MARKET STRUCTURE FOR ULTRABROADBAND:

Should We Expect Multiple, Competitive UBB Access Infrastructures

or

Regulated Monopoly UBB Utility?

(or Something Else?)

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Should We Expect Multiple, Competitive UBB Access Infrastructures…or Regulated Monopoly Utilities?

(or Something Else?)

YES!

Market Structure Overview from CITI's Annual "State of Telecom"

- "Boom-bust" cyclicality likely to repeat
- Equilibrium for telecom networks (particularly "access") is not infrastructure competition but infrastructure oligopoly
  - Operators must cover fixed costs
  - Some markets can't support multiple networks
- This is not a CITI preference or policy recommendation, but a forecast based on business fundamentals
  - High up-front costs, commoditization, competition driving prices to marginal costs

Source: CITI (2003 - 2007)

First, Consider the Historic Range of Market Structures for Other Critical Infrastructures

- Unregulated private monopolies…
- Regulated private monopolies…
- Unregulated private competition…
- Government ownership and operation…
- Public-private partnerships…
- Various degrees of “regulated competition”…

But, the more “normal” or “usual” structures have been toward the bottom of the list because fundamental economics (capital intensity, scale economies, commoditization, etc.) lead to consolidation and public policy abhors unregulated private “utilities”.

Second, Because It Will Be "Critical," Government *Will* Be Involved in UBB

"Just as California has invested in other critical infrastructure such as roads, electricity, and water, the CBTF believes that the state must seize the opportunity to promote private-sector investment, leverage public-private partnerships, and lead the effort to increase broadband availability and adoption. But unlike roads, electricity, and water, California's investment in broadband should not be limited to physical infrastructure, but instead should include policies to increase adoption of broadband technologies."

Source: Final Report of the California Broadband Task Force, January 2008; http://www.calink.ca.gov/pdf/CBTF_FINAL_Report.pdf

Third, Governments Will Not Tolerate Either Unfettered Monopoly or "Second Class" UBB Infrastructure

- Monopolies *will* be regulated, eventually
  - And lazy or collusive duopolies, too
- Government *will* subsidize, directly and indirectly, to encourage UBB deployment
  - But $$/€€ come with strings attached
- Government *may* be the UBB builder, even operator, of last resort

How Many UBB Infrastructures?

- Can each market sustain multiple UBB access infrastructures?
  - Is it likely that each UBB's revenues will consistently exceed expenses, over the medium-to-long term?
- If the answer is "no" (to be expected in many markets), there will be:
  - Consolidation (or no entry) = few or one (or no) UBB
  - A substantial public policy challenge:
    - Deal with a monopolistic situation (utility regulation?) or no privately owned UBB at all (government ownership?)

OR

    - Create an environment that can sustain multiple, competitive UBB access networks

Is There a Business Case For Multiple UBB Access Infrastructures?

- The answer will depend on the *changing*, *specific circumstances* of **<u>each</u>** market, such as:
  - UBB demand/demand growth
    - How much revenue will “stick” to infrastructure/ how much will “flow through” to unaffiliated applications providers?
  - User density and market topography
  - Incremental upgrade or greenfield investment?
  - Competition (how will the demand be divided?):
    - For how long/how many will conventional BB be “good enough”?
    - How many sunk-cost BB “incumbents”?
    - Cable TV/ satellite TV penetration?
    - Are start-up competitors likely?
    - Is a lower cost UBB technology (probably wireless) likely?

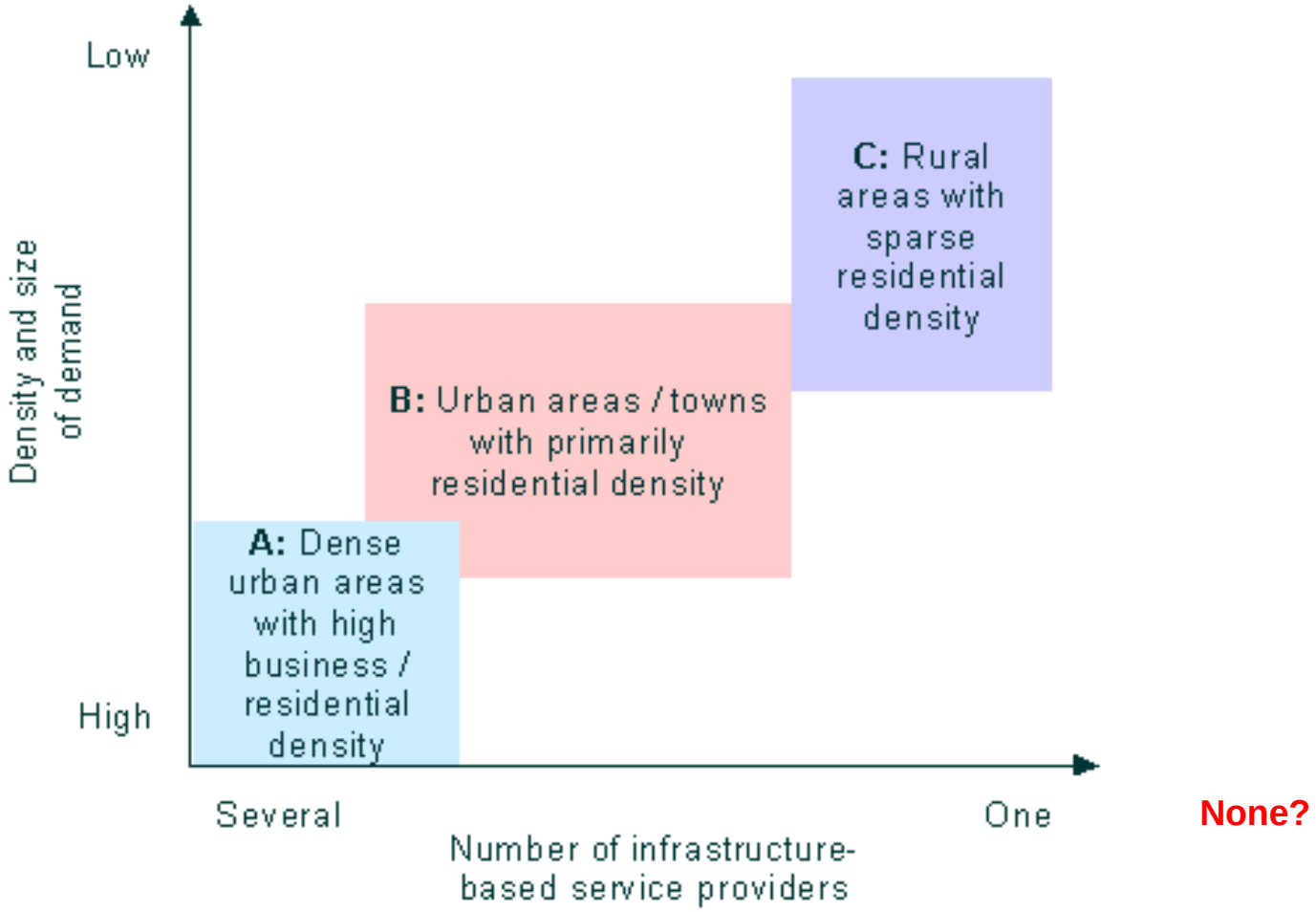
Example: No Business Case
(For A Telco Reselling Satellite TV)

"We haven't seen a business case that justifies some of the investments that Verizon and AT&T have made because of the geography and our particular markets," he said. "We're offering 10-Meg service, and we continue to make sure we have the bandwidth that is necessary for HSI [high-speed Internet]. We also see a lot of non-linear entertainment coming in the future. We have our new portal we migrated to that includes our video store with 5000 movies, 5000 music videos and 1000 television episodes that our customers can pull down over the 10-Meg pipe."

Embarq CEO Tom Gerke

Source: Broadband Reports.com, March 3, 2008

Can Multiple Broadband Infrastructures Be Sustained?



Source: Analysys Group

1.5 versus 2.5 Infrastructures

- 1.5 = one ubiquitous “wired” (usually telco) plus various wireless and niche (CLEC/reseller) networks (the 0.5)
- Less infrastructure competition means:
  - More profits/less risk = easier to finance
  - But less dynamic and innovative
  - More regulation, particularly to protect open access (such as structural separation)

Source: CITI/Eli Noam

1.5 versus 2.5 Infrastructures

- 2.5 = two ubiquitous “wired” networks (cable and telco) plus the wireless/niche 0.5
- More infrastructure competition means
  - Greater volatility, greater innovation, lower consumer prices, greater investor risk
    - Reaction is oligopolistic/collusive behavior
    - Or, in markets with insufficient infrastructure profits to sustain 2.0, additional revenue required (subsidies, content) or 1.0
  - Pressure for vertical integration to capture “content” revenues creates “network neutrality”issue

Source: CITI/Eli Noam

So, Current BB Market Structure Affects UBB Business Case

- Fiber-rich (FTTN or better) BB infrastructure operators have substantial lower risk “head start” business case advantages over UBB start-ups
  - Incremental cost upgrade to UBB
  - Installed customer base
- Therefore:
  - “1.5” fiber-rich BB markets are likely to be 1.5 UBB
  - “2.5” fiber-rich BB markets *may* remain 2.5 but risk of becoming 1.5 if one fails or both consolidate
  - 0 or 0.5 BB markets (or fiber-poor 1.5/2.5) will need government help to become 1.0 UBB.

When Does Government Intervene in Market Structure?

"In the case of broadband deployment, if a project does not generate investment because it does not represent a sound financial business case to a carrier, government intervention can be justified if the expenditures are outweighed by the broader socio-economic benefits."

Source: *Readiness Framework and Sustainability Model for Broadband*, Carleton University and Strategic Networks Group for Industry Canada and Government of Ontario, March 2005; see, http://broadband.gc.ca/pub/program/case_studies/carleton/carleton_en.pdf

Determining Where Government Involvement Is Necessary

- “Which communities can be, or are, served by market forces?
  - Not a “problem”
- Which communities will need assistance with initial investment to become self-sustaining?
- Which communities cannot become self-sustaining and will require ongoing funding?”

Source: *Readiness Framework and Sustainability Model for Broadband*, Carleton University and Strategic Networks Group for Industry Canada and Government of Ontario, March 2005; see, http://broadband.gc.ca/pub/program/case_studies/carleton/carleton_en.pdf

Can Government Help the UBB Infrastructure Business Case?

- Be an anchor user
- Reduce costs (ROW/spectrum licenses)
  - But does this encourage competitors?
- Provide subsidies
  - To operator? Or to subscribers?
- Access to content revenues?
- Allow/encourage consolidation or sharing?

Infrastructure Sharing (or Consolidation)

"The single biggest reason to adopt sharing is to lower the cost of deploying broadband networks to achieve widespread and affordable access… For developed countries, infrastructure sharing promises to play an important role in the move to FTTx access…"

Source: What Do We Mean by 6 Degrees of Sharing? Discussion Paper for ITU GSR08, Feb. 2008

Lowering UBB Access Costs Through Sharing (or Consolidation)

"Deploying mobile base stations on fibre backbone networks to reach rural areas may be uneconomic if each company builds its own network. Likewise, laying fibre to every home, building or street cabinet may be unattainable where operators act alone. Companies can, however, share some infrastructure but compete on services."

Source: What Do We Mean by 6 Degrees of Sharing? Discussion Paper for ITU GSR08, Feb. 2008

If Multiple UBBs Are Not Sustainable, Sharing or Consolidation May Produce UBB Access “Utility”

- Allows operator to capture economies of scale and reduce investor risk (lower costs)

  BUT

  Requires operator to share the lower costs with consumers (rate regulation? structural separation?)
- Minimizes infrastructure competition

  WITHOUT

  Sacrificing retail application/service competition (if conduit market power is separated from “content”)

Should Government Be the UBB Risk-Taker of Last Resort?

- Subsidize incumbent telco/BB to upgrade to “utility”
- Government builds (contracts) for the construction of universal UBB access network
  - Strong competition for government contracts = lower initial costs

  Government can then auction the UBB infrastructure to highest (qualified) operator
  - Monopoly for wholesale-only/open access “utility”operator?

  Any “loss” is a one-time infrastructure subsidy (like building a highway and road system)

And What About UBB Investors?

- UBB Infrastructure Competition = Risk and low risk-adjusted return
- Monopoly = Break-up and government regulation; highly unpredictable and therefore risky
- Utility = Regulation but low risk and reasonable risk-adjusted return

Some Conclusions

- Initial UBB market structures will be similar to current telecom/BB market structures
- UBB market structures will evolve over time (decades?), in response to changes in business, technology and market conditions as well as changes in public policy
  - Tendency to fewer UBBs and therefore less competition and more regulation
  - Public utility model may be attractive in many markets
- However, there is no single market structure that will be optimal in every market, for all time
- Operators, investors and governments will need to be “adept at adapting” to changing circumstances (or have perfect foresight)