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Recommended Regional Broadband Telecommunications Plan

Commission Briefing

#133091

December 5, 2007

Overview of SEWRPC Regional Telecommunications Planning Program

- **Regional Wireless Telecommunications Plan**
  - **SEWRPC Planning Report No. 51, *A Wireless Antenna Siting and Related Infrastructure Plan for Southeastern Wisconsin*, September 2006**
- **Regional Broadband Access Plan**
  - **SEWRPC Planning Report No. 53, *A Regional Broadband Telecommunications Plan for Southeastern Wisconsin*, October 2007**
- **Public Enterprise Telecommunications Networks**
  - **SEWRPC Memorandum Report No. 164, *Potential Public Enterprise Telecommunications Networks for Southeastern Wisconsin*, September 2005**
- **County/Local government telecommunications planning assistance**

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Selected Terms and Definitions

1G	First generation wireless technology: Analog technology (1983)
2G	Second generation wireless technology: Digital technology (1992)
3G	Third generation wireless technology: Broadband, high speed, digital technology (2004)
4G	Fourth generation wireless technology: Advanced broadband, high speed, digital technology (2007?)
FTTN	Fiber-to-the-Node: A hybrid transmission system involving optical fiber from the carrier network to a neighborhood node. The connection from the neighborhood node to individual homes may be wireless or involve legacy twisted pair or coaxial cable.
FTTP	Fiber-to-the-Premises: another name for fiber-to-the-home
IEEE	Institute of Electrical and Electronic Engineers: Develops and promotes standards based technologies
ISP	Internet Service Provider: A company that provides an end user with data communications service that allows them to connect to the Internet
POP	Point of Presence: A physical location on a major telecommunication network where a connection to the Internet can be made
VoIP	Voice Over Internet Protocol: A process of sending voice telephone signals over the Internet
WiFi	Wireless Fidelity: Wireless local area networks operation under IEEE Standard 802.11b in the 2.4 GHz range
WiFiA	A term for the higher frequency version of WiFi operating in the 5 GHz frequency band (IEEE standard 802.11a)
WiMAX	Worldwide Interoperability for Microwave Access: Wireless networks operating under a forthcoming IEEE standard 802.16 in the 2.4-6.0 GHz range

Broadband

Little Broadband: Throughput below 20 megabits per second (Mbps)

- **Telephone DSL (1.5 Mbps)**
- **Fiber-Coax Cable (3.0 Mbps)**
- **2G Wireless (0.1 Mbps)**
- **3G Wireless (2.0 Mbps)**
- **Fixed Wireless (1.0 Mbps)**

Big Broadband: Throughput of at least 20 Mbps

- **Fiber to the premises (5-200 Mbps)**
- **4G Wireless (20 Mbps)**

Basic Objectives of the Regional Broadband Planning Effort

- Inventory broadband infrastructure by service providers in the Region
- Assess current broadband system performance
- Develop broadband system objectives and standards (e.g., 20 Mbps, universal coverage)
- Evaluate alternative system plans
- Select a recommended plan

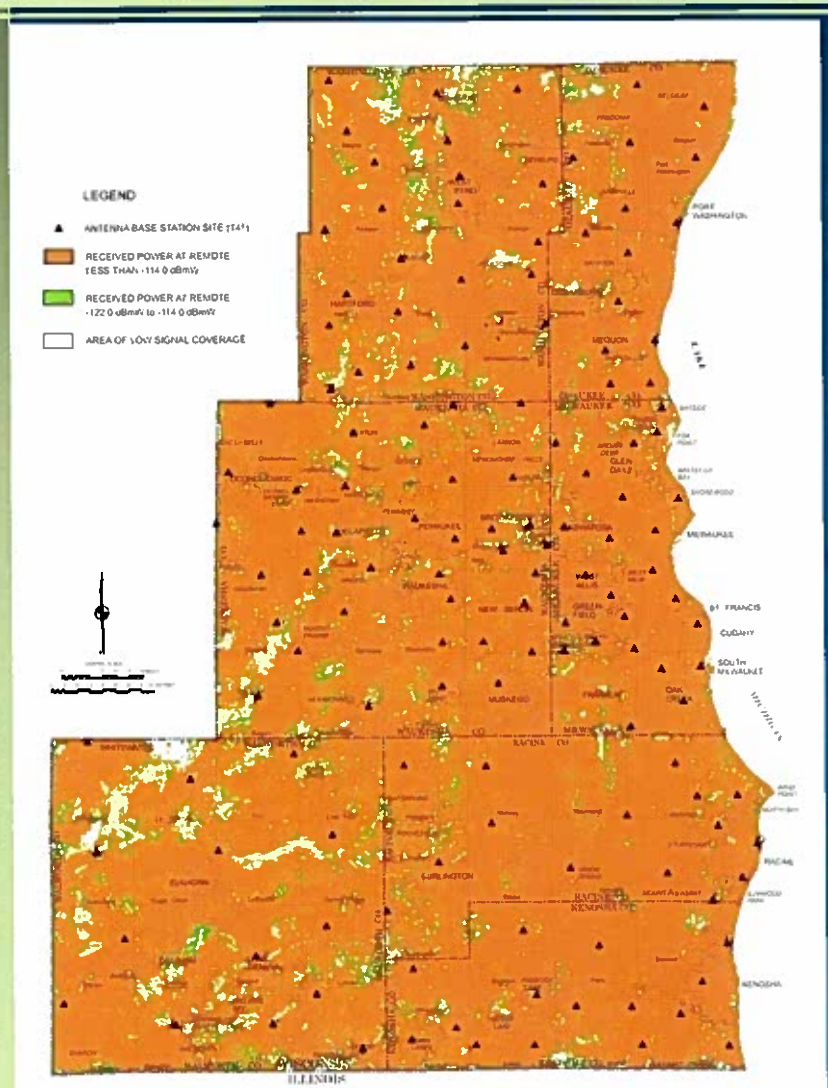
Regional Broadband Alternatives Considered

- Regional Wireless
- Community-Based Wireless
- Fiber-to-the-Node (FTTN)
- Fiber-to-the-Premises (FTTP)
- Evaluation of plans considered performance, universal coverage potential, infrastructure cost, redundancy, potential for public safety applications

Summary of Regional Broadband Plan Findings and Recommendations

- Recognize that Fiber-to-the-Node has emerged as the dominant broadband technology being deployed in the Region by private sector firms to serve most urban areas
- Region should find ways to build a broadband wireless network
  - Would provide the basis to meet emerging public sector communications needs for high-speed data and video
  - If properly designed, could provide the basis for private sector investment to deliver true broadband services to the more rural areas of the Region where Fiber-to-the-Node is not practical
  - Needed to meet goal of universal broadband coverage

Recommended Regional Broadband WiFiA Wireless System Plan



Source: SEWRPC

- Would accommodate
  - 4.9 GHz Public Safety Network
  - 5.8 GHz Commercial Service Network
- 141 Base Station Tower Sites
- Fiber Internet Gateway at each tower site
- Multiple repeater sites for nomadic users as necessary
- 4G performance
- $6.4 million capital cost

The Kenosha County Project

- County Executive and County Board have determined to pursue the broadband wireless network outlined in the regional plan
- A contract is in place whereby SEWRPC will refine the plan for Kenosha County and field demonstrate the technology ($152,160)
- Public safety broadband wireless communications (4.9 GHz band)
  - Has the potential for high-speed data transfer: streaming video, rapid database access, large file transfers(e.g., maps, building layouts, missing person images, medical files)
  - Strategy is to overcome 4.9 GHz path losses with the use of high gain active antennas at both access points and mobile vehicles

The Kenosha County Project—continued

- Back-up peer-to-peer disaster environment communications
  - Major disasters (e.g., 9/11, Katrina) have made clear the need for back-up communications when the primary systems fail (infrastructure destruction, system overload, power failures)
  - Project will explore potential for a back-up, peer-to-peer ad hoc mesh network that bypasses the normal infrastructure
  - Subcontract with Architecture Technologies Corporation to test WirlWind System which creates dynamic mobile networks of handheld devices
- The publicly supplied infrastructure network could also be used by private sector interests to deliver high-speed broadband services to underserved rural areas (5.8 GHz network)