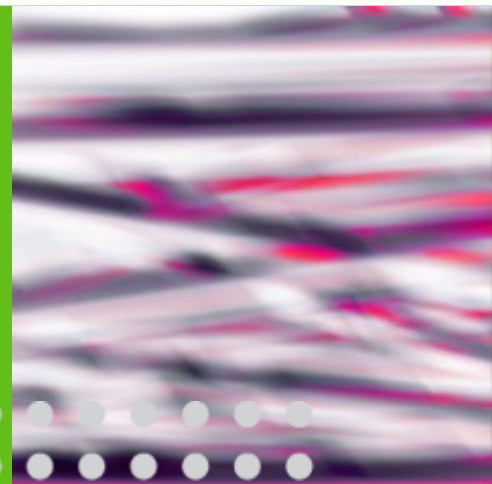


Making the Fiber Broadband Nation Happen and Capturing its Value



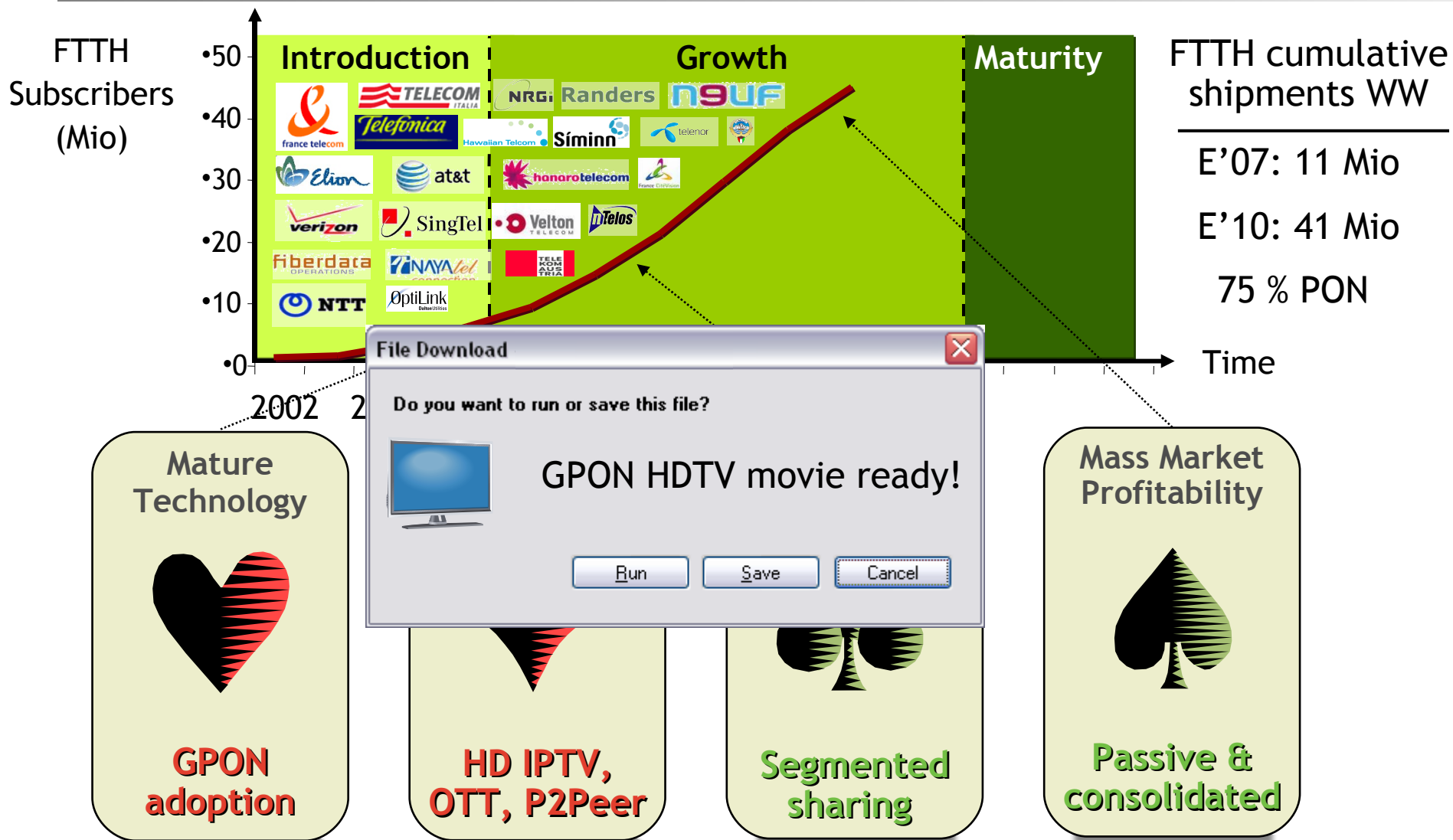
Luis Ribeiro

Setembro, 2008

Let's download an HDTV movie

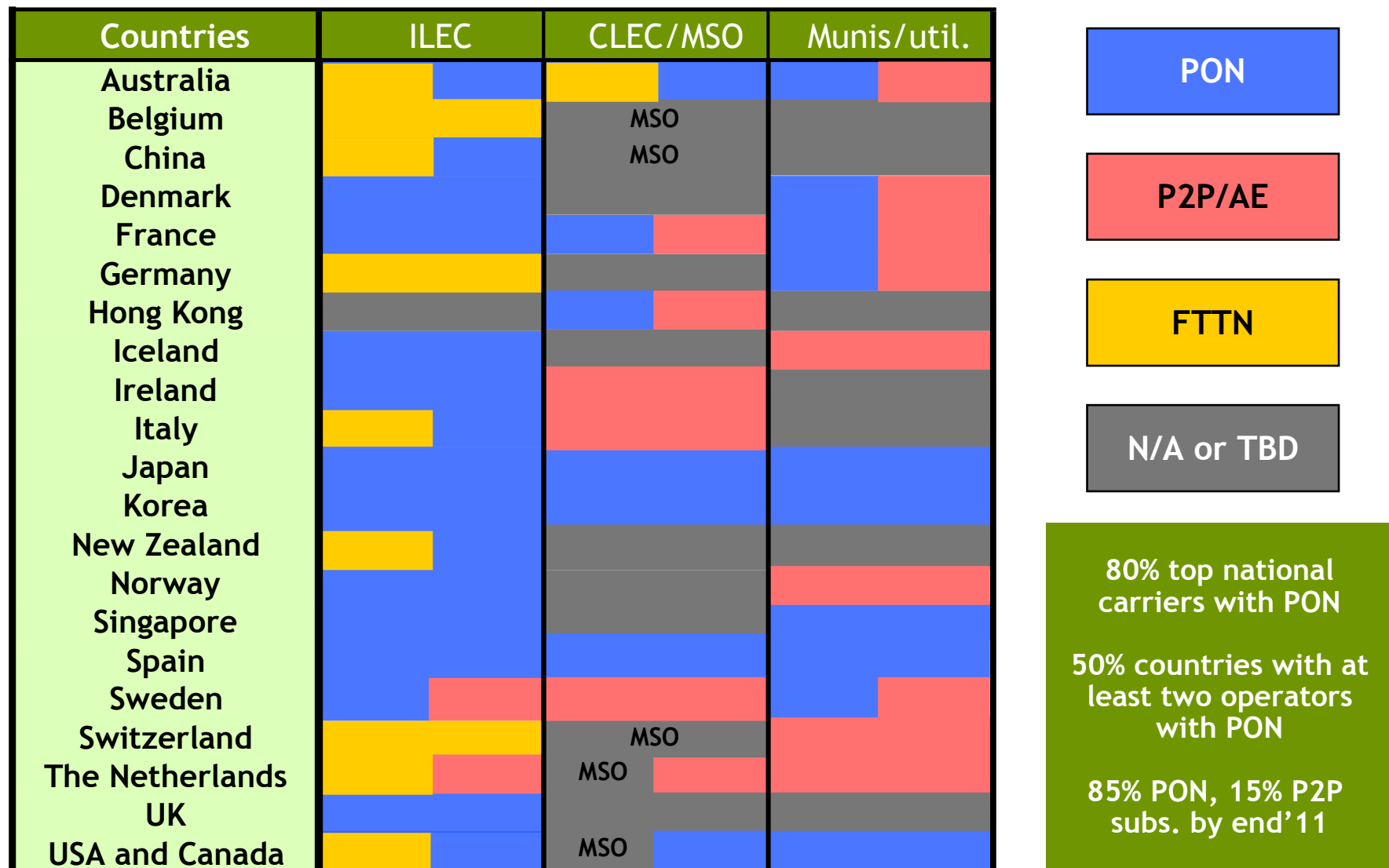


Announcing FTTH mass market introduction, one year ago



Source: Industry analysts reports

GPON emerges as the key reference across the board

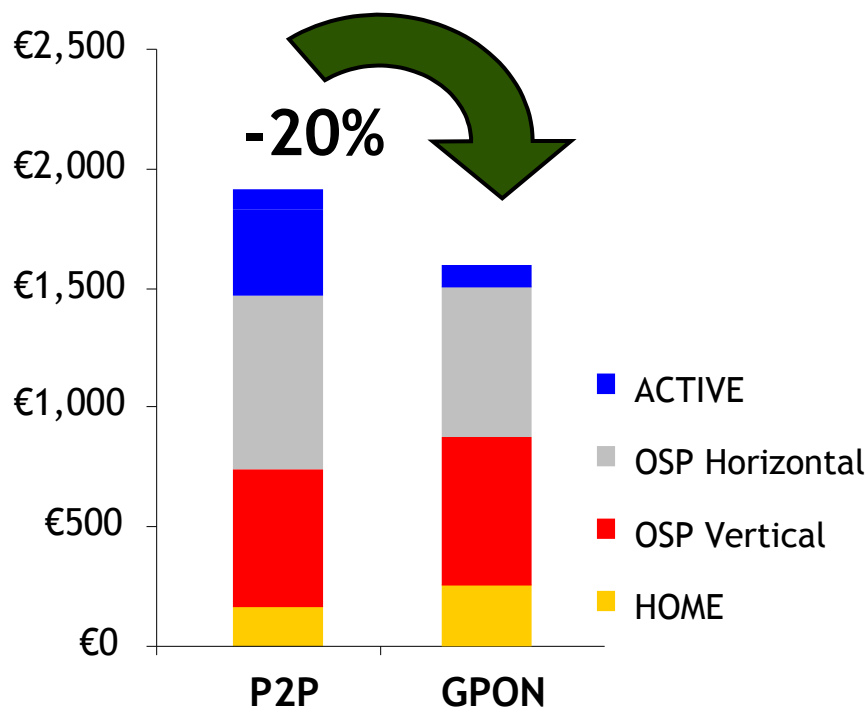


Source: public announcements

Large scale deployment: GPON is favorable

Investments (CAPEX per subscriber)

CAPEX per Subscriber



Case: 1Mio subs, 20% FTTH penetration

Operations (OPEX)

	P2P	AE	GPON
CO <i>Power, space, ODF</i>	High Power Big Space	High Power Small Space	Low Power Small Space
OSP <i>Power, space, ODF</i>	Passive	Active	Passive
Feeder fiber <i>RoW, ducts, aerial</i>	1 sub per fiber	24 subs per fiber	32 sub per fiber
CO consolidation	10 km - max 20k subs/CO	>>20km - > 100k subs/ CO	20 km - > 100k subs/ CO

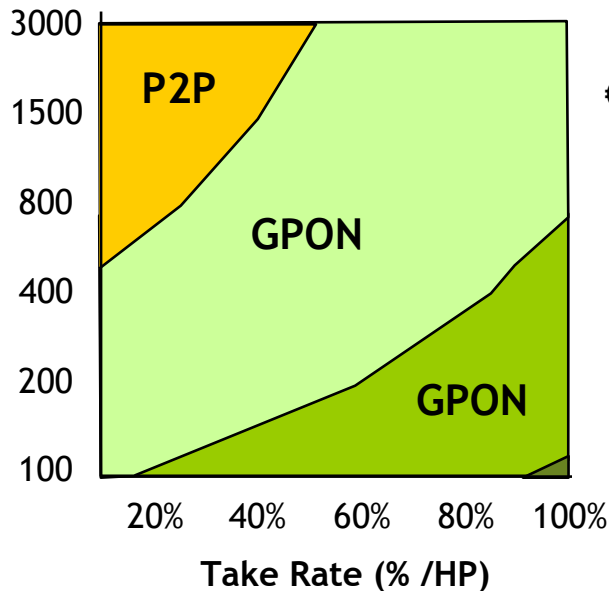
GPON is the best option for mass-market FTTH

But let's not be dogmatic about technologies

P2P - PON CAPEX difference for small COs

Housing Density
(homes/Km²)

Single Family Units,
1,000 units passed/CO



Always positive for GPON for larger roll-out (> 5000 unit passed/CO)

Perspective for local communities

	P2P	AE	GPON
Translating enterprise techno. to residential	Techno Reuse	Techno Reuse	New Techno
Simple Management	Passive	Active OSP	Passive
Scale from City to mass market	Fiber Management	Distributed Network	GPON scale advantages

sydfyns intranet

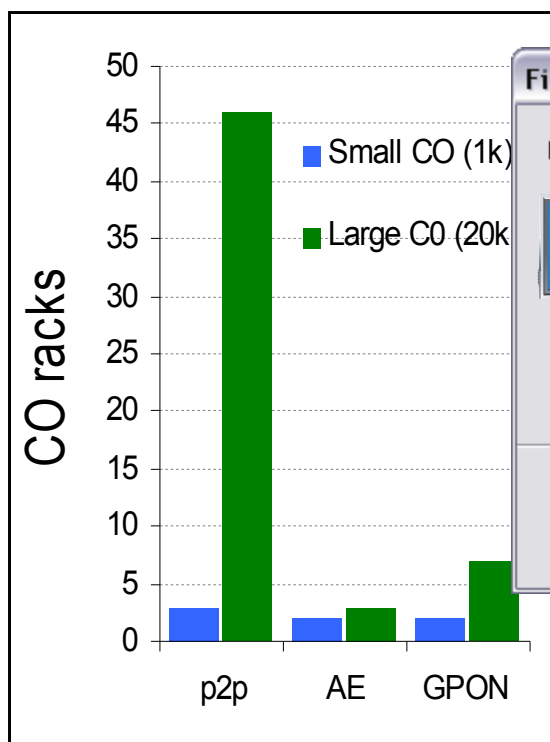


Often complete re-build with no re-use of existing ducts/civil work

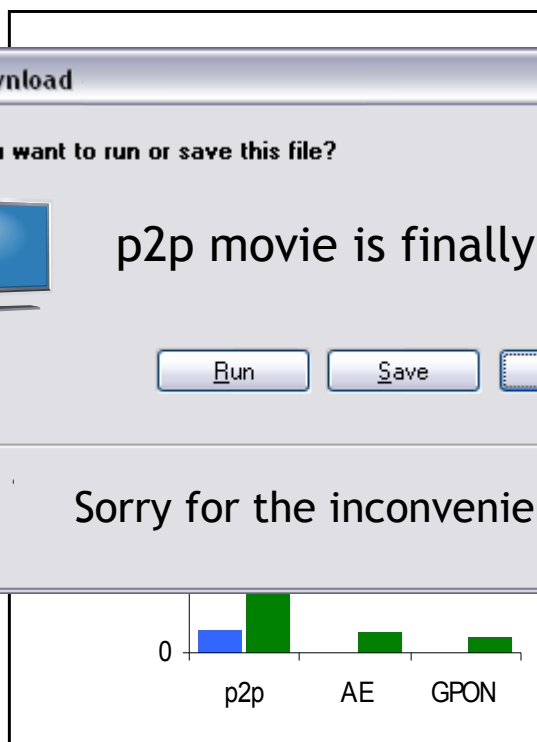
P2P cases: small local or low penetration or very short access loops

GPON has a key impact on sustainable development

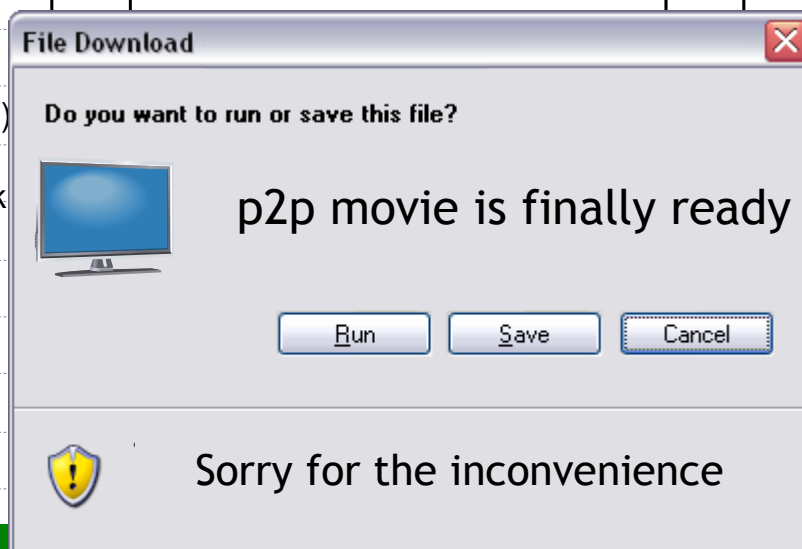
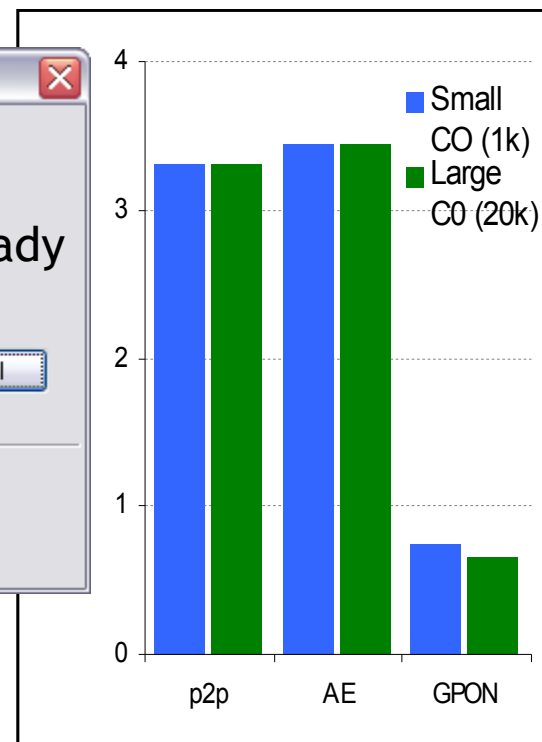
Central Office Space



Fiber Raw Materials



Power Consumption

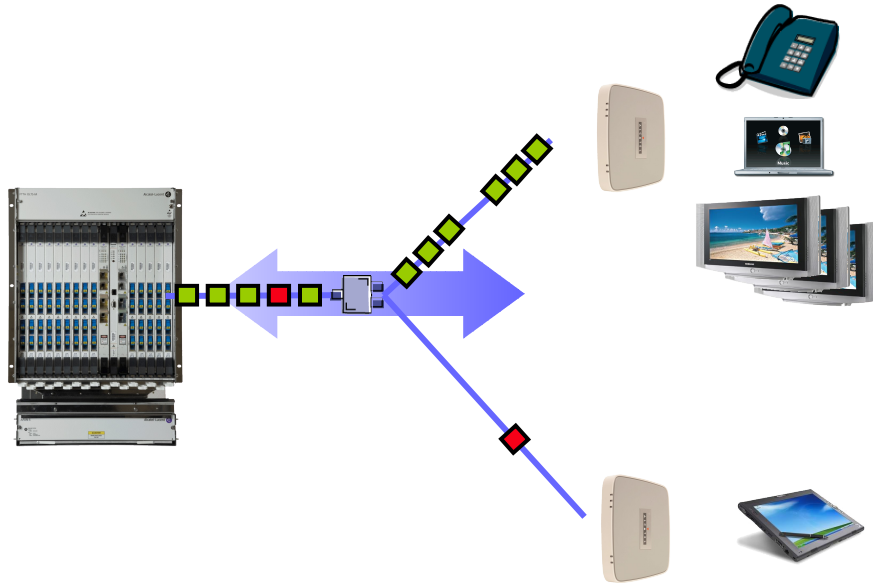


GPON scalability matters especially for large CO's



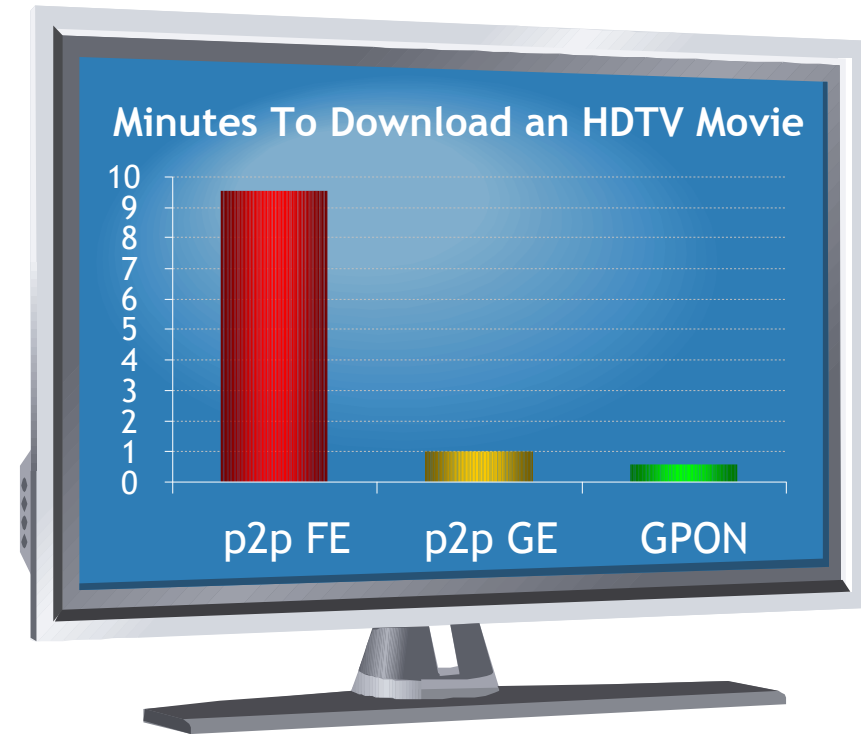
Let's talk about Bandwidth

GPON Gigabit dynamic bandwidth today



- ✓ Dynamic Bandwidth per user and service
- ✓ Burst up to full GPON capacity (2.5G)

...in action!



Bandwidth future-proof: FSAN 10G GPON, reusing outside plant

Network Convergence Phase 1

- Introduce IPTV, enable the triple play
- Non-blocking, broadband access (FTTx)
- Converged, next generation all IP network

Network

???

Converged
IP network

Legacy
networks

1st phase:
IPTV launch

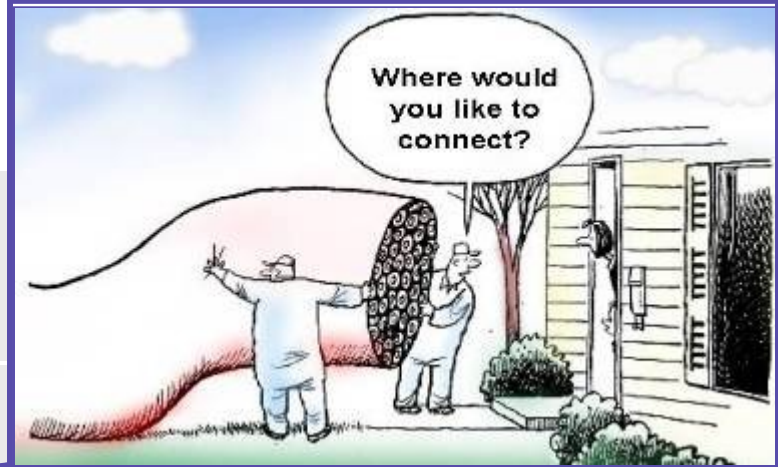
POTS
HSI

Triple play
bundles

Blended
multimedia

Applications

The industry now understands the impact of video and the need for a network transformation



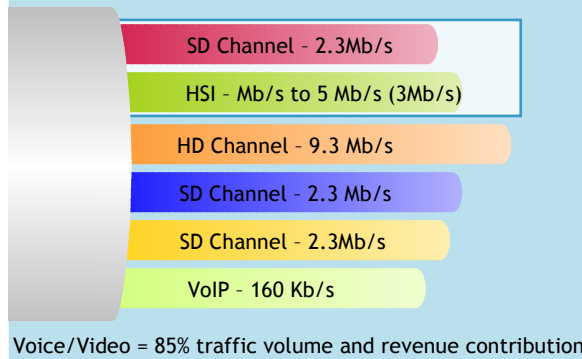
*Introduction of TPSDA to the market
in 2004: Alcatel is awarded AT&T
(SBC) Lightspeed project*



Rationale for Transformation: Video is Driving New Broadband Requirements

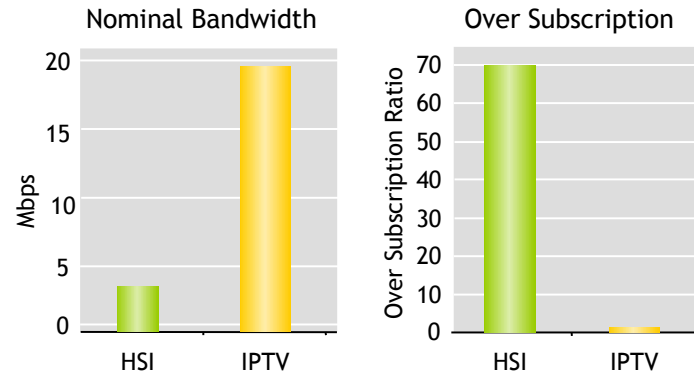
More bandwidth to the end-user

Estimated Peak Bandwidth Levels - 2010



25-100
Mbps

Less oversubscription in the network



Source: Alcatel-Lucent global study

200
Gbps



Video calls for an architectural change to a purpose-built IP network foundation able to meet unique scalability, high availability and QoE needs

...With More and More Bandwidth Capability

Downstream increase drivers

SDTV	2 Mb/s per channel
HDTV	8-12 Mb/s per channel
Basic HSI	5 Mb/s average
Gaming	2 Mb/s per session
Multimedia surfing	8 Mb/s average
Video Conf., learning	3 Mb/s per session
Home working	4 Mb/s average

Drivers: HDTV, variable Quality of Service

Upstream increase drivers

SDTV	0.2 Mb/s
Basic HSI	2 Mb/s average
HDTV	0.5 Mb/s
Personal content upload	3 Mb/s per channel
Gaming	2 Mb/s per session
Multimedia surfing	2 Mb/s per session
Video Conf., learning	3 Mb/s per session
Remote home monitoring	0.5 Mb/s per call
Home working	1 Mb/s average

Drivers: Sharing multimedia content (video, audio)

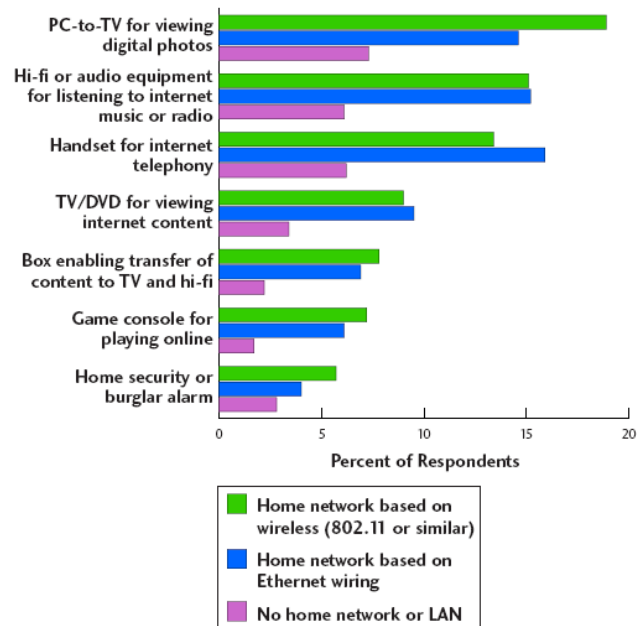
Increased bandwidth is required despite improved compression techniques.

Bandwidth and the Digital Home - a Virtuous Cycle

Linking additional devices to the broadband lines

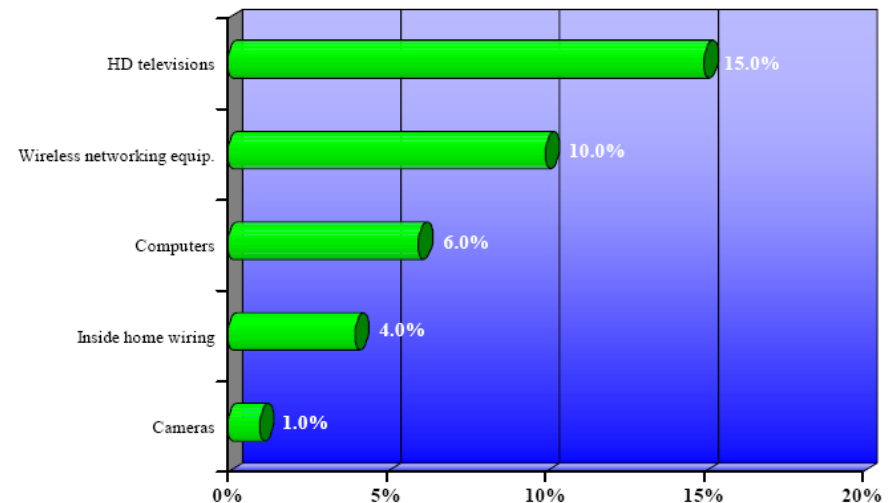
Linking Additional Devices to the Broadband Line

Source: Yankee Group 2006 European Broadband Consumer Survey

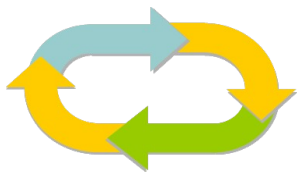


Source: Yankee Group, 2006

Equipment purchases for FTTH users "Primary because of FTTH"



Source: RVA Render & Associates, LLC, 2006



Bandwidth enables the use/purchase of more devices, which in turn drives the need for more bandwidth.

The Future of Bandwidth is in Triple Play Services

■ Video

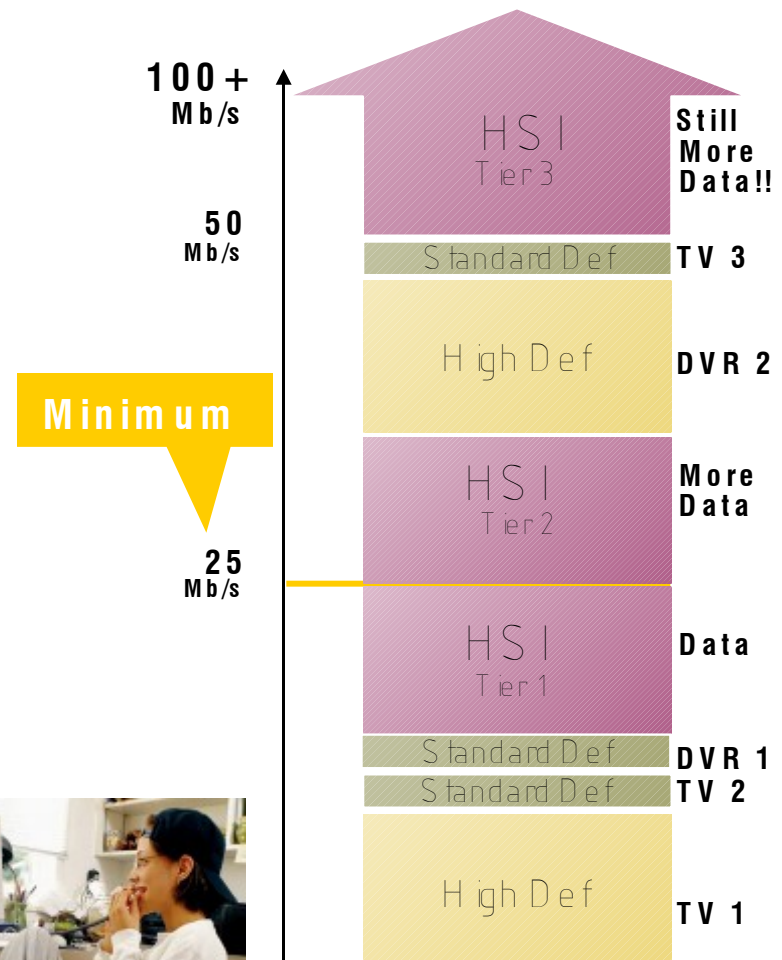
- High definition and standard definition
- Multiple set-tops, DVRs, picture-in-picture, and mosaic views
- High bandwidth and high quality required

■ Voice

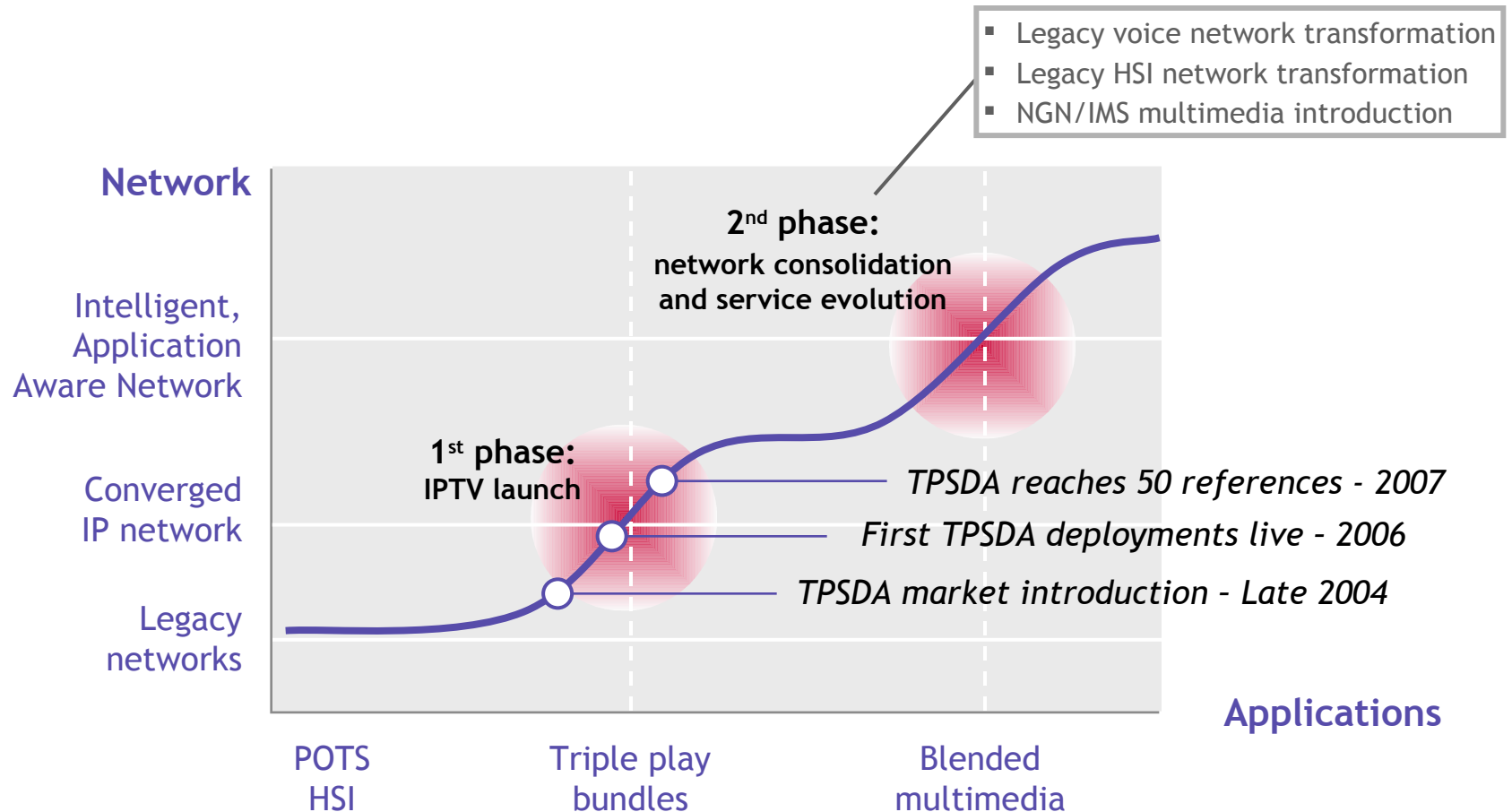
- Flat-rate pricing
- Integrated with e-mail and contact list
- Low bandwidth and high quality required

■ Data

- High bandwidth
- Bursty and largely delay-tolerant



Phase 2 - Network Consolidation and Service Evolution



Making the Fiber Nation Happen

Three key questions to tackle



Build the fiber nation

How to make FTTH economical for a country-wide deployment?



Capture the value of FTTH

How to monetize FTTH investment in BB services landscape?

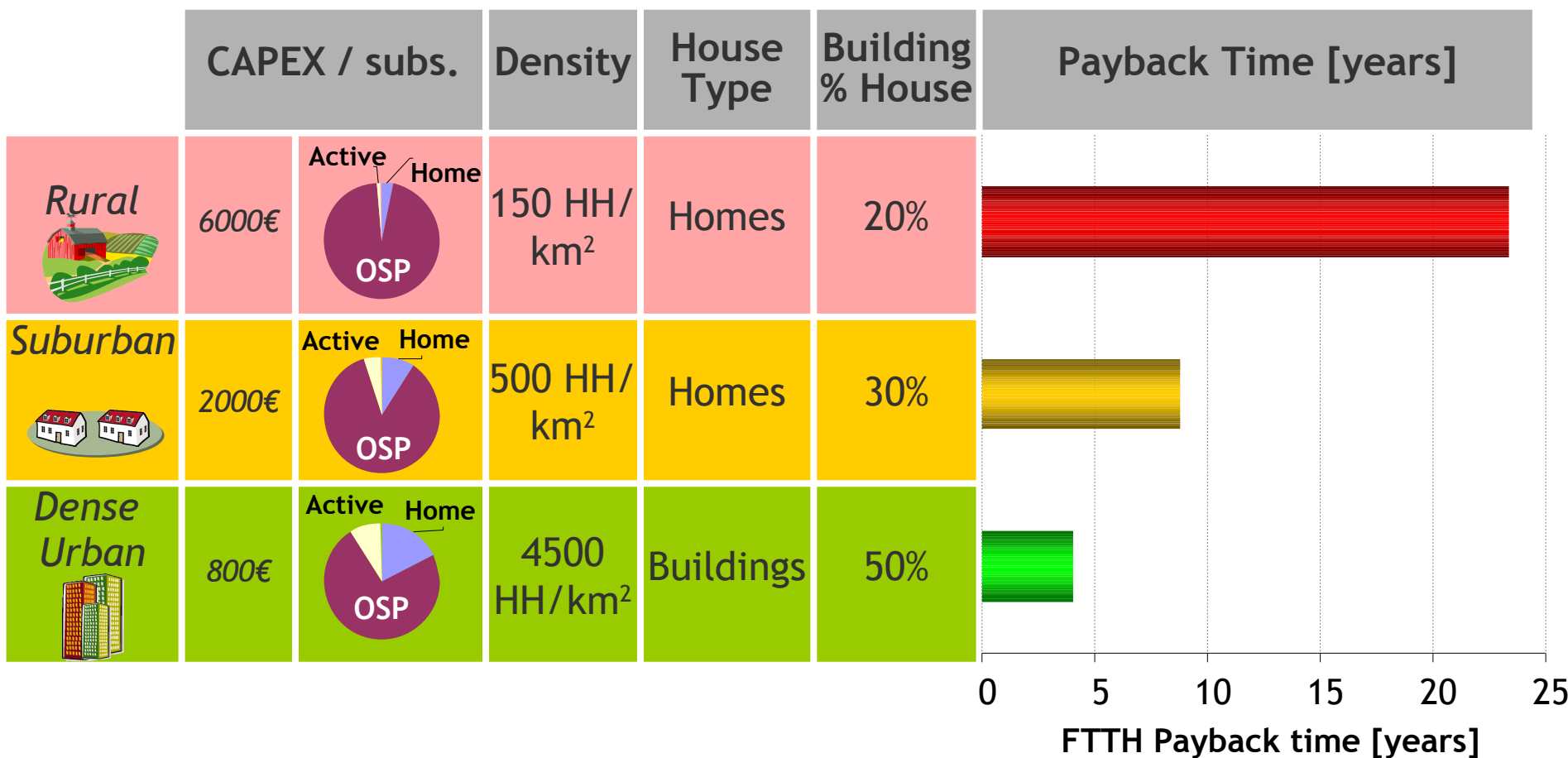


Into the Converged Digital Home

What is the impact of FTTH on Digital Home battlefield?

Build the Fiber Nation (1)

How to make FTTH economical for country-wide deployment?



The main driver is availability of **ducts** in the last 500 meters

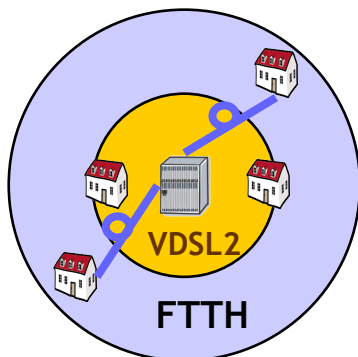
Only a **plurality** of investors and actors will allow to bridge the Digital Divide

Build the Fiber Nation (2)

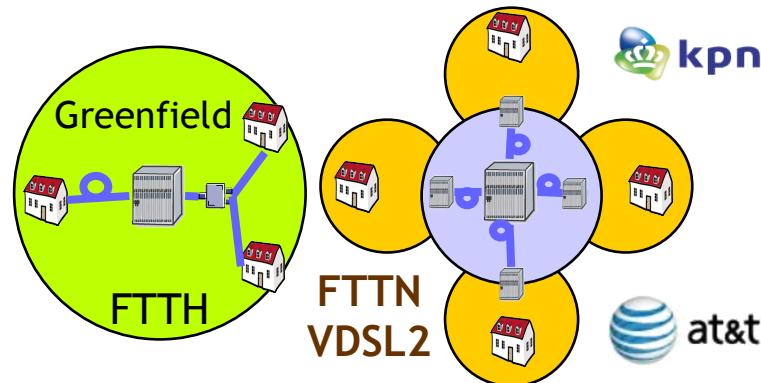
Like Roma, FTTH across the country will not happen overnight



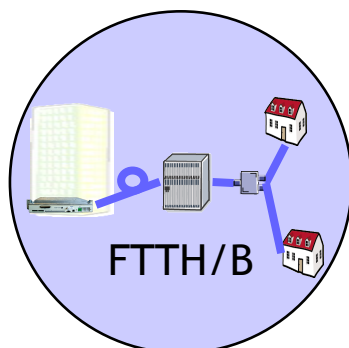
CO VDSL2 & FTTH



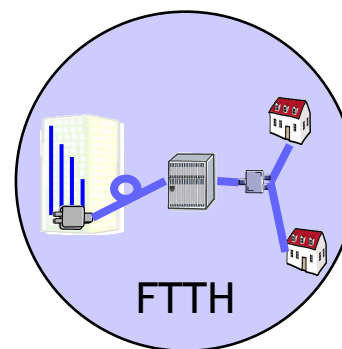
FTTH & FTTN



FTTB/VDSL2 & FTTH

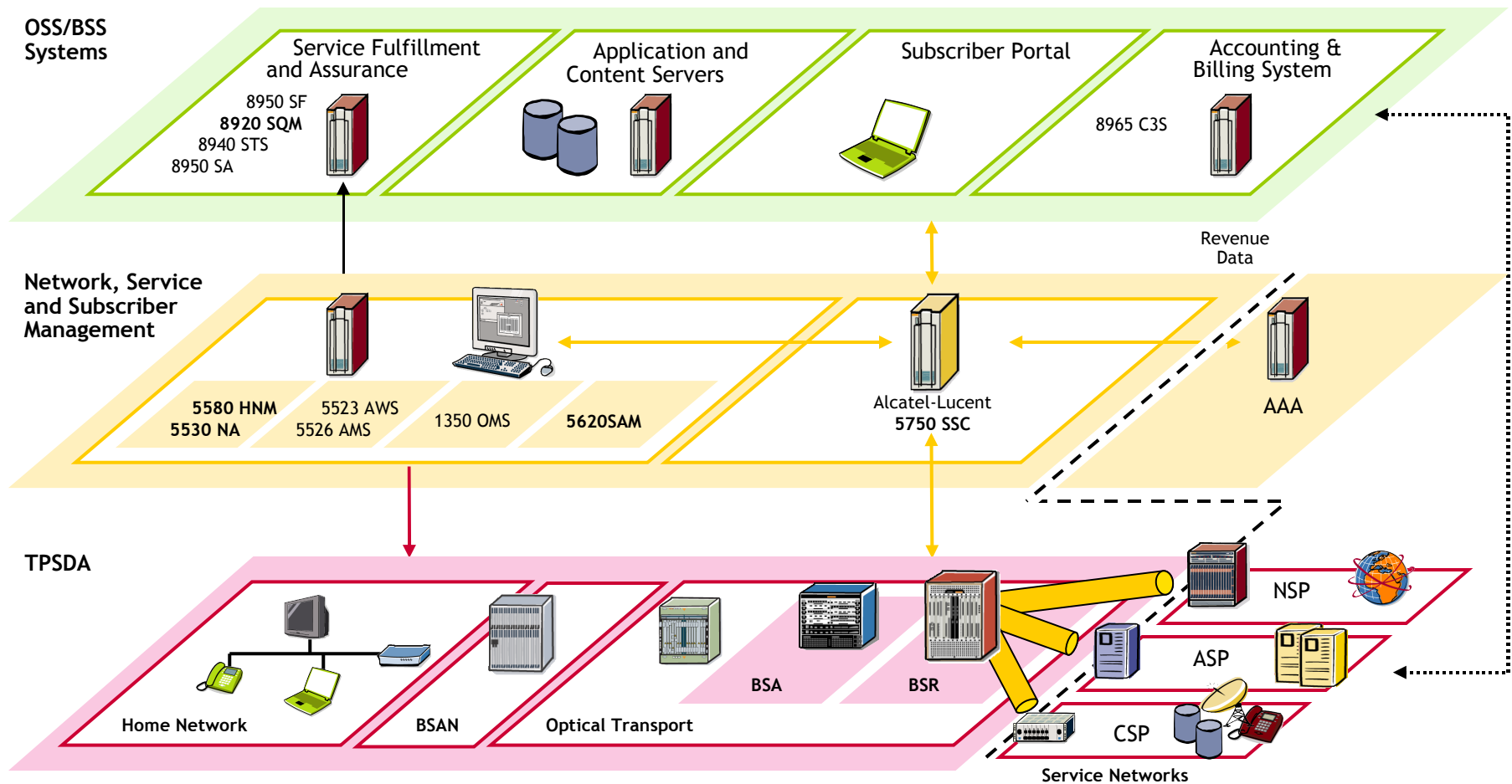


FTTH only



Mixed deployment of VDSL2 and FTTH in most countries

Orchestrating Operational Tasks for Triple Play Service Delivery



TPSDA provides centralized service & subscriber control, combined with monitoring & troubleshooting tools to assure and verify services are delivered at the required quality

Build the Fiber Nation (3)

Sharing FTTH infrastructure: technology-agnostic already




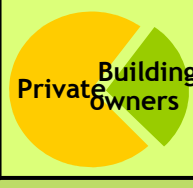
Citynet Open Access

Dark Fiber sharing from Central Office

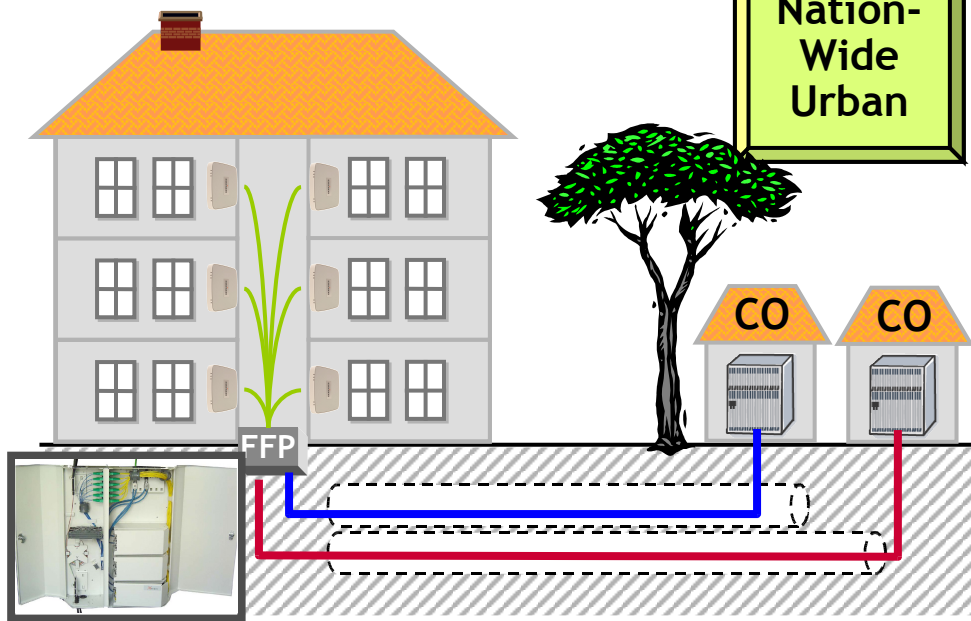
Horizontal ducts sharing

In-Building fiber sharing





Nation-Wide Urban



Build the Fiber Nation (3)

Sharing FTTH infrastructure: technology-agnostic already

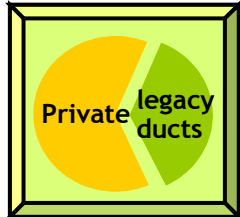


Citynet Open Access

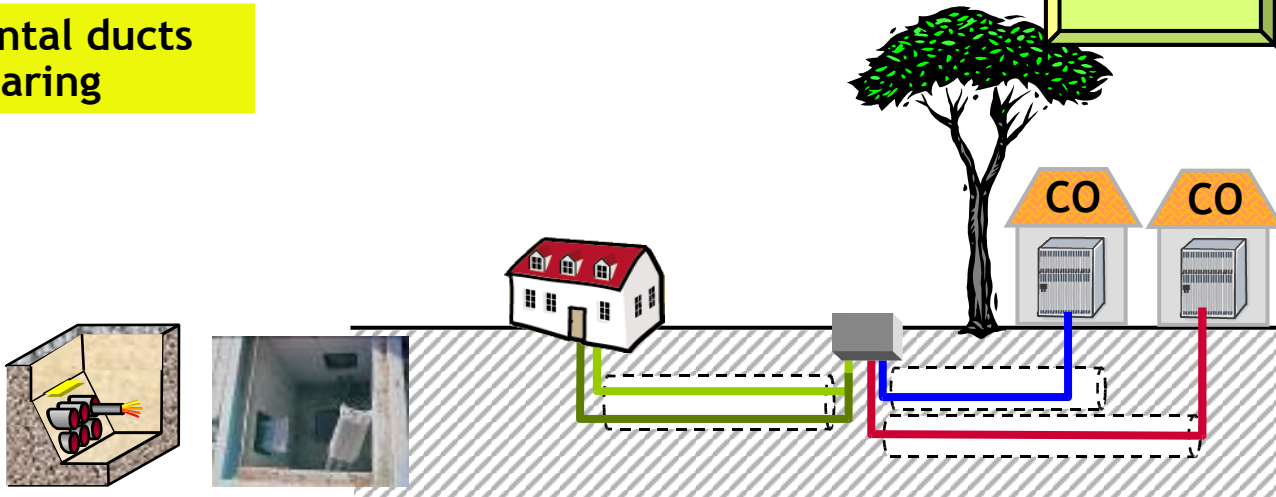
Dark Fiber sharing from Central Office

Horizontal ducts sharing

In-Building fiber sharing

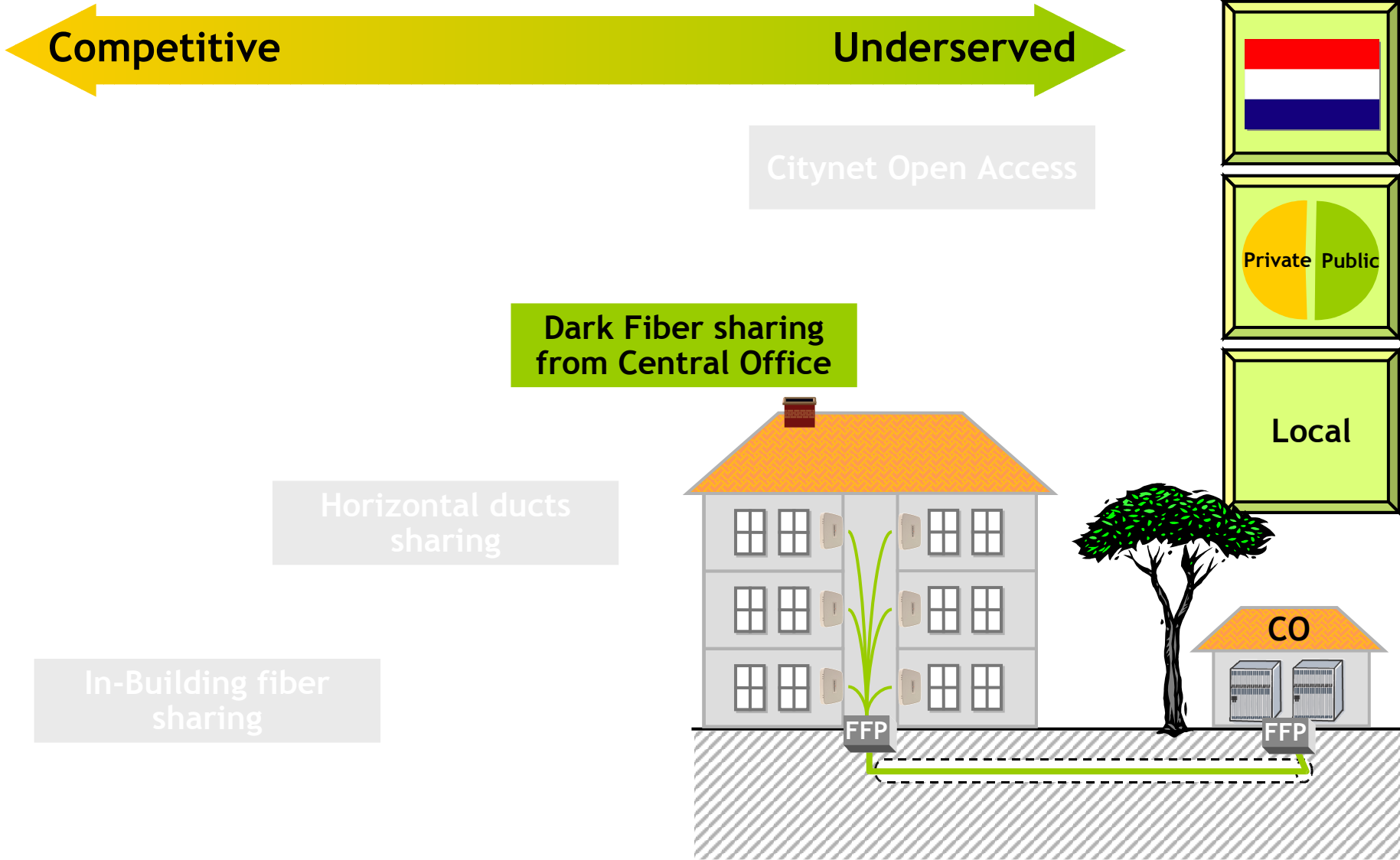


Nation-Wide Suburban



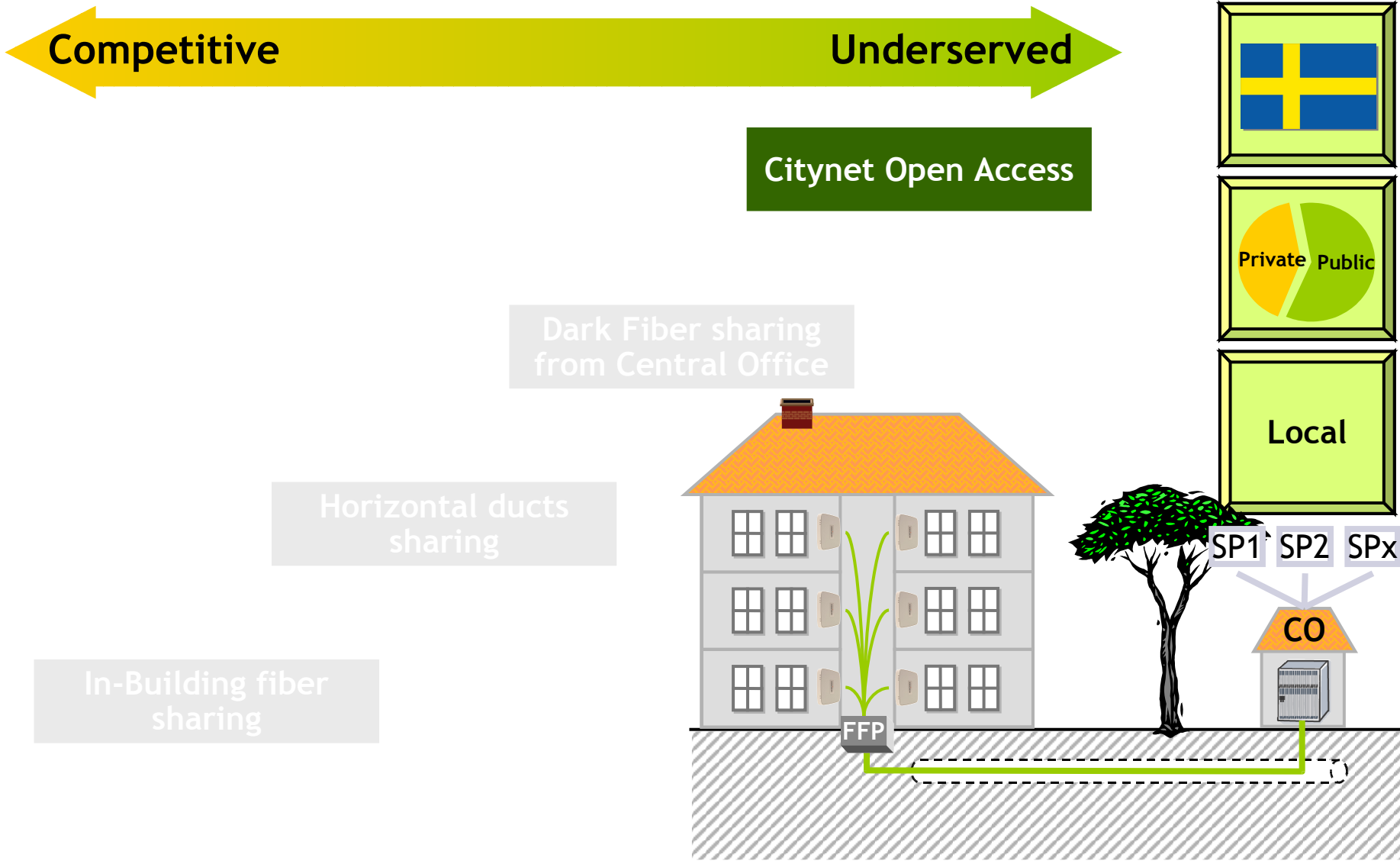
Build the Fiber Nation (3)

Sharing FTTH infrastructure: technology-agnostic already



Build the Fiber Nation (3)

Sharing FTTH infrastructure: technology-agnostic already



Capture the value of FTTH (1)

Evolving value chain drives new positioning and play



**End-User Device
Vendors**

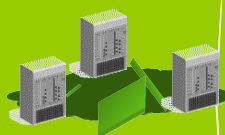
**Service
Providers**

**Content &
Applications
Providers**



Apple tv

**Stimulate
Usage**



**Capture
Usage**

Content

**Applications &
Service Delivery**

**Network &
Transport**

Access

BlackBerry



XBOX 360

MICROSOFT



**Service providers
create value**

Reach & Usage

Always-on Broadband & Mobility

Secured with IP awareness

Monetized across all content

QoS

HD IPTV,
VOD, On line
gaming ...

Over-
the-Top

Best Effort



Added ARPU



Basic



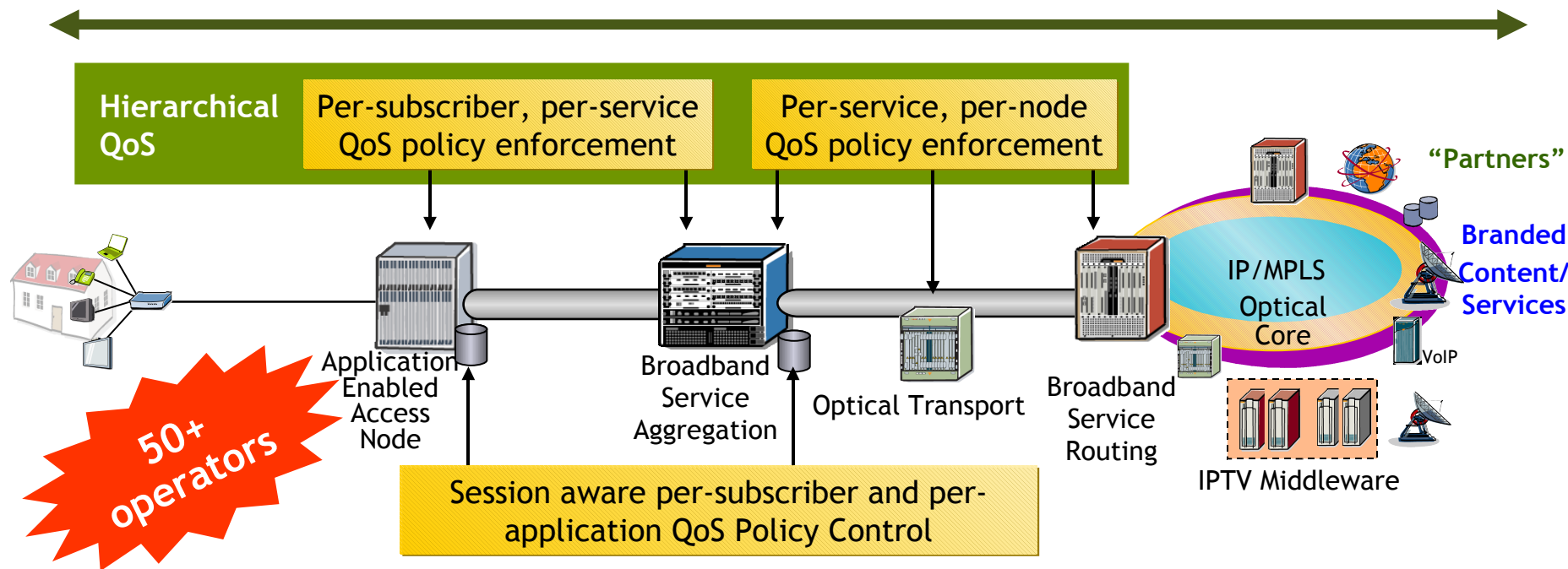
**Flat
Rate**

Capture the value of FTTH (2)

Evolving IP Triple Play Service Delivery Architecture with Fibre



- Distributed intelligence at most economical & service enhancing point



Unique scaling at >80k subscribers

- ✓ Scalability, QoE, Flexible, Resilient
- ✓ Secured network



Embracing new market challenges

- ✓ Enhanced Internet with per-application QoS
- ✓ Fixed/Mobile convergence (home, backhaul)
- ✓ Dynamic content delivery (network & home)

Into the Converged Digital Home (1)

Convergence Begins at the Home

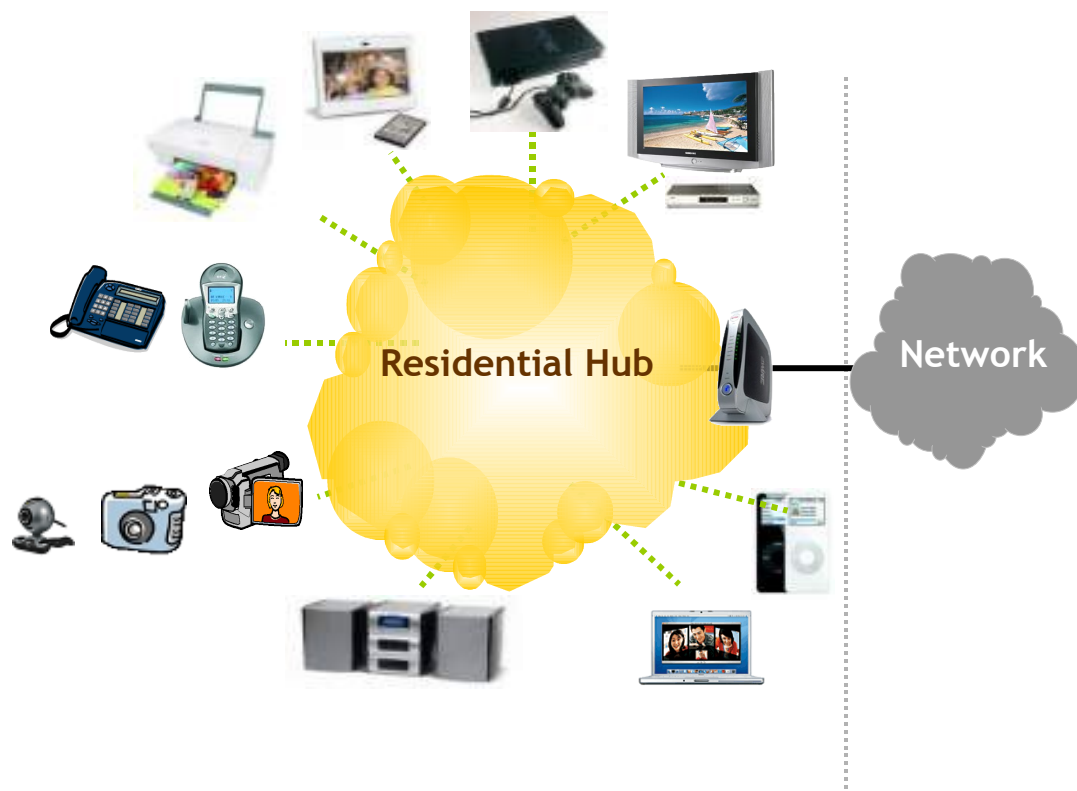


Continuity

Convenience



Consistency (user interface / portals)



Into the Converged Digital Home (2)

Where fiber meets mobile



Home Network Bridge Point

- Extent TPSDA attributes to the home
- Integrated GPON ONU/RGW

Platform for New Services and Applications

- IMS, Home Automation
- Resource and Media Sharing

Fixed Mobile Convergence Point

- Integrated RGW
- Femto

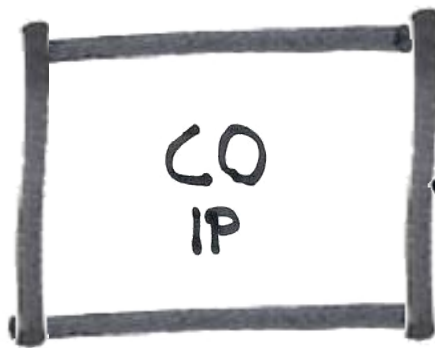
Digital Home Care support

- Automated Service Activation
- Self Care and Customer Service

Residential Gateway: the natural convergence point in the home



Unifying Applications & Network



Leading the “Fiber Revolution”



**Creating the
Converged Digital Home**

Transformation to the Digital Life



<http://www.alcatel-lucent.com/tpsga>

Thank you

www.alcatel-lucent.com

