



FTTH in Japan: Strategy, Technology and Implementation

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NTT

- **Restoration from the Earthquake Disaster**
- **FTTH Market in Japan**
- **NTT's Business Strategies**
- **NTT's Technology Innovations**

Restoration from the Earthquake Disaster

Damage Status of NTT's Facilities



Telecom office buildings



Demolished: **18** buildings
Flooded: **23** buildings

Telephone poles



Flooded/collapsed: **65,000** poles

Trunk line



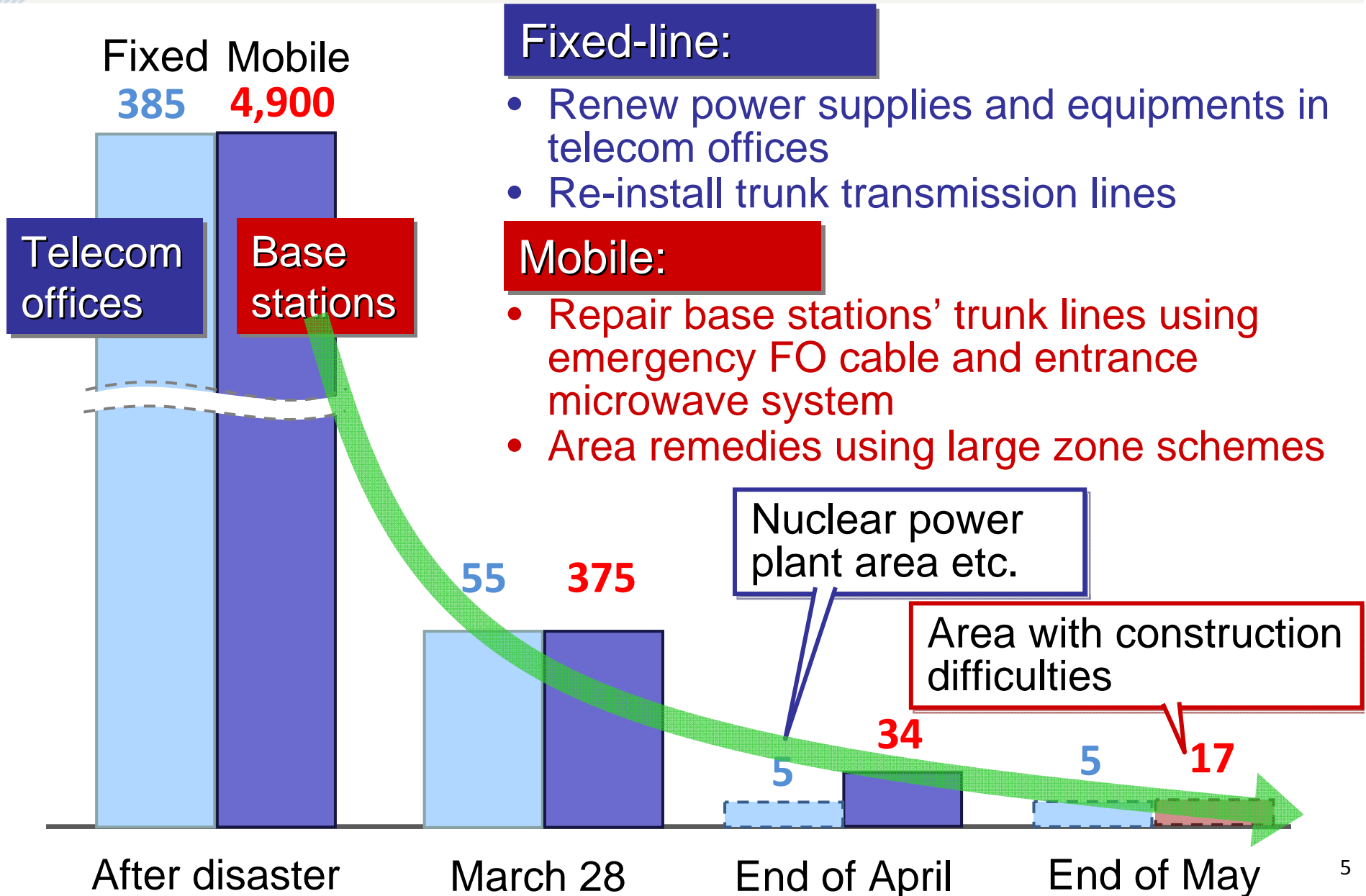
Trunk lines: **90** routes disconnected
Flooded/damaged: ~ **6,300** km

Base stations



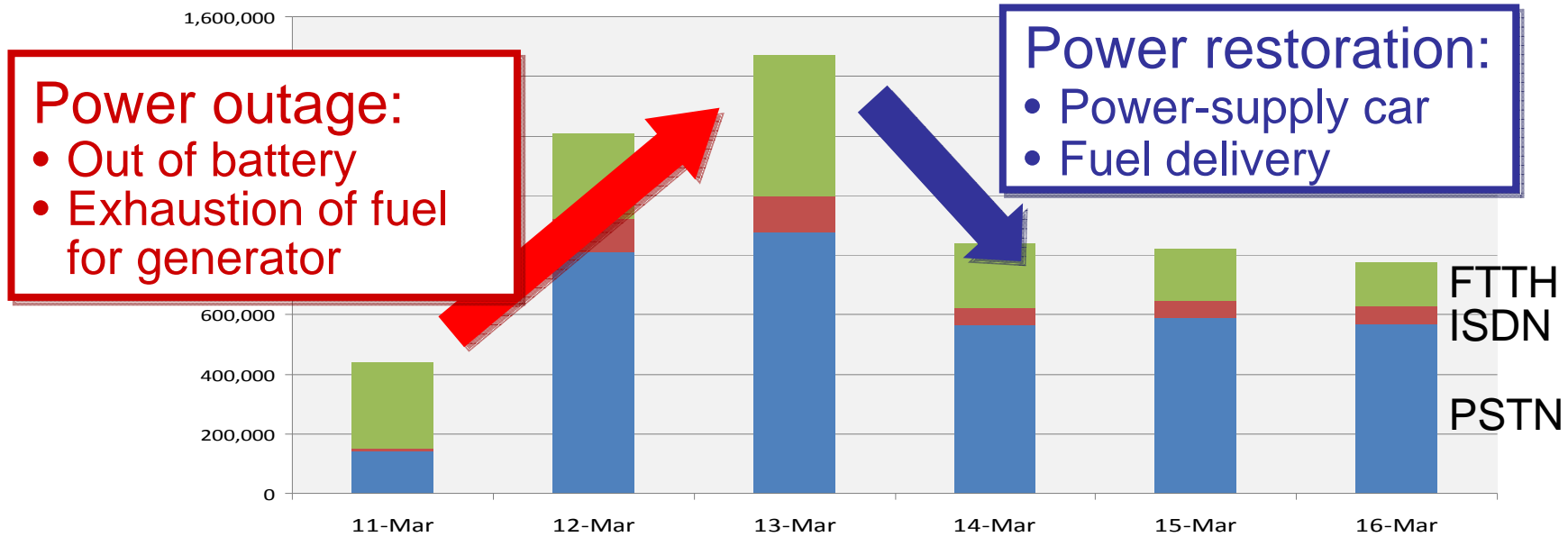
Requiring restoration: **375** stations

Restoration Status of NTT's Service

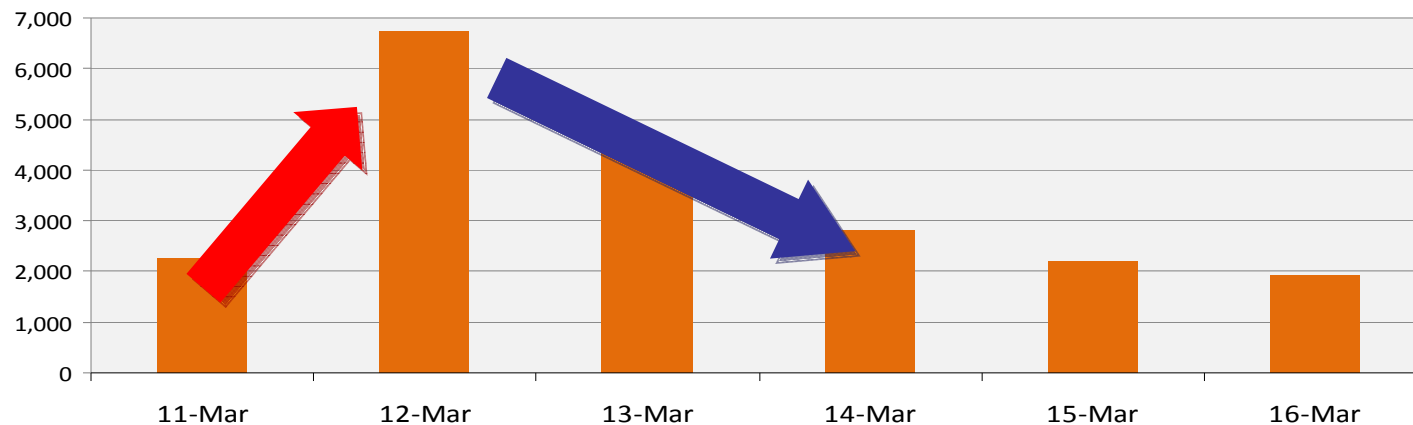


Interruption in Power-Supply

of affected circuits for fixed-line services



of base stations with discontinued mobile services



Tsunami:

- **Severe damages to telecom. facilities**
- **Large qnty. of debris and severed roads blocking access to & within the affected areas**

Electricity:

- **Widespread and long-term power outages**
- **Brownout (scheduled blackout)**
- **Risk to over-depend on the utility power**

Emerging ICT Services:

- **Voice service : unprecedented congestion**
- **E-mail and the Internet played key role**

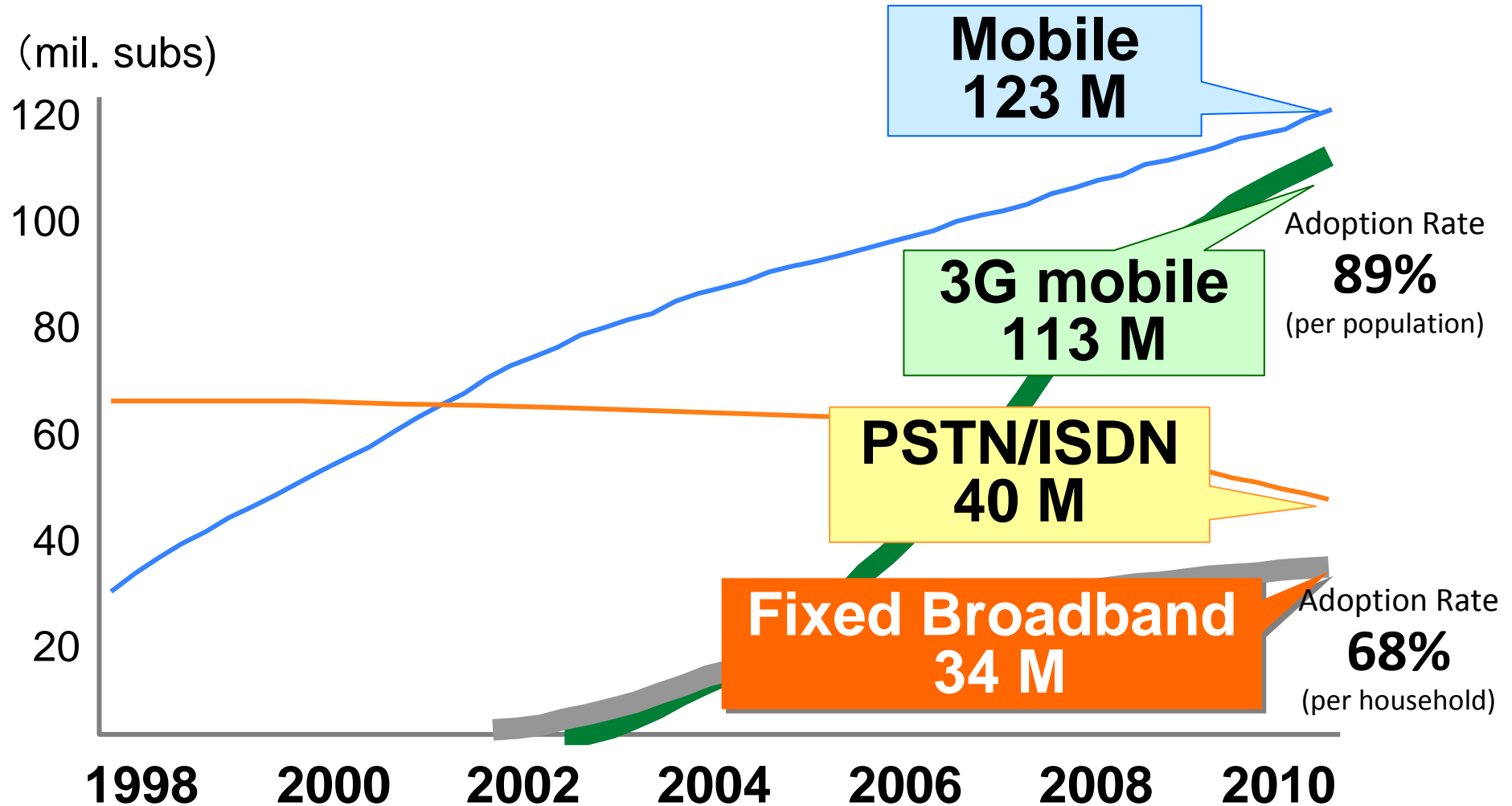
- Development of disaster-resistant networks and prompt recovery methods
 - Key function dispersion across the country
 - Multiple route Implementation
 - Increasing Reserved power capacity
- Secure prompt reconnection for local relief sites
 - Satellite and wireless communication
- Secure means of info. distribution after disaster
 - Enhancement of existing answering service
 - Encouraging users to use email & Internet
- Provide services and solutions useful during a disaster and during recovery
 - Local government support, medical care, schools etc.

FTTH Market in Japan

Telecom Service Subscriptions

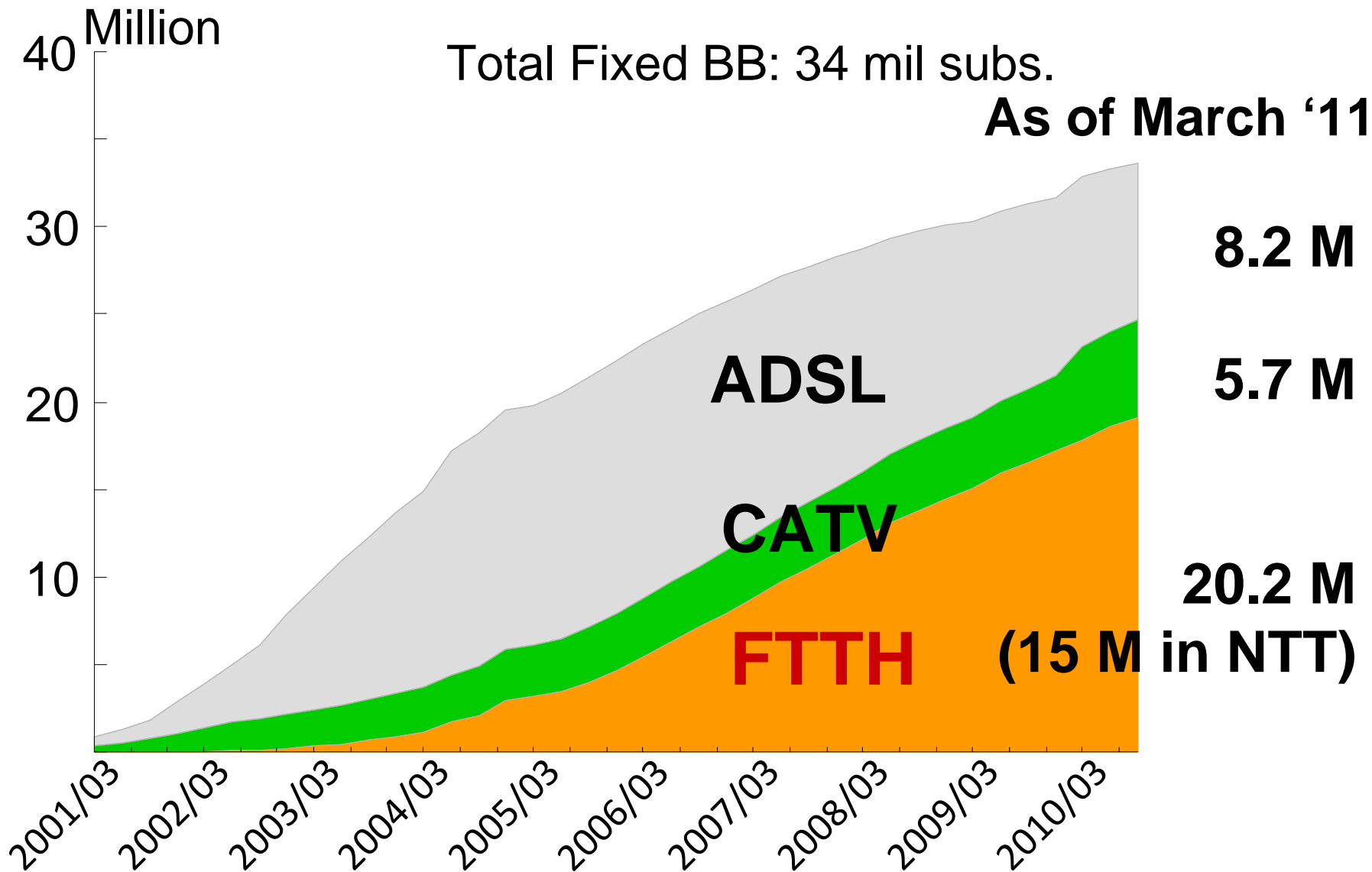


As of March '11



Source: Ministry of Internal Affairs and Communications (MIC) and the Telecom Carriers Association

Fixed Broadband Market



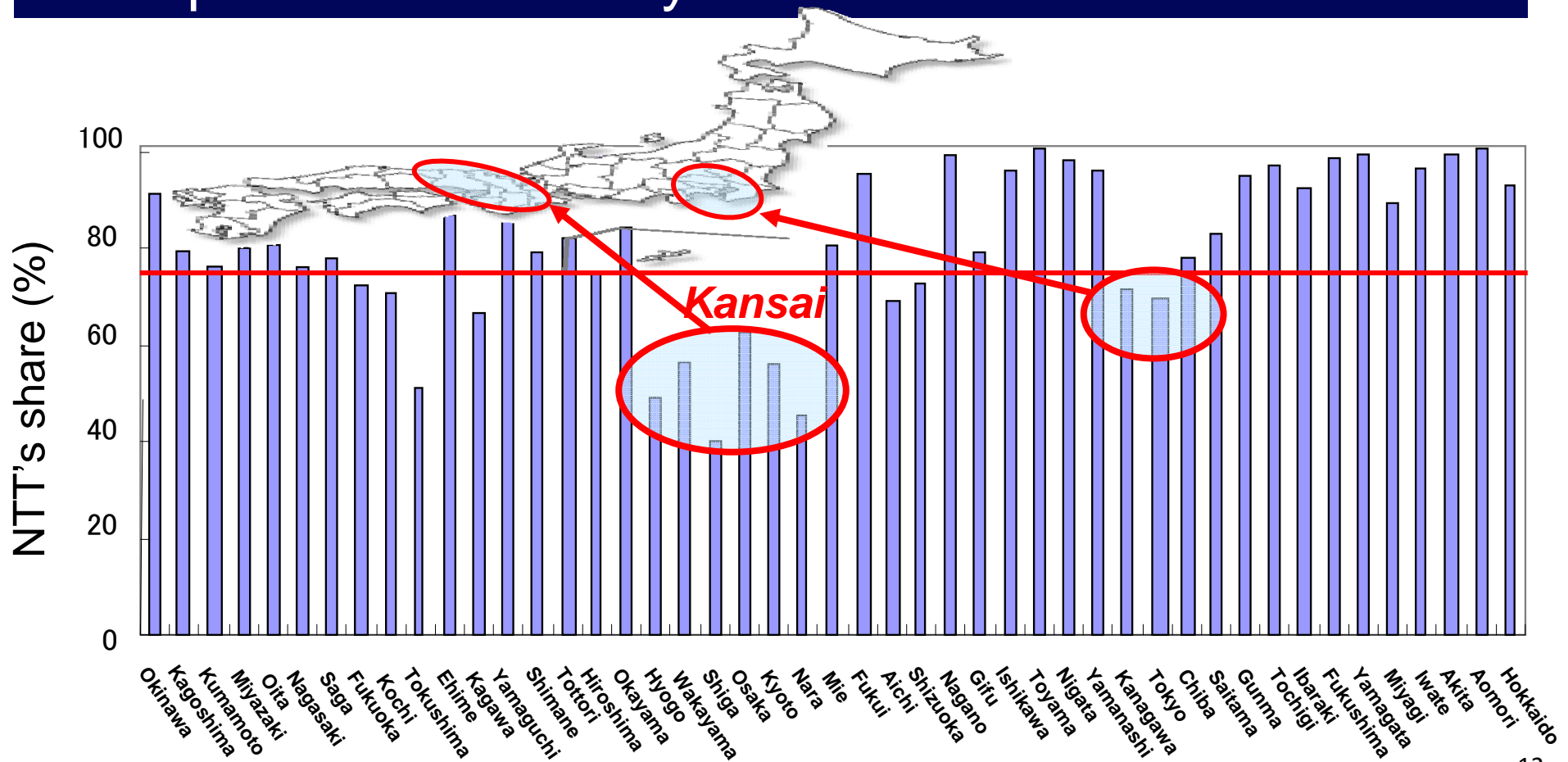
Source: Ministry of Internal Affairs and Communications (MIC)

11

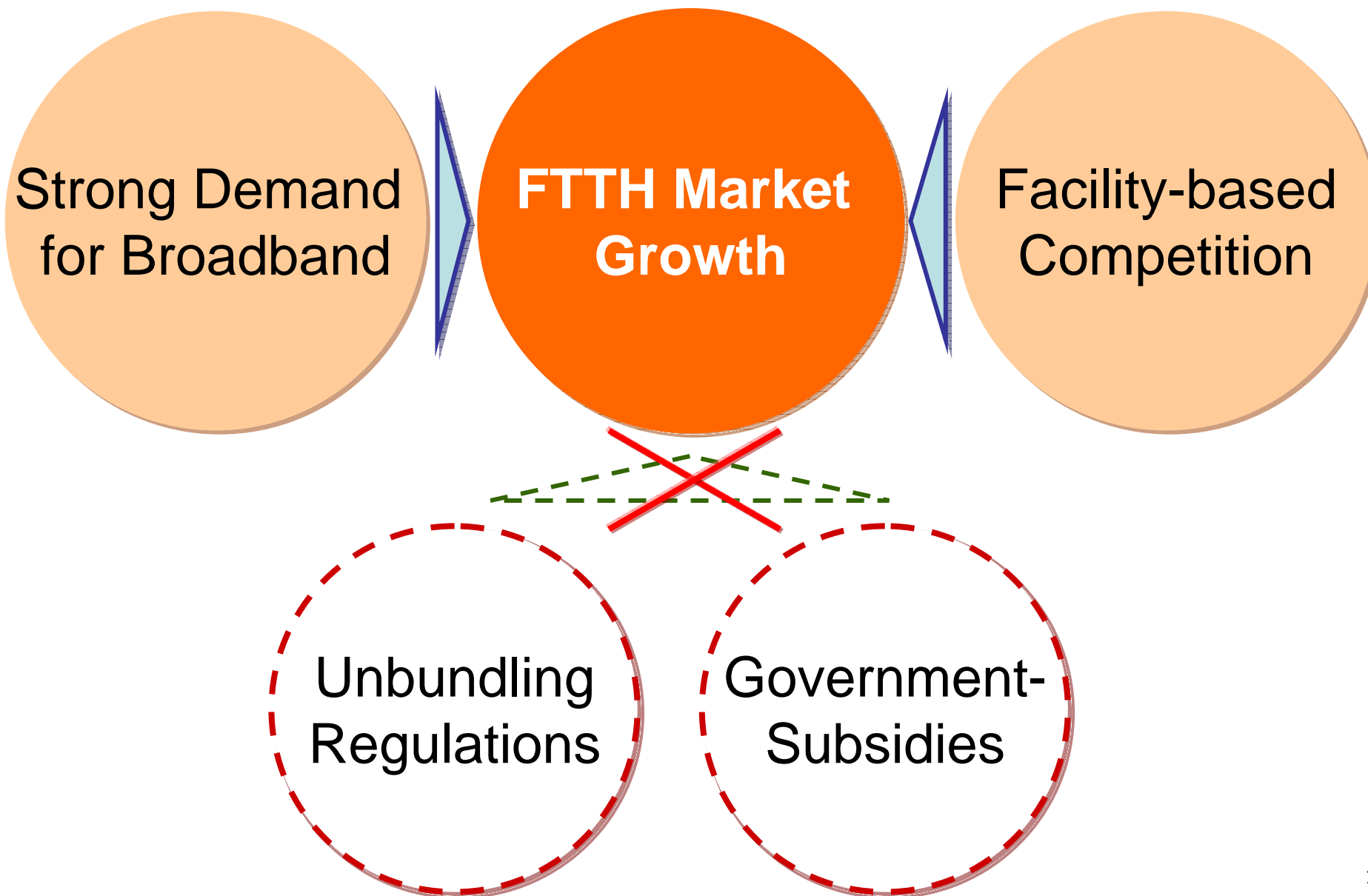
FTTH share in individual prefectures



- NTT's nationwide share of FTTH is above 70%.
- In urban areas, NTT struggle with smaller market
- BB providers basically use their own fiber

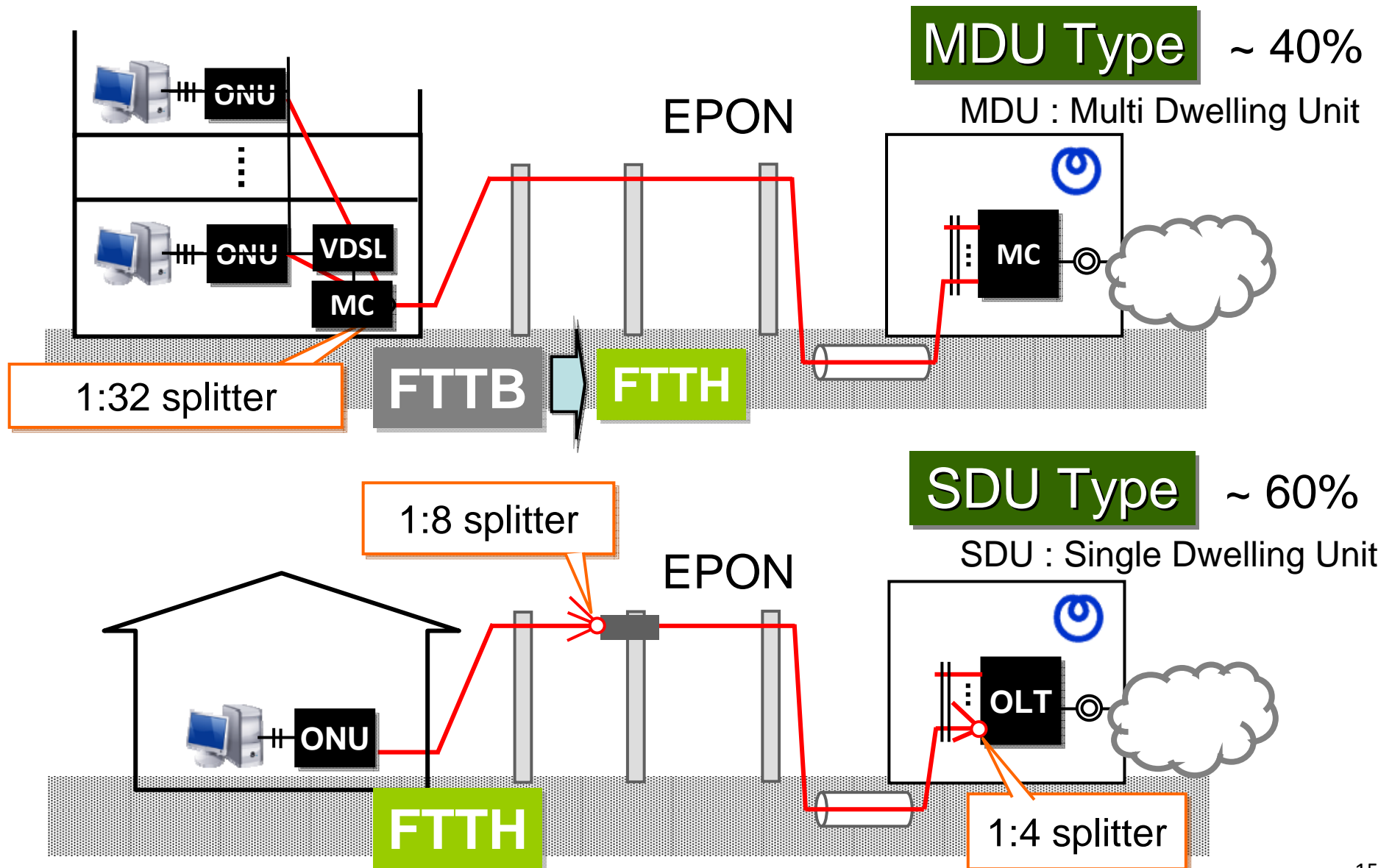


FTTH Market Growth in Japan

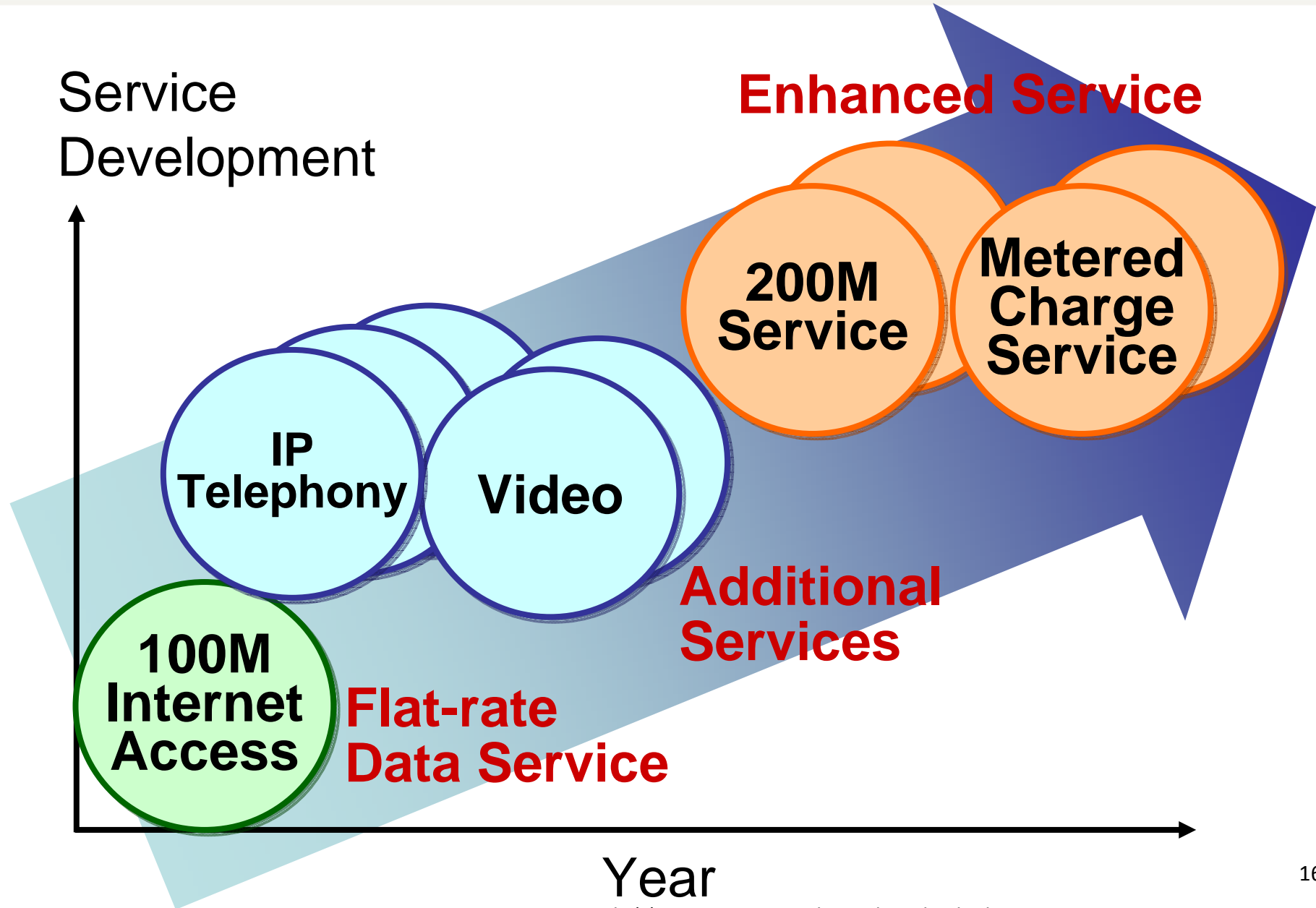


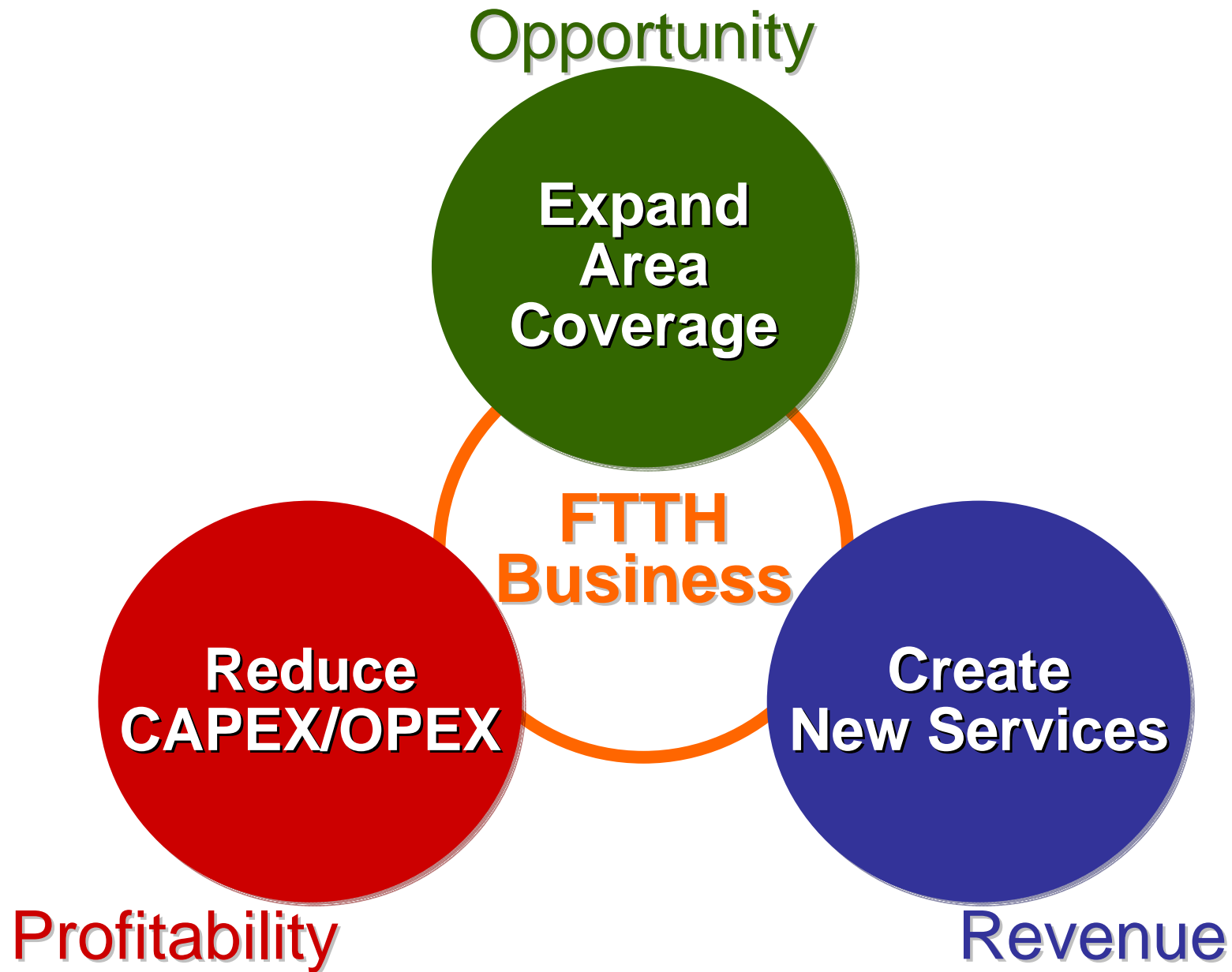
NTT's Business Strategy

NTT's FTTH Access Services



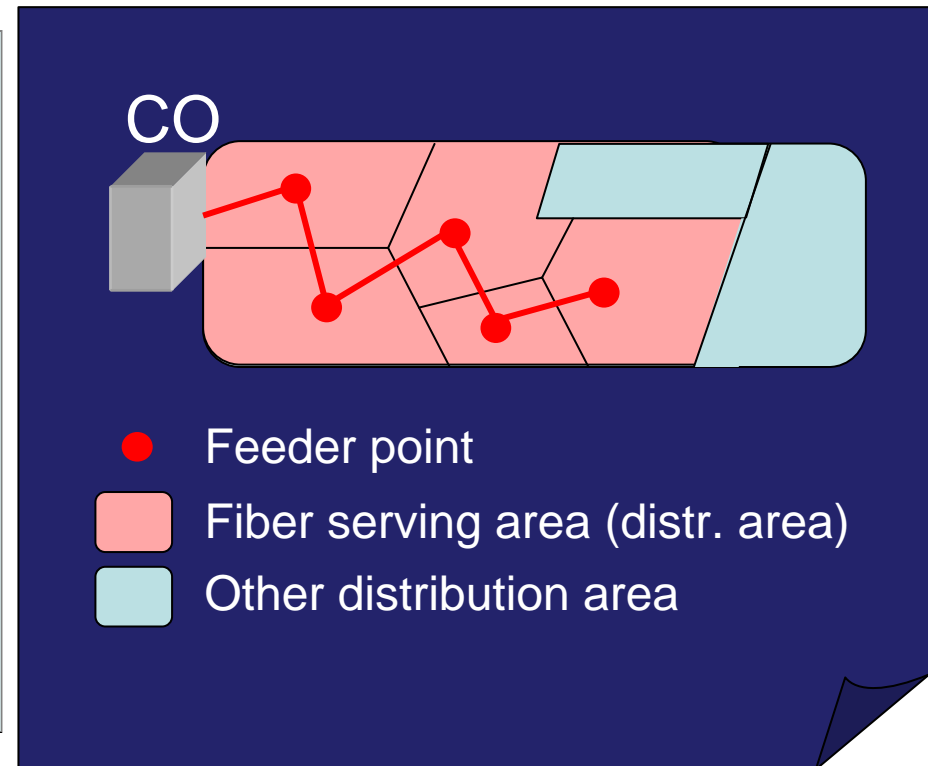
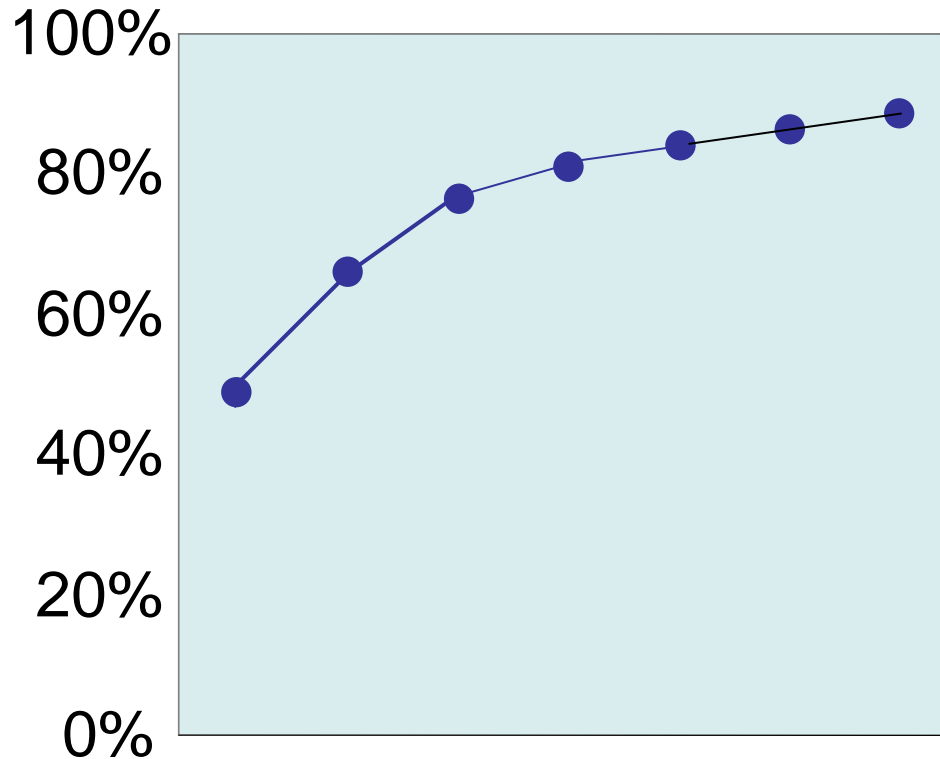
NTT's FTTH Service Development





Fiber penetration in NTT

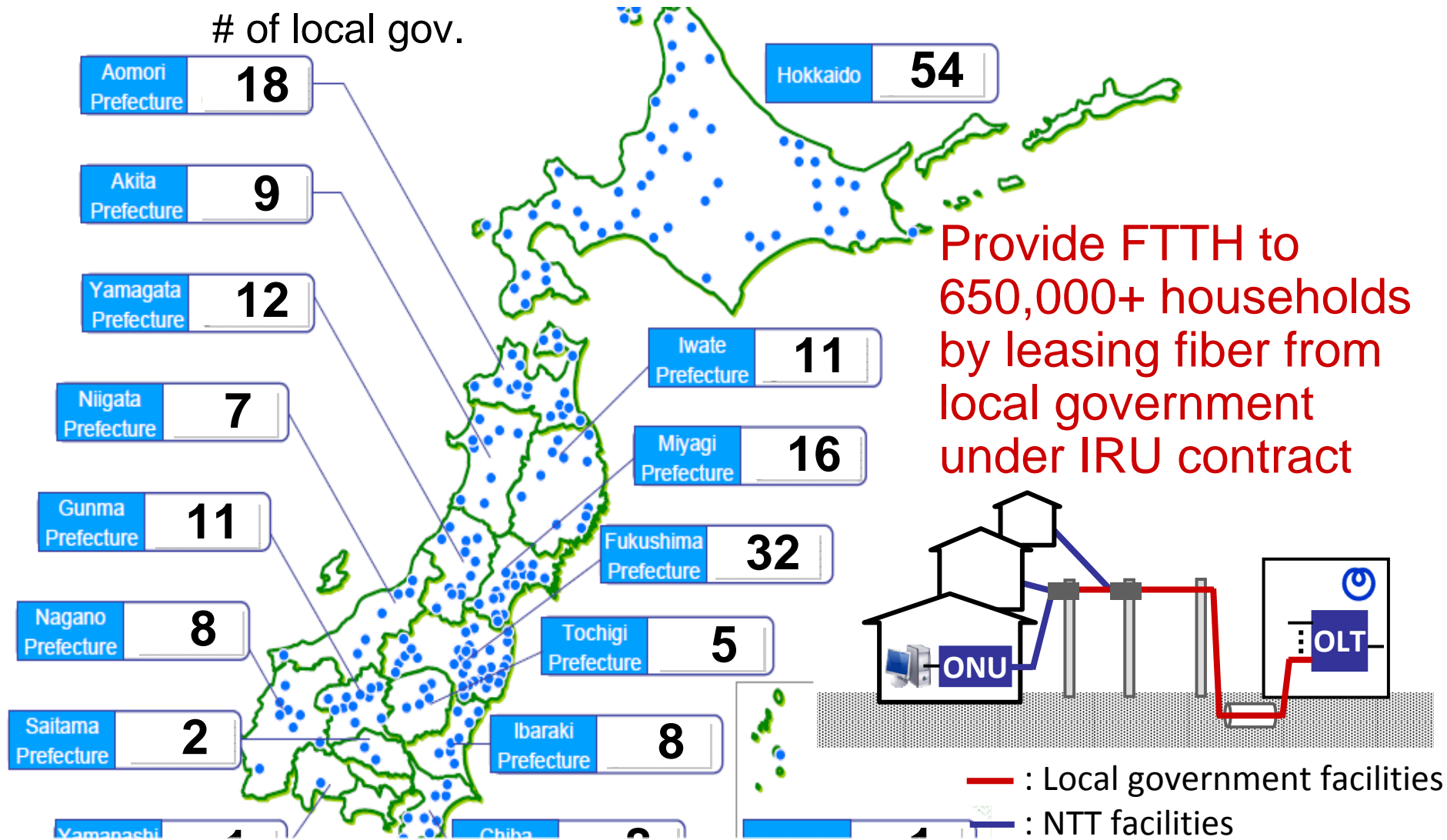
Fiber coverage rate



$$\text{Fiber coverage rate} = \text{Fiber serving area} / \text{Total area}$$

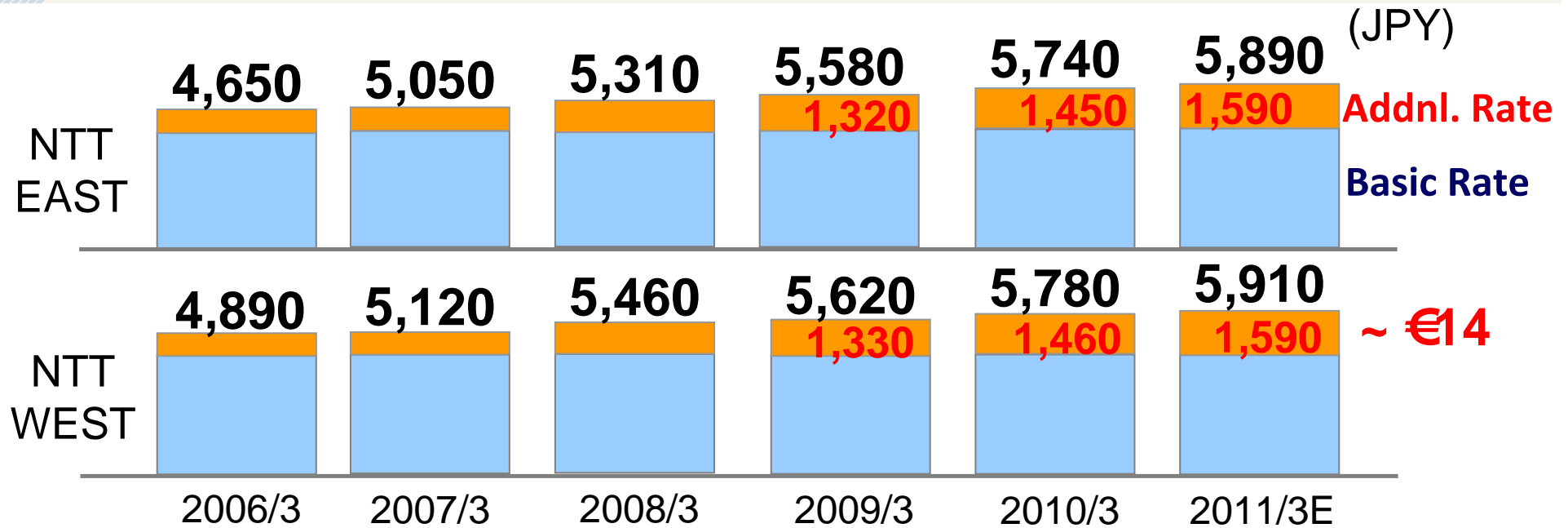
Service offering in depopulated areas

: Indefeasible Right of User Contract Scheme



Extended PON reach : Normal reach (7km), Long Reach(50km)

ARPU from FTTH Services



Diverse additional services

IP Telephony

Remote Support

RF overlay video

Virus clear

Local information

Mobile Wi-Fi router

File hosting

Personal Health Record

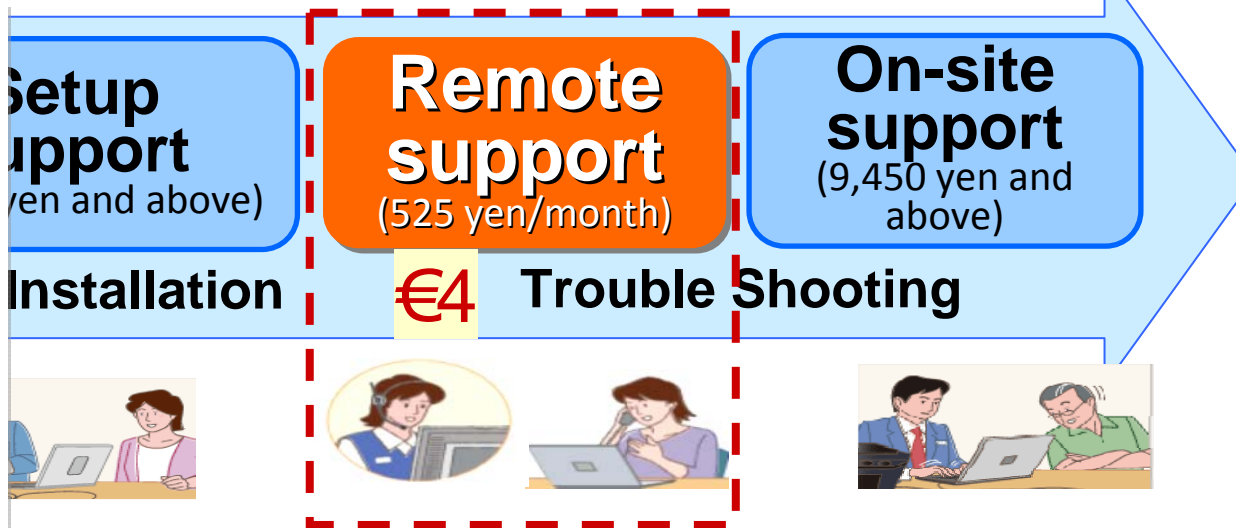
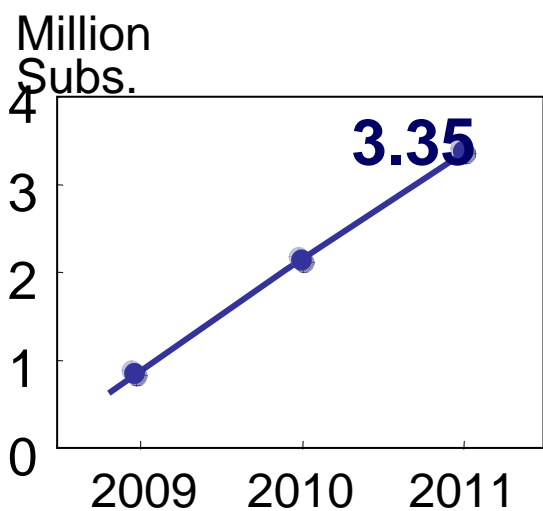
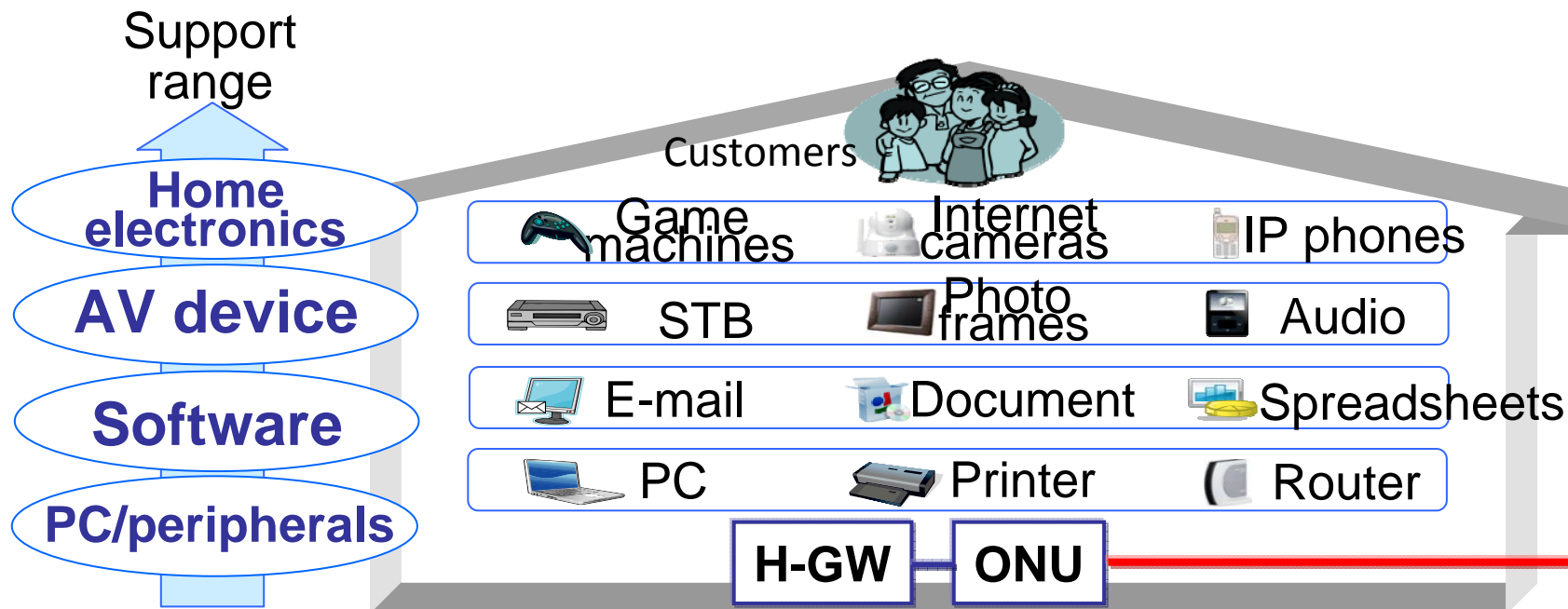
Earthquake alert

Our FTTH business is turning profitable !!

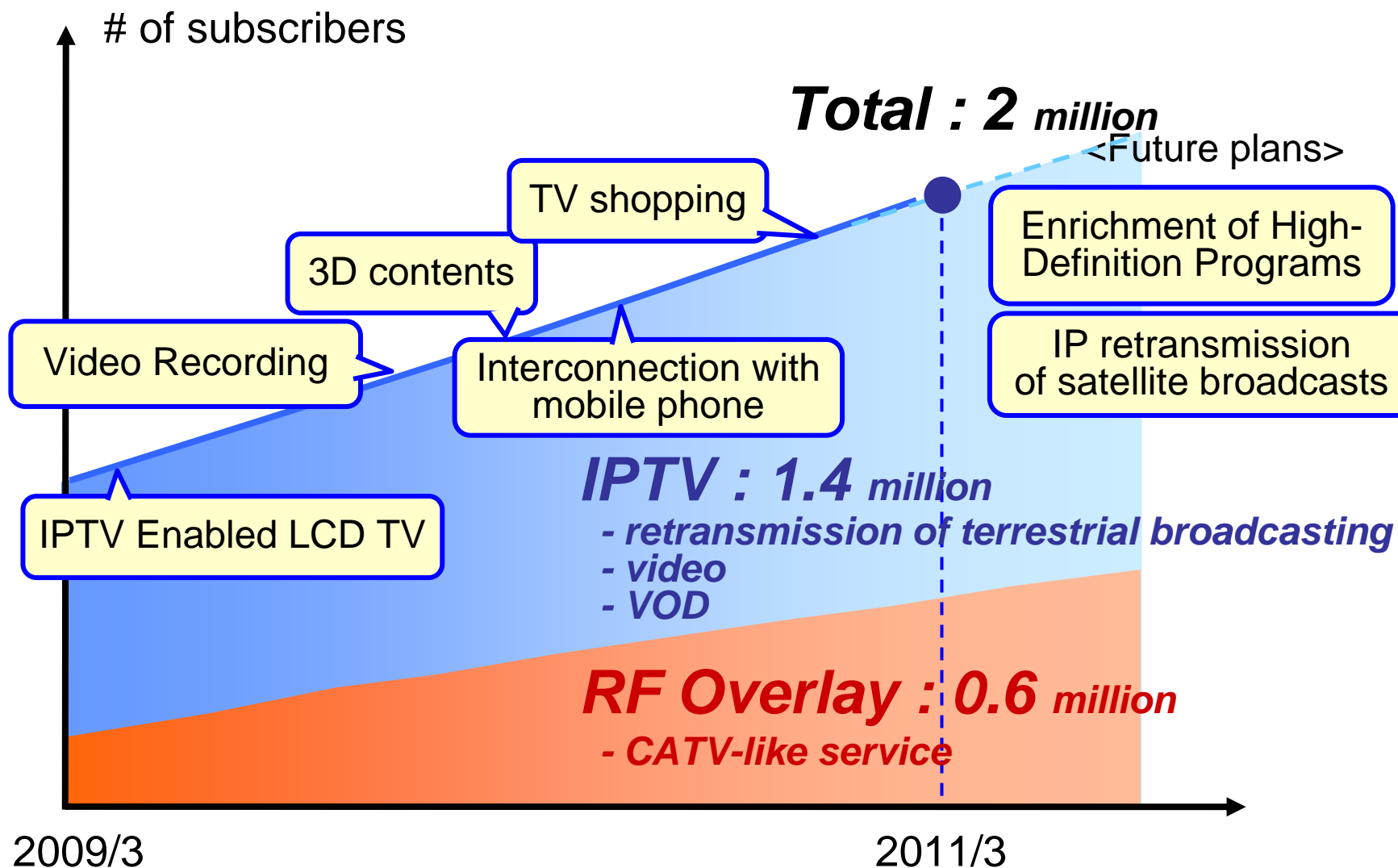
“Hikari-denwa” : Optical telephone

- Low-price
 - Monthly charge : JPY 525 (cf. POTS : JPY 1,785)
 - Dialing charge : JPY 8/3min. to any fixed telephone
 - Geographically assigned telephone number of 0AB....J
 - Current telephone number can be used
 - Existing telephone terminal can be used
 - Voice quality is equivalent to POTS
 - 2-lines & 5 telephone numbers
 - Emergency calls (Fire & Police) can be made
- # of users : 12.2 million
- Take-up rate exceeded 80%*

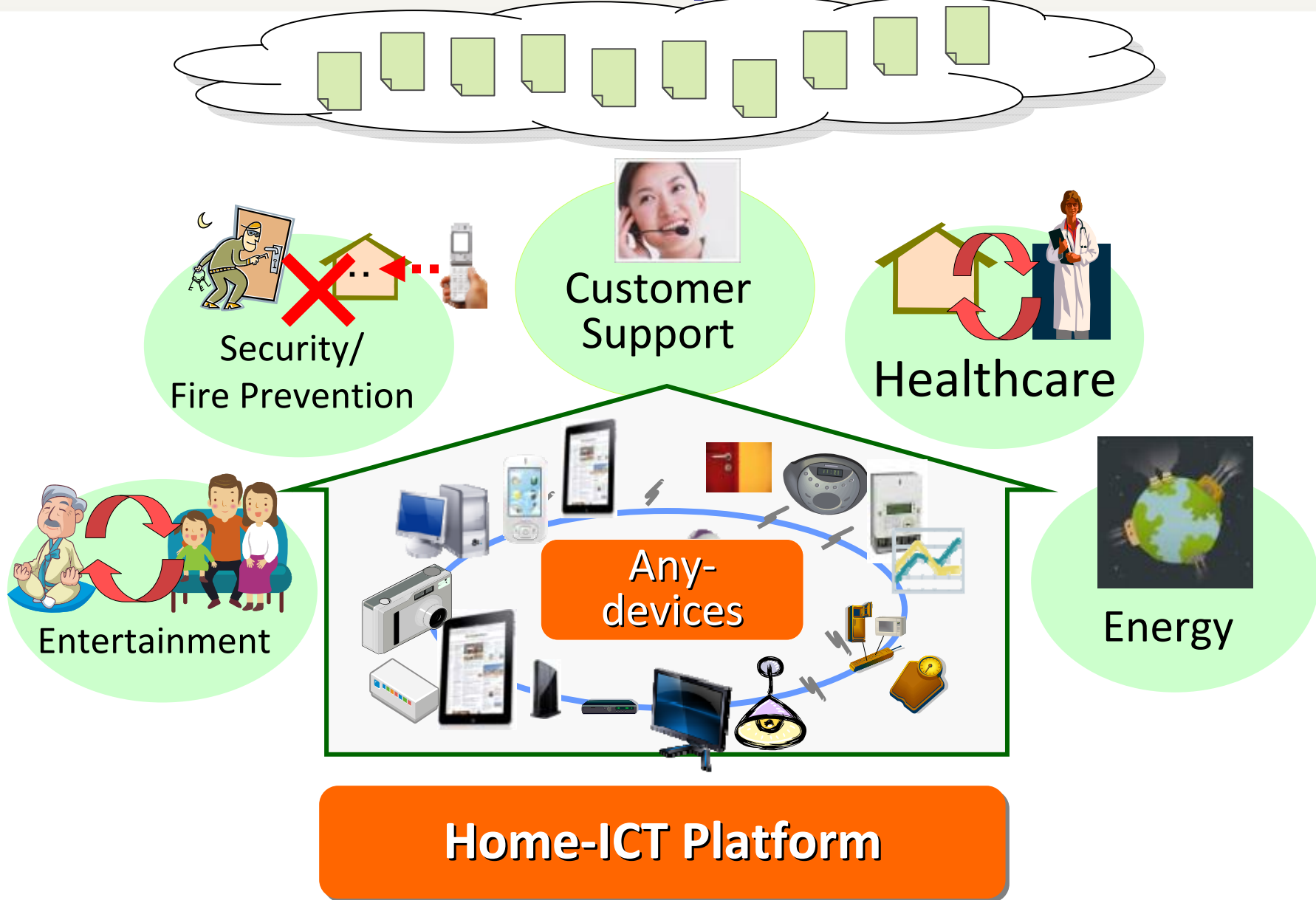
Remote Support Service



Video Services



“Broadband” x “ICT app.” at “Home” **NTT**



Technical Aspects of NTT's FTTH

FTTH Technology Innovations



1990

2000

2010

Reduce product costs

Multi-fiber ribbon

0.3 mm fiber for ribbon

Single slot (1,000 fibers)

Multi-cable installation (2,000 fibers)

Multi-cable installation (3,000 fibers)

Main cable

Multi-fiber fusion splicing

Mechanical splicing

Fiber splicing

PON system

BPON

EPON

4 service classes

ONU

Reduction in power consumption & size

FTTH Technology Innovations

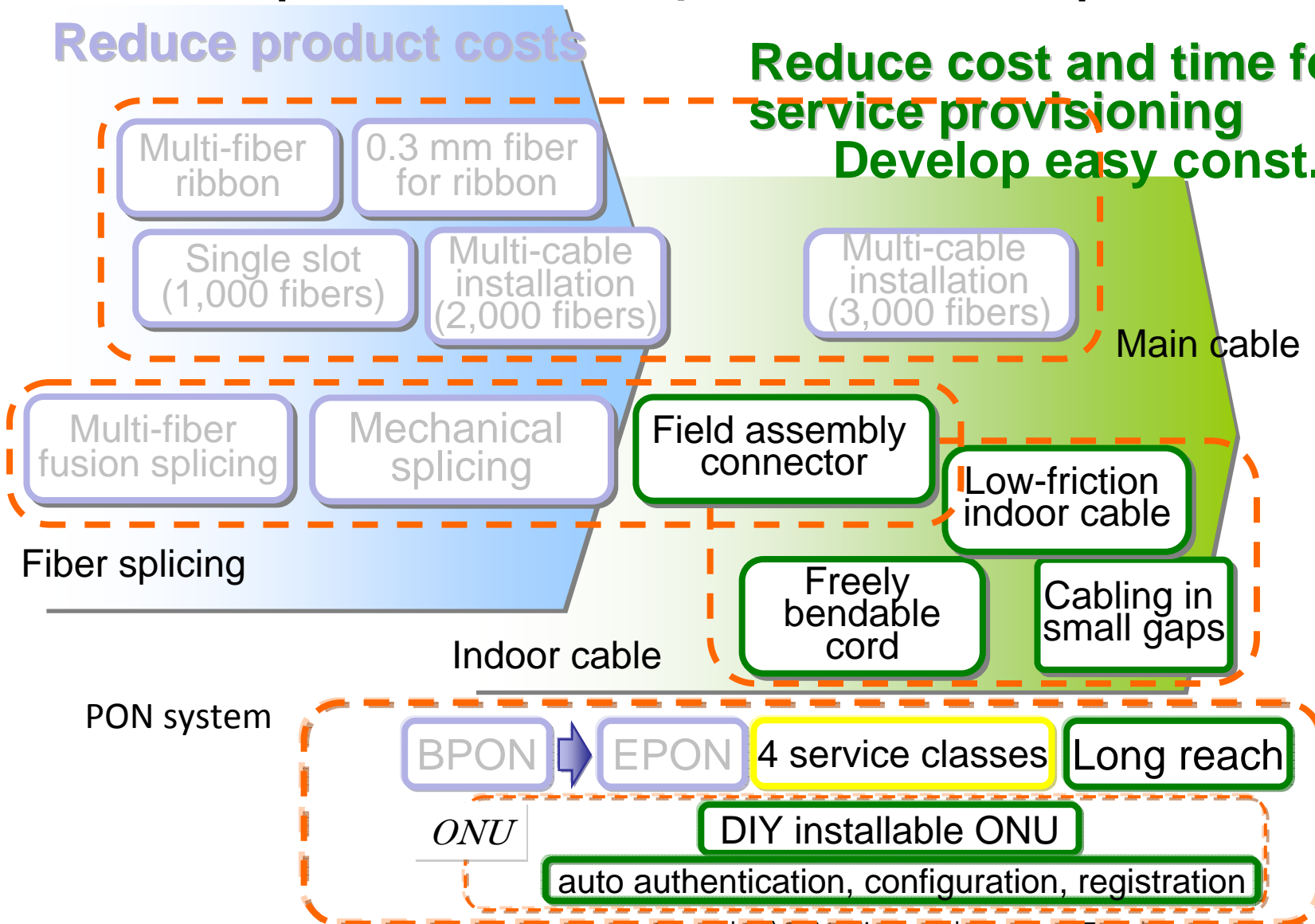
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Reduce product costs

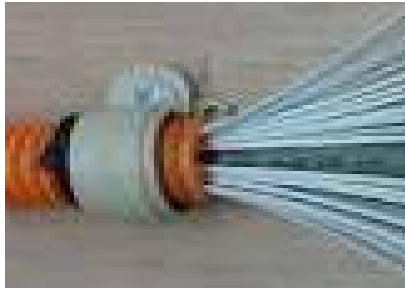
Reduce cost and time for service provisioning
Develop easy const. techs.



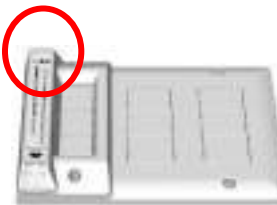
Easy construction techs. for MDU



Low-friction indoor cord

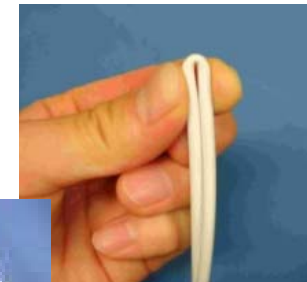


DIY Installable fiber cord



Connector plug

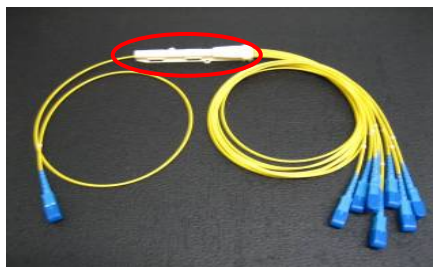
Bendable



Connector



Space-saving splitter



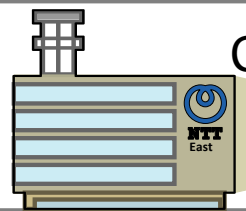
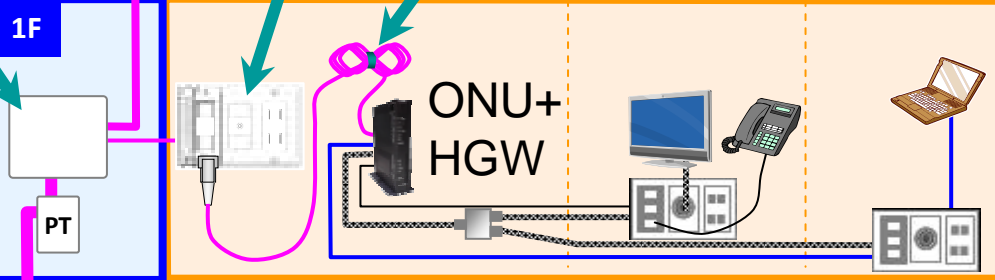
3rd Floor

2nd Floor

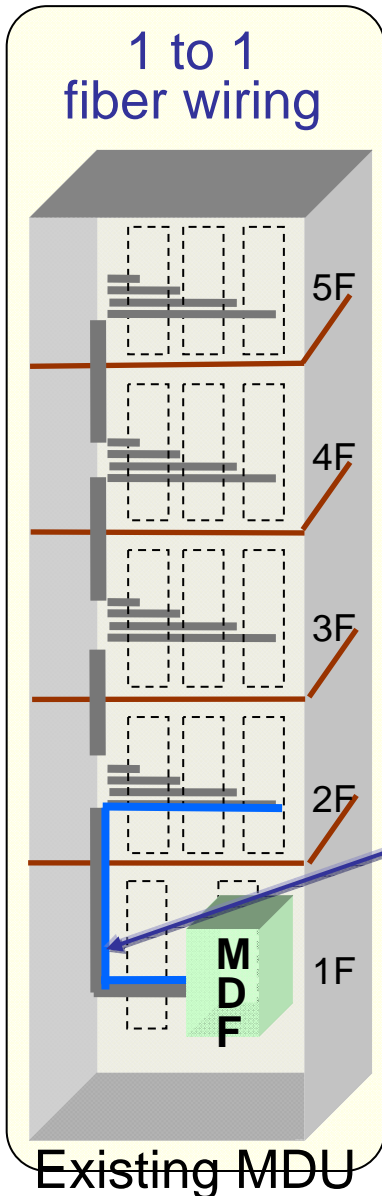
pipe outlet

1F

Common space



Low-friction indoor cable



Conventional cable

Optical cable
2.0mm
3.1mm

< 5-6 cables

New indoor cable

Pipe (22mm ϕ)
Metallic cable (30 pairs)
Optical cable
1.4~1.6mm
1.9~2.0mm

> 20 cables

Downsizing (by 50%)
Applying low-friction material to cable sheath

Pipe for wiring



- **Narrow pipe**
- **Existing metallic cables in pipe**
- **No spare pipe**

Easy construction techs. for MDU

Low-friction indoor cord

DIY Installable fiber cord

Hole or **Core** or **Clad** or **pipe** or **outlet**

Space

Connector plug

Freely bendable optical cord

Easy-to-Plug Connector

Shutter

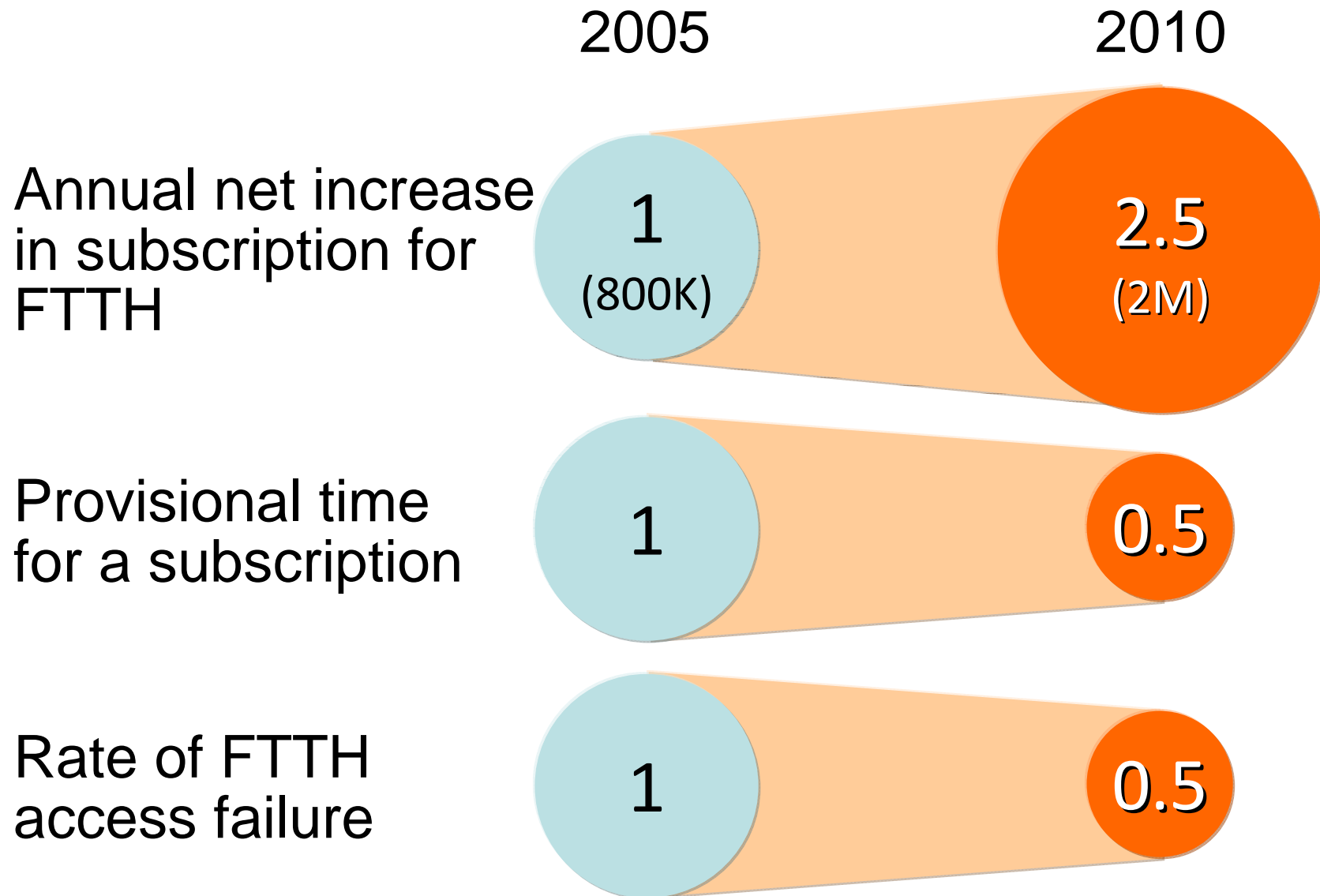
clinched

bent at right angle

bundled

knotted

Provisioning Time of FTTH Services NTT



FTTH Technology Innovations



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Reduce cost and time for service provisioning

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Field assembly connector

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Freely bendable cord

Cabling in small gaps

Remote & hitless switching

PON system

BPON

EPON

Facilitate operation and maintenance

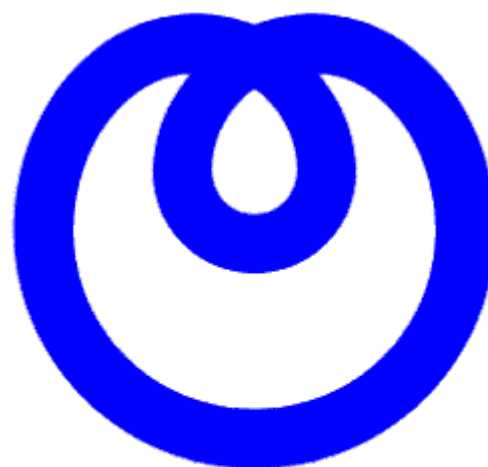
Easy repairing

ONU

Non-dispatch Testing

Optical facility maintenance

- Strong demand & facility-based competition were driving force behind FTTH growth
- Investment in fiber, service creation & cost reduction are keys for growth & profitability of FTTH business
- Easy construction techs. are keys to spread FTTH service
- R&D activity is shifting its direction to O&M for sustainable devlpmnt. of FTTH service
- A major challenge after the rapid market growth & the earthquake disaster is energy-efficient network



NTT