



Wireless business models

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Agenda

- Background: wireless deployments
- Drivers
- Efficiency
- Social factors
- Commercial
- Partners
- Equipment choices
- Case studies
- Future trends

Driver: universal access

- Broadband becomes a right
- Wireless more practical in new markets
- Government and EU initiatives
- Social and demographic change
- New spectrum and regulations
- Is there a profit model?
- Should there be? (cf railways)

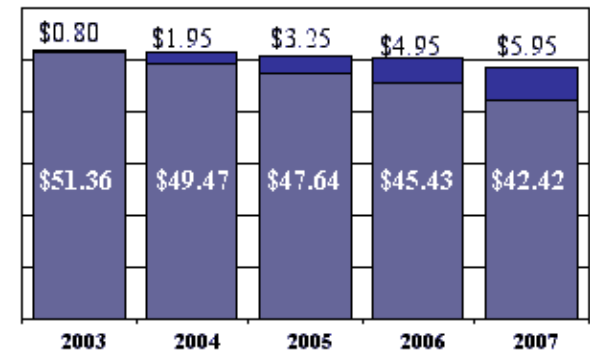
Other drivers

- Public safety
- Efficiency and citizenship
- Digital divide
- Competitive edge for city
- Revenue generator

Need for new networks

- Broadband becomes a utility – where is the profit?
- Failure to find profit model in Wi-Fi, but it won't go away
- If no profit, cost control vital
- Rising use of data
- Convergence bandwidth
- VoIP
- Need for low cost, high performance networks
- All-IP for convergence and lower opex

Wireless ARPU Shrinking, But 3G Data Usage will Grow



Source: The Yankee Group, 2004

New operators

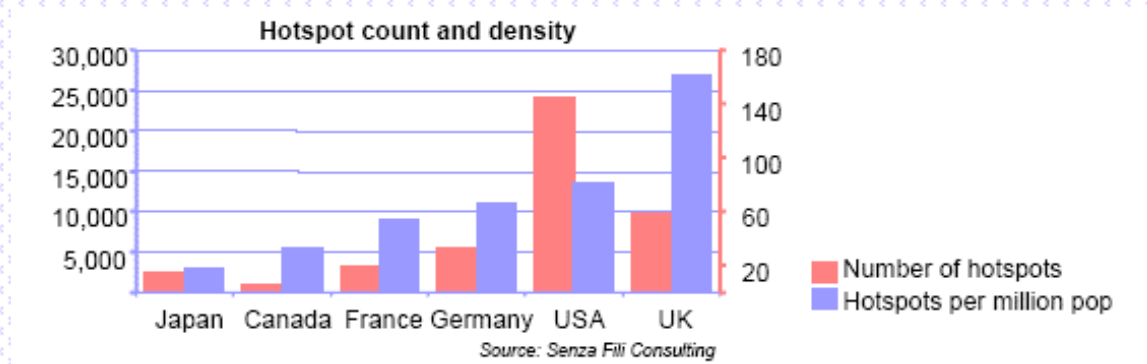
- Public safety
- Freezones
- Unlicensed WISPs
- Media owners
- Enterprise networks
- New spectrum holders
- Where does the municipality fit?

Questions to ask

- What's the purpose of the Municipal Wireless Network?
 - Public Safety, Residential/Business?
- How many square miles will be covered?
- How will the network be funded/financed?
 - Bond?
 - Vendor financed?
- What wireless technology is being considered?
 - Unlicensed or Licensed
- Are their existing broadband wireless options available?
- Who will subsidize the Customer Premise Equipment?
- What are the hidden costs?
 - Who pays to install the CPE?
 - Who subsidizes the installation cost - truck roll?
 - ISP infrastructure - it isn't easy and certainly not free
- How is the vendor held accountable?

Impact of Wi-Fi

- Wi-Fi has shifted consumer expectation and proves demand
- Portable Wi-Fi best indicator so far of personal broadband usage trends and economics
- Metrozones
- But limitations – user and operator

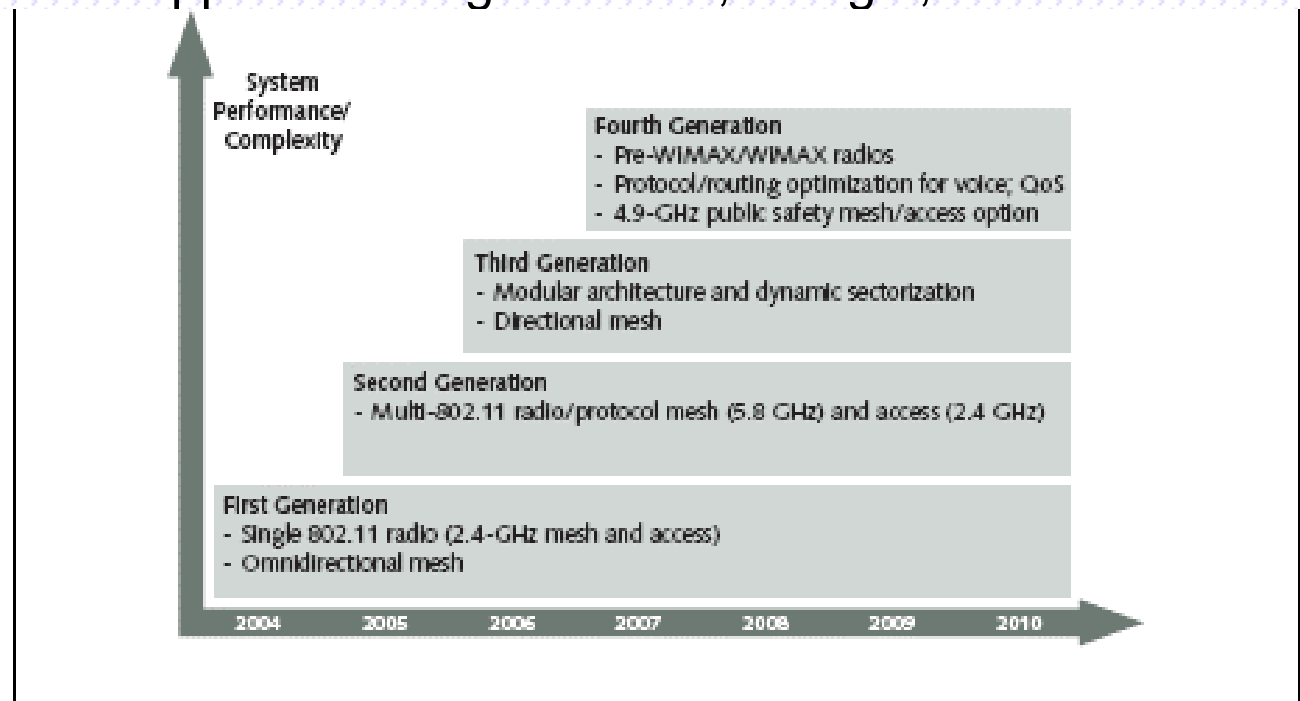


Wi-Fi limitations

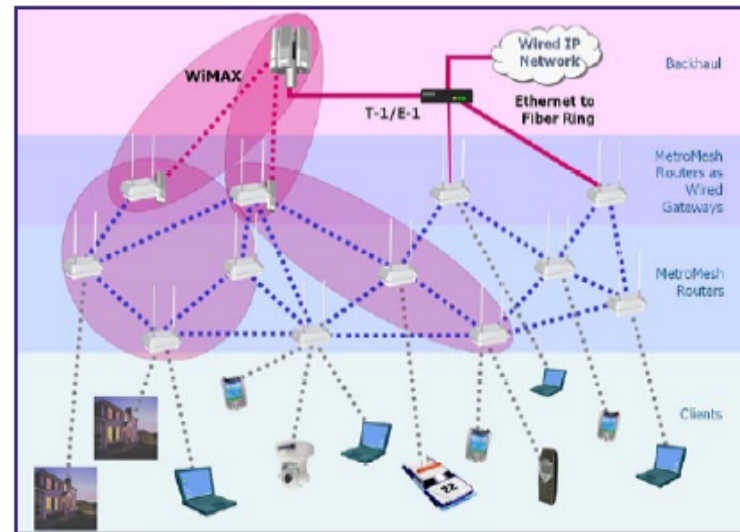
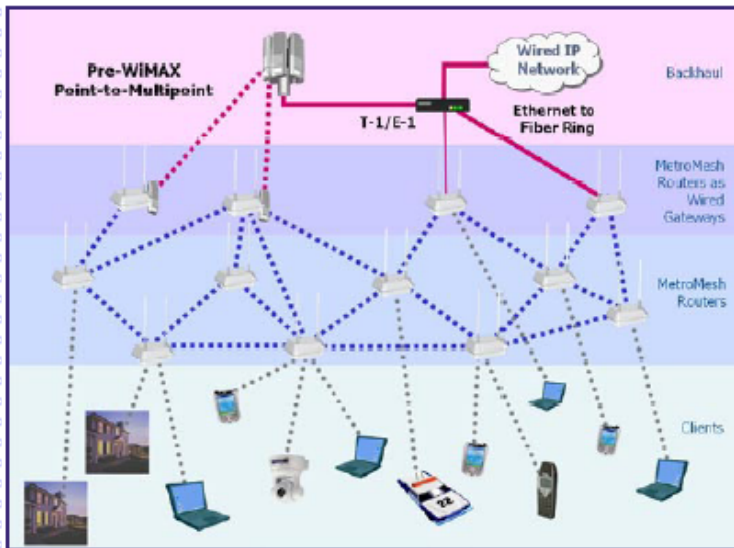
- Unlicensed spectrum risks
- Continuing security and QoS concerns
- No profit model in best effort data but less support for premium services
- Wi-Fi reduces churn but does not boost profit (T-Mobile example)
- Barriers to competitive entry too low (municipalities)

Wi-Fi mesh and metrozones

- Part of 4G?
- Operators take control
- Alternative to cellular eg Taipei
- Vehicle for new approaches eg Earthlink, Google, Nokia



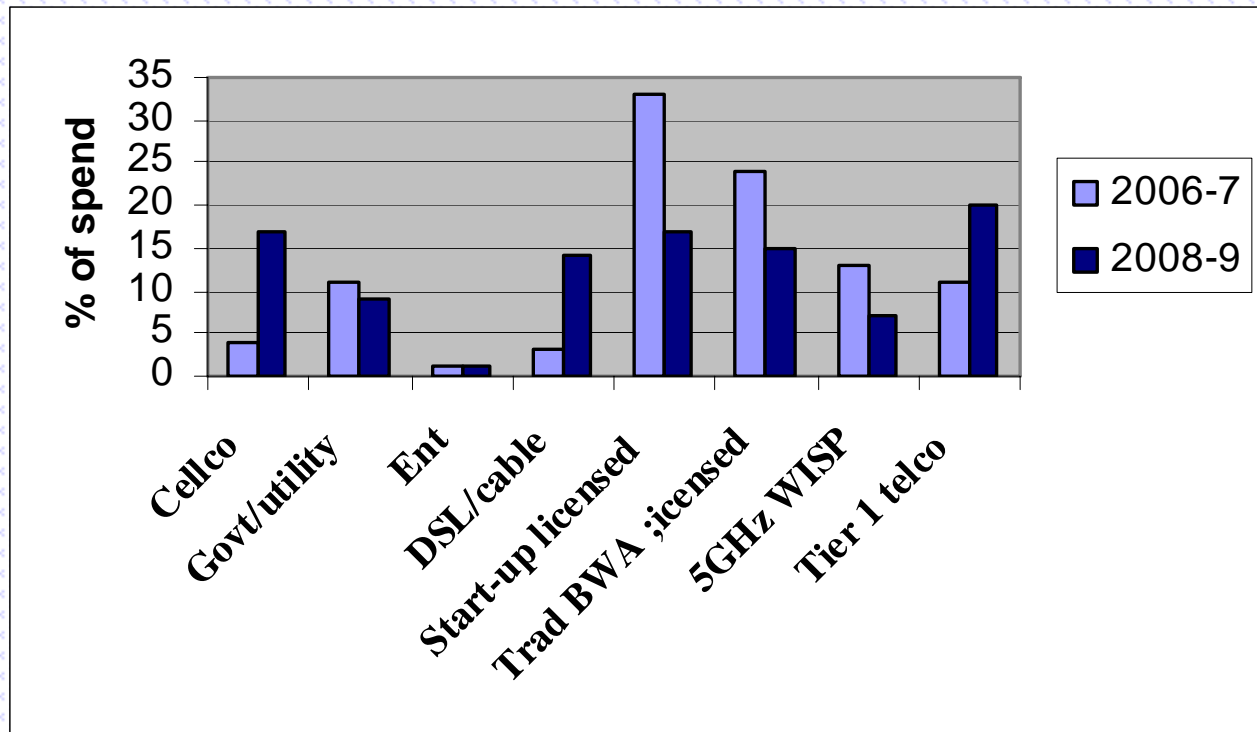
Hybrids



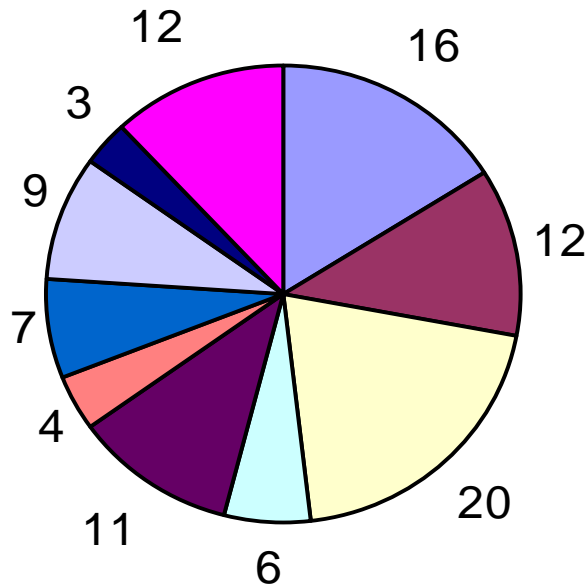
Source: Tropos

WiMAX

Operators investing in WiMAX



Top reasons to pick 16e



- Low er opex
- Low er cost per Mbps
- No subsidy CPE
- Full mobility
- Spans fixed/mobile
- Low er capex
- Advanced technology
- Advanced multimedia
- Wide vendor choice
- Can acquire spectrum

Build-out implications

Pressure on cell sites

- Denser networks
- Indoor penetration
- Sensitivity and expense
- New spectrum
- Parallel networks
- More spectrum and license holders
- Unlicensed players
- Low power Europe (25mW)

Mitigating factors

- Low mounted stations
- Femtocells
- Beamforming
- Smart antennas
- Power limits increasing
- Lower spectrum ranges
- Larger channels
- Software base stations

Base station proliferation

- Wi-Fi metrozone
 - 90% coverage top 5 cities by 2009
 - 35-70 APs per square mile, 75% outdoors, \$>100,000, 100m
- WiMAX
 - 1m users Europe 2009
 - 1 base station per square mile, more in mobile
- 3G
 - 50% Increase in subscribers Europe by 2009
 - 50K sites per operator for UK alone

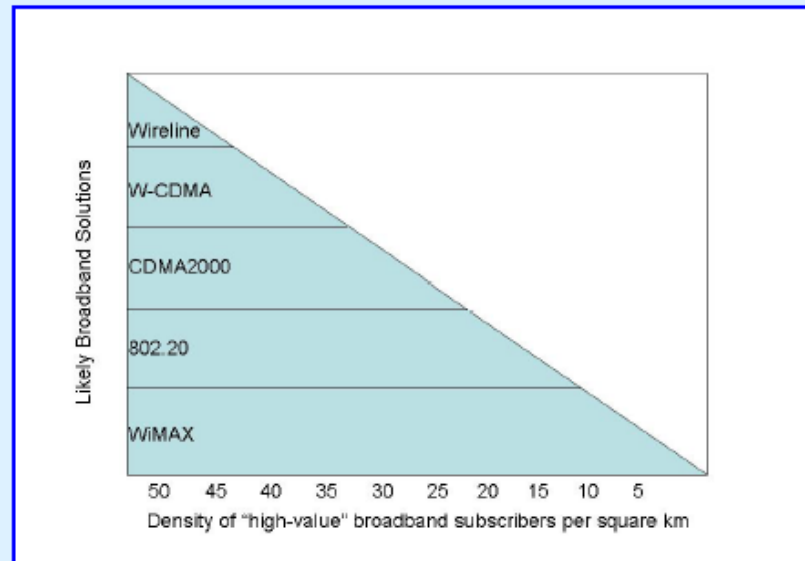
Cost considerations

- **Non-Recurring Costs (Per Tower Site)**
- Cost per square mile ~ radios, mounting hardware, brackets, etc.
- \$ 48,000.00
- Cell site development Cost per square mile \$ 37,000.00
- **Total Initial Cost for a square mile of Broadband Wireless Access \$ 85,000.00**
- **Monthly-Recurring Costs (Per Tower Site)**
- Backhaul ~ Backhaul, Maintenance, etc. \$ 21,000.00
- **Total MRC for single BWA Site \$ 21,000.00**
- *** Hidden Costs - assuming the Customer Premise Equipment will NOT be subsidized**
- Customer Premise Equipment (1 Site) \$ 679.88 x 1500 subs = \$ 1,019,820.00
- CPE installation \$ 200.00 x 1500 subs= \$ 300,000.00
- **Total Residential Hidden Costs \$ 1,319,820.00**

Rural access

- Wireless suited to sparse populations
- Economics of triple play harder
- New spectrum

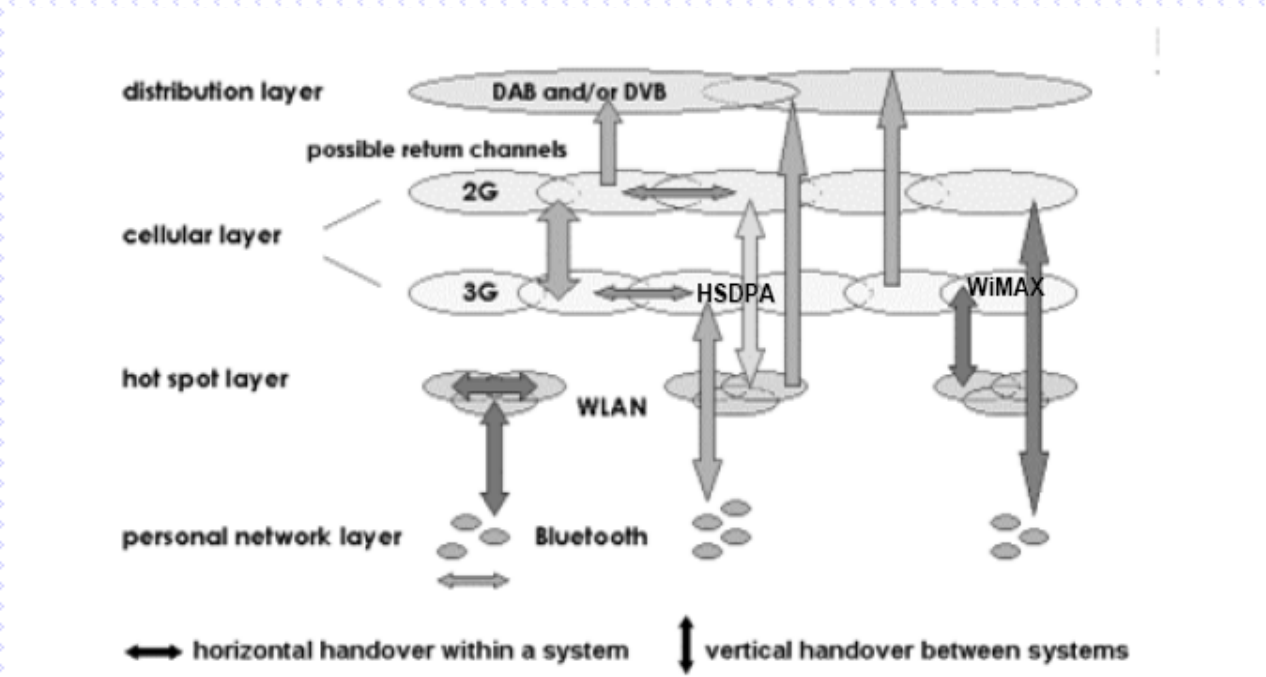
Figure 20: Likely broadband solutions against the expected number of broadband subscribers per sq km



UK situation

- Metrozones – BT
- Convergence – BT, Vodafone, Orange, free broadband
- Ofcom re 4G spectrum
- Additional 2.5GHz needed in urban areas
- Ceiling of 800MHz unlicensed
- Power limits rise to 4W in 5GHz?
- Other bands eg analog TV, 1.5GHz L band, low power 1.8GHz, LMDS
- Huge proliferation likely

Towards 4G





Thank you for your attention
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