



*Optical Access Seamless Evolution (OASE):
project overview*

D. Breuer

Deutsche Telekom Laboratories

Goslarer Ufer 35, 10589 Berlin, Germany

Life is for sharing.





Duration: Jan 2010 – December 2012

12 partners from 8 countries:

- SME coordinator
- 3 operators
- 2 (3) vendors
- 3 universities
- 2 research institutes



Outline.



Part 1: OASE Targets, coverage and assumptions.

Part 2: OASE challenges.

Part 3: OASE structure



Next Generation Optical Access (NGOA)

Target.



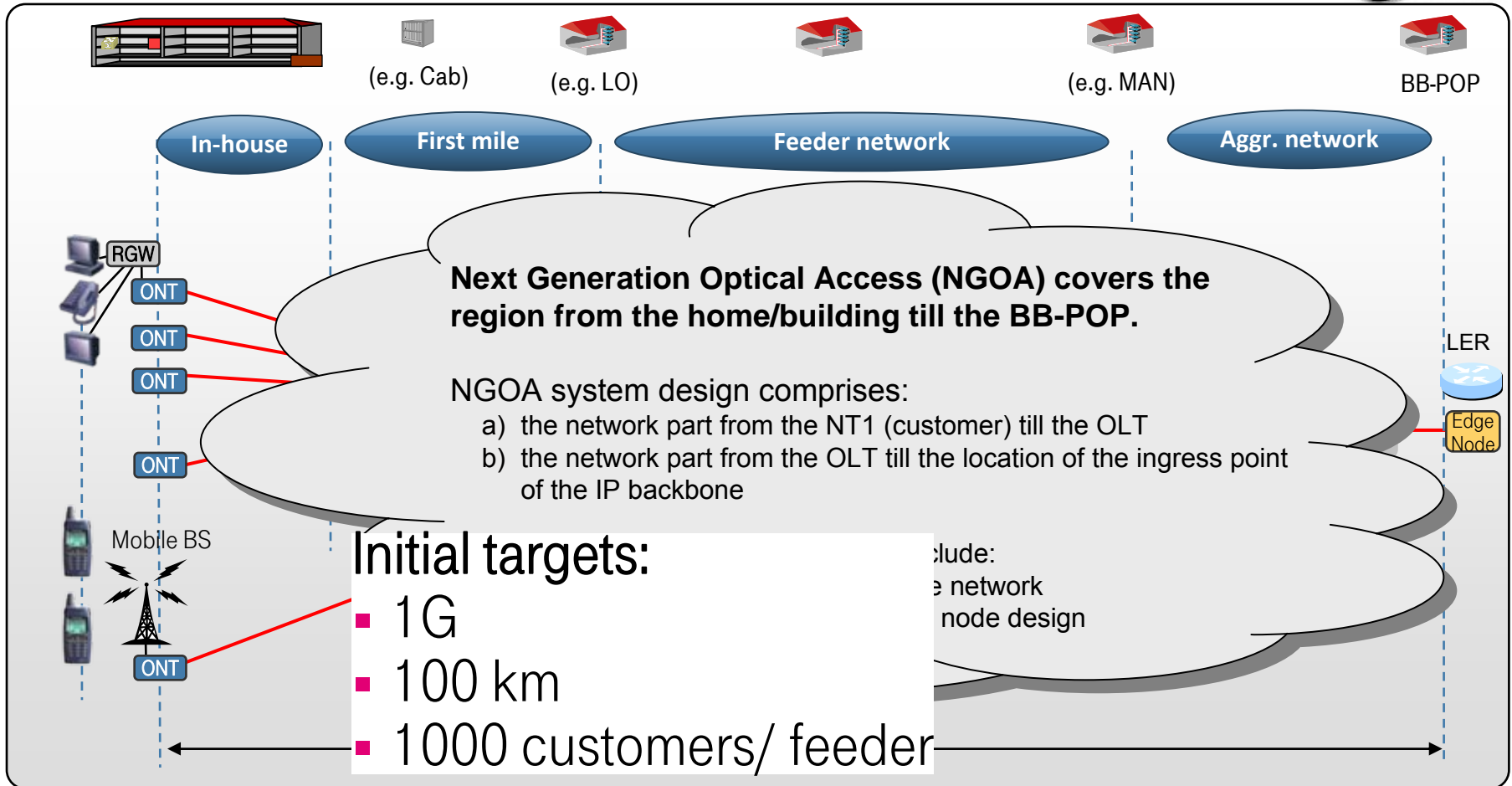
Development of architecture and system concepts for the “2020” time horizon addressing:

- Increasing access data rates per user
- Total Cost of Ownership (TCO) optimized optical access
 - Network consolidation - savings on:
 - Real estate
 - Powering
 - Higher concentration – savings through better sharing, utilization of:
 - OLT resources, Feeder fibers
 - Protection and aggregation resources
 - Less Opex – savings by simplified network structure with less active network elements
 - Unified network - residential, business, wireless backhaul
- Understanding the impact of new business models, co-operation on the design of NGOA



NGOA – Network coverage.

NGOA covers today's access and aggregation network.



NGOA – Assumptions.

Basic assumption for the network design.



Basic assumptions with respect to “2020”

- FTTH deployment is running
- FTTH will evolve to the dominant access solution
- Transition to NGN finished – All IP network is reality
- Multi-operator environment
 - Co-operation
 - Open Access Networks
- Universal access, a common network for :
 - Residential
 - Business customers
 - Fixed and mobile backhaul

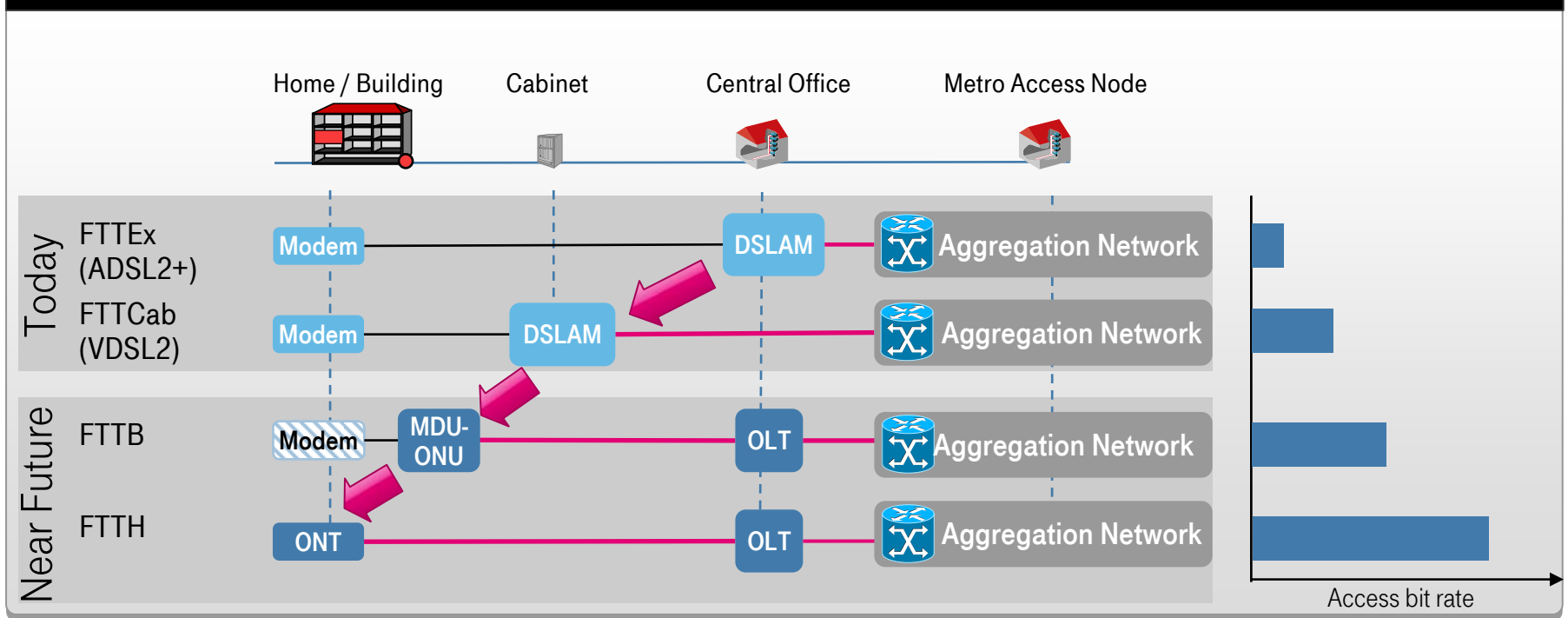


Access network evolution.

Migration towards FTTH: Increased access bit rate per subscriber.



Access / aggregation network migration path

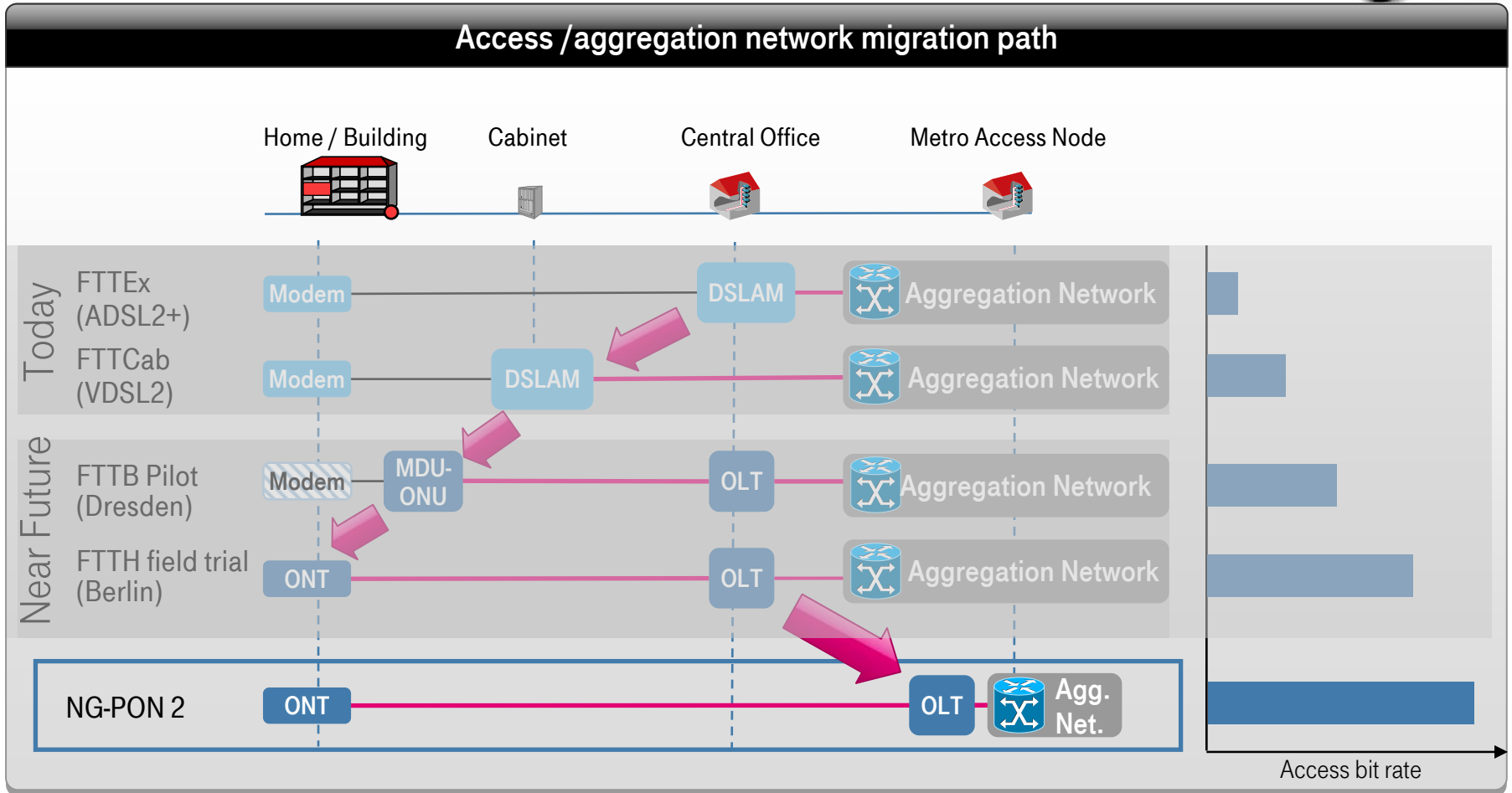


FTTH – Optical fiber access: No (practical) limitation in the access bandwidth.



Minimal TCO at still growing bandwidth.

Re-structuring of the access and aggregation network towards unified optical access network for residential, business and backhaul.

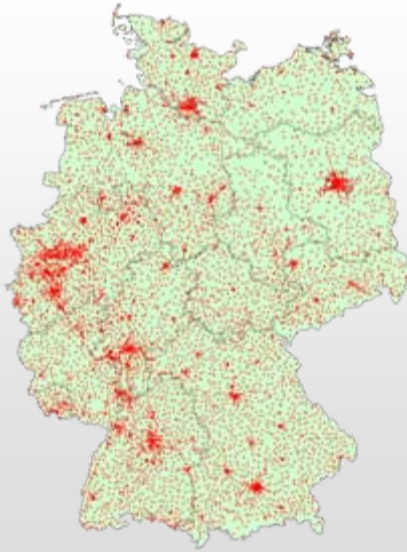


Optics in access networks enable network structure change.

Exemplary future network structure.



Today's network site distribution



Future vision with consolidated network sites



Target: Simpler network structure with minimized total cost of ownership.

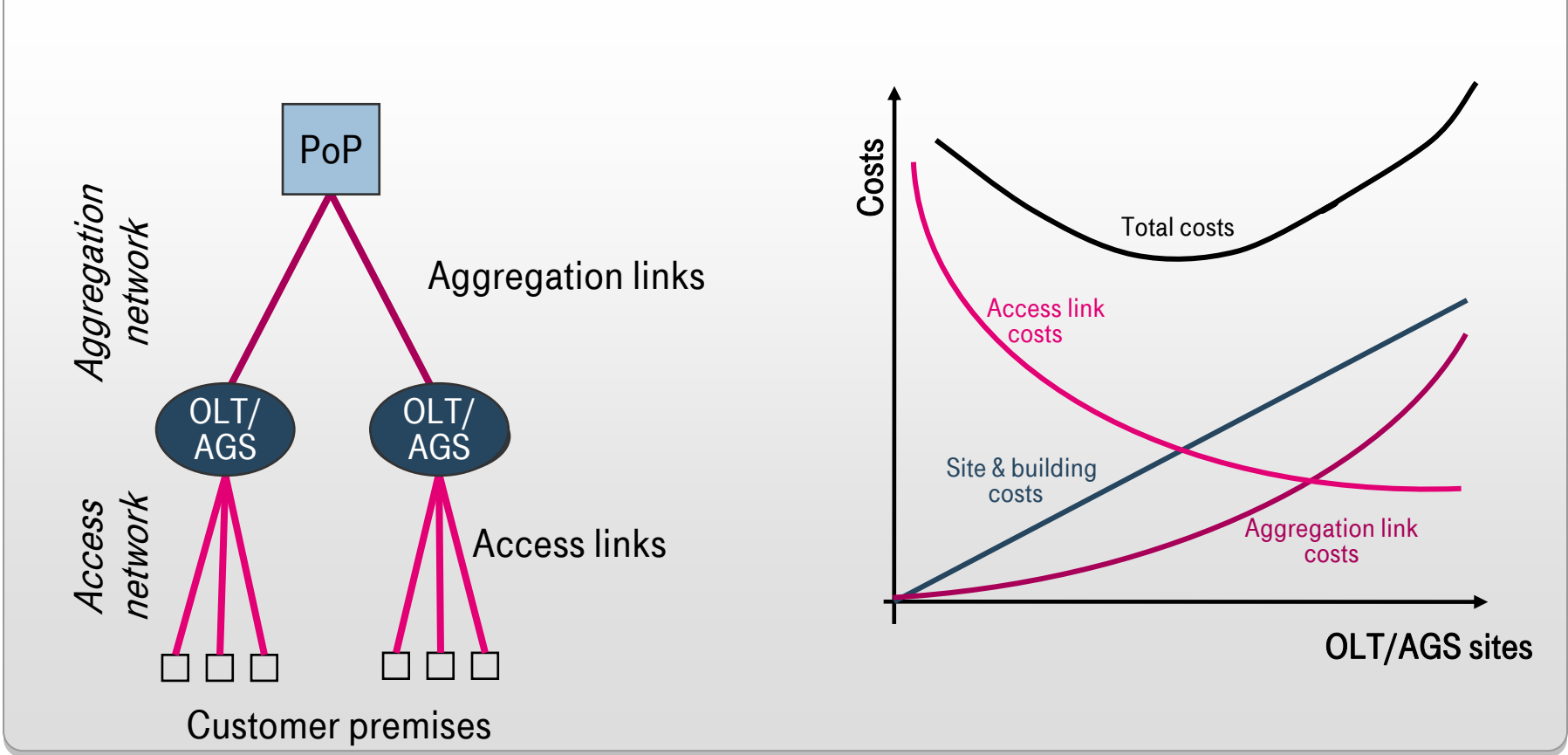


NGOA – Reducing Total Cost of Ownership (TCO).

Understanding the trade offs and finding the Optimum.



Dependency of access/ aggregation network structure and total network costs

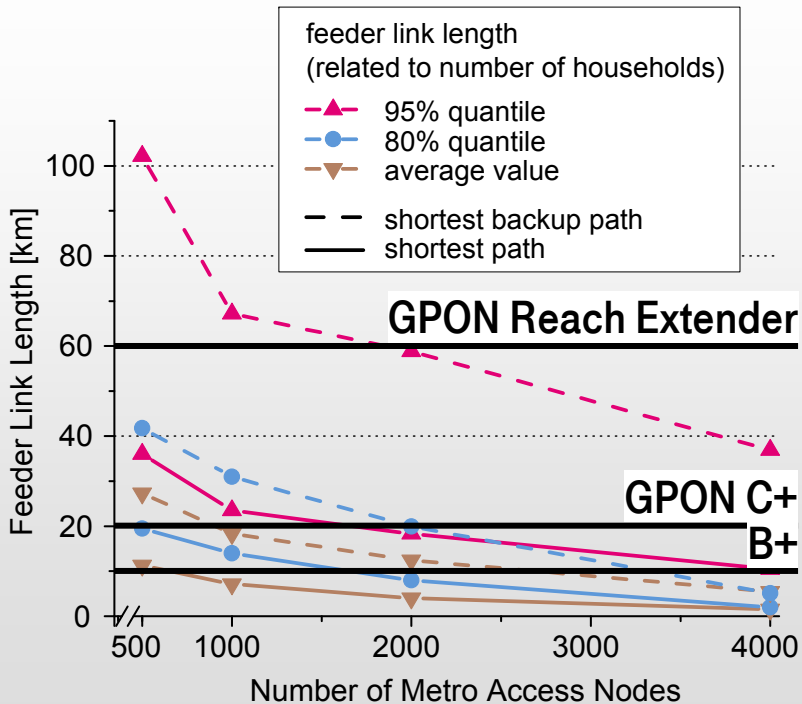


Feeder link length.

Which reach should be provided by NGOA systems?



feeder link length = f(# metro access nodes)



Reach is not the challenge?

- Feeder links length ≤ 40 km for majority of households in all scenarios
- Very long feeder links for a minority of households only
- For total transmission distance subscriber line length in ODN has to be added (typically < 5 km)
- Typically about ($<$) 40 km reach are sufficient
- Protection will require longer reach (2x)

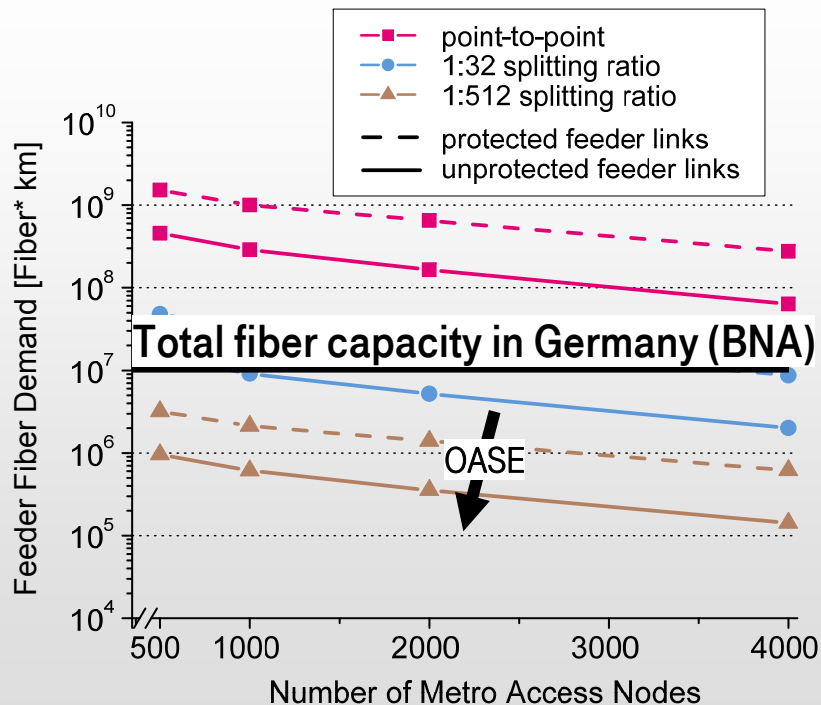


Feeder link fiber demand.

The dark side of site darkening - additional cable required.



Feeder fiber demand = f(# metro access nodes)



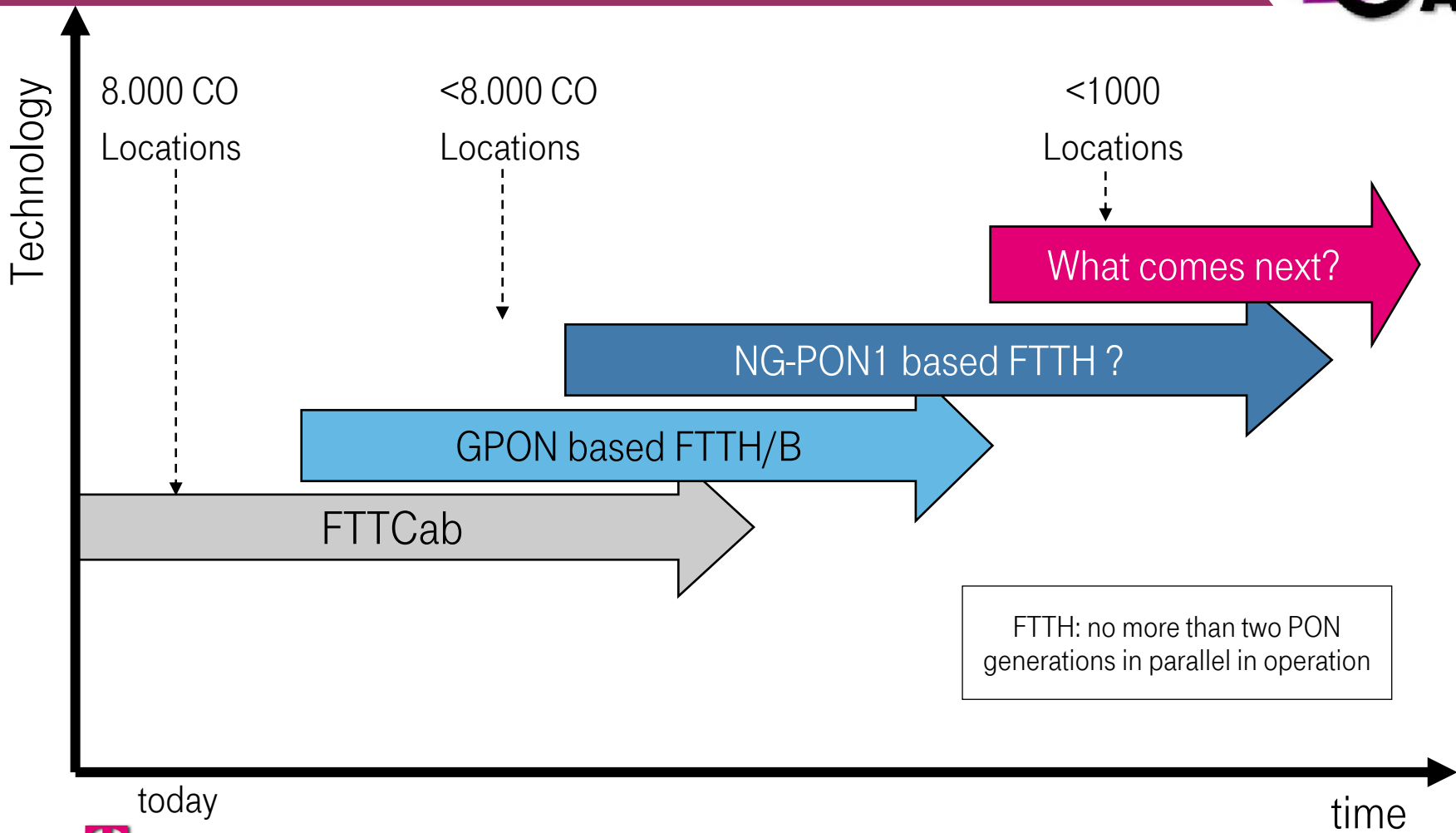
High splitting is required!

- Feeder cables are an important additional cost factor
- Feeder fiber demand depends on
 - Number of Metro Access Nodes / Feeder link length
 - Feeder fiber multiplexing (splitting)
 - Resilience requirements
- High splitting ratio is key to reduce additional feeder costs
- Resilience has to be optimized



NGOA – Reducing Total Cost of Ownership (TCO).

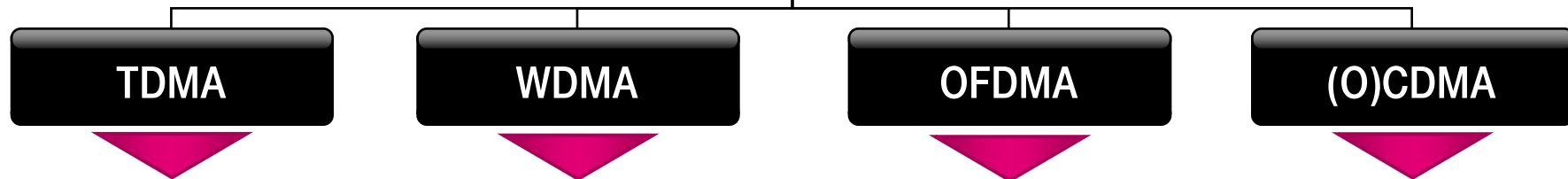
Which solution comes next enabling structural network changes?



NGOA – Reducing Total Cost of Ownership (TCO). Technology options.



Technology options for NGOA



ODN: passive



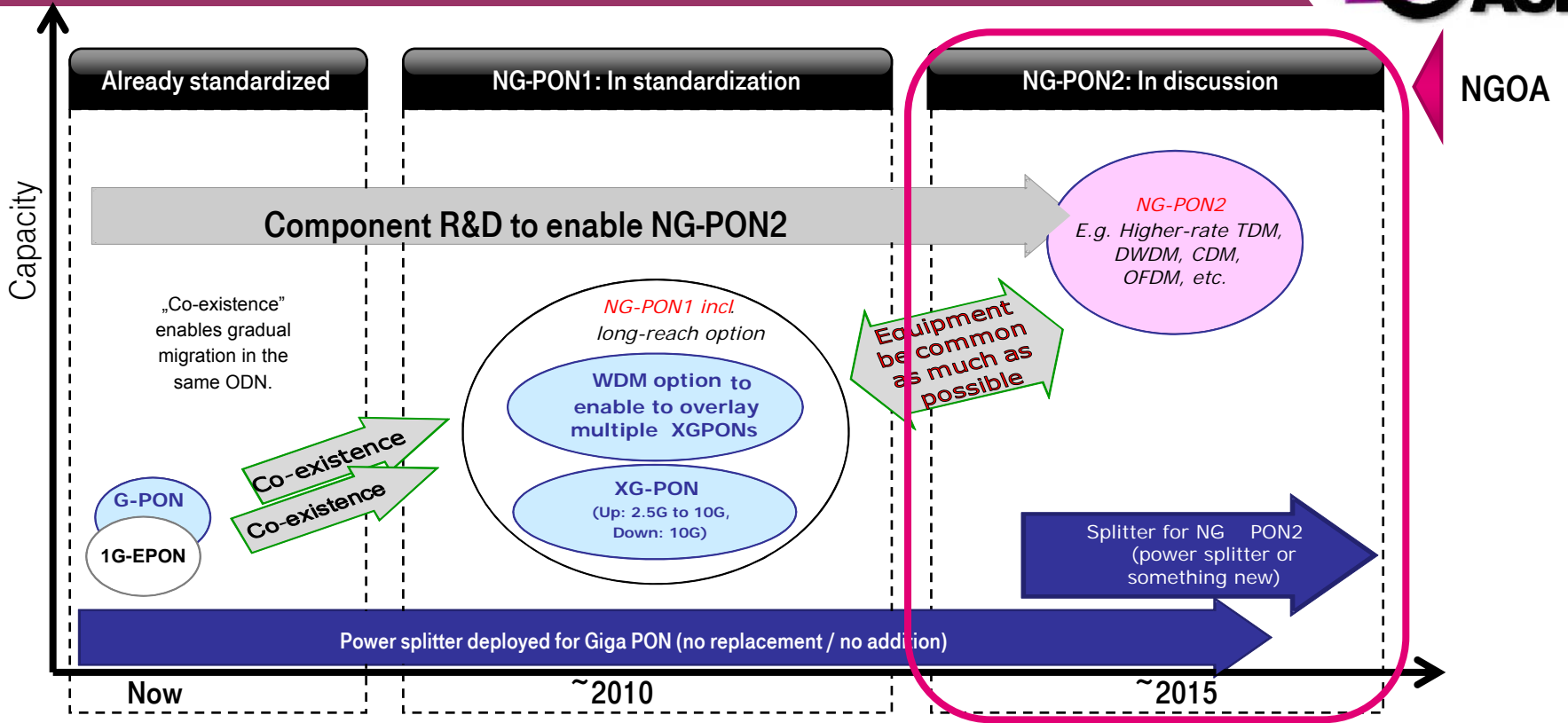
ODN: with RE



Currently each technology option is facing major technical and economical challenges.



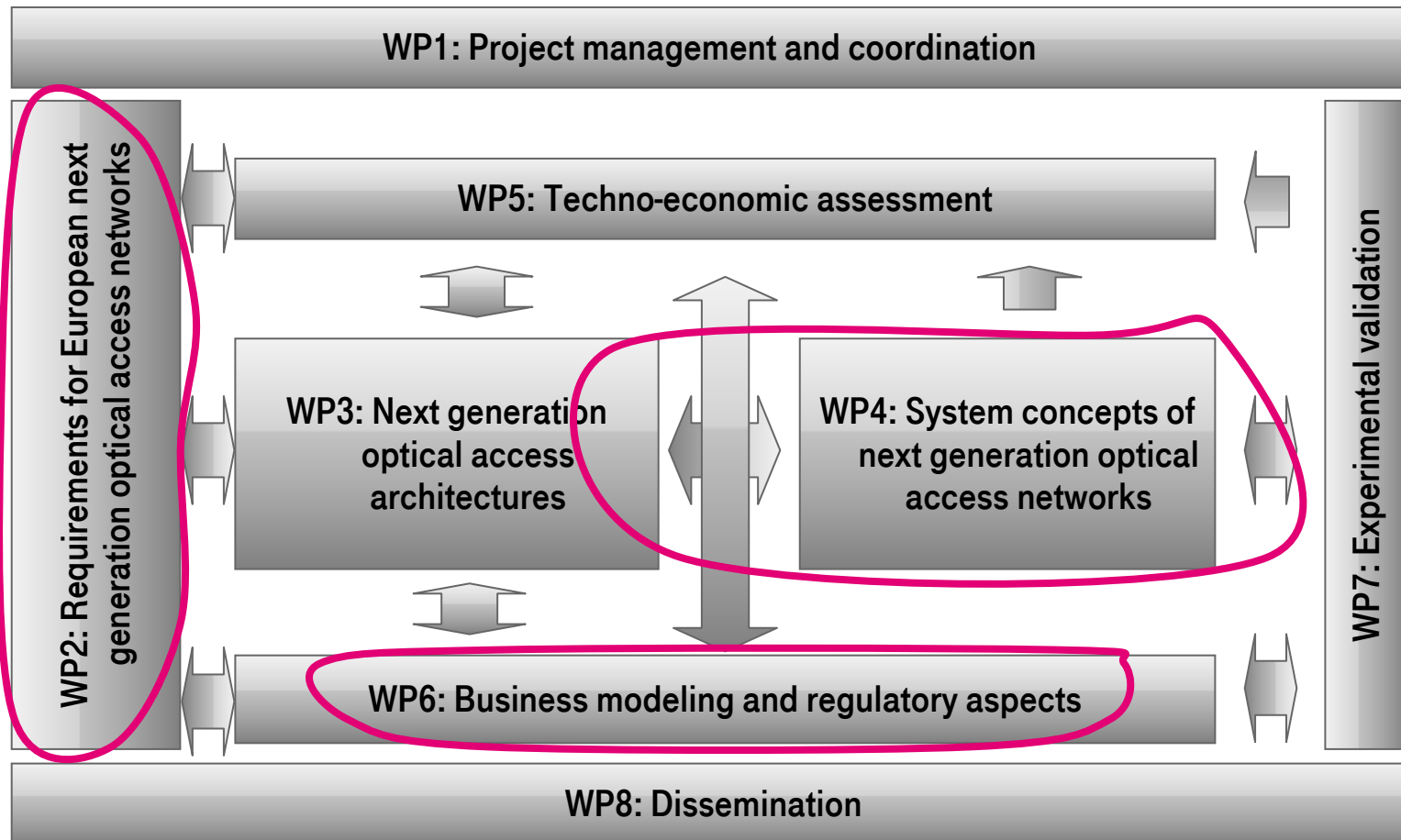
NGOA – Reducing Total Cost of Ownership (TCO). FSAN Next Generation PON (NG-PON) Roadmap.



NGOA objectives: Significant higher data rates per user, long reach & higher split at lower TCO. There are various options and proposed solutions but up to now, there is no clear picture!

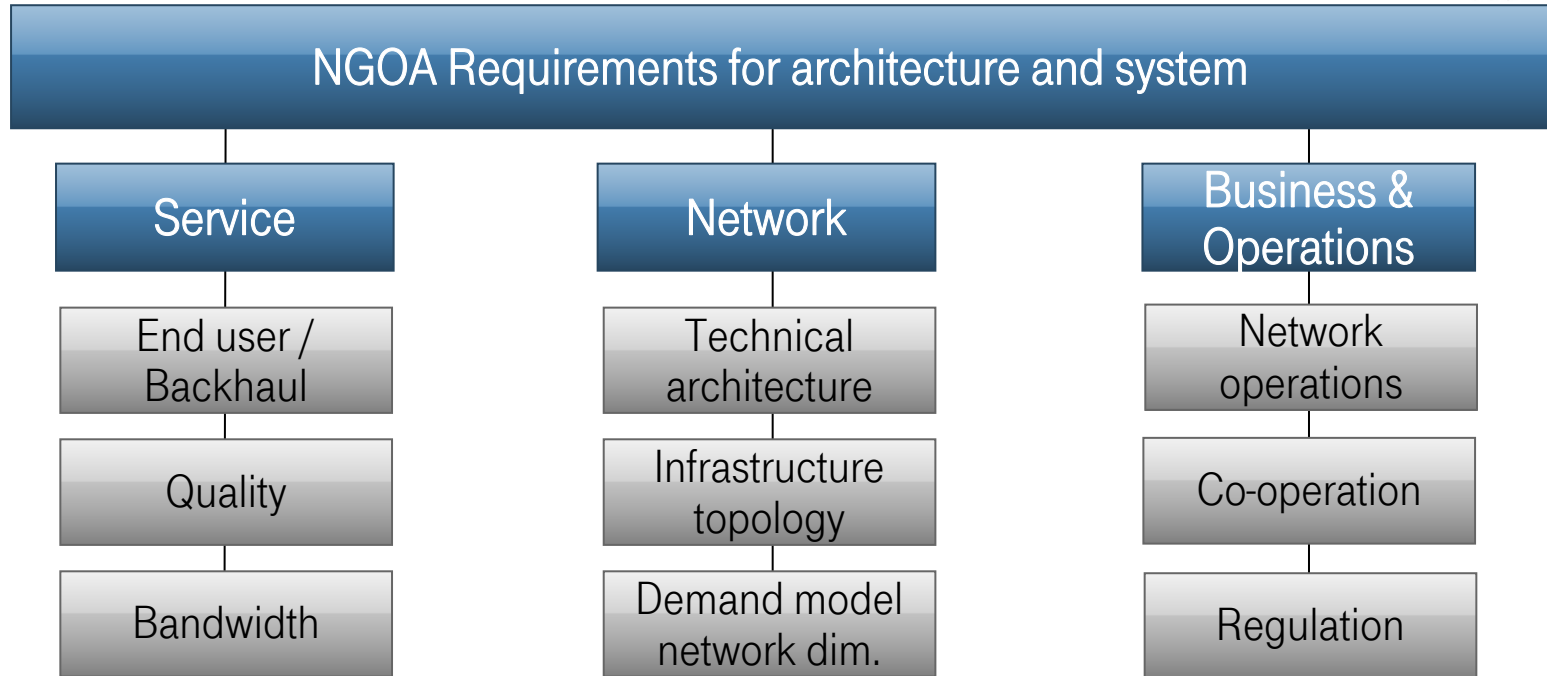


Work package structure.



Requirement on NGOA

Structure.



There will be a feedback loop to review the requirements and do a refinement if necessary depending on results of the techno-economic studies).



Thank you!

Dirk Breuer
Deutsche Telekom Laboratories
Goslarer Ufer 35, 10589 Berlin, Germany
d.breuer@telekom.de

“The work leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 249025, project OASE”

Life is for sharing.

