# Market and technology trends in broadband

## Markt- und Technologietrends im Breitbandbereich

Stephan Jay
WIK-Consult GmbH

November 6th, 2008
iTec08
Darmstadt

wik CONSULT

# Overview

- **Focus of this presentation: Developments in NGN / NGA**
- **Analysis of international NGA deployment diversity**
- **Results from cost modelling of NGA economics**
- **Implications for market & technology trends, regulation and competition policy**

wik CONSULT

# Focus of this presentation

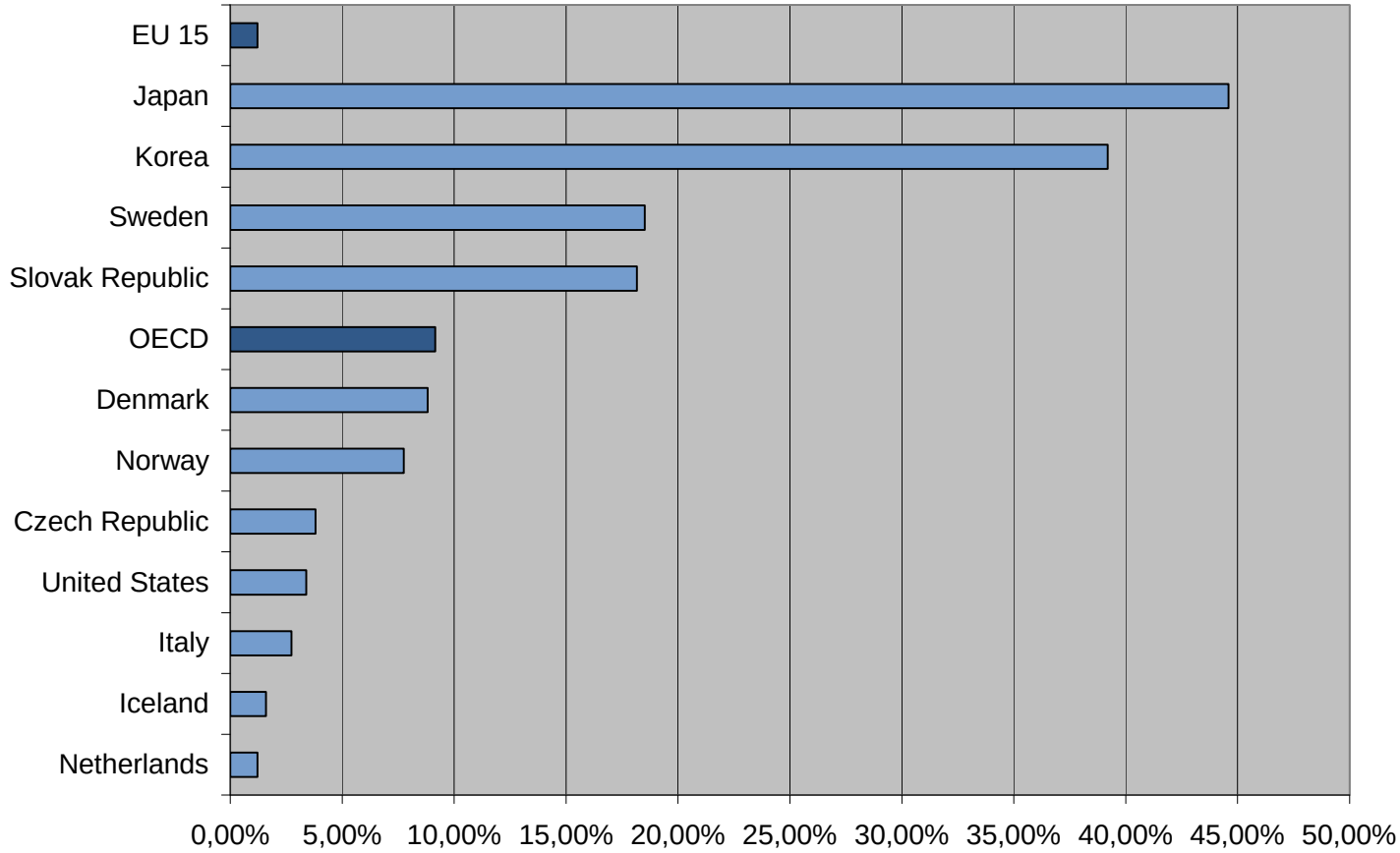
- Definition of NGN
- Scope of analysis
  - Next Generation **Core** Networks
  - Next Generation **Access** Networks

**Goal: Analysing the migration of the old PSTN infrastructure to Next Generation Access**

wik CONSULT

# Large differences between countries regarding FTTH/B share in broadband

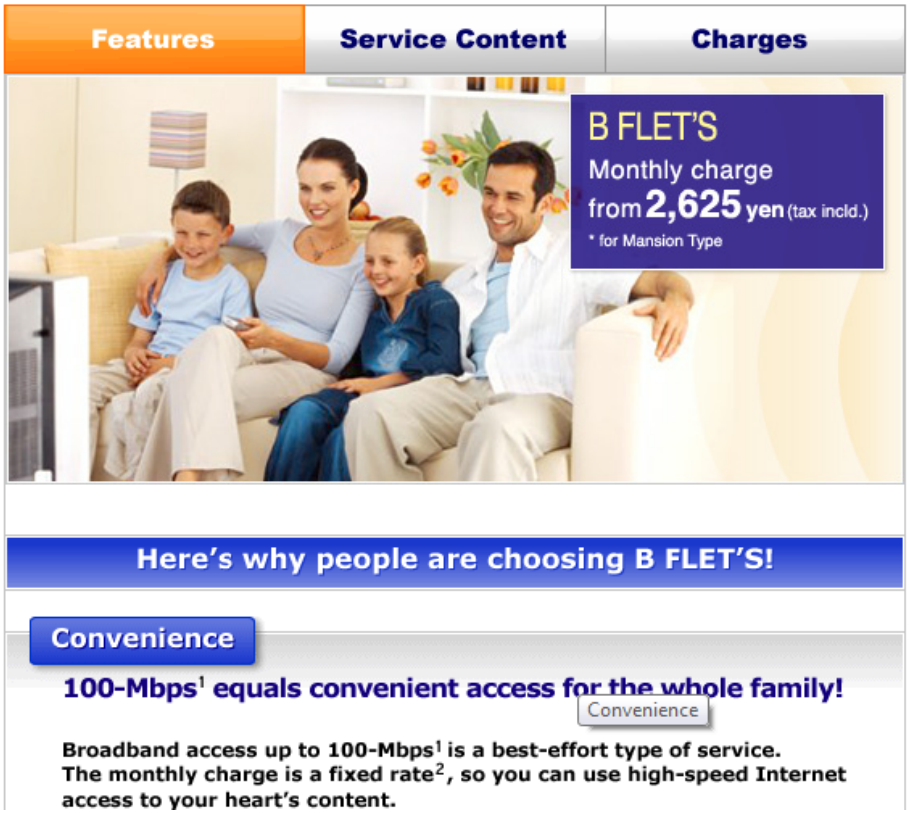
Percentage of fibre connections in total broadband, June 2008




Source: OECD, includes FTTB and FTTH

# 100Mbps downstream is commercial reality today (…in some areas)

## Tokyo




## Cologne


wik CONSULT

# Overview

- Focus of this presentation: Developments in NGN / NGA
- Analysis of international NGA deployment diversity
- Results from cost modelling of NGA economics
- Implications for market & technology trends, regulation and competition policy

# Outside Europe: The role of the state

## Various degrees of regulation

- Japan: More than 13mn FTTH/B lines. NTT market retail share 75%; NGN massmarket since early 2008. Early emphasis on LLU (2000) including fiber LLU (since 2006).
- Australia: Tender for (near) nationwide FTTN-network (~ VDSL); partly funded by the state; ongoing discussion regarding degree of separation; Universal Service Obligations (USO)
- Singapore: License for deployment of widespread FTTB-Network awarded recently; partly funded by the state; double layer of separation and USO
- USA: AT&T (FTTC) and Verizon (FTTB) commenced ambitious deployments. FCC removed obligation for fiber LLU in 2003.

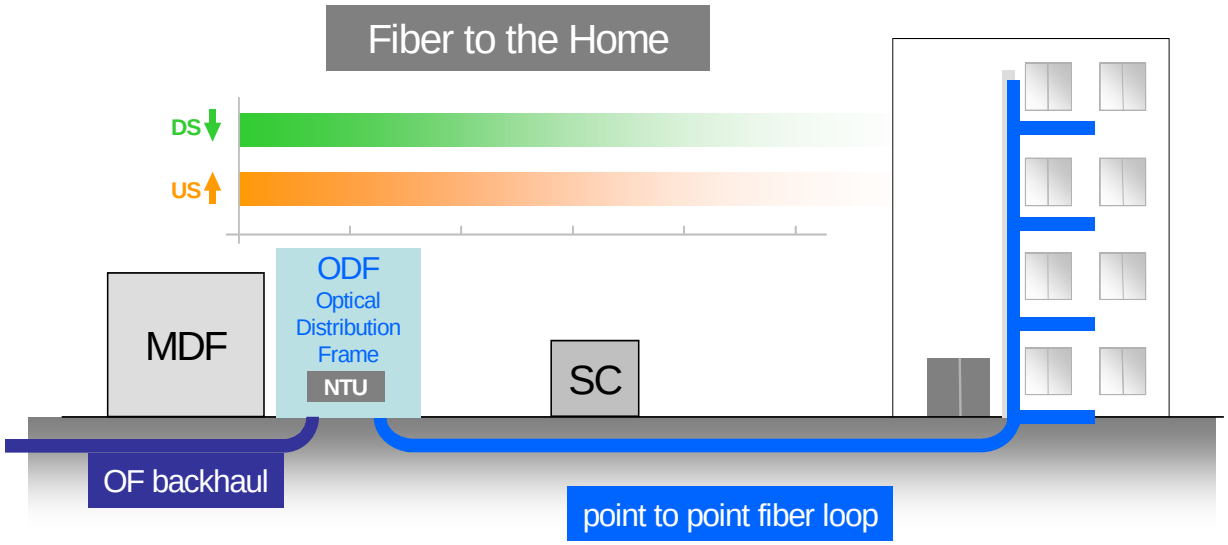
wik CONSULT

# (very) selected European approaches

## Incumbents, competitors, municipalities, French Régions & Départements, co-ops

- **Finland:** national action plan (09/08) calls for 100 Mbit/s connections for all households and business users by end of 2015; State, regions and municipalities share costs for roll-out in non-profitably servable areas.
- **France:** FT, SFR (neuf/Cegetel), Free/Iliad, Numéricable started to implement individual ambitious roll-out plans; in addition large number of regional and local FTTC/B/H initiatives.
- **Greece:** government announced FTTx rollout for 2mn households in 3 major metro areas (09/08); total invest of 2.1bn € partly funded by the state
- **Sweden:** many local FTTC/B/H projects on municipal level; TeliaSonera (03/08): Plans to deploy P2P, PON and VDSL2 covering 1,5 – 2mn. Households & businesses
- **UK:** (Caio Report; 09/08): „[…] government should act now to support investment in NGA“: Set up framework for NGA deployment, establish benchmarking process, identify remedies

# Different degree of fiber in the local loop (FTTx)




*Quelle: G. Gauthey, Präsentation auf der VDSL Konferenz des WIK; 22.03.2007*

**Goal: Provide more bandwidth for end-users**

# Overview

- Focus of this presentation: Developments in NGN / NGA
- Analysis of international NGA deployment diversity
- Results from cost modelling of NGA economics
- Implications for market & technology trends, regulation and competition policy

# „The Economics of Next Generation Access“

- Study for the ECTA (europäischen Wettbewerberverband)
- Viability of next generation access business models based on VDSL, FTTH-PON or FTTH-P2P
- Replicability of NGA roll-out by competitors
- Modelling the impact of regulatory remedies (duct access, dark fiber, fibre LLU & SLU)
- Results for 6 countries: D, P, SE, F, ES, I

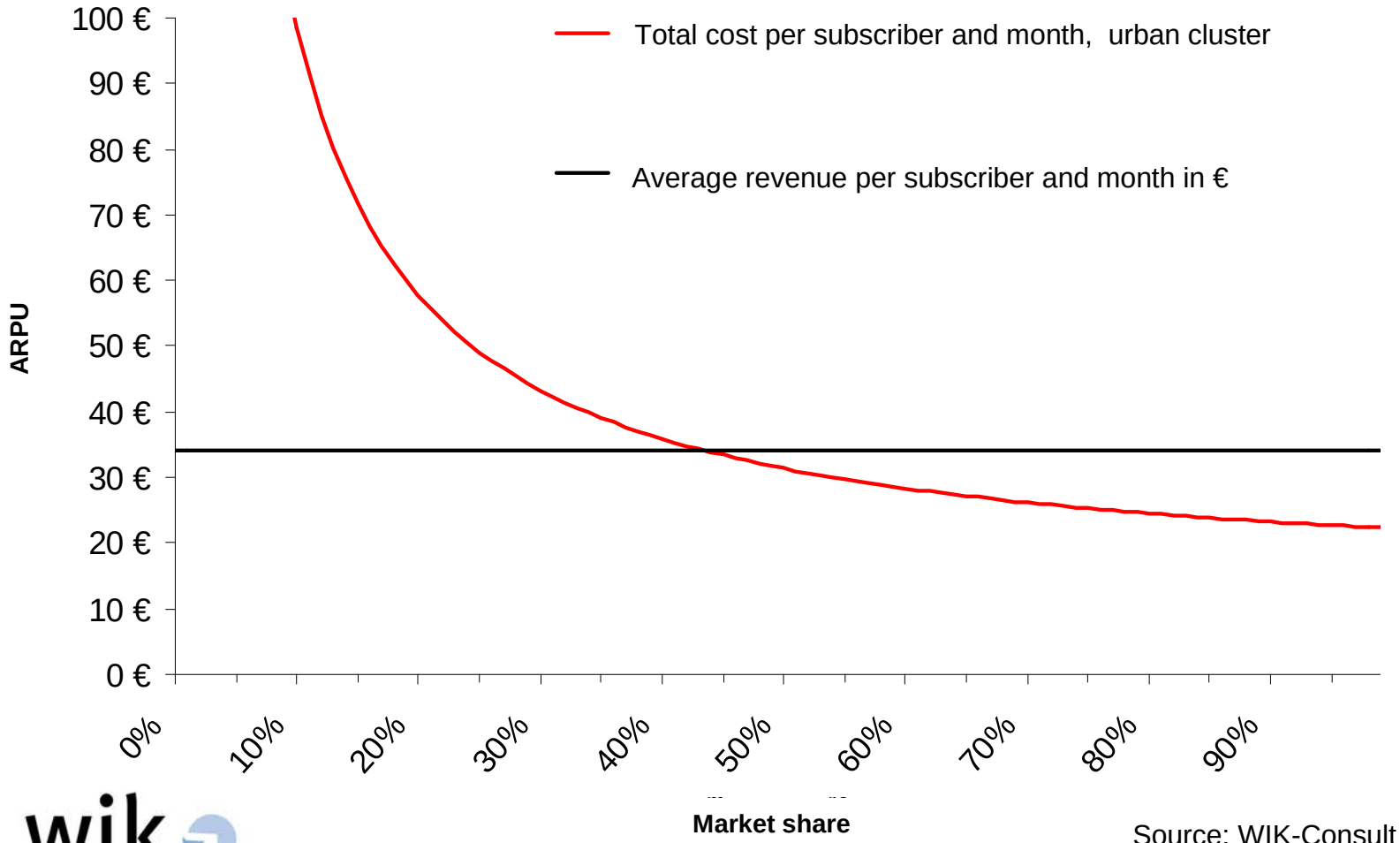
Complete study available for download at

- http://www.ectaportal.com/en/
- http://www.wik-consult.com/content_e/ecta/ECTA%20NGA_masterfile_2008_09_15_V1.pdf

wik CONSULT

# Model results:

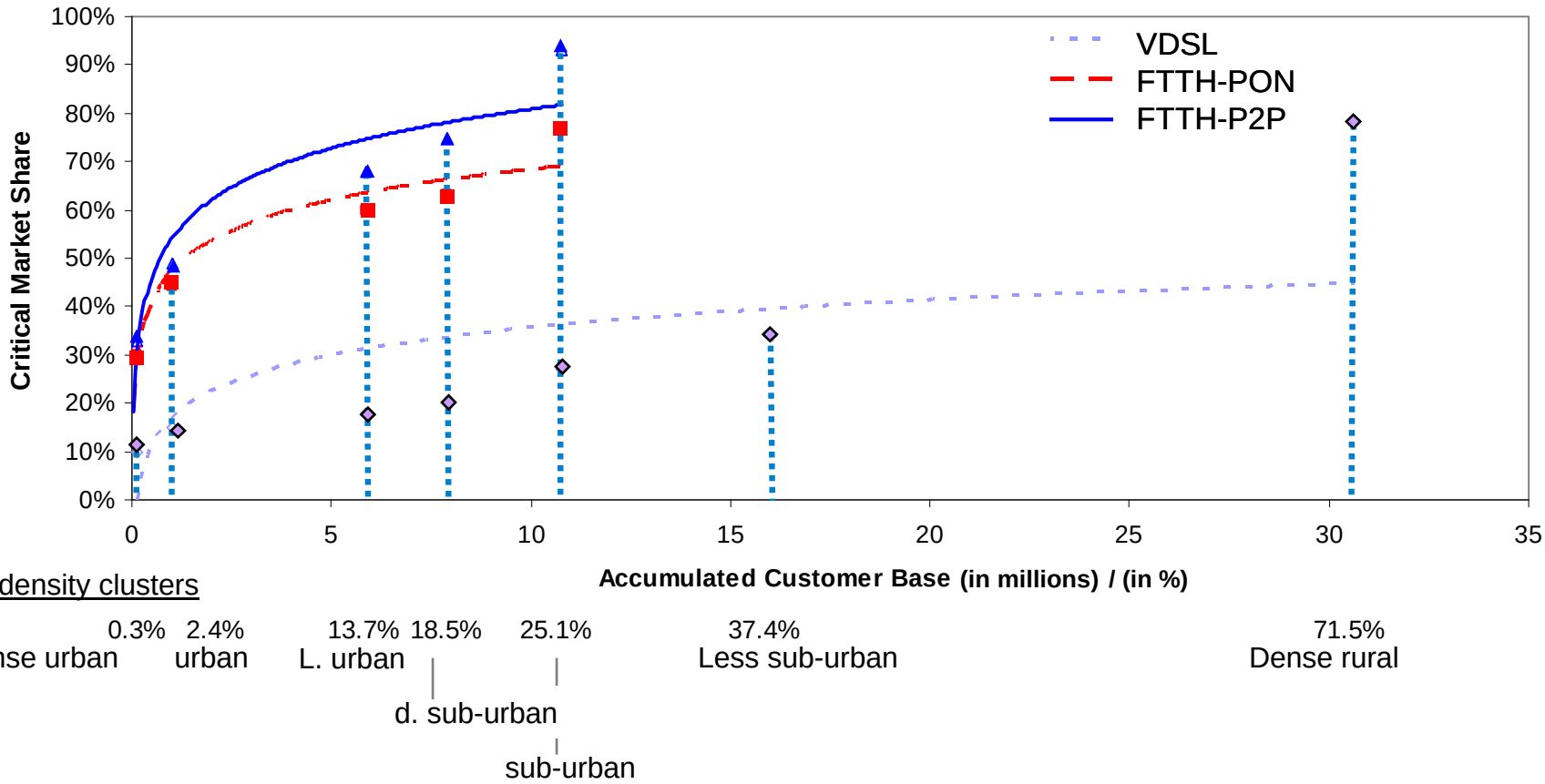
## Methodology for determining the critical market share for a given cluster of population density




Source: WIK-Consult

# Model results
## Germany: Incumbent

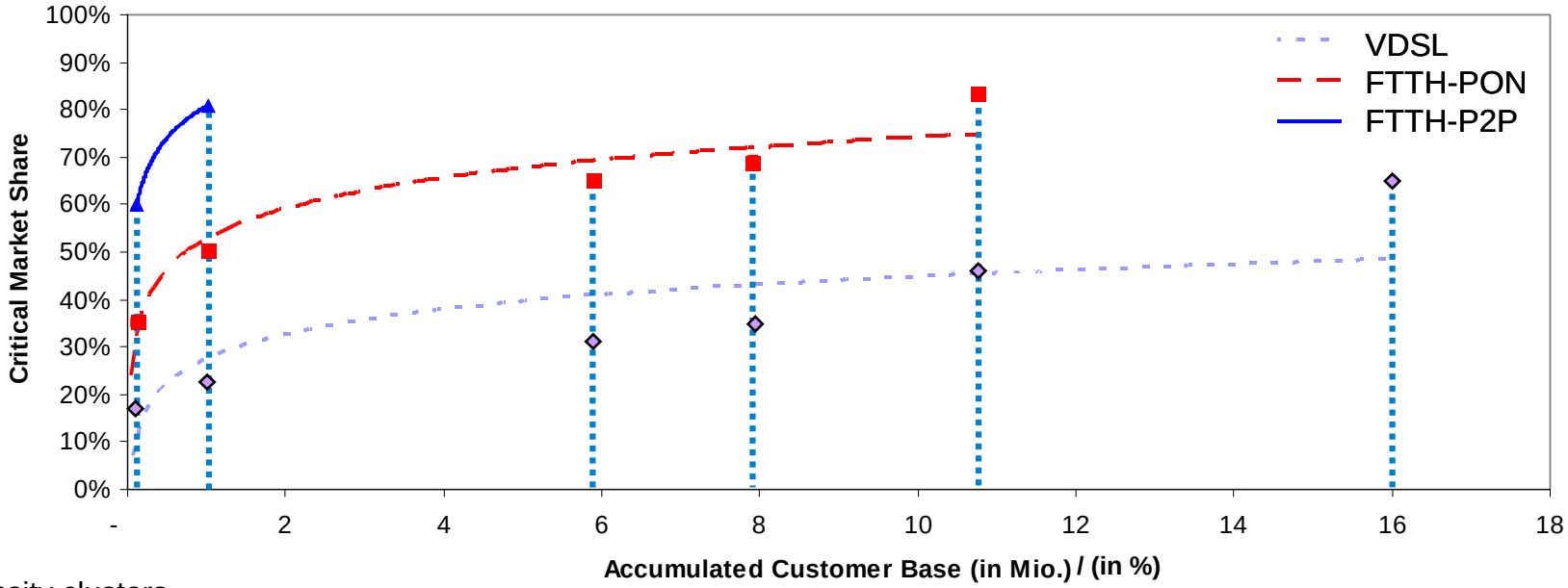
### NGA roll-out opportunities of the incumbent




Source: WIK-Consult

# Model results
## Germany: Second Mover

**2nd mover roll-out (scenario with 80% duct access)**




pop. density clusters

| dense urban | urban | L. urban | d. sub-urban | sub-urban | Less sub-urban |
|---|---|---|---|---|---|
| 0.3% | 2.4% | 13.7% | 18.5% | 25.1% | 37.4% |

**VDSL:** Even in this most beneficial regulatory scenario, replicability is only 18.5% of lines (ms: 35%)

**PON:** Replicability only 2.4% of customer base (requires 50% market share!)

**P2P:** No replicability possible

ms – market share

# Overview

- Focus of this presentation: Developments in NGN / NGA
- Analysis of international NGA deployment diversity
- Results from cost modelling of NGA economics
- Implications for market & technology trends, regulation and competition policy

# Some conclusions

- The economics of NGA vary across different technologies, network architectures and different geographic areas, depending on customer density and the cost of infrastructure deployment. These differ among countries.
- A nationwide NGA roll-out is generally not profitable. The area of NGA coverage beyond the level of profitable roll-out can only be expanded with public funding or subsidies.
- Viable NGA requires high market shares… limiting the number of players and changing the game compared to present LLU economics.
- Regulation and competition policy needs to take differences between countries/regions into account.
- Access remedies (duct access, dark fiber, fiber LLU/SLU) are required to increase the degree of replicability and enhance competition.

wik CONSULT

# Thank you for your attention!

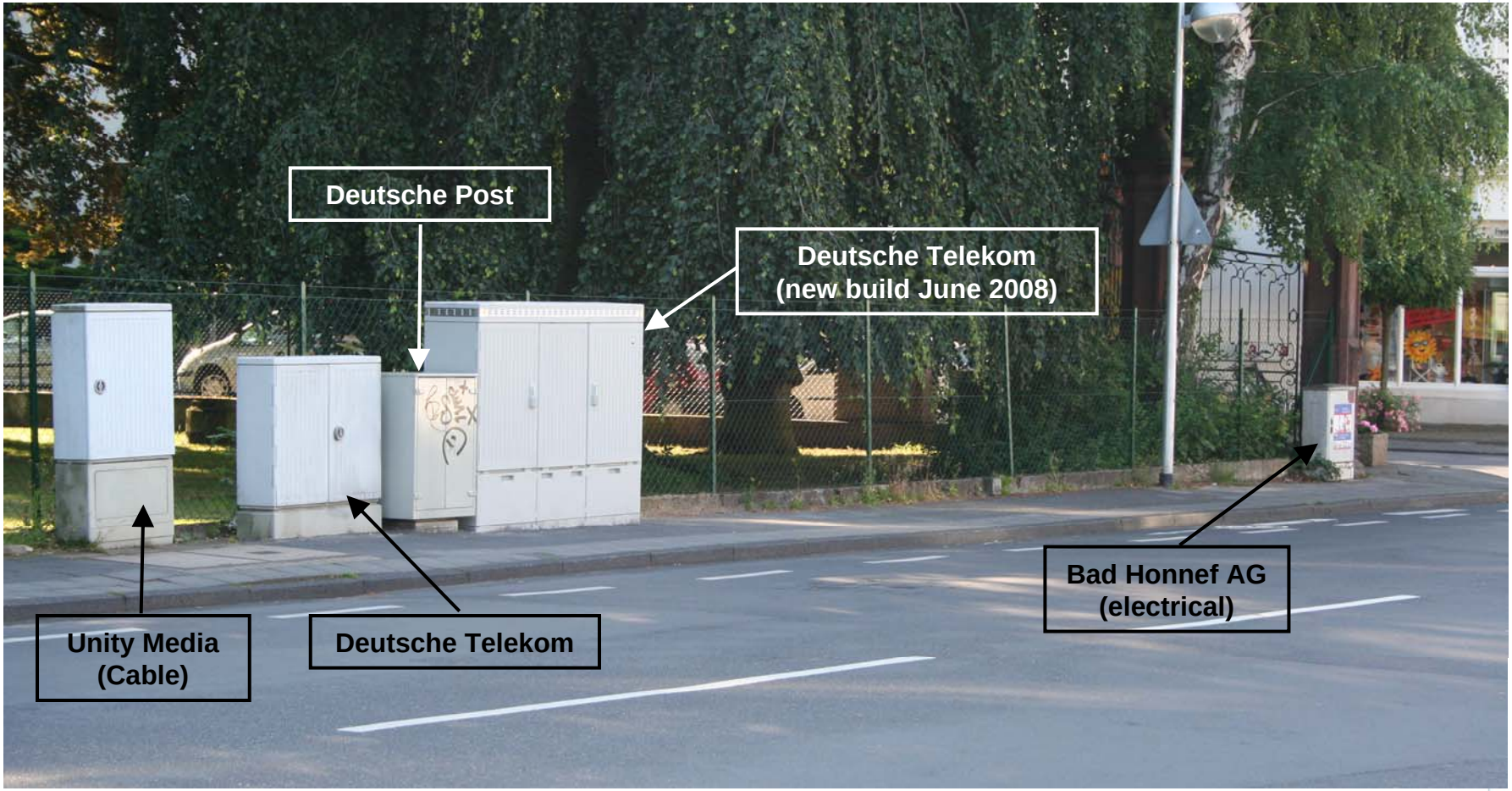
WIK-Consult GmbH
Postfach 2000
53588 Bad Honnef
Deutschland

Stephan Jay

Senior Consultant

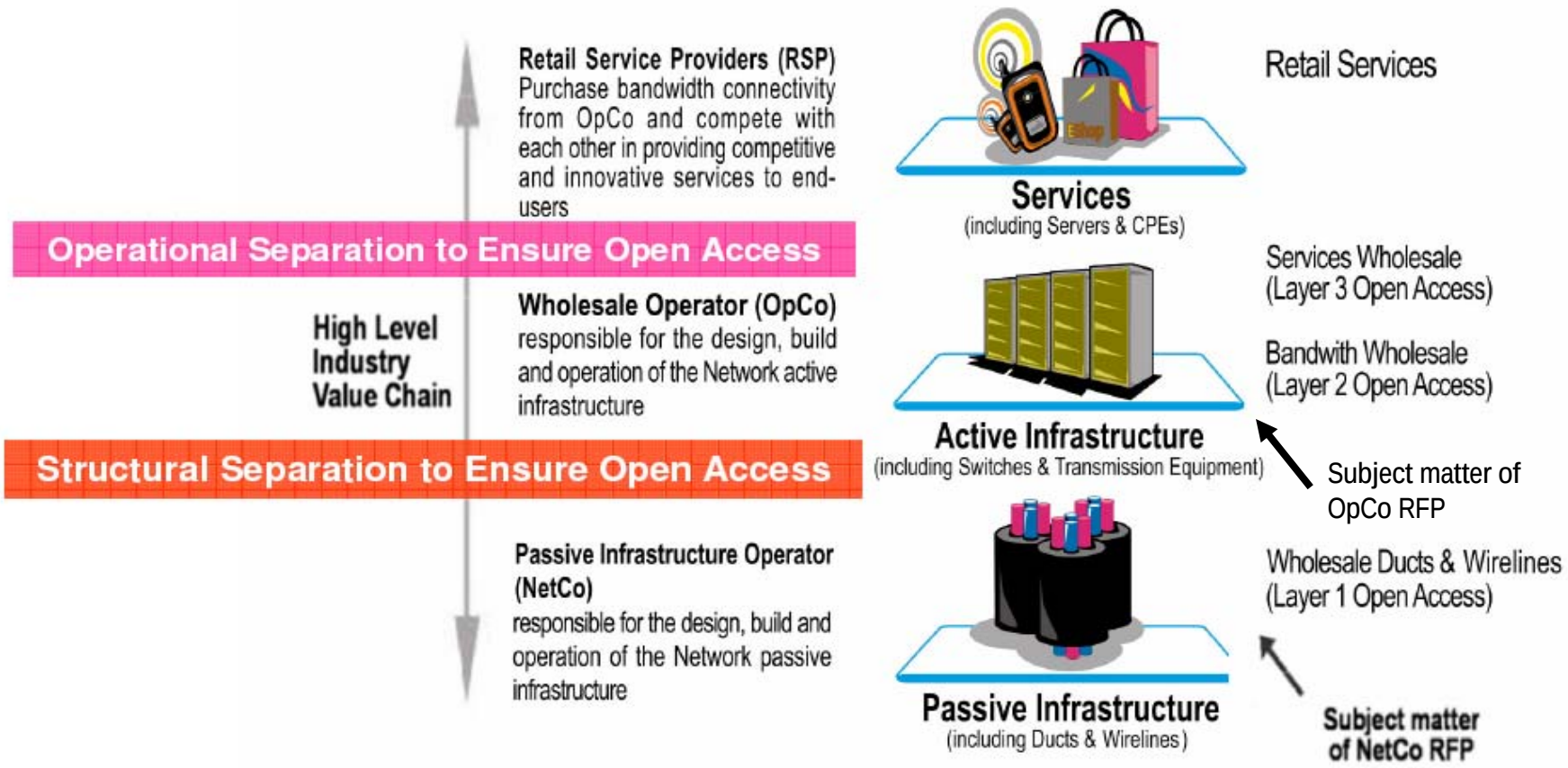
Tel +49 (0) 2224-9225-27
Fax +49 (0) 2224-9225-2227
eMail s.jay@wik-consult.com
www. wik-consult.com

# NGA: Street cabinets in Bad Honnef



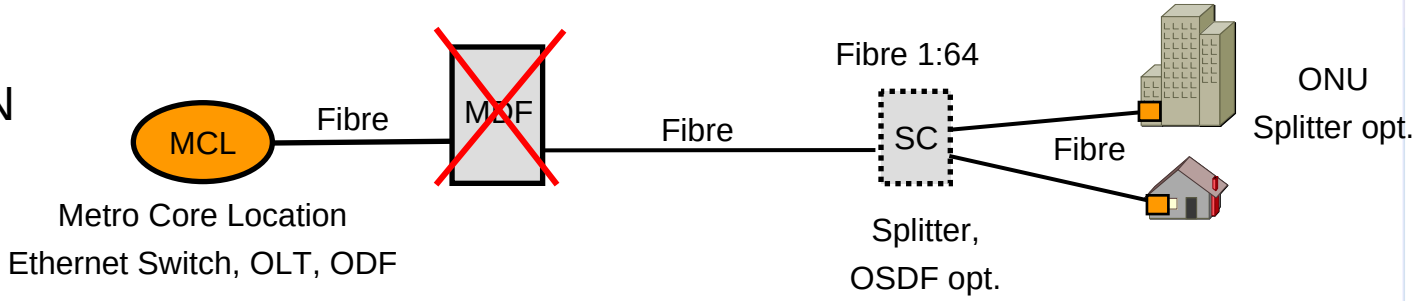

*Quelle: wik-Consult*

# Singapore: double layer of separation between retail and wholesale



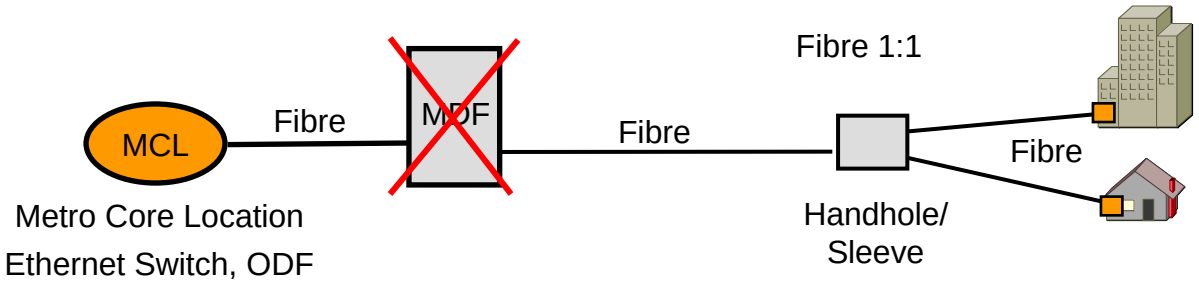
# FTTH architecture variants

- FTTH PON




Just fiber SLU possible, and only if splitter at street cabinet is accessible

- FTTH P2P




fiber LLU from Metro Core location

wik CONSULT

Active Electronic Equipment

# Country specific infrastructural parameters

| | DE | FR | IT | NL | UK | PT | ES | SWE |
|---|---|---|---|---|---|---|---|---|
| Number of MDFs | 7,900 | 12,500 | 11,300 | 1,360 | 5,580 | 2,200 | 7,600 | 8,000 |
| Number of MDFs accessed by competitors (as of September 2007) | 2,700 | 2,053 | 1,129 | 530 | 1,526 | n.a. | n.a. | n.a. |
| Number of Street Cabinets | 374,000 | 120,000 | 145,000 | 28,000 | 80,000 | 10,000 | 74,000 | 30,500 |
| Average Sub Loop Length | 300 | 750 | 400 | 1,000 | 500 | 350 | 500 | 300 |
| Number of lines | 37,300,000 | 23,810,000 | 18,797,617 | 2,683,000 | 21,774,721 | 2,852,396 | 16,552,365 | 4,745,000 |
| Lines per MDF | ~ 4722 | ~ 1905 | ~ 1664 | ~ 1973 | ~ 3902 | ~ 1297 | ~ 2178 | ~ 593 |
| Lines per Street Cabinet | ~ 100 | ~ 198 | ~ 130 | ~ 96 | ~ 272 | ~ 285 | ~ 224 | ~ 156 |

Source: WIK (2008).

wik CONSULT