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Current Scenario in India's Telecom Market

Prepared for
Metro Ethernet Forum
Carrier Ethernet Press Briefing

March 19, 2007

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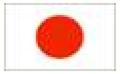
BDA: Telecom / Media / Technology Consulting & Research

- BDA provides strategy consulting and research to leading TMT firms and investors with a focus on emerging markets and emerging technologies in Asia.

- The first TMT consultancy in China, BDA was founded in 1994 and is the leading firm of its kind, now having a team of over 30 based in Beijing.

- Active in India since 2004, advising TRAI as well as international carriers, vendors and investors active in, or seeking to enter, the Indian market.




- BDA also tracks emerging technologies and business models from Japan and South Korea.
- BDA has dedicated analysts organized around three sector groups:

Handsets/Devices | Fixed Line & Wireless | Equipment & Services | Internet/New Media

- BDA is able to support companies through:
  - Research subscription services
  - Customised retainers
  - Consulting projects

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Industry dynamics will make India the number two mobile subscriber market in the world by 2010

- Most inhabited areas of India should be covered by mobile networks by the end of 2009, despite only 45-50% coverage today.
- The number of total mobile subscribers is expected to increase from over 155 million today to 500 million by the end of 2010 as per Govt. targets.
- Broadband growth has just begin with the incumbent and some private telecom operators offering aggressive pricing plans along with expanding networks. But penetration remains minute compared to voice penetration.
- Factors accelerating growth include:
  - low levels of penetration and increased competition leading to product innovation and increased capital expenditures
  - reduced regulatory uncertainty
  - declining equipment costs
  - the Government changing its policy for Universal Service to provide subsidy for mobile cellular and plans to extend that to broadband connectivity as well
  - Broadband spread has just begun
  - Entry of foreign carriers into the ILD & NLD space

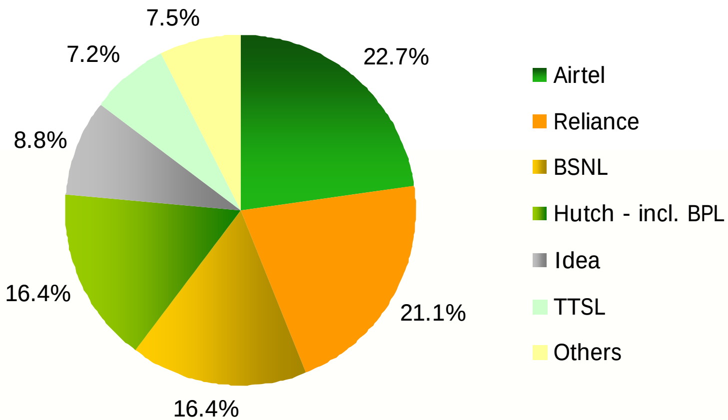
Source: Industry Reports, BDA Analysis

India Market Status

Population	**1.112 billion**
Fixed Subs / Penetration	**40.40 mn / 4% (Jan 2007)**
Mobile Subs / Penetration	**156.31 mn / 14% (Jan 2007)**
Internet Subs / Penetration	**8.07 mn / 0.7% (Sep 2006)**
Broadband Subs / Penetration	**2.15 mn / 0.2% (Jan 2007)**

Note: Mobile subs data includes fixed wireless customers.

Operator Wireless Market Share Breakdown (Jan 2007)



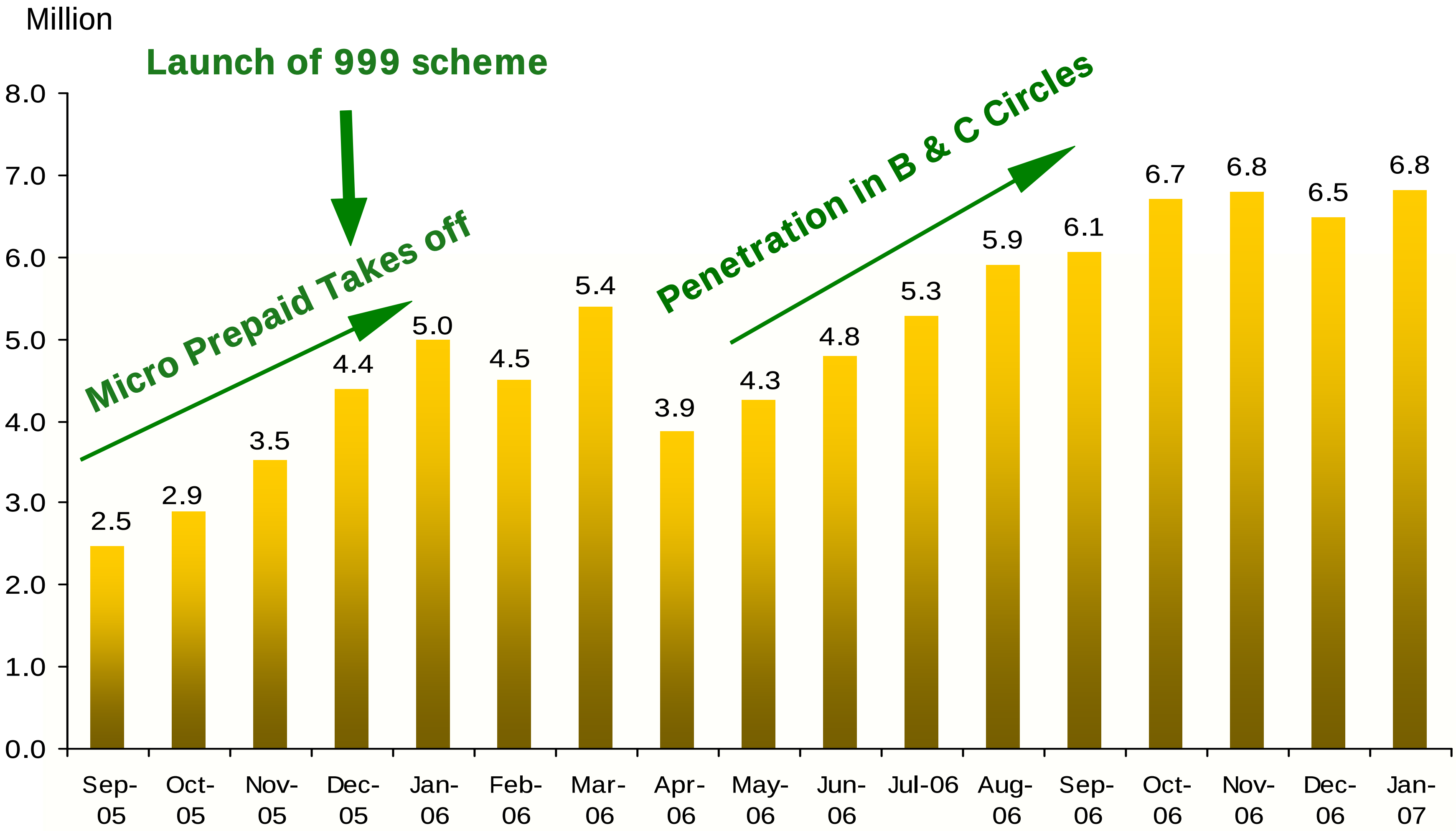
* CDMA Mobile Figs for BSNL not included

Selected market trends

- India's mobile subscriber growth continues to grow faster than China
- Recent M&A/FDI activity by Vodafone (Hutch Essar), and IDEA Cellular's IPO being oversubscribed is a major vote of confidence in India's Telecom sector growth prospects and response to lifting of foreign investment ceiling to 74%
- Government recognizes that QoS parameters are extremely important, however spectrum availability continues to be the biggest bottleneck

Source: TRAI, COAI, AUSPI, BDA Analysis

India's mobile subscriber base is increasing phenomenally with nearly 7 million subs added each month



Source: TRAI, Morgan Stanley Research, BDA Analysis

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Emphasis on broadband growth in India was ignited by the efforts of TRAI & DOT in 2003 to 2004

Key Milestones in the History of India Broadband	
• ISP policy announced to allow private ISPs to enter	Nov 1998
• National Telecom Policy 1999 sets targets for providing high speed data for all towns with greater than 200,000 population	1999
• **TRAI releases consultation paper & recommendations on Accelerating Growth of Internet and Broadband Penetration**	**Nov 2003 & April 2004**
• National Internet Exchange launched by Department of IT	2003
• **DOT partially accepts TRAI's reco's for Internet and Broadband, including those for broadband subscriber targets, and releases Broadband Policy 2004**	**Oct 2004**
• WPC de-licenses 2.4 GHz spectrum for outdoor usage	Jan 2005
• BSNL & MTNL launch residential broadband services on DSL	Jan 2005
• TRAI slashes rates of international and domestic leased circuits	Apr & Nov 2005
• India misses first broadband subscriber target of 3 mm	Dec 2005
• TRAI issues recommendations on IPLC competition , which are then accepted by DOT	Dec 2005 & Dec 2006
• TRAI issues consultation on Review of Internet Services	Dec 2006

Source: TRAI, BDA

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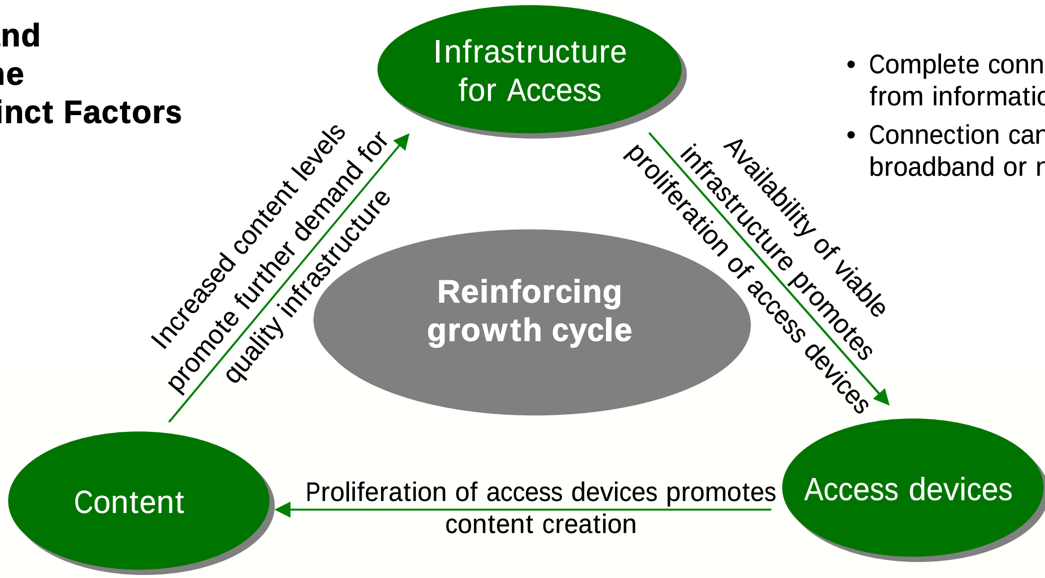
In 2004, TRAI developed a framework for how to analyze growth of broadband in India & identified the various hurdles preventing it

Telecom Regulatory Authority of India
(An ISO 9001-2000 Certified Organisation)

Growth in Broadband and Internet is Driven by the Interplay of Three Distinct Factors



Infrastructure for Access:
- Complete connection to the end-user from information source
- Connection can be wire-line or wireless, broadband or narrowband

Content:
- The information, programs, and services on the internet
- This includes portals, information sites, e-mail, messaging, chat, e-commerce, etc.

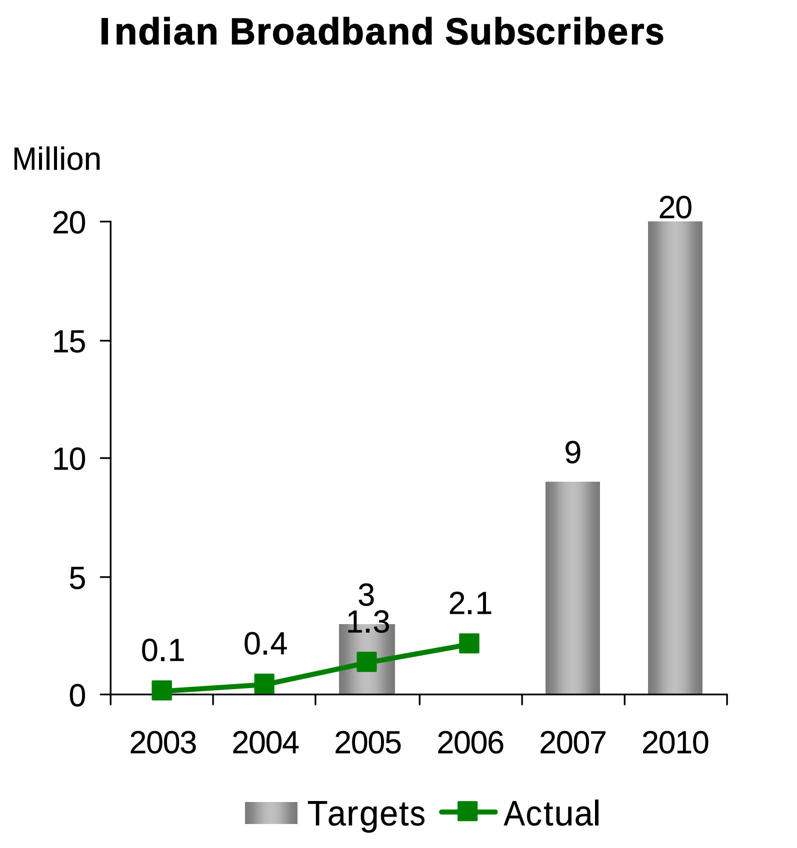
Access devices:
- The interface the user has with the internet and its contents
- Does not have to be a PC

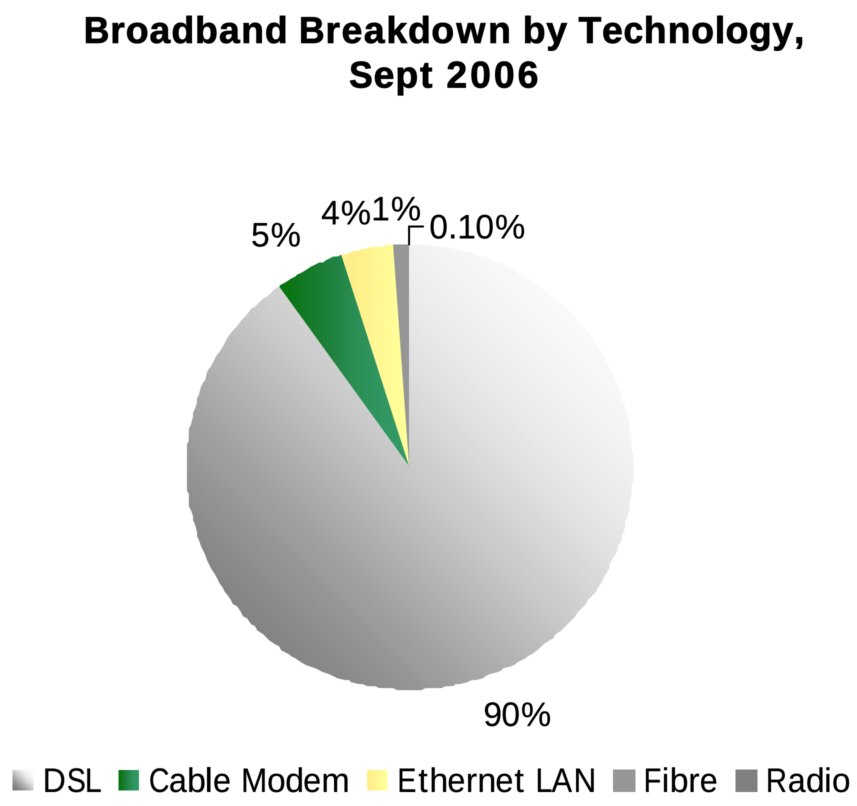
11 Hurdles Are Preventing the Growth of Broadband

- Price
  1. Prices for broadband are **1,200** times higher than in Korea
- Access to the customer
  2. Lack of access to the **incumbent's copper** for DSL
  3. Low **quality of cable TV** infrastructure and lack of organization
  4. High costs for **DTH and VSAT**
  5. Policies preventing **wireless solutions** from spreading
  6. Clearances for **right of way**
- Cost of backhaul networks
  7. Lack of effective competition in the **"within city" networks**
  8. High costs of **international bandwidth**
  9. Ineffective implementation of **National Internet Exchange of India (NIXI)**
- Fiscal policies
  10. High taxes and duties, and lack of incentives for faster growth
- Content and applications
  11. Lack of locally relevant content and absence of "change agent" to drive growth

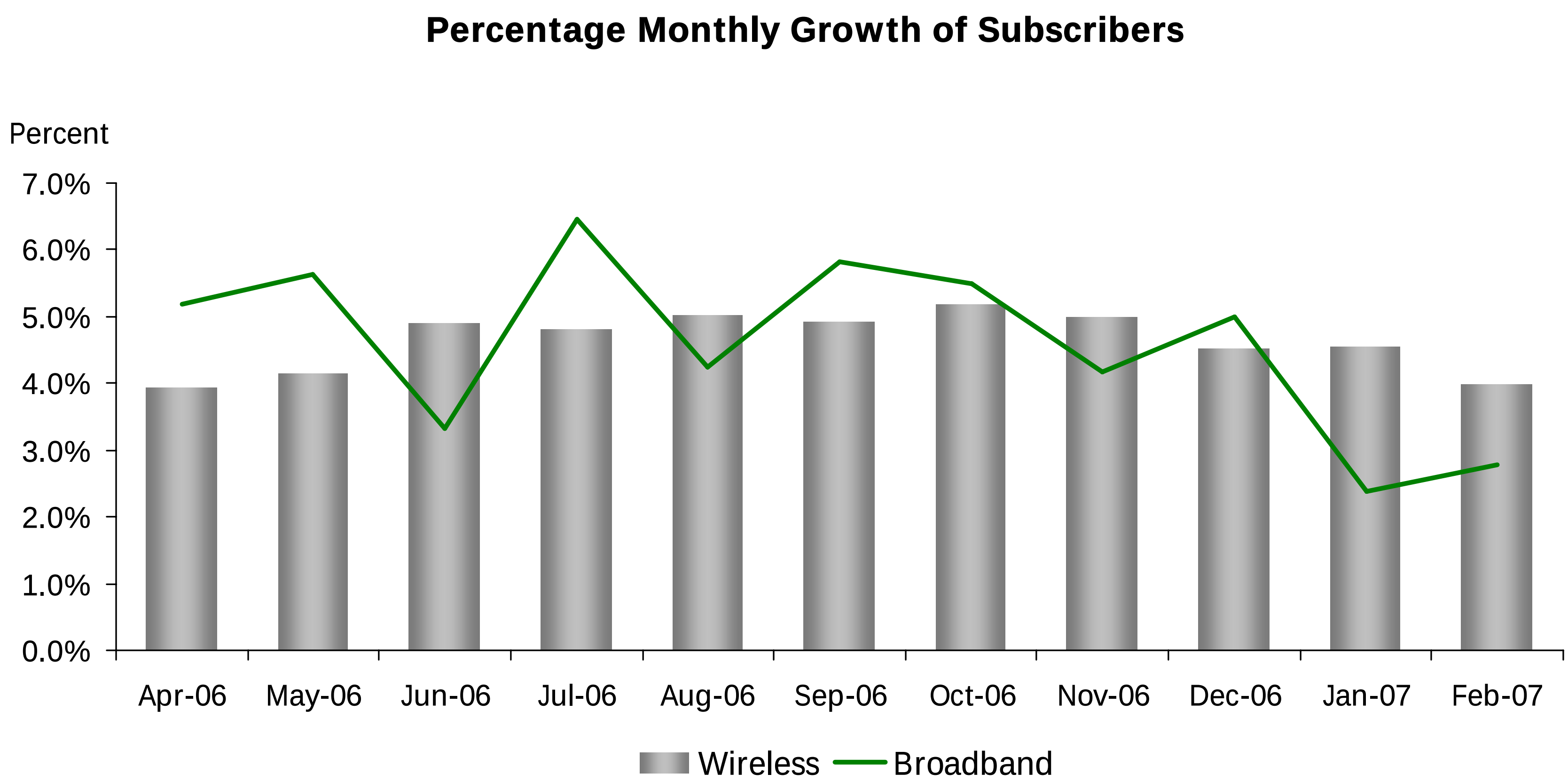
Source: TRAI

Since then, broadband subscriber growth in India has not met the targets set by the Government





Even the trend of broadband growth is not yet very positive, and much less consistent than mobile



Source: TRAI, BDA

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Many in the industry have been questioning government policy initiatives

Has the government changed policies sufficiently to enable exponential growth

Outstanding issues

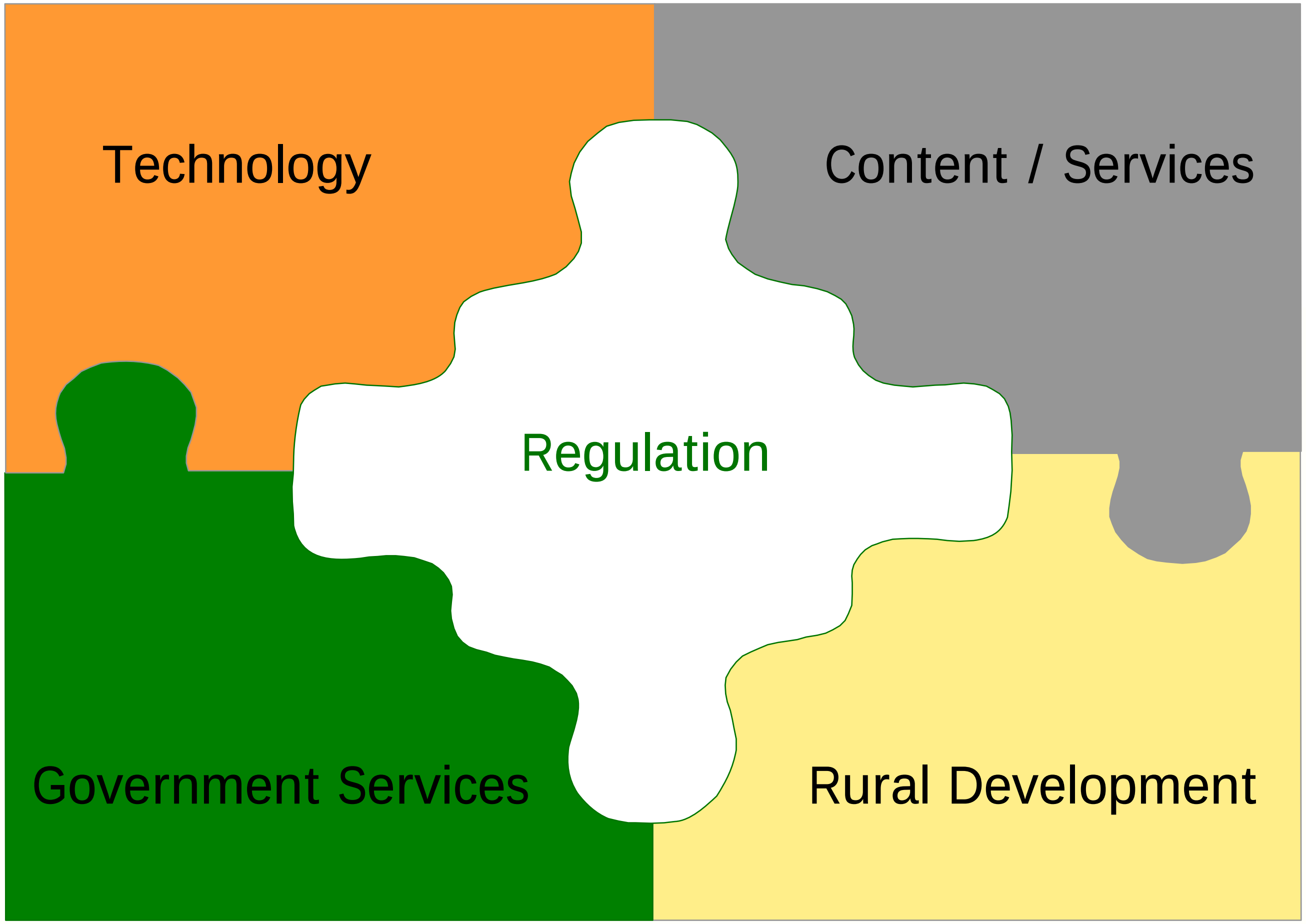
- Spectrum allocation and pricing for wireless broadband
- Unified licensing & VOIP / Internet telephony interconnection with PSTN
- License fees for ISPs providing VPN and Internet telephony
- Wholesale / resale market for bandwidth
- Local loop unbundling
- Clarification of broadcast & cable laws for IPTV provisioning
- Rural area growth via niche operators
- QoS and SLAs for upstream bandwidth from NLD & ILD operators

Positive movements

- Relocation of satellite services from lower extended C band (3.4 GHz – 3.7 GHz)
- Regulating international bandwidth landing stations
- USO subsidies for wireless infrastructure in rural areas
- Potential USO subsidies for broadband in rural areas
- State wide area networks and 100,000 community service centers
- Reduction of entry barriers for telcos into NLD & ILD services space

Source: BDA

But for broadband to succeed in India, each part of the ecosystem needs to be appropriately promoted



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