BHARAT FIBER
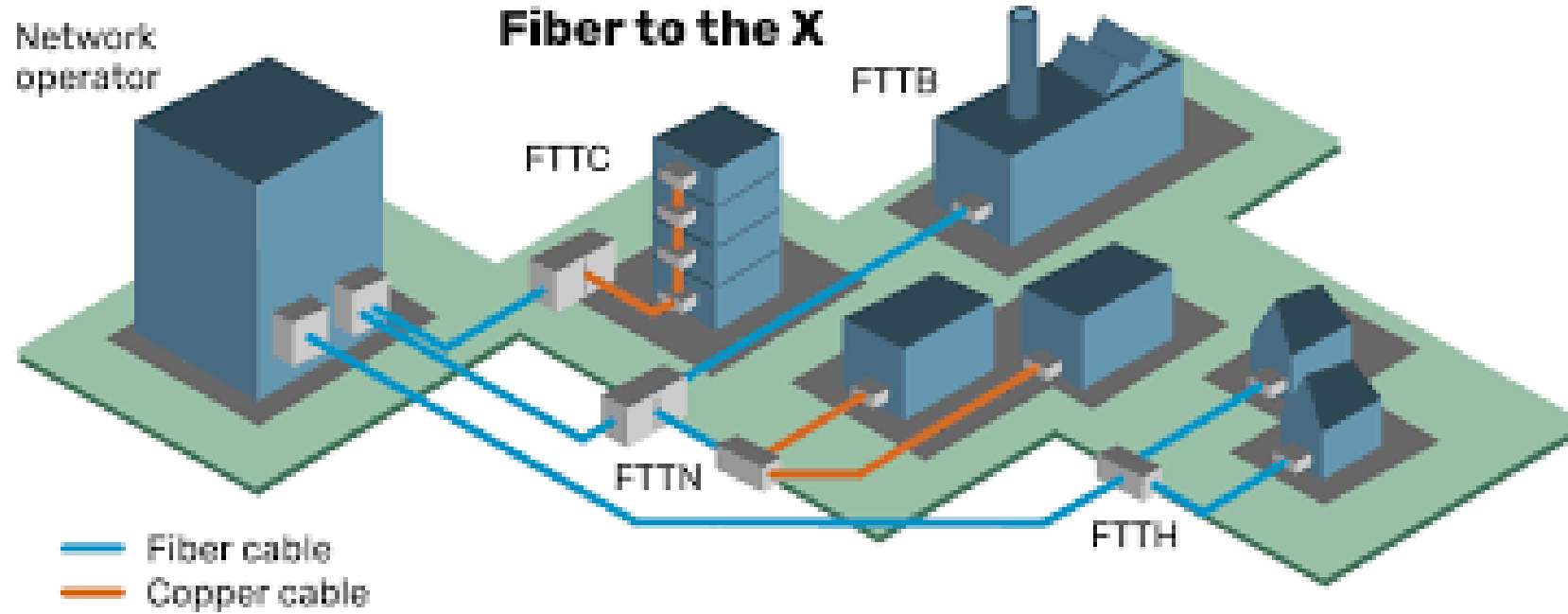
**FTTH Technology Innovation –
Key Business Drivers & Successful Future
Business Model**

FTTx Models

Fiber to the X

Network operator

FTTC

FTTB

FTTN

FTTH

Fiber cable
Copper cable

FTTC- Fibre To The Cabinet

FTTN- Fiber to the Node or Neighborhood

FTTB- Fibre To The Building

FTTH- Fibre To The Home

Introduction

- It is estimated that about 90% of the households will have "superfast broadband connection"

- By year 2020 with the ever-increasing demands of users traffic grow about 24% per year.

- "superfast broadband connection" technologies capable of delivering download speeds over 30 Mb/s.

- Network operators have a wide range of high-speed access technologies to choose from namely
  - Passive Optical Networks (PONs),
  - Hybrid Fibre-Coax (HFC),
  - cable-based like Digital Subscriber Line (DSL)fast versions like VDSL2 and G.fast1,
  - the latter capable of providing up to 2 Gb/s.

- Past decade, many telcos have widely deployed Fibre-To-The-x (FTTx) technologies, specially in large cities, where fiber was taken directly to the end user as in Fibre to the Home (FTTH),Fibre to the neighbourhood /Curb (FTTN/C) and then terminated with cable.

Future of Access Network Fiber FTTH GPON

- Traffic demand in the access has grown in the last years, and service providers need to upgrade their infrastructure to the latest access standards.

- While fiber has become the preferred technology of choice in access networks, there are many fibre access technologies available in the market.

- This poses a challenging question to operators not always easy to answer:

- How to upgrade?

- What technology and for how long it will cope with the demands?

- To model the traffic forecast in the access for the next decade.

- And analyze possible upgrade scenarios of fibre access networks.,

- Which of the NGPON flavours could better fit the demand.

Future of Access Network Fiber FTTH GPON

- "We recognize that building fiber networks is capital-intensive, and the cost of deploying advanced broadband and smart-city infrastructure can seem daunting. Therefore, we continue to develop strategies of collaboration, co-investment and policy adoption with our clients."

- "Fiber is feeding an economic engine."

- "Today's fiber optic networks are just the beginning of a large and varied display of the use of IoT. If we add IoT to fiber, what we are seeing is the beginning of the FibeR IOT – fiber in every aspect of our day-to-day lives."

- "Fiber is the technology of the future, and we want our communities connected to advance their opportunities for online education, business expansion, telemedicine and telecommuting."

Future Traffic needs
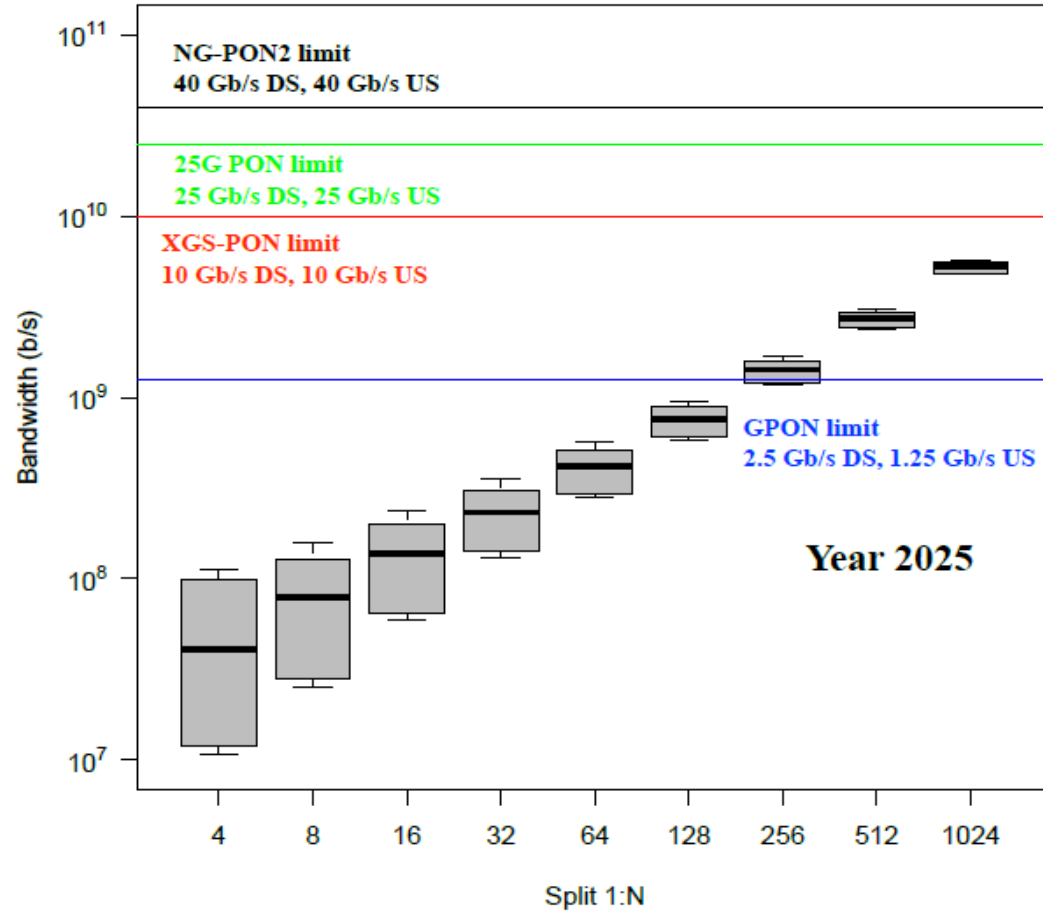
(a) Traffic needs, year 2025, 8.80 Mb/s peak per household
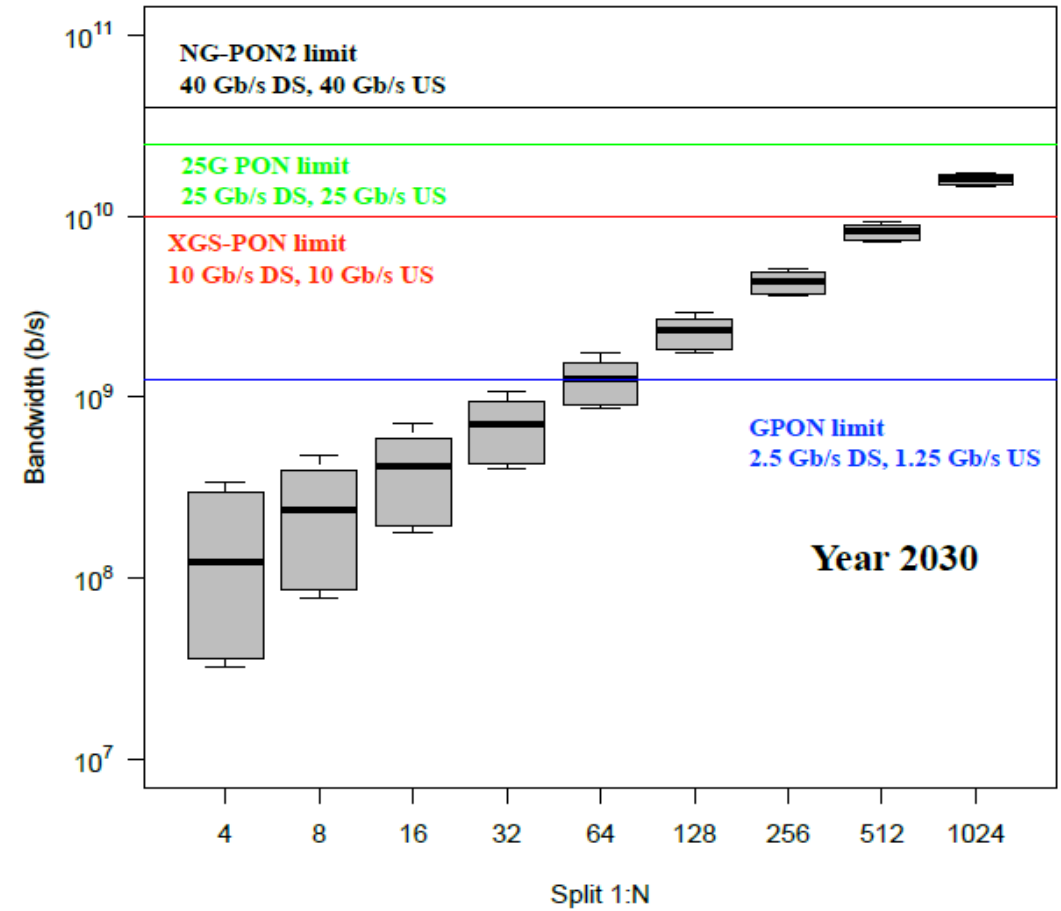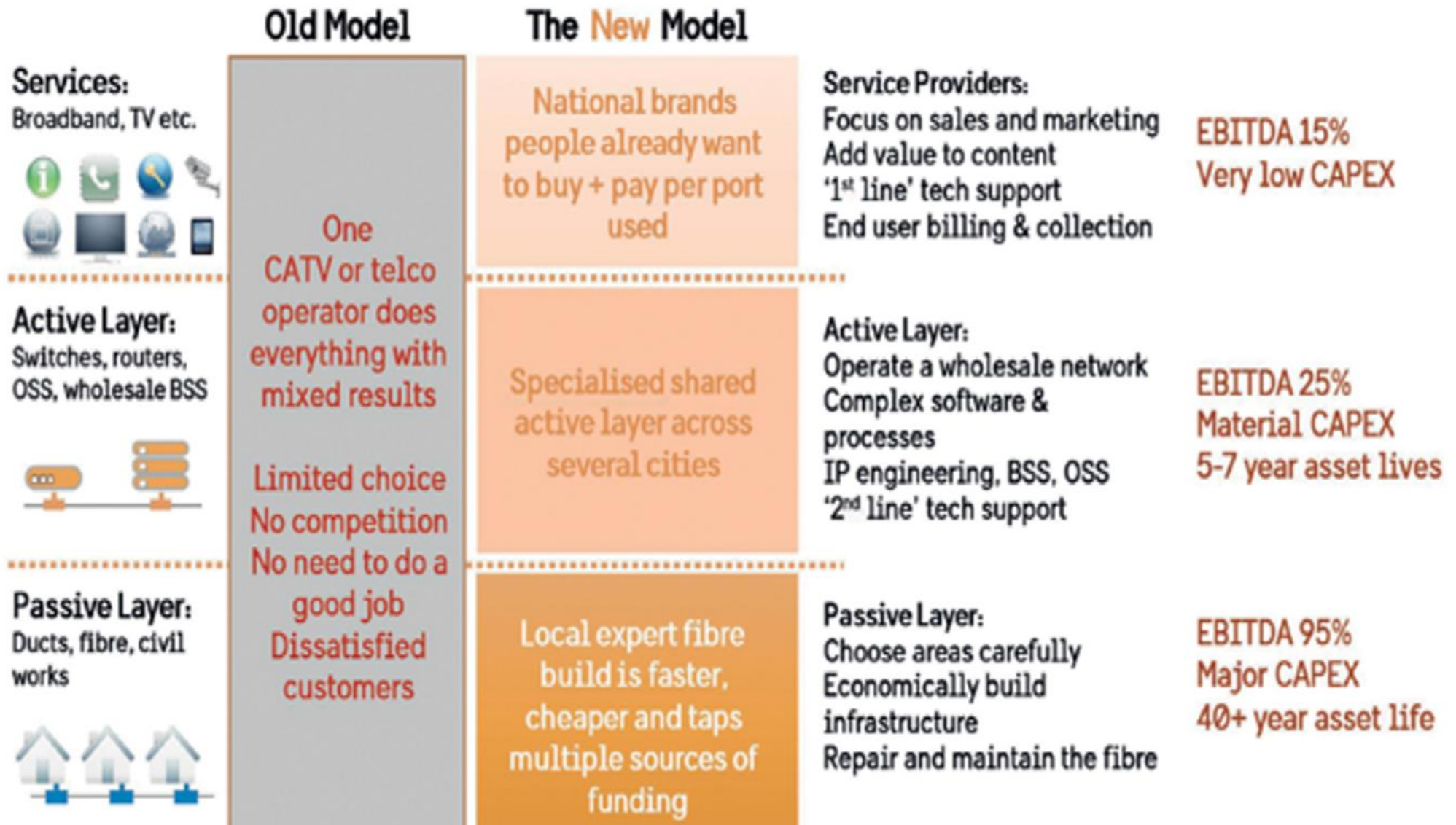
(b) Traffic needs, year 2030, 26.9 Mb/s peak per household

Fig. 3.   Aggregated offered traffic per 1:N PON (Years 2025 and 2030)

Expanding Access to Broadband Infrastructure with the 4 Is

- "**4 I's**" – **Infrastructure, Investment, Innovation and Inclusivity** – are central to ITU's strategy to leverage the power of ICTs to expand access to broadband services, and help accelerate the achievement of all :

- We need to redouble our efforts to bring the power of ICTs to all nations, all people and all segments of society.

- Infrastructure: Today, broadband networks are critical infrastructure, as important as roads, railways, water and power networks. Next-generation ICT infrastructure will power many digital solutions, from smart cities to public & financial services.

- Investment: Innovative financing mechanisms and PPPs are needed to create a better environment for investment (especially for hard-to-reach areas), which cut across industries and sectors.

- Innovation: In emerging markets, ICTs are helping farmers to monitor prices, health workers to respond to emergencies, and borrowers to connect with lenders. In developed and developing markets alike, entrepreneurs and tech MSMEs are at the forefront of industry disruption.

- Inclusivity: The digital divide takes many forms. More than two billion adults still don't have a formal bank account, but 1.6 billion of these do have access to a mobile phone. Digital financial inclusion can help boost poverty eradication, job creation, gender equality and women's empowerment.

The New Model

Old Model

The New Model

Services:
Broadband, TV etc.

Active Layer:
Switches, routers, OSS, wholesale BSS

Passive Layer:
Ducts, fibre, civil works

One CATV or telco operator does everything with mixed results

Limited choice
No competition
No need to do a good job
Dissatisfied customers

National brands people already want to buy + pay per port used

Service Providers:
Focus on sales and marketing
Add value to content
'1st line' tech support
End user billing & collection

EBITDA 15%
Very low CAPEX

Specialised shared active layer across several cities

Active Layer:
Operate a wholesale network
Complex software & processes
IP engineering, BSS, OSS
'2nd line' tech support

EBITDA 25%
Material CAPEX
5-7 year asset lives

Local expert fibre build is faster, cheaper and taps multiple sources of funding

Passive Layer:
Choose areas carefully
Economically build infrastructure
Repair and maintain the fibre

EBITDA 95%
Major CAPEX
40+ year asset life

India Optical Fiber Cables (OFC) Market

- It was $ 881.5 million in 2019 and projected to grow at a CAGR of 19.7% to reach $ 2.1 billion by 2024.

- Growth in the market is led by rising investments in OFC network infrastructure by the Indian government to increase internet penetration across the country, which is in line with government initiatives such as Smart Cities Vision and Digital India.

- Moreover, growing demand for OFC from
  - IT & telecom sector,
  - rising number of mobile devices,
  - increasing adoption of FTTH (Fiber to the Home) connectivity
  - and surging number of data centers are further anticipated to fuel optical fiber cables market in India over the coming years.

New Fibres for New Performances

- Optical fibre manufacturers go on researching and developing more and more performing optical fibres.

- Recently standardized a new multi-mode fibre, called OM5, which promises higher performances than those at disposal until now.

- The key characteristic of a multimode is its "modal bandwidth", capacity of transmitting a certain quantity of information on a certain distance, and this is expressed in Mhz*km.

- This latest technology, at the cutting edge of optical communications, carries data on light waves that have been twisted into a spiral to increase their capacity further still.

- This is known as light in a state of **orbital angular momentum**, or OAM.

- The formation of optical solitons within fiber lasers is inseparable from the balance between various non-linear optical effects including
  - self-phase modulation (SPM)
  - cross-phase modulation (XPM)
  - four-wave mixing (FWM)
  - stimulated Brillouin scattering (SBS)
  - stimulated Raman scattering (SRS)

- Therefore, as is reported, SRS can expend the spectral range of ion-doped fiber lasers and significantly improve the stability of solution operations.

New Fibres for New Performances

- Meanwhile, one of the largest rural fibre connectivity projects in history is underway in India. Over 100 million Indians are ready to be connected with fibre, Wi-Fi and LTE. Phase 1 is finished of India's BharatNet.

- All 250,000 regional councils and 625,000 villages are expected to be reached by GPON fibre by March 2020.

- Most villages will have local Wi-Fi from the local Post Office and/or a program of local businesses.

- Backhaul for telcos is included; Indian operators may use BharatNet backhaul as they extend mobile broadband coverage to rural populations.

- The USD 15 billion project is primarily funded by the Indian Universal Service Fund (USOF).

Models of BharatNet Utilization

- Fiberization of Towers by TSPs

  - 1 Gbps connectivity to connect e-NodeBs
  - 1 Gbps Bandwidth at OLT and ONT
  - Optical/Electrical connectivity from Gram Panchayat to e-NodeBs

- FTTH connection by ISPs

  - 100 Mbps connectivity at OLT and 1-2 Mbps connectivity at each ONT

- Public Wi-Fi Hotspots at Gram Panchayats

  - 2-4Mbps Bandwidth at ONTs to connect Access-Points
  - 2-3 APs from each ONT
  - 1 GB usage cap per subscriber per day

Models of BharatNet Utilization

- CSC Wi-Fi Choupals

  - 1Mbps Bandwidth at ONTs to connect Access-Points

  - 6-8 APs from each ONT

  - Prepaid coupons from Rs.10 to Rs.100; with FUP of 500 MB - 12 GB and validity ranging from 10-28 days

- Leasing of Incremental Dark Fibres by LCOs

- FTTH connections from ONTs at GPs

Thanks