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Broadband World Forum – Governmental Workshop, 24 Oct 2017

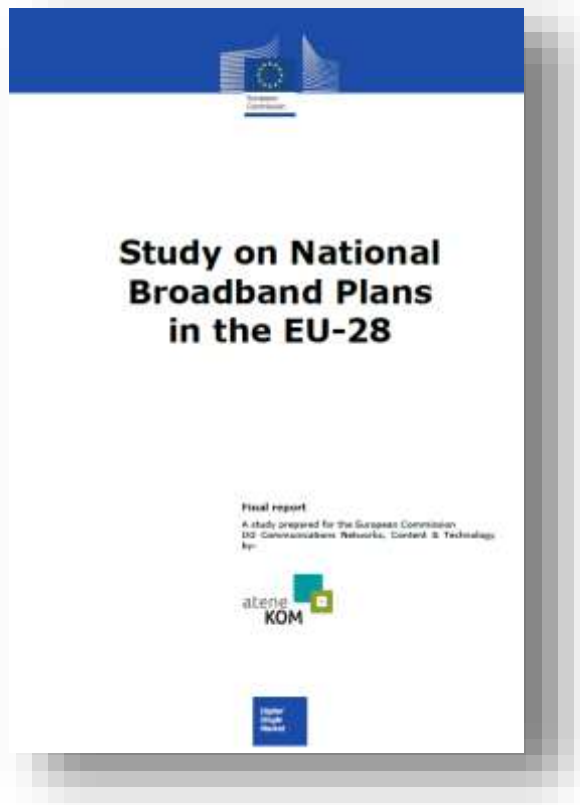




NBPs and Network Deployment across Europe

*Study on National Broadband Plans in the EU-28
(SMART 2014/0077). A short summary*

NBPs and network deployment across Europe | (SMART 2014/0077)



atene KOM recently investigated...

- ...national broadband plans of 28 Member States
- ...their practical implementation and feasibility
- ...the likelihood of achieving the EU's DAE2020 targets
- ...main trends and best practices across member states

Study Facts

- **Title: Study on National Broadband Plans in the EU-28 (SMART 2014/0077)**
- **Research period: Mid 2015 to End 2016**
- **320 Pages**

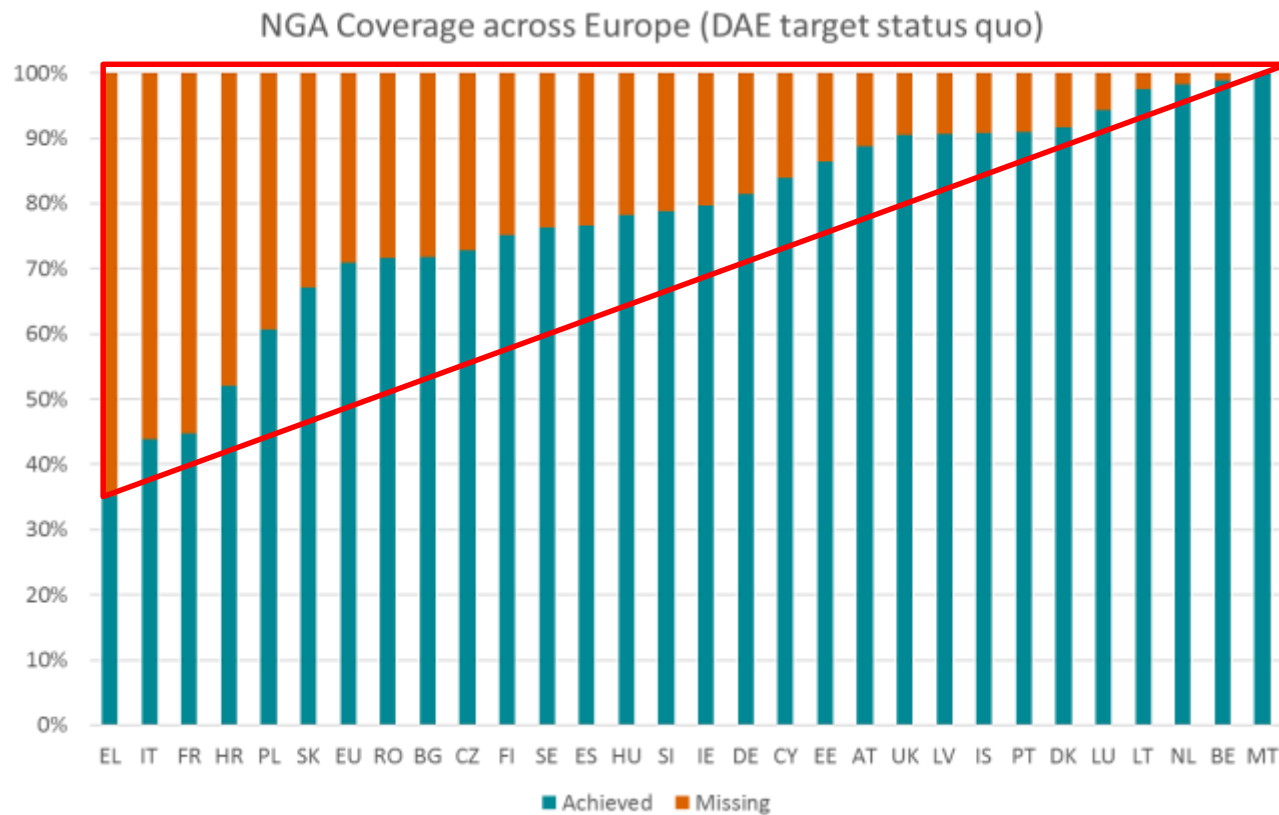
NBPs and network deployment across Europe | DAE Targets

“... to deliver sustainable economic and social benefits from a digital single market based on fast and ultra-fast internet and interoperable applications”

The Digital Agenda for Europe defined besides the basic coverage target two ambitious targets concerning NGA-Access across Europe

- all European households should have access to internet speeds higher than 30 Mbps by 2020 (target II)
- 50 % or more of European households should subscribe to 100 Mbps or more by 2020 (target III)

NBPs and network deployment across Europe | DAE Target II

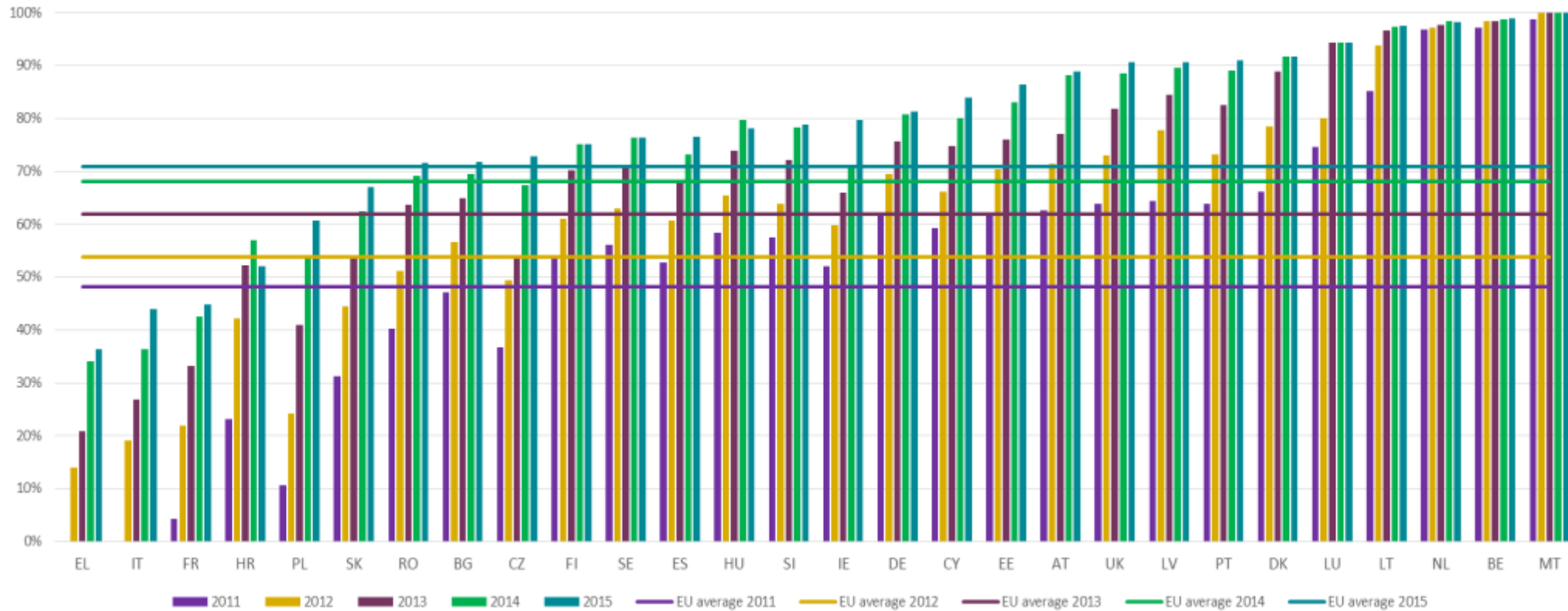


DAE Target II (100 % 30 Mbit/s)

- Only MT has achieved the target so far
- BE, NL and LT are also close to meet the target
- The majority of MS is below 90 % coverage, thus the most costly connections are still to come

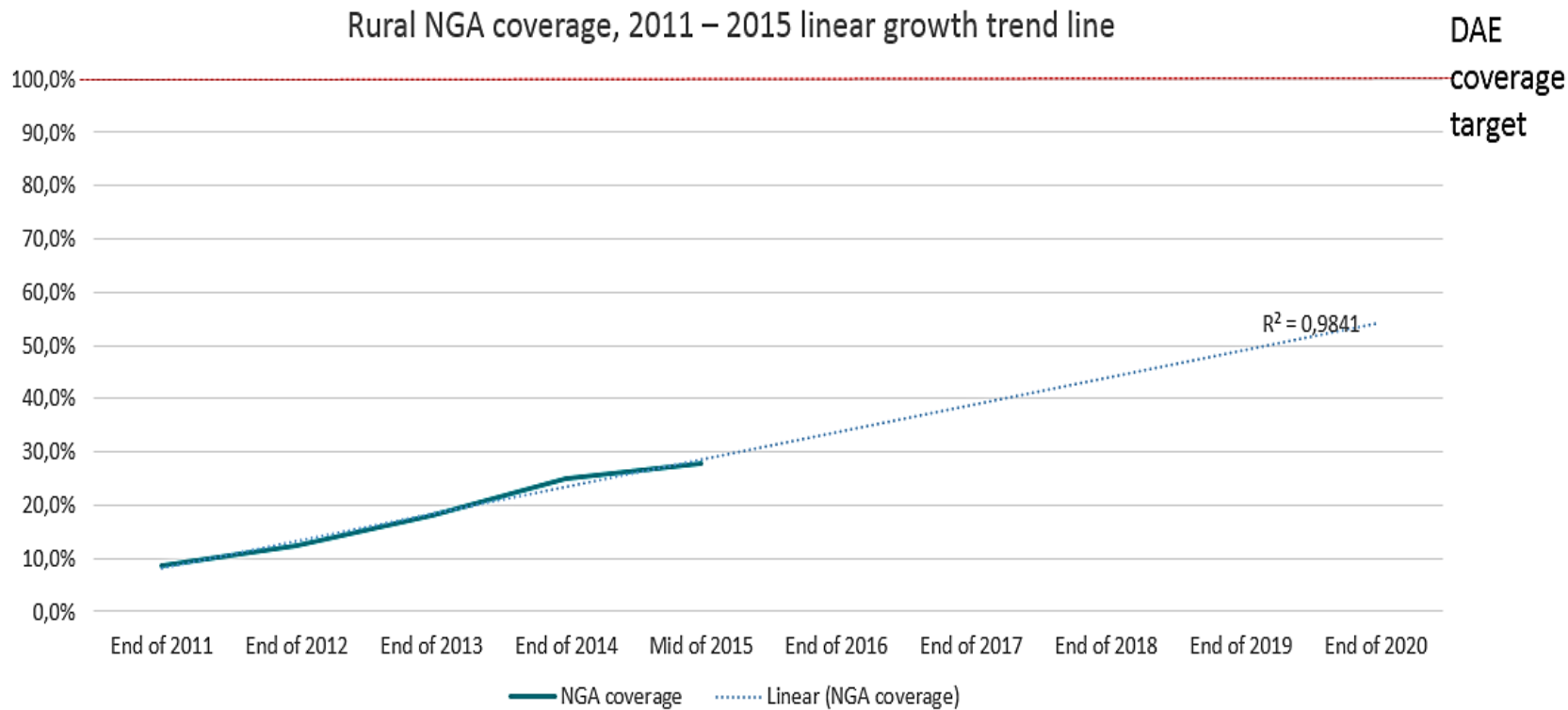
NBPs and network deployment across Europe | DAE Target II

NGA coverage, Member States 2011-2015



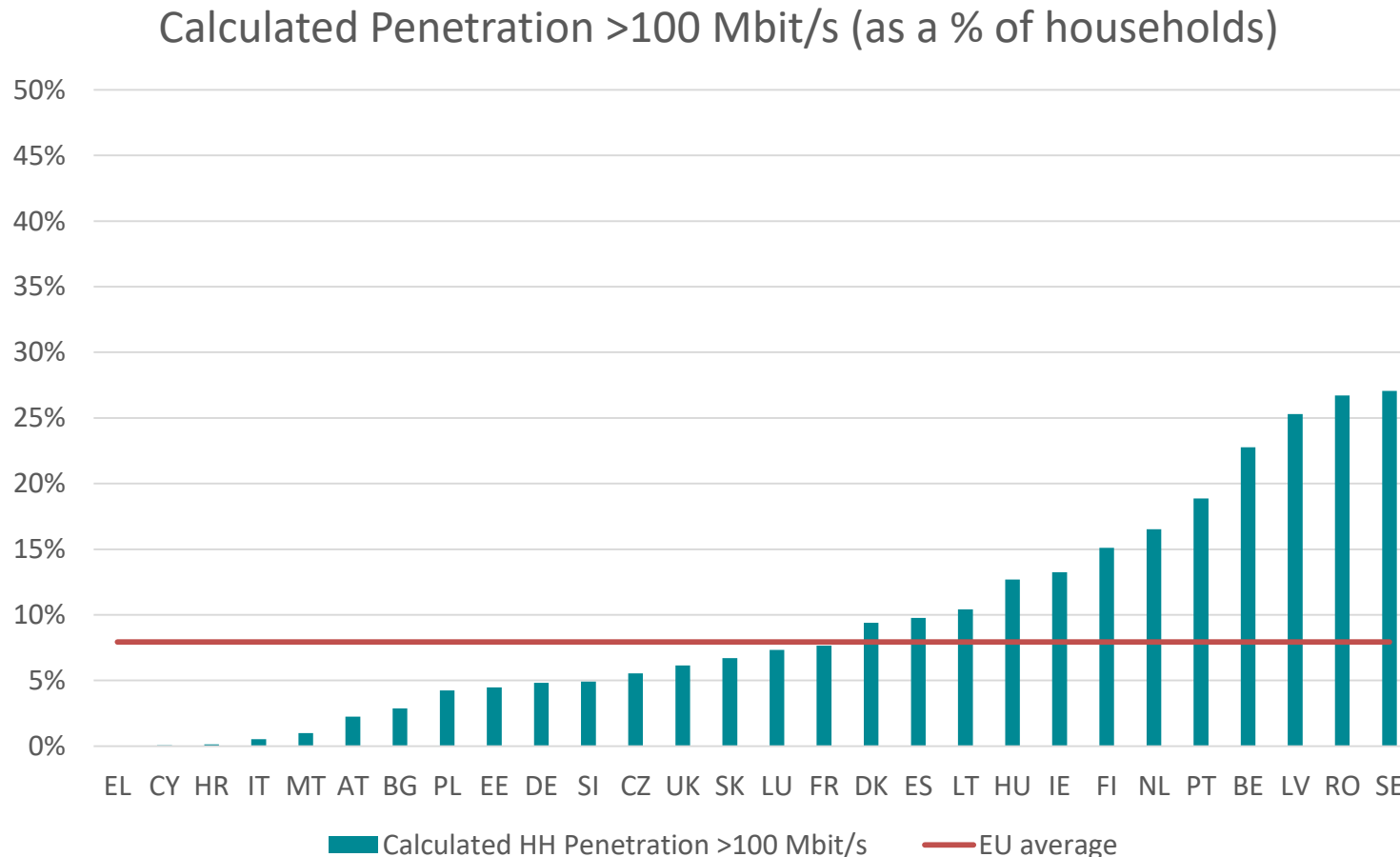
Saturation Effect becomes visible from 75 % coverage upwards. Further gains are usually in low single digits

NBPs and network deployment across Europe | DAE Target II



NGA coverage in rural areas is insufficient, speed of growth will further decrease

NBPs and network deployment across Europe | DAE Target III



- SE, RO and LV are the top 3 with calc. Household penetration rates of more than 25 %
- EU28-average is roughly 8 %
- Despite high growth, very few Member States could actually achieve DAE target III

NBPs and network deployment across Europe | DAE Target III

MS	100 Mbps and above – 2015	100 Mbps and above – 2016	Growth rate
AT	3,5%	4%	13,34%
BE	26%	37%	40,15%
BG	6 %	8%	49,13%
CY	0,07%	0%	132,25%
CZ	9 %	20%	135,08%
DE	6 %	9%	41,05%
DK	10 %	13%	36,59%
EE	7%	9%	30,86%
EL	0,01%	0%	60,43%
ES	14 %	22%	57,73%
FI	23 %	26%	15,32%
FR	8 %	11%	32,04%
HR	0,19%	1%	225,47%
HU	20 %	30%	51,95%
IE	17 %	21%	17,65%
IT	1 %	2%	116,76%
LT	17 %	19%	9,99%
LU	9 %	15%	72,98%
LV	42 %	48%	13,88%
MT	1 %	4%	336,77%
NL	18 %	32%	83,15%
PL	8 %	14%	67,31%
PT	25 %	37%	43,47%
RO	49 %	57%	16,41%
SE	42 %	50%	19,54%
SI	8 %	12%	63,32%
SK	10 %	12%	14,57%
UK	7 %	11%	58,33%

Rapidly growing demand for the most capable access networks indicates

- **The availability of ultra-fast access networks directly influences the take-up rate. There is no evidence that there was no demand for 100 Mbps and more**
- **Demand grows well quicker than supply. We need to act now to avoid a shortage of supply in near future**
- **Despite high growth numbers, baselines are usually too low to achieve the targets**



Time for New Strategies

Recurring topics, Best Practices and what Member States can do

Time for New Strategies

Generic Issues and Approaches

Issue I: Most **current NBPs are not suited** to achieve the upcoming Gigabit-targets

Issue II: In order to achieve all targets (including 5G), **fiber connections** throughout each member states will be crucial

Issue III: considering the NGA saturation effect, there will be a significant number of **areas with market failure** left

Recommendation I: **Capacity building, demand aggregation and demand stimulation** can make market failure areas more attractive

Recommendation II: Transparency and regulatory measures are key to **bring down cost** of deployment

Recommendation III: Substantial **State aid funds will be needed** to cover the remaining and least attractive areas

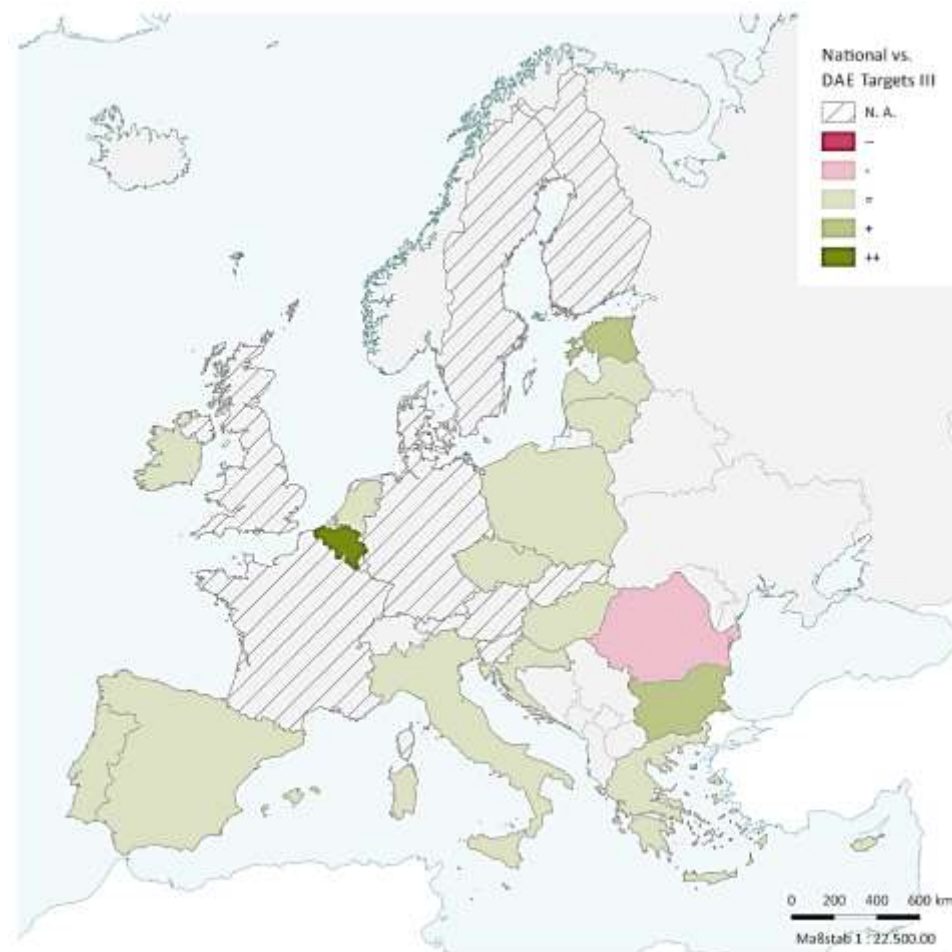
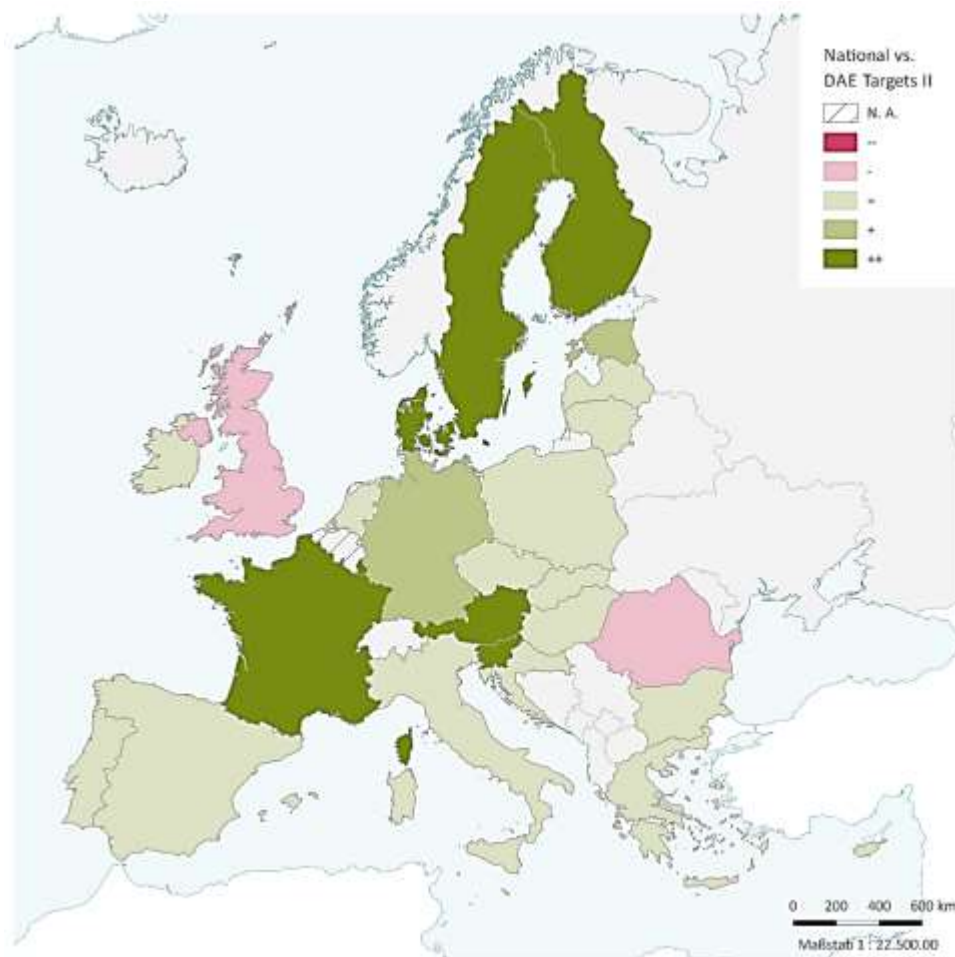


Issue I: New NBP's

The **current** NBP's targets are not fit to achieve the upcoming targets

New NBPs

Existing Targets



Most Member States' NBP targets are in line with the DAE targets

Legend: "(+)"(clearly surpasses) DAE targets; "=" convergent with DAE targets, "-" does not meet DAE targets, "N.A." not defined. Some Member States do not have targets on penetration/uptake (50 % of households having 100 Mbps subscriptions or higher) in their National Broadband

New NBPs

New Targets

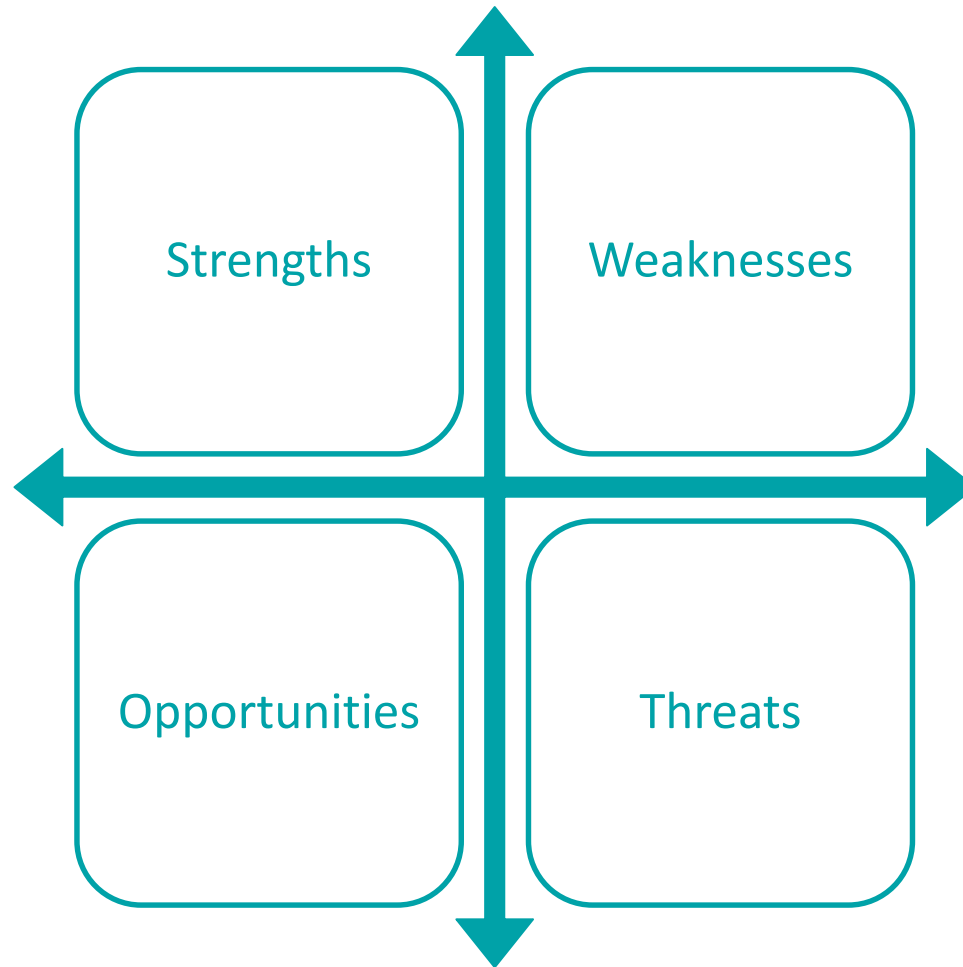
“... The Commission’s strategy on Connectivity for a European Gigabit Society, adopted in September 2016, sets a vision of Europe where availability and take-up of very high capacity networks enable the widespread use of products, services and applications in the Digital Single Market.”

The Connectivity for a European Gigabit Society defines that by 2025, the following should be achieved

- Gigabit connectivity for all main socio-economic drivers
- Uninterrupted 5G coverage for all urban areas and major terrestrial transport paths
- Access to connectivity offering at least 100 Mbps for all European households (upgradable)

New NBPs

New Targets

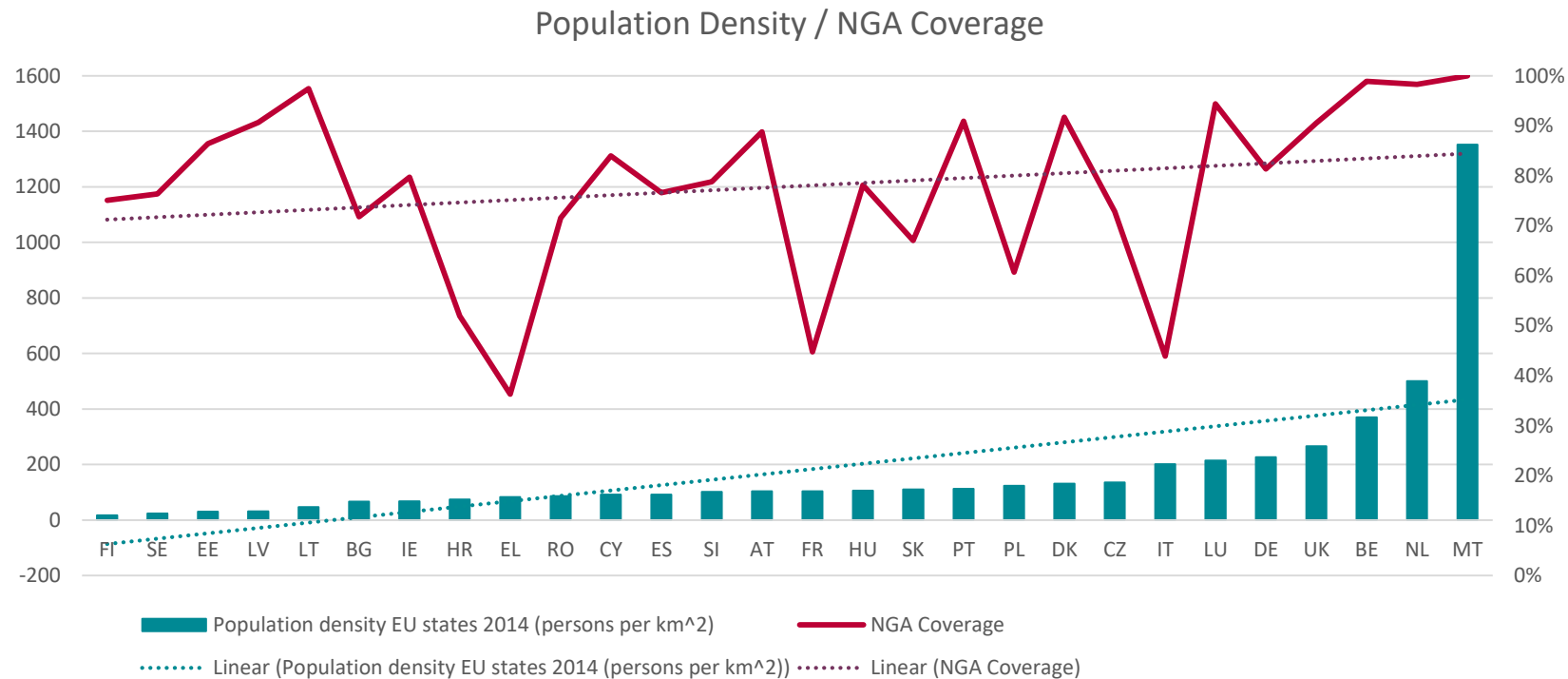


There is no „one-size-fits-all“ approach

- Each and every country is unique
- There are several determinants that favour the deployment of NGA networks (e.g. topography, urbanization, population density, avg. persons per household, existing infrastructures)
- A successful NBP will regard the starting point of a country as well as the vision of what the country wants to be by 2025

New NBPs

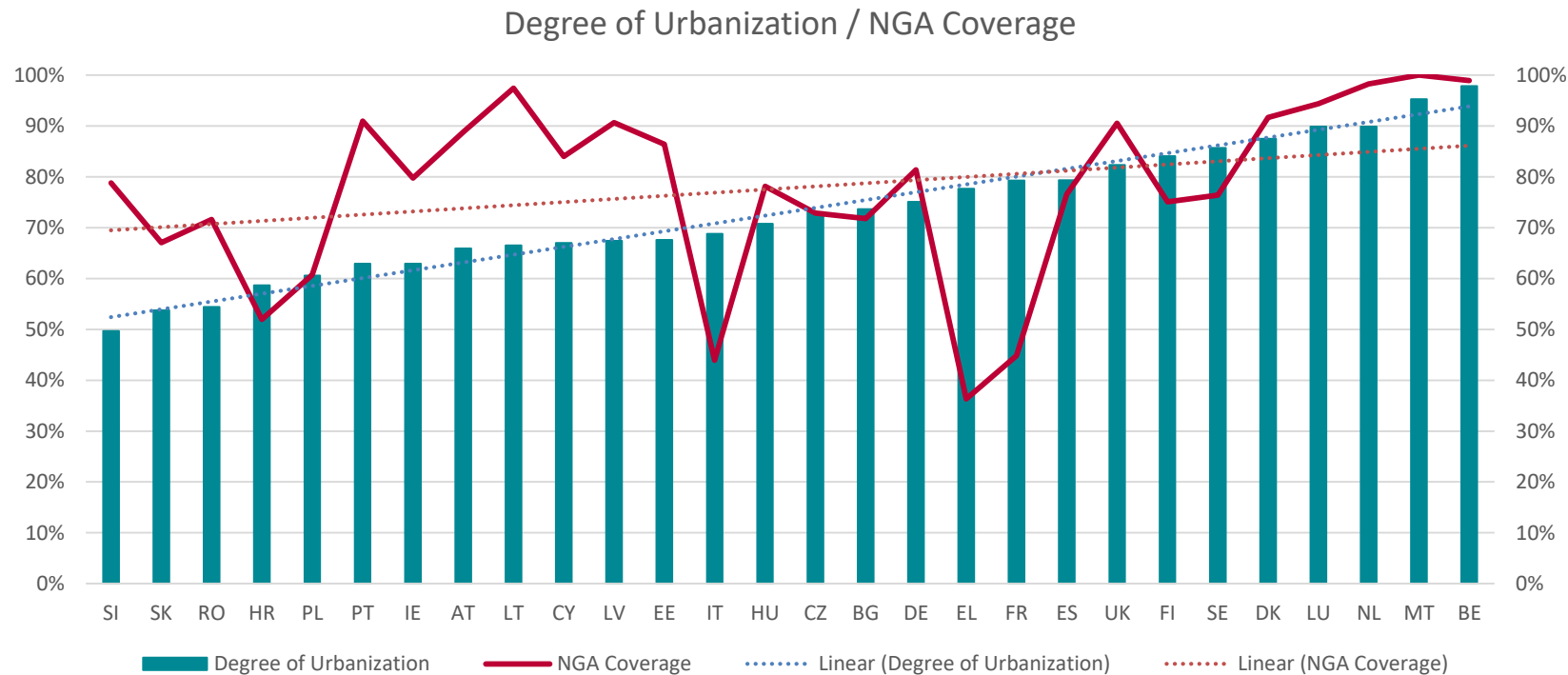
Positive and negative circumstances



- There are a lot of aspects a NBP can hardly influence
- The higher the population density, the higher NGA coverage
- Low pop. density countries will always struggle to achieve full fixed coverage

New NBPs

Positive and negative circumstances

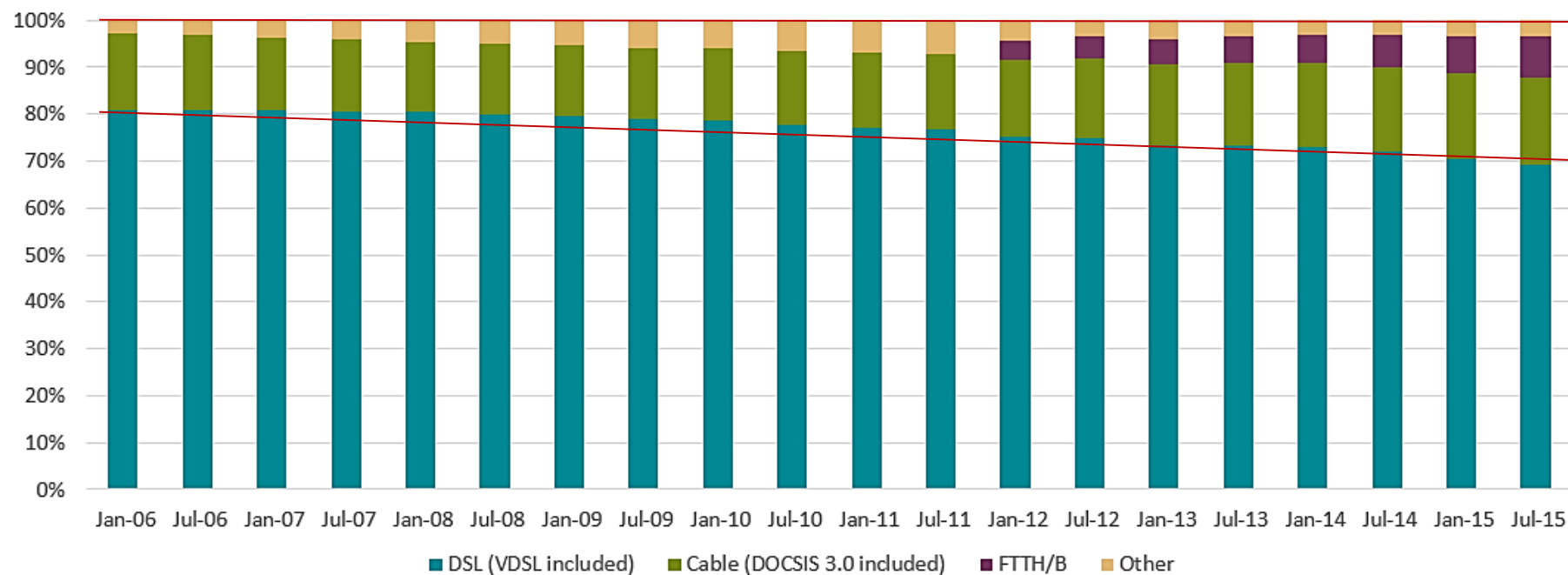


Possible measures include

- bottom-up approaches for demand aggregation
- universal Service Obligations
- public investments

New NBPs Technologies

Fixed broadband subscriptions across Europe (by technology 2006 – 2015)



Decline of xDSL technologies while technologies that usually offer *ceteris paribus* higher bandwidths, gain market shares

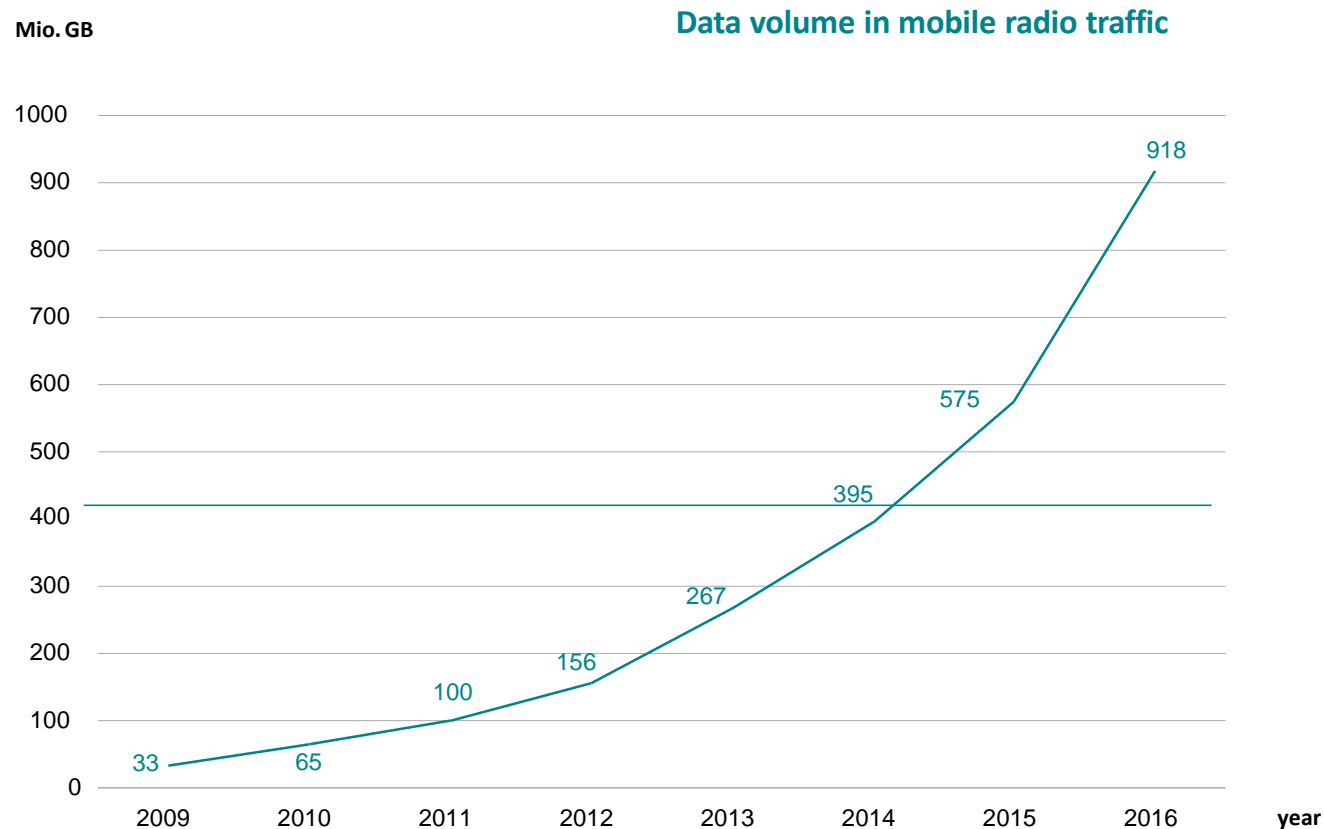


Issue II. Fiber is the base for all new Infrastructures

In order to achieve all targets (even 5G), fiber connections throughout each member states will be crucial

Fiber is the base for all new Infrastructures

Example: 5G Infrastructures

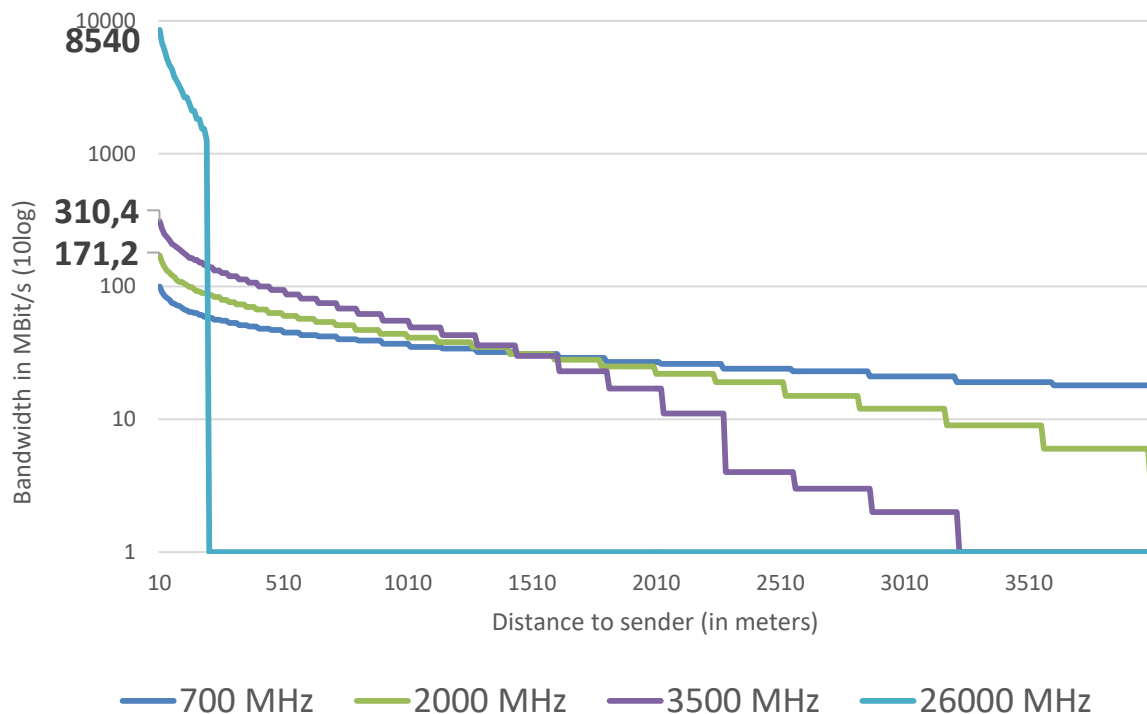


Exponential Increase of data volume

- Fiber connections for base stations will be needed
- Demand will be mainly driven by mobile video, but also new upcoming services
- Public investments

Fiber is the base for all new Infrastructures

Example: 5G Infrastructures



Low distance of spectrum with the highest bandwidths leads to new challenges

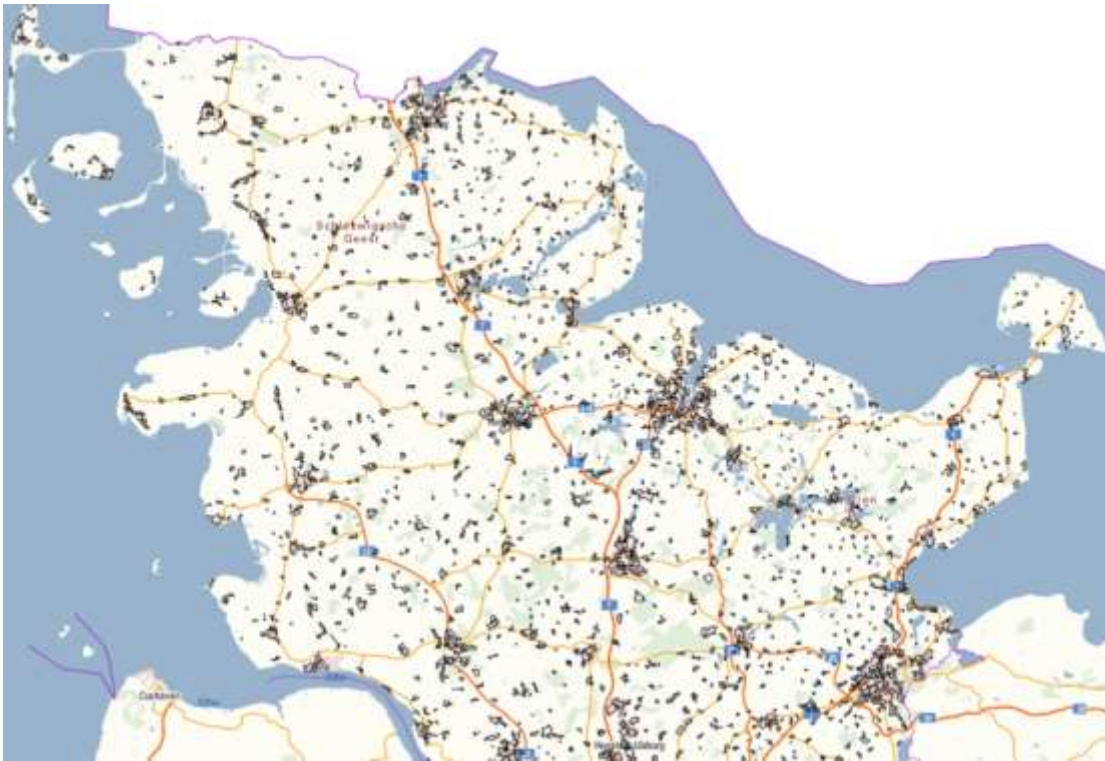
- densely built fiber networks
- use of existing infrastructures for 5G (e.g. street cabinets, street lights, traffic lights)
- legal aspects (e.g. state aid)

Issue III: Market Failure

considering the NGA saturation effect, there will be a significant number of areas with market failure left

Market Failure

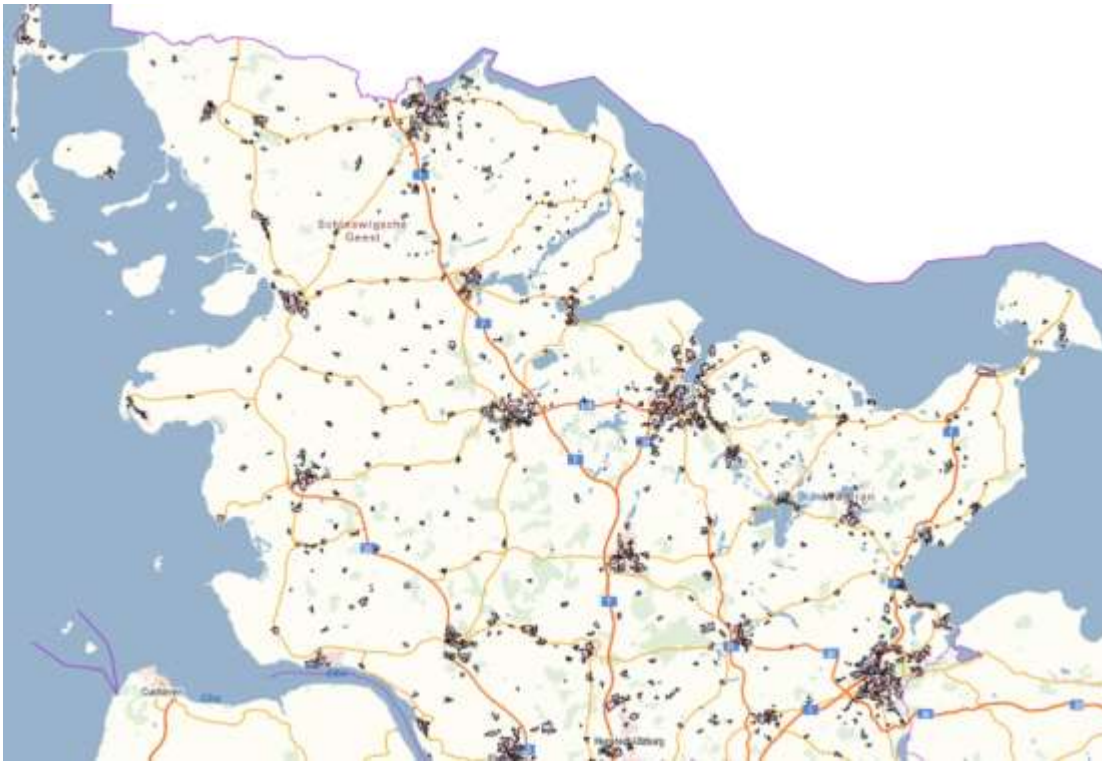
Private sector alone is insufficient



- Schleswig-Holstein
- Rural State in Germany
- Incumbent's supply map
- Offered Quality: 16 Mbit/s DSL

Market Failure

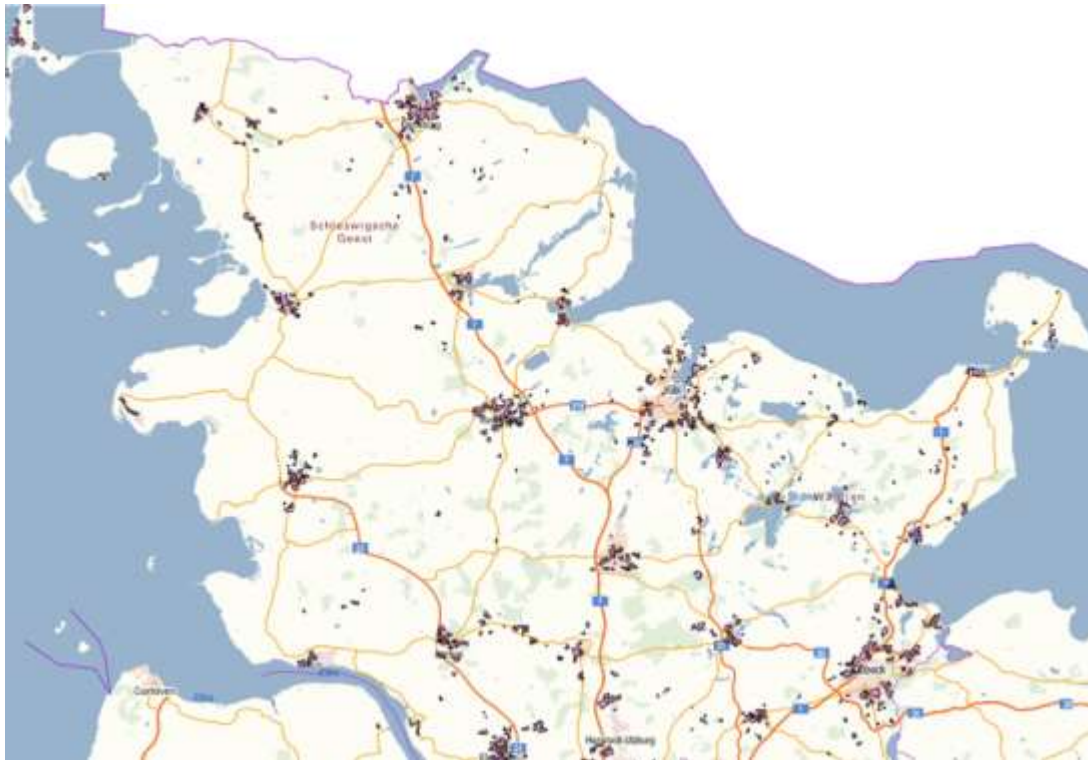
Private sector alone is insufficient



- Schleswig-Holstein
- Rural State in Germany
- Incumbent's supply map
- Offered Quality: 50 Mbit/s VDSL

Market Failure

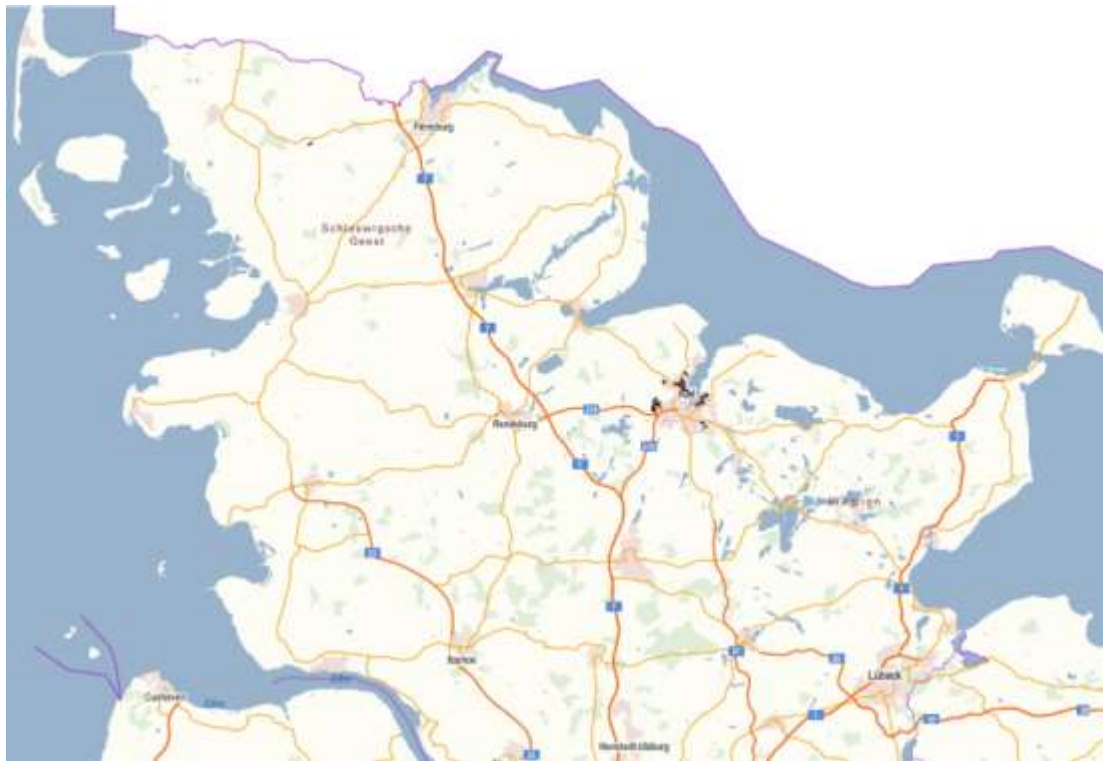
Private sector alone is insufficient



- Schleswig-Holstein
- Rural State in Germany
- Incumbent's supply map
- Offered Quality: 100 Mbit/s VDSL

Market Failure

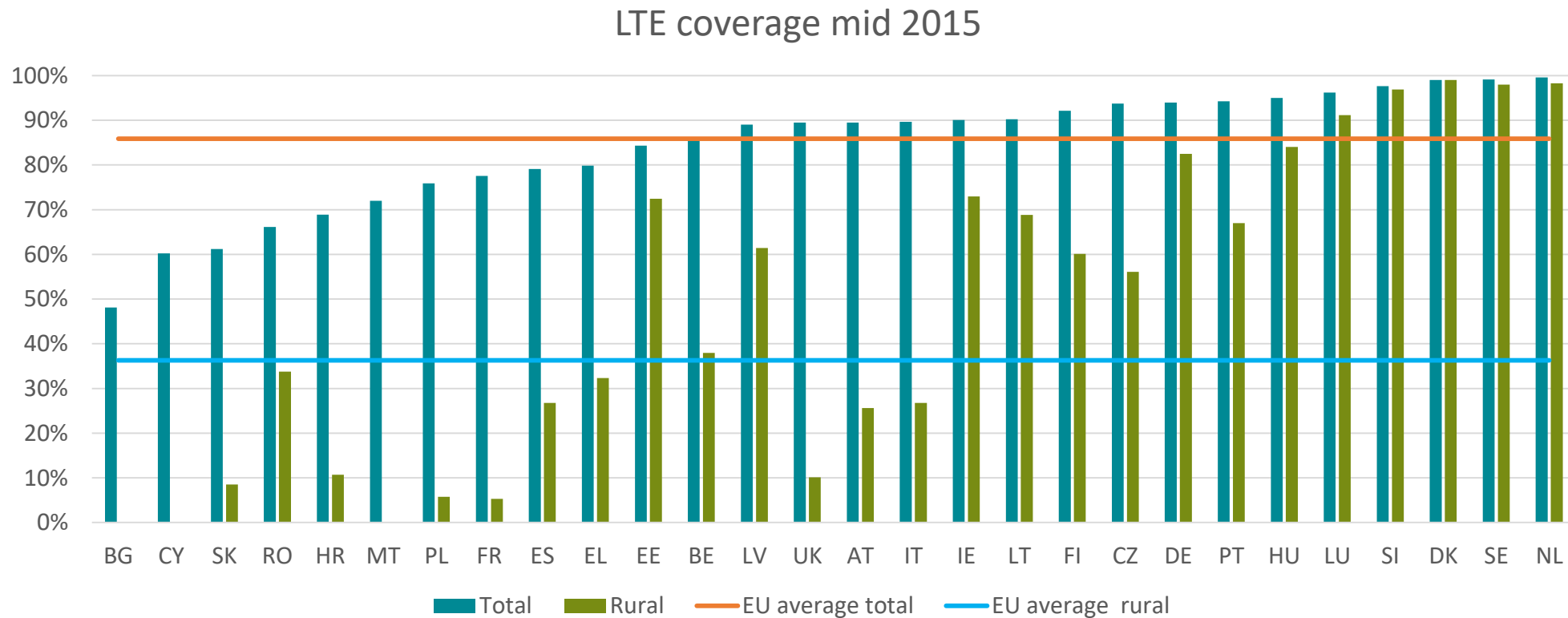
Private sector alone is insufficient



- Schleswig-Holstein
- Rural State in Germany
- Incumbent's supply map
- Offered Quality: 200 Mbit/s FTTB

Market Failure

Private alone is insufficient

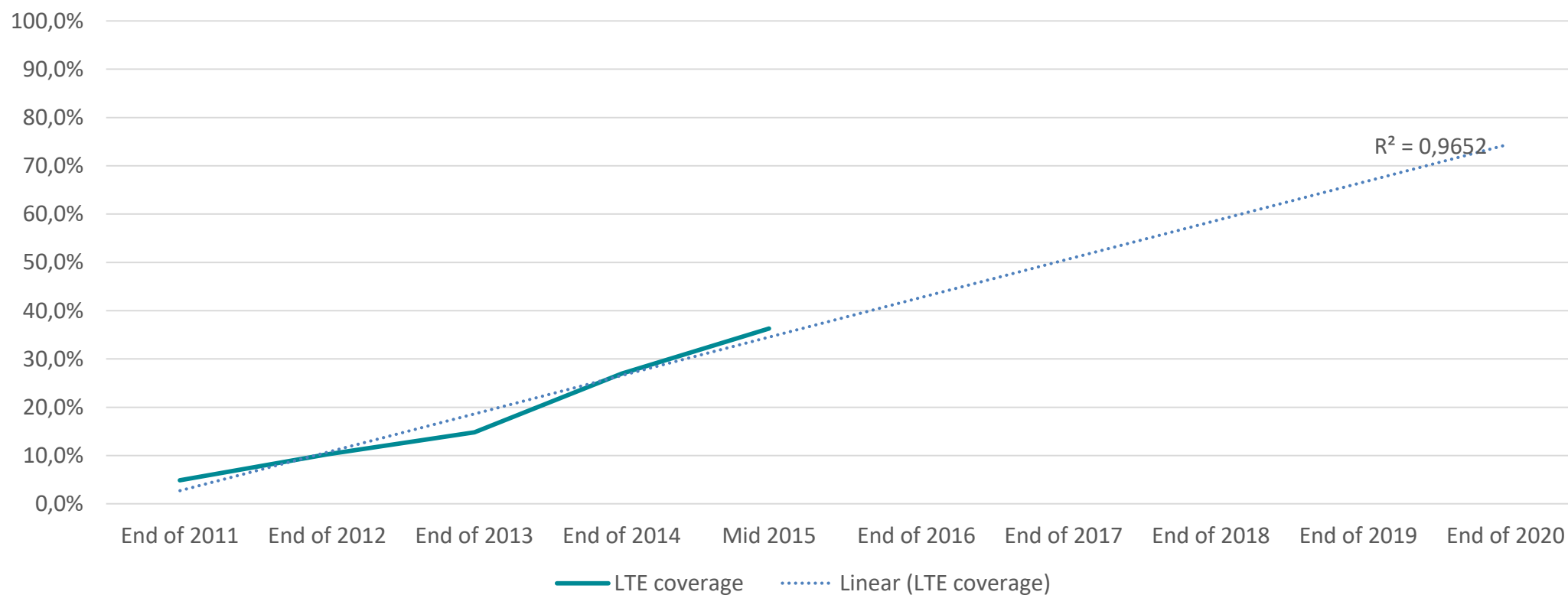


LTE is far from being a full coverage alternative

Market Failure

Private alone is insufficient

rural LTE coverage in Europe, 2011 - 2015



Coverage obligations are crucial to avoid a further digital divide between urban and rural areas



Recommendation I: Demand

Capacity building, demand aggregation and demand stimulation can make such areas more attractive

Demand

Digital Illiteracy

Summarisation of MS-DAE - socio economic indicators							
digital inclusion				public services			
EU-28 MS	increase regular internet use	...for disadvantaged people	persons that have never used the internet	People using eGovernment	returning filled in forms		
DAE	65% -> 70% / 2015	41% -> 60% / 2015	max. 15%	50%	50% of a)		
AT	80,6	64	13,42	67,1	36,7		
BE	83,5	72	12,64	60,6	39,2		
BG	54,6	33	34,71	29,6	15,1		
CY	69,6	53	26,00	46,6	23,7		
CZ	77,2	66	13,36	39,1	12		
DE	84,5	73	9,67	60	19,1		
DK	93,2	89	2,79	91,2	71,1		
EE	85,8	73	9,05	91,2	80		
ES	74,7	45	19,02	62	37,7		
FI	90,5	62	5,29	85,5	63,2		
FR	81	84	10,77	72	48,4		
EL	63	70	29,97	68,3	37,1		
HR	65,8	48	26,24	49,3	21,3		
HU	71,6	52	21,16	55,6	31,6		
IE	77,6	63	16,47	61,1	56,5		
IT	63,4	52	27,89	35,3	17,9		
LT	69	50	24,56	60,4	42,3		
LU	96,8	94	2,18	72,1	35,7		
LV	74,9	58	18,17	65,2	36,4		
MT	74,4	59	21,63	54,2	28,5		
NL	91,5	87	4,44	79,4	56,1		
PL	64,8	47	27,08	38,1	22,5		
PT	65	51	27,86	61,8	40,8		
RO	51,8	33	31,79	17,5	7,96		
SE	88,6	80	4,52	79,4	48,9		
SI	70,5	50	22,12	60	24,2		
SK	74,2	54	16,25	62,8	16,3		
UK	89,6	81	6,14	52,9	34,4		

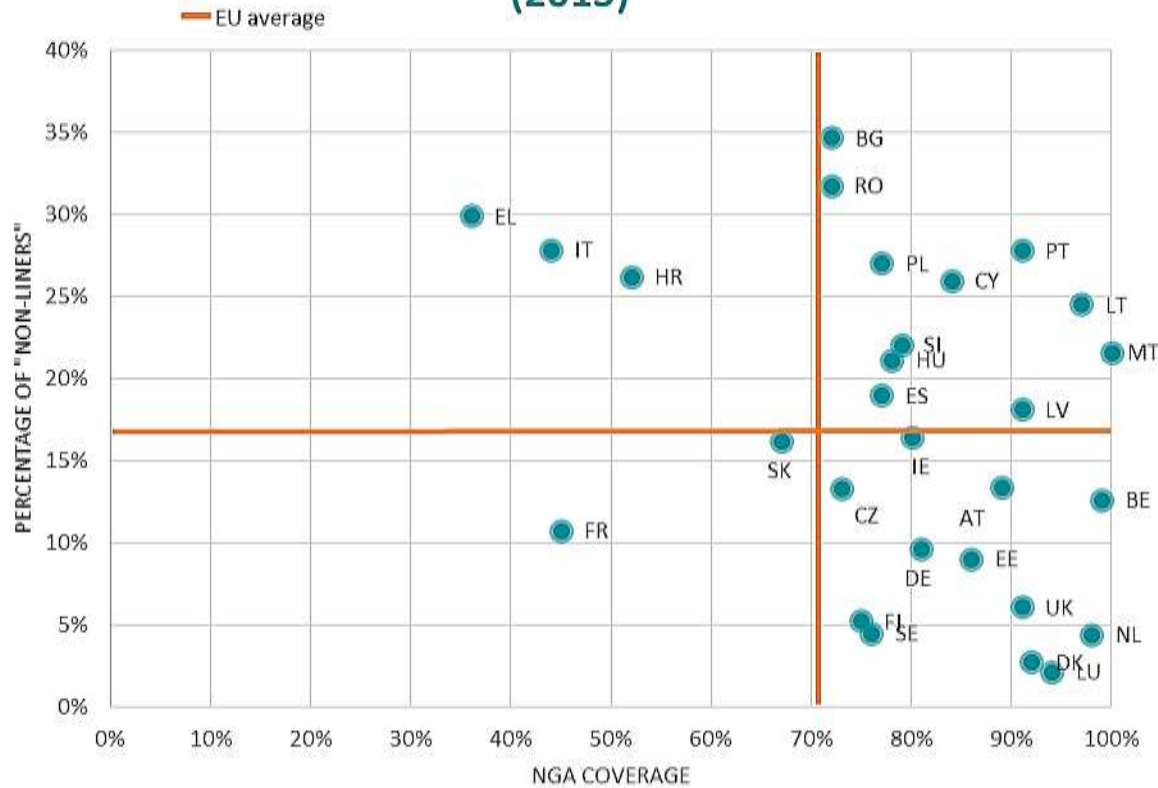
Socio-Economic indicators show lack of demand side measures

Indicator	Success	Failure
Reg. use	19	9
Disadvantaged	14	14
„Non-liners“	12	16
eGov. use	21	7
Filled forms	5	23

Demand

Digital Illiteracy

NGA Coverage vs. Percentage of "non-liners"
(2015)



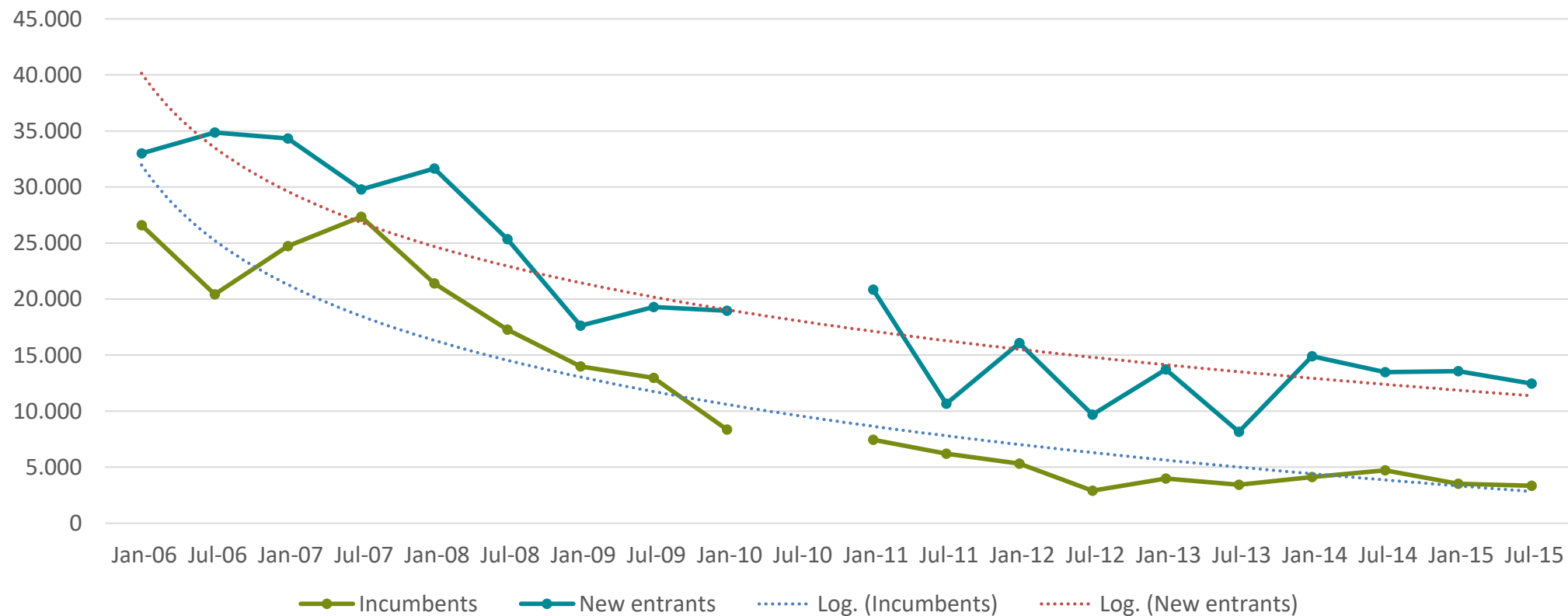
Possible measures include

- Awareness raising campaigns
- Public WLAN
- Use of digital media in education
- Incentives i.e. vouchers
- Capacity building
- Tax deductions

Demand

Slowing down of new subscriptions

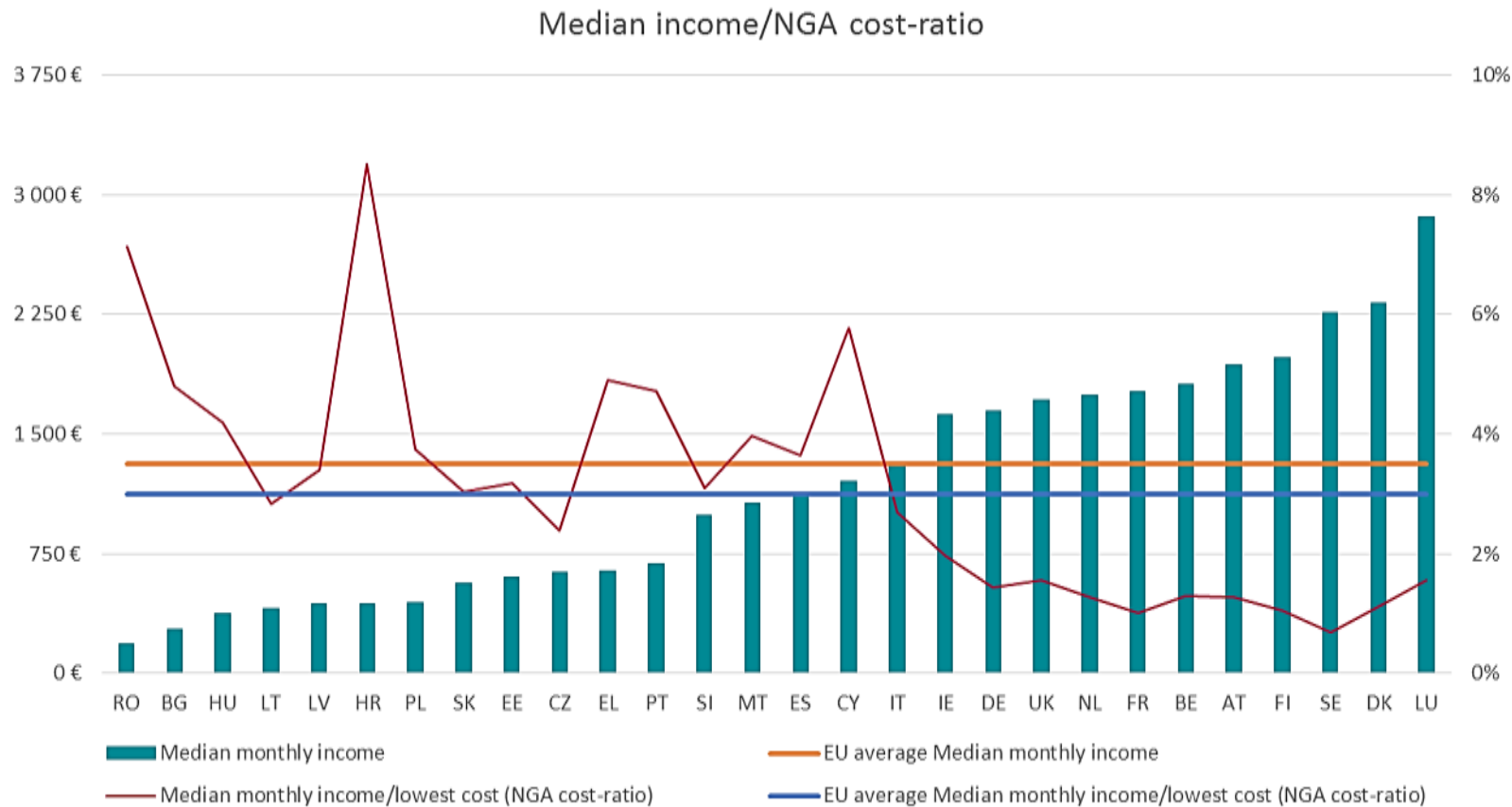
Fixed Broadband subscriptions per day by Operator at EU level 2006 - 2015



Declining number of new connections per day, indicating serious slowing of growth

Demand

Cost of subscriptions



Possible measures include

- Tax deductions
- Vouchers, Grants
- Free public WLAN
- Free internet access within centers of education (e.g. universities, libraries, schools)



Recommendation II: Reducing Costs

Transparency and regulatory measures are key to
bring down cost of deployment

Reducing Costs

Cost Reduction Directive

Pillar 1: Access to
& transparency of
existing physical
infrastructure

Pillar 2:
Coordination &
transparency of
planned civil works

Pillar 3: Permit
granting

Pillar 4: In-building
infrastructure

Dispute Resolution
Body & Single
Information Point

- **Transposition of the Cost Directive Directive and the subsequential results will be crucial to bring down costs of deployment**
- **Most Member States have fully or partially transposed the CRD**
- **However, each country should evaluate the actual impact of the CRD in order to avoid negative impacts**

Reducing Costs

A market for Infrastructures

Stages of the Value Chain		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Stage 1 Infrastructure-/ Network roll-out							
	roll-out and rent of Dark Fibre						
Stage 2 Network Operation							
	roll-out and operation of active network						
Stage 3 Services							
	offering services						

To increase the dynamic within the market, make more efficient use of infrastructures und thus decrease the risk of market failures..

- ...legal frameworks should enable a variety of infrastructure investors
- ...a variety of financial instruments need to be available
- ...open-access models should be encouraged

Reducing Costs

Single Point of Information / BCO



Communication, information, capacity building and networking are the main tasks of the BCOs.

BCOs usually offer:

- Know-how-transfer for all stakeholders and target groups
- Public relations activities (website, newsletters, brochures, guidelines, events, etc.)
- Capacity Building
- Best practices and identification of synergies
- Standardization and other working groups

Reducing Costs

Increased Transparency



Mapping tools are important to avoid overbuilding and duplication of infrastructures, use existing synergies and increase the likelihood of joint deployment

Examples of typical mapping systems are

- Service Mapping
- Infrastructure Mapping
- Investment Mapping
- Demand Mapping

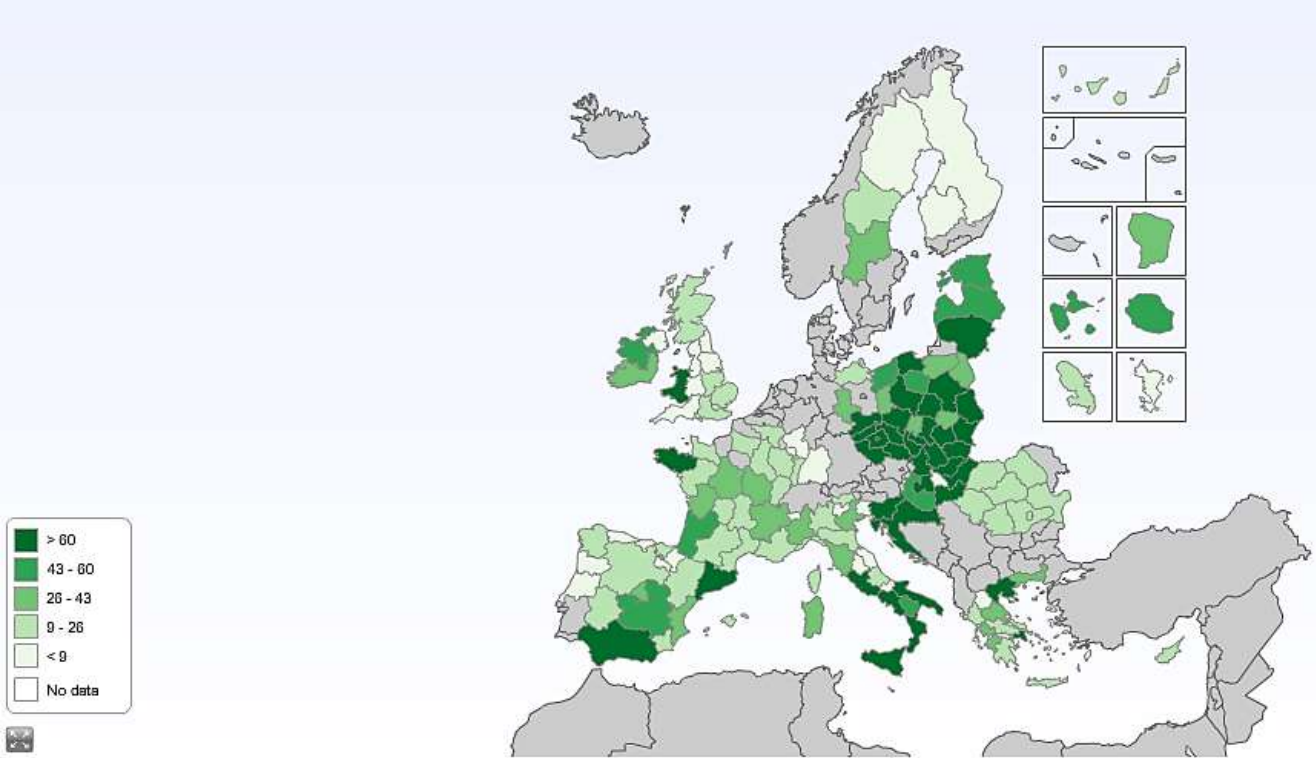




Recommendation III: State Aid

Substantial State aid funds will be needed to cover the remaining and least attractive areas

State Aid ERDF



ERDF is an important source of funding for many Member States.

Blended finance is crucial to meet the demand in a given country

MS	ESIF	MS	ESIF	MS	ESIF	MS	ESIF
Italy	1.165 M	Croatia	335 M	Ireland	75 M	Belgium	21 M
Poland	1.025 M	Greece	323 M	Sweden	71 M	Cyprus	19 M
France	628 M	Slovakia	278 M	Slovenia	68 M	Malta	18 M
Czech Republic	563 M	United Kingdom	164 M	Lithuania	64 M	Portugal	8 M
Spain	449 M	Germany	139 M	Latvia	51 M	Finland	0.5 M
Hungary	400 M	Romania	100 M	Estonia	43 M		

State Aid National Funding Schemes



Funding schemes on national (or regional) level will be necessary to achieve quick wins in areas deemed economically not feasible. Funding schemes should

- Support the National/European targets
- Cluster projects to a size which helps to mitigate risks
- avoid fragmentation and a digital divide
- Be governed by building standards that technically guarantee open access and ensure technological sustainability
- Be available for areas with market failure
- Not crowd-out private investment



Conclusion

Key Aspects of future NBPs

Conclusion

How to define a Gigabit-Strategy

- ✓ Define a *vision* for a Gigabit-Society in your country. Think about the application level: How can digitization increase the welfare of your people? What drives demand? What services will be needed? How could other sectors profit?
- ✓ Analyze your starting position, your own strengths and weaknesses. *Define targets* that are in line with the European targets or at least support them (*steps* towards a Gigabit-Society). Exclude targets that you cannot influence.
- ✓ Convergence of networks: Include Fixed, Wireless and Fixed Wireless technologies. Define their advantages, roles and use cases. *Fiber should be the base for all technologies.*
- ✓ Define a regulatory framework that will *support your approach*. Bring in the private and third sector to achieve acceptance.
- ✓ Define responsibilities on national, regional *and* local level. Each level has its own strengths and weaknesses.
- ✓ Define concrete measures of what you want to do and explain what you expect from them.
- ✓ Define the *support mechanisms* that will be available (e.g. finance, mapping tools, capacity building).
- ✓ *Standardize* (e.g. methods of deployment) as much as possible to allow for economies of scale and foster open access to avoid inefficiencies.
- ✓ If resources are short, *prioritize* and maximize the effects of your efforts (e.g. backbone investment instead of access-networks)
- ✓ Define timeframes, make your results controllable (*SMART* indicators help).
- ✓ *Control* the results. Act, if the results don't fit the intention.

Thank you very much!

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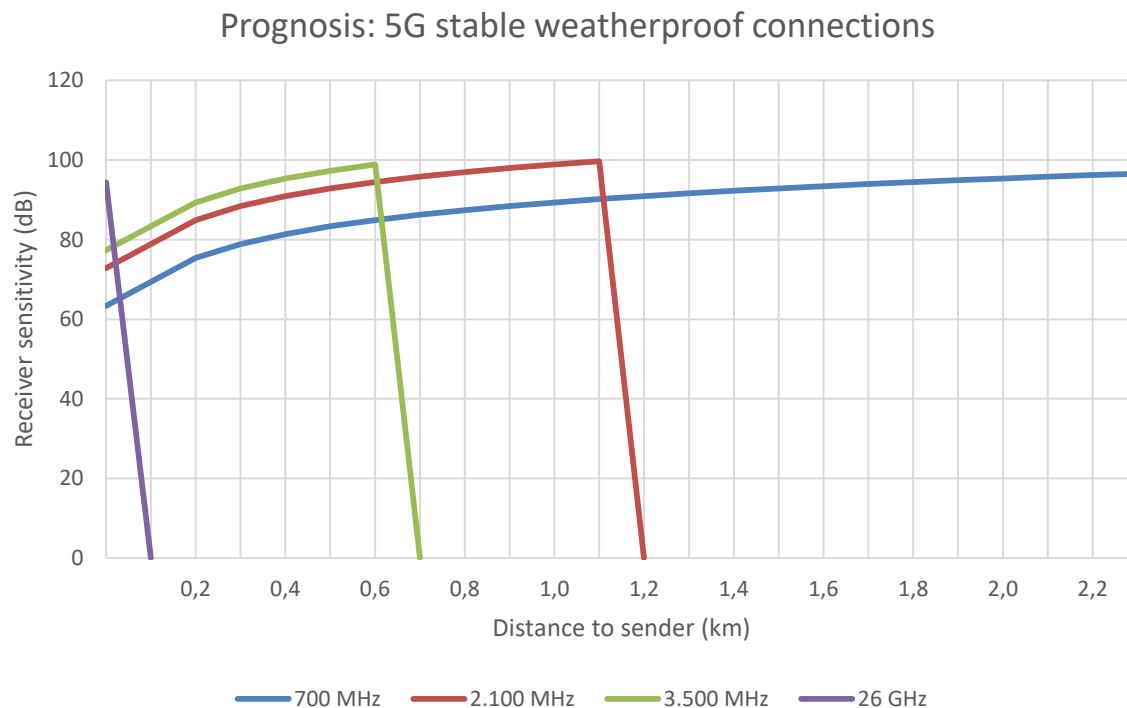
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Fiber is the base for all new Infrastructures

Example: 5G Infrastructures



The issue of low distance between base stations is even exacerbated due to weather influences on mobile network signals