



Cost-efficient Access Networks for Gigabit service to everyone

Charalampos Papanastasiou

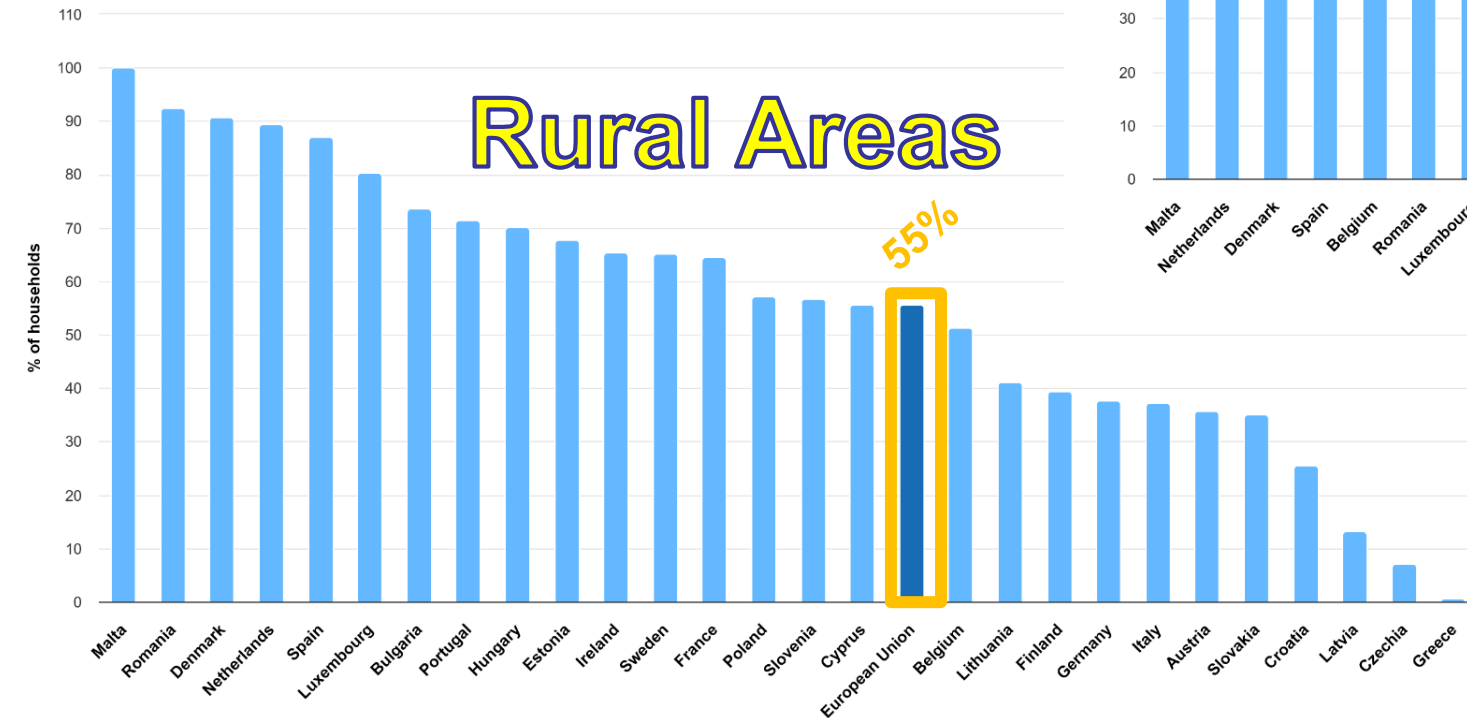
**Head of Access Radio Solutions
Wireless Network Systems**

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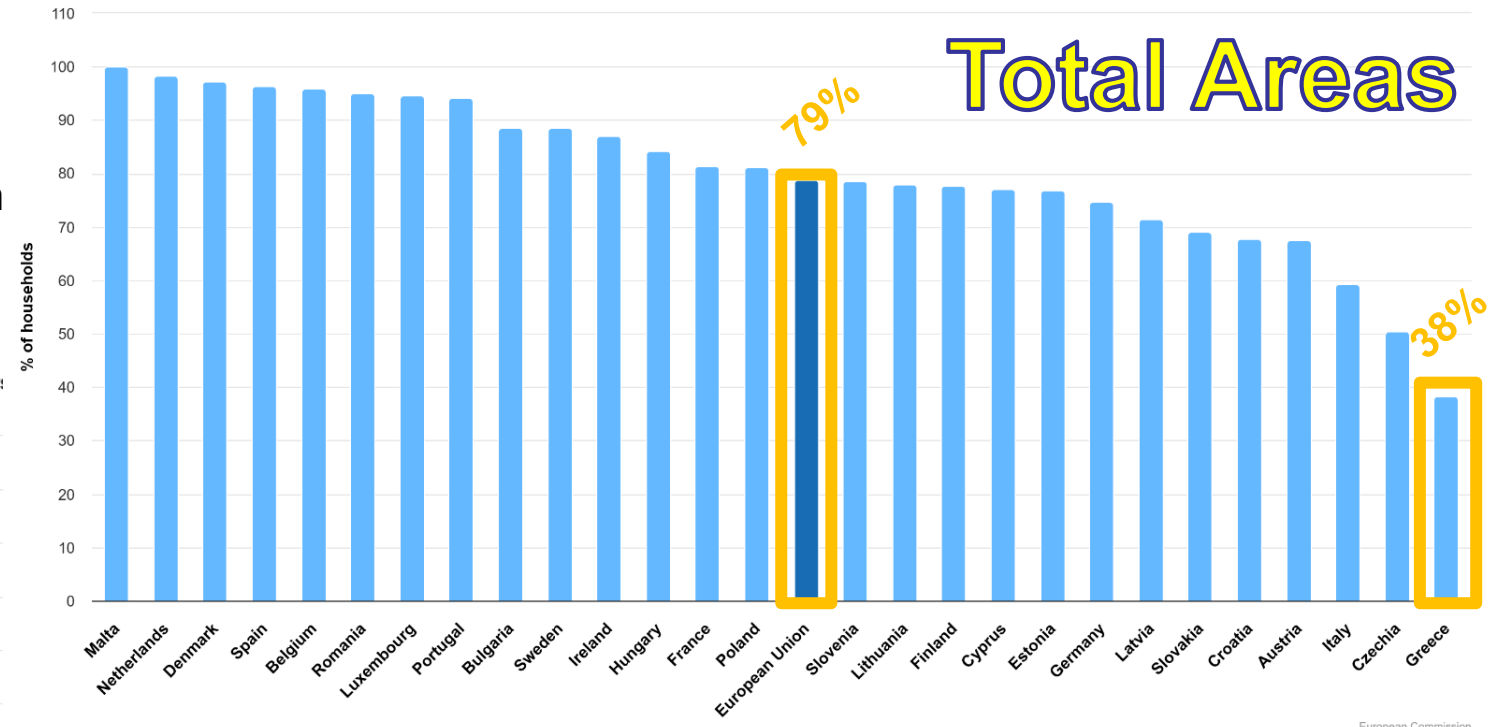
Fixed VHCN coverage in EU - Current situation

- ▶ Target is to reach **100% VHCN** coverage by 2030, replacing Copper networks (FTTC) that are not capable to deliver VHCN service
- ▶ Fiber is the predominant technology, while alternative Reliable technologies can be used **complimentary** in accordance with **technology neutrality** principles
- ▶ Rural Areas still exhibit lower VHCN adoption

Fixed Very High Capacity Network (VHCN) coverage, Households living in sparsely populated areas (SPA)
DESI period: 2024 (data from 2023)

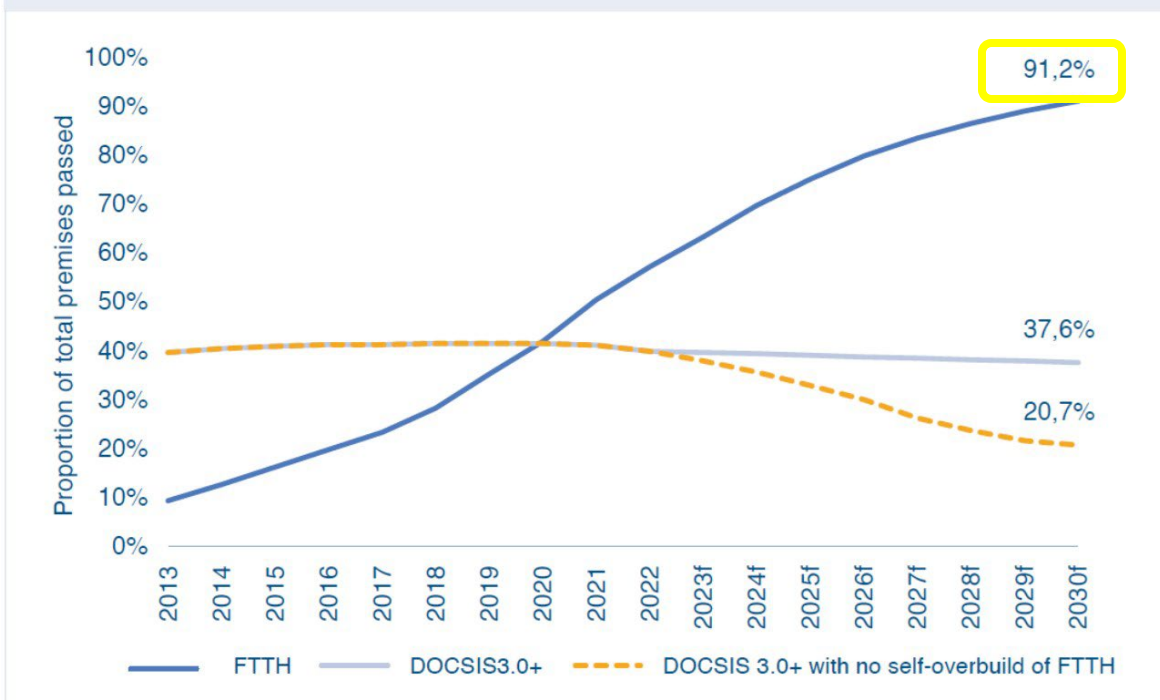


Fixed Very High Capacity Network (VHCN) coverage, Total
DESI period: 2024 (data from 2023)



Europe's FTTH projections vs. Cost

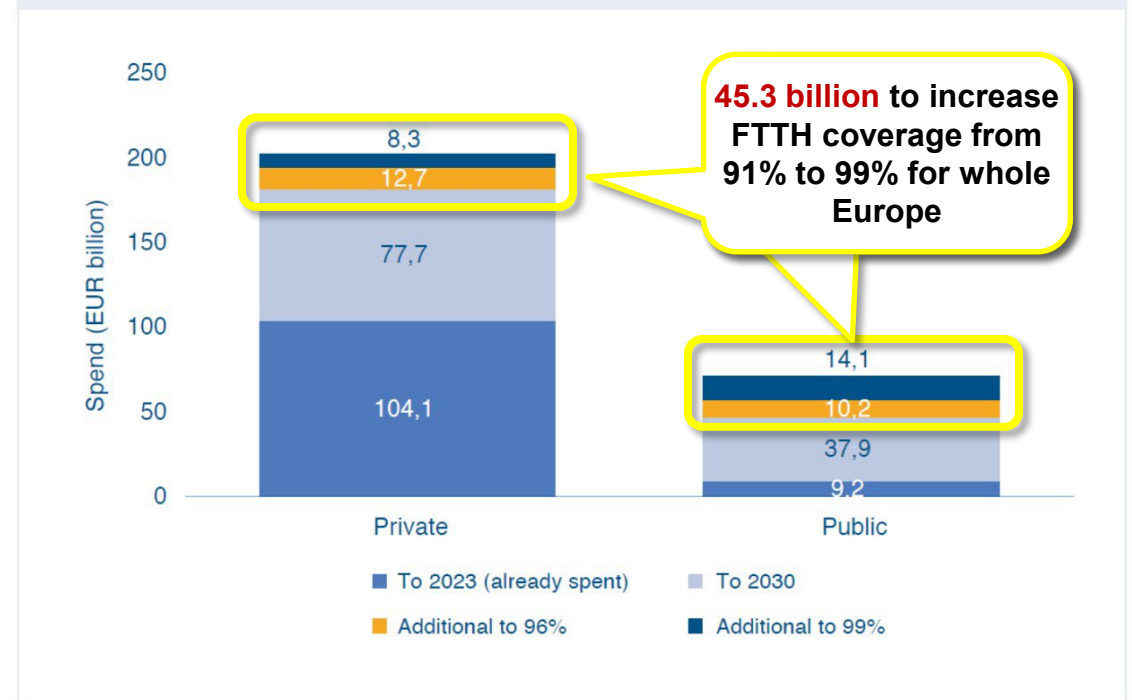
FIG 3.1 : Premises passed by FTTH and DOCSIS3.0+, Europe, 2013–2030f



Source: Analysys Mason, 2023

24 million premises will not be served by an FTTH network in 2030

FIG 3.3 : Cost of deploying future FTTH networks by coverage bands, Europe



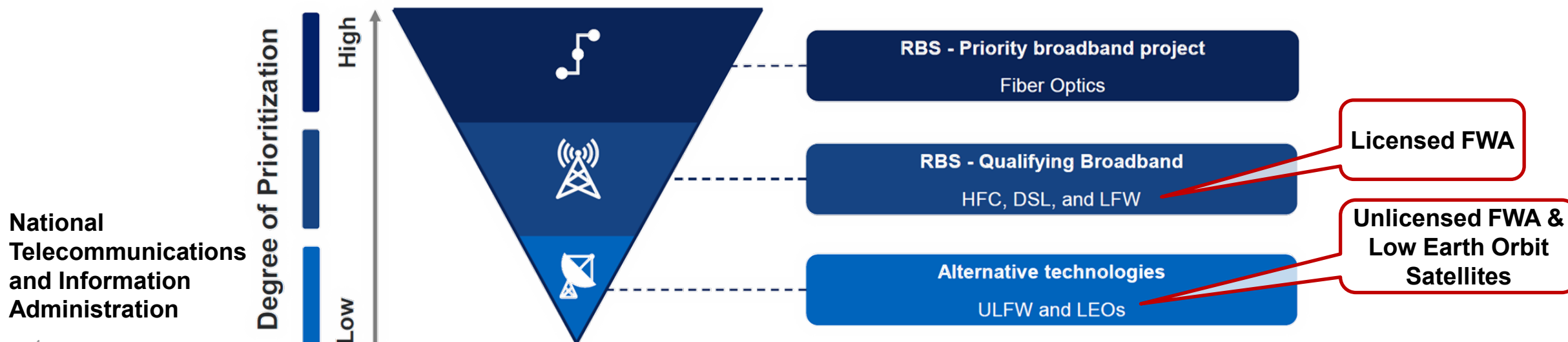
Source: Analysys Mason, 2023

For the **EU27** alone, the additional cost for coverage projection (**91%**) by 2030 amounts to **€97 billion** and the additional cost to reach **99%** is **€37 billion**

It is becoming evident that alternative **Reliable** technologies are required complementary to FTTH, in order to serve 100% of the population with Very High-Capacity Services, in a **cost-efficient** manner while meeting the **strict timeline**.

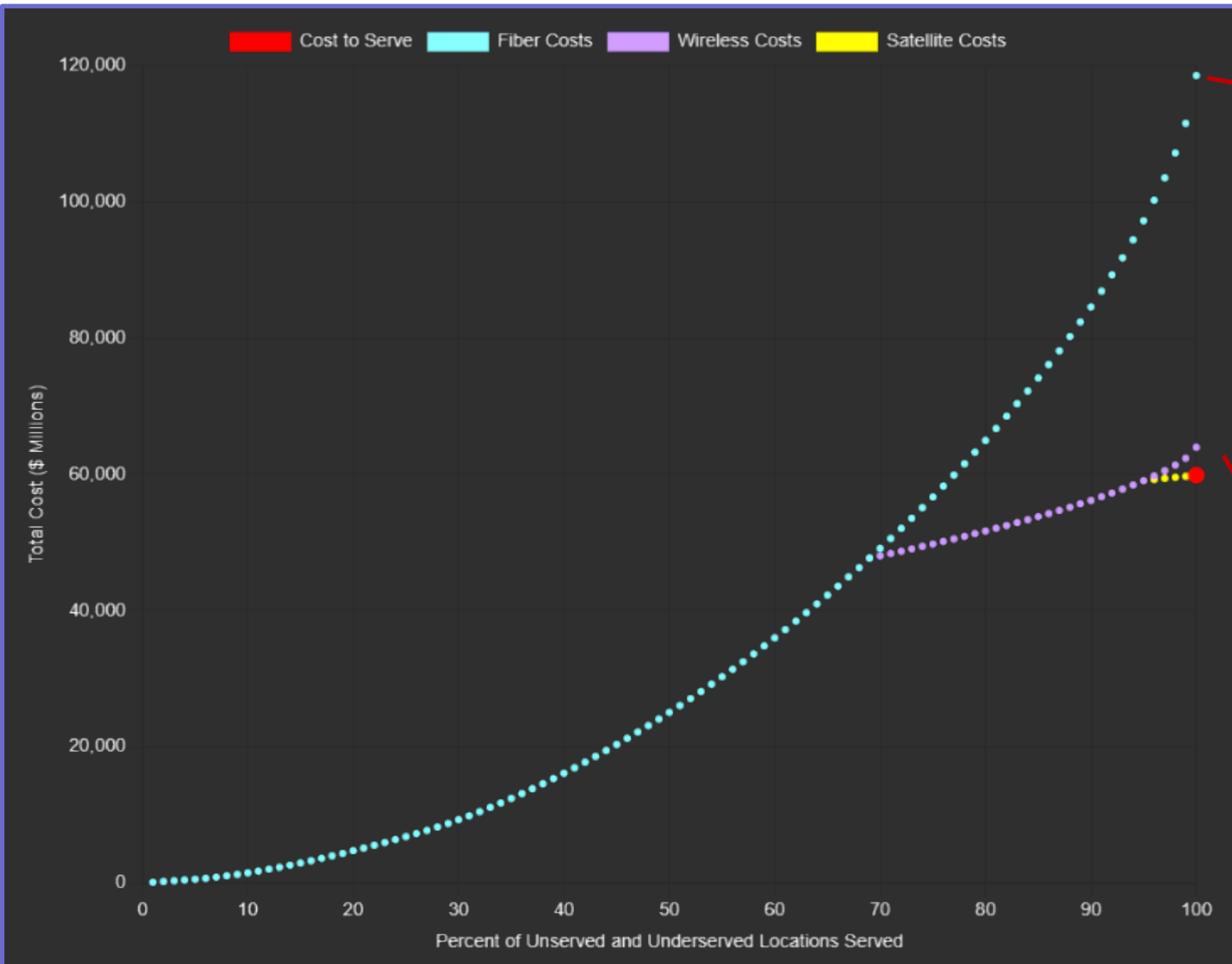
- ▶ **\$42.5bn** boost for broadband connectivity.
- ▶ “biggest investment ever” in high-speed internet, with the goal of **connecting all Americans by 2030**.
- ▶ Funds allocated to 50 states to roll out broadband to unserved and underserved regions for at least 100 Mbps DL and 20 Mbps UL.

- ▶ **Reliable broadband service (RBS) technologies**
 - Fiber-optic
 - Terrestrial fixed wireless utilizing entirely **licensed spectrum** or other wireline technologies (HFC, DSL)



BEAD economics - \$42bn funding

Technology mix is necessary to achieve the goals with the available funds



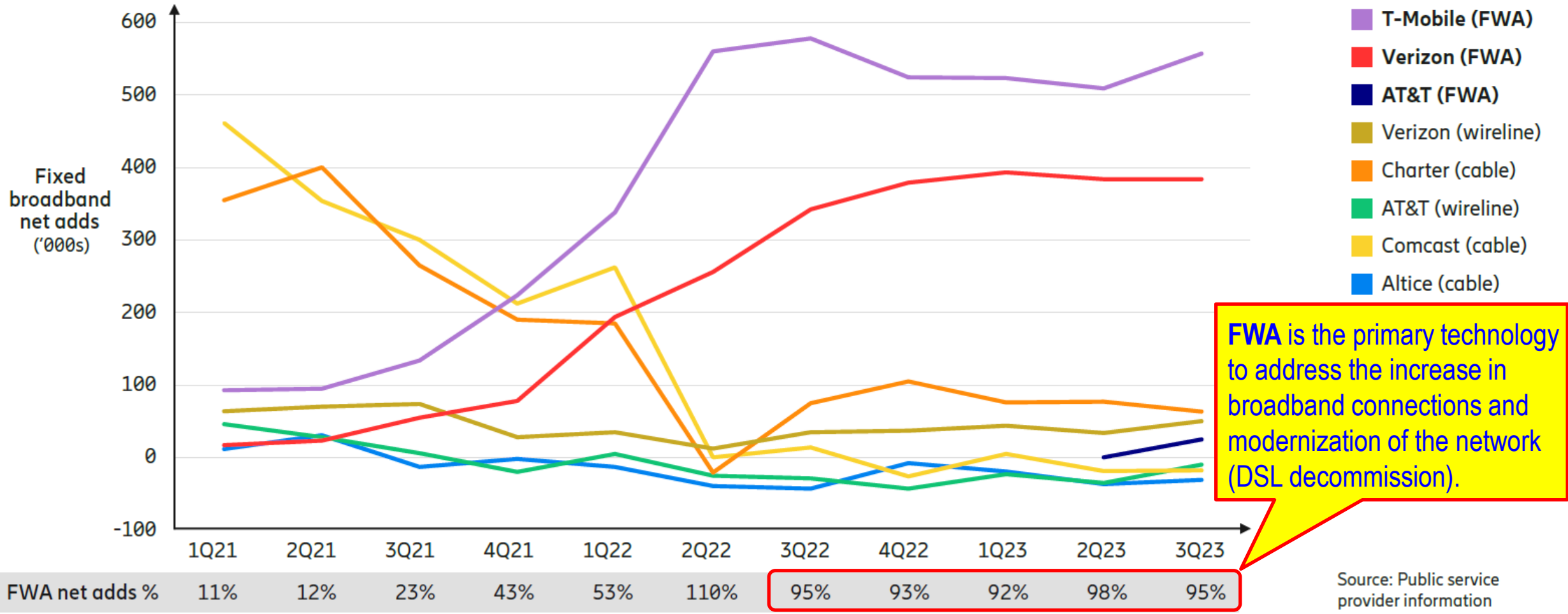
\$120 Billion to reach all homes only with FTTH deployments

\$62.8 Billion Total Deployment Funds (Including Match)

- 7 Million homes**
 - 4.4 Million** (63.0% Locations Served with Fiber)
 - 2.3 Million** (32.3% Locations Served with Fixed Wireless)
 - 330,143** (4.7% Locations Served with Satellite)

FWA market dynamics

FWA is capturing more than 90 percent of fixed net adds in the US



- ▶ Bands of licensed frequencies are the foundation for **Reliable** Broadband Service
 - ▶ Predictable performance
 - ▶ Free from interference
- ▶ High bands have an **abundance of spectrum**
 - ▶ Channel sizes wider than 100MHz for FWA
- ▶ High bands fit for ultra broadband **up to 1 Gbps** service
 - ▶ 26.5 – 27.5 GHz (high 26 GHz) - available
 - ▶ 24.25 – 26.5 GHz (low 26GHz) – to become available
 - ▶ 27.5 – 29.5 GHz, utilized on co-primary basis with Fixed Satellite Services (FSS)

Instant coverage after BS deployment → **Fast time to market**



Technology advances in mmWave bandsboosting the performance of FWA networks

- ▶ **MIMO** techniques to optimize spectrum utilization
 - ▶ Use the same channel 4 or more times on sector
 - ▶ Use the same channel 2 or more times on terminal
- ▶ **Multi carrier** to utilize all available resources
 - ▶ Use more than 1 carrier per sector
- ▶ **Multi-User (MU)** to densify networks
 - ▶ Serve more than one end user concurrently
- ▶ **Active Antennas** to optimize transmission
 - ▶ Beamforming and steerability function



- ▶ Capacity per sector 5.6Gbps, **per cell 22.4Gbps**
- ▶ Occupied bandwidth 400 up to **800MHz**
- ▶ **QoS-enabled** services with committed CIR service and high PIR service
- ▶ **2 Gigabit/s speed** of subscriber connection
- ▶ Extended range for Gbps service provisioning **up to 8Km**

Ultra Broadband Strategy

UFBB
for all the population

Piano “Italia a 1 Giga”

White areas: Rural & Semi-Rural (Clusters C & D)

- UFBB to more than 13,8m users in 9,3m homes
- 100 Mbps service
- FTTH: 62% - FWA: 38%

Grey areas: sub-urban & Semi-Rural areas

- “Italia a 1 Giga”, with FWA & FTTH in 8 regions
- Funded by National Recovery and Resilience Plan (PNRR)
- 8 regions across the country
- 3,881 municipalities
- 3.3mil households
- Rural & Semi-Rural areas
- 1000Mbps / 200Mbps (DL/UL)





THE LARGEST MMWAVE FWA NETWORK WORLDWIDE

WiBAS G5



- ▶ Ultra Fast broadband, fibre-like services ,with QoS, at 26/28GHz
- ▶ Extended Coverage, addressing rural, semi-rural & sub-urban
- ▶ Dense network of several 100s of terminals per Base Station
- ▶ 2K Terminals installed per week
- ▶ Massive nationwide network rollout

WiBAS^{5G} Reliable solution proven worldwide

more than **50 networks worldwide**

Base Station Hubs

more than **20,000**

FWA Terminals

more than **500,000**

Accumulated expertise & know how for **20 years**



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Thank you

- We are in the network infrastructures business for more than 40 years
- We control 100% of
 - product development*
 - supply logistics*
 - product manufacturing*
 - Product support*
- We continuously invest in technology innovation and product evolution
- We have been developing FWA products since late 90's
- We develop wireless transport technology for more than 20 years