Re-thinking the Digital Agenda for Europe (DAE):

A richer mix of technologies

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A richer mix of technologies

- Introduction
- Coverage of broadband networks in Europe
- Network usage trends
- Technical capabilities of cable
- A mix of technologies could offer advantages
- Concluding remarks

Introduction

- The European Union is committed to an ambitious Digital Agenda for Europe (DAE).
- The DAE includes
  - full broadband availability in 2013,
  - 100% availability of 30 Mbps in 2020, and
  - 50% adoption of 100 Mbps by 2020.
- It is widely acknowledged that meeting these goals is challenging.

Introduction

- What is really meant by 30 or 100 Mbps?
- Requirements for speed and symmetry should be understood in light of the use that consumers are likely to make of the network.
- What trends are visible as regards:
  - Applications in use?
  - Bandwidth demand per HH?
  - Traffic asymmetry?
- Demand is dynamic over time.

Introduction

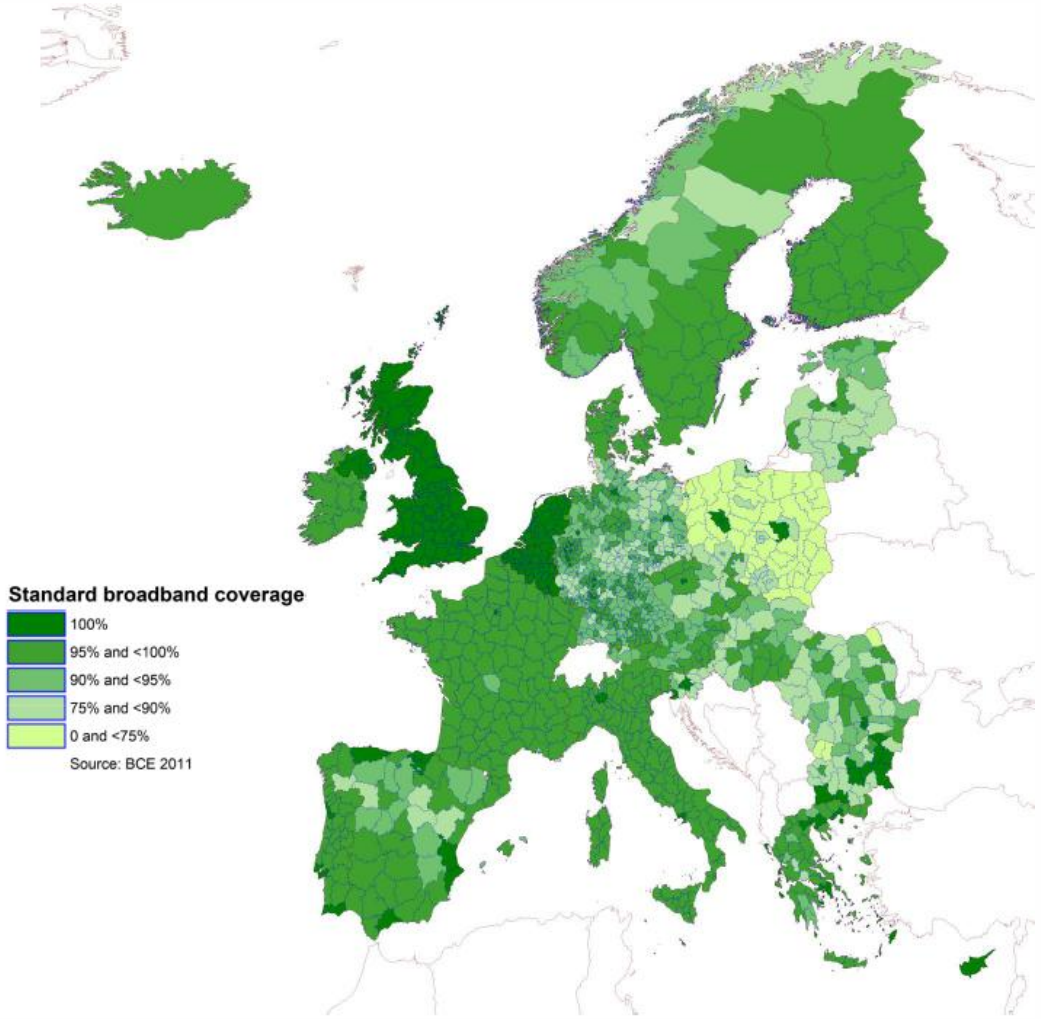
- DAE was initially viewed in an FTTx-centric way.
- Commissioner Kroes, Barcelona, 27 February:
  "I also want at least half of Europeans to have ultra-fast access at over 100 Megabits by 2020: again, it is clear that no single technology will deliver this, no single magic potion will get us there overnight. We rather need an intelligent mix of complementary technologies, deployed incrementally, and according to local circumstances. Such technologies include in particular Fibre-to-the-Home, upgraded Cable, Fibre-to-the-Cabinet and LTE."

Coverage and capabilities

Basic broadband coverage

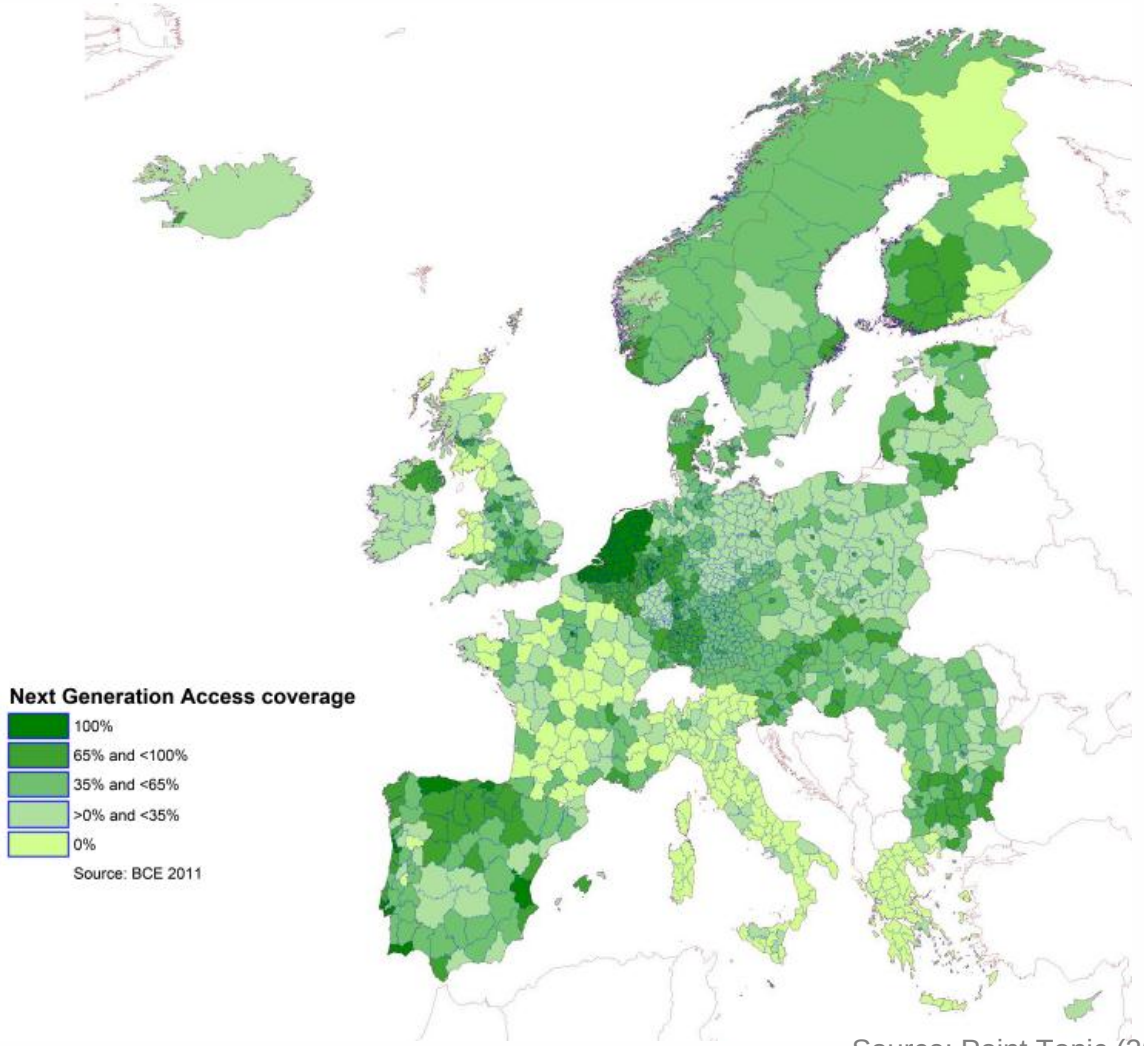
- For years, European broadband policy was based on flawed coverage data.
  - Assumed full coverage of the fixed network, which clearly was not the case in newer Member States.
  - Assumed that all fixed network lines were good enough to support broadband.
- A 2012 Point Topic report for the European Commission provide an improved baseline.

Basic broadband coverage



Source: Point Topic (2012)

NGA coverage



Source: Point Topic (2012)

Coverage in Europe

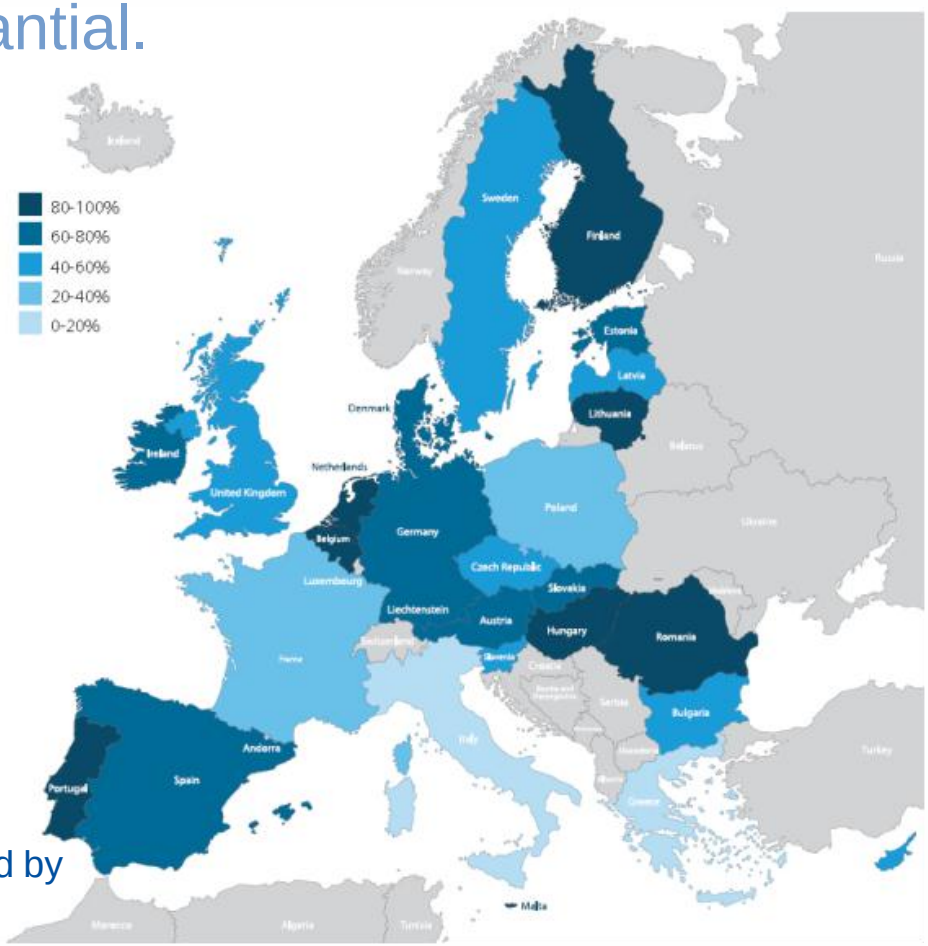
- Basic broadband
  - The older Member States have nearly full coverage.
  - Some of the newer Member States have sufficient gaps in rural coverage.
- NGA coverage
  - Member States with cable already enjoy full deployment (the Netherlands, Belgium, Malta).
  - Some eastern Member States have already deployed substantial fibre.
  - Some eastern Member States have lots of cable.

Coverage of Cable Networks

- Total cable coverage in Europe is substantial.
- A significant fraction of this cable infrastructure is DOCSIS 3.0 capable.
- The remainder could be upgraded at modest cost.
- In many Member States, cable represents a significant fraction of total broadband.

Coverage of Cable Networks

- Total cable coverage in many EU Member States is substantial.



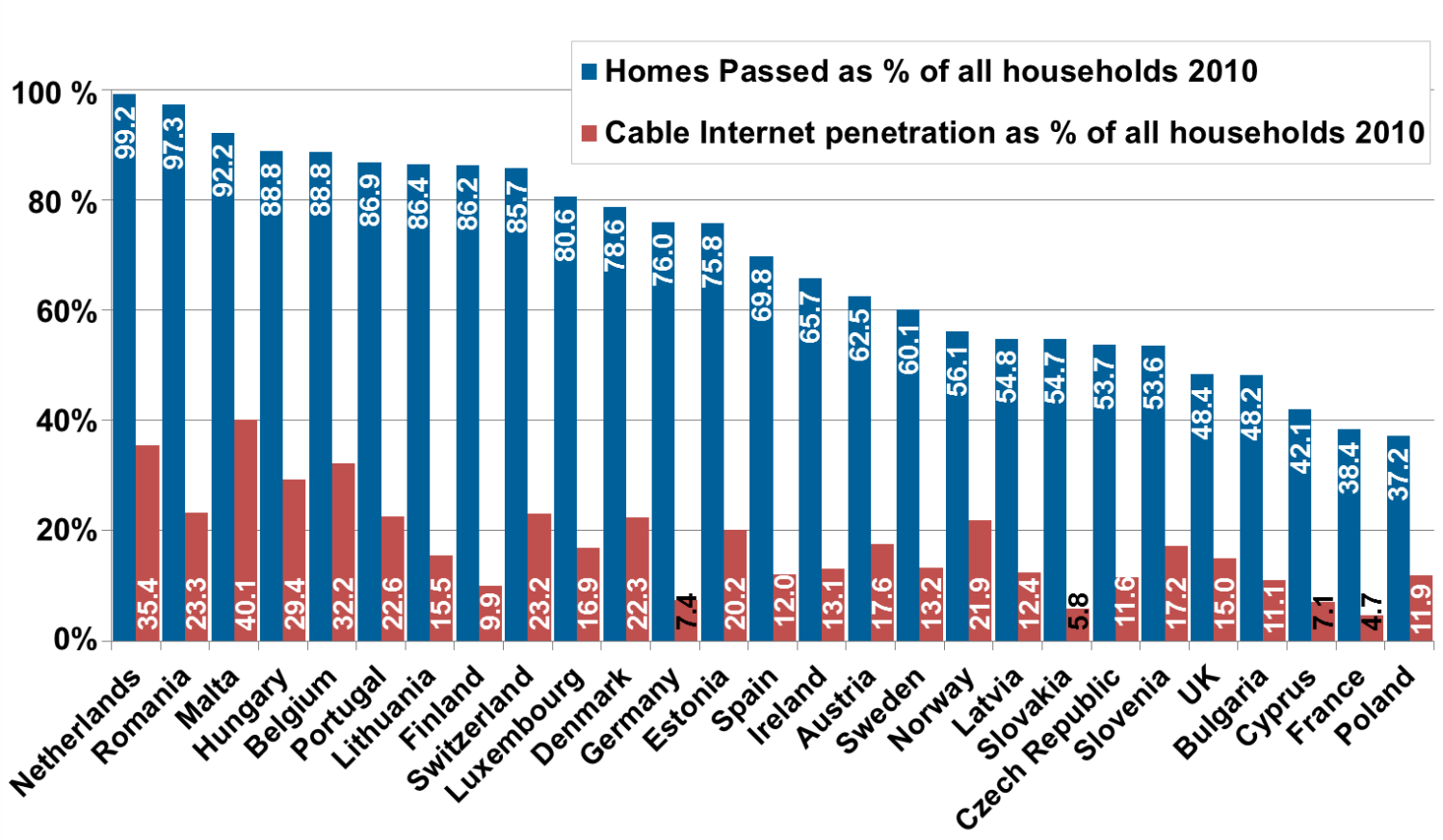
Percentage of households passed by cable (2010)

Full report, page 36.

Source: Screen Digest (2010), WIK calculations

Cable's Potential

- The "gap" between cable coverage and cable broadband penetration represents a significant opportunity for Europe and for the industry.

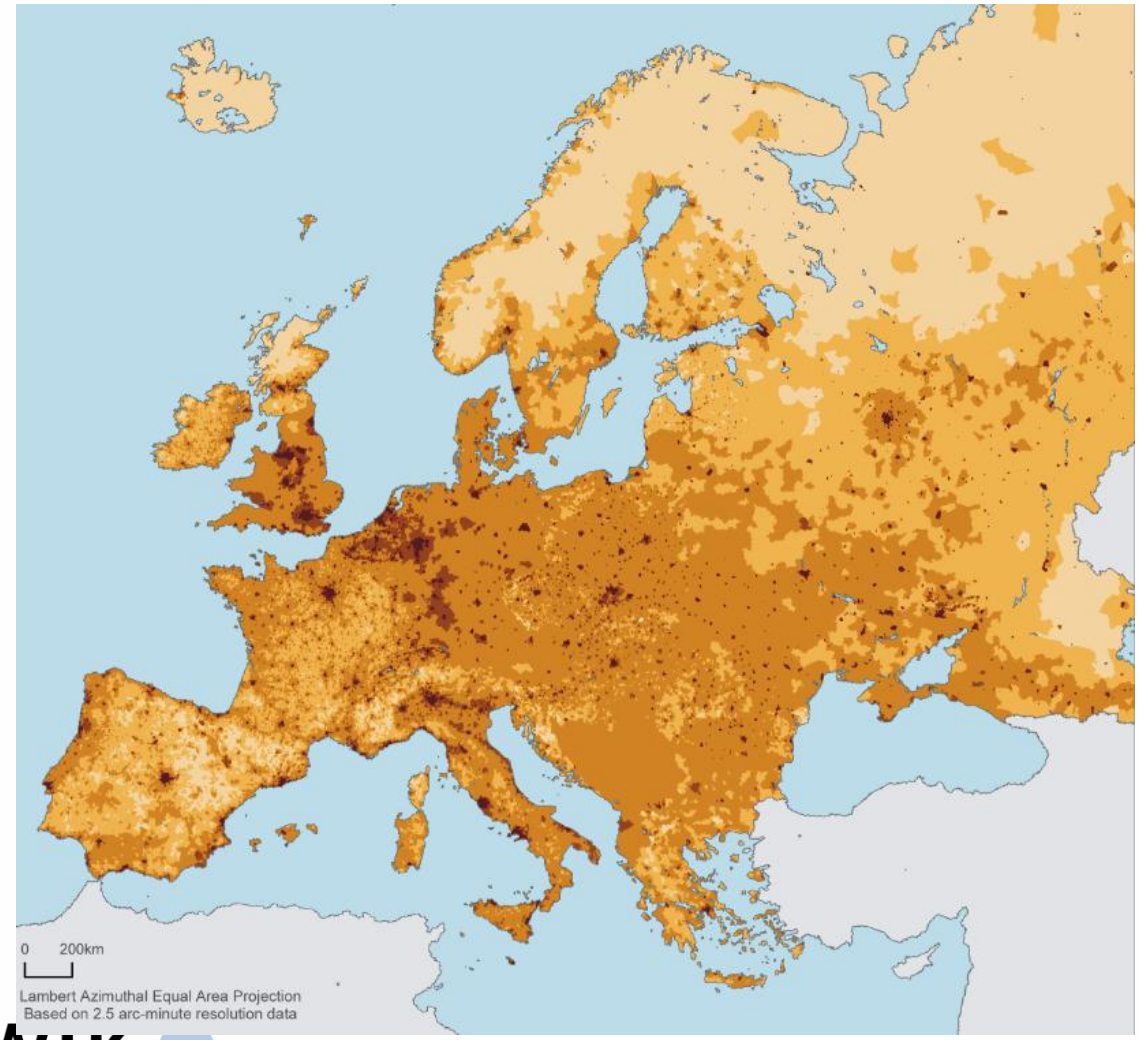


Full report, page 37.

Source: Screen Digest (2010), WIK calculations.

Challenges of achieving full basic and NGA coverage

Coverage poses challenges
Population density

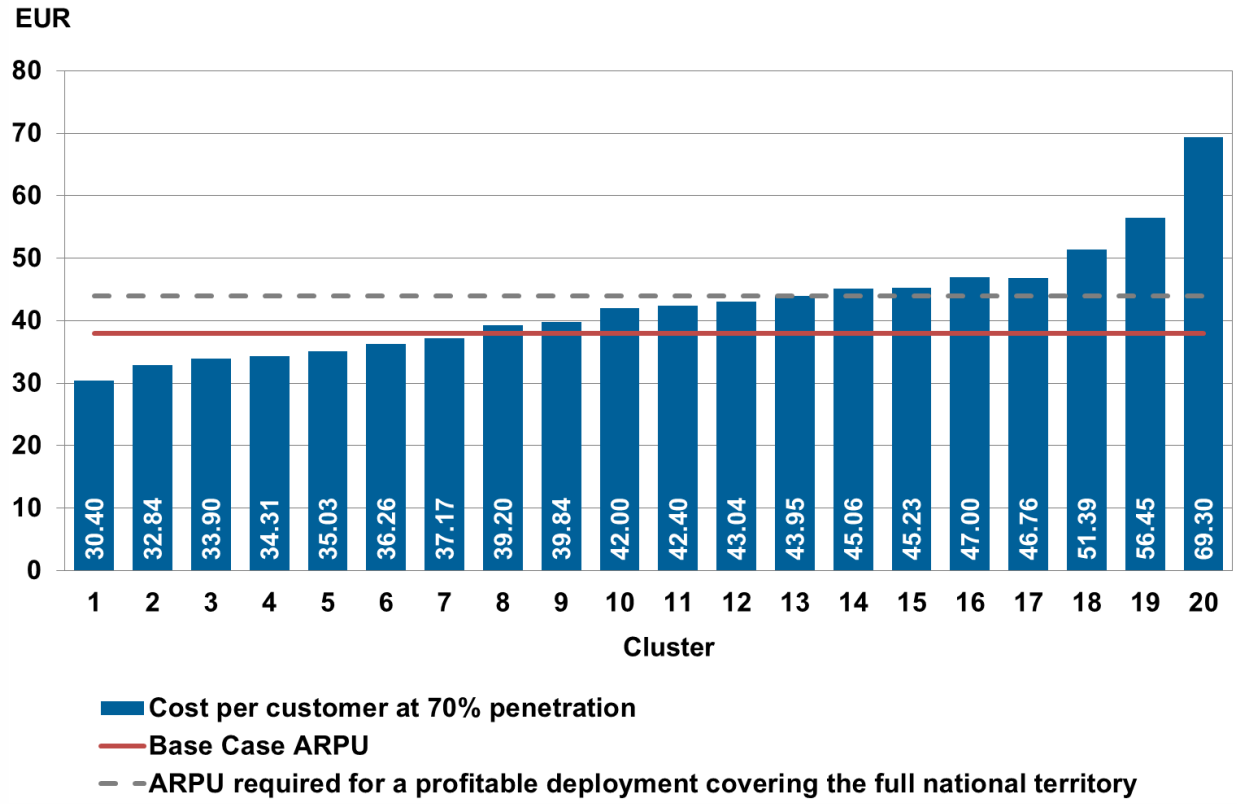


Full report, page 41.

Source: Center for International Earth Science Information Network (CIESIN).

Challenges of achieving NGA deployment

Cost and ARPU per customer per month for FTTH P2P Ethernet (Germany, 70% penetration)

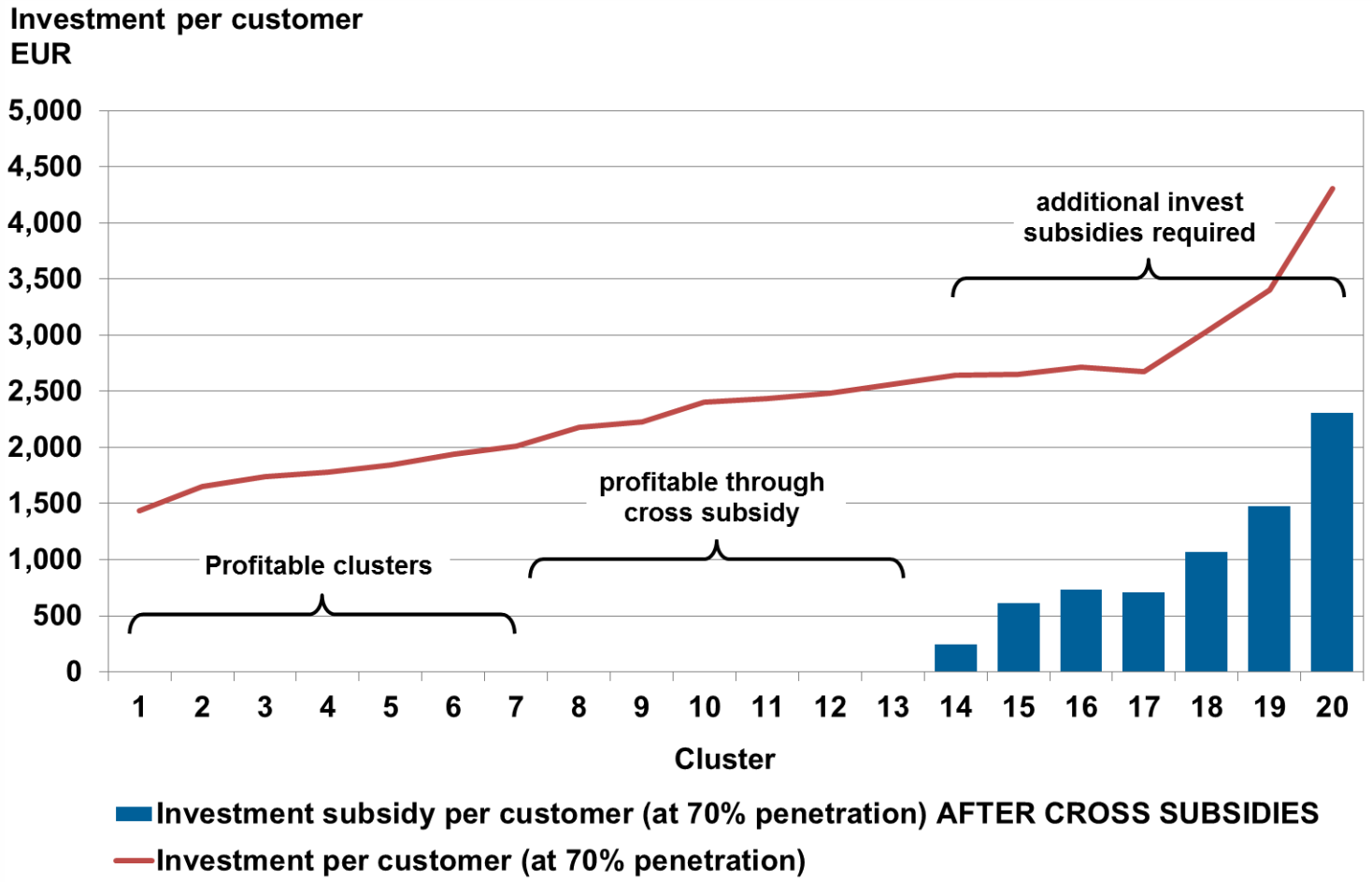


Full report, page 45.

Source: Feijoo, Gomez-Barroso et al. (2011a).

Challenges of achieving NGA deployment

Investment subsidy per customer required for FTTH P2P Ethernet (Germany)



Full report, page 46.

Source: WIK

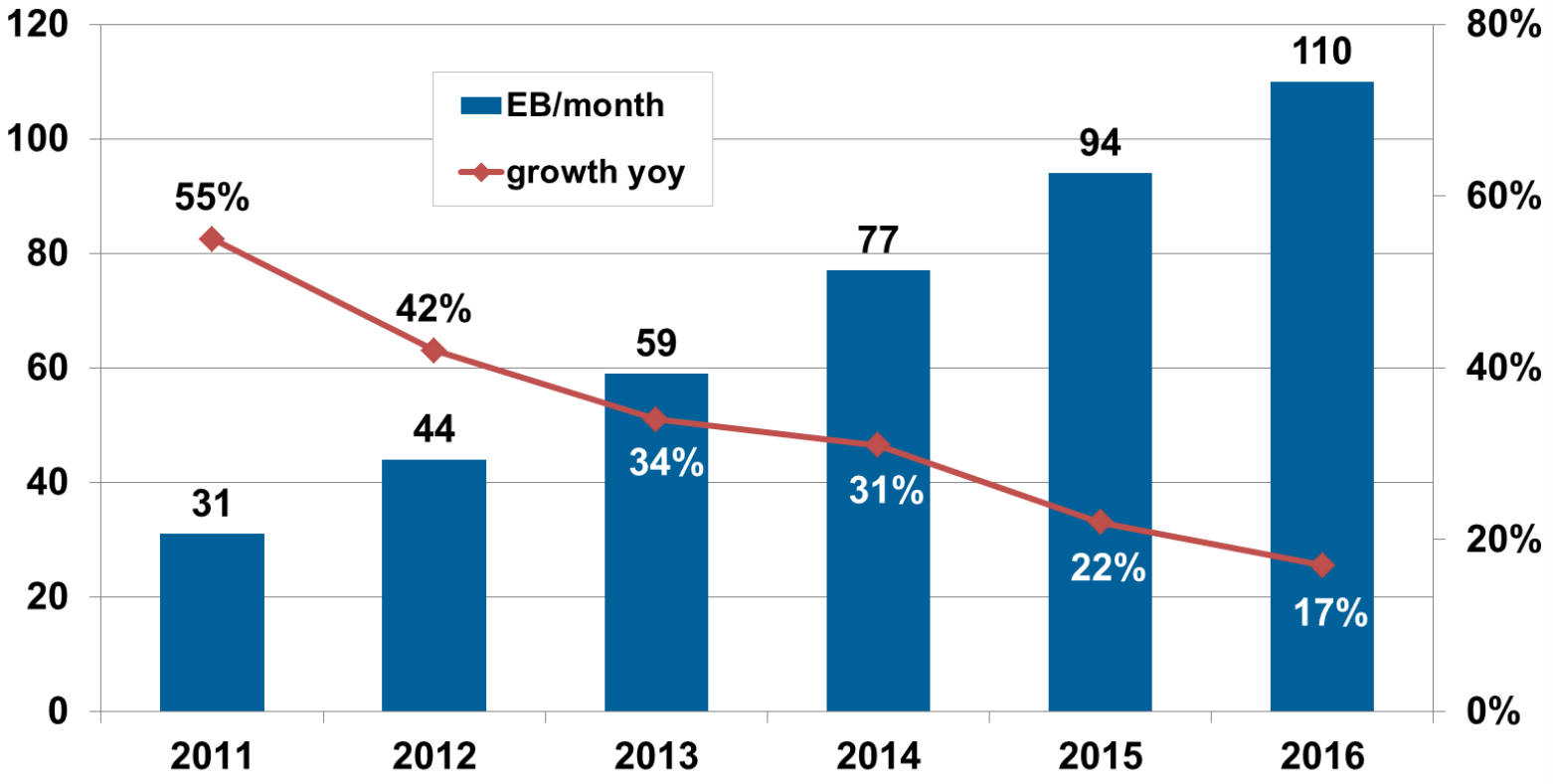
Usage Trends

Global Internet traffic trends

"It's tough to make predictions, especially about the future."

- Yogi Berra (US baseball player and manager)

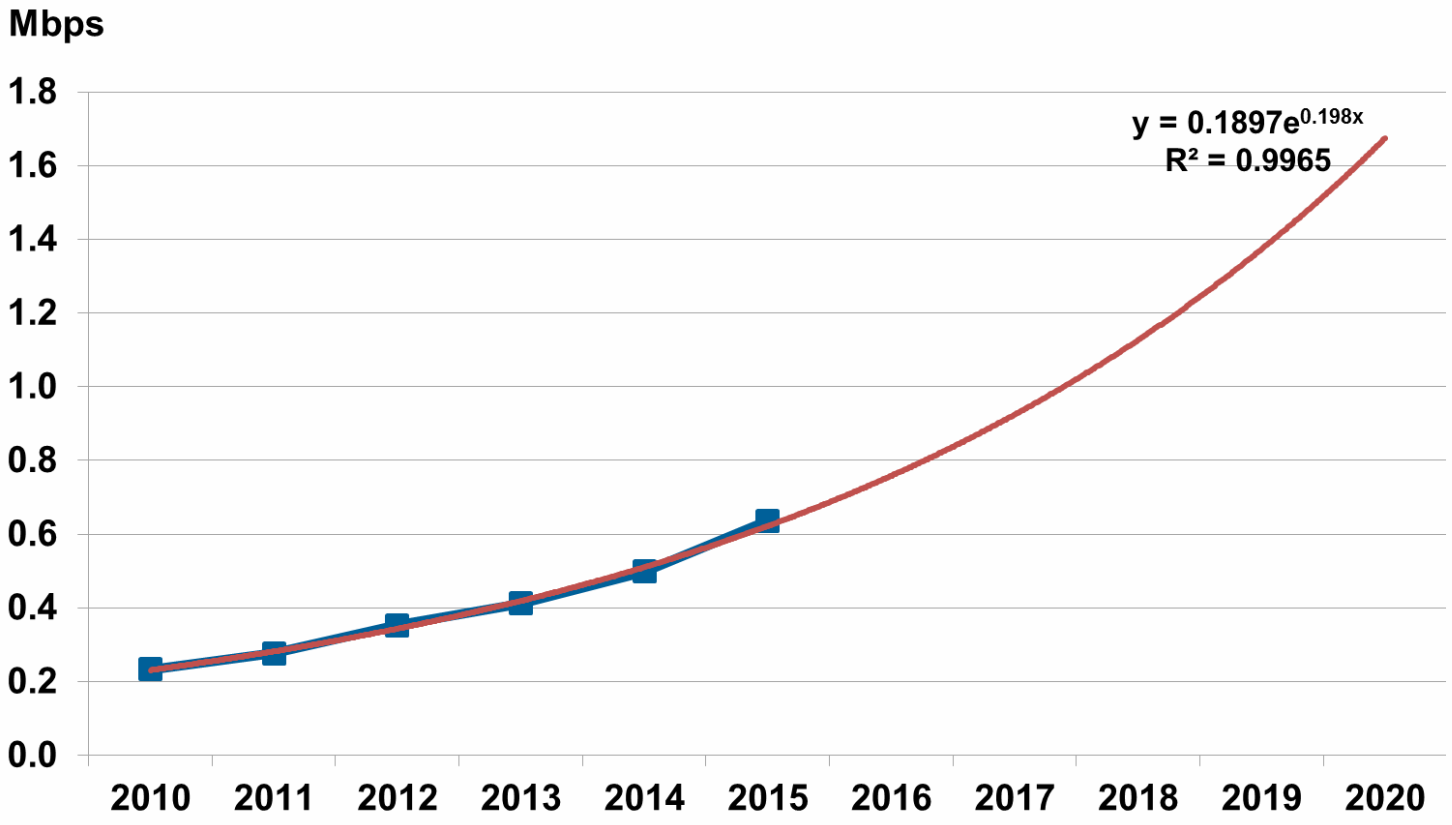
Global Internet traffic trends



Full report, page 16.

Source: Cisco VNI (2012), WIK calculations.

Average busy hour traffic per user



Full report, page 20.

Source: Cisco VNI 2011 data, WIK calculations.

Implications for network design

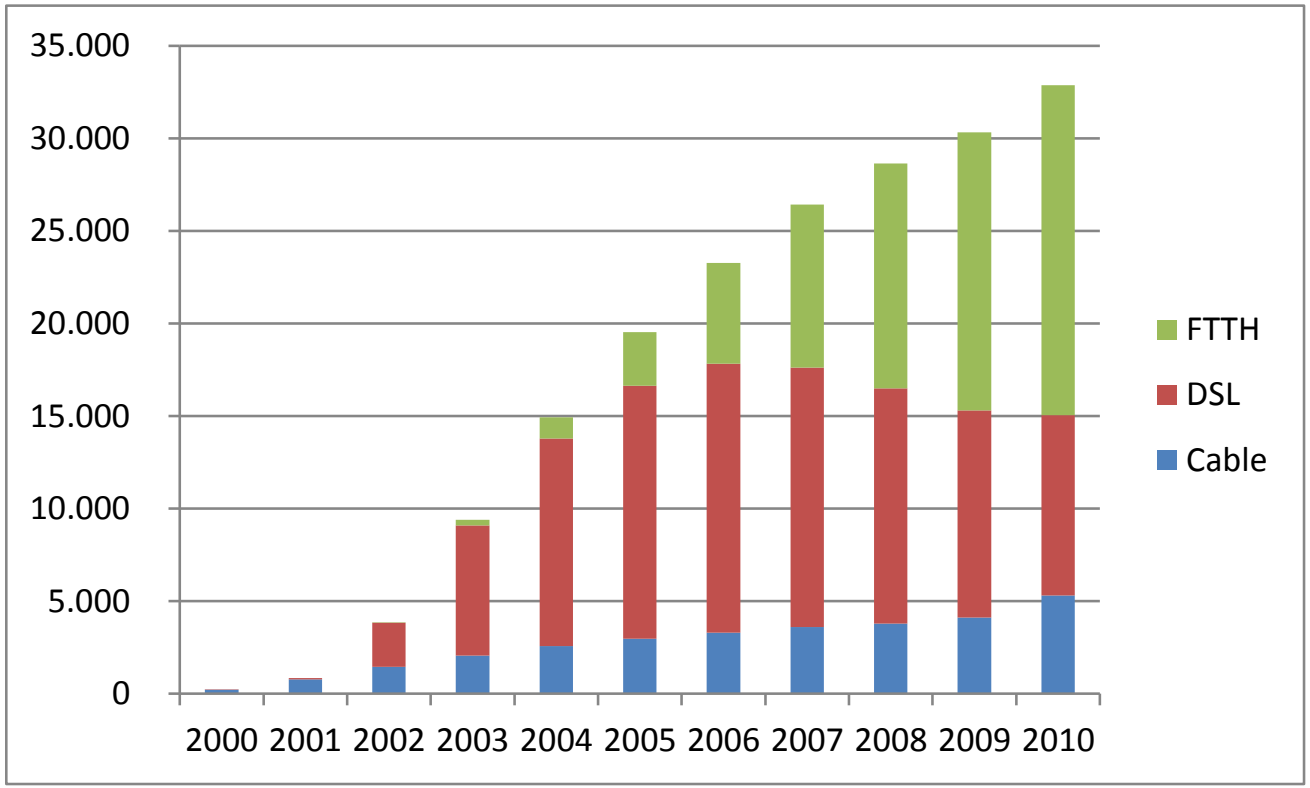
- Average busy hour traffic (which largely drives the size of the network) per user is much lower than many assume, and is likely to remain far less than DAE access speeds.
- This suggests that media with shared bandwidth – wireless and cable – are likely to be able to meet consumer demand well into the future.
- High access speeds nonetheless offer benefits.
  - Enable applications that would not otherwise be possible.
  - Faster response from all applications.

Does supply drive demand?

- It is fairly clear that demand for broadband can drive supply.
- How does supply affect demand?
- Will abundant supply stimulate creation of new bandwidth-hungry applications?
- Alternative hypothesis:
  - too little available bandwidth can *reduce* consumption, but
  - “too much” bandwidth availability has only limited ability to *promote* bandwidth consumption.

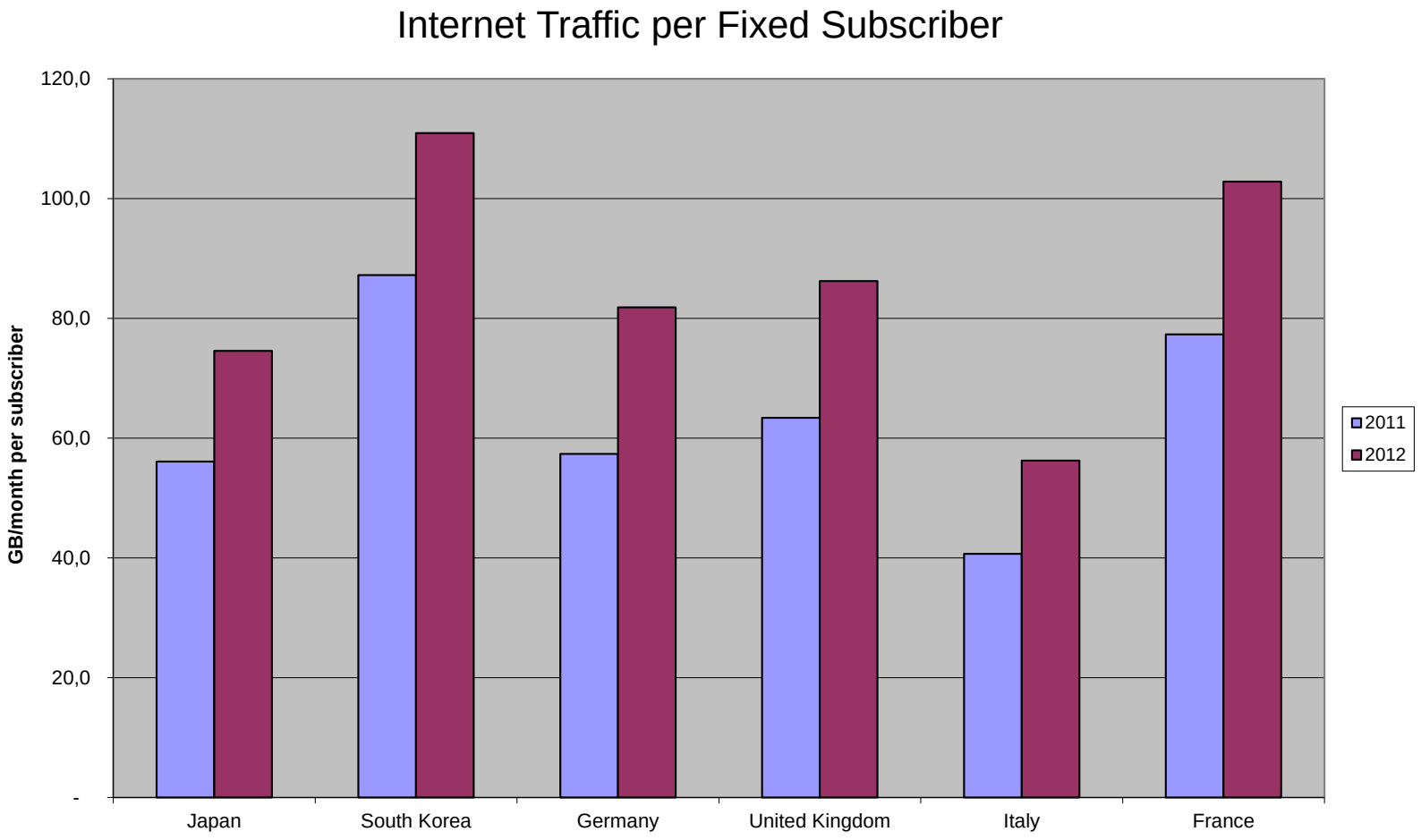
Fibre-based NGA in Japan and South Korea

- If an effect is visible anywhere, it ought to be visible in Japan and South Korea.



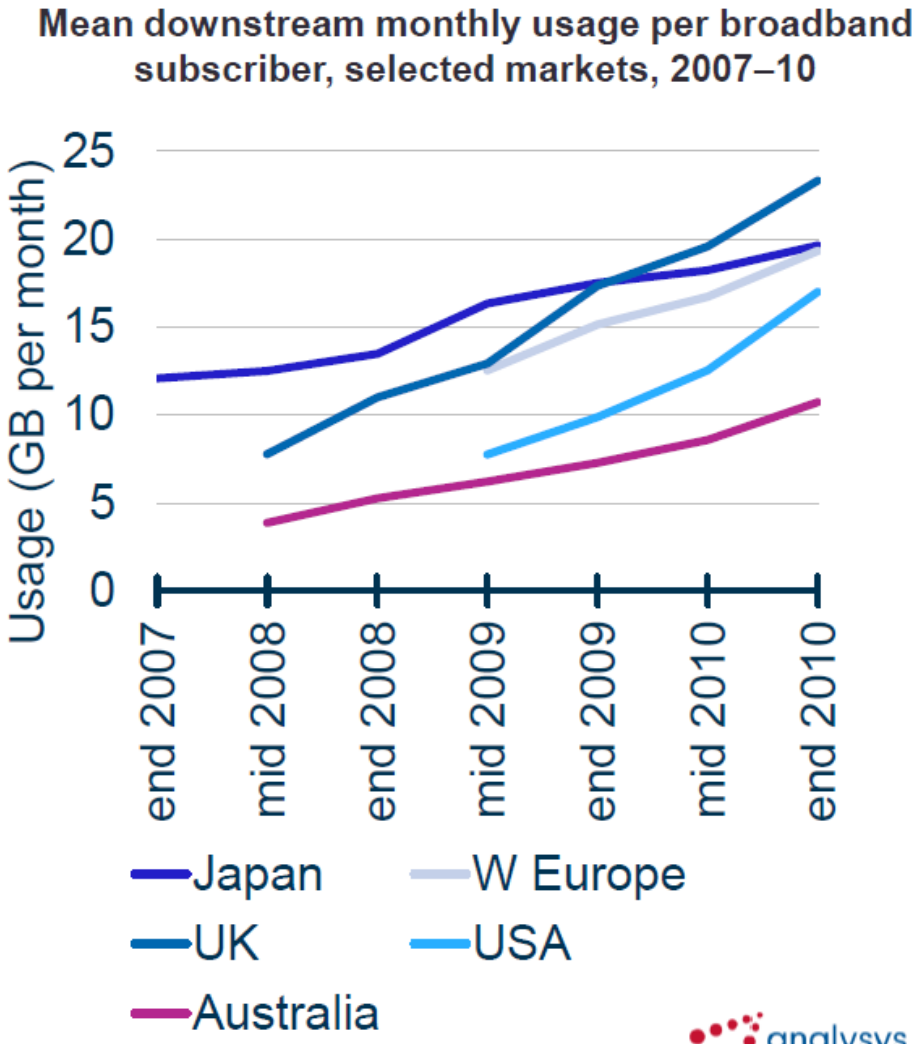
Source: Tatsuo Takita, Infocom

Japan and South Korea vs Europe



Data sources: Cisco VNI 2012 online database, OECD, ITU, WIK calculations

Japan vs Europe



Source: Rupert Wood, Analysys Mason

Global Internet traffic trends

"[M]ost forms of Internet video do not have a large upstream component. As a result, traffic is not becoming more symmetric as many expected when user-generated content first became popular. [S]ubscribers still consume far more video than they produce."

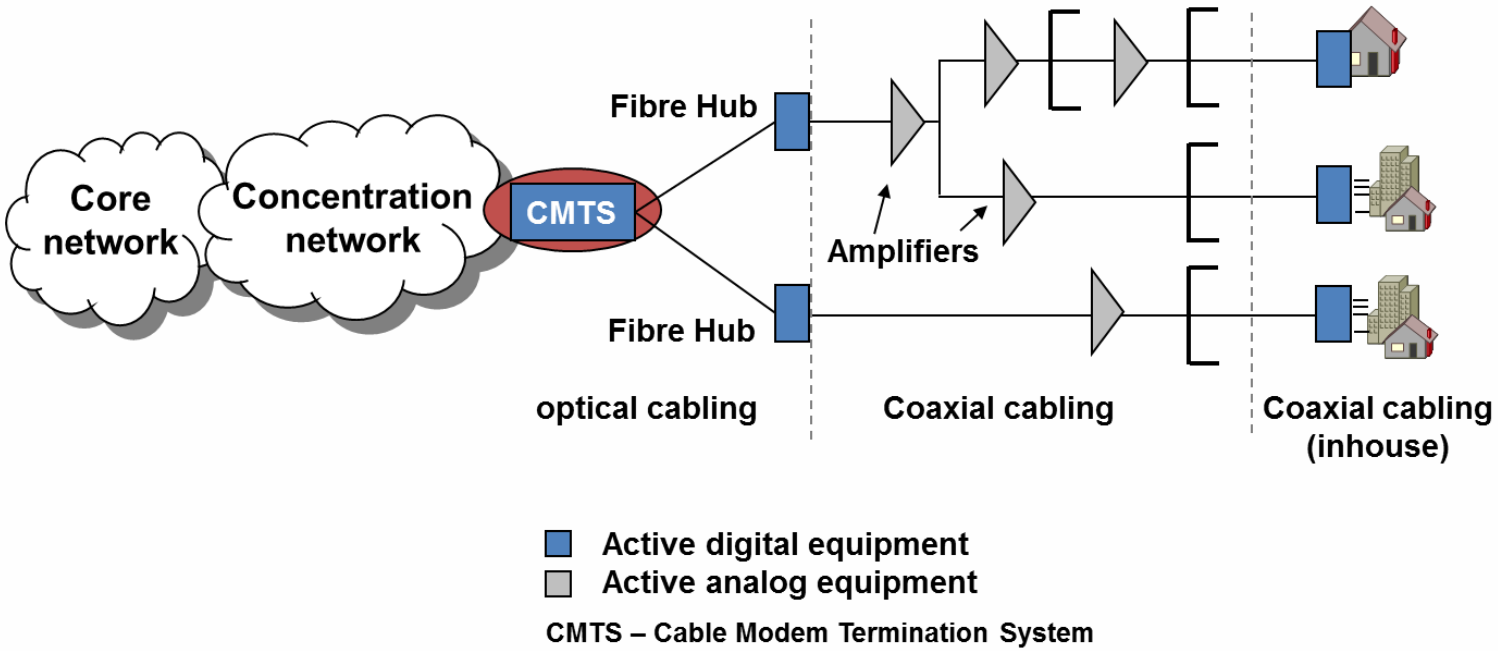
- Cisco VNI Methodology (2012)

Cable Technology

Technical capabilities of cable

- The (inexpensive) upgrade to DOCSIS 3.0 enables high speed cable broadband.
- Cable is a shared medium; nonetheless, cable operators have considerable control over the bandwidth available per user.
  - More CMTS can be deployed to serve a group of users.
  - More fibre nodes can be deployed to a street cabinet.
  - If a cable system has been deployed with excess fibre capacity, these upgrades need not require civil works.
- These upgrades can be made incrementally.

Two-way HFC/DOCSIS cable



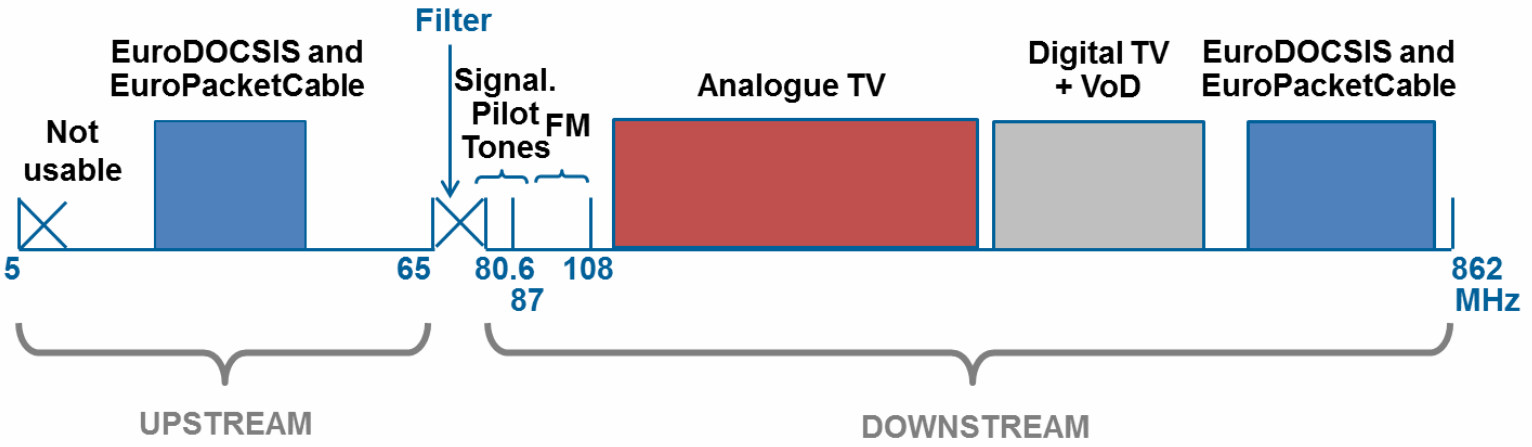
Full report, page 54.

Source: WIK-Consult

Technical capabilities of cable

- Cable systems could offer symmetric bandwidth if there were customer demand for it.
- Current channel allocations on cable systems provide far more bandwidth downstream (e.g. 5 MHz to 65 MHz) in order to enable more linear video to consumers.
- There could however be a different allocation if there were a business case to do so.
- If consumer demand for symmetric broadband services were to grow, cable could readily adapt.

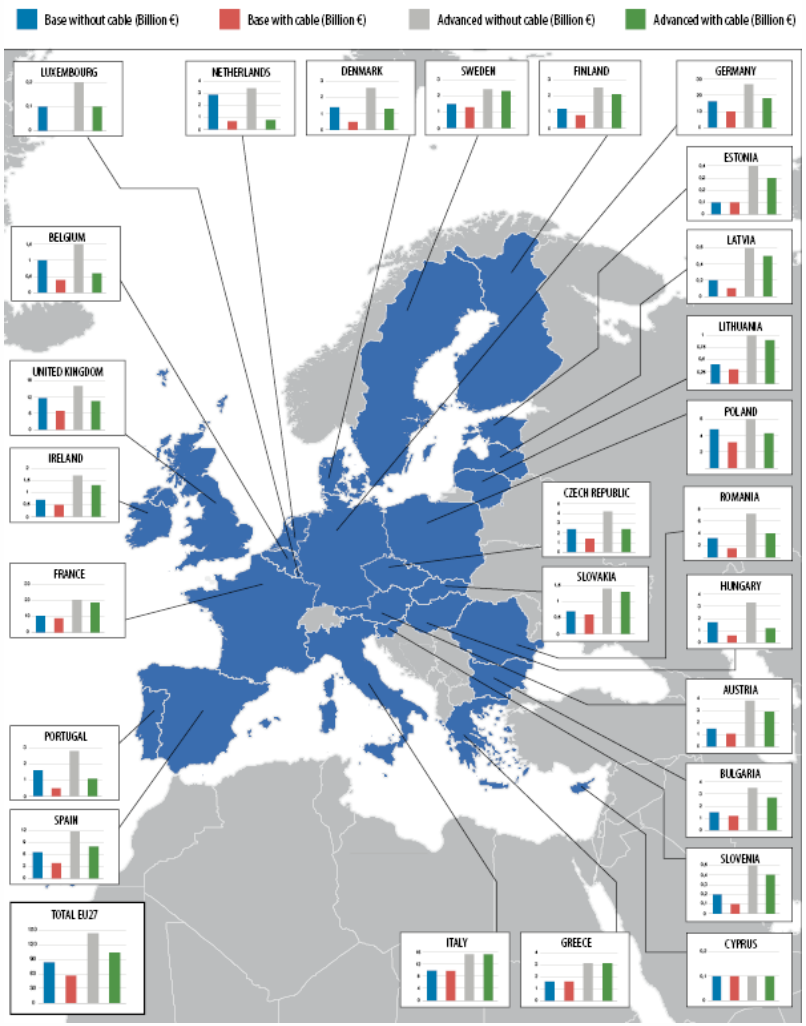
Spectrum allocation in cable networks



Full report, page 57.

Source: Cable Europe Labs (2009): Cable network handbook; CEL-TR-HFC-V4_3-091001.

A Mix of Technologies



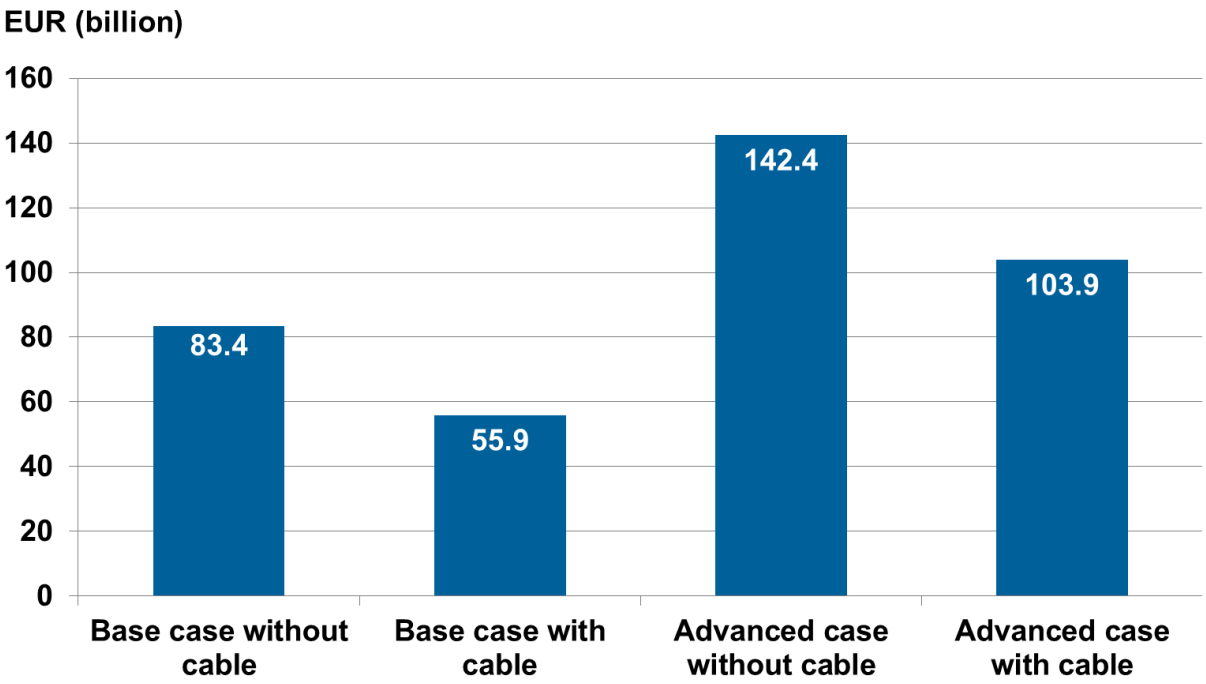
The use of cable influences the cost of meeting DAE objectives

Full report, page 63.

Source: Hätönen/EIB (2011).

The use of cable influences the cost of meeting DAE objectives

- Aggregate incremental cost of achieving DAE objectives for the EU as a whole, with and without cable.
- Savings for the EU as a whole could be substantial – up to 30%.

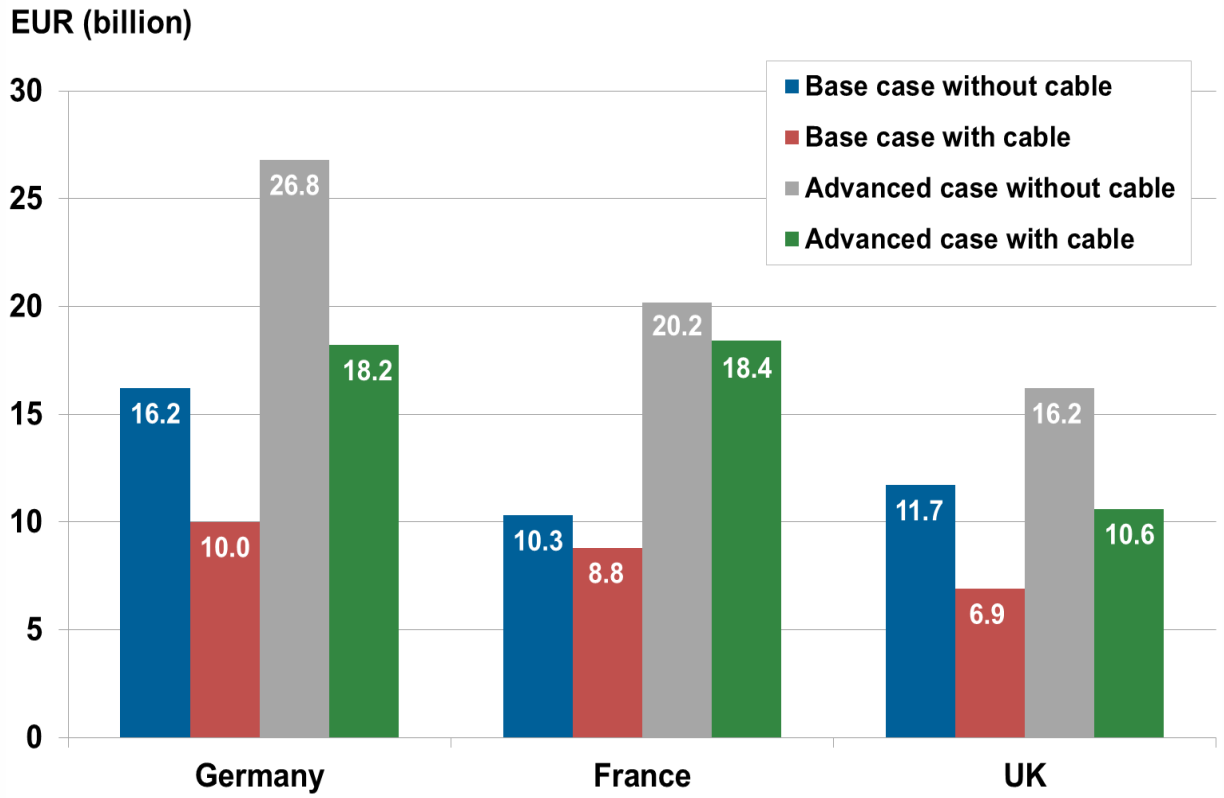


Full report, page 65.

Source: Hätönen/EIB analysis, WIK calculations.

The use of cable influences the cost meeting DAE objectives

- Incremental cost of meeting DAE objectives with and without cable, in Germany, France and the UK



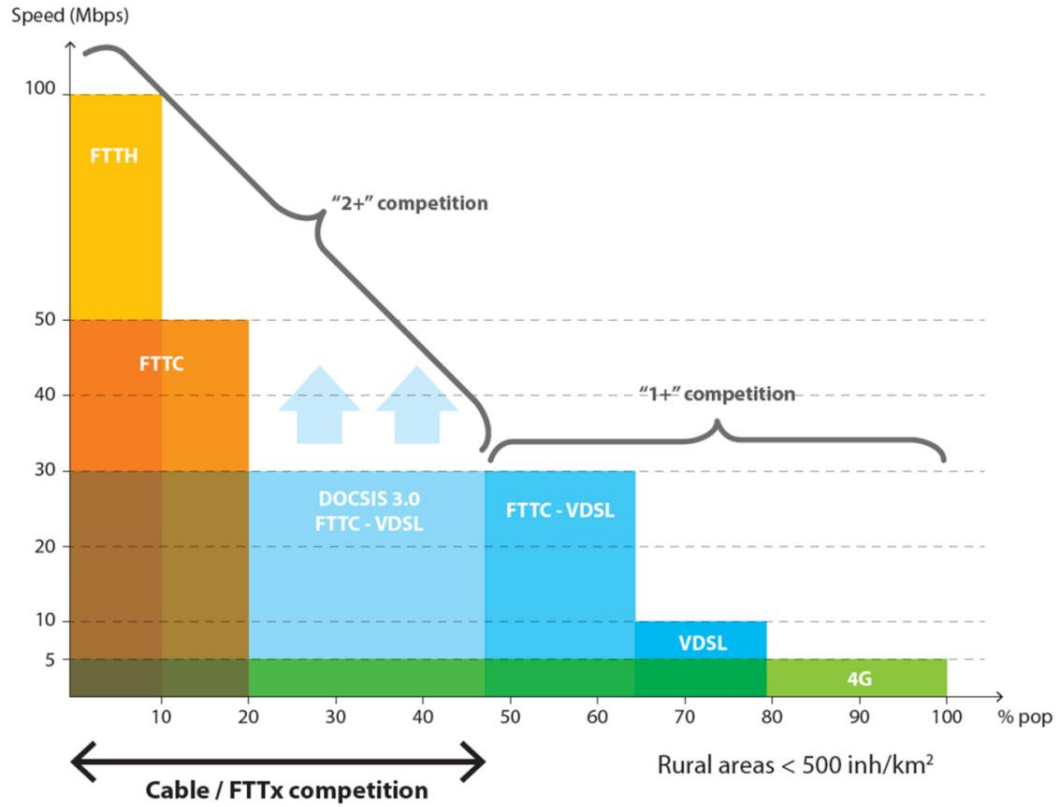
Full report, page 66.

Source: Hätönen/EIB analysis, WIK calculations.

Infrastructure Competition

Infrastructure-based competition and NGA deployment

- Policymakers may prefer to promote facilities-based competition, rather than cost savings for a single infrastructure.
- This example reflects Spain as it was in 2010.



Full report, page 72.

Source: Feijoo and Gomez-Barroso (2010a).

Concluding remarks

- A technologically neutral approach to the DAE, drawing on cable and LTE, offers real benefits.
- Cable can and does serve as
  - an alternative to making FTTx upgrades, especially in areas where the cost of fibre upgrades would be particularly uneconomic, providing cost savings; or
  - as a second fixed network in a given area, providing a facilities-based fixed network alternative to an FTTx network, thus enhancing competition.