

Measure of problem: 3-5% of U.S. will not get megabits without government action. Another 5-10% will only get 2-10 megabits. More than half of those 3-12% can be offered better at modest expense (\$200-500.) A few percent either are satisfied with satellite (which should be improved) or will cost a lot (\$thousands) or an awful lot (\$tens of thousands)

Most of "broadband crisis" is affordability or b-----, except those 3-10%.

2013 - Without a stimulus

95% 4-10 meg LTE (Verizon 92%)

85-90% 50 meg DOCSIS 3.0 (60% in 2010)

96-97% Landline + wireless megabits

Conclusion: "Unserved" 5-10% need tight focus

2009: Worst year since 1999 for broadband expansion. Virtually no investment to extend broadband.

Since 2005 "Unserved" have been 4-9%, virtually no expansion of availability, prices generally going up, U.S. falling behind many other countries

Basic number: 4-9M "unserved." 4M at \$500/home is \$2B, a fraction of the stimulus. 2M more at \$2,500 home and we've reached all but 1-2%. Practical for 2011.

President Obama can then say. "98-99% of the U.S. can now get megabit broadband. 70% can get 50 megabits. I delivered what I promised."

Smart stimulus results if run by engineers, 2011

98-99% get megabit service

70-85% 50 megabits (enable TWC, Charter to match Comcast and Cablevision)

Smart spend for 4-7% unserved, 2008,

30-40% can get cable TV but not data. Upgrade less than \$400.

Many of remainder need wireless towers, now down in cost.

Niches for DSL repeaters (megabits), improved satellite etc.

Specific strategy for territories of AT&T & Verizon (likely boycott) and Qwest (likely inadequate proposal for unserved.)

Likely stimulus result with present plans:

minimal new reach to "unserved." Infinite rhetoric.

Better: Target unserved areas, find cost-effective technology.

Where are the "unserved." 60-70% are in AT&T, Verizon, and Qwest territory. They cover over 80% of U.S. If there is no plan to reach the "unserved" in their territories the broadband stimulus is guaranteed to fail.

UK plan: Minister Timms threatened to fund someone else and suddenly BT decided to go to 99.6% DSL.

3-5% of homes can't get cable TV and will be the toughest to reach. Typically need wireless towers as well, the natural and probably cost-effective way to give them 5-10 meg. A small fraction can be reached for a few hundred dollars with a DSL repeater at a few meg. If the only alternative is new coax or fiber, the costs will range from high to prohibitive.

Perspective: 4 companies (AT&T, Verizon, Comcast, & Time Warner) are more than 60% of U.S. lines. 8 companies are 85% of U.S. telecom, wired and wireless. Except for rural issues like universal service, determine what those companies are doing and you have it.

In particular, abstract reasoning and principles - typical policy discussions - are far less likely to find the truth than empirical data.

Underserved: Term invented to justify spending public money. For some, euphemism for "poor," whom I too would want to help, preferably directly by lowering prices. For a handful, really low speeds < 1-2 meg. Mostly, excuse for feeding at public trough.

Incidentally, the 40% take rate seemed to me an effective proxy for poorer areas. But as we got data from New York City, it didn't work. Nearly no NYC tracts have less than 40%. We need a better marker, perhaps lifeline users or actual poverty rate.

Mapping: Good, sensible stuff that should cost less than \$25M and take only a few months. Minnesota paid \$163K to map a state of 5M people, Diane Wells emails. Extrapolating that to the 304M U.S. population, the cost to map the country would be under \$10M. ($\$163,982 * (304,059,724 / 5,220,393) = \$9,551,066.68$). Something is profoundly wrong with spending \$240M. Partly, rules were set so CN would often be sole source bidder.

Good maps would provide information on who is the local cableco and telco in any unserved area, and what towers are available. That will point to the obvious options to reach the people unserved.

Soft stuff - Demand Stimulus: Not my expertise, but nearly all is an obvious crock except lowering prices. Basic broadband used to cost \$15; now \$20-25. Fix that. Those not taking broadband overwhelmingly old, poor, or learning disabled. Telling them broadband will change their lives is not likely to make many hand over \$300/year to the telco. Because it won't. Connect Kentucky actually had a negative result when you look at the data instead of the press release. I'd guess some basic training helps, but there's no credible evidence for anything having a major effect except price.

Backbone: speeds up, congestion down, prices dropping. Competition working pretty well. Transit in volume now \$4-8; some medium-sized carriers have a problem getting peering, but I wouldn't recommend more than watchful waiting.

Middle Mile: Virtually unlimited capacity for 97-99% of country.

Weak competition means some rurals pay \$100-\$200/megabit that costs \$5-15 to others. That is often a bigger issue than the density in rural areas, and must be solved if rurals want decent speeds.

Big policy choice: Do we bring the prices down through special access, or do we spend \$tens of billions of public money to overbuild fiber that has plenty of inexpensive capacity.

The "special access" rules can be very generous (?TELRIC + 40%,) yielding a competitive profit while solving most of the backhaul cost problem.

Related issue to understand:

Who profits from any public subsidy? For example, if RUS spends \$1B on overbuilding fiber, do consumers or the companies reap the benefit. Because rural competition is weak, unlikely much will go to consumers without strong regulation. (Which has its own problems, of course)

Costs

DSL \$100-400. AT&T U-Verse at 25 meg costs \$300. (source: AT&T)

DSL repeater \$200 + install (source: manufacturer)

Cable upgrade from analog to digital \$200-500

Digital cable to 50 meg DOCSIS < \$100. Source: Comcast, NY Times

Typical fiber < \$700/home passed large company. Source: Verizon FiOS

~\$1,000 small company Source: Multiple deployments and actual bids

Deployments of less than 25 homes, new equipment needed. Add \$5,000 to plan engineering, do installation.

Key higher cost: New fiber, \$20K/mile. Source: Actual bids

Miles of new fiber runs are the only common cause that should drive costs beyond \$1,000-1,500 for fiber home or \$500 for DSL, cable, FTTN (which is really DSL from remote terminals and costs like DSL.)

For example, if there are only 8 homes along a mile of road, that's \$2,500/home for the fiber. *It is therefore imperative to get the length of fiber required to do a cost estimate.*

Occasional higher costs - difficult terrain, etc. - are surprisingly rare. They should be clearly identified and costed in any proposal.

Cost I'm not qualified to estimate: Wireless towers. Huge range of cost per home served based on density. Backhaul will almost always be wireless at \$8,000-

History:

Whitacre SBC promised 100% 2004-2005, Babbio VZ promised 90% 2002 Both stopped investing around 2002

2005 DSL 78% Cable 93%

2006 DSL 79% Cable 96%

2007 DSL 82% Cable 96%

2008 DSL 83% Cable 96% June

Saving public money

Never spend money on CPE, routers, backhaul, etc because they are only needed where you have paying customers and hence a good reason for companies to spend.

Almost never spend public money of wireless equipment - Verizon and others will almost supply, often including wireless backhaul

Rarely spend money on fiber backhaul from cell tower, now obsolete except for incumbents with low costs.