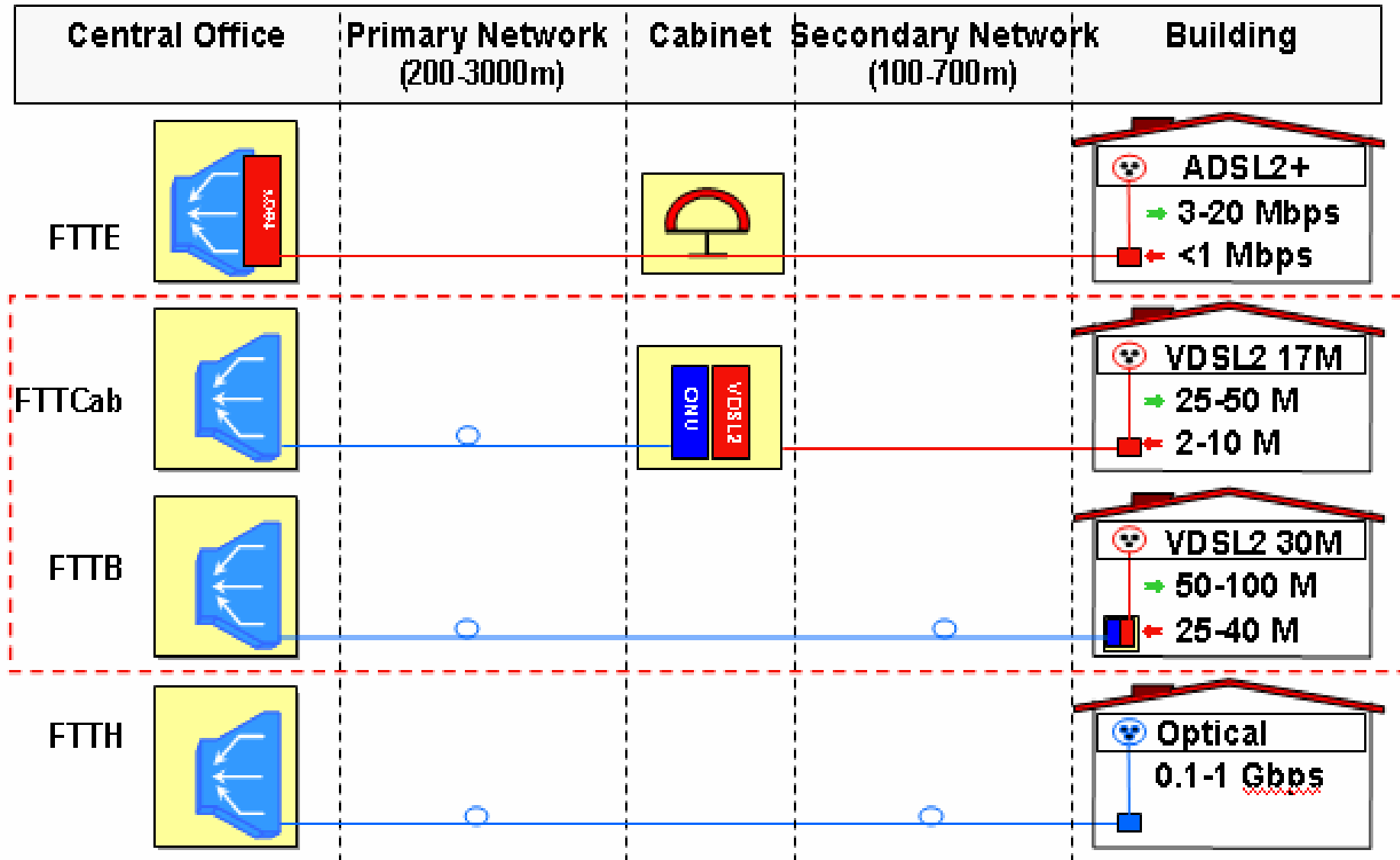


Communications Future Forum

*Infrastructure Innovation and
Investment*

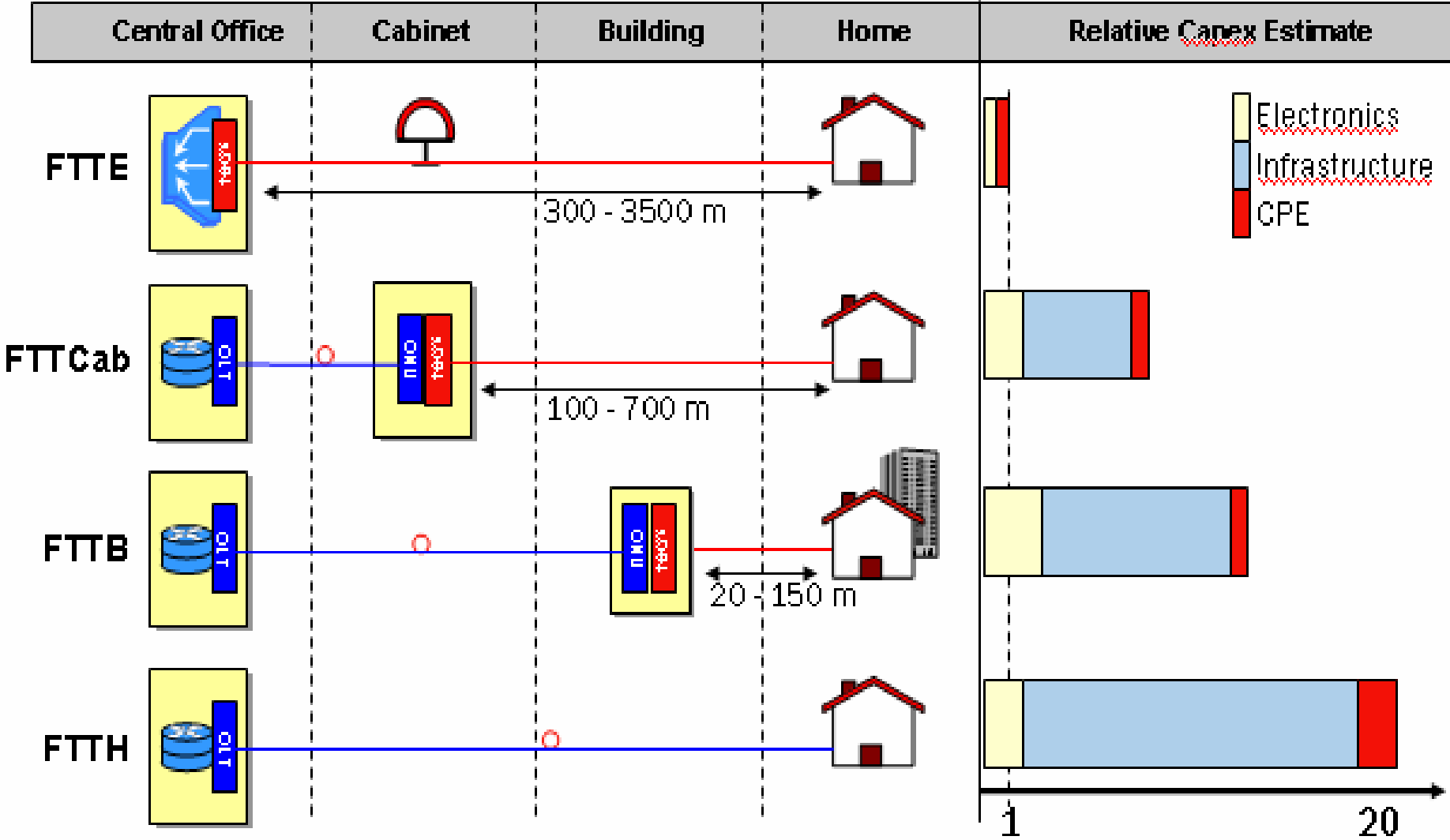
Who, How, Models and Options

Next Generation Access Network Architectures



Source: Telecom Italia Lab ,2007

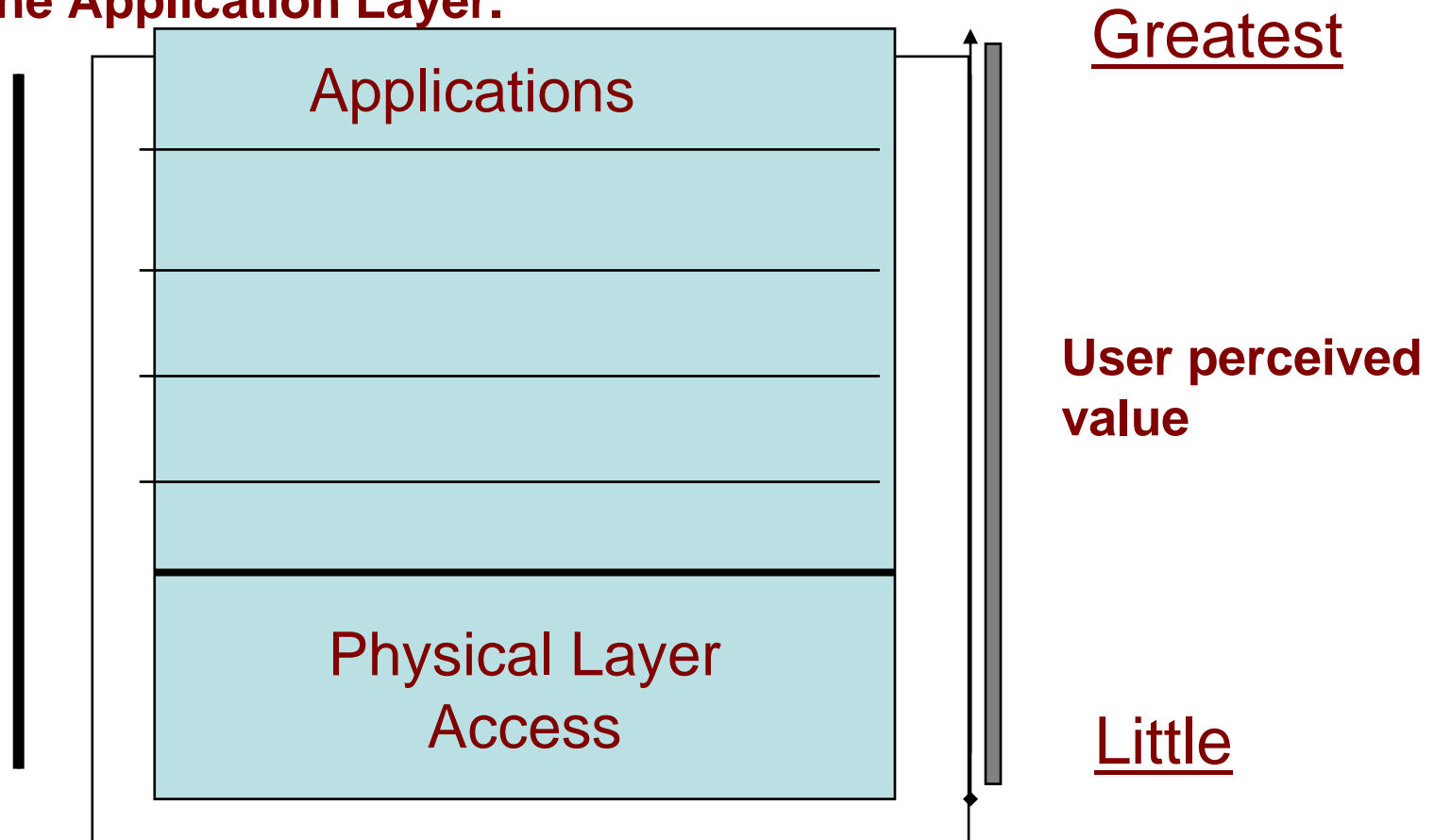
Capex Estimates for different fiber access network deployment



Source: Telecom Italia Lab ,2007

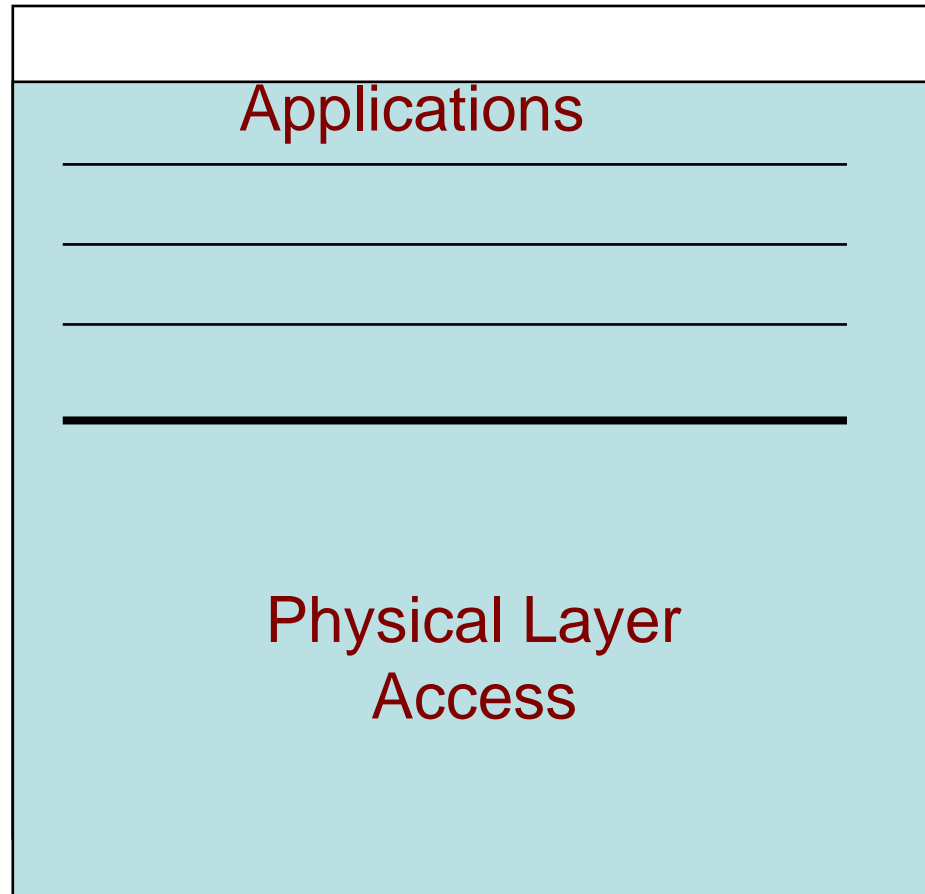
Next Generation Network User Value

Users place little (or no) value on the physical layer [access] and most on the Application Layer.



Next Generation Network Investment

Investment Required (\$s)



Largest by far

Risk from uncertain demand

NGN Implementation Approaches

The following slides look at how NGN-like networks are being implemented in a number of areas, covering

- New Zealand – operational separation
- Verizon – access regulatory relief (FTTP)
- AT&T – access regulatory relief (FTTN)
- Singapore – access PPP
- Hong Kong – market decides
- BT – operational separation
- Germany – access regulatory relief?
- The Netherlands – to be determined
- Utopia – wholesale market provider

New Zealand

- **Operational** separation - Access Network Services, Wholesale and Retail business units
- Access Network Services - a stand-alone basis
- Wholesale arms-length from retail business units
- An Independent Oversight Group (BT)
- 13 April: TNZ wants full **structural separation** of ANS
 - Current proposal for ANS unsustainable
 - No capability or incentive to invest
 - Netco to own copper – not electronics
- NZ regulator and industry not supportive
- Has now agreed to **operational separation**

Verizon (USA)

- NGCN being implemented
- NGAN based on FTTP since 2004
- Plans to pass 18 million premises by the end of 2010
- Plans to spend \$18 bn 2004-2010; net of \$5 bn maintaining traditional copper technologies
- USA **regulators** decided operators can own the access network with no requirements for access to competitors at wholesale rates
- According to Verizon it is **this regulatory approach** that made the investment decision

USA (AT & T)

- 66.5 million fixed lines, 61 million wireless, 12 million broadband lines, local phone service in 22 states
- **Competition:** Cable TV & wireless offer voice & data services
- AT&T lost **1.4m residential phone lines** last year, mostly to cable TV and wireless operators
- Strategy: to compete & grow spend \$5.1 bn to cover 18 m households by 2008 with triple play services (U-verse)
- Use **FTTN/VDSL**, fibre within 1.2 km of premises, 15-25 Mbps services
- Same **regulatory structure** as for Verizon

Singapore Telecom (ST)

- Market opened to competition & foreign investment in all services in 2000. Telecom network providers: StarHub and Singtel
- Networks deployed ATM, ADSL, VDSL, FTTC, PWLAN, cable modems, Metro Ethernet
- Government initiative to deploy a next generation National Infocomm Infrastructure (NII)
- 2006 IDA: RFP for BB wireless & next generation national broadband network
- Adopt a **public-private partnership** to build, own, operate the network, with **Structural separation** of the Operating Company and the retail service providers (RSPs) Government to provide some funding.

Hong Kong (PRC)

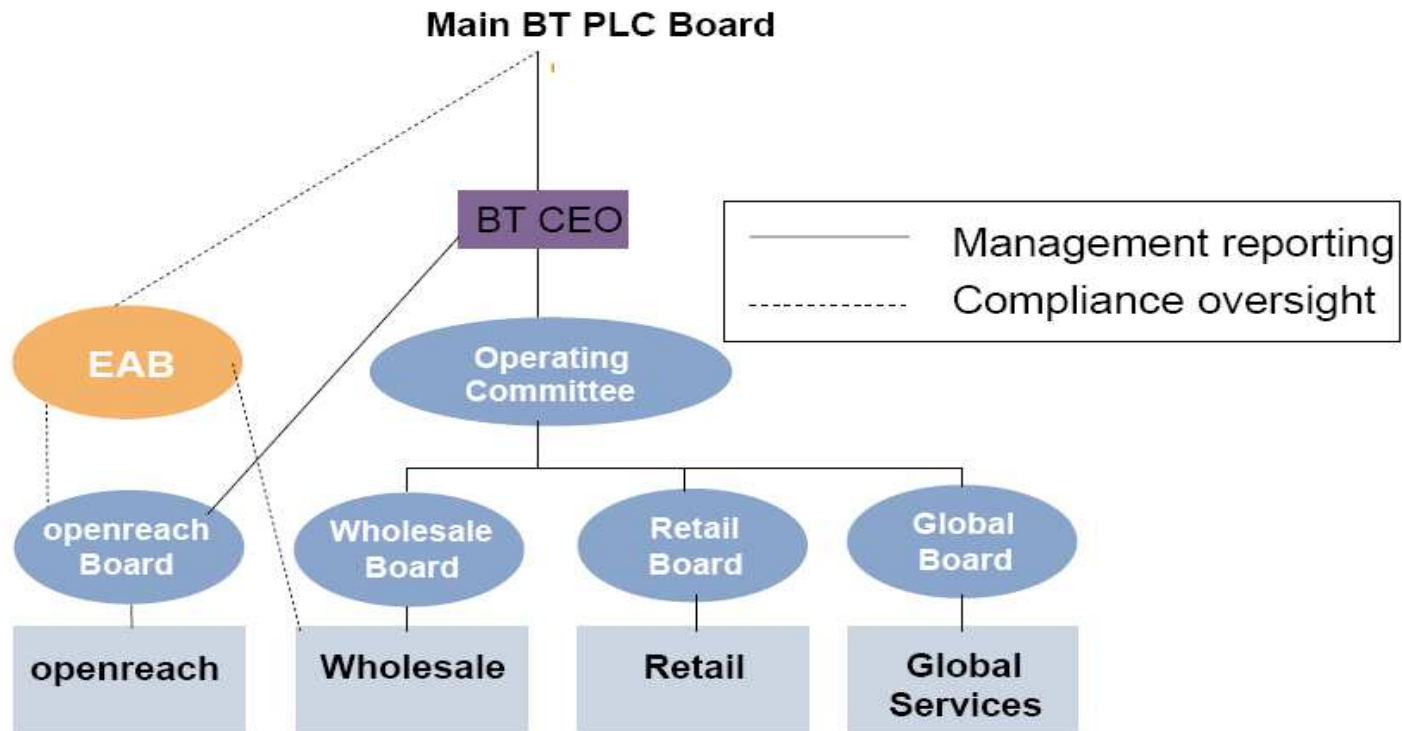
High levels of BB household coverage:

- – DSL network incumbent 98%; Cable modems >90%
- – Fibre networks of new entrants 71%; four 3G mobile networks
- IPTV household penetration 25%
- Market fully liberalised since 2003; reviews since 2004
- Terminated some tariff regulation in 2005 & timetable to phase out mandatory Type II interconnection from 2008
- **Unlikely** to need **regulated access** to access and transport layers in the Hong Kong environment
- **Regulation** at control & applications layers
- Scope for commercial agreements between seekers and providers
- No need to rush to regulation of NGN

BT (United Kingdom)

- 21st Century Network (21CN) developed **within an agreement** with the regulator Oftel/Ofcom
- An **operationally separate wholesale business unit**, BT Openreach
- Ofcom established **NGNuk** – industry forum
- By law must provide competitive service providers the same access and pricing as its own retail divisions
- **Responsible for managing the UK access network on behalf of the telecommunications industry as a whole**
- Concentrates on the NGCN rather than NGAN
- Equality of Access Board (EAB)
- Based on ADSL2+; available to 50% UK by 2008
- By 2008 more than 15% of PSTN lines will have been migrated to the next generation platform

BT Implementation



Deutsche Telekom (Germany)

- Deutsche Telekom (DT) sought relief from extension of existing unbundling and wholesale obligations to its NGN infrastructure to obtain “regulatory holidays” indispensable to recoup its investments (especially NGAN)
- Parliament **approved amendments** to **exempt** “new and emerging markets” from regulation
- **EC** has indicated that it will **sue to block** the law granting DT the right to restrict a competitor’s access to fibre networks
- EC is vehement in **including NGN access** infrastructure within the existing market definitions

Netherlands

6.9 million fixed lines, 1.7 million ADSL connections, 20.8 million wireless subscribers, Very high cable, broadband & wireless penetration rates

- Competition: KPN must innovate to compete, grow and cut costs.
- KPN decided: rapidly deploy an IP-based network €1-1.5bn, Broadband VDSL/FTTH network & IP-based platforms. Gains from streamlined processes - savings in equipment & headcount - On track to make planned savings of \$1 bn by 2010
- OPTA proposes KPN guarantees connectivity to other providers
- Key obstacles remain although not likely to stop KPN's NGN eg access pricing for 3rd party service providers & net neutrality and IP interconnect
- **Regulatory situation** to be determined

Utopia (USA)

- Utah Telecommunications Open Infrastructure Agency.
- An inter-local government agency comprising 14 cities
- Building a fibre infrastructure to reach all 170,000 homes and businesses (100 Mbps)
- Utopia: **wholesale** - selling bandwidth to private companies
- Private companies including AT&T (data and voice products) & 3 Internet service providers
- Competitors to Utopia include telecom company Qwest and cable operator Comcast
- Wall Street prefers this wholesale model to other municipal models where services are offered directly to customers
- Risk: could expose tax & rate payers to financial losses
- Note: 15 States have direct or indirect barriers on municipal fibre

Utility Model

Electricity Model

- Electricity transmission and distribution lifetimes 30 + years
- A limited number of products and innovations
- A regulated return on assets set by regulators – low risk

Telecommunications Industry

- Rapid technology change lifetimes often less than 10 years
- An unlimited number of products and rapid **global** applications and innovations
- Demand uncertainty and high investment risk

Greenfields Model

Opportunities

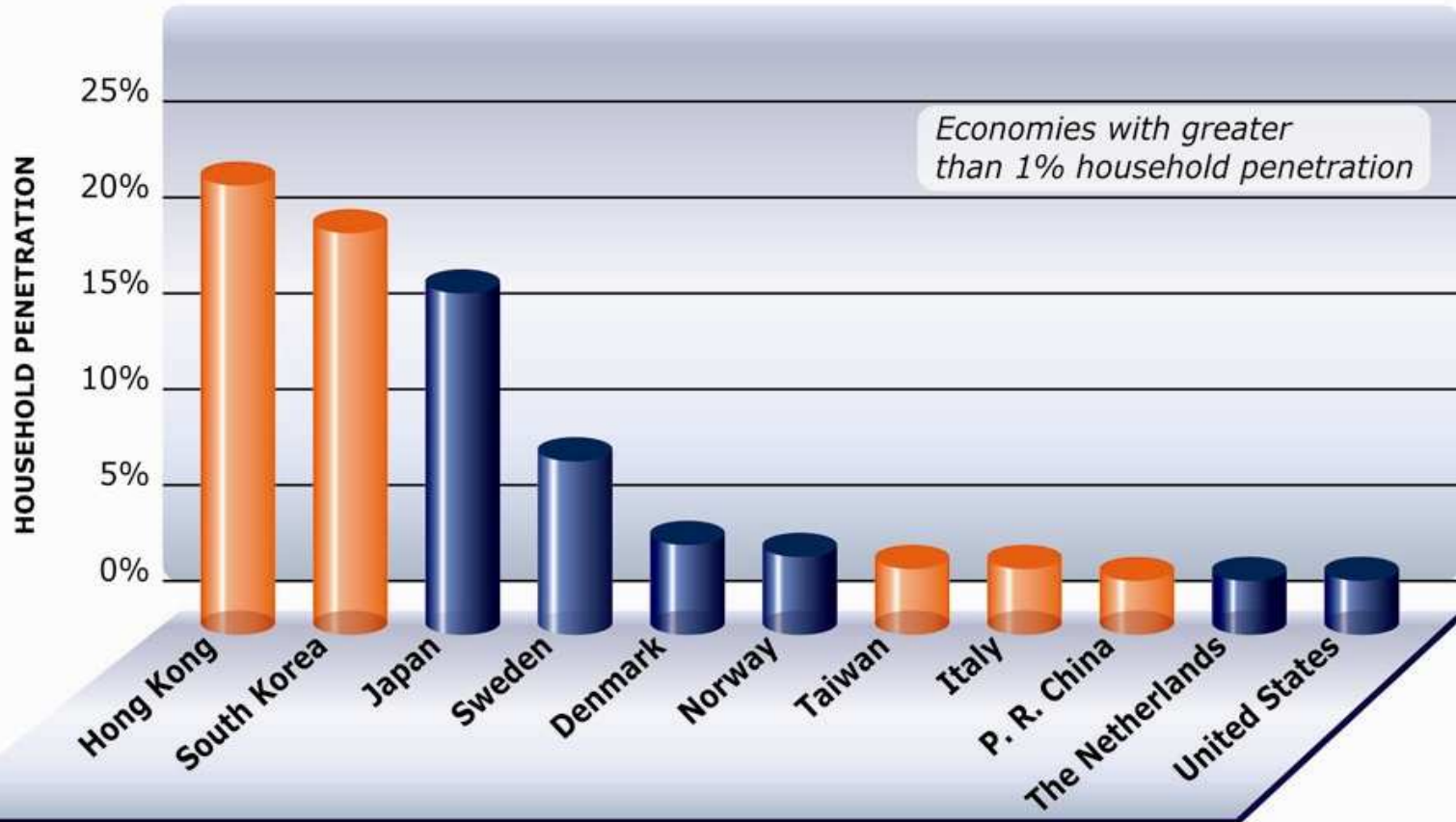
- During property development – Whittlesea example
- Build infrastructure able to provide high speed broadband services
- Work with developers, councils, State & Federal Governments
- Open access policy to encourage competition for users

General Comments

Regulators in USA, Europe & Asia are looking at:

- Whether **competition exists** in the market - **widescale** competing end-to-end access infrastructure
- If sufficient competition is found to exist, some regulators **opt to forbear** from regulating NGNs eg the United States while Hong Kong, China have not imposed access regulations on incumbent's infrastructure altogether
- In these cases, regulators have relied on large scale deployment of end-to-end **competing networks** eg cable, satellite, fibre, alternate providers

Economies with the Highest Penetration of Fiber-to-the-Home / Building



Source: Fiber-to-the-Home Council
July 07

- Economies where majority architecture is **Fiber-to-the-Home**
- Economies where majority architecture is **Fiber-to-the-Building**