Broadband Study 2018

Market survey among BREKO members

For the BREKO Broadband Study 2017, all BREKO network operators were interviewed (nationwide). The study comprises data from around 90% of all BREKO network operators. In addition, data from publicly available sources was used for verification and determination of total market figures. The research of the market data and the analysis of the survey results were carried out by BREKO in cooperation with the consultancy Böcker Ziemen Management Consultants GmbH & Co. KG.

Overview

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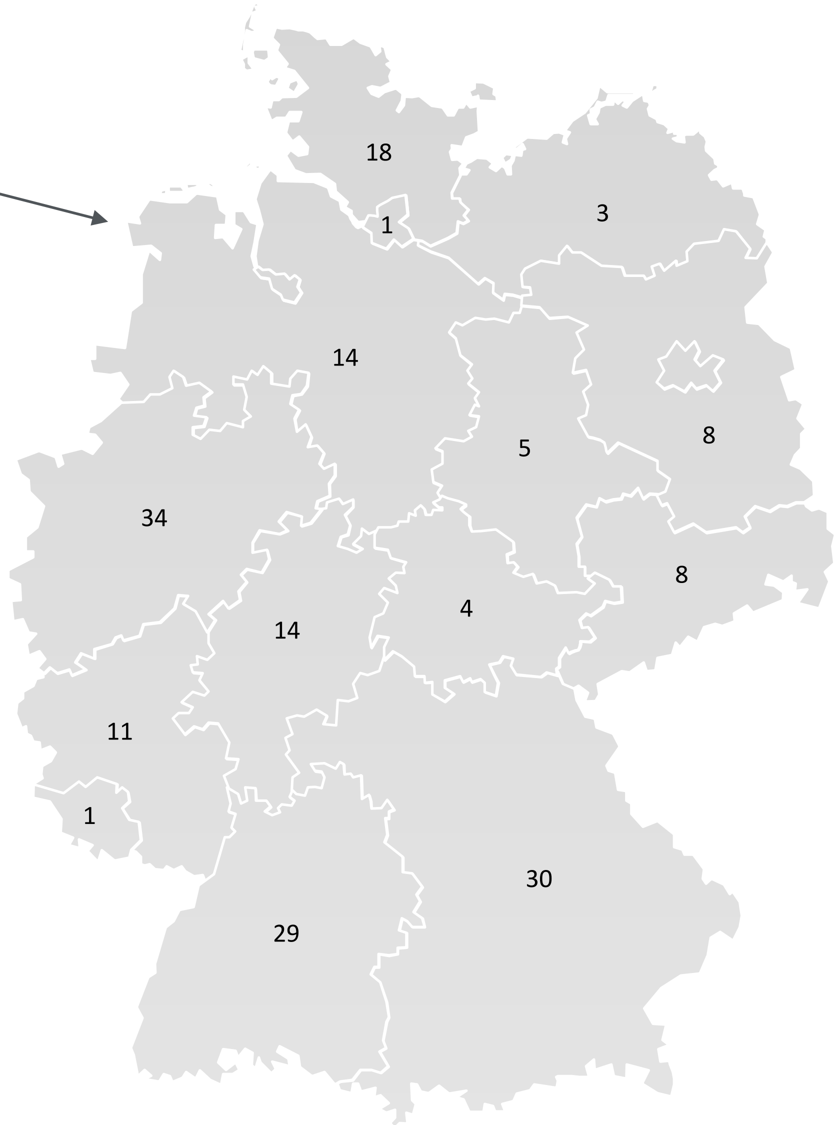
BREKO network operators

BREKO's 180 network operators are the drivers of fibre deployment

180 network operators throughout Germany



BREKO unites **more than 80 %** of broadband network operators in Germany

About **56 % of FTTB/H deployment** by BREKO-network operators

Turnover in 2017: **€ 7.9 billion**, expected in 2018: € 8.35 billion

Investments in 2017: **€ 2.1 billion**, expected in 2018: € 2.2 billion

Broadband connections: 8 million, thereof **931,000 FTTB/H**

Evolution of data volume

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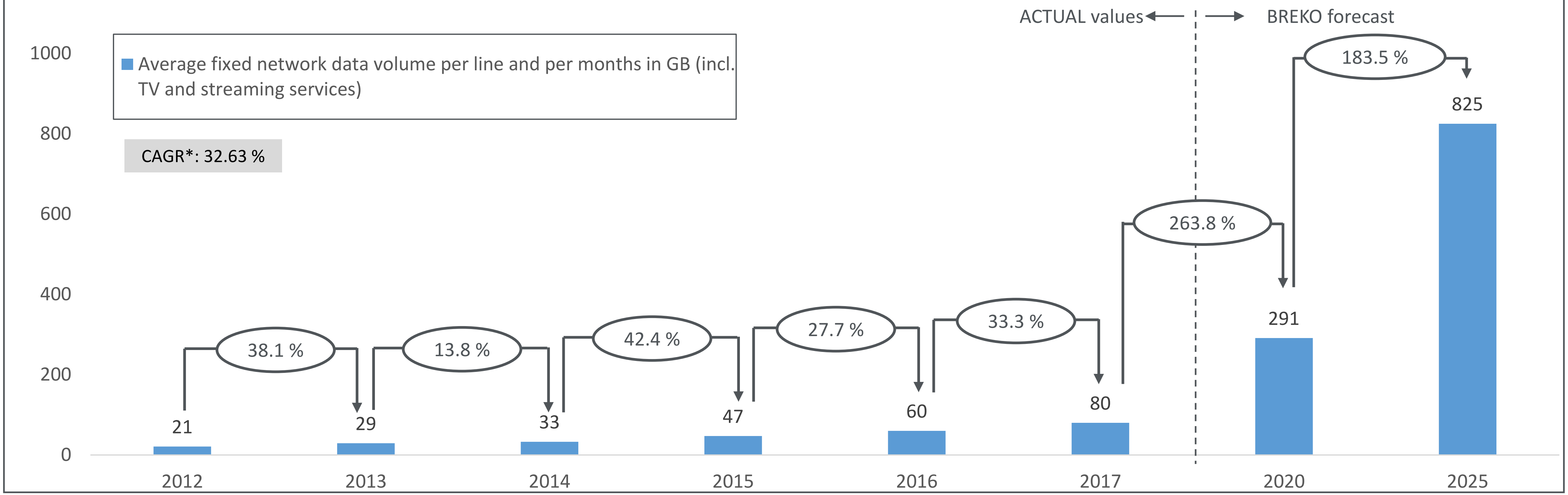
A strong increase in data volume is expected in the fixed network.

Additional note: **95%** of tablet and **70%** of smartphone internet use takes place in **Wi-Fi** networks. (Source: Deloitte)

Average fixed network data volume per line and per month in GB over time



Source: Federal Network Agency Annual Report 2016, p. 53, Annual Report 2017, p. 53.59; Deloitte: Global Mobile Consumer Survey 2015, p. 17.

*Compound Annual Growth Rate: Average percentage growth over the years.

Expected broadband demand

According to a forecast by BREKO members, the demand for broadband will accelerate until 2020/2025. The Upload section in particular is gaining significance.

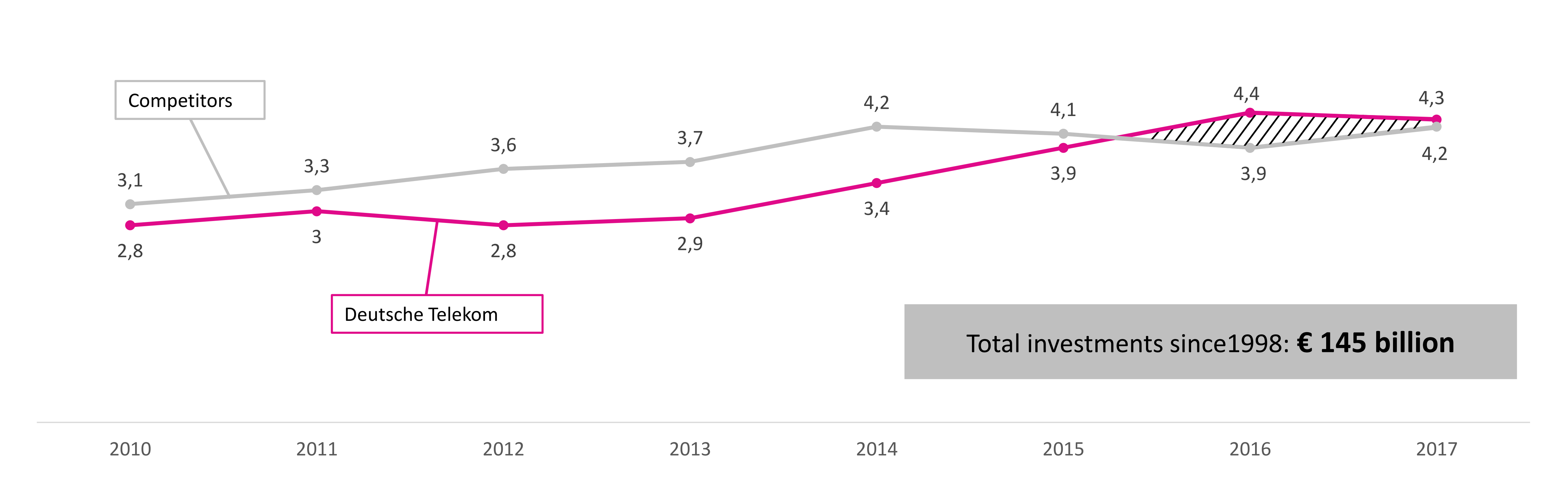
Years / Data transfer	Forecast 2020	Forecast 2025	Forecast 2020	Forecast 2025
	Figures from the survey of BREKO network operators in 2017		Figures from the survey of BREKO network operators in 2018	
Upload in Mbps	100	350	200	700
Download in Mbps	200	600	400	1000

Source: BREKO Research (n=50).

Total investments in fixed assets

Equal distribution of investments between Deutsche Telekom and its competitors in 2017. The impact of the vectoring decision in 2016 is clearly visible.

Investments in fixed assets in the telecoms market over time in € billion



Source: Federal Network Agency Annual Report end 2017, pp. 48-49.

Investment rates

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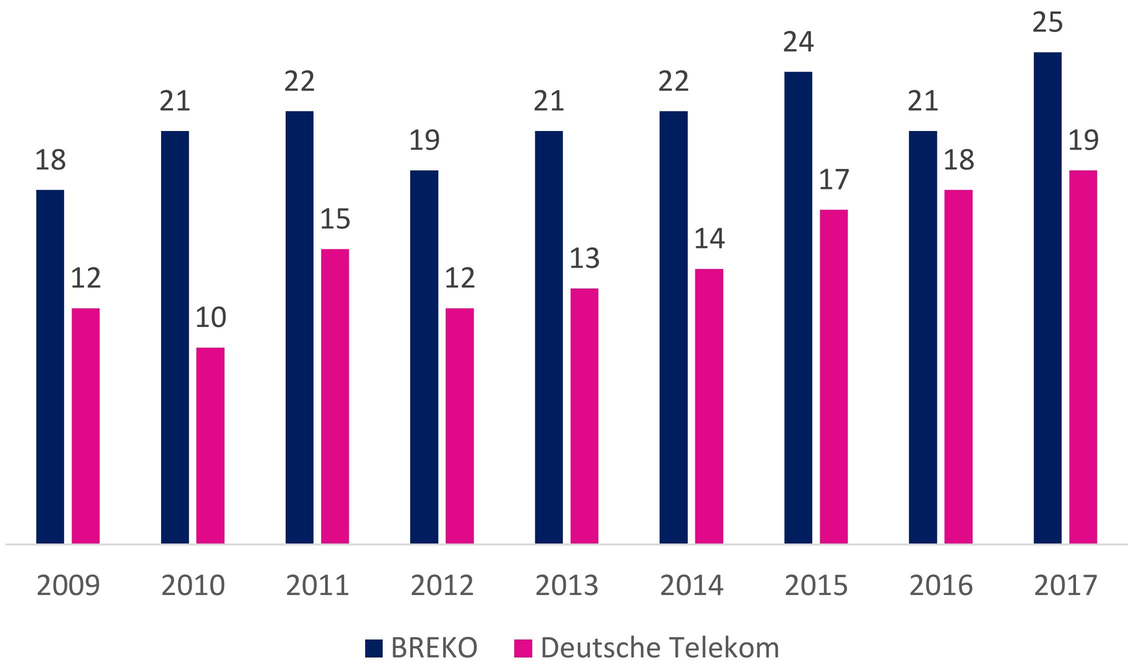
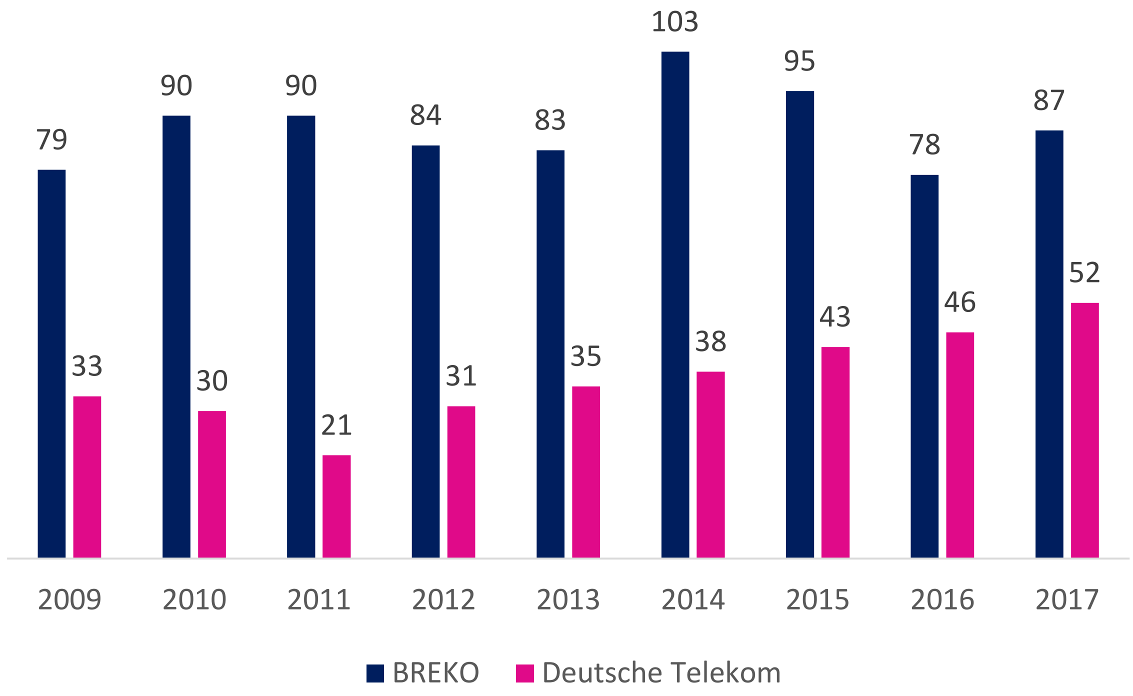
High willingness of BREKO network operators to invest compared to Deutsche Telekom. Overall increasing investment rates since 2009.

Share of investments in* turnover *in % over time



Share of investments in* EBITDA *in % over time

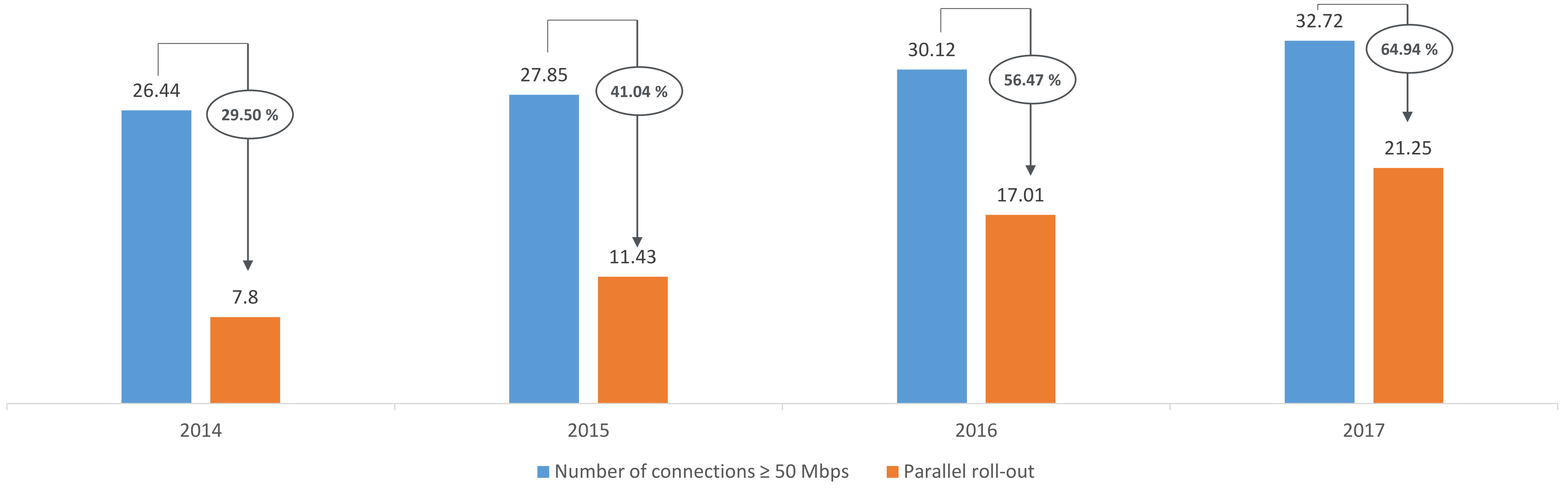


Source: BREKO Research (n= 172-175); Deutsche Telekom Annual Report 2017, pp. 61-62.

Parallel roll-out

More than two-thirds of the investments in 2015, 2016 and 2017 did not contribute to the Governments broadband targets but have led to parallel roll-out. Vectoring decision apparent since 2016.

Households with connection bandwidths (fixed) in million ≥ 50 Mbps over time



Source: BMVI report on the Broadband Atlas at the end of 2017, pp. 20-22.

Available connections by bit-rate

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Share of high bit-rate connections is increasing. BREKO network operators account for the highest share of these connections.

Bitrate / Years	2013 (All network operators)	2014 (All network operators)	2015 (All network operators)	2016 (All network operators)	2017 (All network operators)	2017 (All network operators)
< 10 Mbps	44%	43%	29%	21%	-1,4 Mio.* 16%	13%
10-30 Mbps	40%	36%	42%	43%	-0,8 Mio.* 39%	34%
30-100 Mbps	13%	16%	21%	25%	+2,1 Mio.* 30%	24%
> 100 Mbps	3%	5%	8%	11%	+1,3 Mio.* 15%	29%

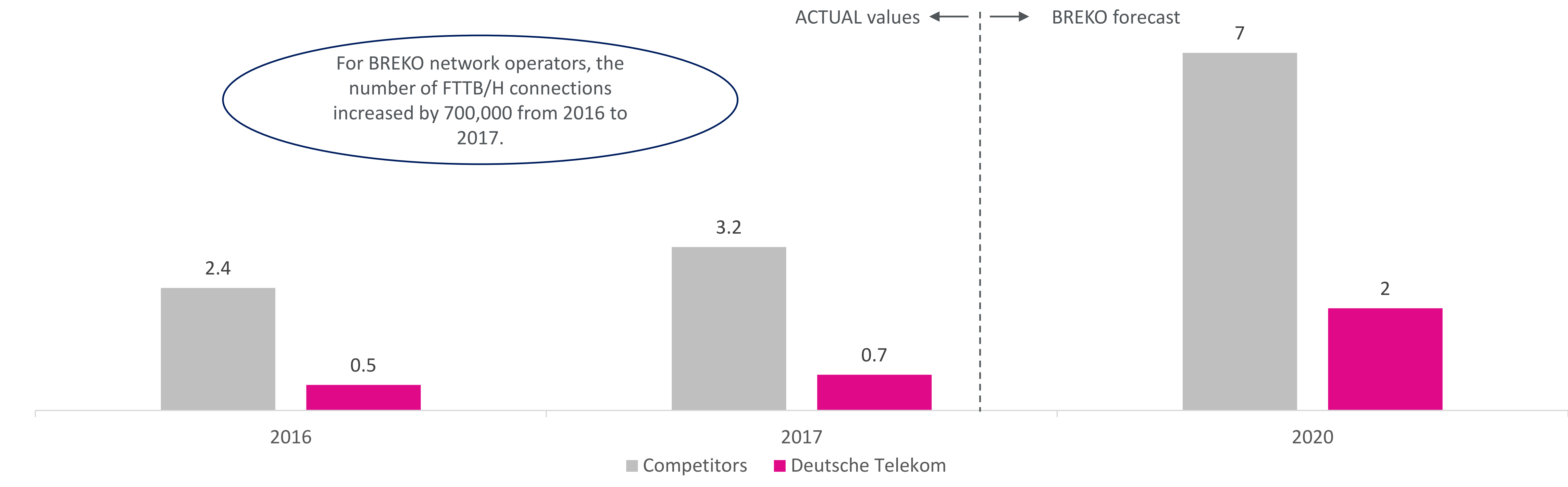
Source: BREKO Research (n= 110-119); Federal Network Agency Annual Report end 2016, pp. 52-53 and Annual Report end 2017, pp. 50-51.

*Im Vergleich zu 2016

Available FTTB/H connections

The number of available FTTB/H connections is increasing. Approximately 82% of FTTB/H connections are provided by alternative network operators.

Number of available FTTB/H connections in million over time: Alternative network operators vs. Deutsche Telekom



Source: BREKO Research (n= 123); Presentation by Johannes Pruchnow (at the time Board Member for Broadband Communications at Deutsche Telekom) at the BREKO Fibre Fair in March 2018.

Available broadband connections by region

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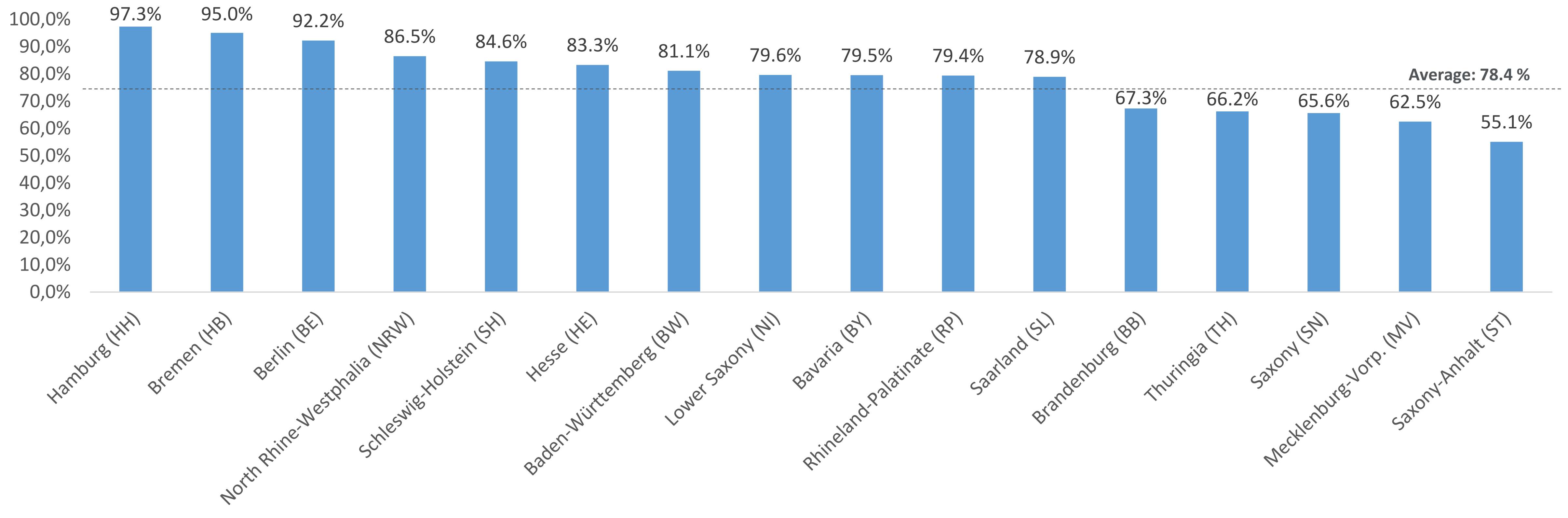
Substantial differences in broadband availability between federal states.

Broadband availability (≥ 50 Mbps) by federal state for households in 2017 in % (fixed-line).



Source: Report on the Broadband Atlas mid-2017, pp. 10-18.

Federal funding programme by region (1/2)

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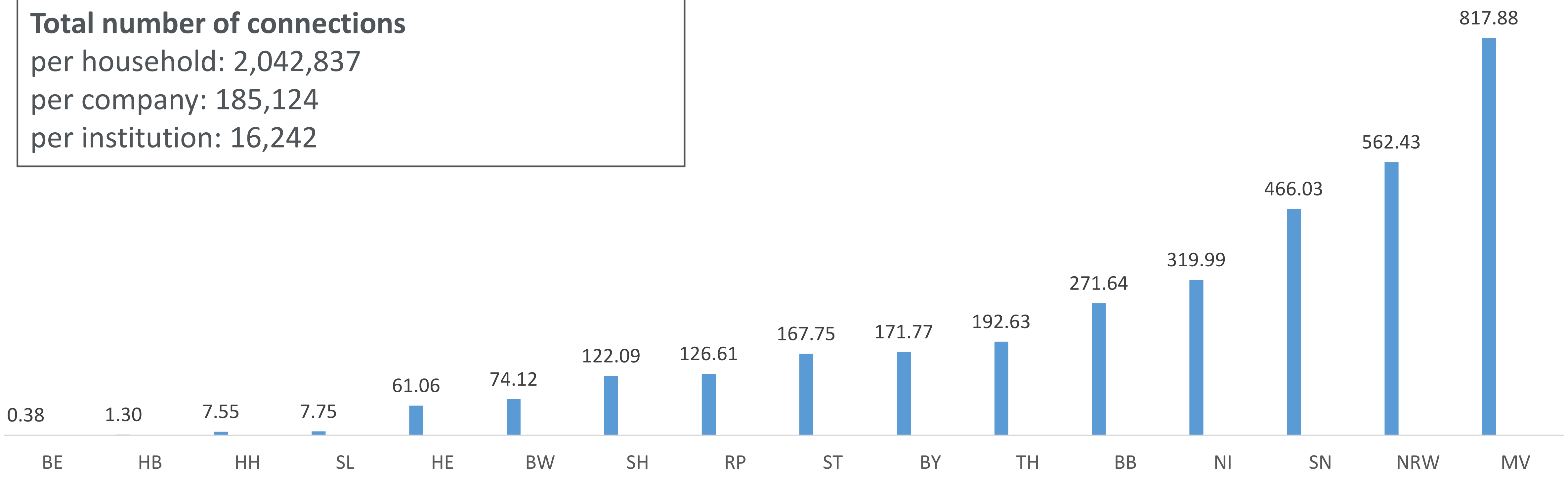
Broadband deployment projects of the federal broadband funding programme. Large differences between the individual federal states are clearly visible.

Federal funding in € million per federal state

Total number of connections
per household: 2,042,837
per company: 185,124
per institution: 16,242

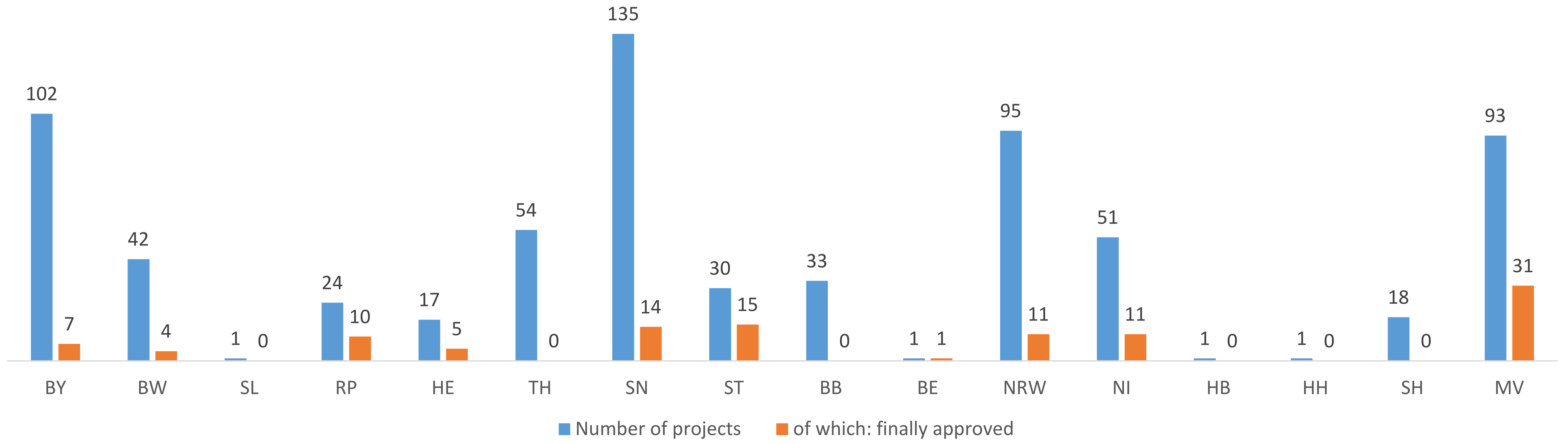


Source: BREKO Research.

Federal funding programme by region (2/2)

Compared to the number of launched broadband projects, the amount of awarded funding is too low.

Proposed and approved projects



Source: BREKO Research.

Available FTTB/H connections: European comparison

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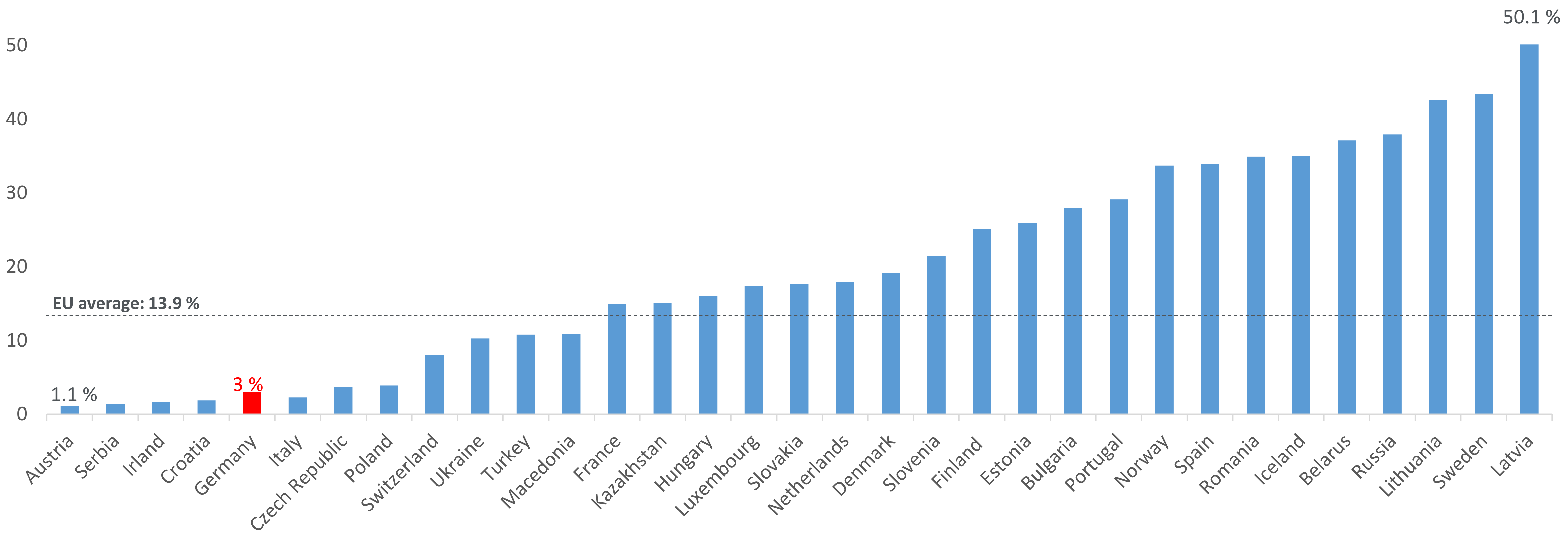
A comparison across the EU shows that Germany needs to catch up

Share of households with FTTB/H connections in % per EU country



Source: FTTH Council Europe. The 3% figure for Germany is based on BREKO Research.

Available broadband connections by technology

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The largest share of households with ≥ 50 Mbps is connected via CATV. Strong growth in vectoring technology.

Technology \ Years	2014	2015	2016	2017
CATV	61.6%	63.3%	63.4%	63.9%
VDSL/DSL	17.1%	26.5%	44.9%	59.7%
FTTB/H	4.4%	6.7%	7.5%	9.0%*

Source: BMVI Report on the Broadband Atlas 2014-2016, p.7, Report on the Broadband Atlas 2017, p.7,22; *value based on BREKO estimates (deviation from primary source).

The BREKO Broadband Study shows:

Build tomorrow's infrastructure today, as the demand is already increasing.

- Demand for broadband is increasing rapidly.
- Fibre deployment is indispensable.
- Fibre deployment is mainly driven by alternative network operators.
- Federal funding is necessary but is not being used to a sufficient degree.
- Bad investments as a result of parallel roll-out are apparent.
- **Recommendation:** Cooperation prevents parallel roll-out and accelerates nationwide fibre deployment in Germany.