Wireless Pittsburgh:

Sustainability of Possible Models for a Wireless Metropolitan-Area Network (WiMAN)

Jon M. Peha
Carnegie Mellon University

Associate Director, Center for Wireless & Broadband Networks
Professor of Electrical Engineering & Public Policy
www.ece.cmu.edu/~peha

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peha@cmu.edu

Policy Objectives for a WiMAN

- Ubiquitous citywide service
- Competition
- Some limited free services
- No government subsidies
- Financially sustainable
  - Revenues exceed costs + acceptable return (?)
  - We have developed models to estimate revenues and costs, with a focus on Pittsburgh

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Four WiMAN Models

- Monopoly
  - One citywide vertically-integrated provider
- Facilities-based competition
  - Multiple citywide vertically-integrated providers
- Wholesale-retail split
  - One citywide wholesaler. Competing retailers.
  - Wholesaler may or may not offer retail services.
- Open competition
  - Multiple providers. Each chooses to serve in those neighborhoods where profits are expected.

- Role of wholesaler, retailer, or vertically-integrated provider could be played by
  - government agency, commercial company, or non-profit organization

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Results on Costs and Revenues

- Costs
  - Based on specific wifi-based architecture
  - Deployment costs far exceed annual costs.
    - In Pittsburgh: $6.5 million vs. $2.2 million
- Revenues
  - Our analysis of cities with operational WiMAN shows that best revenue predictors are:
    - median household income
    - household density (e.g. households per sq mile)
  - Large uncertainty over revenues
    - due to limited experience so far

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Results on Four Models

- Citywide monopoly appears sustainable in Pittsburgh, but losses are within our (large) margin of error.
  - High risk for estimated return.
- Facilities-based competition clearly not sustainable
  - Large capital investment, small incremental cost, like phone and cable
  - Because wifi designed as short-range technology. Emerging wireless technologies may have different engineering-economic characteristics.
- Wholesale retail-split
  - Roughly as financially sustainable as monopoly
  - Competition may be viable, if and only if wholesaler keeps rates low
  - Profit-seeking wholesaler has ability and incentive to end retail competition.
    - Even if the wholesaler is not a retailer.
- If providers only deploy services in profitable areas, much of the city may be unserved
  - In rough first-order analysis, 40% of Pittsburgh population not served

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Policy Implications for City

- Cannot completely meet all initial goals for Pittsburgh
  - Ubiquitous coverage, strong competition, no subsidies, financial sustainability
- If services are provided by entities other than the city, City or other players need *leverage* to achieve goals
  - e.g. incentive to serve low-income neighborhoods, to keep wholesale prices low, to facilitate roaming
  - Sources of leverage include
    - Offering access to light poles and other useful antenna sites
    - Making early long-term contracts for service - anchor customer(s)
    - Becoming provider, e.g. wholesaler
    - Providing subsidies, especially during build-out
- Entire community might contribute to resources and leverage
  - City government, civic foundations, universities, large companies, non-profit organizations

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Different Answers for Different Cities

- Government involvement is helpful in some cities, not in others.
- Good reasons for substantial government involvement
  - WiMAN would reduce cost of city services, e.g. public safety
  - WiMAN advances some other policy objective, e.g. promote tourism
    - WiMAN is just one part of a broader effort
  - WiMAN would reduce disparity in Internet access
    - Only where WiMAN is most cost-effective way to meet needs of unserved
- Bad reasons for substantial government involvement
  - Government can offer services at lower cost than commercial providers
  - Government gets new source of revenues.
- The current approach in Pittsburgh
  - Deploy a WiMAN downtown only for now
    - Part of much larger effort to revitalize downtown.
  - Substantial involvement from non-profit organizations, university (CMU)
    - City government orchestrates rather than provides service
  - Still considering whether to extend WiMAN to the rest of the city

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State and Federal Policy

- Because the best policy will vary greatly from city to city, local officials and local voters must decide.
- State laws should not preempt local governments
  - Pennsylvania law limited options for the Pittsburgh WiMAN.
  - Made the process more complex and time-consuming.
- Congress should restore power of local governments.

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