

# Fiber Broadband Market Trends

## Fiber Connect

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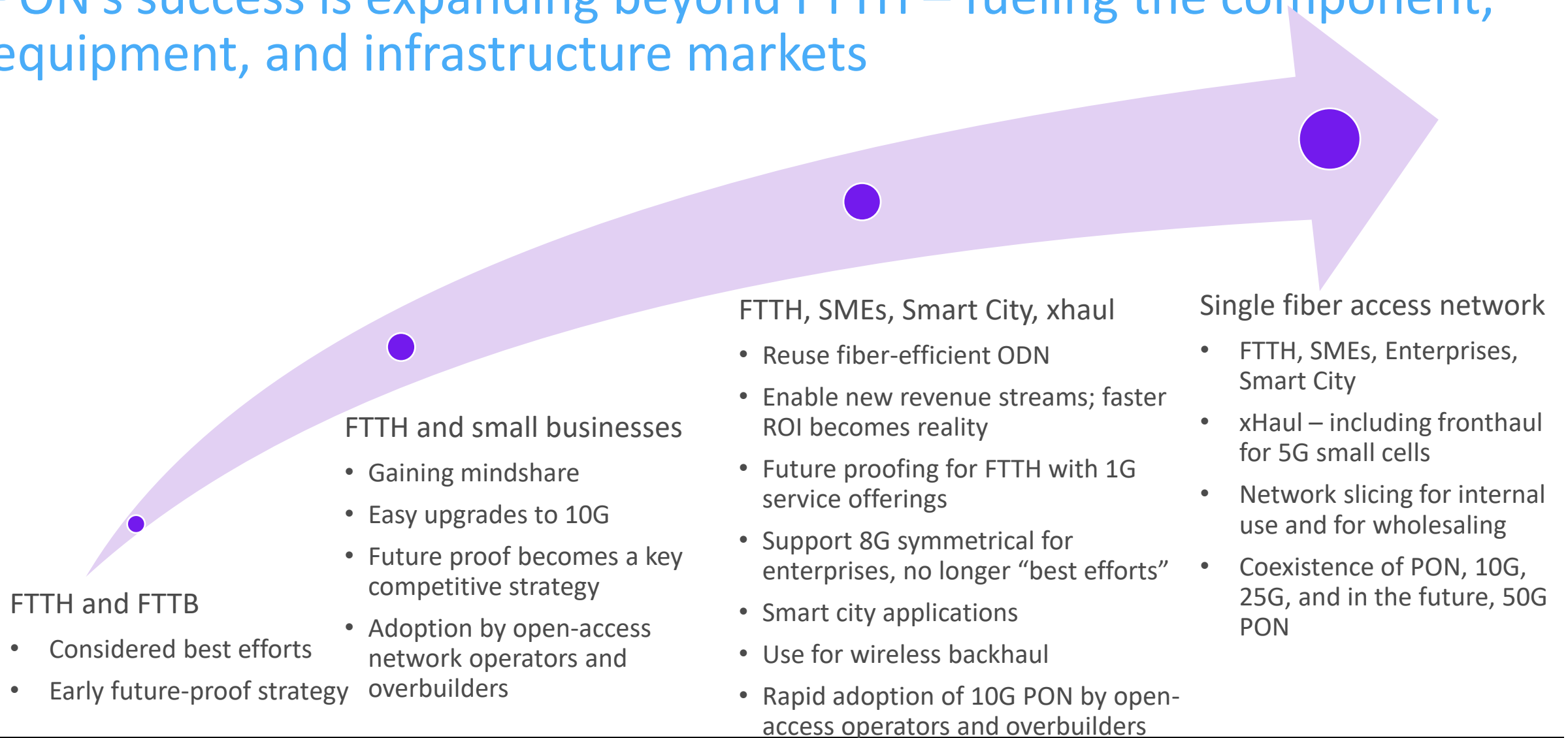
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# PON's success is expanding beyond FTTH – fueling the component, equipment, and infrastructure markets



# Great news, along with challenges

- PON equipment market is growing strongly in all regions (except China), reflecting importance of fiber-based access networks. Leading to unprecedented opportunities for selected PON equipment vendors.



- More realism around role of FWA versus fiber-based access networks. More focus on fixed-network convergence at infrastructure layer. More understanding of PON's supporting role in 5G xHaul transport.

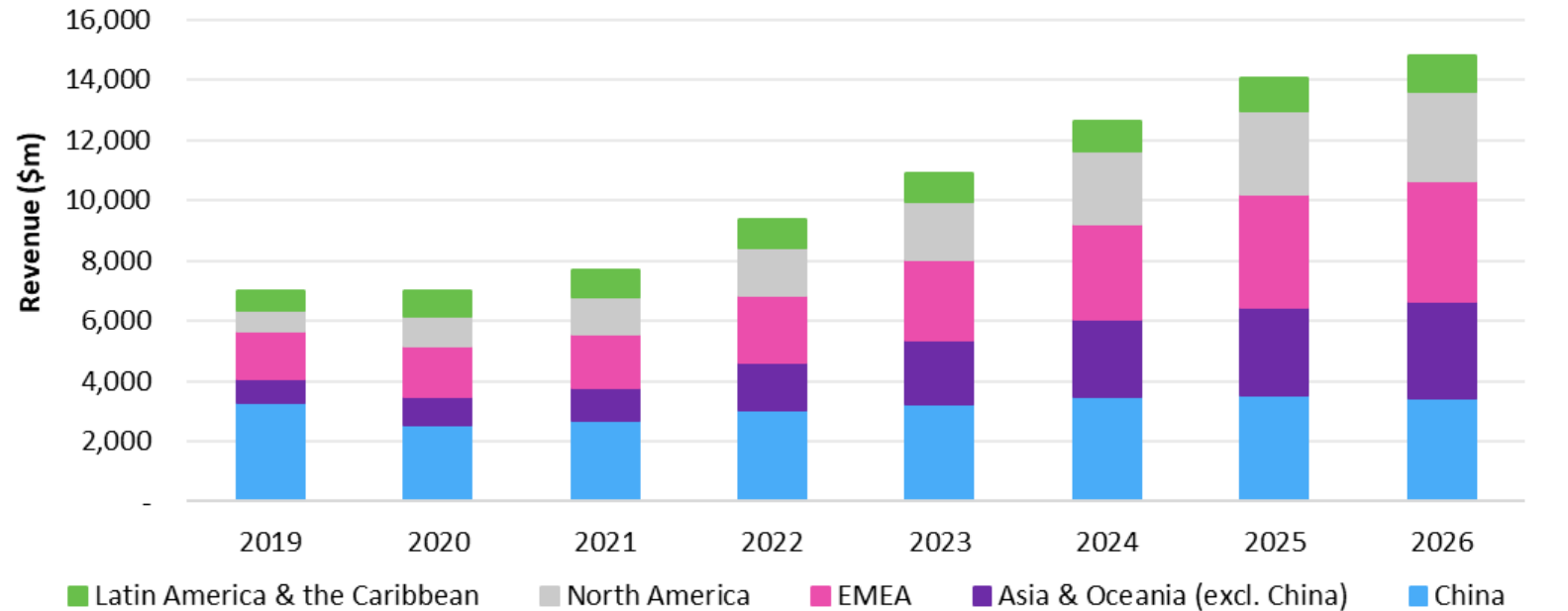
- Ecosystem issues: including supply chain shortages, 25G PON versus 50G PON divergence, lack of skilled labor for fiber access network construction in certain regions/countries, diverse lobbying opinions on how much bandwidth is really needed.



- Wide range of operators with differing goals, timeframes, and skill sets. Unprecedented opportunities for selected vendors although potential “Indigestion versus starvation” execution challenges.

# Shift in “power” away from China – strong global growth

PON equipment revenue by region/country



Source: Omdia

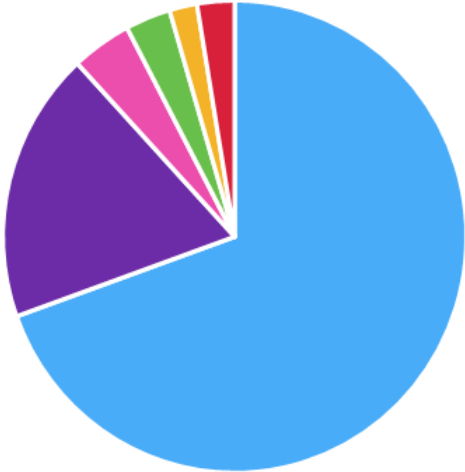
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- Growth in FTTH and nonresidential – enterprise, xHaul transport, smart cities, and POL. Leads to growth in next-gen PON.
- China continues to upgrade but no longer dominates consumption (decreasing to under 25% from close to 50%).
- Asia and Oceania (excluding China) – new builds along with upgrades – India, Australia, New Zealand, Japan, South Korea, Indonesia, Vietnam, and more.
- EMEA – strong growth in Western Europe as UK and Germany (finally) begin FTTP builds. And growth in Africa (China Inc).
- NA – US is gaining momentum. Canada has momentum.
  - **NA forecasted to grow from \$732m in revenues 2019 to \$3bn in 2026**
- Latin America & the Caribbean – deployments continue, including cable operators.

# Shift in growth + geopolitical situation = upside for some

## PON OLT Port Revenues for Full Year 2020

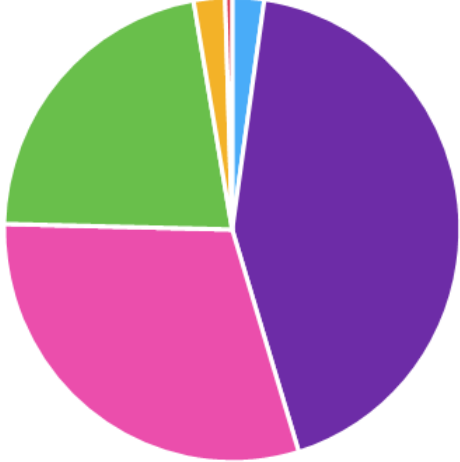
Global



■ Chinese vendors ■ Nokia ■ Calix ■ Adtran ■ DZS ■ Others

Source: Omdia

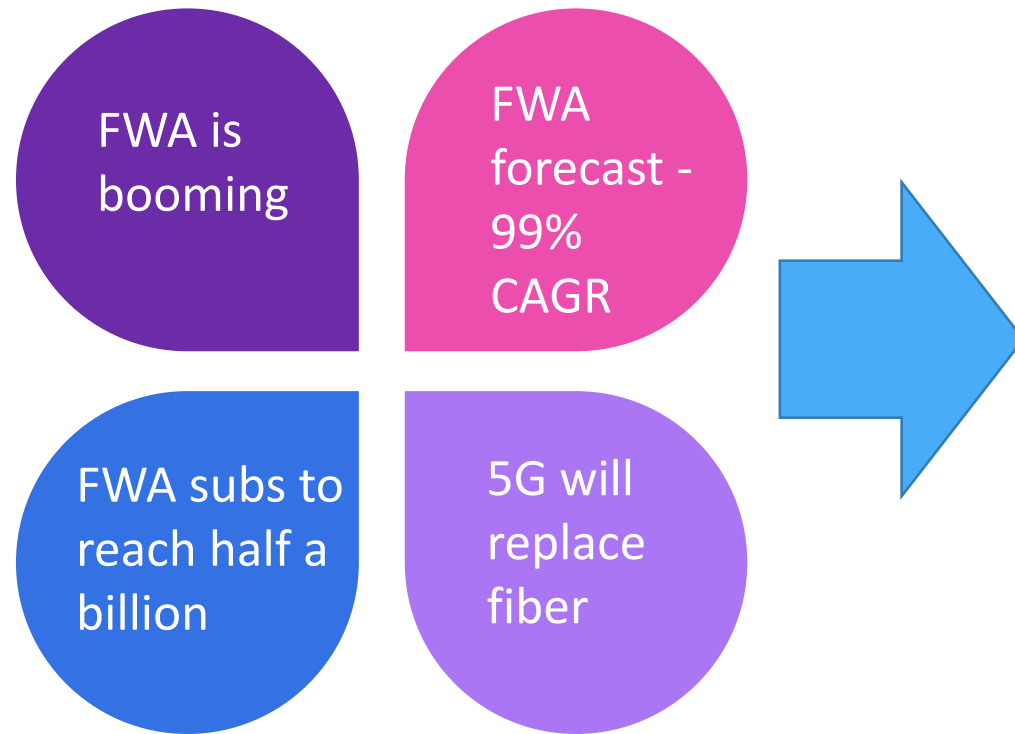
North America



■ Chinese vendors ■ Nokia ■ Calix ■ Adtran ■ DZS ■ Others

Source: Omdia

# FWA - less hype, more realism: last year's quotes, this year's quotes



Bell Canada cuts FWA rural broadband plan.

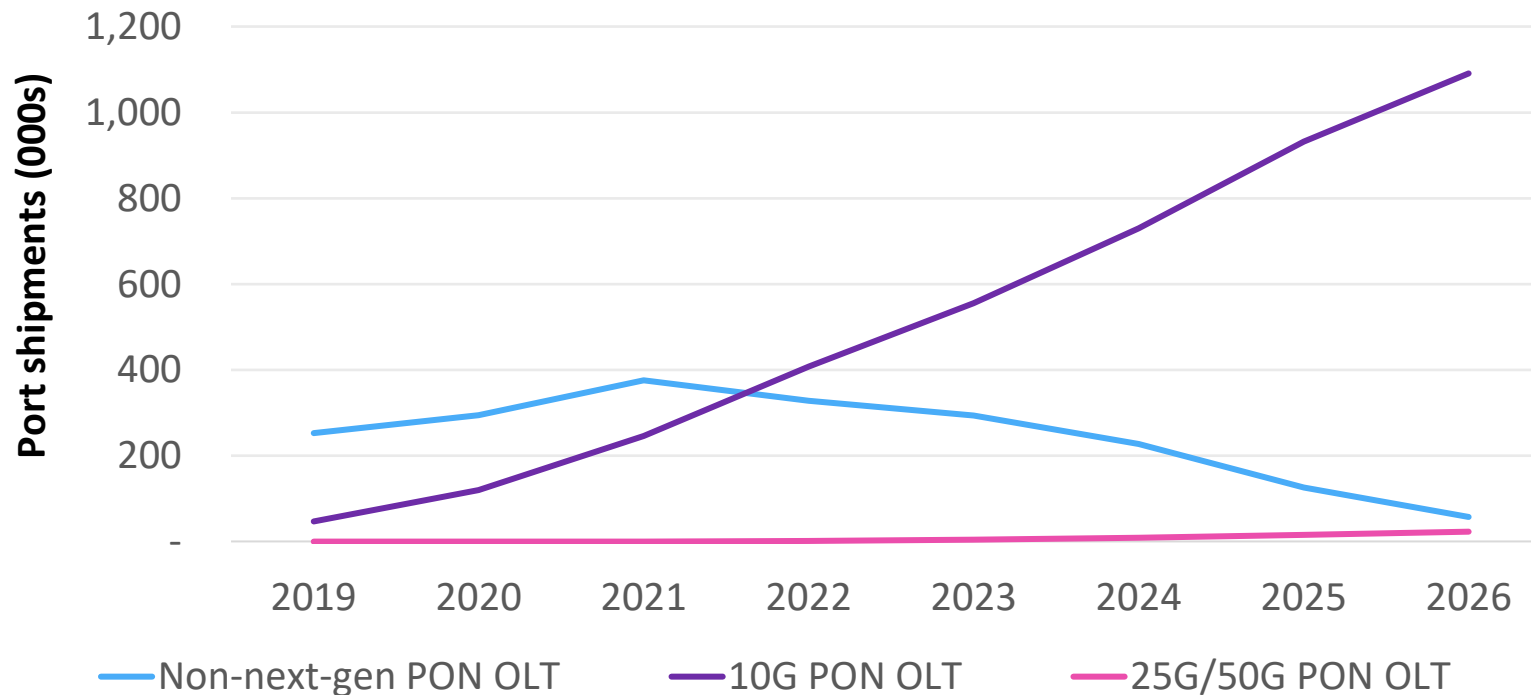
AT&T expects mid-level home internet users to consume up to 1.5 terabytes per month by 2025, up from 500G today.

**“In RDOF, we don't believe fixed wireless was the right technology,”** added Windstream CEO. The company won \$523 million in the RDOF auction, and plans to rely on fiber to meet its obligations... And there are also technical limitations in fixed wireless on the upload speed.” *–Light Reading*

**T-Mobile makes ~40x the revenue per GB from mobile subs that they would from fixed broadband subs,”** according to Wall Street financial analysts. That's not necessarily a surprise considering the average smartphone customer consumes just 12GB of data per month, according to Ericsson.

# 10G PON is ramping quickly in North America

PON port shipments, North America, 2019-26, by technology



- 10G PON OLT port shipments will grow at CAGR of 44% through 2026.
- Non-next-gen PON ports will decline at a CAGR of 24% as operators choose 10G and higher to support residential and non-residential services and applications.
- 25/50G PON OLT ports will begin their ramp in 2022.
- 25G PON is available from one named vendor and there are commercial deployments.
- 50G PON in development.

Source: Omdia

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# Divergence on what comes after 10G PON

## 50G PON

- 50G GPON is becoming an ITU-T standard.
- Backed by Chinese operators – next upgrade should be 5X bandwidth increase, matching 5X increase between XG and GPON.
- Backed by Chinese vendors; several are vertically integrated so no reliance on Broadcom, for example.

## 25G PON

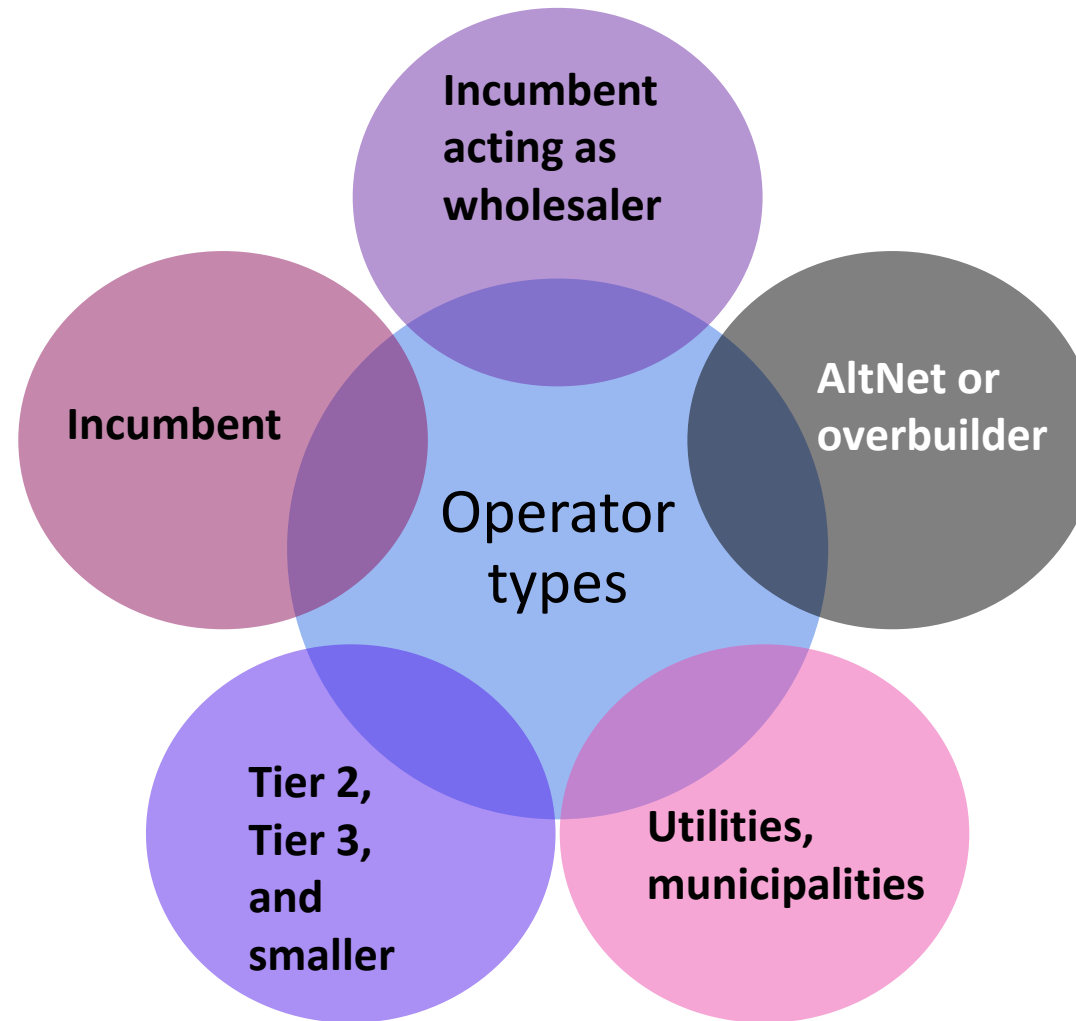
- 25G GPON did not pass ITU-T standardization. Based on operator interviews, less concern since 25G PON is not for mass market FTTH.
- 25G MSA group, including operators, equipment and component vendors.
- A leading supporter has internal PON MAC chips that support 25G PON.



# Diversity of opportunities can actually become a challenge

Examples of differences between operator types:

- Existing network design, operations, and management expertise.
- Integration with older broadband technologies, along with OSS/BSS.
- Expectations regarding end-to-end network build versus “just” equipment.
- Time-to-market expectations.
- Multi-vendor awards versus 100% wins.



**Vendors must objectively assess internal (and partnership) capabilities against the opportunities.**

# Higher speed PON supports reuse of ODN & more applications

## Operator quotes from 25G PON consulting project

“The goal is to increase revenues and reduce opex. A single access network is the solution and 25G PON would support fronthaul, along with high-bandwidth services.”

“25G PON is a necessity, enabling efficient, fast time-to-market, and cost-effective transport for its 5G millimeter cell site network. It has the bandwidth to support 5G xHaul requirements.”

“We have begun XGS PON installations and are now evaluating 25G PON. 25G PON supports a capacity strategy; support for higher bandwidth services to enterprise end-users over the same PON infrastructure as GPON and XGS PON.”

“Given the civil costs of fiber, we want to reuse those assets for enterprises. 25G PON would give use more flexibility. We would use the same ODN. We would be mixing and matching GPON, XGS, and 25G PON.”

# Appendix

## **Omdia Consulting**

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