

WIMAX IN EMERGING MARKETS

Monica Paolini

Trendsmedia Telebriefing

April 19, 2006



Telebriefing roadmap

- Demand for fixed and mobile WiMAX in emerging markets
- Market dynamics in developed and emerging countries
- Planning a WiMAX network in an emerging market

Senza Fili Consulting

experience in wireless data



Technology focus

- Wireless data technologies and services:
- Wi-Fi, WiMAX, proprietary BWA, cellular (GSM, WCDMA, EV-DO, HSDPA) technologies
 - Data and VoIP services

Approach

- Provide a bridge between technologies and services, assisting vendors and service providers
- Quantitative analysis, with an international perspective
- Carrier, enterprise and residential markets

Services

- Business plans and financial modeling
- Business development and strategy
- Market research and forecast
- Due diligence
- Publications and training

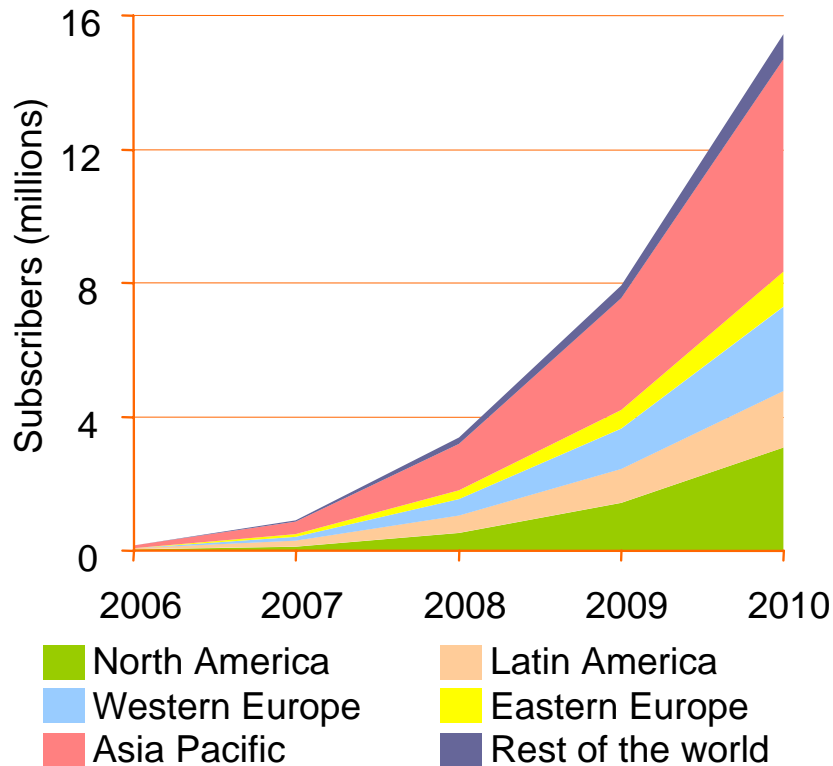
Our latest report on WiMAX was recently published

Fixed or mobile WiMAX? Forecasts and assessment for the transition from 802.16-2004 to 802.16e WiMAX

- In-depth market global forecast of demand and revenues
 - 15 countries
 - 6 regions
- Assessment of 802.16-2004 and 802.16e
 - Fixed and mobile services
 - Competing technologies
- Business models and drivers towards adoptions
 - Market segments
 - Geographic markets
 - Regulation

Our forecast predicts 15.4 million WiMAX subscribers worldwide by 2010

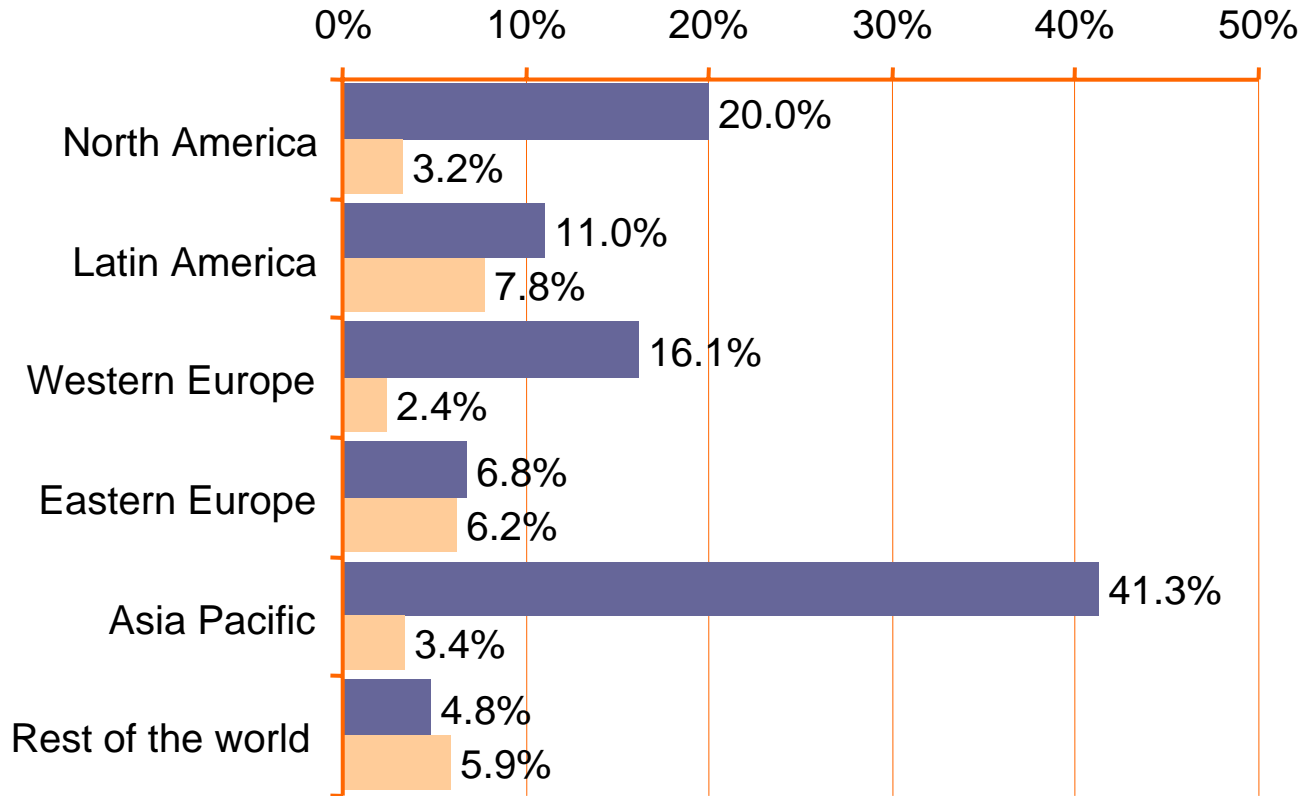
Number of broadband subscribers by region in 2010



Source: Senza Fili Consulting, "Fixed or mobile WiMAX? Forecasts and assessment for the transition from 802.16-2004 to 802.16e WiMAX"

- 57% of WiMAX subscribers will be using 802.16e by 2010
- US\$16.5 billion in service revenues
- Drivers to adoption are different in each market
- Asia-Pacific countries will be WiMAX largest market with 41% of subscribers
- The hottest markets:
 - Emerging countries like China and Mexico where WiMAX is a cost-effective last-mile solution
 - Countries like Korea with a high demand for portable and mobile services

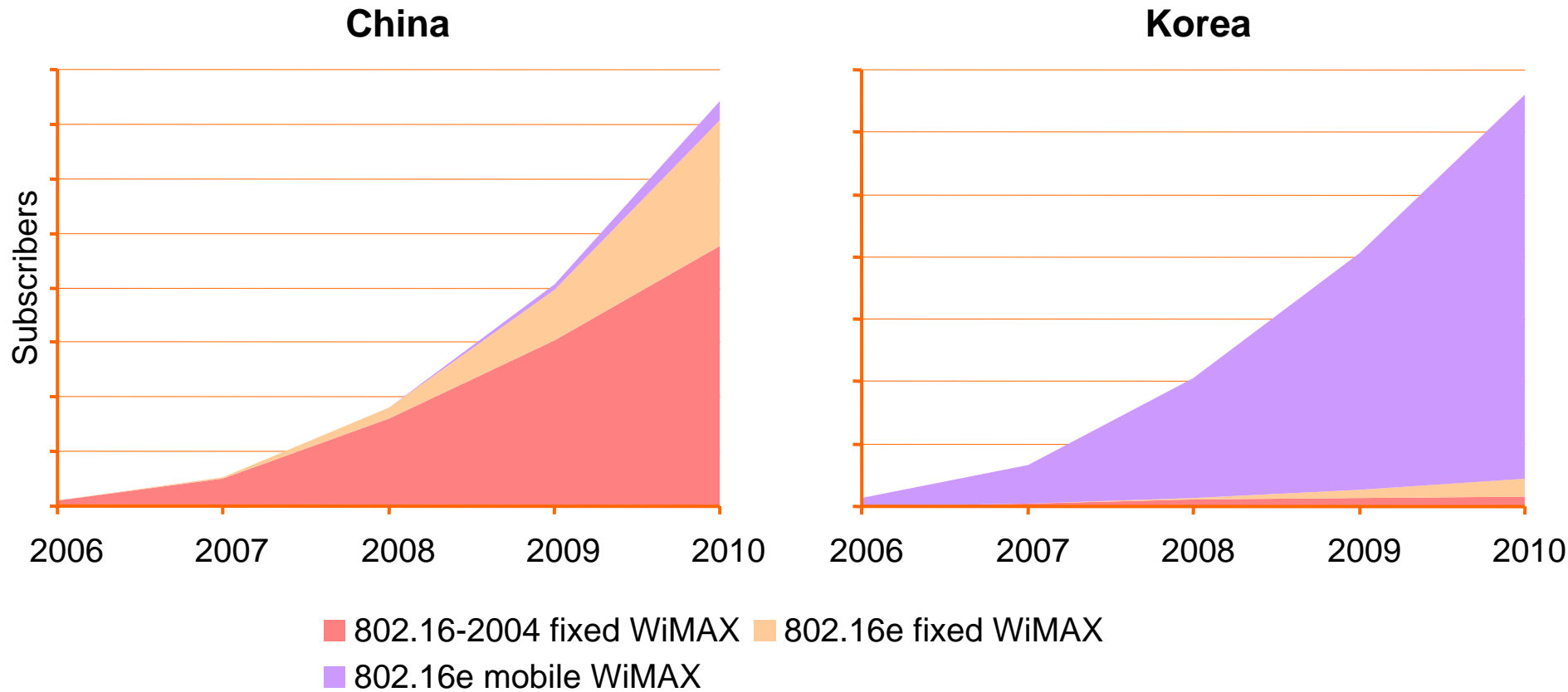
WiMAX will have a stronger impact on broadband access in emerging markets



- WiMAX subscribers as percentage of broadband subscribers
- WiMAX subscribers as a percentage of worldwide WiMAX subscribers

Source: Senza Fili Consulting, "Fixed or mobile WiMAX? Forecasts and assessment for the transition from 802.16-2004 to 802.16e WiMAX"

The dynamics of adoption change dramatically across markets



Note: graphs are drawn to a different scale

Source: Senza Fili Consulting, "Fixed or mobile WiMAX? Forecasts and assessment for the transition from 802.16-2004 to 802.16e WiMAX"

- Spectrum bands available
- Applications (e.g. relative importance of VoIP)
- Split between business and consumer users
- ARPU
- Market competition
 - From wireline operators
 - From wireless operators
- Timeline for demand for portable and mobile access
- Business models

Developing markets represent the fastest growing market for WiMAX

Developing markets

- Opportunity for WiMAX operator to gain (and retain) a dominant position in the market
- Wireless infrastructure may get established first
 - Wired networks may become unnecessary in low density areas
 - Wireless infrastructure easier to deploy, maintain and secure
- Demand for broadband connectivity is still mostly limited to urban areas
- Residential market segment is still in its early days
- Lower competition, but regulation may not favor new entrants

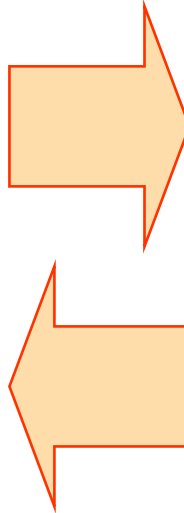
Developed markets

- Larger market, greater demand and willingness to pay for broadband connectivity
- Competition with fixed networks is inevitable
 - Even where DSL is not currently offered, it may be introduced soon
- Established market with a slowing growth rate
 - WiMAX service providers needs to be able to go beyond first time users and lure subscribers away from DSL
- Increased demand for mobility and popularity of wireless connectivity will spur demand for WiMAX

Who will take advantage of the WiMAX opportunity?

Who is interested

- Greenfield operators
- Fixed operators
- Mobile carriers
- WISPs
- MMDS (wireless cable) operators
- Satellite operators
- Municipal/public partnerships



How to evaluate the opportunity

- Rural vs urban deployment
- Fixed vs portable/mobile services
- Business vs consumer market
- Regulatory constraints
- Funding required
- Service bundling
- Competitive environment
- Differentiation from competition
- Target ARPU
- Brand development

A detailed assessment of the market is crucial to succeed

What are the key trends in emerging markets?

- Wireless broadband benefits from an insufficient wired infrastructure
- Metropolitan areas is where most of the demand is
 - Subsidies are often needed in rural areas
- Business market is typically the most attractive one initially
 - The residential market is a great, mostly untapped opportunity for the longer term
- VoIP is often a key to attract customers
- Licensed spectrum is preferred and often required
 - Regulators are becoming more sensitive to the need for additional spectrum for wireless broadband
- Initial demand is mostly for fixed services
 - Portability and mobility will become important later

Which version of WiMAX is better suited to emerging markets?

	802.16-2004 WiMAX	802.16e WiMAX
Standard	802.16-2004 (June 2004)	802.16e (a.k.a. 802.16-2005) (December 2005)
Access	Fixed, nomadic	Fixed, nomadic, portable and mobile
Modulation	OFDM	OFDMA
Service providers targeted	DSL and cable modem service providers, wireless and wired ISPs	Mobile operators, DSL and cable modem service providers, wireless and wired ISPs
Subscriber unit	Outdoor or indoor CPE, eventually PCMCIA card	Indoor CPE, PCMCIA card, mini-card built in laptops
Certification start	July 2005	2H2006
Certified products	January 2006	1H2007 (Expected)
Commercial availability	1H2006	2007 (Expected)

Is 802.16e worth the wait?

Deploy now 802.16-2004

- Faster time-to-market
- Less complex technology
- Comparable performance for fixed services
- Operators are not interested in mobility
- FDD required
- Unlicensed spectrum
- Business market

Wait for 802.16e

- More advanced technology with better support for indoor coverage
- Plan to offer portable and mobile services
- TDD required
- Licensed spectrum below 3 GHz
- Residential deployments

Within a few years, 802.16e is poised to dominate the WiMAX market for fixed, portable and mobile services

Concluding remarks

- The impact of WiMAX will be stronger in emerging markets
- Initial growth in WiMAX adoption is driven by demand for fixed services
- Network operators need to carefully assess the WiMAX opportunity
 - Realistic expectations should replace hype (and nay saying)
 - Business case heavily depends on specific market situation
- WiMAX will enable network operators to enter or to strengthen their position in the broadband access market
 - New services and applications
 - Improved coverage and performance

**Senza Fili Consulting
+1 (425) 657 4991
www.senzafiliconsulting.com
monica.paolini@senzafiliconsulting.com**