Company presentation

8th January 2019

Building and Sharing Vital Infrastructure

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Agenda

- Changing telecom landscape
- Impact on
  - Operator & Tower companies
  - Regulatory landscape
- Opportunities
- Bharti Infratel 2.0

Changing telecom landscape

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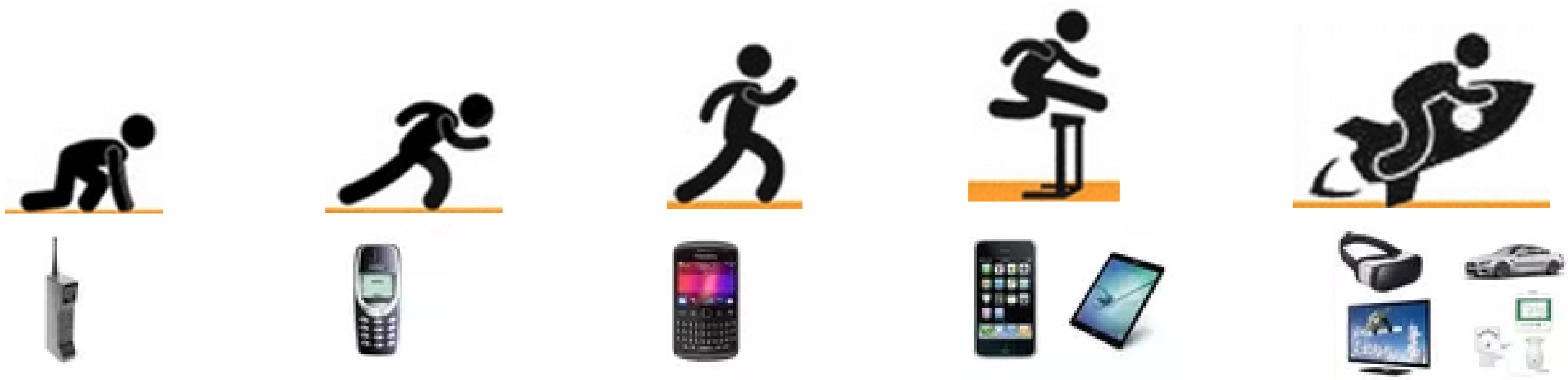


	1G	2G	3G	4G	5G
Global	1980	1991	2001	2009	2019
India	N/A	1995	2008	2014	2020

Spectrum	900 MHz 1800 MHz	900 MHz 2100 MHz	850MHz, 1800 MHz, 2300MHz	<1 GHz, 1-6 GHz, >6 GHz
Speeds	64 kbps	2 Mbps	200 Mbps	>1 Gbps
Latency	500 -1000 ms	50 - 200 ms	25 – 100 ms	<= 1 ms

With M2M and IoT, the number of devices continue to increase

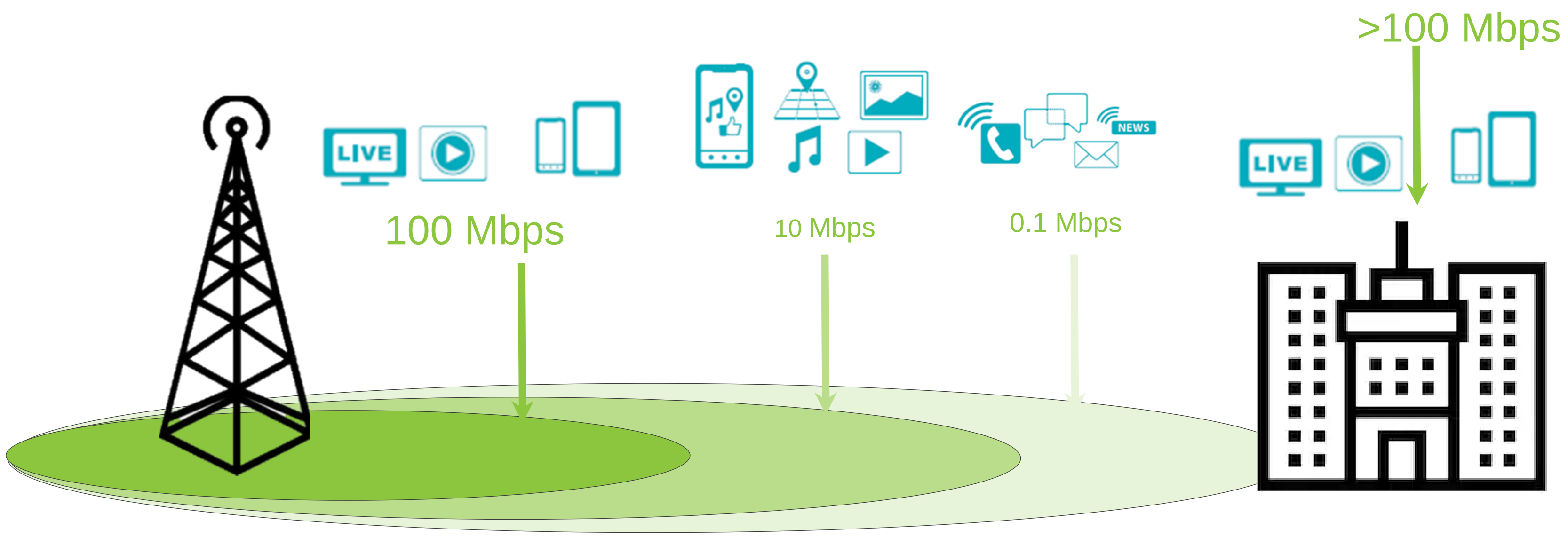
Trends

- Voice to data demand
- Increasing data speeds
- Technology cycle shrinking
- Band to ‘Bandwidth’ for higher speeds
- Bandwidth only in higher bands; i.e. need higher frequencies
- Better user experience necessitates lower latency demands
- Favorable regulatory environment for Infrastructure

Impact

- Uniform high speeds require site densification
- Higher frequency signals travel lesser distances
- Fiber a necessity to backhaul
- Capex requirements going up and hence sharing is imperative
- Service differentiation would be the key

User speed reduces with distance from site



Site densification needed to give uniform speeds for applications

More sites required for coverage on higher frequency

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		2G Spectrum		3G / 4G Spectrum		
		New frequency band				
		900 MHz	1800 MHz	2100 MHz	2300 MHz	2600 MHz
Base frequency band	900 MHz	1.0x	1.6x	1.9x	3.2x	3.7x
	1800 MHz		1.0x	1.2x	2.0x	2.3x
	2100 MHz			1.0x	1.7x	2.0x
	2300 MHz				1.0x	1.1x
	2600 MHz					1.0x

High bandwidth 5G likely to be in 3.5Ghz frequency bands

Source: Analysys Mason

High backhaul capacity needs call for Fiber

Backhaul Capacity per BTS	
2G	2 – 4 Mbps
3G	12 – 30 Mbps
4G	30 – 120 Mbps
5G	> 1 Gbps

Drivers for fiber

- Microwave capacity limitations
- Low latency demands
- Losses due to large distances
- Poor wireline availability
- More data is consumed indoors

% Fiberized Networks

China	US	Global	India
~85%	~80%	~50%	~25 %

Opportunity to create another shareable asset

Source: https://www.prysmiangroup.com/staticres/nexst-2018-3/article-8.html, Broadband India Forum Sep 2018

Increasing investment by operators

Spectrum

Spectrum Outlay	2010	2012	2014	2015	2016	Cumulative
(Rs bn)	1,063	94	672	1,099	658	3,585
(USD bn)	15.9	1.4	10.1	16.4	9.8	53.7

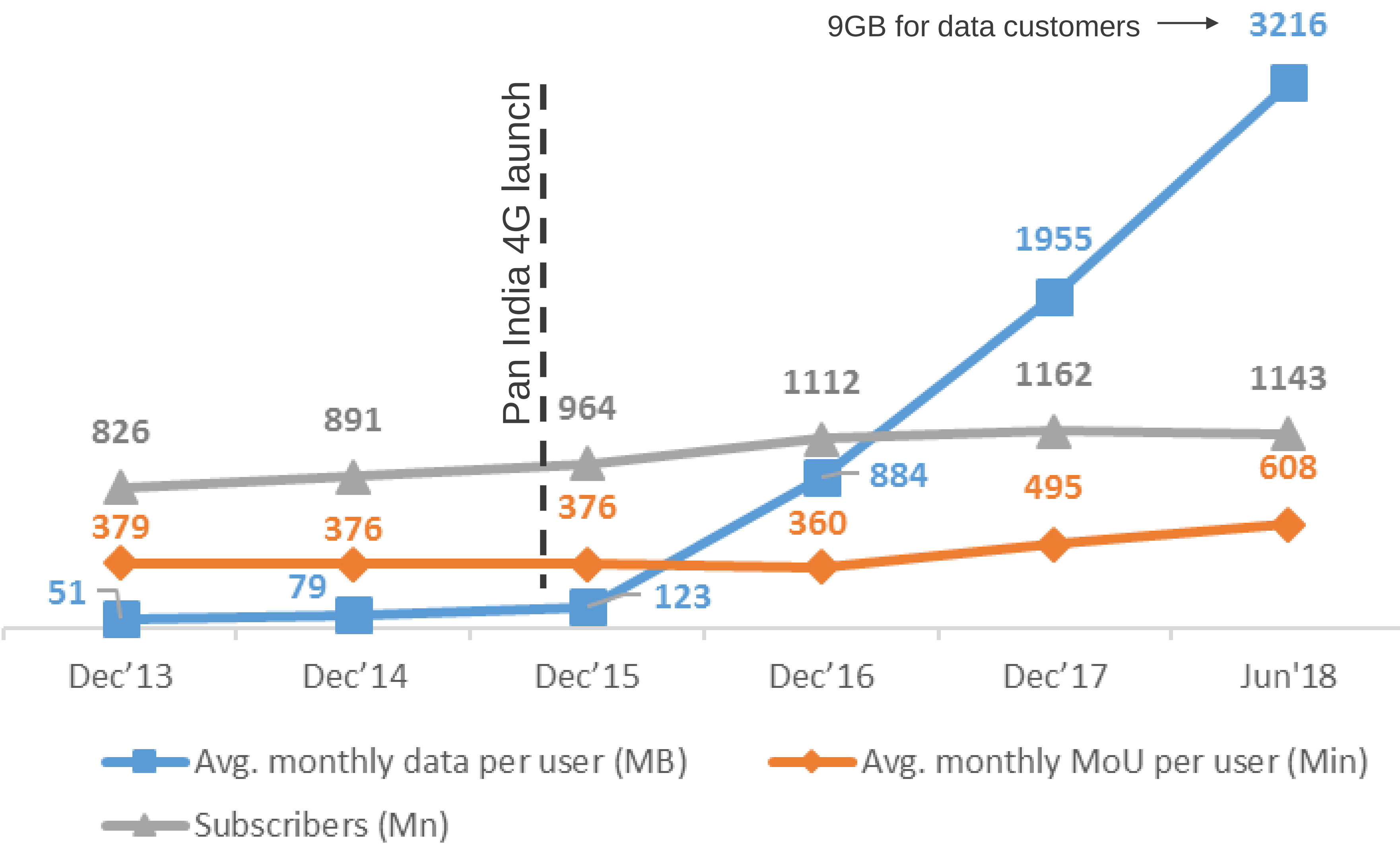
Non-Spectrum *

Capital investment	FY15	FY16	FY17	FY18	FY19 (H1 annualized)
(Rs. Bn)	219	280	296	337	372
(USD Bn)	3.3	4.2	4.5	5.1	5.6

Sharing is imperative

Source: Morgan Stanley, Vodafone-Idea Analyst Meet 2018; Data converted at US$=INR 66.8. * Only for Bharti Airtel + Vodafone-Idea

Growth trends with 4G launch



With increasing penetration of 4G and implementation of 5G, a bigger leap is expected

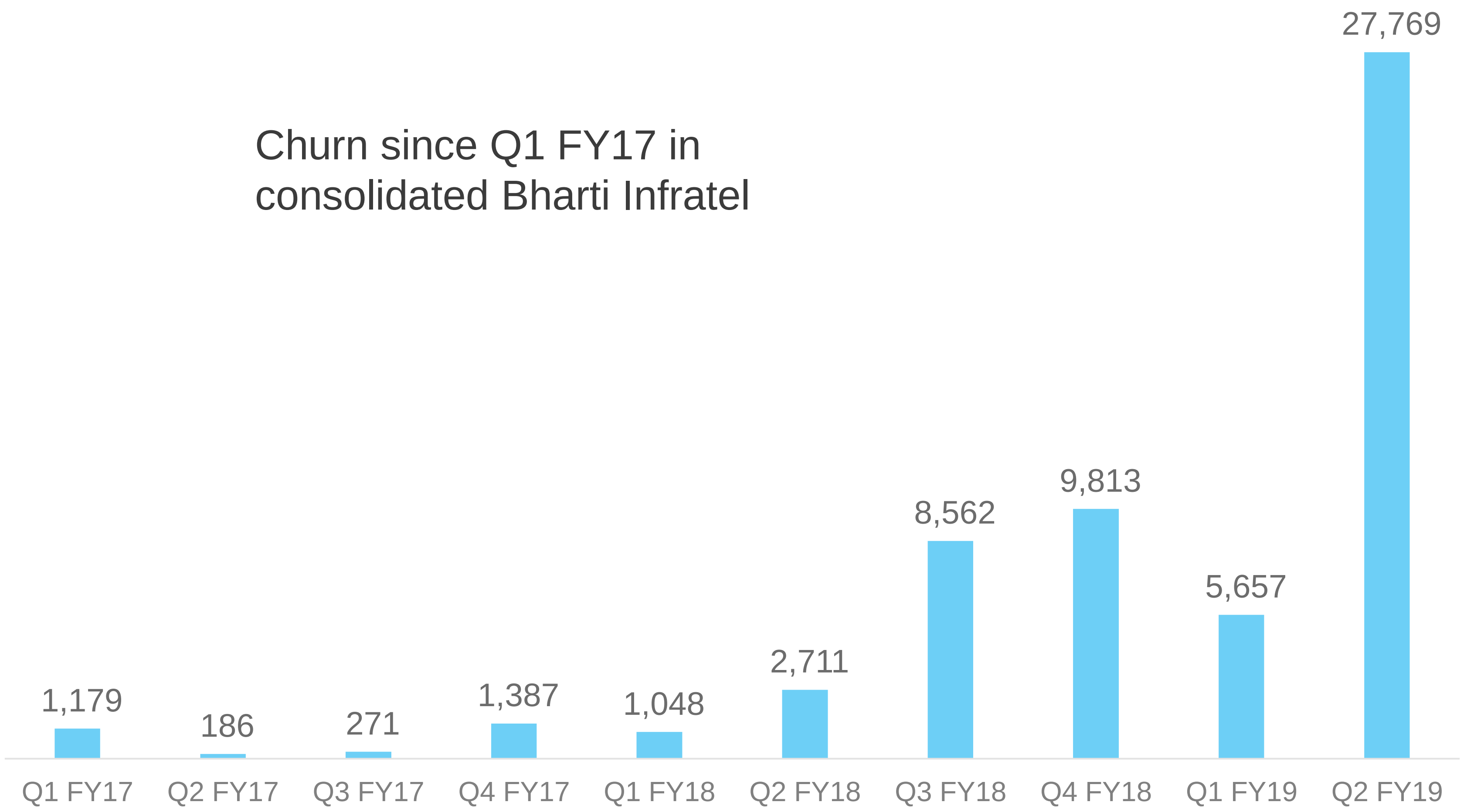
Source: TRAI reports

Consolidation in operator landscape…

Dec 2013 → 11 down to 4 → **Dec 2018**

Larger and stronger operators to take on data led opportunities

Operator consolidation impact on Bharti Infratel



Worst behind us, industry impact significantly higher

Source: Company filings

Leading to consolidation in tower market

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Key Players

Bharti Infratel Limited
indus TOWERS

AMERICAN TOWER CORPORATION
viom NETWORKS
vodafone
!dea

OpCo owned towers

airtel

jio
RELIANCE Infratel
Anil Dhirubhai Ambani Group

BSNL

Other players

GTL INFRASTRUCTURE

ASCEND

TowerVision™ Infrastructure Sharing

Changing landscape as we head towards more independent tower companies

Changing regulatory landscape

National Digital Communications Policy 2018

Vision	India's transition to a digitally empowered economy and society by fulfilling ICT needs of citizens and enterprises by establishment of a ubiquitous, resilient and affordable Digital Communications Infrastructure and Services.
Missions	• **Connect India**: Creating Robust Digital Communications Infrastructure • **Propel India** : Enabling Next Generation Technologies and Services through Investments, Innovation and IPR generation • **Secure India** : Ensuring Sovereignty, Safety and Security of Digital Communications
Strategic Objectives (to be accomplished by 2022)	1. Provisioning of Broadband for All 2. Creating 4 Million additional jobs in the Digital Communications sector 3. Enhancing the contribution of the Digital Communications sector to 8% of India's GDP from ~ 6% in 2017 4. Propelling India to the Top 50 Nations in the ICT Development Index of ITU from 134 in 2017 5. Enhancing India's contribution to Global Value Chains 6. Ensuring Digital Sovereignty

Progressive, forward looking policy with Infrastructure focus

Source: National Digital Communications Policy 2018

Impact on tower companies

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Key takeaways

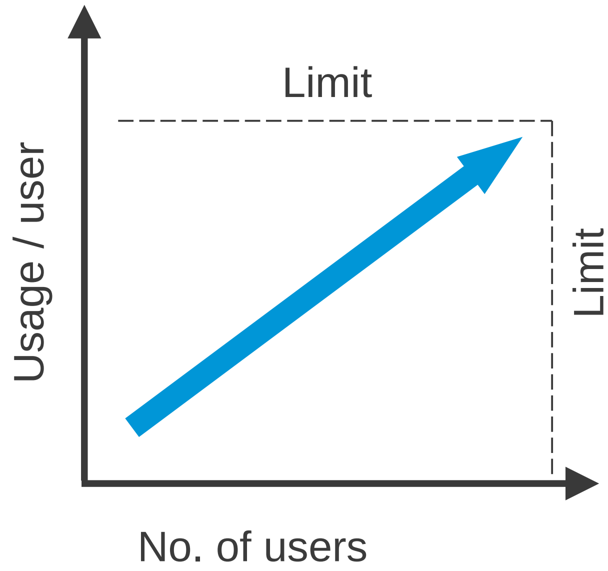
- 60% towers fiberization
- Accelerated rollout of fiber in government premises
- Common service ducts alongside roads / highways
- Ease in rollout of fiber
- Incentivizing clean energy for sites
- Scope enhancement of IP1s to include active infrastructure
- Incentives and exemptions for tower construction
- Cabling (IBS) for buildings compulsory through NBC

Government realizing the importance of Neutral Hosts; paving way for NetCo

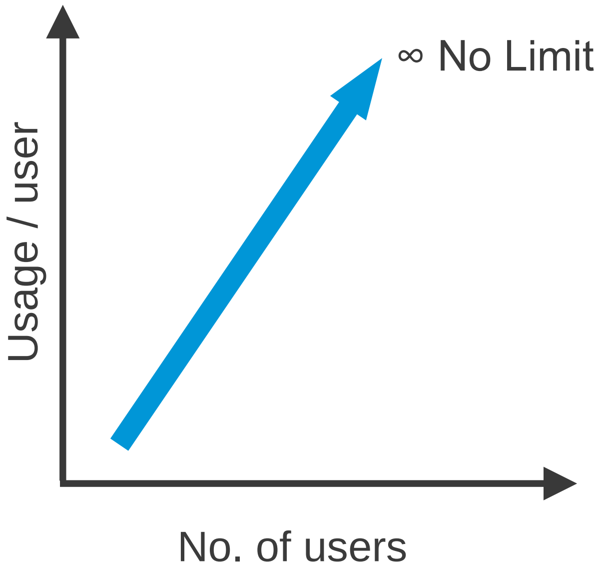
Source: National Digital Communications Policy 2018

Opportunities

Multiplier effect on data consumption



Growth in voice usage

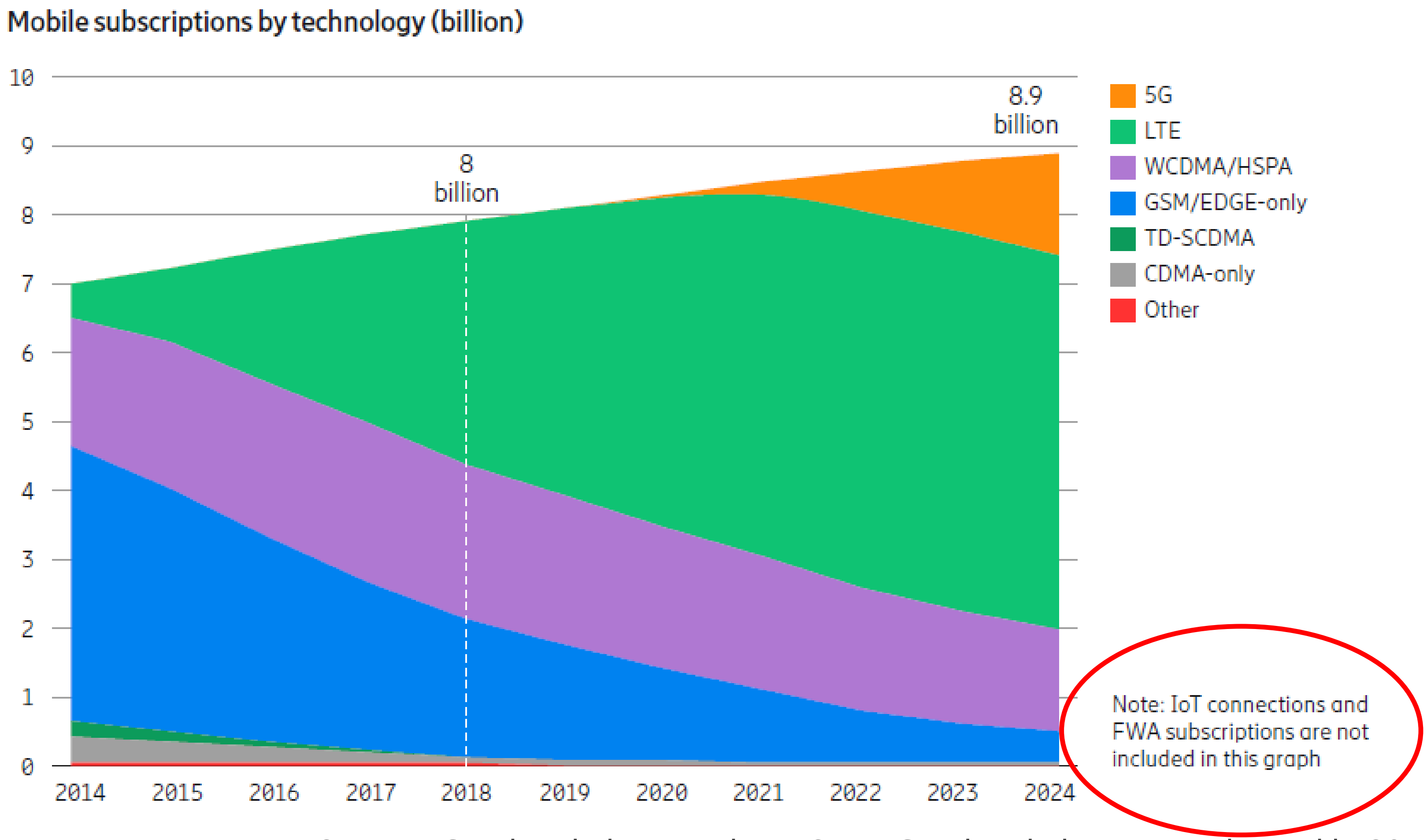


Growth in data usage

Capacity = No. of users ✖ Usage per user

Data, unlike voice, is not limited by number of subscribers or usage

Mobile subscriptions forecast



3.5 Bn 4G subscriptions against <2Bn 4G subscriptions as envisaged in 2014

4G technology adoption exceeded expectations by over 2X

Source: Ericsson Mobility Report November 2018 and 2014

Different kinds of sites

Improve macro

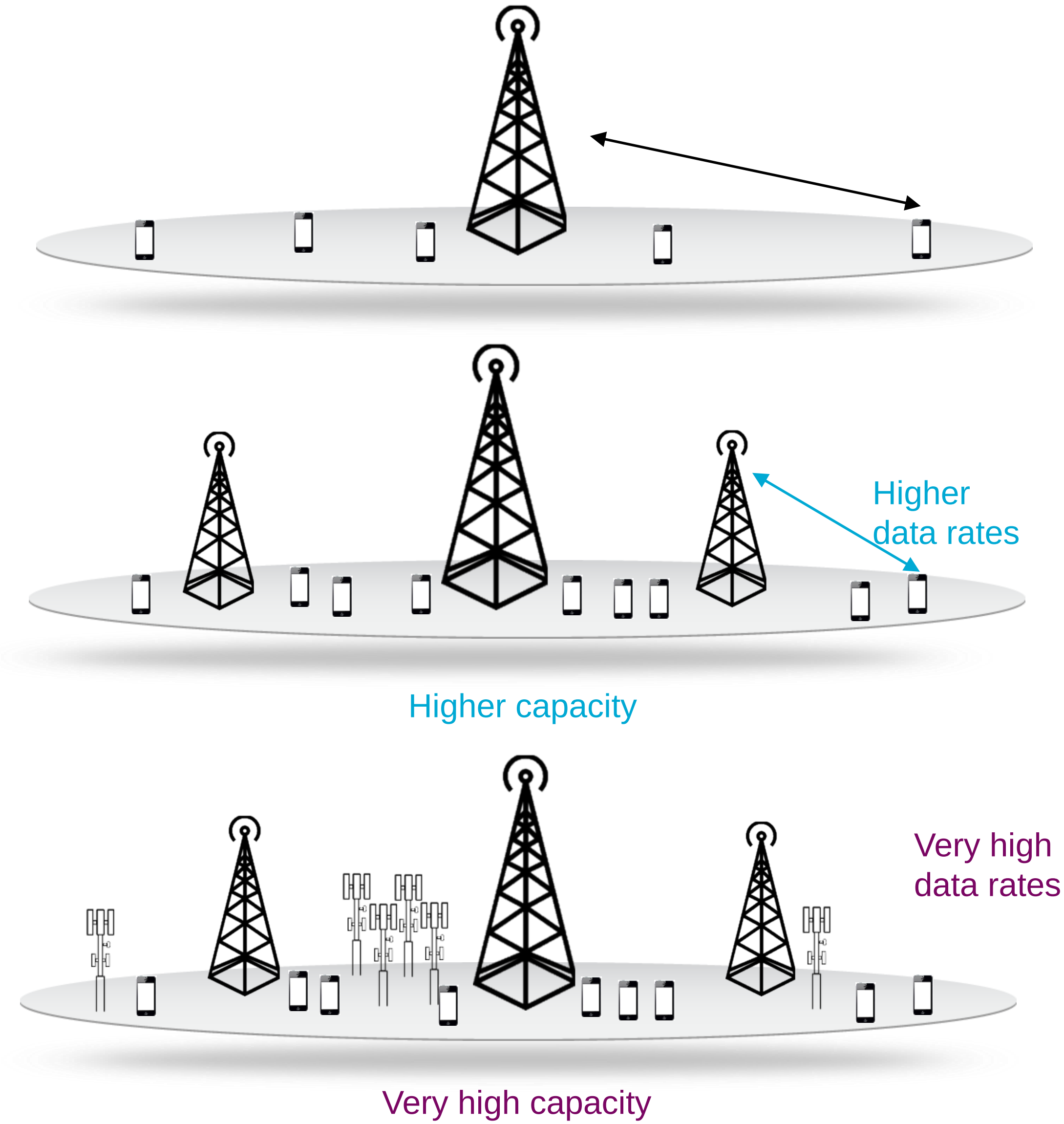
More spectrum, Multi Carrier, MIMO, Advanced Antennas, etc

Densify

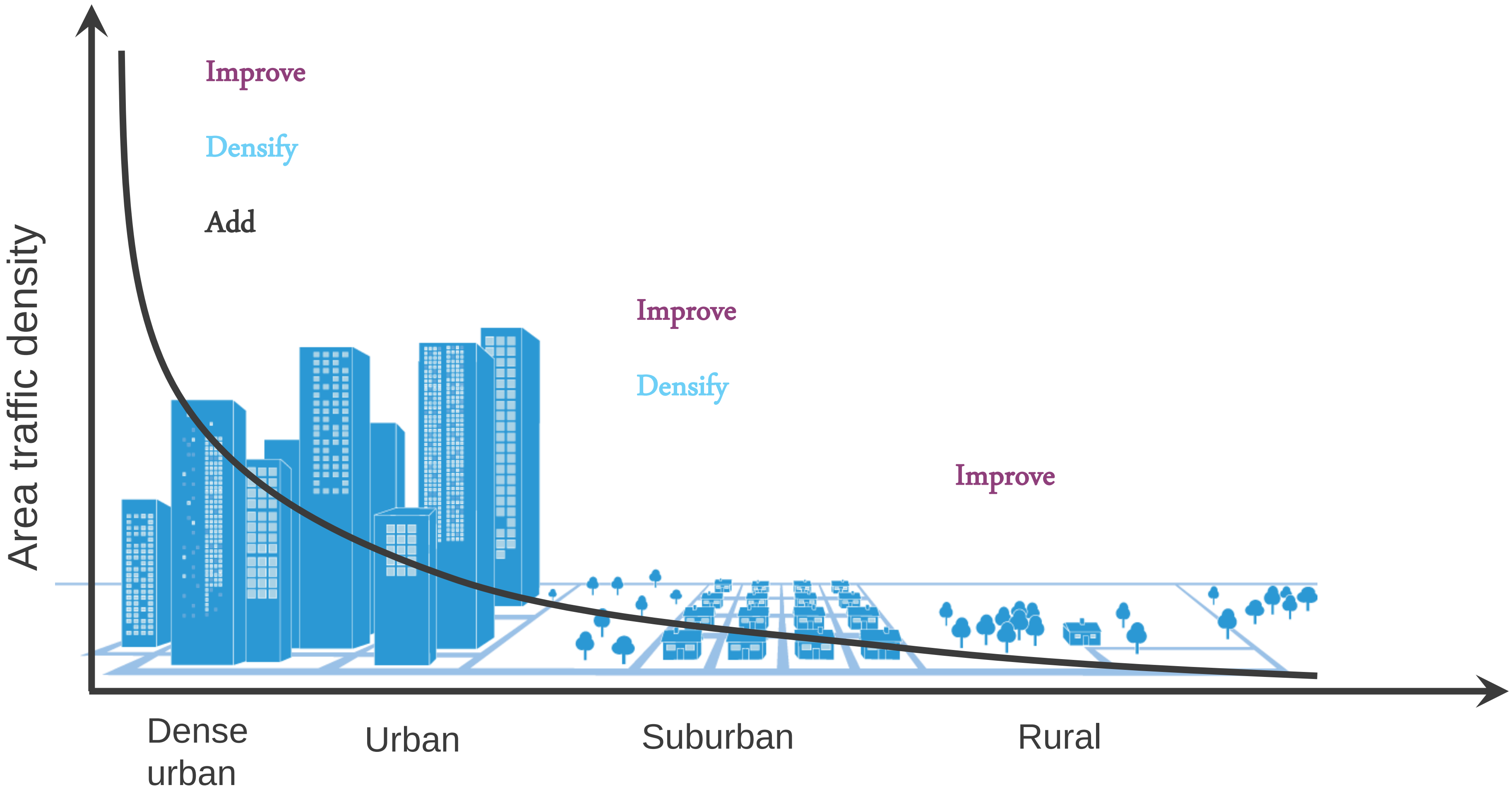
Additional Macro

Add “Small Cell”

Macro + ”Small Cells”



How densification will play out



Working towards a service differentiation

	airtel	vodafone Idea	jio
Existing sites	180k	200k	> 220k
Would have to catch up / rationalize	airtel	vodafone Idea	

Market growth will be led by macro densification and small cells

Source: Company fillings, Street estimates, News reports

New type of opportunities will emerge

Current opportunities

› Macro densification

› In-building solutions (IBS)

› Smartly placed "small cells"

Adjacent opportunities

› Wi-Fi complementing 3GPP access

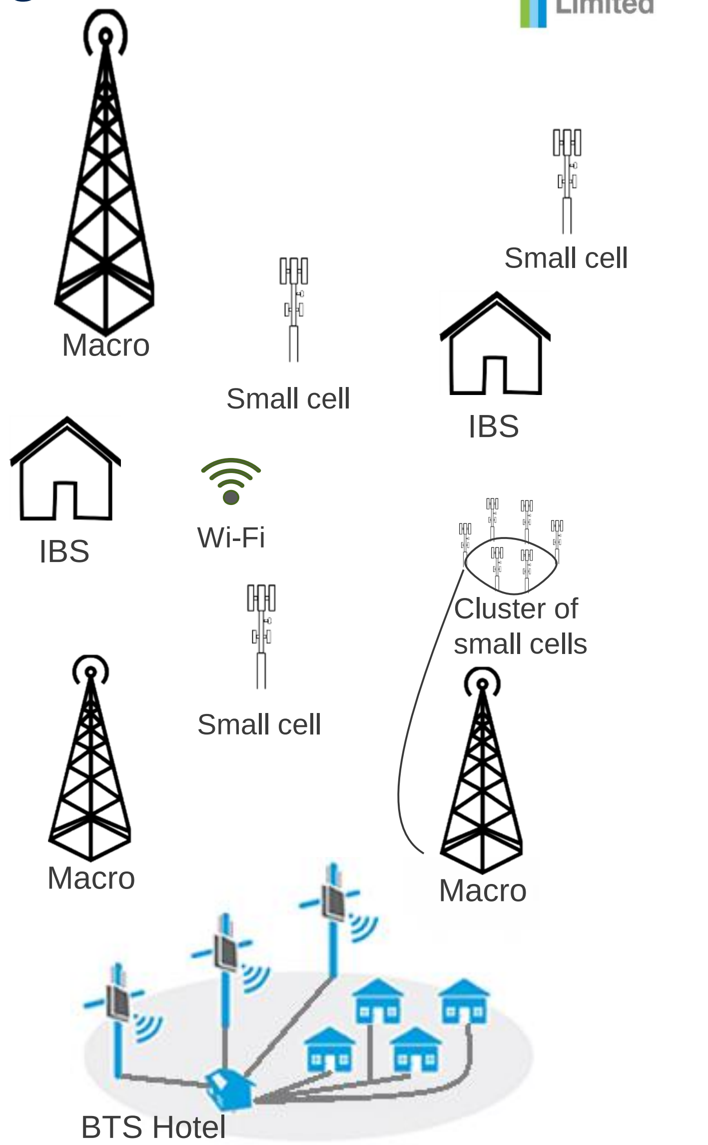
› Fiber backhaul for high capacity BTS Sites

› BTS hotels / Outdoor DAS

› Managed Services

› NetCo

› Data Center



Number of Sites will increase; but new type of sites will start to emerge

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Company Strategy

Promote Passive Infrastructure Sharing

Organic Growth and Acquisition Opportunities

Capitalize on opportunities of Data growth, Digital India, Smart Cities Initiatives of Government

Achieving Cost Efficiencies Across Tower Portfolios

Increasing Revenue and Capital Productivity

Investment Thesis

Largest Indian Towerco with over 1.9x Sharing Factor

Demonstrated Operational and Financial Performance

Insulated from Major Concerns - $-Re, Leverage, Import Dependence

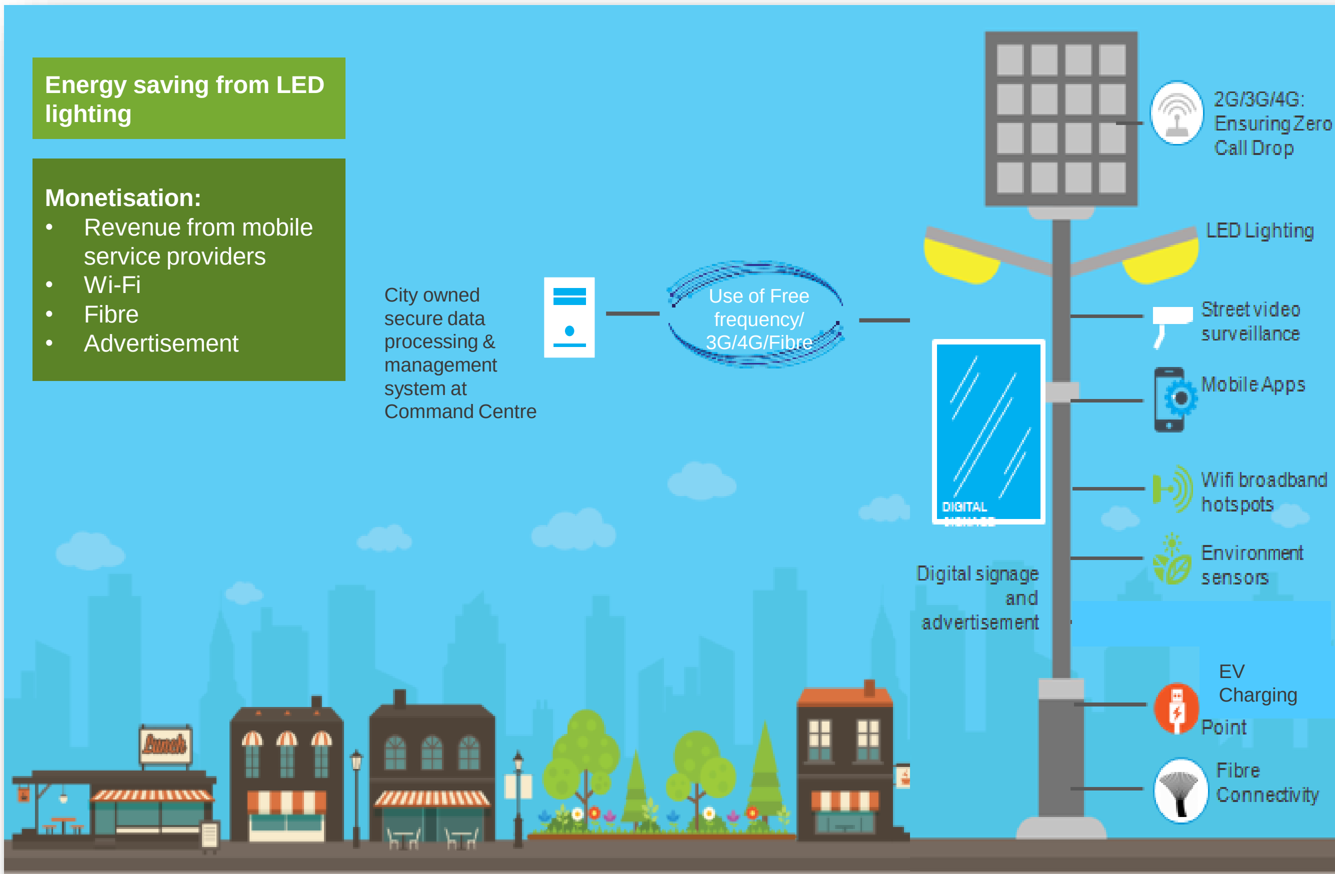
Operator Agnostic Way to Benefit from Data Growth

Experienced Management Team

Regulatory Environment Favorable

High Standards of Corporate Governance

Bhopal Smart City: Architecture



Item	Deployed
Smart Pole	150
LED Lights	21000
WiFi Hotspot	100
CCTV	100
OFC	200 Km
Sensors	50
Mobile App	1
Command and control center	1
Smart Billboard	150

Great showcase to demonstrate the model and capability

Smart City expertise

- Setting up of infrastructure which will include poles, micro sites and fiberized backhaul
- PPP long term contracts
- Shared ICT infrastructure is the key enabler of the smart city

Smart Cities to throttle us ahead to capitalize on new opportunities

Opportunities for Infratel

- Existing areas of business
  - Maximizing organic business
  - Small Cell
  - In Building Solutions

- New areas
  - Fiber sharing
  - Wi-Fi
  - Smart cities
  - BTS Hotel
  - Managed services

- Selectively evaluate inorganic growth

5G will bring opportunities for NetCo and Data Center

Thank you

8th January 2019

Glossary

Term	Definition
3GPP	3rd Generation Partnership Project
Bn	Billion
BTS	Base Transceiver System
CCTV	Closed Circuit Television
DAS	Distributed Antenna System
FY	Fiscal Year
GDP	Gross Domestic Product
IBS	In-Building Solutions
ICT	Information and Communication Technology
IoT	Internet of Things
ITU	
LED	Light Emitting Diode
MHz / GHz	Mega / Giga Hertz
MB / GB	Megabyte / Gigabyte

Glossary

Term	Definition
MIMO	Multiple Input Multiple Output
MoU	Minutes of Usage
Ms	Milliseconds
M2M	Machine to Machine
NDCP	National Digital Communications Policy
NetCo	Network Company
OFC	Optical Fiber Cable
Rs / Re	Rupees
Towerco	Tower Company
USD	United States Dollar
Wi-Fi	Wireless Fidelity