 vs 3.1, spectrum, node split, amplifier cascades, drop cable quality, ...)

Most advanced CableCos consider HFC will stay at technological parity with FTTH over the next decade in addressing users requirements



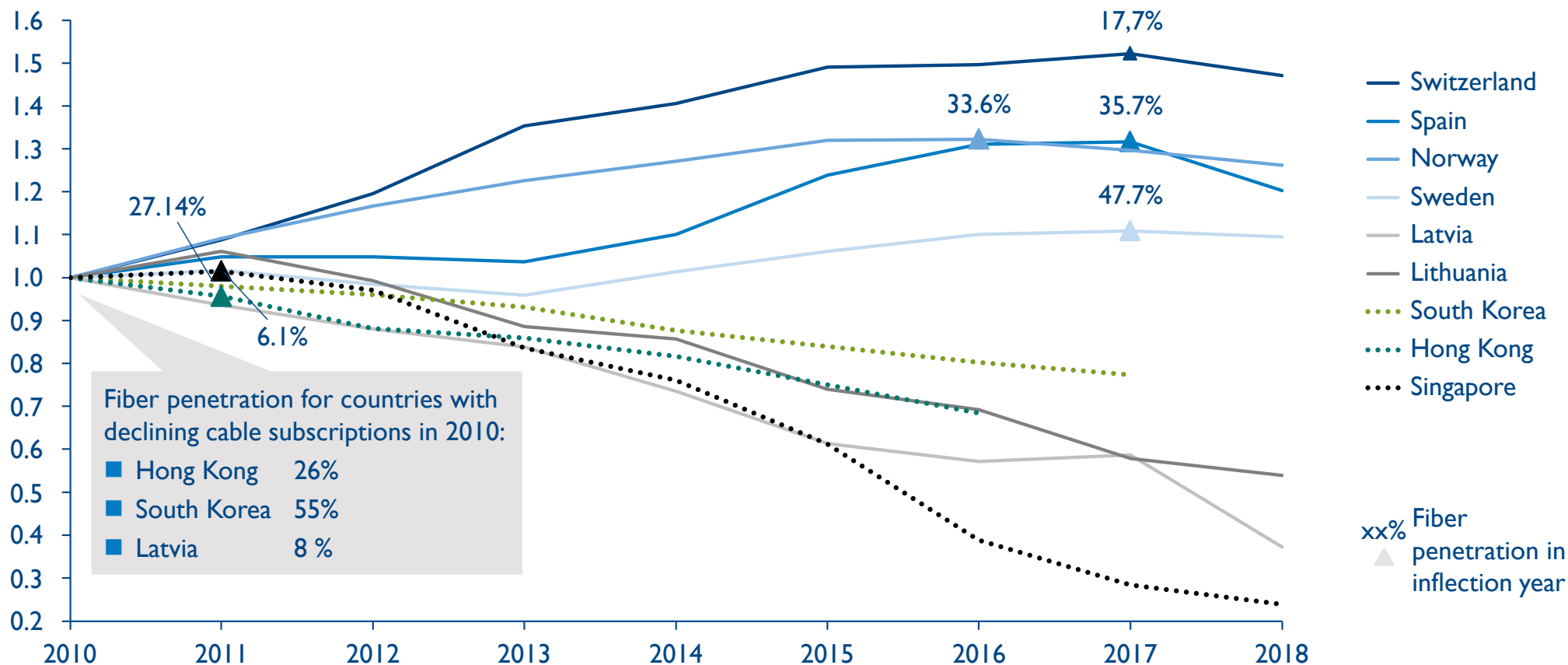
- FTTH massive rollout overbuilding HFC (up to 60-100% of HFC footprint expected by 2030), driven by
 - Incumbents (migration from DSL and opportunity to capture back cable subs)
 - MNOs eager to become tenants on FiberCos in FMC markets

1. *Loss of technological superiority; eroding their current market shares (in footprint) towards their “fair share”*
2. *Risk the FTTH claim being perceived as stronger by customers and falling under parity*

¹Comcast is an exception and opting for Full Duplex D4.0 (FDX), enabling 8.8Gbps/4.8Gbps. While requiring FTTLA it works with only 1.2GHz
Source : Arthur D. Little

In recent years, we have seen cable providers losing subscribers even in developed cable markets such as Switzerland, Spain, Norway and Sweden

Indexed cable subscriber development
Selected countries, 2010-2018



Source: National regulatory agencies, Arthur D. Little

Virgin Media-O2 announced it would fully overbuild its HFC network with FTTP by 2028 – an ambitious reaction to OR, CF et al. roll-outs

Full HFC-FTTH self overbuild leveraging low FTTH deployment costs



- Virgin Media has been extending its footprint by 1.2M HP with FTTP since 2017
- Virgin Media-O2 announced, in July 2021, it will overbuild 100% of its HFC network (14.3M HP) by 2028
 - Pre-empting OpenReach announced deployment of 25M HP FTTP and the multitude of emerging FiberCos (e.g. City Fiber, Community Fiber)
 - Leveraging existing ducts (£100/HP, vs £60/HP for D4.0 upgrade)
- Both FTTH and HFC networks are expected to be offering wholesale services
- Shareholders have hinted to a possible opening to financial investors under a FiberCo or NetCo structure

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Contact:

Dr. Nejc Jakopin
Principal

+49 175 5806 442

Jakopin.nejc@adlittle.com