Mapping of Terrestrial Broadband

Po-Wen Liu

The views expressed are the opinion of the presenter and might not correspond to that of the EIB Group.
ABOUT EIB

EIB is the EU Bank
The European Investment Bank, the EU Bank

- Financing partner for the EU Member States and institutions since 1958;
- More than 90% of lending is within the EU;
- Financial support to projects outside the EU amounted to 10% of EIB lending;
- Shareholders: 28 EU Member States;
- The EIB contributes to the realisation of investment projects that further the economic, social and political priorities of the EU;
- More than 60 years of experience in financing projects;
- Around 3 000 staff – not only finance professionals, but also engineers, sector economists and socio-environmental experts.
EIB Group financing was 64.2bn channeled in these key areas in 2018

- **Innovation**: €13.5bn
- **Environment**: €15.2bn
- **Infrastructure**: €12.3bn
- **SMEs**: €23.3bn
We deliver **impact** where it is needed

**JOBS**
5 million jobs in small businesses

**HEALTH**
27.3 million people with access to improved health services

**WATER**
20 million people benefiting from safer drinking water

**TRANSPORT**
290 million additional passengers

**ENERGY**
34.3 million households powered by EIB projects

**DIGITAL**
29 million people with new or upgraded connections
CHALLENGES IN THE INVESTMENT IN DIGITAL INFRASTRUCTURE
Investment gaps in EU

- Mission to tackle insufficient investment in policy goals
- Digital sector is suffering from large underinvestment in Europe (market failures):
  - R&D: accounts for R&D/GDP gap with US
  - **Infrastructure**: Economic growth constraints due to lack of very high capacity networks
  - Manufacturing and services: KET argument
  - Education and skills: lack of ICT experts
  - Data security: EU is lagging (NSA ...)

Po-Wen Liu

Mapping of Terrestrial Broadband

02/07/2019
There exist a number of challenges involving financing FTTH networks in Europe

**High cost and low viability of deployments**
- The required investments to reach the targets of the DAE and the EGS amount to 384 bn€ until 2025
- 80% of this cost is needed in rural and suburban areas which lack financial viability

**Access to finance**
- Currently operators suffer to secure financing with tenors exceeding 10 years
- Governments are scaling back planned subsidies for FTTH build-outs

**Uncertain regulatory environment**
- The EU-wide and national FTTH regulations are under development and to large extent untested → operators are cautious to commit to investments in an uncertain environment

**Market mechanisms alone are unable to deliver the envisaged coverage targets of the DAE.**

**Significant public sector support is required in form of subsidization and long-term debt finance.**

**Regulation remains one of the crucial aspects for future investments**
The cost per home passed and financial viability threshold

- In **urban areas**, the cost per home passed with FTTH is between EUR 150-540
- In **suburban areas**, the cost varies between EUR 540-2700
- In **rural areas**, the cost is beyond EUR 2700 per home passed
- The financial viability threshold lies somewhere in the range of EUR 600-700 per home passed
- Although this represents 55-60% of the European population, it represents only 20-25% of the total required investment cost

Estimates based on market benchmarks and EIB experience
INVESTMENT NEEDED TO REACH THE DAE AND EGS GOALS
## Selected EU regulation/policy for broadband

<table>
<thead>
<tr>
<th>Digital Agenda</th>
<th>State Aid&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Gigabit Society</th>
<th>ECC</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% coverage</td>
<td><strong>White areas:</strong> No coverage NGA (&gt;= 30Mbps)</td>
<td>100% schools, transport hubs, public services, digitally intensive enterprises &gt;= 1Gbps By 2025</td>
<td>Very high capacity Network: «fibre elements» or equivalent</td>
</tr>
<tr>
<td>&gt;= 30 Mbps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By 2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50% up-take</td>
<td><strong>Grey areas:</strong> One operator NGA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;= 100 Mbps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By 2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Black areas:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;= Two operators NGA</td>
<td>100% coverage &gt;= 100 Mbps Upgradable Gbps By 2025</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

1: 2013/C 25/01
### Main assumptions

<table>
<thead>
<tr>
<th>Choice of technology of new deployments</th>
<th>Digital Agenda for Europe (DAE)</th>
<th>European Gigabit Society (EGS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5G Connectivity</td>
<td>Gigabit Connectivity</td>
</tr>
<tr>
<td>T2 – 100% coverage with 30 mbps</td>
<td>T3 – 50% penetration of 100 mbps</td>
<td>T4 – 5G in major city</td>
</tr>
<tr>
<td>Urban</td>
<td>FTTB</td>
<td>FTTH</td>
</tr>
<tr>
<td>Suburban</td>
<td>FTTB</td>
<td>FTTH</td>
</tr>
<tr>
<td>Semi-rural</td>
<td>FTTC</td>
<td>FTTH</td>
</tr>
<tr>
<td>Rural</td>
<td>FTTC</td>
<td>FTTH</td>
</tr>
<tr>
<td>Extreme-rural</td>
<td>LTE-A</td>
<td>LTE-A</td>
</tr>
</tbody>
</table>

1. Technologies suitable for:
   - 1 Gbps: FTTH, FTTB, DOCSIS 3.1.
   - 100 mbps: above + FTTC with advanced DSL, DOCSIS 3.0, LTE-A (in extreme-rural).
   - 30 mbps: above + FTTC, VDSL, LTE (in extreme-rural).

2. If any existing infrastructure could be re-used, it would be upgraded.

3. All new fixed-network deployments are based on fiber.

**Target-specific assumptions:**
- T2, T3 and T7: “households” + “business offices” = “premises” were covered (more representative for actual operator roll-outs.)
- T4: As major city, the NUTS 3 area of the capital was taken.
- T6: The number of socio-economic drivers and digitally intensive enterprises were estimated to be 28.5m.
The required investments to reach the targets of the DAE and the EGS amount to 384 bn€ until 2025.

Further analysis of the required investment:

<table>
<thead>
<tr>
<th>Geotype</th>
<th>% Invest.</th>
<th>% Pr*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>20%</td>
<td>32%</td>
</tr>
<tr>
<td>Suburban</td>
<td>25%</td>
<td>36%</td>
</tr>
<tr>
<td>Semi-rural</td>
<td>30%</td>
<td>21%</td>
</tr>
<tr>
<td>Rural</td>
<td>21%</td>
<td>10%</td>
</tr>
<tr>
<td>Extreme-rural</td>
<td>4%</td>
<td>1%</td>
</tr>
</tbody>
</table>

*Pr = Premises

- 72% for wired connections (premises, excl. companies)
- 36% in cohesion regions
The investment gap for public funding to reach the targets of the DAE and the EGS is ca. 254 bn€.

Expected private investments relevant for the DAE and EGS targets until 2025 amount to ca. 130 bn€.

- Cover (only) 33% of total investment needs
- Investment gap: ca. 254 bn€

Alternative scenarios:

1. Max:
   - FTTC in extreme-rural + max 5G quality
   - Investment need: +15% to 428 bn€
   - Private investments: 39%
   - Investment gap: 262 bn€

2. Min:
   - Wireless technologies in all 3 rural geotypes + only 1m socio-economic drivers/enterprises
   - Investment need: -53% to 192 bn€
   - Private investments: 68%
   - Investment gap: 62 bn€
MAPPING AND EIB INVESTMENT
Importance of mapping for broadband investment

- Inform about availability of broadband services in the regions
- Show the operators providing services in the regions
- Identify the regions uncovered with very high capacity networks
- Illustrate the population density
- Assess the demand for very high capacity networks
- Identify the areas covered by private investments
- Map the planned investments of the operators
- Tagging areas with market failures
- Support the channeling of investment
EIB Lending in telecommunication infrastructure from 2009-2018

Lending to EU Member States, signed loans

Loan amount (in bn) | EFSI
---|---
2009 | 2.8 | 0.5
2010 | 1.4 | 0.5
2011 | 1.3 | 0.5
2012 | 1.4 | 0.5
2013 | 2.6 | 0.5
2014 | 2.2 | 0.5
2015 | 1.4 | 0.5
2016 | 2.4 | 0.6
2017 | 2.0 | 0.7
2018 | 3.0 | 0.8

Po-Wen Liu
Mapping of Terrestrial Broadband
Types of EIB financing

- Direct Loans
- Intermediated Loans
  - (PPP) Project finance with direct project risk
  - Other financial instruments (in partnership with EC)
  - Equity through Funds

Flowchart showing the interaction between Banks, Intermediated Loans, Direct Loans, and the Borrower.
EIB finance instruments for broadband financing

- Corporates
  - Financing to telecommunications operators, utilities companies etc. to deploy broadband infrastructures
- Project finance
  - Financing to ring-fenced projects of a special purpose vehicle (SPV) formed by a private and/or public sector (joint ventures, off-balance sheet etc.)
- Public sector
  - Financing for public sector initiative typically together with EU and/or national grants
- Others
  - Intermediated loan structures and framework loans to financial institutions, local governments and other 3rd parties
  - Investments into infrastructure funds
  - New instruments
    - Risk sharing - InnovFin
    - Project bonds – First loss piece
  - Advisory services

Grant element
(Grant + EIB loan max 90% of the project cost)

EIB loan
(up to 50% of the project cost or credit risk limit)
Examples of broadband lending

- **Proximus (Belgium)**
  - 2018
  - EIB loan: € 400m

- **Open Fibre (Italy)**
  - 2018
  - EIB loan: € 350m

- **Linkem (Italy)**
  - 2017
  - EIB loan: € 60m

- **EWE Tel (Germany)**
  - 2018
  - EIB loan: € 115m

- **IP Only (Sweden)**
  - 2017
  - EIB loan: € 125m

- **Ericsson (Sweden)**
  - 2017
  - EIB loan: € 500m

- **DNA (Finland)**
  - 2018
  - EIB loan: € 50m

- **Cosmote (Greece)**
  - 2017
  - EIB loan: € 150m
Mapping of Terrestrial Broadband

Po-Wen Liu

Senior Sector Economist
Digital Infrastructure

T: +352 4379 83037
M: +352 681 285890
E: p.liu@eib.org