

# bda



## Wireless India: Catalyzing Next Wave in Economic Growth

Planning the Way Forward

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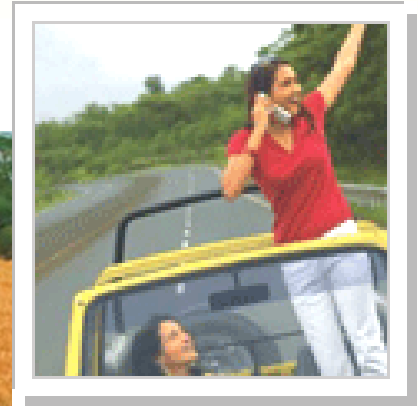
June 6th 2007

[www.bdaconnect.com](http://www.bdaconnect.com)

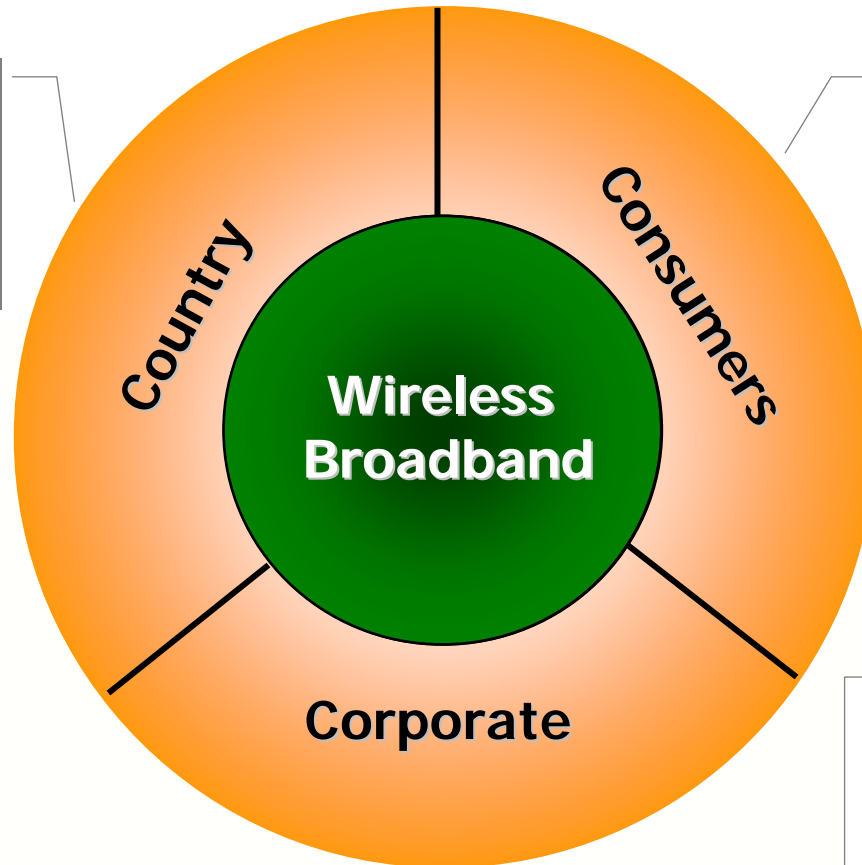


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# INDIA GOES WIRELESS !!!



- Investments
- Revenues
- Employment
- Social improvement



- Improved lifestyle
- Better productivity
- Equal access to information
- Global exposure

- Information integration
- "World is Flat"
- Global reach
- Efficiency
- Anytime, anywhere, anything





## Voice and Data



- WCDMA and EV-DO are backwards compatible with GSM & CDMA, evolved for higher efficiency data transport
- Both techs evolve from voice-centric core
- Mobile WiMAX designed to support data, though efforts ongoing to optimize for VOIP

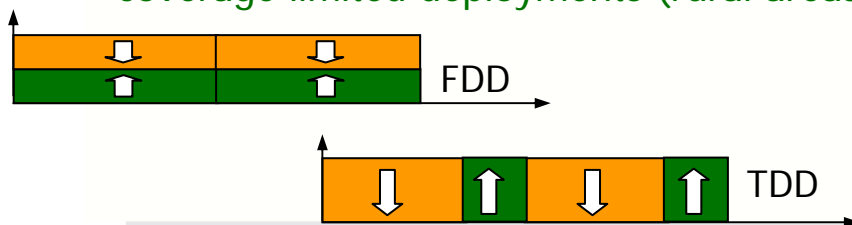
## Spectrum Harmonization



- Spectrum harmonization is key to ensuring economies of scale and worldwide roaming
- 3G systems have achieved worldwide coordination in limited bands
- WiMAX Forum is currently making efforts towards ensuring both 802.16d and 16e platforms achieve the same

## FDD/TDD

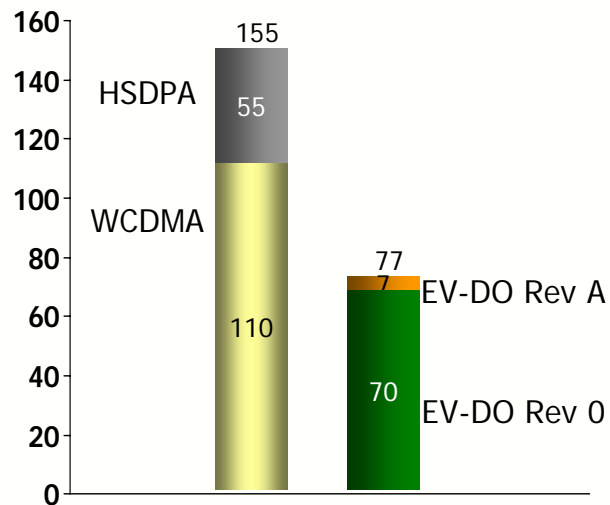
- WiMAX uses TDD, which is simpler to implement in electronics
- 3G systems based on FDD have advantage in link budget, and therefore range, in coverage limited deployments (rural areas)



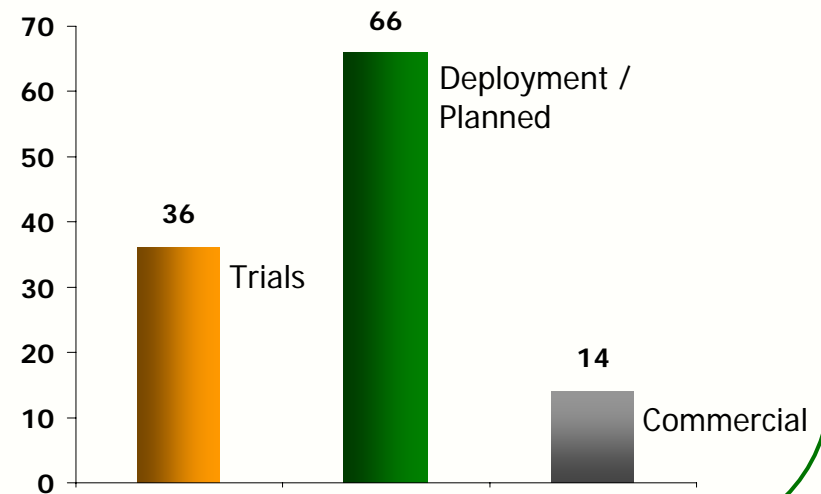
## IP Core Network

- WiMAX and Wi-Fi, both IP based techs, are well-suited to support bursty traffic and can leverage IP core networks from the start
- GSM & CDMA use one backhaul portion for circuit switched traffic and one for data.
- When upgrading to WCDMA or EV-DO, can remain with this configuration to preserve guaranteed voice quality, or migrate to an all IP core with HSPA and EV-DO Rev A

- By March 07 there were 155 commercial WCDMA (45 HSDPA) and 77 EV-DO networks (7 Rev A). Additionally, there were 165 HSDPA network commitments and 83 EV-DO trials worldwide
- 3G subscribers increased from 74 million in 2006 to 173 million by March 07



- By June 2006, there were 14 commercial WiMAX networks globally with 107 planned and trial networks
- Various operators are currently testing WiMAX networks, with Sprint announcing investments commitments worth USD 2 billion for 16e



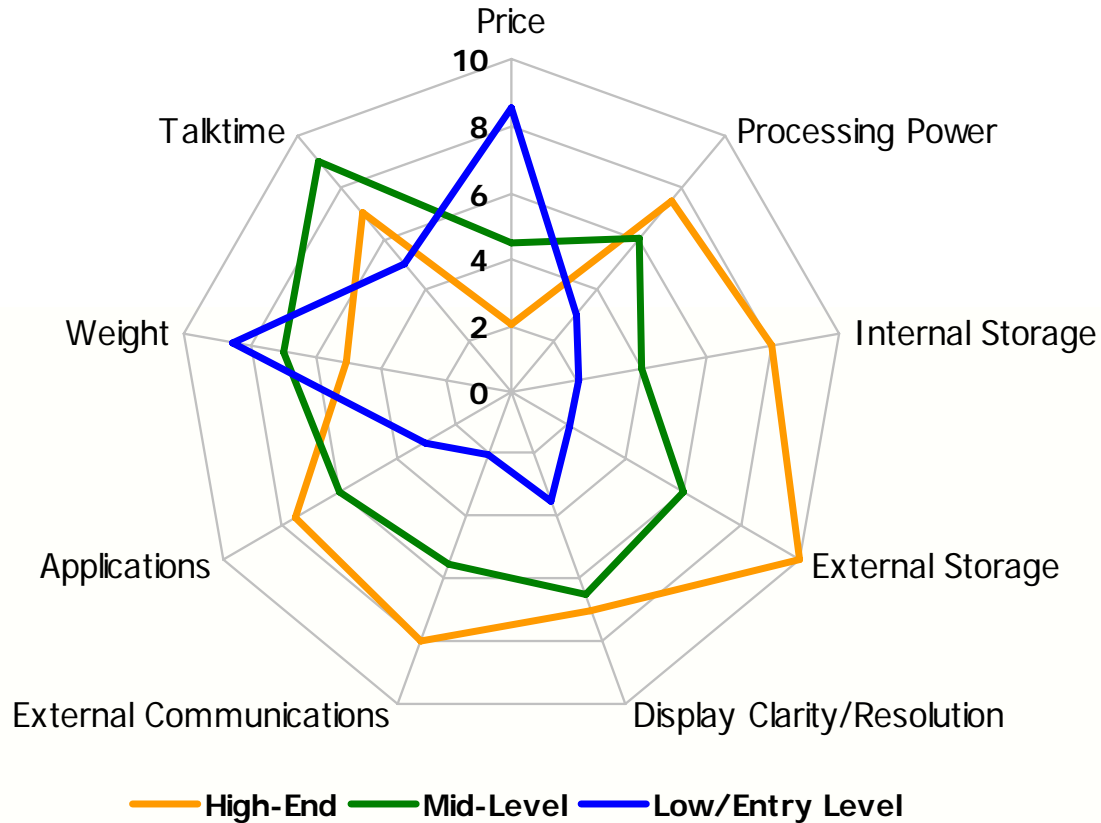
Low end 3G phones are already at or below 2G mid-level phones, and with equal or great features



2G



## 2G Handset Overview

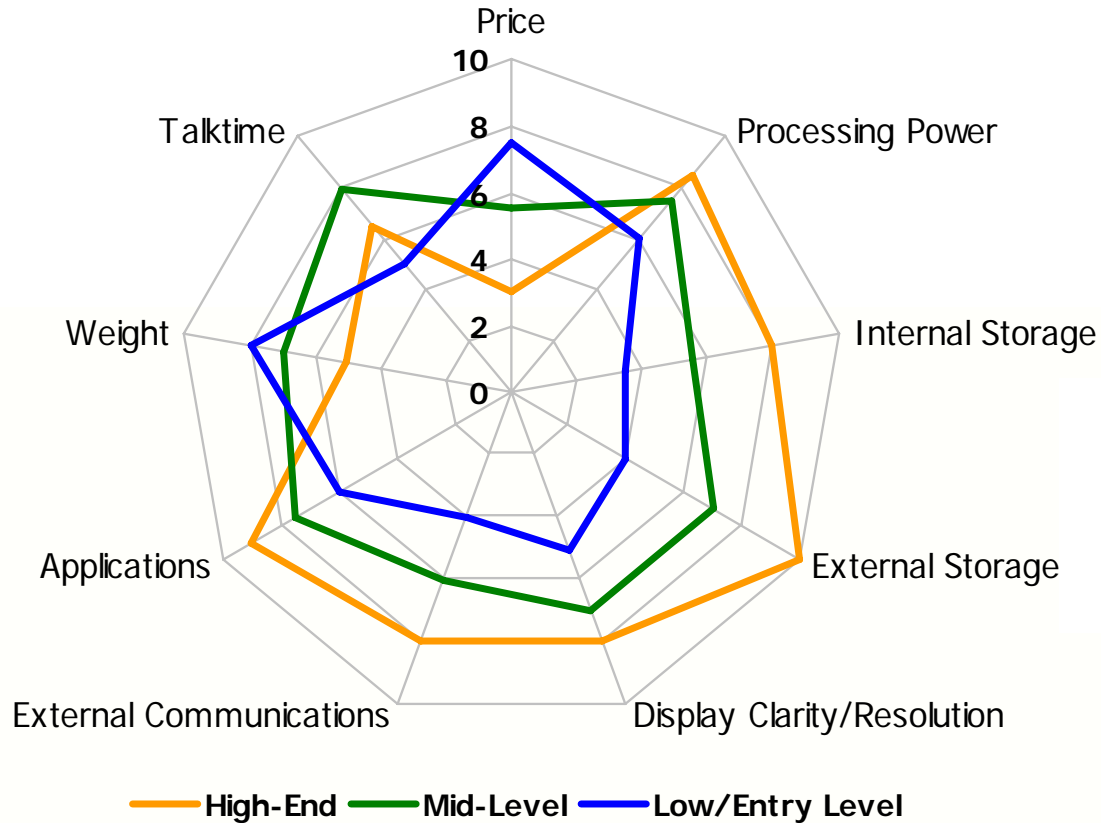


- Low-End 2G phones are pure play voice based handsets without any other features

Low end 3G phones are already at or below 2G mid-level phones, and with equal or great features



### 3G Handset Overview



3G



- High-End 3G handsets are offering high processing power and more applications

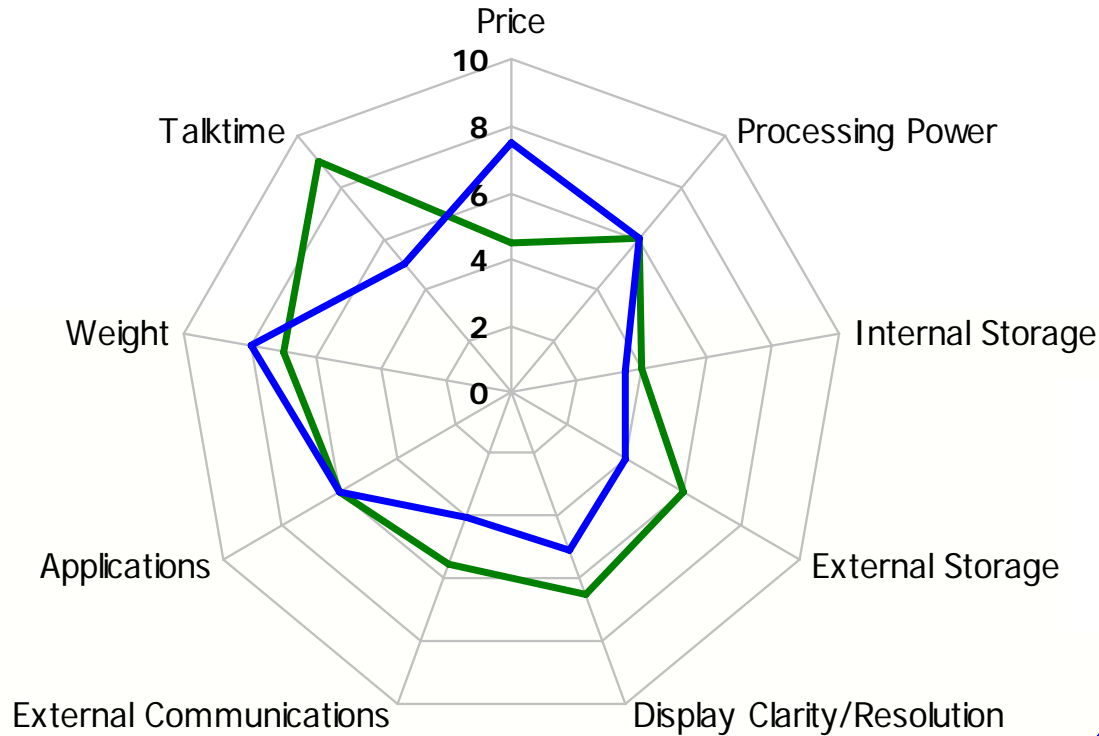
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2G



## 2G mid-level vs. 3G low-end



3G



- This trend will drive adoption amongst the quickly growing middle market
- 3G phones are quickly working towards low-end

- Key driver for network deployment and maintenance is the number of cell sites



## CAPEX

- Site preparation
- Installation and commissioning
- BTS equipment and controller
- Aggregation elements
- Passive infrastructure accounts for 60 -70% of total site cost

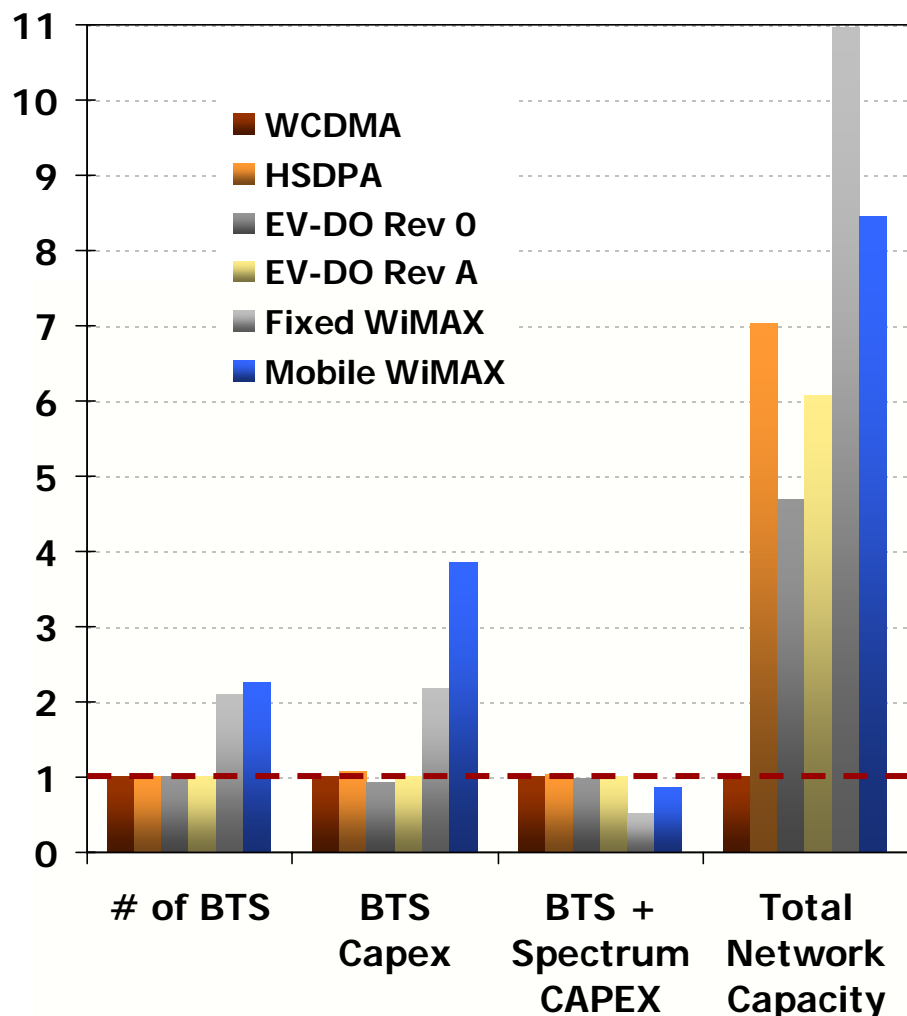
## OPEX

- Site lease and maintenance
- Power backup
- Backhaul

- Analysis Model

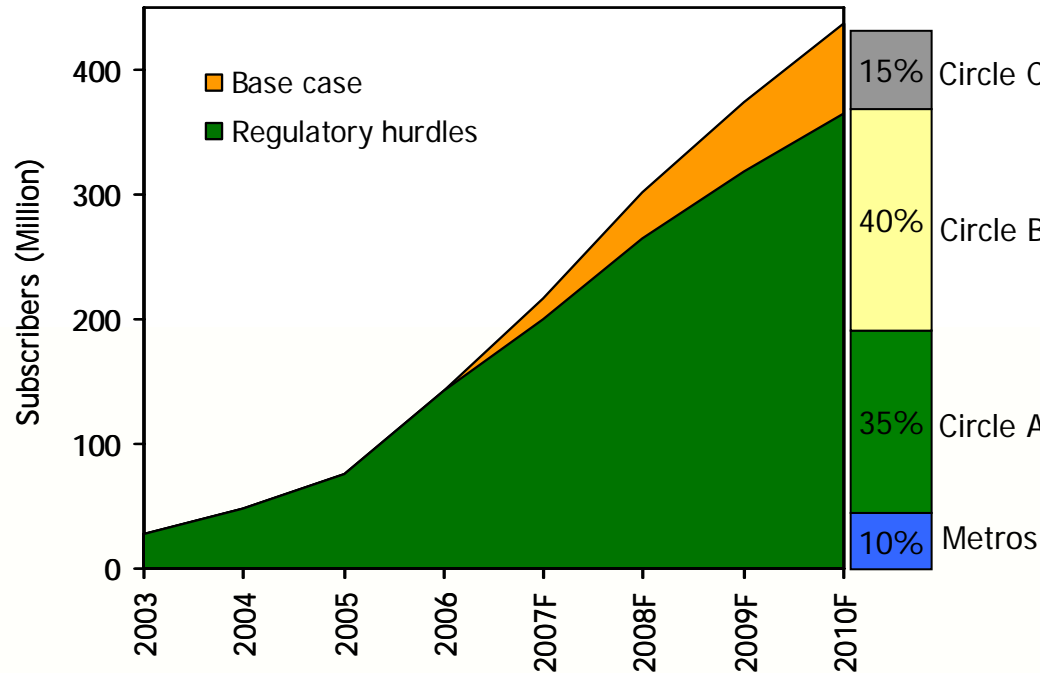
City size considered	1,400 sq. km.	
Target coverage at launch	50% (700 sq. km.)	
Density	Dense urban	20%
	Urban	30%
	Suburban	50%
Coverage	One wall penetration	

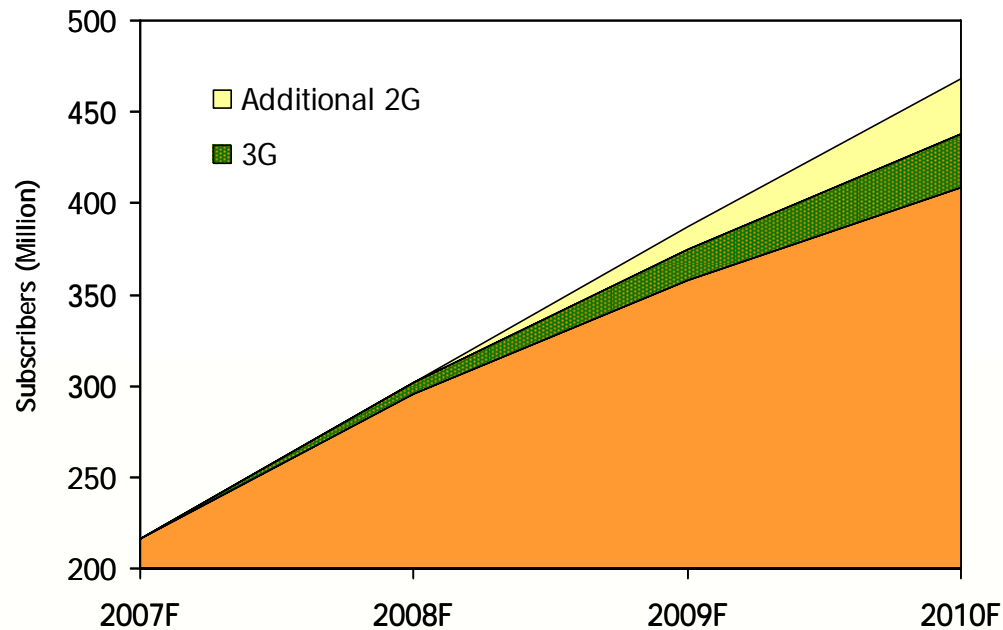
X relative to WCDMA as the Reference (WCDMA = 1)



- In India, 3G systems will work at 2.1 GHz compared to 3.3 GHz for BWA technologies
- 16e and 16d have more network capacity due to higher number of BTSs
- CAPEX proportional to # of BTSs
- Disparate spectrum costs in India for 3G and BWA skew the results when considering just reserve price
- When considering an upgrade scenario, 3G has cost savings in both active and passive infrastructure
- For rural areas, a greenfield 3G network, offering both mobile voice and broadband data, will be more economical

- **Affordability:** With cost per year of USD 58, 95% of Indian household can own 1 or more phones
- **440 million target (mobile teledensity 38%) can be met**
  - Majority of subscribers will come from the semi-urban and rural areas in Circles A, B and C, fuelled by support from USOF
  - Majority of subscribers from Circles A and B
- **In absence of quick regulatory action on spectrum, mobile teledensity of only 32% with 364 million subscribers at the end of 2010 would be achieved**
  - Low QoS increases cost of ownership from dropped calls and disturbance, especially for cost sensitive low end





- AWS, particularly 3G, will play a key role in the future growth of India
  - AWS platforms will be able to alleviate the major problems currently faced in metros and top cities due to the lack of spectrum by migrating high end users
  - With more content and low cost handsets, more users will migrate to 3G

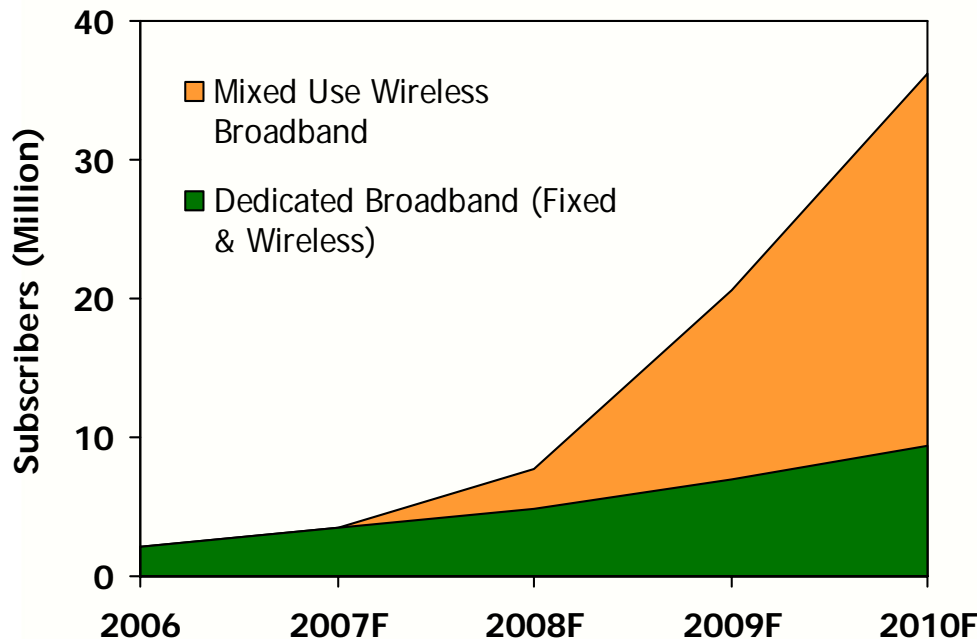
- Freed spectrum will allow additional growth from lower end 2G subs
  - Capacity has already been amortized
  - Allows going further towards bottom of pyramid





## Dedicated Broadband Affordability

Household Income (USD/Annum)	Percentage of Population	Households (Millions)
USD 11,000-23,000	2.8%	1.2
USD 23,000-45,000	1%	2.1
USD >45,000	0.6%	5.9
Total HHs with dedicated broadband		9.2



- Growth in fixed BB will continue, though most new subs will favor wireless
  - Convenience
  - Variety
- Each subscriber to 3G platforms will automatically be a broadband enabled subscriber
- Broadband segment will be enabled by the added convenience of wireless, and India will **surpass the DOT's goal of 20 million broadband subscribers by the end of 2010**

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