



All for Broadband – Broadband for all.

Session 1: Challenges of operators especially in rural and remote areas – how to reach everyone? .

Budapest, 3rd March 2011

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Content

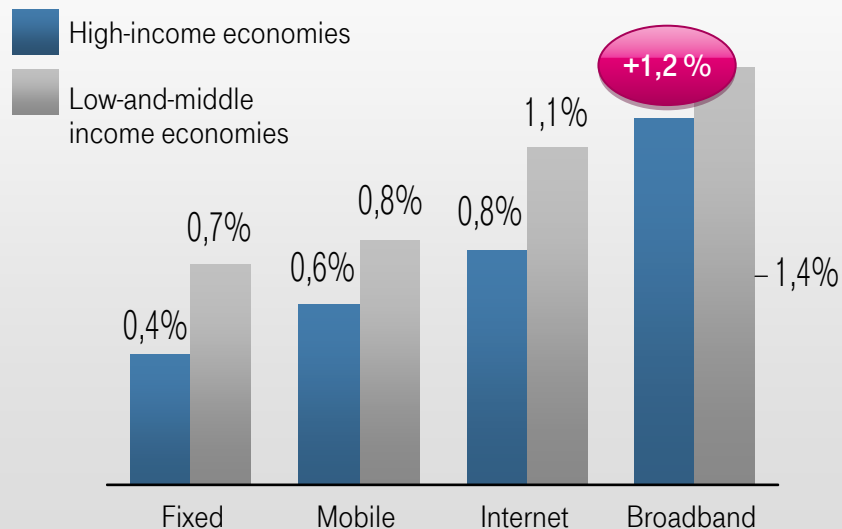
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- Importance of ICT
 - Different technologies to deliver broadband access
 - Challenges of broadband roll-out in rural and remote areas
 - A complementary mobile and fixed strategy
 - Recommendations
-



Investments in modern fixed and mobile broadband networks drive overall GDP growth and employment.

Cross-country growth effects of ICT infrastructures

“In developed countries a 10%-increase in broadband penetration leads to an additional annual GDP-growth of 1,2%”



Source: World Bank 2009.

Case study “Germany’s broadband targets 2020”

- Study of the renowned Columbia Institute for Tele-Information (CITI) by Prof. Katz
- Underlying target 2020: FTTH to 50% of households (HH), VDSL to next 30% of HH & broadband services below 50Mbps to remaining HH
- Impact on German GDP 2015-20: Additional € 171 bn. of which 20% in network construction and 80% in other sectors
- Impact on employment: 968,000 new jobs of which 56% in network construction and 44% in other sectors

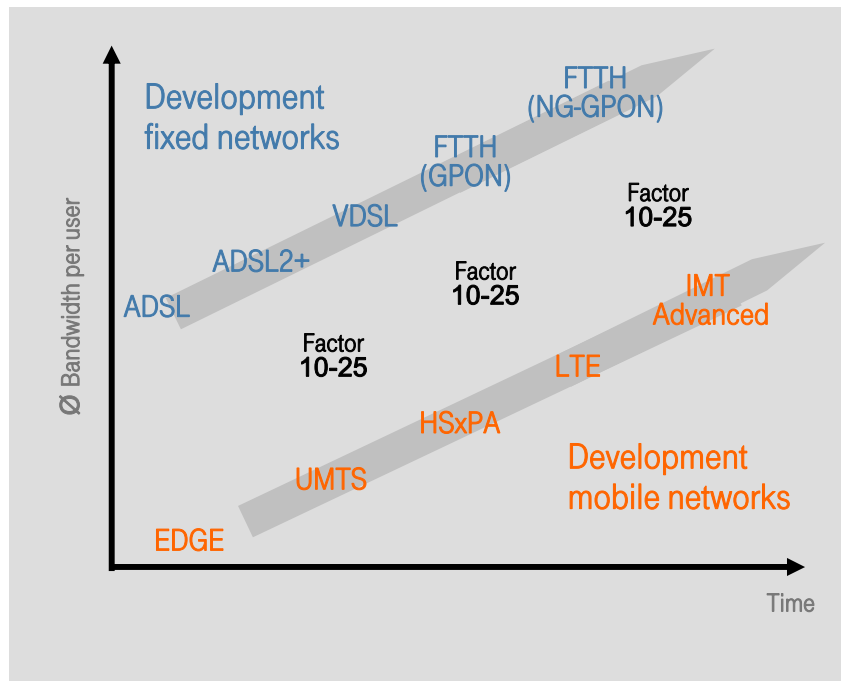
**To leverage these potentials
substantial investments into modern
fixed and mobile broadband networks needed**

Source: Katz et al. 2009.



BB access is possible via both mobile and fixed technologies. However fixed is the medium/long-term solution to achieve the 'Gigabit Society'.

Overview on broadband technologies

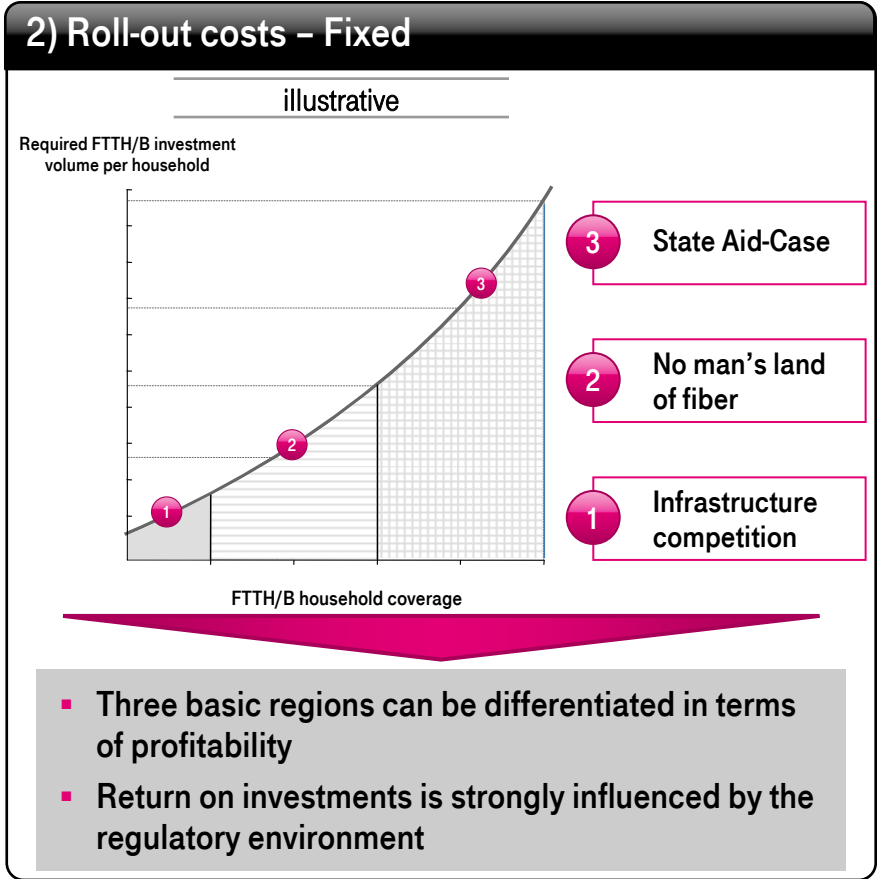
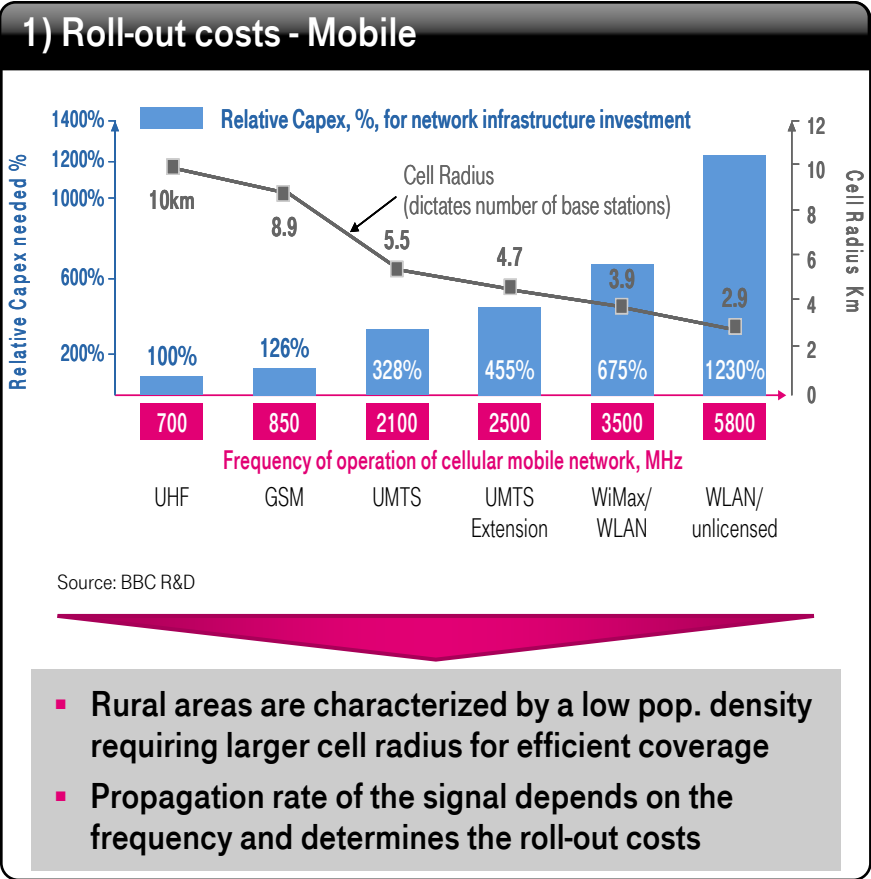


Source: Alcatel Lucent 2006 - 2007; Cisco, Global IP Traffic Forecast and Methodology, 2006-2011

Remarks

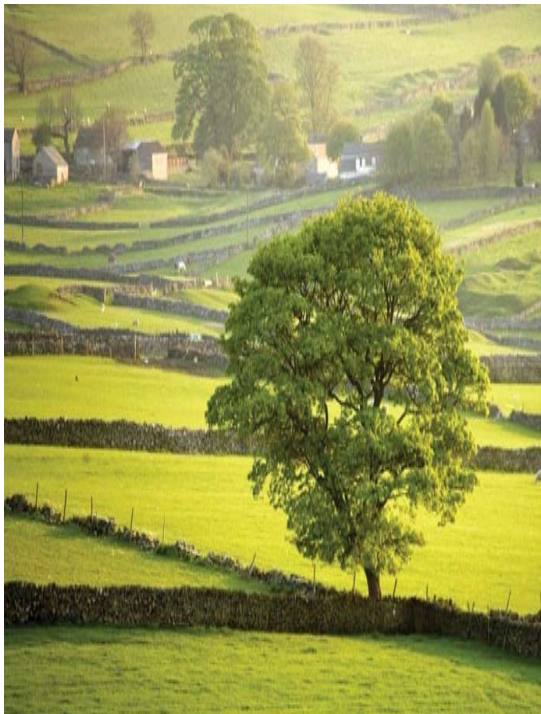
- Fixed broadband develops rapidly with FTTH of theoretically no limits for bandwidth
- Mobile broadband bandwidth is growing as well with LTE reaching similar bandwidth as current DSL
- Thus, LTE is sufficient for most of today's services, although the medium (spectrum) is shared
- However, fixed infrastructure is required for the 'Gigabit Society' as bandwidth demands will certainly increase

Challenges to reach remote areas arise from significant higher roll-out costs for both mobile and fixed.



Given certain conditions, mobile BB will help to cover white spots short term, while fixed BB can only be achieved medium/long-term.

Complementary mobile & fixed broadband strategy for rural and remote areas



1

Short term



- Cover remote areas with mobile broadband
- LTE technology using digital dividend

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Medium to long term



- Fixed broadband roll-out based on FTTx
- However, certain requirements need to be fulfilled

Fast availability and deployment of the digital dividend is key for allowing short-term white spot coverage.

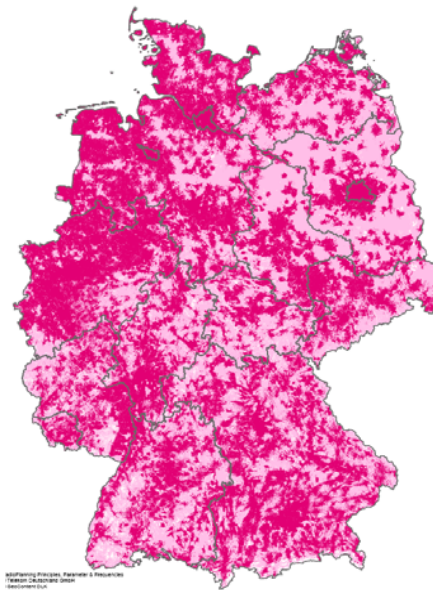
The example of the German spectrum auction in 2010 and expected coverage

	800	1800	2100	2600	TDD
	2x10	2x15	-	2x20	1x5
	2x10	-	2x5	2x20	1x25
	2x10	-	2x5	2x20	1x29
e-plus+		2x10	2x10	2x10	1x10

'Digital Dividend'

- 2x30 MHz have been assigned in an auction in 2010
- 2x10 MHz per operator as minimum for efficient usage
- Obligations guaranteed fast white spot coverage

Deutsche Telekom's German roll-out plans until end of 2012



LTE 800

LTE 2600*

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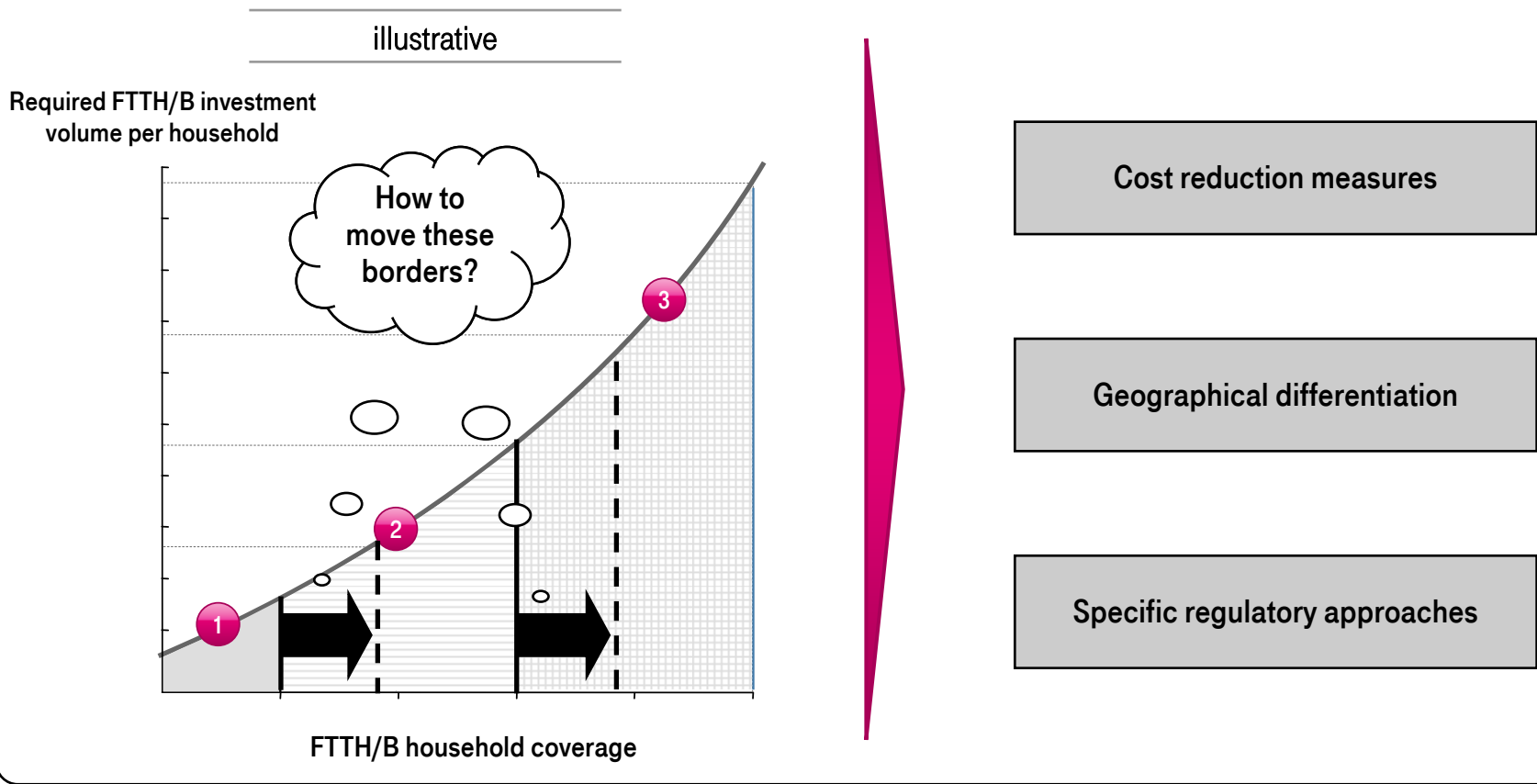
Country-wide 5-10 MBit/s possible when deploying LTE on the 'Digital Dividend'



*among other, including as well UMTS/HSPA

Medium to long-term, coverage of remote areas with high-speed fixed infrastructure has to deal with several issues.

Key issues for fixed broadband infrastructure in rural and remote areas



The Hungarian broadband market as a typical example for Central Eastern and Southern Europe shows several challenges in both fixed and mobile.

Key characteristics of the Hungarian broadband market



- Aggressive infrastructure competition
- Strong mobile broadband uptake / substitution impact
- DSL losing ground
- Cable becomes the leader in fixed broadband
- Nominal price decrease on broadband market
- TV is the main driver

Challenges

- **Mobile**
 - Rapid growth of traffic
 - More frequencies needed
 - Long process of building permissions
 - Quality requirements
 - Roll-out in rural areas
- **Fixed**
 - Diverse competitive situation
 - NGA deployment needed
 - Market fragmentation
 - Asymmetric regulation



For Central Eastern and Southern Europe, several actions are necessary to allow broadband for all.

