Countrywide Broadband - Parameters for Success

(Landesweit Breitband - Parameter für Erfolg)

8th FTTH Conference 2012, FTTH Council Europe, ‚Deutscher Workshop', Munich, 14. - 16. Febr. 2012

Some Results of the research project

„Implikationen eines flächendeckenden Glasfaserausbaus und sein Subventionsbedarf"

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14. February 2012

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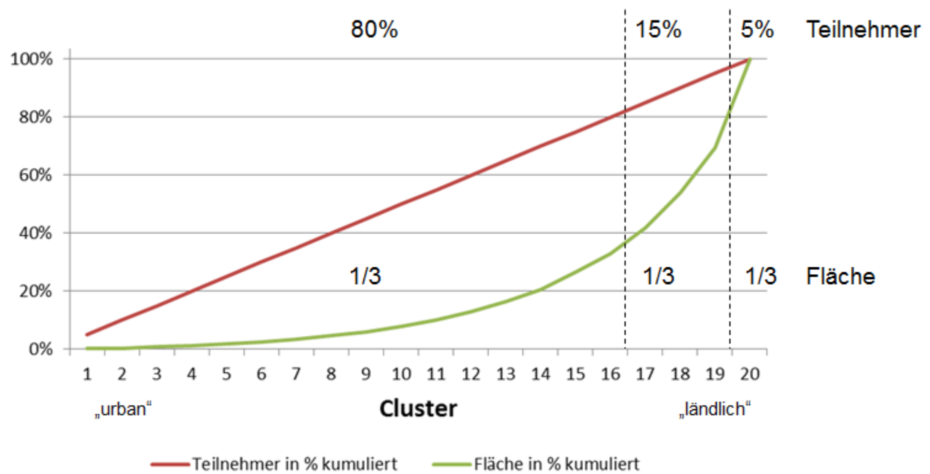
Content

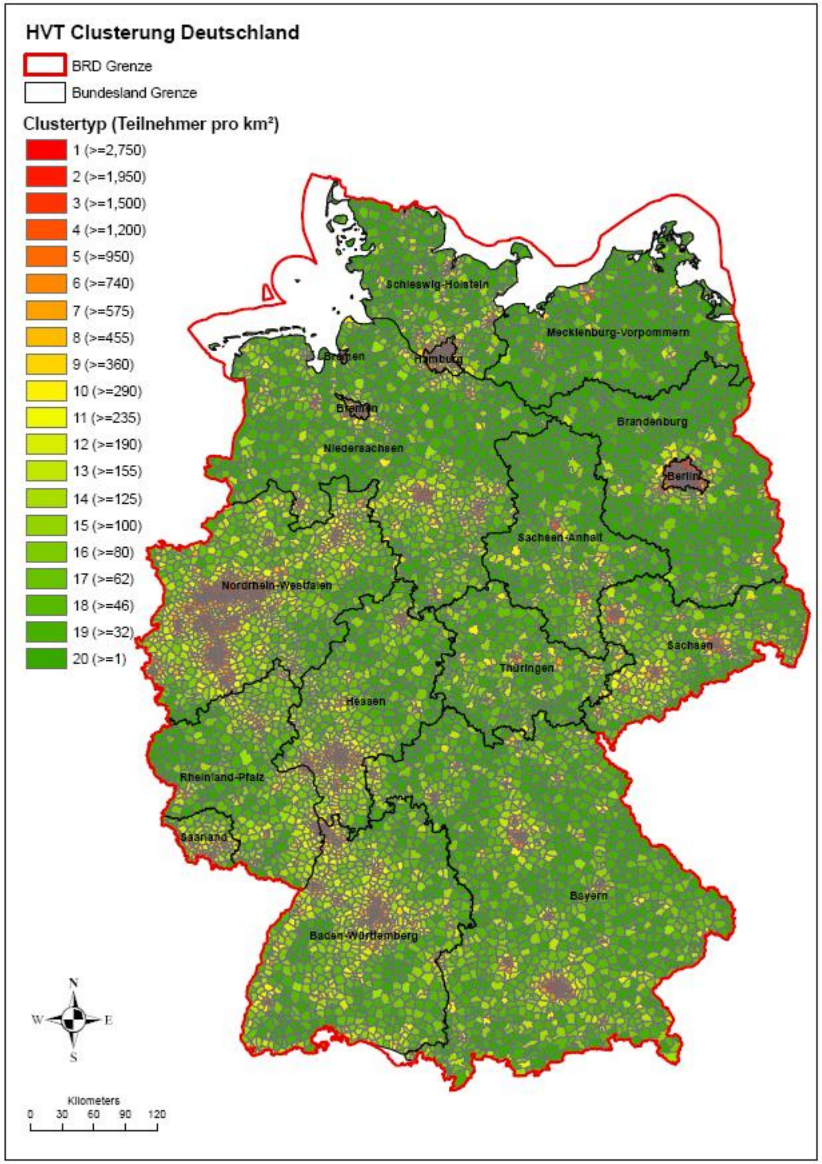
- **Approach**
- Results
- Summary and conclusions

MDF areas ranked according to customer density
20 Cluster of 5% subscribers each

~ 2 Mio. potential subscribers per cluster

Fläche und Teilnehmer je Cluster in kumulierten Prozent

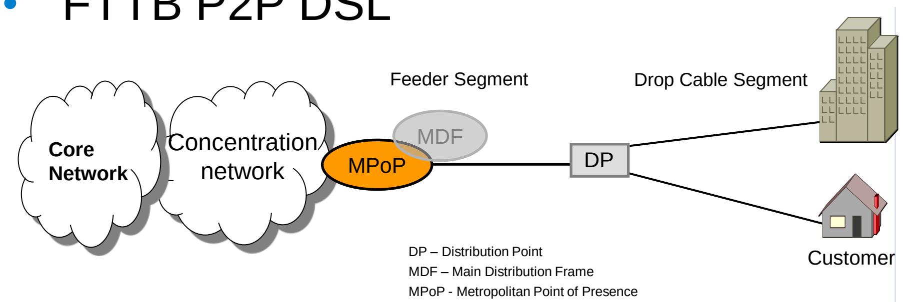




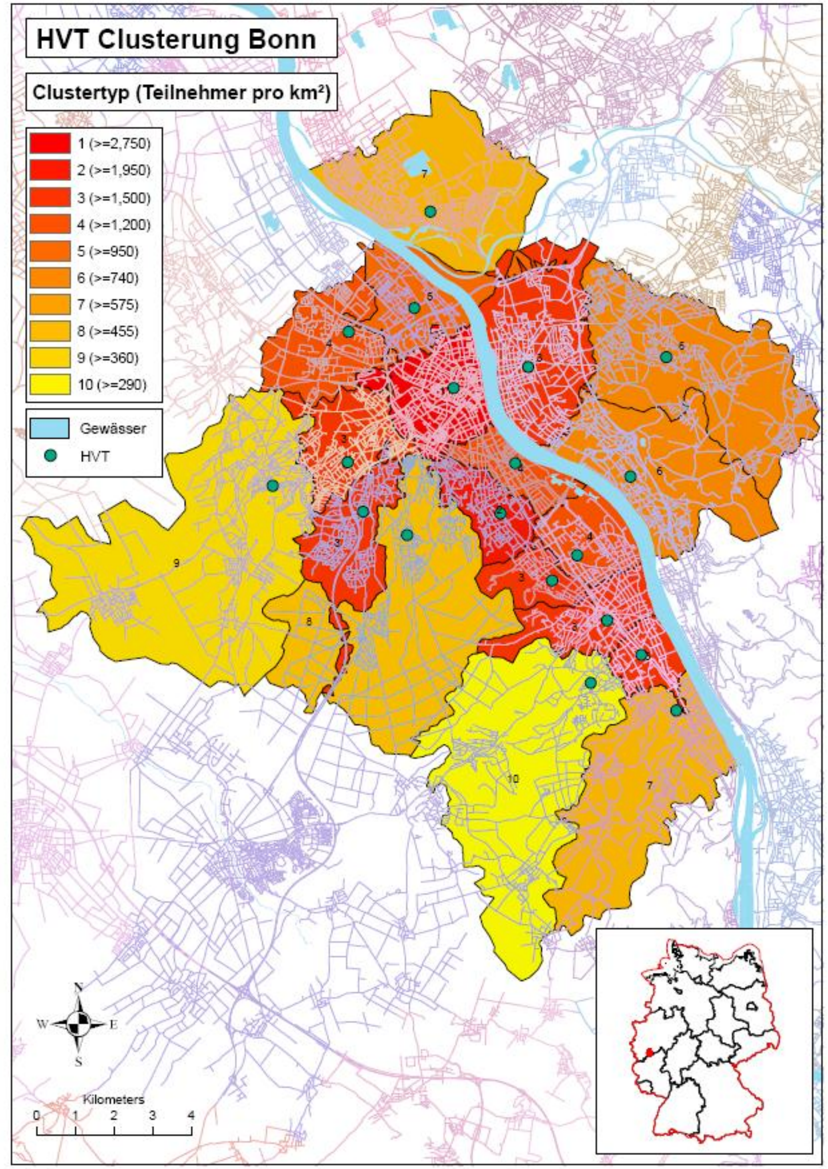
Calculation of 4 NGA architectures with detailed data of all regions in Germany

Architectures

- PMP GPON
- P2P Ethernet
- P2P GPON
- FTTB P2P DSL



- Streets
- Buildings
- Business and residential customers



Important assumptions

- Maximum penetration
- 100% homes passed
- Mix of ducted/ aerial cables
- All cost considered (OPEX, common, access, concentration, core)

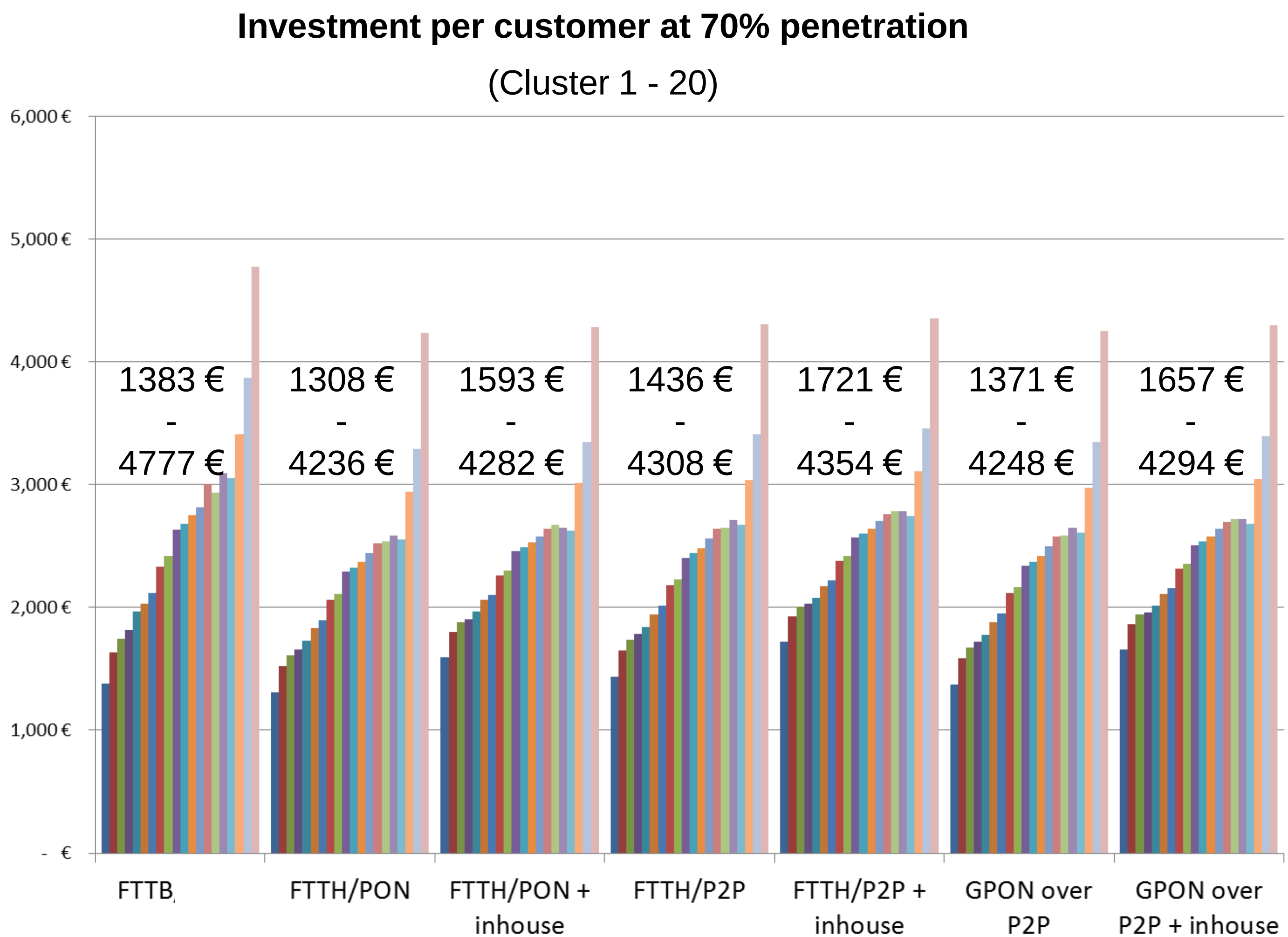
- Steady state approach
- No opportunity cost
- Inhouse cabling selectable

ARPU

	Price per month (in €)	Busy hour traffic (in kbps)	customer share
Telefone	17	20	10%
Telefone & Internet	30	380	45%
Telefone, Internet und IPTV	40	425	35%
Busines customer	88	600	10%
Average customer	**38**	**382**	

Invest per customer connected:
Invest spreads between dense and sparse clusters by factors 3-4

Cluster 1: - Cluster 20:



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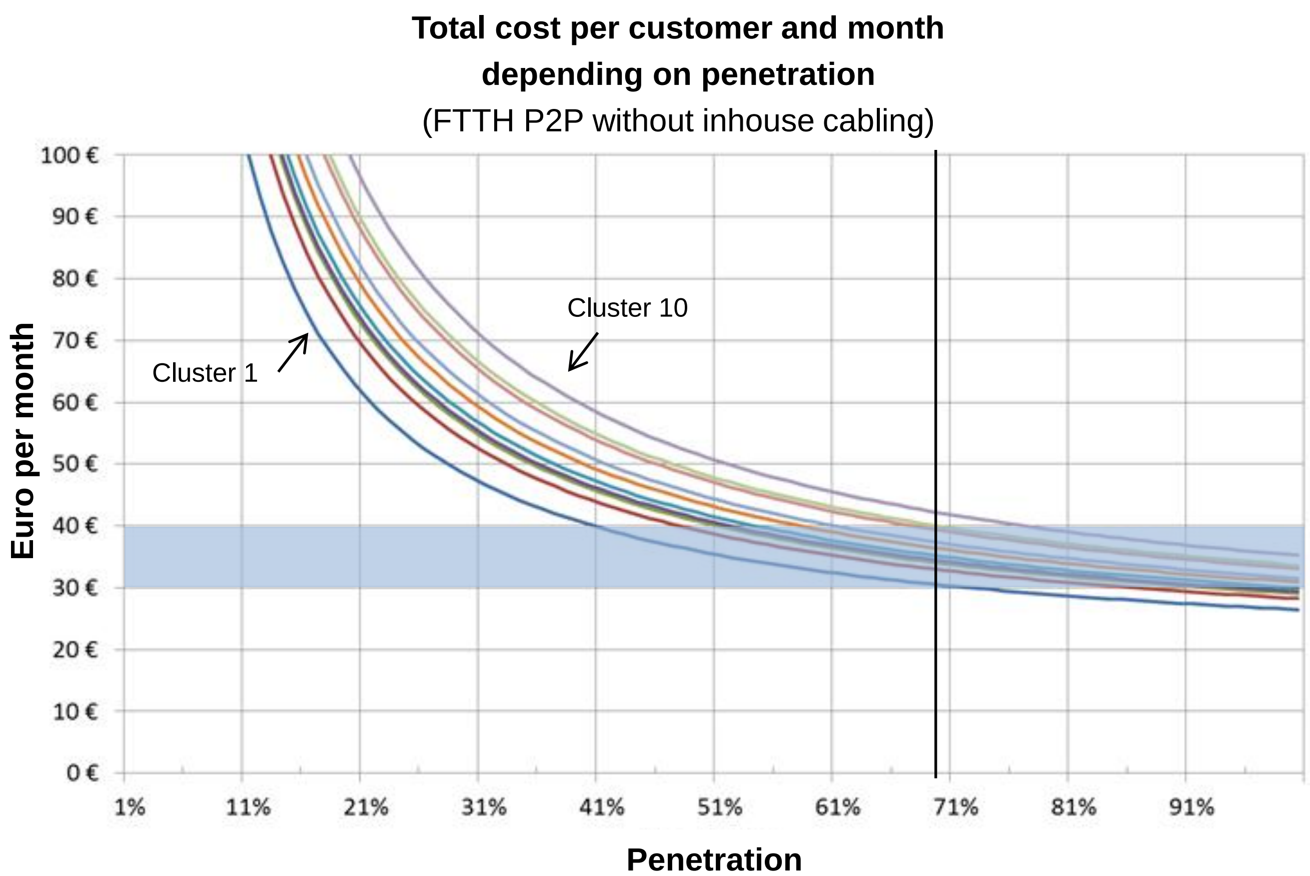
Critical penetration rate depends on ARPU

example: FTTH/P2P without inhouse cabling, clusters 1-10



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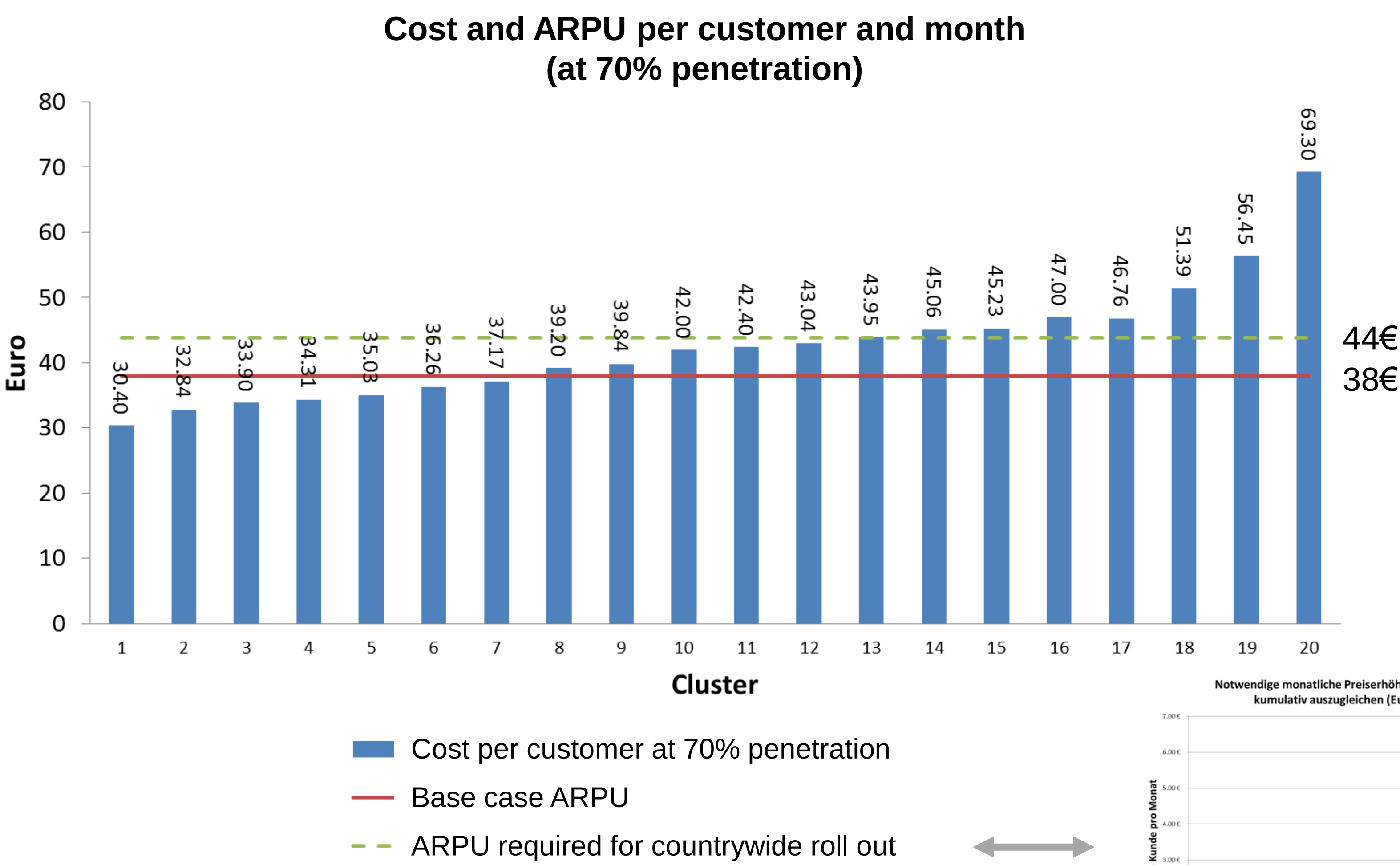
Base case result
How to improve situation

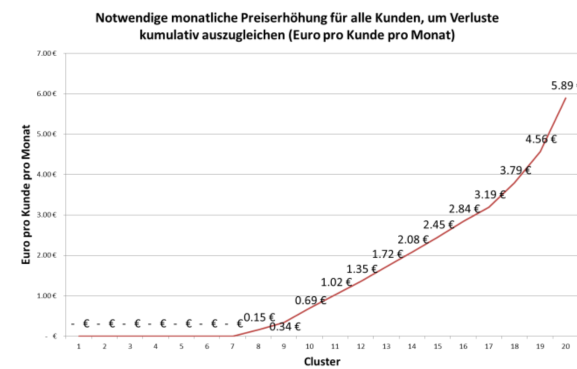
- Profitable rollout for 25 - 45% of access lines in Germany
- Profitable coverage strongly depend on hight of ARPU and customer penetration rate
- Ramp up cost make situation worse
- National invest between 70 and 80 Bn. €
- Passive fibre network has 80-90% share of total invest

- Reduce cost (e.g. by using existing facilities …)
- Improve penetration (wholesale open access, …)
- **Increase ARPU**
- **One time subsidy**
- **Cross subsidies between clusters**

Which ARPU-increase required?

Either customers pay cost oriented prices per cluster of 30 € - 70 €, or all customers pay additionally ~ 6 € per month





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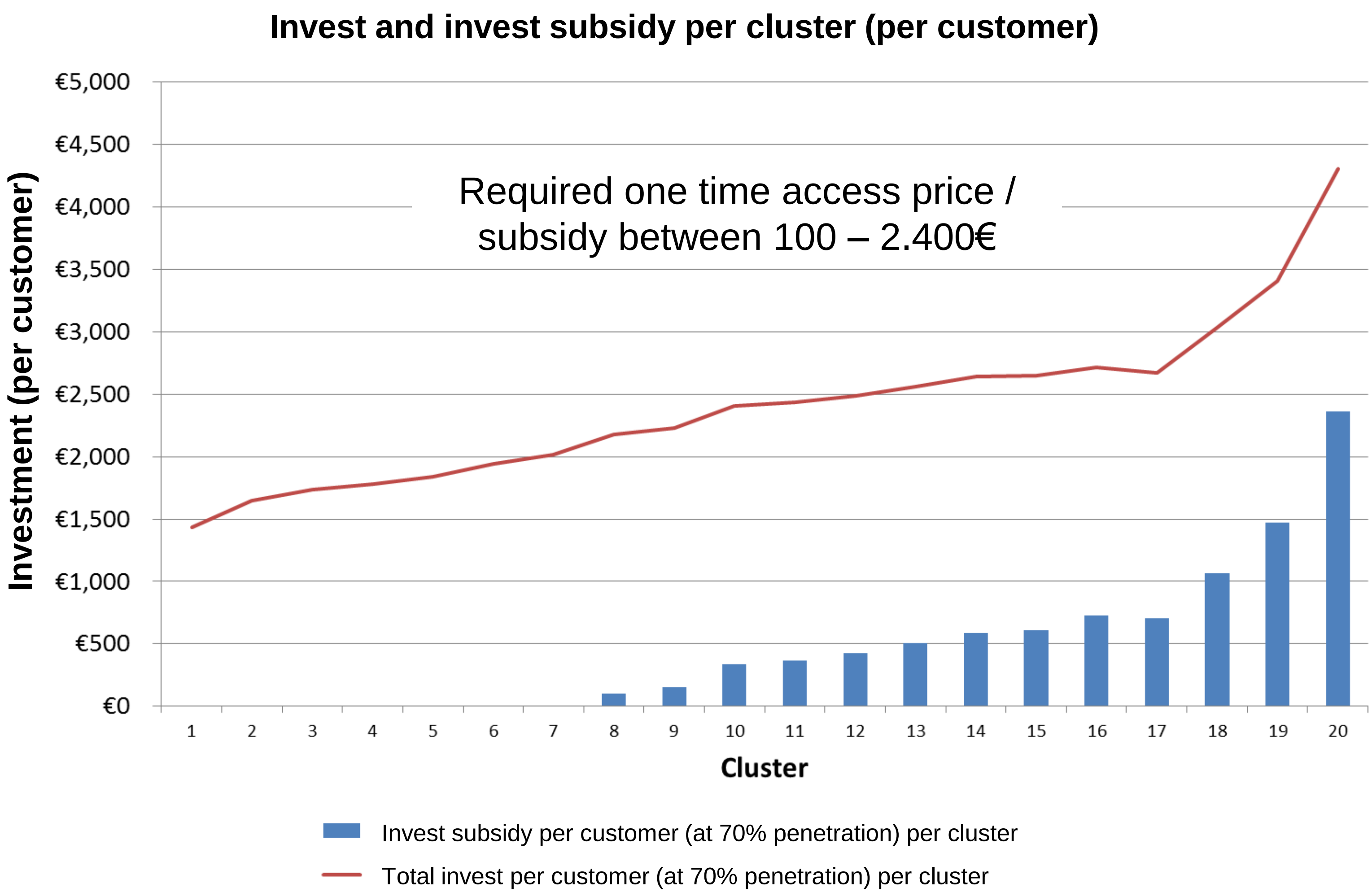
Which one time access price/ subsidy per customer required?

FTTH P2P



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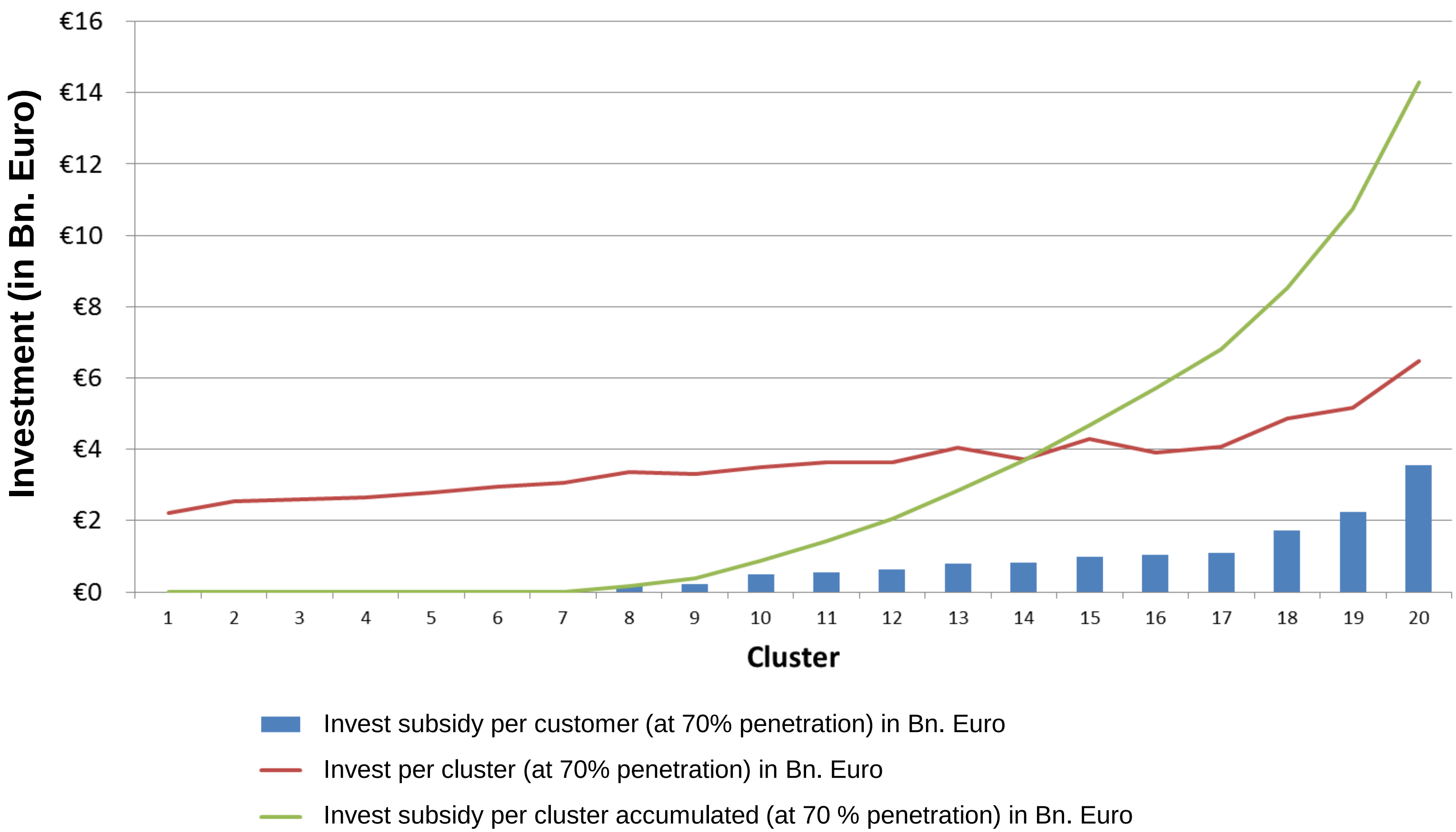
FTTH/P2P without Inhouse, ARPU 38€, 70% Penetration

Cummulative subsidies for profitable roll out per cluster increment

A countrywide rollout of FTTH requires appr. 14 Bn. Euro subsidy

FTTH P2P

Invest and invest subsidy per cluster (Bn. Euro)



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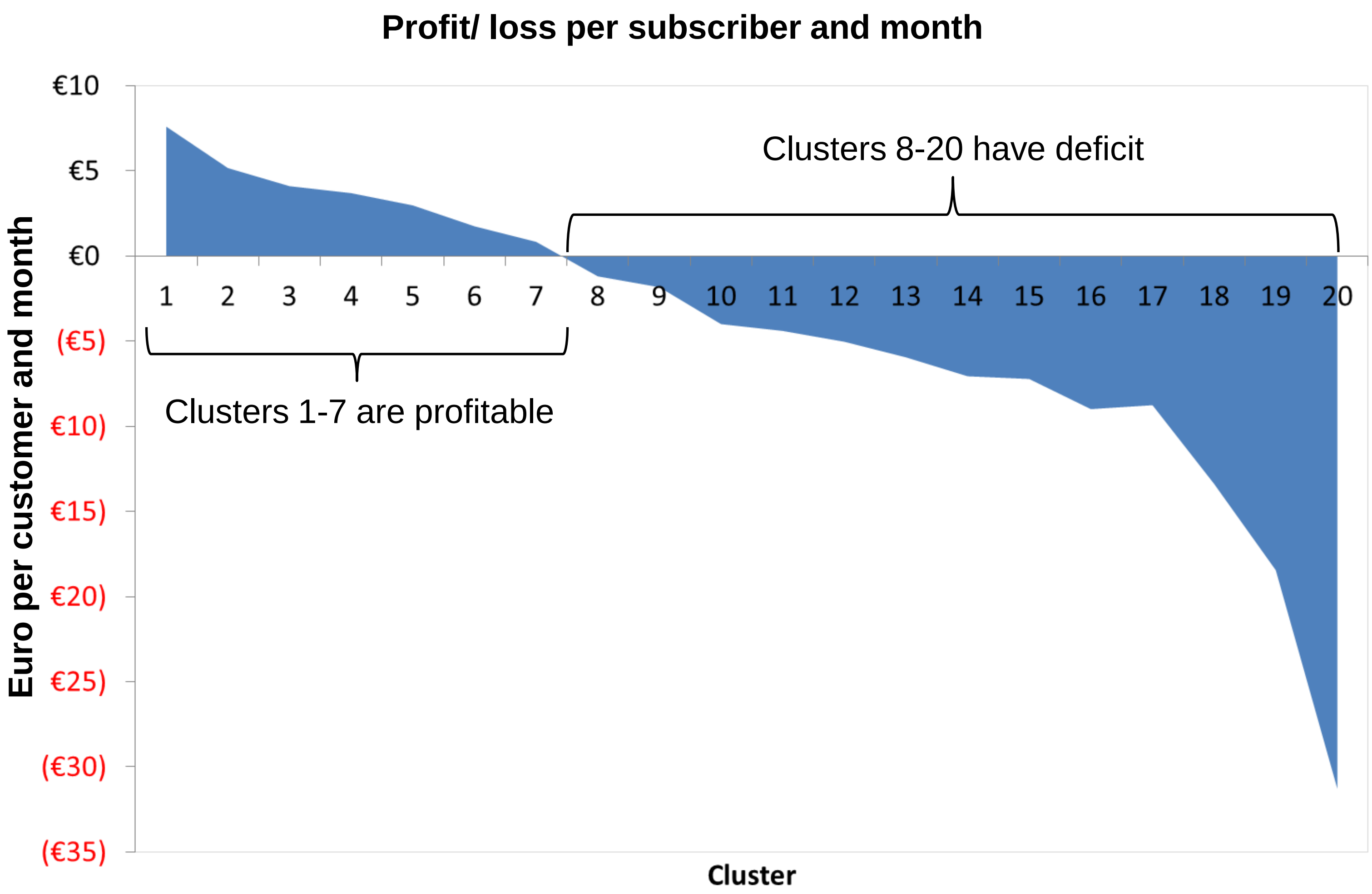
FTTH/P2P without Inhouse, ARPU 38€, 70% Penetration

If main goal of the operator is optimal coverage (without losses) instead of profit, profitable clusters can subsidize others



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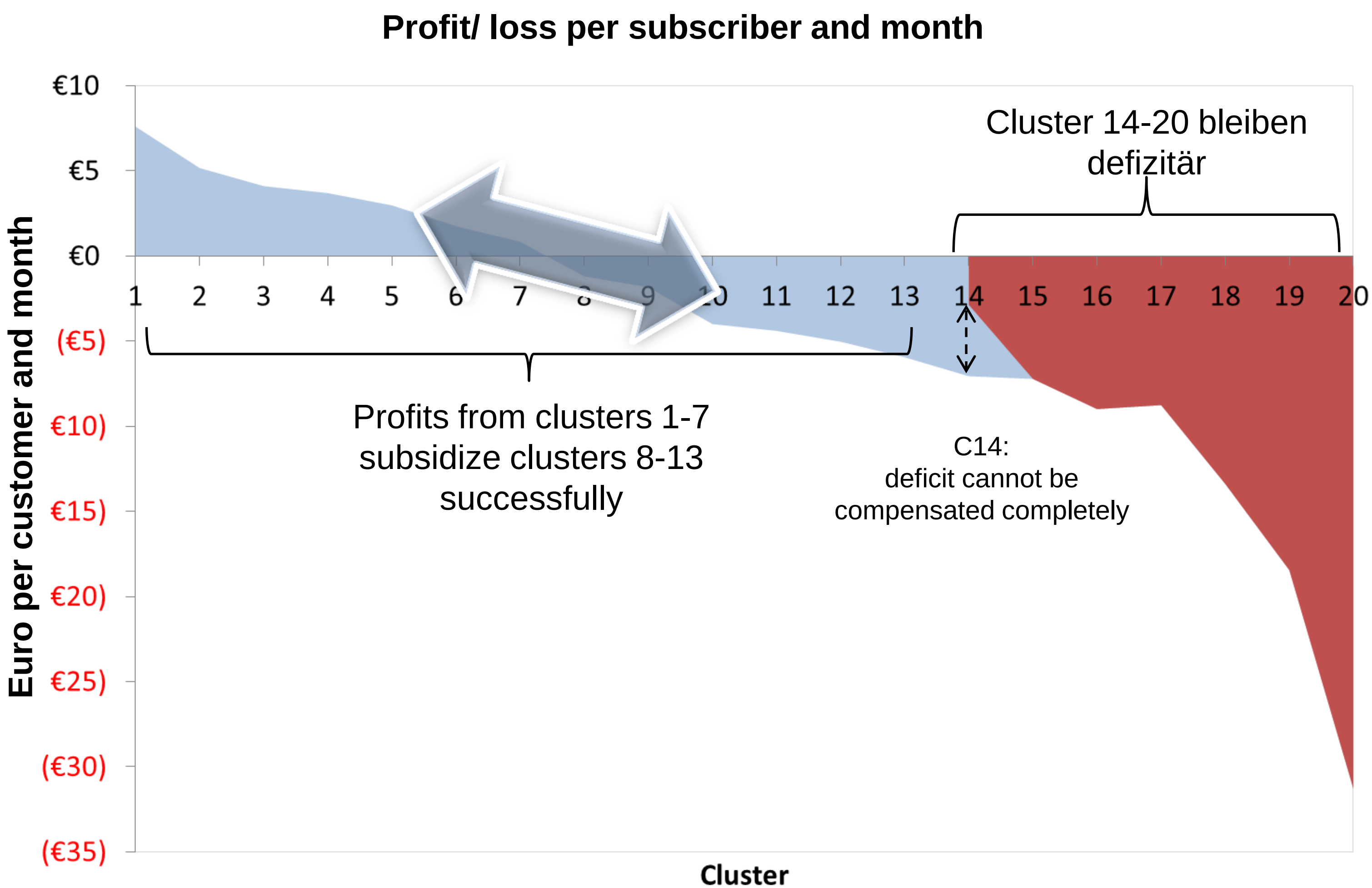
FTTH/P2P without Inhouse, ARPU 38€, 70% Penetration

If main goal of the operator is optimal coverage (without losses) instead of profit, coverage can be nearly doubled



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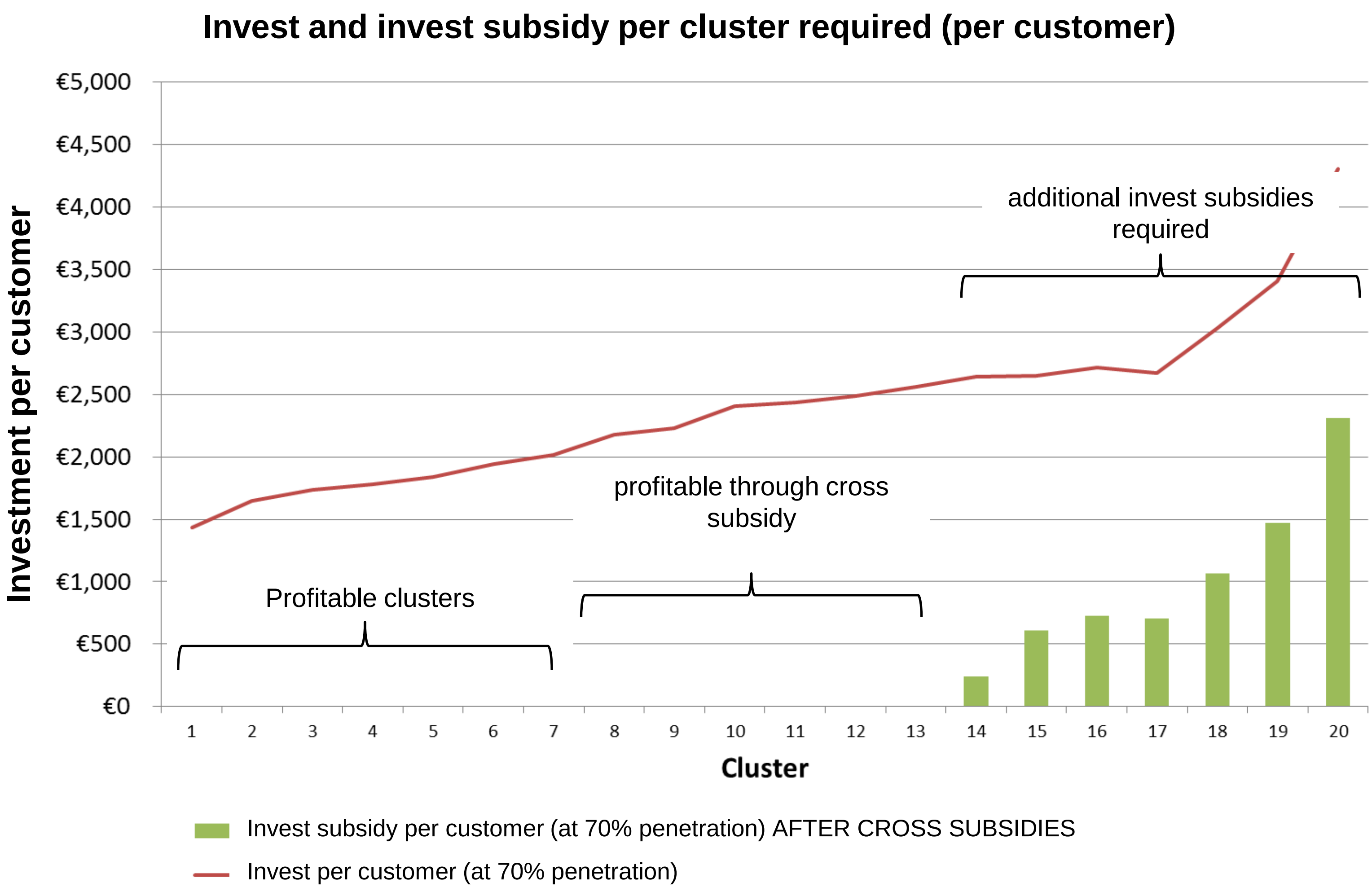
FTTH/P2P without Inhouse, ARPU 38€, 70% Penetration

With cross subsidy the investment deficit for a countrywide roll out can be reduced from 14 to ~11 Bn. Euro



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FTTH/P2P without Inhouse, ARPU 38€, 70% Penetration

Results: country wide fibre roll out in Germany under todays circumstances cannot be profitable

- Invest volume 70-80 Bn. €
- FTTH in Germany only profitable for 25-45% of the access lines
- Coverage expansion with
  - Higher ARPU: ~44€
  - Invest subsidy: up to 2.500€ per access
  - Cross subsidy: not sufficient for countrywide coverage

Results are comparable for many countries

Key factors for NGA success

- Penetration rate
- Wholesale product
- Migration of copper to fibre access
- ARPU
- User one time payment (Inhouse cabling, building access)
- Public subsidies/ prorated contribution system

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Study: www.wik.org - Diskussionsbeitrag Nr. 359 (German)

https://www.econstor.eu/dspace/handle/10419/52172
(ITS conference contribution (English)

Other important parameters

Direct Investment

Network element	Invest per unit	Lifetime (years)
Ethernet CPE	100€	5
GPON CPE	115€	5
FTTB Mini DSLAM in basement of building	905€	5
ODF port	23€	35
OLT port	1000€	7
Ethernet port 1Gbps / 10Gbps	120€ / 2000€	7
Trench, duct and cable incl. installation per meter	120€ Cluster 1 … 40€ Cluster 20	35

Direct cost and other parameters

Parameter	Assumption
Concentration network cost per month	22,5 Mio € + 0,7€ per customer
Core network cost per month	6 Mio € + 1,08€ per customer
Retail cost (customer care, billing, sales & marketing, customer acquisition) per month	5€ per customer
WACC	10%

Comparing key invest positions for a total roll out in GE

at 70% penetration, Bn. Euro

	FTTB	PON	PON + inhouse	P2P	P2P + inhouse	GPON over P2P	GPON over P2P + inhouse
Total invest (Bn. €)	79.34 €	69.31 €	74.35 €	72.78 €	77.82 €	70.86 €	75.90 €
*FTTR**	**65%** 51.84 €	**76%** 52.95 €	**71%** 52.95 €	**73%** 52.78 €	**68%** 52.78 €	**74%** 52.78 €	**70%** 52.78 €
Building access	**14%** 11.18 €	**16%** 11.18 €	**15%** 11.18 €	**15%** 11.18 €	**14%** 11.18 €	**16%** 11.18 €	**15%** 11.18 €
Inhouse cabling			**7%** 5.04 €		**6%** 5.04 €		**7%** 5.04 €
FTTB - Mini DSLAM	**14%** 10.96 €						
CPE	**3%** 1.99 €	**5%** 3.81 €	**5%** 3.81 €	**5%** 3.31 €	**4%** 3.31 €	**5%** 3.81 €	**5%** 3.81 €
Active Technique MPoP	**4%** 2.98 €	**2%** 1.12 €	**2%** 1.12 €	**5%** 3.99 €	**5%** 3.99 €	**1%** 0.68 €	**1%** 0.68 €
Rest**	**0%** 0.39 €	**0%** 0.26 €	**0%** 0.26 €	**2%** 1.52 €	**2%** 1.52 €	**3%** 2.41 €	**3%** 2.41 €

Passive net: 80-90%

Active net: 10-20%

* Passive net from ODF to branch sleeve in the street in front of the building.

** Rest: MPoP-Invest in floor space, net sided ODF-ports, IPTV platform, central splitters with GPON over P2P

Financial demand for countrywide roll out, all scenario overview

	FTTB	FTTH/PON	FTTH/PON + inhouse	FTTH/P2P	FTTH/P2P + inhouse	GPON over P2P	GPON over P2P + inhouse
No. of profitable Cluster	4	9	7	7	5	9	7
Required uniform ARPU at 70 % Penetration (€ pro Monat)	51.55 €	42.29 €	43.11 €	43.89 €	44.98 €	42.56 €	43.44 €
All customer monthly broadband subsidy, 38 € ARPU and 70 % penetration (€ per montht)	13.55 €	4.29 €	5.11 €	5.89 €	6.98 €	4.56 €	5.44 €
invest subsidy reqired (Bn. €)	27.07 € (Bn.)	10.54 € (Bn.)	12.49 € (Bn.)	14.21 € (Bn.)	16.89 € (Bn.)	11.15 € (Bn.)	13.32 € (Bn.)

Calculation basis for profitability: ARPU 38 €

Sensitivities

1. Brownfield instead of greenfield
2. Higher costen
3. Lower penetration

Sensitivity considerations do not reval principal change of results

1. 35€ instead of 38€ ARPU: 4 insteaf of 7 profitable clusters
2. Brownfield instead of greenfield: small cost decrease
3. Higher Cost*: 6 instead of 7 profitable clusters
4. Penetration only 60% max.: 5 instead of 7 profitable clusters

*Changes:

- Invest for civil construction, ducts, cables and installation for building access: 40 € instead of 30 € per meter
- CPE: 125 € instead of 100 €
- Aerial cabling: No aerial instead of 5% in the last five clusters

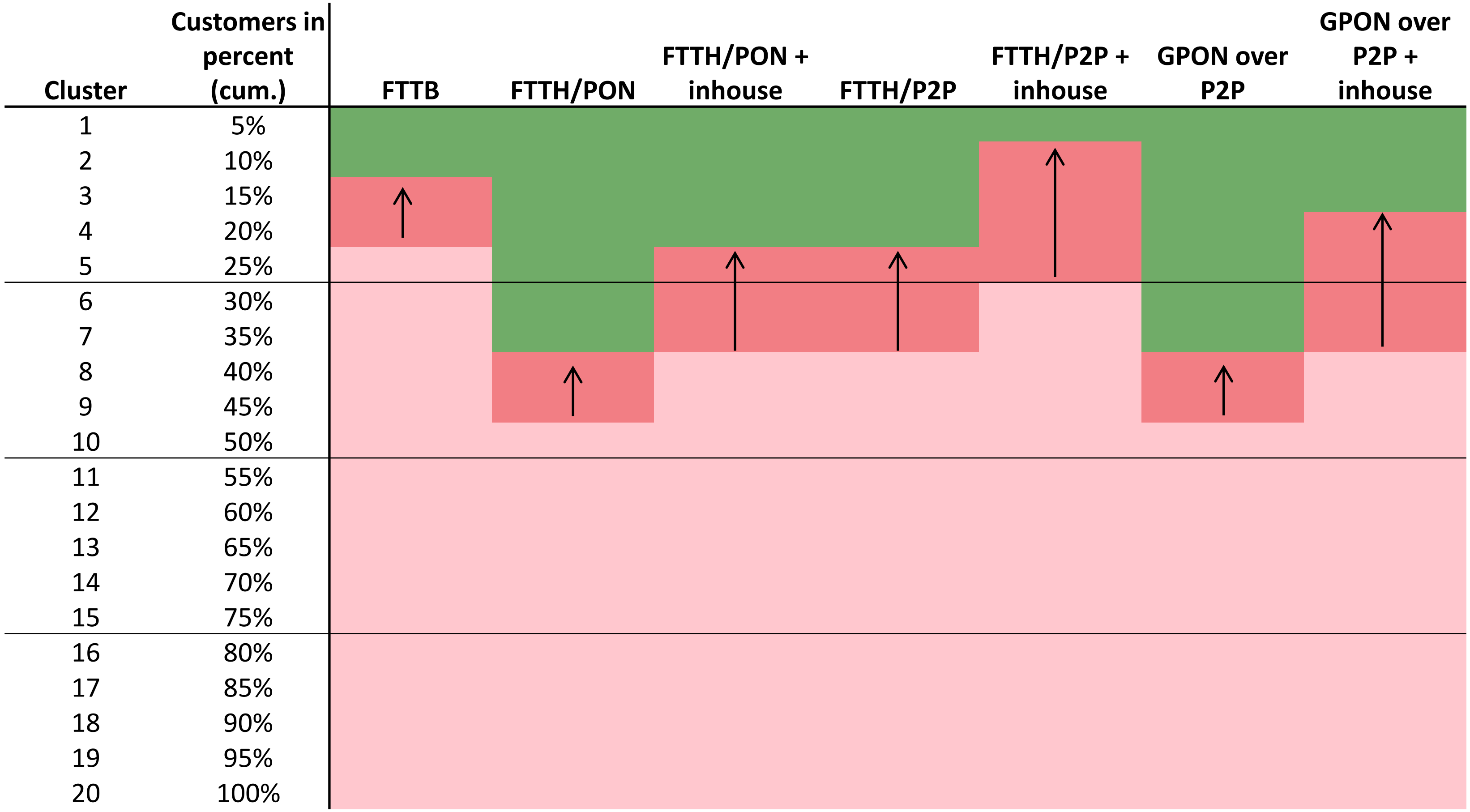
Profitable coverage at ARPU of 38€: appr. 25-45% of customers

Cluster	Customers in percent (cum,)	FTTB	FTTH/PON	FTTH/PON + inhouse	FTTH/P2P	FTTH/P2P + inhouse	GPON over P2P	GPON over P2P + inhouse
1	5%							
2	10%							
3	15%							
4	20%							
5	25%							
6	30%							
7	35%							
8	40%							
9	45%							
10	50%							
11	55%							
12	60%							
13	65%							
14	70%							
15	75%							
16	80%							
17	85%							
18	90%							
19	95%							
20	100%							

Green= critical penetration rate is less or equal 70%

Red = critical penetration rate is greater than 70%

Profitable coverage at ARPU of 35€, significant decrease



Green= critical penetration rate is less or equal 70%

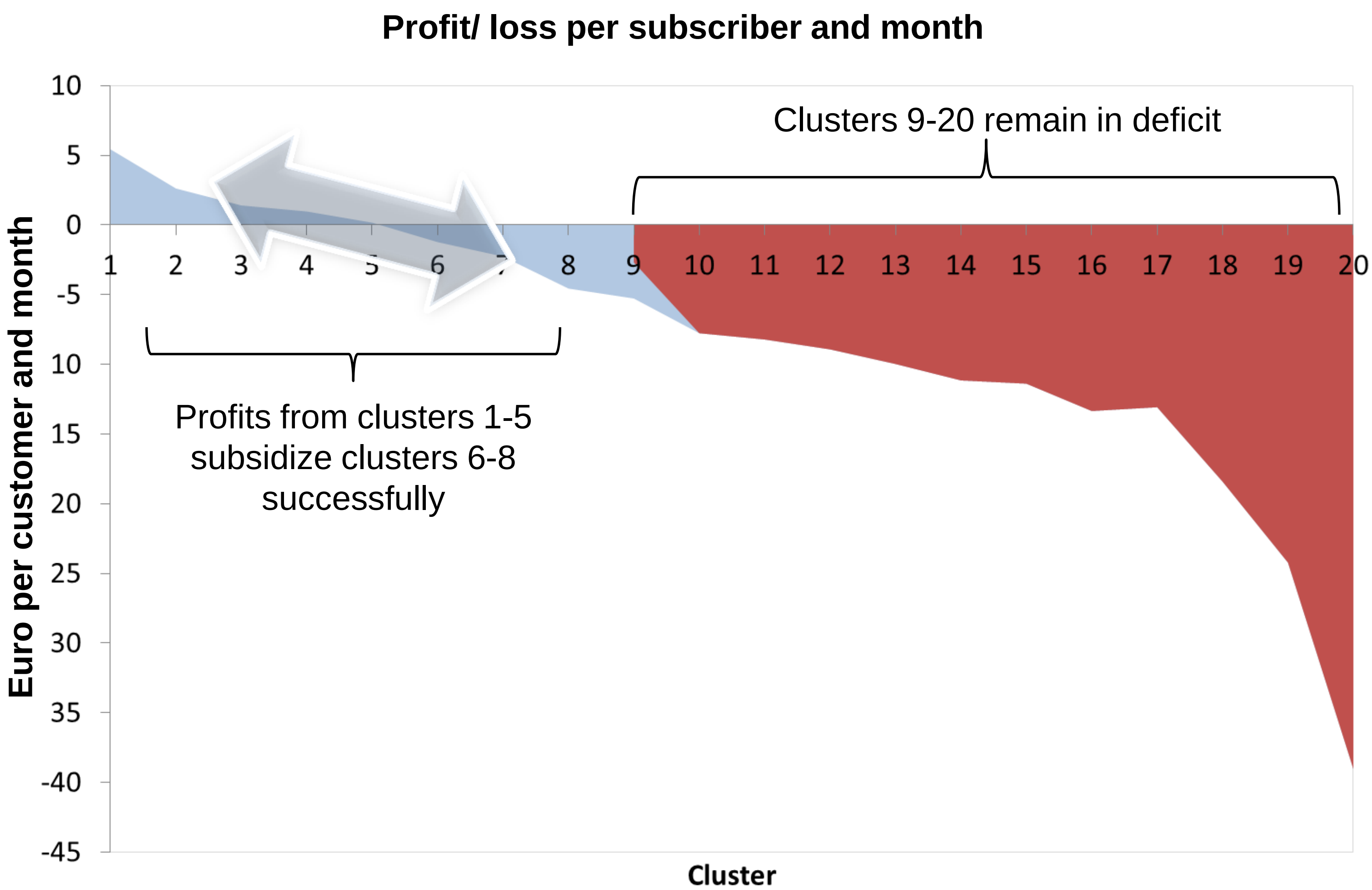
Red = critical penetration rate is greater than 70%

Sensitivities considered

	Basis Szenario	Variant 1	Variant 2
	70% Penetration, 38 € ARPU	**60 % Penetration, 35 € ARPU, higher cost**	**60 % Penetration, 38 € ARPU**
No. of profitable clusters	7	1	5
Uniform ARPU for profitable roll out (€ per month)	44 €	48 €	47 €
Broadband contribution for all NGA-customers (€ per month)	6 €	13 €	9 €
invest subsidy required (Bn. €)	14 Mrd. €	27 Mrd. €	25 Mrd. €

FTTH/P2P ohne Inhouse

If penetration rate falls from 70% to 60%, profitable coverage and potential of cross subsidy also decreases



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FTTH/P2P without Inhouse, ARPU 38€, 60% Penetration