Arthur D Little

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European Copper Decommissioning

A study on the status quo in Europe

September 16, 2021

Copper, a 150-year-old legacy infrastructure, is still trying to deliver gigabit broadband of tomorrow…. time to retire gracefully?

1850
Telegraph
communication initiated roll-out of long-distance copper infrastructure

100k homes connected

1900
Telephone
communication spurs copper infrastructure roll-out to support voice

1 mn homes connected

2000
Internet
drives upgrade of copper infrastructure upgraded to support dial-up & DSL

400 mn homes connected

Peak in DSL subscribers reached **in 2013** at approx. **667 mn** and has been steadily **dropping since**

2020
Broadband
necessitates partial fiberization of copper

4 bn homes connected
100 GB / month

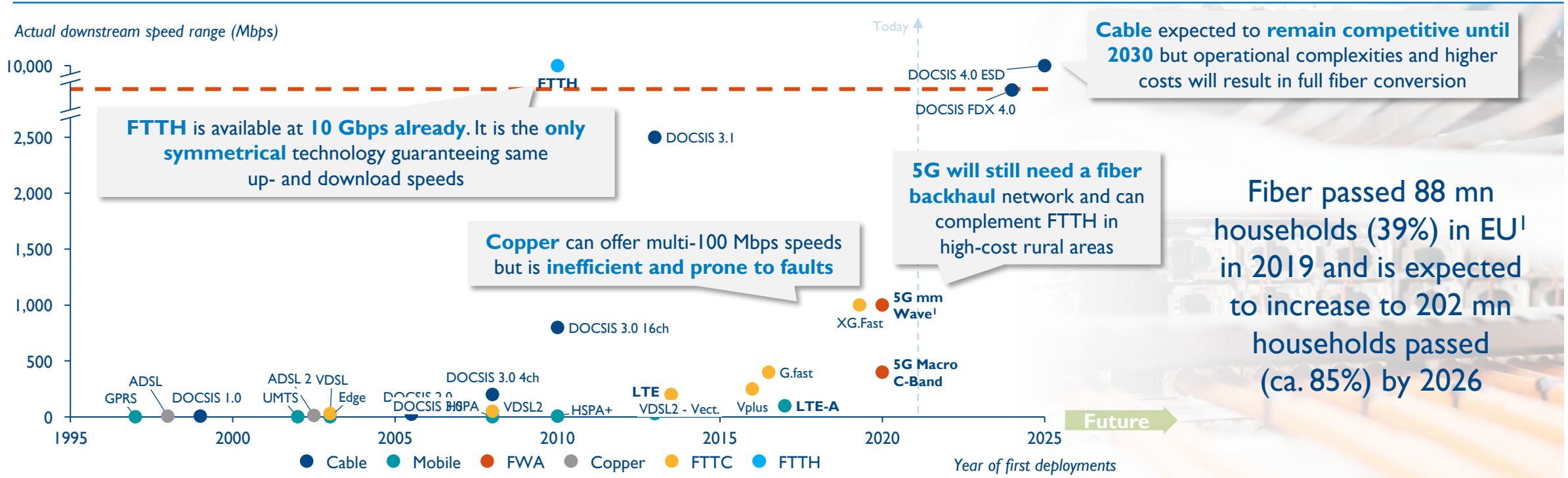
2030
Gigabit broadband
Copper gives way to future proof technologies?

100+ bn connections
10+ TB / month

Source: Point Topic, Image of unknown source of the Telegraph infrastructure in Germany republished by the ITU.int, Arthur D. Little

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

Broadband access technology roadmap



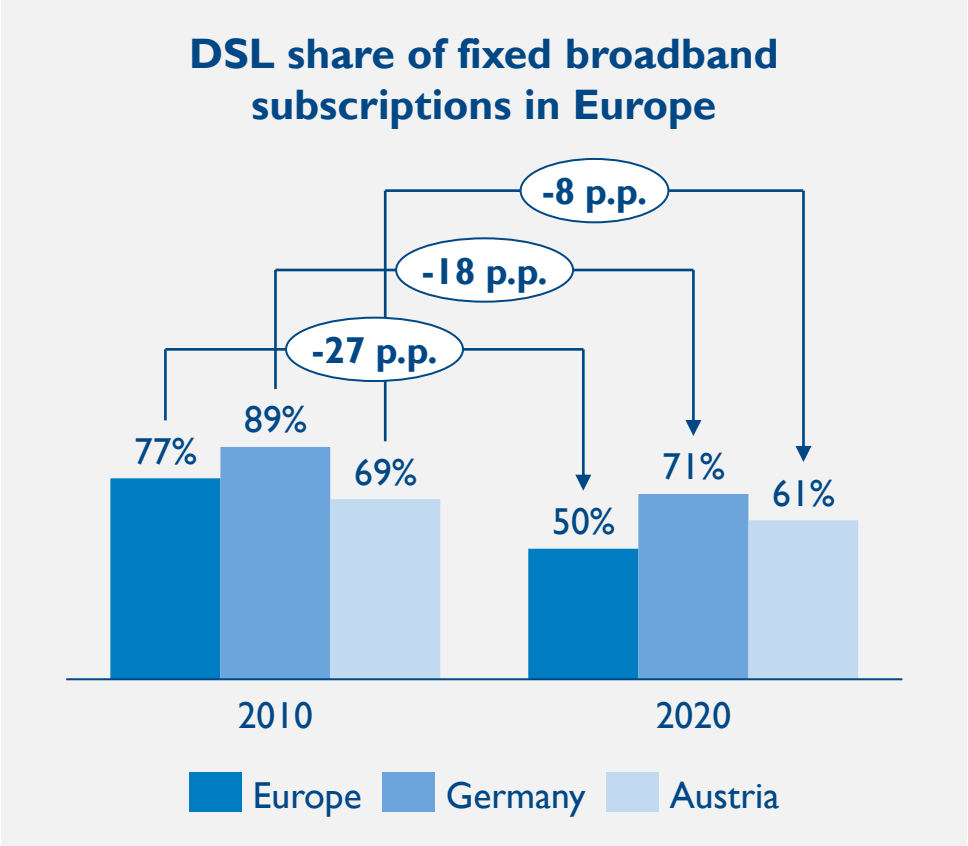
Fiber passed 88 mn households (39%) in EU[1] in 2019 and is expected to increase to 202 mn households passed (ca. 85%) by 2026

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

As a result, the share of DSL subscribers in Europe has been steadily decreasing (-27 p.p. since 2010) – Germany (-18 p.p.) and 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

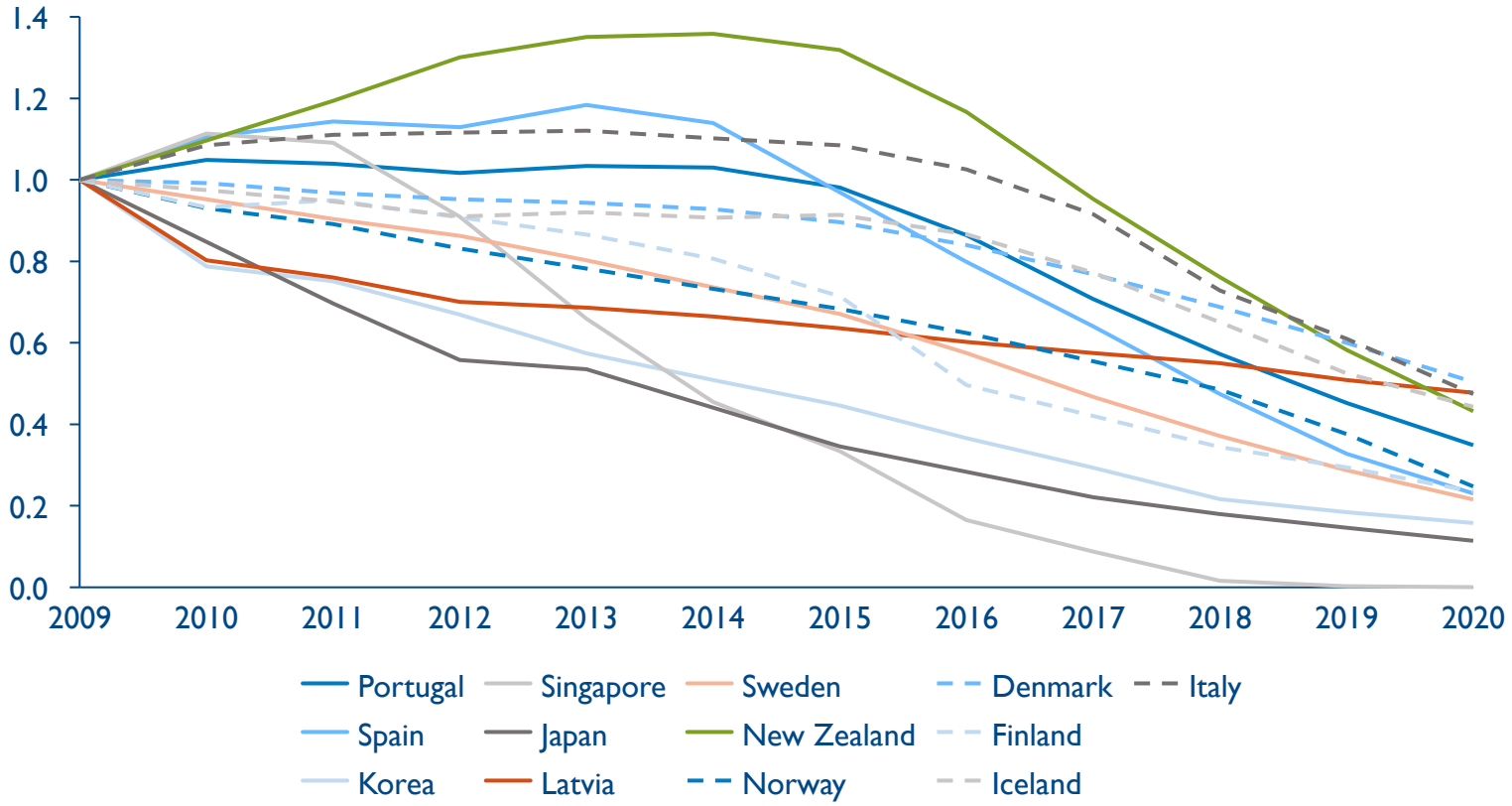
Funds provided by EU (EUR 15 bn for 2013-2020) to support the roll-out of faster internet for households have **not been fully used for full fiber (FTTH) solutions**

Source: European Commission Data, European Court of Auditors, Arthur D. Little

DSL network substitution by fiber has led to a significant decrease in DSL subscribers globally and will result in full decommissioning of DSL within the next decade(s)

Sunsetting trend of DSL networks

2009-2020, indexed DSL subscribers, selected countries



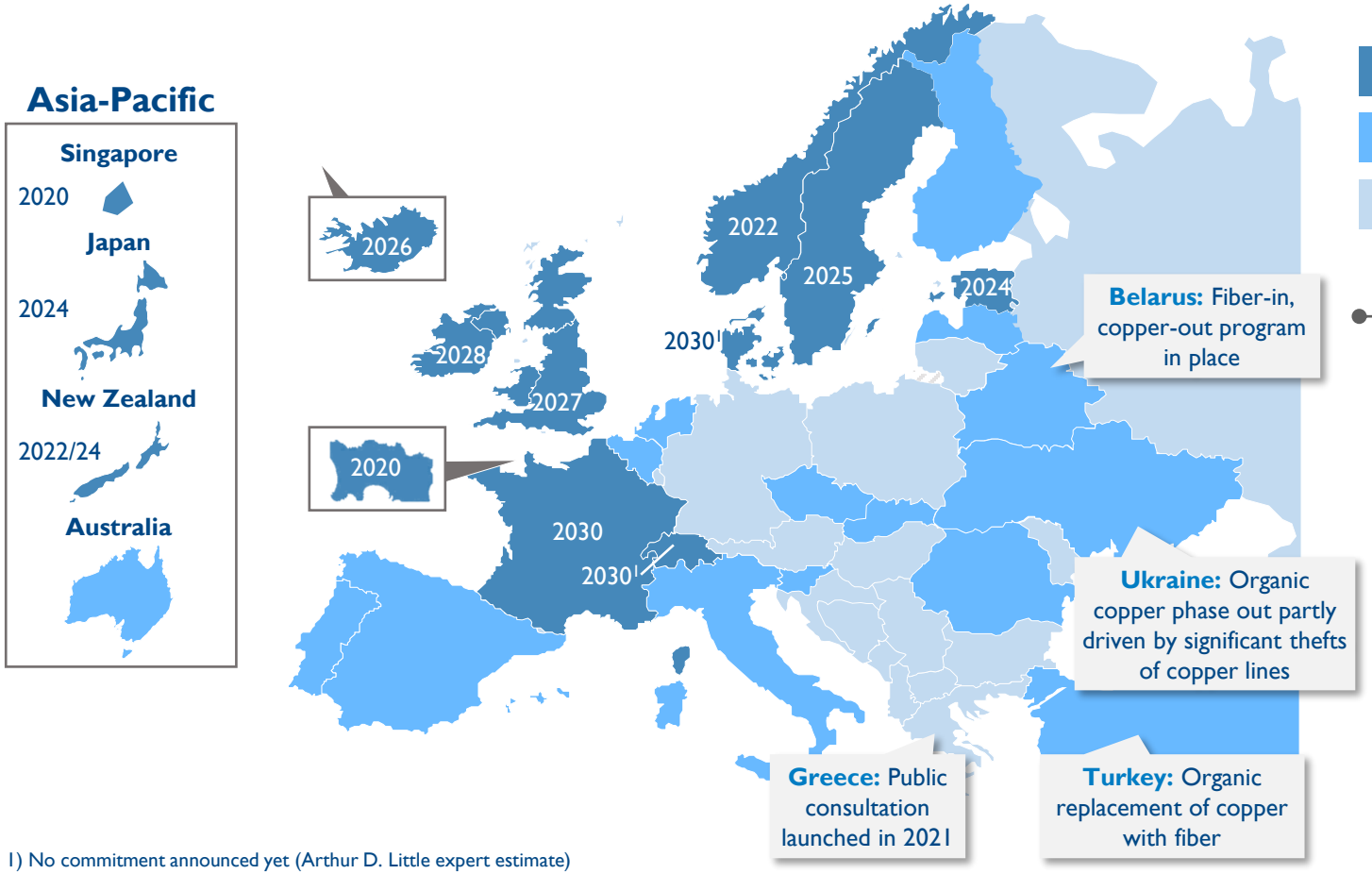
- The **global emergence of fiber** has **put DSL technologies into a downward spiral**
  - **Global peak** in the number of **DSL subscribers** achieved **in 2013**
- As fiber networks move closer to homes / buildings, more and more DSL connections are being replaced
- **Eventual complete sunsetting** of the copper technology **will be driven by political** and **regulatory will**, **substitute availability** and national **incumbent's strategy**. Thus, DSL networks **can have a long tail** before shutdown

Source: OECD, National regulators and statistics offices, Arthur D. Little

Consequently, incumbents have started decommissioning their copper networks – Singapore and Jersey have already achieved this goal with more countries expected by 2030

NON-EXHAUSTIVE

Copper decommissioning status quo in Europe and Asia-Pacific



Concrete plan to fully switch off copper until 2030

Existing plan to reduce copper until 2030

No plan in place to reduce copper until 2030

Copper switch off leaderboard in Europe (2020)

2		3
Estonia	Jersey	Norway
80%	100%	75%
Telia Company	JT	telenor

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

Incumbent operators are in a favorable position to leverage the existing copper network for fiber deployment – copper switch-off then 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
- Energy[1] (55-85% savings) and space saving
- Customer & network[2] operations (60% fewer costly truck rolls)
- Monetization of extracted copper[3], 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

Copper switch-off and migration to FTTH has positive implications for customers who report higher satisfaction scores and increasing usage of online services

Customer benefits of copper decommissioning

Based on survey among Swedish respondents

1. Customer satisfaction

- 82% of FTTH customers were happy with their service compared with only 50% of DSL customers

2. Internet speed

- 87% of FTTH users highlighted high bandwidth as a benefit of FTTH
- Average global download speed increased by 200% over the past three years

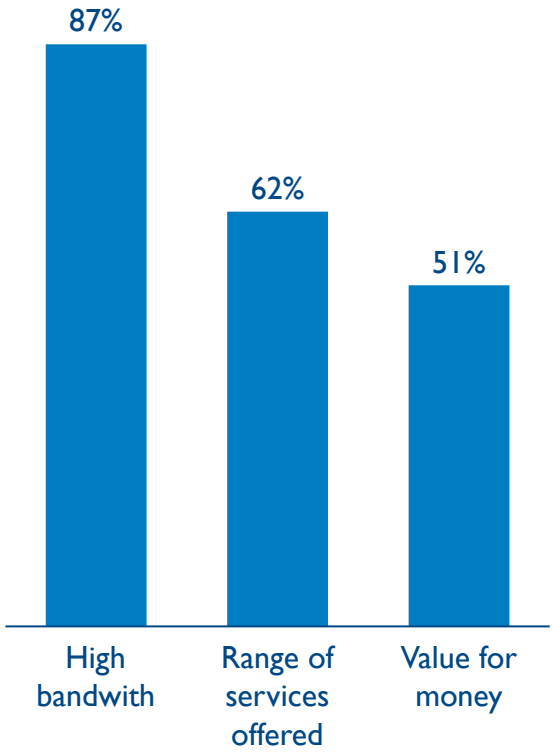
3. User intensity

- FTTH users in Sweden (79.8% coverage) were more likely to be online daily and were more active on the internet than users in Germany (13.3% coverage)

4. User behavior

- More than 30% of Swedes surveyed streamed all their music and video content online

Benefits of FTTH



Source: WIK, Ookla Speedtest Global Index, Arthur D. Little

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

Key challenges in copper decommissioning

Regulatory / competition

- Obligation to provide regulated wholesale services
- Managing multiple stakeholders including municipalities and wholesale customers

Migration / CEX

- Managing each and every customer upgrade
- Logistical nightmare – CPEs / customer connections
- Managing PR impact

Technology

- Fiber is not always cost-economical
- Potential for FWA
- Organizational silos
- Timing of roll-out vs. switch-off
- Maintaining customer experience

Organizational

- Stakeholder management (fixed & mobile)
- Communication management
- Organizational alignment
- Transformation program management

Investment

- Self cannibalization of copper services
- Insufficient funding for fiber roll-out
- New wholesale business models
- Shareholder management

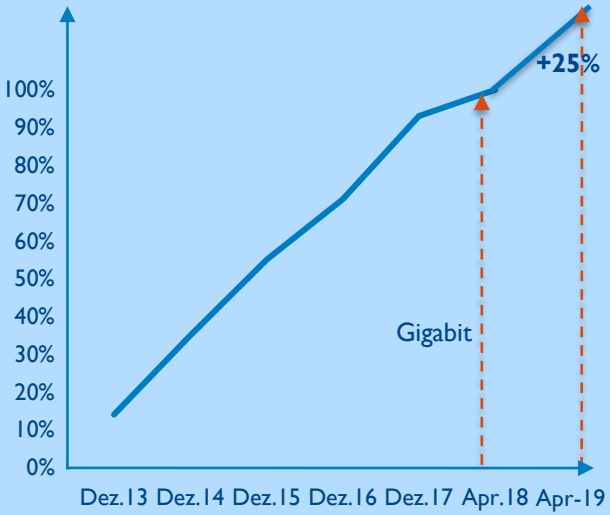
1) The incumbent does not switch off the copper network until it is fully overbuilt by own fiber
Source: Arthur D. Little

With an end-to-end approach, JT Global achieved an effective copper-to-fiber migration with significant commercial benefits

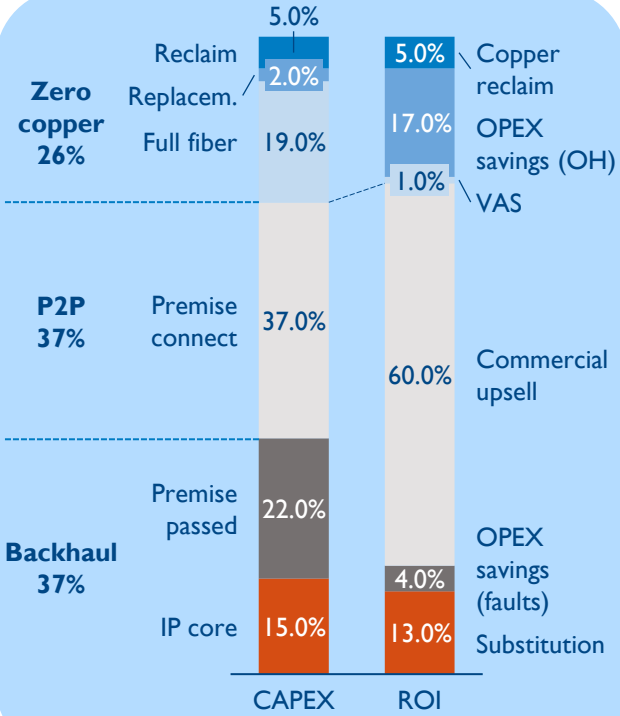
JT Global experience with full copper switch-off

Daragh McDermott
Managing Director
JT Channel Islands

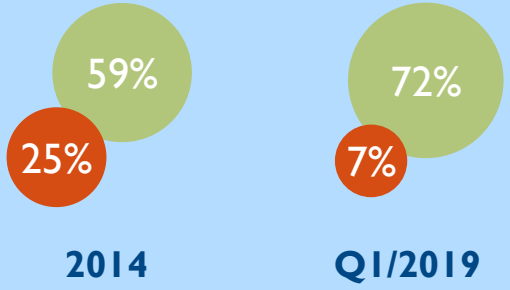
Program timeline



CAPEX & ROI of FTTH migration



Customer satisfaction impact



Source: JT Global, Arthur D. Little

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

Scenarios for copper decommissioning

Capital intensity[1]

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

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