

Calculating
the benefits
of Fiber for
Everything

NOKIA

New paradigm: Fiber for Everything

The industry is raising the bar for fiber broadband. It is not just fiber-to-the-home but Fiber for Everything.

Recent advances in technologies are pushing the boundaries of fiber broadband performance in terms of speed, latency, agility... This means that existing fiber broadband networks can now cover new use cases and connect enterprises, Industry 4.0, 5G sites, smart city infrastructure, etc.

Having a unified network that delivers all services means you need to dig only once and have one network to deploy, power, operate and maintain, which delivers cost benefits. Fiber in itself is a highly efficient network in terms of operating costs and power consumption, so the more end points are connected to fiber broadband network, the better it is for the business case.

Let's explore the economic benefits of Fiber for Everything.

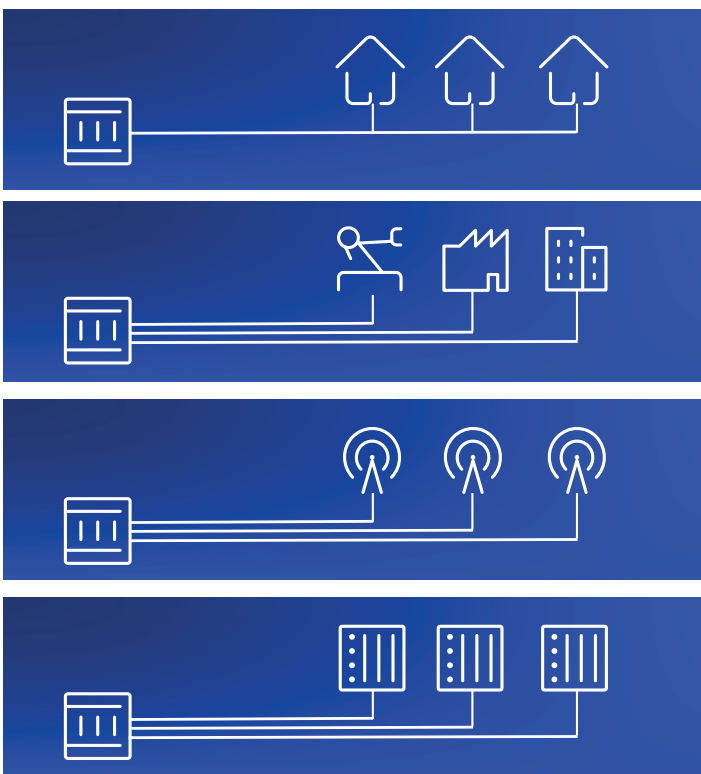


Comparing 5-year total cost of ownership (TCO) compared for two scenarios

Traditional approach

Multiple parallel networks are deployed for different services

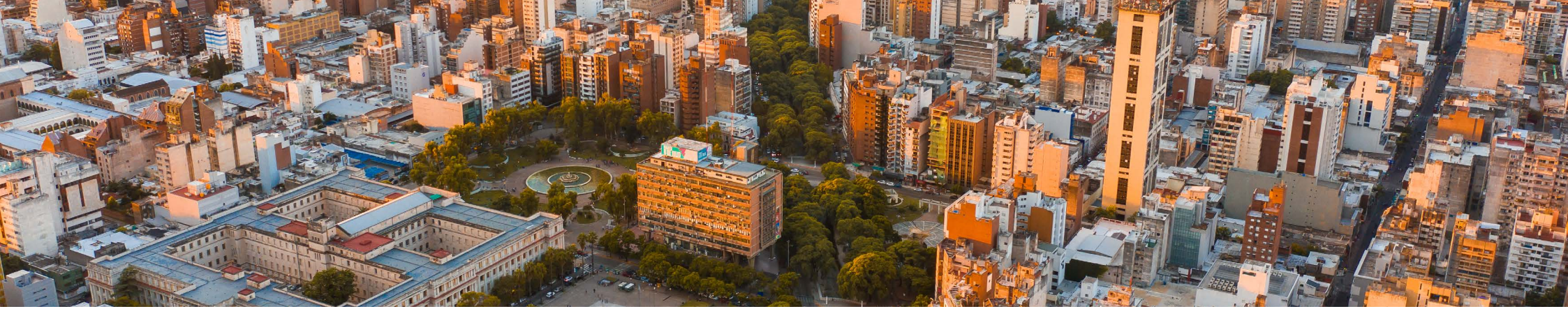
- PON for consumer services and small businesses
- Dedicated P2P network for enterprise services
- Dedicated P2P for mobile transport
- Dedicated pre-aggregation of remote DOCSIS nodes.



Converged approach

The existing PON FTTH network supporting GPON, XGS-PON or 25G PON, delivers all services.





Business case assumption and results

Assumptions

Results



Urban area



Split ratio on PON: 64



Underground cabling



Consumers are served on PON or PON+DOCSIS



Small/medium businesses (SME) have similar bandwidth demands as residential users



Enterprises require multi-Gigabit connectivity



Mobile transport: backhaul and midhaul



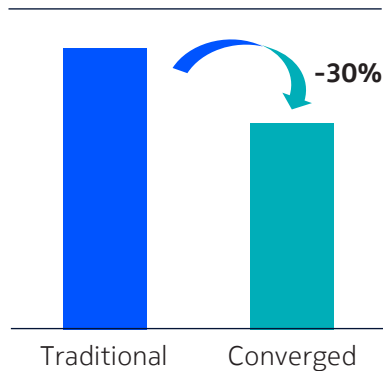
TCO

CAPEX: Network equipment, passive plant, fiber drop, customer CPE and installation

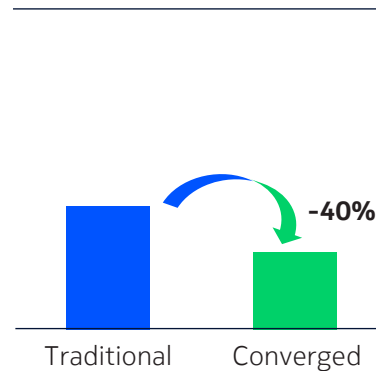
OPEX: Maintenance, upgrades, power consumption, floor space, customer care, fault management

1 – Benefits of serving enterprises on PON

5Y TCO



Power consumption



Assumptions

- Residential: 93% of all users on a PON
- SME: 5% of all users on a PON
- Enterprise services: 2% of all users on a PON
- Mobile transport: not included
- DOCSIS users: not included

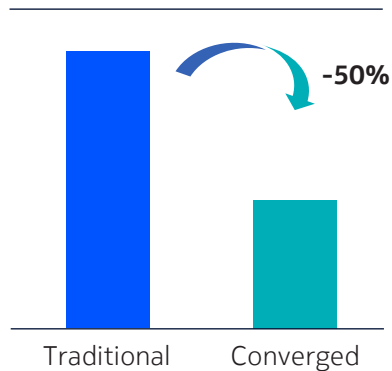
Key findings

Serving even a small number of enterprises on a PON instead of P2P delivers 30% cost savings and consumes 40% less power over 5 years. These numbers come from the cost savings on business routers, central office equipment, and outside plant.

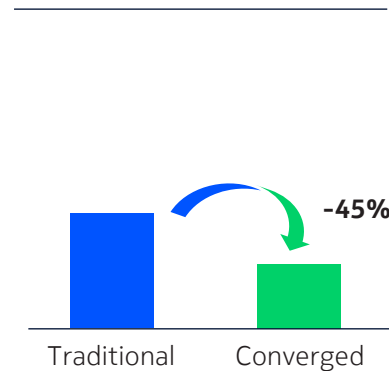
The power consumption of the customer premises equipment (business routers and ONTs) are not included in OPEX as they are paid by enterprise customers.

2 - Benefits of serving mobile transport on PON

5Y TCO



Power consumption



Assumptions

- Residential: 94% of all users on a PON
- SME: 5% of all users on a PON
- Enterprise services: not included
- Mobile transport: backhaul
 - Number of cells: 1% of all endpoints
 - Intercell distance: 500m
- DOCSIS users: not included

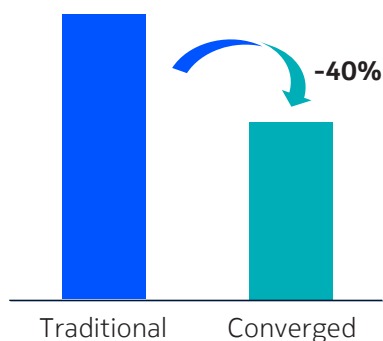
Key findings

Mobile sites have the same footprint as PON networks, so using the PON to connect them eliminates the need for a dedicated transport network. Serving mobile transport on PON networks delivers 50% cost savings and 45% power savings over 5 years.

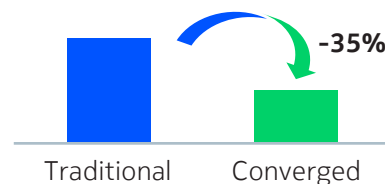
In converged networks, we consider SFP ONTs for mobile transport, which are plugged into the cell site gateway. These SFPs are very power efficient, resulting in higher power savings.

3 - Benefits of serving enterprises and pre-aggregation of small DOCSIS nodes on PON

5Y TCO



Power consumption



Assumptions

- Residential: 50% served on PON, 50% on DOCSIS
- SME: 5% of all users on a PON
- Enterprise services: 2% of all users on a PON
- Mobile transport: not included
- DOCSIS users: 50% of all residential users

Key findings

Many cable operators deploying DOCSIS technology are already deploying or exploring the benefits of PON. In this scenario we assume that the existing remote DOCSIS nodes are backhauled via PON instead of P2P fiber. In addition, these PON networks can serve enterprise customers with high upstream and downstream speeds, bringing more revenues. The total TCO benefits come from eliminating the need for costly P2P connectivity, bringing 40% lower TCO, and requiring >35% less power and floor space.

Final observations



Fiber broadband networks are available everywhere so they can be used to connect more than consumers.

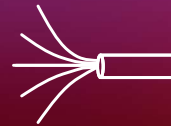


Technology advances in PON (capacity, latency, SDN) enable fiber networks to connect enterprises, mobile cells, smart cities, etc.



The benefits include:

- Lower TCO
- Energy efficiency
- Less floor space
- More revenues on fiber.



PON has unlimited bandwidth potential, supports smooth evolution and co-existence of multiple technologies (speeds) over the same optical cable.



Network slicing enables a single physical PON network to be partitioned into several logical slices. Each type of service can have its own slice.



PON is the greenest of all broadband technologies, resulting in lower total energy bills as more services are converged to it.

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