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Fixed broadband solutions for rural areas: a techno-economic analysis

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- Introduction
- Network scenarios
- Costing methodology
- Results
- Conclusions

Introduction

Status of NGA deployment in the European Union

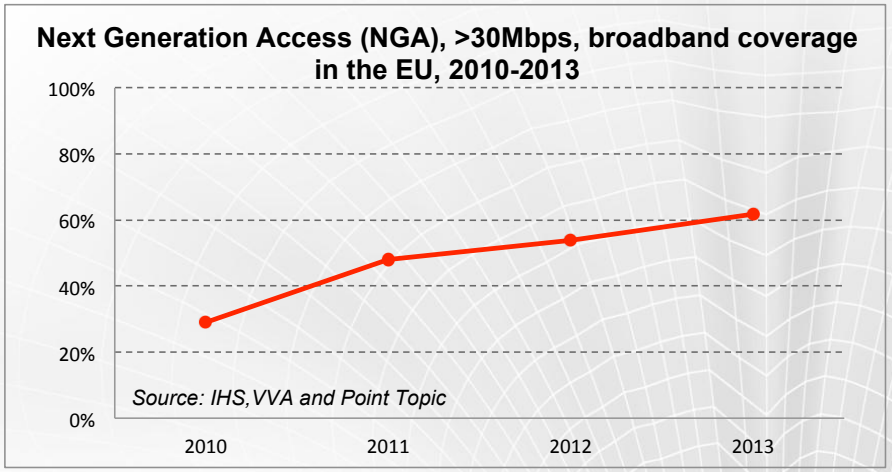
Achievement of the Digital Agenda Targets (as of 2014)

Basic broadband for all by 2013: 100% in 2013 √ **Mission accomplished!**

Fast broadband (>30Mbps) for all by 2020: 62% in 2013 **Not yet, but as of 2014 there are 6 years left.**

NGA networks and coverage:

- Cable Docsis 3.0 (41.2%)
- VDSL (31.2%)
- FTTP (14.5%)

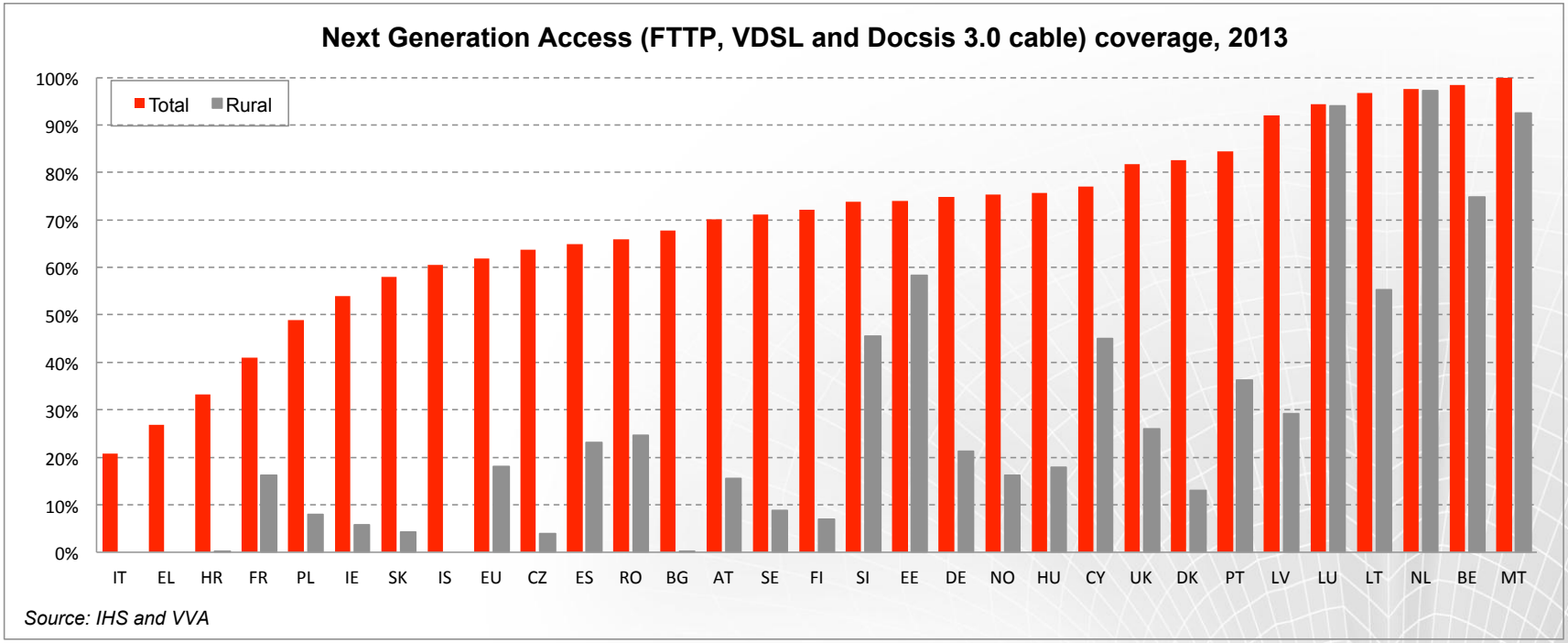


Next Generation Access (NGA) covers 62%, but in rural areas the penetration is low.

Source: European Commission, Digital Agenda Scoreboard 2014

Introduction

Lack of NGA deployment in rural areas in Europe



Source: IHS and VVA

NGA rural coverage:18.1% (mostly through VDSL)

Source: European Commission, Digital Agenda Scoreboard 2014

Introduction
Motivation and Objectives

- In many cases NGA deployment in urban areas - and for a few suburban areas - can be provided by means of competition. The business case in these areas is rather clear.
- As of 2014, there is very little deployment of NGA networks in rural areas.
- Policy makers and operators in Europe are examining different possibilities to provide high-speed fixed broadband services in rural areas over the next years.
- *This presentation examines the use of different NGA networks in rural areas.*
- *A techno-economic analysis of the following networks is provided:*
  - *FTTC Vectoring*
  - *FTTdP-Street G.fast*
  - *FTTdP-Building G.fast*
  - *FTTH GPON*

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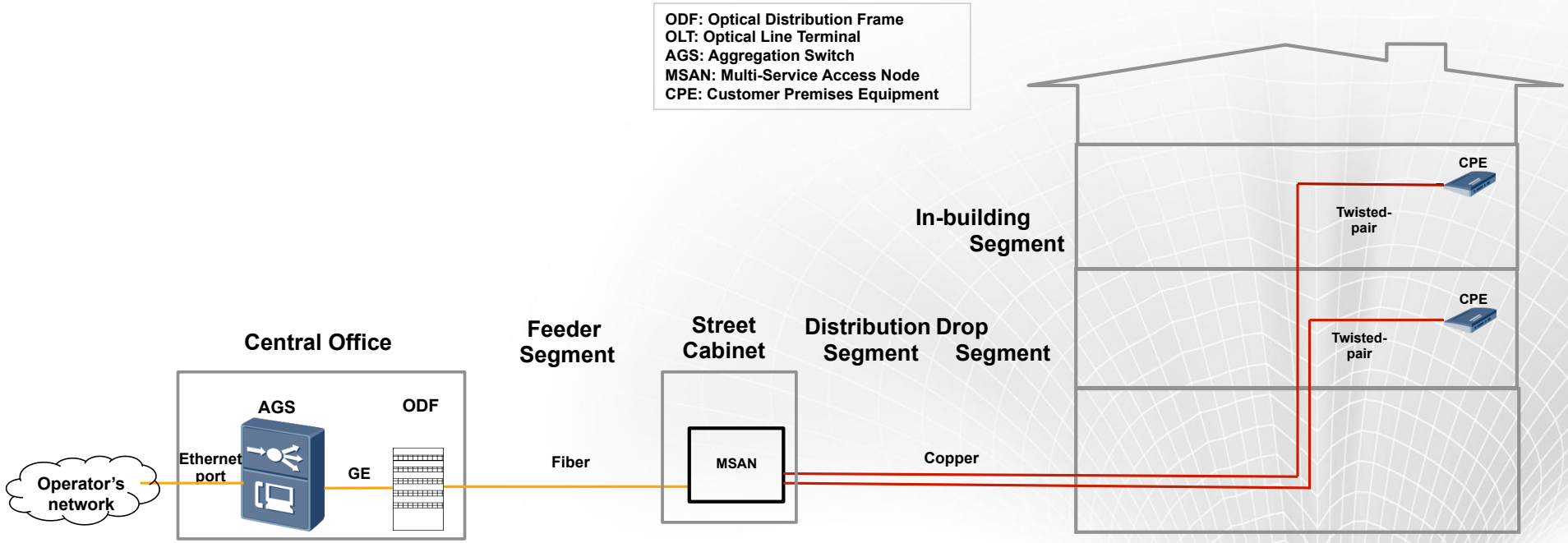
Network architecture

FTTC Vectoring

- This is a reference architecture.
- No fault management system is considered in this architecture



Network architecture

FTTdP-Street G.fast

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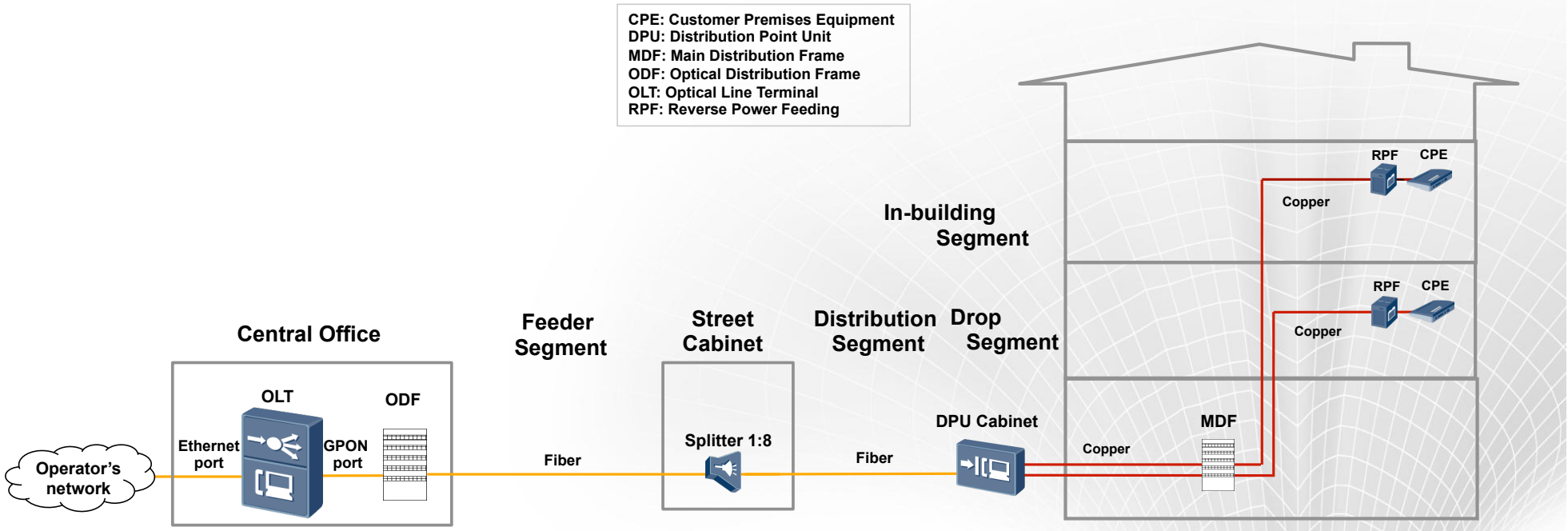
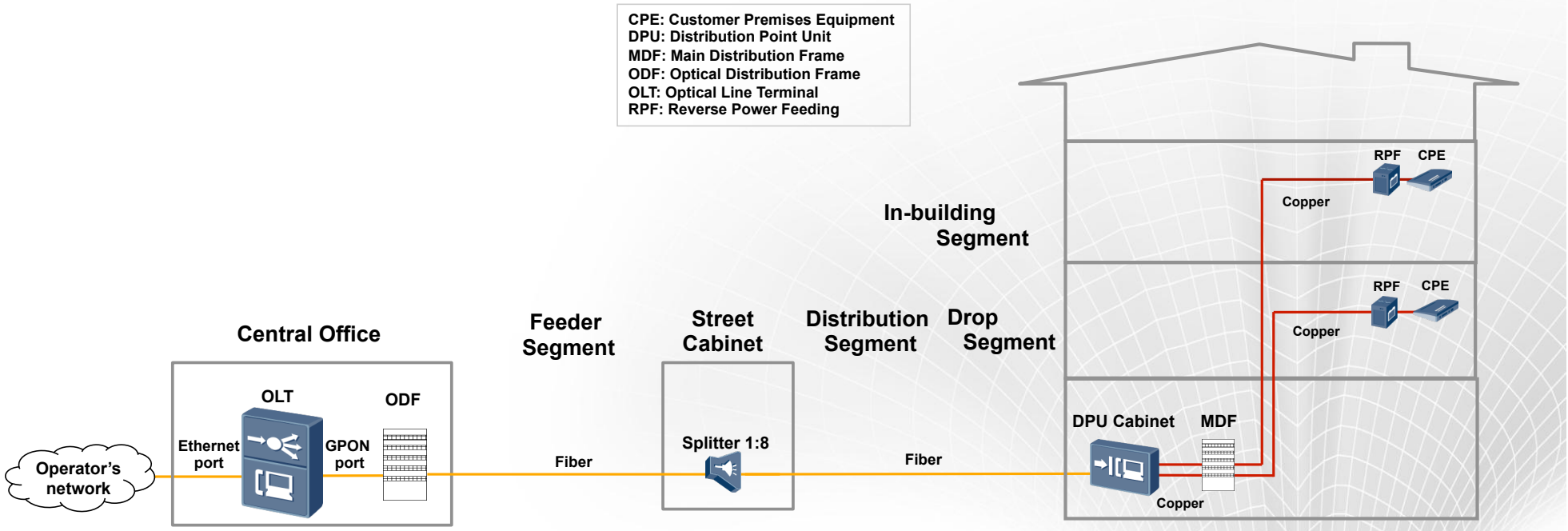


Network architecture

FTTdP-Building G.fast

- This is a reference architecture.
- No fault management system is considered in this architecture



Network architecture

FTTH/GPON

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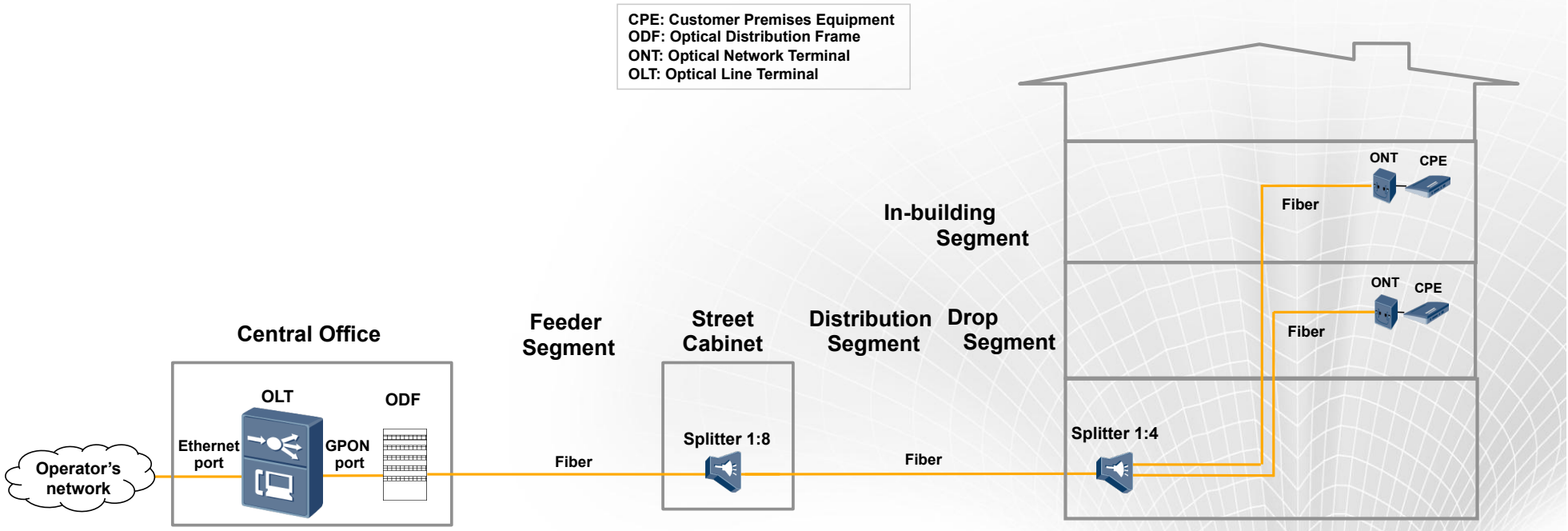

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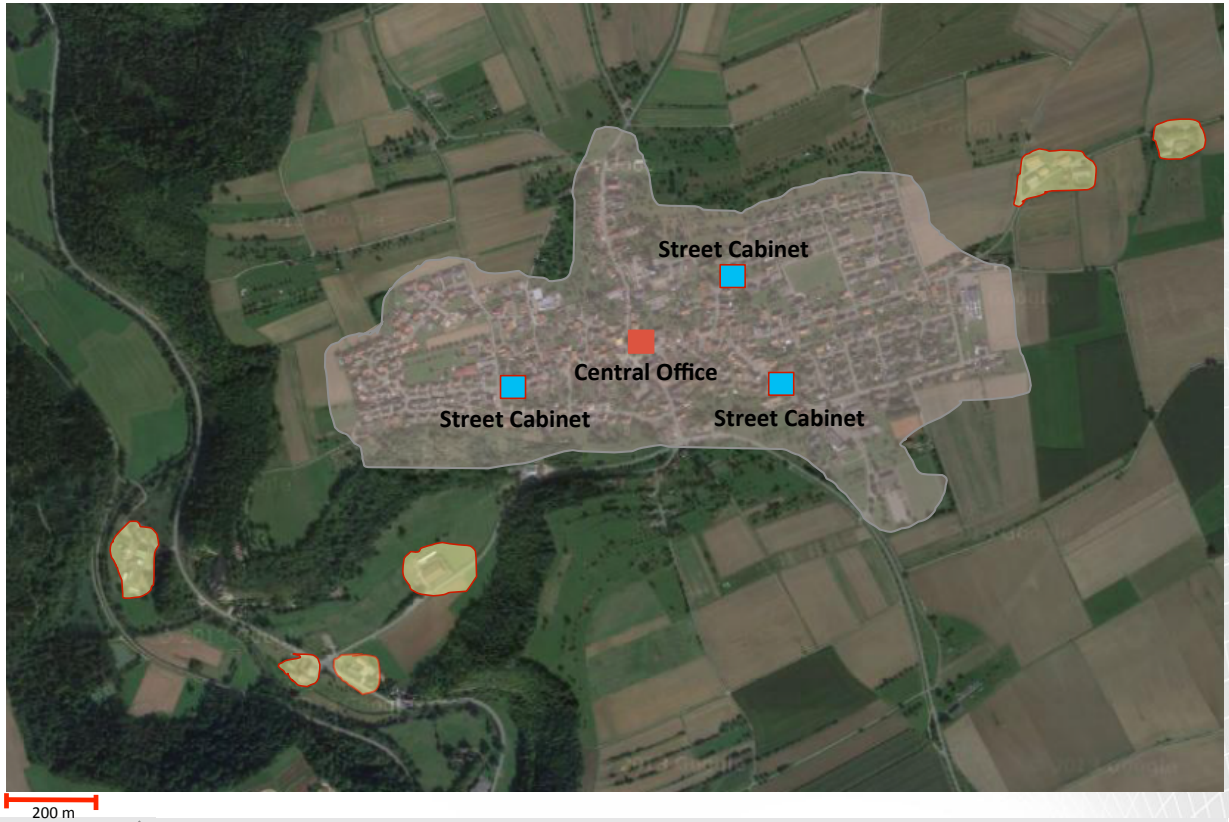
What is a rural area? Example of a village and its surroundings

- This is a satellite picture of google maps of a village in Germany.
- The results presented in this study are **not** based on this specific case.



In this case two types of households are identified:

a) those that are close to the Central Office located in the village (in pink), and

b) those that are far away (in yellow)

Assumptions for the average rural area

Item	Value
Total number of subscribers per Central Office	3,000
Average feeder segment length	2,500 m
Average distribution segment length	220 m
Average drop segment length	26 m
Number of households per building	5
Time period for the analysis	15 years

- These values are not based on the example of a rural area shown in the previous slide.

Type of results presented in the study

	CAPEX/OPEX?	Market Share	Effect of churn rate on the number of subscribers?
1) Homes Passed	only CAPEX	100%	No
2) Homes Connected	CAPEX and OPEX	50%	Yes

CAPEX:
- Material and installation of equipment (Homes Passed and Homes Connected)
- Connection works of a new user (Homes connected)

OPEX:
- Maintenance of the equipment (Homes connected)

GREENFIELD APPROACH:
Feeder and Distribution segments: The ducts in the feeder and distribution segment should be deployed.

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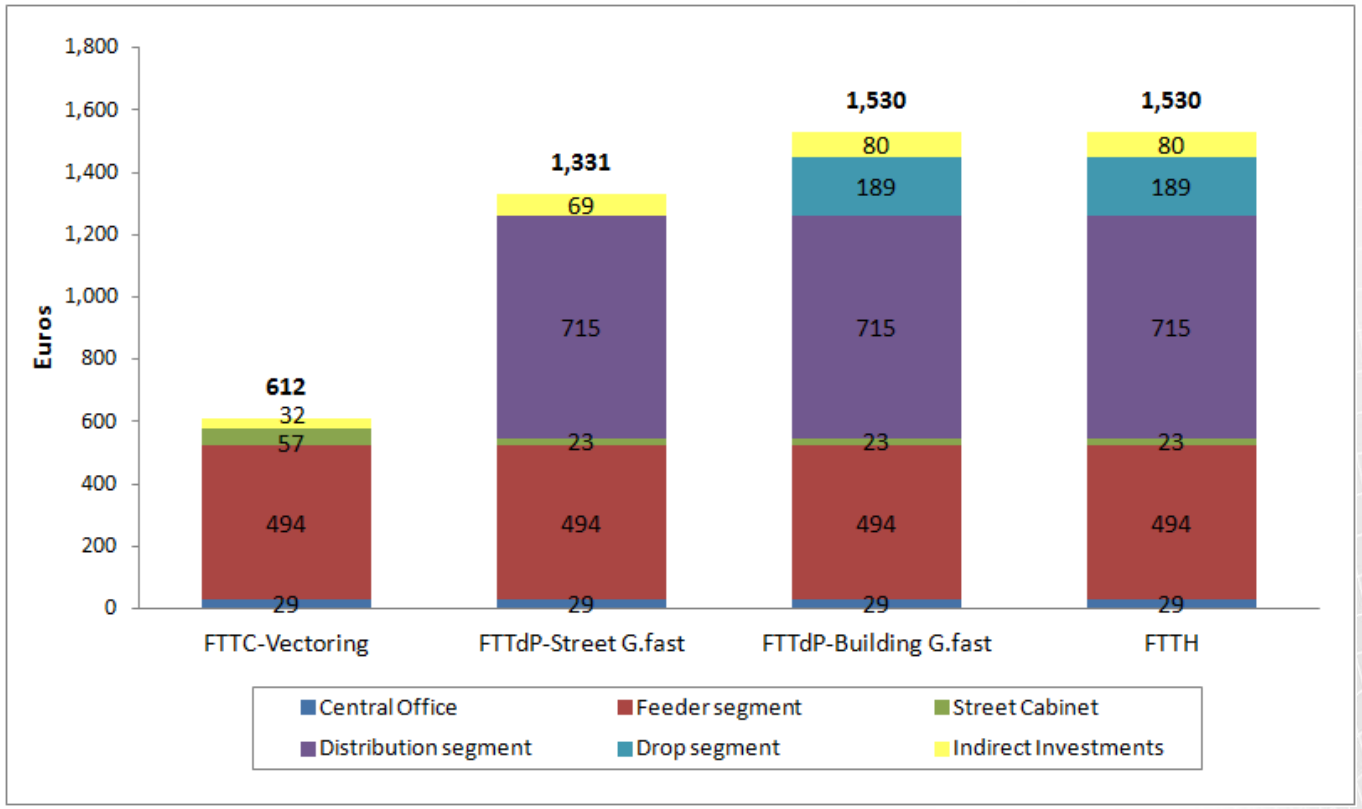
Set of Results

- Cost per Home Passed, CAPEX only, 100% market share
- Cost per Home Connected, CAPEX and OPEX, 50% market share
- Techno-economic comparison

Rural Area

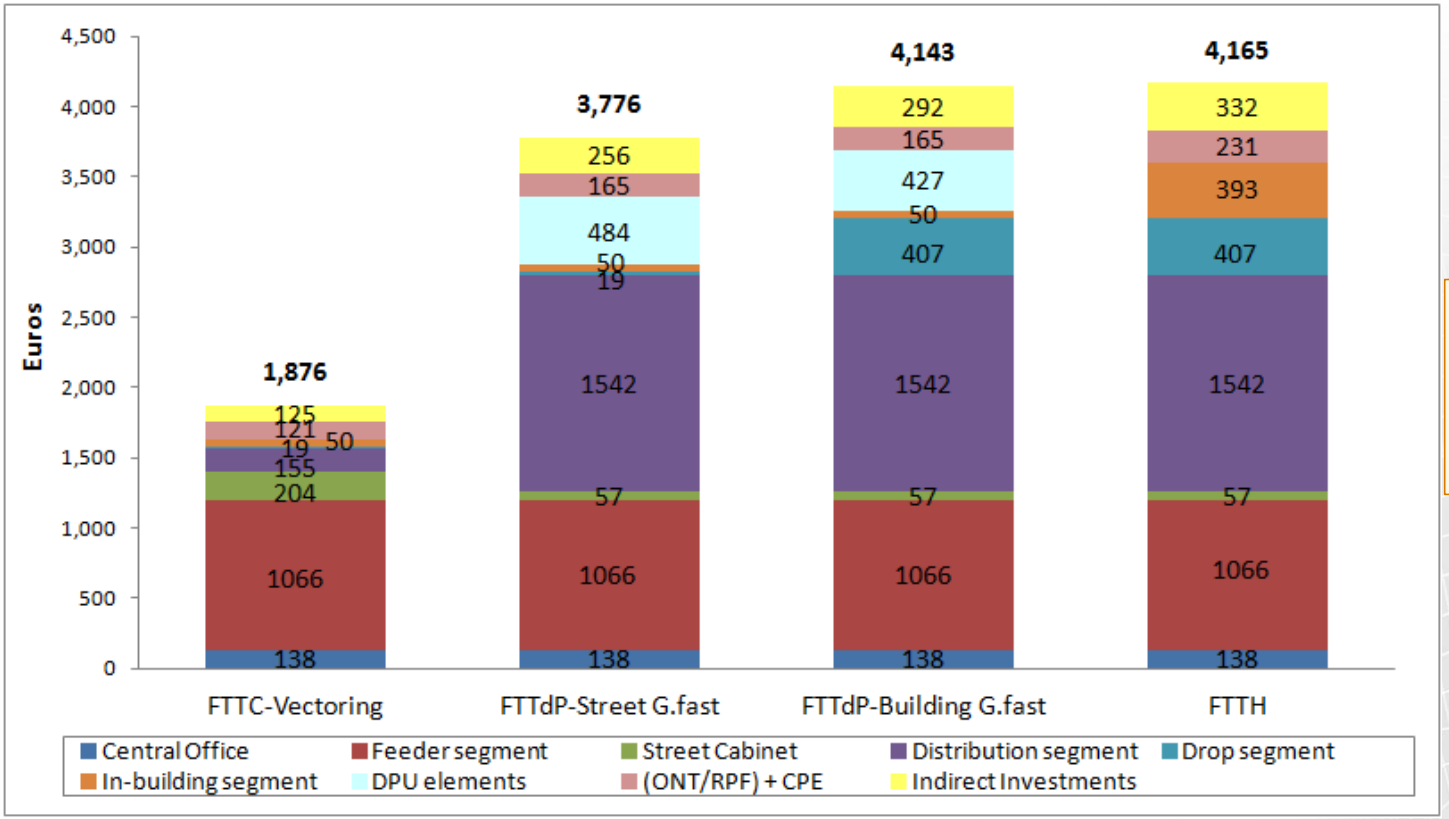
Cost Per Home Passed: CAPEX only, 100% market share



Cost Reductions achieved vs. FTTH:

- FTTdP-Building G.fast: 0%
- FTTdP-Street G.fast: 13%
- FTTC-Vectoring: 60%

Cost per Home Connected, CAPEX and OPEX, 50% market share:
Time period: 15 years. It includes the effect of the churn rate (10%). Rural area



Cost Reductions achieved vs. FTTH:

- FTTdP-Building G.fast: 1%
- FTTdP-Street G.fast: 9 %
- FTTC-Vectoring: 55 %

Rural area

Techno – economic comparison

Network type	Theoretical transmission capacity (Cost per home connected, 50% market share)
FTTC-Vectoring	[60-80 Mbps for 250 m.] (1,876 €)
FTTdP-Street G.fast (GPON splitting ratio of 32)	[80-100 Mbps] (3,776 €)
FTTdP-Building G.fast (GPON splitting ratio of 32)	[80-100 Mbps] (4,143 €)
FTTH GPON (GPON splitting ratio of 32)	[80-100 Mbps] (4,165 €)

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Conclusions

- In rural areas, the cost of FTTC-Vectoring is lower than the cost of the other networks described (FTTH and FTTdP G.fast)
- The cost of FTTdP G.fast is lower than the cost of FTTH.
- The question that operators and policy makers will ask is: *which broadband capacity should be provided?*
- More rural scenarios will be studied to understand better the technical and cost implications of fixed broadband access networks.

Thank You

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