Unserved and Underserved Area Deployment

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My Background

•BSEE Case Institute of Technology 1981

•MSEE Stanford University 1985 (Master's project: digital radio)

•Founded LARIAT as a 501(c)(12) non-profit co-op to serve unserved/underserved areas in and around Laramie, WY in 1992 -- well before most people had dial-up. LARIAT was likely the first WISP (terrestrial, Wireless high speed Internet Service Provider)

•Took LARIAT private in 2003 at the request of the membership

•17+ years of experience in deployment of high speed rural Internet

•Growing network coverage by approximately the size of the District of Columbia every year; pace is accelerating

Rural Deployment Case Study: Howell, Wyoming

Non-recurring Expenses	Amount Spent
Backhaul antennas (Pacific Wireless parabolic dishes)	$700
Backhaul radios (Tranzeo TR-5Plus-Nf)	$500
Access point radio (Deliberant DLB-2100 802.11g)	$100
Access point antenna (Omnidirectional, 12 dBi)	$60
High strength mount for rancher's barn (custom fabricated steel)	$250
Power conditioning equipment/building electrical system upgrade	$500
Other parts, including cables, lightning protection, cabinets	$600
Labor and misc expenses	$400
Grand Total	**$3110**

Coverage: 40+ square miles, depending upon terrain and interference levels; Recurring cost/month: $120 (partially in kind); Node capacity: ~36 Mbps (can be expanded); Overhead is sufficiently low that service pricing is determined not by cost of site but by cost of bandwidth at "head end" (bandwidth + "special access" charges). Cost is far, far less per square mile than any other medium!

Barriers to rural WISP deployment

•Current spectrum auction regime seems designed in every respect to preclude small, local, and independent carriers from winning exclusively licensed spectrum

•Interference in Part 15 unlicensed "jungle" limits coverage and stability. Example: Wal-Mart interferes with customers farther out... and even self-interferes!

•Use of 3650 MHz non-exclusively licensed spectrum prohibited in many areas; elsewhere, only half the band is available and no spectrum etiquettes in that half

•Internet bandwidth unncessarily expensive in rural areas due to excessive "special access" charges by ILECs and refusal to deal by nationwide backbones

•Anticompetitive tactics by telco (and sometimes cable) incumbents -- these would be further enabled by broadband mapping initiatives that revealed competitors' proprietary information

•Threat of regulation of network mangement (e.g. potential prohibition of caps or traffic prioritization) has spooked investors

Broadband Plan Elements: Facilitating Rural Deployment

- Devote nonexclusively licensed spectrum to wireless broadband, with mandatory spectrum etiquettes. Possibilities
  - oAWS-3 Spectrum (Could become "National Broadband Deployment Band")
  - o700 MHz "D Block" (Cellular industry would not share with public safety, but WISPs would)
- Open upper half of 3650 MHz band with IEEE 802.11y
- Increase power limits in rural counties (Population <200K) for Part 15 WISPs
- Do not define "broadband" so as to make it unaffordable in areas where wholesale bandwidth is very expensive. (At $100 per Mbps, 768K = $76.80 at wholesale!)
- Do not prohibit network management techniques that "stretch" bandwidth
- Fix the broken "middle mile" (special access) market
- Incent (or, if necessary, require) nationwide fiber backbone providers to offer access at amplifier sites
- Ensure that Form 477 and broadband mapping data are kept confidential and released only in aggregate to protect competition