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Emerging Wireless Technologies for Local Loop Broadband

Next Generation Wireless Platforms and Mesh Functionalities – the new Hype?
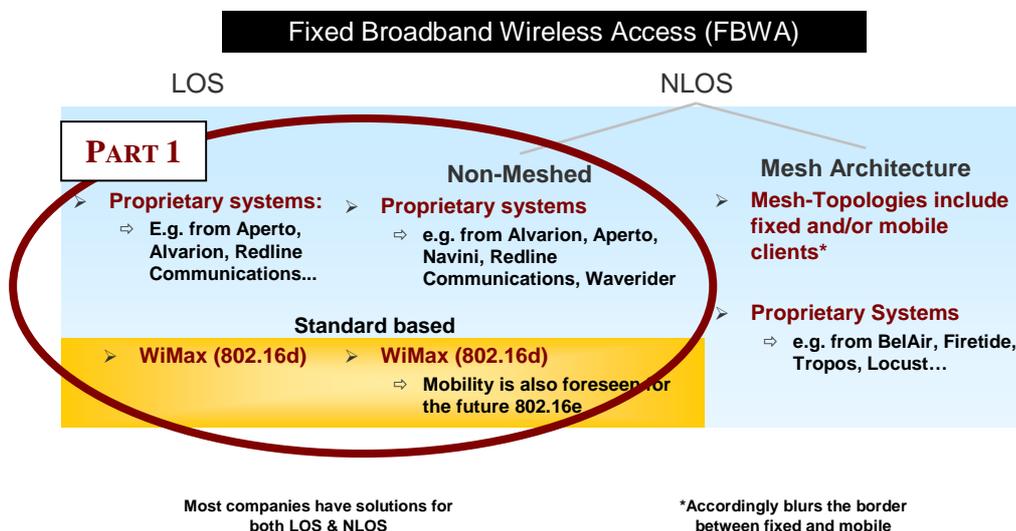### PART 1: (PRE-) WIMAX

WIRELESS BROADBAND has regularly been seen as a major driver for broadband and competition while up to now it completely failed to be a successful platform. It began with the high hopes conveyed by Wireless Local Loop (WLL) which left many demises (Firstmark, Broadnet, Star21….) in its trail. Another example would be the demise of WiFi-player Cometa which failure is attributed to not acquiring enough locations and establishing enough alliances. Regarding WLL the major pitfalls were complexity of deployments, high cost and low functionality of these early systems which were all based on proprietary technology.

Interoperability fueled the provisioning of WiFi and interoperability is the goal of the WiMax Forum which is set to promote the uptake of broadband wireless through such a standard. The following graphic provides an overview of wireless technologies in order to shed some light on the different types of technologies and highlights the emergence of a standard in an otherwise very proprietary industry.

Wireless broadband has so far failed to become a successful (mass market) platform

WiMax will bring interoperability for the first time

Tech classes and standards


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          Fixed Broadband Wireless Access (FBWA)

      LOS                           NLOS

  ┌─────────┐
  │ PART 1  │          Non-Meshed            Mesh Architecture
  └─────────┘
  ➤ Proprietary systems:  ➤ Proprietary systems   ➤ Mesh-Topologies include
    ⇨ E.g. from Aperto,      ⇨ e.g. from Alvarion,      fixed and/or mobile
      Alvarion, Redline         Aperto, Navini, Redline   clients*
      Communications...         Communications, Waverider
                                                       ➤ Proprietary Systems
            Standard based                                ⇨ e.g. from BelAir, Firetide,
  ➤ WiMax (802.16d)      ➤ WiMax (802.16d)                   Tropos, Locust…
                           ⇨ Mobility is also foreseen for
                             the future 802.16e

  Most companies have solutions for      *Accordingly blurs the border
          both LOS & NLOS                   between fixed and mobile
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From the broadband local loop perspective - especially when considering to address the mass market - Point-to-Multipoint (PMP) systems with Non-Line-of-Sight (NLOS) capability are preferable or even compulsory. The advantage of NLOS for the service provider lies in extended coverage and getting to previously unreachable customers. Furthermore the installation becomes simpler and thus faster, ideally to the point where the subscriber installs the equipment on his own (self-install). Furthermore the base-station might need less additional equipment such as an extra high pole or large antenna for set up. On the other hand NLOS systems thrive on the reflections from barriers such as buildings, hills or trees. In a flat rural area without tall buildings NLOS technology would therefore not be the first choice. In any case service providers must establish sufficient prequalification capabilities in order to ensure rapid reactions to orders and fast provisioning processes. Complementary setups in hybrid deployments with other broadband platforms (e.g. WiFi, Satellite, Powerline) hold further potential, especially in Digital Divide scenarios. Fixed wireless could in these cases either act as last mile access or backhaul.

Mass market business models require
- **Non-Line-of-Sight systems**
- **self install subscriber units**
- **prequalification capability**

1. Proprietary Broadband Wireless Access on the route to WiMax
Vendors will probably all eventually migrate their solutions to WiMax, they cannot afford not to because operators will demand it from a certain point of time. This brings up the question on how the capabilities of WiMax and current solutions actually differ.

Forecast of CPE costs

source: bmp TC

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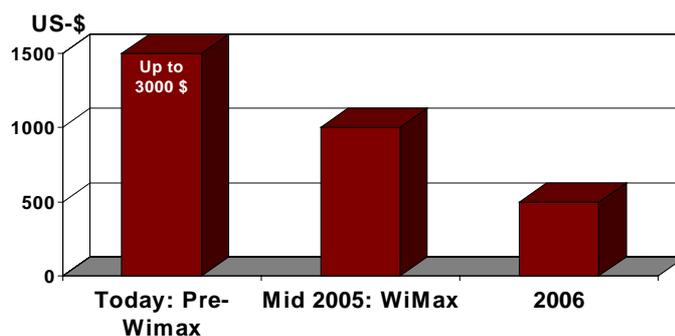
Today a consistent NLOS range is about 4-6km with up to 10km successfully tested. Of course differences exist between the manufacturers. While WiMax promises to extend the range up to 30 miles it appears that NLOS range will remain at the present levels.

NLOS range is 4-6km

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Base station pricing is assumed to stay the same with ~10.000$ per base station sector. It is expected that CPE pricing will profit from higher sales/production volumes generated through the existence of the WiMax standard. While the announcements of the WiMax forum regarding the roadmap for CPE pricing appear utterly optimistic, a serious cost reduction is still to be expected: Proprietary pre-WiMax CPE (no self install) costs between 1.500-3.000$ today and we expect the cost to go down to 1.000$ by mid 2005 (now WiMax standardized) and reach 500$ by 2006. Furthermore the introduction of self-install CPE will greatly facilitate WiMax' potential for residential mass market. This is not expected before 2006 though.

In addition to strong cost reductions the WiMax certified solutions will benefit from built-in QoS mechanisms specifically designed for outdoor wireless use. While speed announcements for WiMax gear often cite 70 Mbps the actual bandwidth will be far nearer to current systems.

Cost structure delays mass market WiMax applications to 2006 and beyond

WiMax key benefits

> ➢ **WiMax systems increase the range & rate compared to past systems**
> ➢ **Some vendors already have solutions that are very close to what WiMax will be like**
> ➢ **Key benefits of WiMax adoptions will be**
>> ⇨ **Lower investment risk through interoperability (use CPE of vendor x with base station of vendor y)**
>> ⇨ **Lower cost through higher volumes**
>> ⇨ **Integrated QoS mechanisms specifically designed for outdoor use (previously unavailable)**

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Based on the cost structure of today's equipment and the roadmap for CPE pricing & self install capability the role of Fixed Broadband Wireless Access systems remains in the enterprise customer sector. Replacement of leased lines, connection of remote buildings will thus be main areas for WiMax deployments. Targeting residential customers is at this point too expensive due to equipment cost and associated truck rolls.

Vendors following different approaches such as Navini or IP Wireless already provide self install CPE although at a higher base station cost and potentially smaller cell spacing. Accordingly operators using Navini or IP Wireless have to cope with the considerably higher infrastructure costs as drawback to the ability to have "zero-install" (to cite the Navini slogan) today. It currently appears that up to 2006 wireless systems will only be used in business models for business customers although first approaches towards mass market are visible. Accordingly we expect that most residential clients will only be connected in projects receiving structural funding for fighting the *Digital Divide* such as the example of BT in the UK. In this period hybrid infrastructures (e.g. WiMax & WiFi-Mesh, PLC…) could prove very interesting.●

In the short term Wireless Broadband remains a solution for the enterprise sector

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In Part 2 of our Wireless Market Review series we will take a look at the opportunities of Mesh architectures.

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<u>About bmp Telecommunications Consultants:</u>

bmp TC is a strategic consultancy in the field of telecommunications with a focus on central issues related to business model based on broadband platforms such as DSL, Wireless (WLAN, WLL, WiMax), Satellite or Powerline Communications.

Typical projects include business model set-up and evaluation, support for market analysis and market entry, project definition, set-up and project management. bmp TC provides advice aimed at ensuring long-term success and offers high-value solutions to address real-world problems and opportunities, based on its clients' unique competencies and its high international expertise.

Hands-on experience combined with a wide-ranging industry view enables bmp TC to create and launch new services for the market and to offer exceptional added value to its clients. The implementation and introduction of unique and justifiable business models can therefore be realized in all fields of the telecommunications sector.

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