



Paving the way for 5G readiness in India: A guide for effective policymaking on small cell deployment

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Introduction

Countries are increasingly appreciating the varied use cases of small cells and working towards policy frameworks that would ease the deployment of small cells paving the way for 5G implementation. The aim of this paper is to propose policy recommendations to ease the deployment of small cells moving forward, an essential step towards countries becoming 5G ready. In this paper, we discuss initiatives across the globe, identify key bottlenecks including Right of Way permissions, and suggest the way forward for consideration by policy makers.

Small cells are an umbrella term used to refer to low cost, low powered radio access nodes.¹ Small cells typically have a range from ten metres to several hundred metres and are mostly marked by short ranges. They may however vary significantly depending on their use cases.

Small cells are a fairly recent phenomenon. Legacy mobile networks are dominated by macro cells. These are large cells typically mounted on a mast or roof top in cities and towns, with a range of kilometers served by a high powered cellular base station.

Small cells vary in their ranges, power levels, form factors etc. depending on the use cases. They can be in the form of femtocells, picocells, microcells/ metrocells that are used in residential (Home Base Station (BS)), enterprise (Local Area BS), urban and rural environments (Medium Range BS).²

Small cell deployments that are connected to multiple antennae are also termed distributed antenna systems (DAS) or in building systems (IBS) where they provide service within an existing structure. Local Areas BS are typically deployed in indoor environments accessible to the general public such as stations, airports, commercial centres. Medium range BS are typically deployed in outdoor environments. Outdoors, small cells are often embedded in what are called, street furniture, such as lighting fixtures, advertisement panels, bus shelters, pay phones, street signs and distributed cabinets etc.

Small cells are particularly significant due to their usage inside buildings which is challenging yet essential³ as well as in underground transportation. Their usage also extends to populated urban areas as well as isolated villages.⁴

The deployment of small cells has been a critical part of the 4G network upgrades and expansion but will become even more critical in 5G networks because of the introduction of higher spectrum bands that necessitate denser network deployments to support larger traffic volumes per unit area.⁵

5G networks offer the potential to transform industrial sectors and deliver significant social and economic benefits in India. The manufacturing sector is set to benefit the most from 5G applications (accounting for 20% of the total benefit), followed by retail (12%) and ICT (11%).⁶ Over the period 2023–2040, the GSMA forecast that 5G technologies will make an overall contribution of

¹ https://www.gsma.com/publicpolicy/wp-content/uploads/2016/12/GSMA_Small_Cell_Deployment_Booklet.pdf

² Ibid.

³ <https://www.gsma.com/membership/resources/indoor-coverage-is-a-public-safety-priority/>

⁴ https://www.gsma.com/publicpolicy/wp-content/uploads/2016/12/GSMA_Small_Cell_Deployment_Booklet.pdf

⁵ https://www.gsma.com/publicpolicy/wp-content/uploads/2020/03/Realising_5Gs_full_potential_setting_policies_for_success_MARCH20.pdf

⁶ <https://www.gsma.com/spectrum/wp-content/uploads/2020/11/mmWave-5G-in-India.pdf>

approximately \$450 billion to the Indian economy (0.6% of GDP by 2040).⁷ The GSMA forecast 88 million 5G connections by 2025.⁸

Many studies have forecast a huge increase in the global 5G small cell market size over the next 5-6 years. According to a report by the Small Cell Forum, small cells for 5G networks are going to witness a CAGR of 80 per cent between 2019 and 2025.⁹ Enterprise is poised to account for 68% of small cells deployed by 2026.¹⁰

One application area for 5G would be in-building solutions. The capabilities of 5G need to be supported both indoors and outdoors. This presents a strong incentive for businesses and operators to invest in in-building wireless networks to the same extent as outdoor networks.¹¹ Additionally, the law of diminishing returns makes network expansion uneconomic without streamlining the process.

⁷ Ibid.

⁸ <https://www.livemint.com/industry/telecom/india-may-have-88-million-5g-connections-by-2025-says-gsma-1559746078156.html>

⁹ <https://tele.net.in/small-cell-surge/>

¹⁰ <https://www.fiercewireless.com/wireless/scf-68-deployed-small-cells-will-be-enterprise-by-2026>

¹¹ https://www.analysismason.com/contentassets/77beb4f62c72464696d8ca0cf6adbea5/analysys_mason_indoor_5g_quality_jun2020_rdns0_rma18.pdf

Small Cell Deployment in India

The National Digital Communications Policy, 2018¹² has set out to create a robust digital communications infrastructure by 2022. It recognizes digital communications infrastructure and services as the key enablers and critical determinants of India's growth and well-being. For meeting its objectives, facilitating infrastructure creation is imperative. Telecommunications is a central subject and telecom services fall under "critical services" due to COVID-19's impact.

One of the key challenges for rolling out of telecom infrastructure has been identified as the 'Right of Way' (RoW) permissions.

Right of Way is defined as "the legal right, established by usage or grant, to pass along a specific route through grounds or property belonging to another."¹³ Historically, getting timely and affordable RoW permission has been the primary concern in expansion of the telecom infrastructure across the country. The procedure for grant of RoW for laying optical

fibre cable was complicated, time consuming and expensive.

Both connectivity through towers and through tower-less solutions require that these procedures are simplified. Hence certain amendments were suggested to Section 10 of the Telegraph Act to make the approval time not more than 90 days and other changes.¹⁴

In 2016, Telecom Regulatory Authority of India (TRAI) enacted the Right of Way Rules (hereinafter, the Rules). The time period for approval was set at 60 days. The rules also brought administrative expenses across the country to a maximum of Rs 1000 per km for fibre, and a maximum of Rs 10000 per application for overhead towers.¹⁵

However, the resulting ease of rollout and cost benefits was not as much as expected. India is also reportedly falling behind the National Broadband Mission targets due to RoW clearances not being received in time.

National Broadband Mission: Implementation Targets



Proposed Implementation Targets PAN India						
	Current Status	1-year (2020)	2-year (2021)	3-year (2022)	4-year (2023)	5-year (2024)
Broadband Connectivity to villages (%)		50%	60%	100%		
Availability of broadband speeds (Mbps)*	17.96	4	10	25	30	50
Fiberization (in Lakh Kms) Cumulative**	22	24	27	30	40	50
Towers Cumulative (in Lakhs)\$	6.69	7	8	10	12	15
Fiberization of Telecom Towers (%) Cumulative^^	34	35	45	55	65	70

* India Today, Open Signal COAI Analysis
Source: Tarang Sanchar Data

** Source: COAI estimates, DoT Mar 2021
NBM PPT - Dec 2020, estimates

¹² <https://dot.gov.in/sites/default/files/EnglishPolicy-NDCP.pdf>

¹³ https://www.trai.gov.in/sites/default/files/Recommendations_082021_0.pdf

¹⁴ <https://www.trai.gov.in/sites/default/files/5-main.pdf>

¹⁵ <https://telecom.economicstimes.indiatimes.com/news/right-of-way-rules-the-effects-of-implementation-delay-on-india-telecom-industry/59855964>

This is largely due to the fact that there remain multiple challenges at the ground level. While some states have aligned their RoW policies either partially or fully with the rules, other states are yet to align their RoW policies and procedures with the rules. Estimates suggest that a total of 31 states/union territories in India have implemented the Rules so far. Furthermore, many states still do not have enabling provisions for the use of street furniture. Online Portals are also not available in all of the states. RoW permissions are delayed due to varying and complex procedures, non-uniformity in fees, high charges, lack of coordination among the authorities and other factors. Obtaining approvals from the different departments has greatly impacted planning and rolling out of towers and fibre across the country over the last few years. Permissions from several authorities including electricity, gas, sewerage, Railways, NHAI, forest authority contribute to delays and cost inefficiencies.

TRAI has released its 'recommendations on broadband connectivity'¹⁶ on Aug 31, 2021, where broadband infrastructure creation was identified as an important area that was discussed at length. Some key recommendations proposed by TRAI were: the creation of a National Portal for RoW permissions; exemption of RoW charges for next five years; and setting up a Centrally Sponsored Scheme to incentivize states/UTs for RoW reforms. Furthermore, TRAI suggested the need for a proper regulatory framework to support the deployment of small cells which will pave the way for 5G deployment. It emphasized that this policy/framework should ensure standardized guidelines for small cell size, power, space, etc. to make street furniture ready to deploy small cells. It also suggested adoption of criteria for exemption in deployment of new antennas.

On October 21, 2021, the Indian government further introduced amendment rules¹⁷ to incorporate the provisions related to nominal one-time compensation and uniform procedure for establishment of Overground Telegraph Line in the Indian Telegraph Right of Way Rules, 2016. Earlier the Rules had covered only underground optical fibre cable (OFC) and mobile towers. The amount of one-time compensation for establishment of over ground telegraph line would now be a maximum one thousand rupees per kilometre. Documentation for RoW application for over ground telegraph line has been made simple. Also, moving forward, there would be no fee other than Administrative fee and Restoration charges for establishing, maintaining, and working, repairing, transferring or shifting the underground and over ground telegraph infrastructure.¹⁸

While these are some very welcome steps on the path to socio-economic development for India, the glaring absence of small cell deployment in the RoW regulatory framework continues nonetheless.

¹⁶https://www.trai.gov.in/sites/default/files/Recommendations_31082021_0.pdf

¹⁷ <https://www.thehindubusinessline.com/info-tech/government-amends-indian-telegraph-right-of-way-rules-2021/article37127149.ece>

¹⁸<https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1765755>

5G Readiness and Small Cells: Global Initiatives

Below we discuss some initiatives that have been undertaken by governments across the globe to facilitate 5G deployment through small cell installations.

Hong Kong

As facilitating measures for 5G deployment, Office of the Communications Authority, Hong Kong, issued guidelines on the use of street furniture such as sheltered bus stops, public payphone kiosks and smart lampposts for installation of 5G Radio Base Stations in 2019-2020.¹⁹ Earlier this year, telecom company, 3 Hong Kong, adopted the ComFlex Pro DPU solution of Comba Telecom to support its 5G indoor network coverage and provide high-speed indoor 5G connectivity for major landmark buildings such as the Hong Kong Convention and Exhibition Centre, Exchange Square, Prince's Building and Alexandra House.²⁰

Japan

In Japan, operators are permitted to install 5G base stations on 208,000 traffic lights across the country.²¹ Moreover, the Japanese government has proposed that the costs of using the traffic lights for 5G deployments be shared between operators and local administrations.

Singapore

The Singapore regulator Infocomm Media Development Authority (IMDA) provides a Code of Practice for Info-communication Facilities in Buildings (COPIF) specifying the duties of building owners and developers to provide adequate space, facilities, and access for telecom licensees to provide their services. These are typically the rooftop spaces reserved for telecom equipment to be provided to network operators by building developers and owners at no additional cost. The COPIF covers both macro as well as small cell installations. Since its inception on 1 April 2000, the COPIF has been reviewed and revised when appropriate, to ensure its continued relevance in light of the evolving requirements for info-communication facilities.²²

Egypt

In Egypt, no building permits are required for small cell deployments. The only regulatory approval required after installation is the measurement of RF exposure. This occurs only once for the lifetime of the site whereas for a macro cell inspections are conducted at least every two years.²³

¹⁹ "Guidelines on the Use of Sheltered Bus Stops for the Installation of Radio Base Stations for Provision of Public Mobile Services". Available here: <https://www.coms-auth.hk/filemanager/statement/en/upload/552/gn112020.pdf>

²⁰ <https://www.comba-telecom.com/en/press-releases/industry-releases/item/2515-comba-telecom-deployed-5g-indoor-network-coverage-solution-for-3-hong-kong>

²¹ Realising 5G's full potential: Setting policies for success, GSMA, March 2020. Available here: https://www.gsma.com/publicpolicy/wp-content/uploads/2020/03/Realising_5Gs_full_potential_setting_policies_for_success_MARCH20.pdf

²² <https://www.imda.gov.sg/regulations-and-licensing-listing/code-of-practice-for-info-communication-facilities-in-buildings>

²³ https://www.gsma.com/publicpolicy/wp-content/uploads/2017/05/tw_gsma_15_small_cell_deployment_booklet_Final.pdf#:~:text=No%20building%20permits%20are%20required%20for%20small%20cell,inspections%20are%20conducted%20at%20least%20every%20two%20years.

United Kingdom

Recently, in September 2021, the UK government has launched a £4 million competition, the Digital Connectivity Infrastructure Accelerator project, to explore ways to make it simpler and quicker for mobile companies to use publicly owned buildings and curb side infrastructure, such as CCTV poles and traffic signals, to host 5G radio equipment.²⁴ Furthermore, the government has also acknowledged that network operators often find it difficult to get the required information to verify a structure is suitable, like its location or physical dimensions, proximity to the street, or access to a power source. To deal with this, the government said it will invest in piloting the latest innovations in digital asset management platforms, to help local councils share data more easily with network operators.²⁵

Australia

In Australia, the Australian Communications and Media Authority (ACMA) and the Department of Communications have put policies to facilitate small cell deployments including reductions in planning requirements for small cell deployments in the public space, and the removal of barriers between license types to facilitate the re-allocation of incumbent spectrum holders.²⁶ Small cells are installed using the Commonwealth Telecommunications (Low-impact Facilities) Determination 2018 and therefore local council/government approval is generally not required. Mobile phone carriers are required to consult with Councils, and consider their feedback when they plan to install small cells.²⁷

United States of America

Initiatives have been taken by the Federal Communications Commission (FCC) in USA in the past when it issued an order in 2018 which provided for reasonable fee to be levied in a non-discriminatory manner by local bodies, and introduction of shot clocks for timely approvals. This order was subsequently appealed, however, the Appeals Court has upheld majority of the order and specifically the provisions on shot clocks and reasonable permit fee. Similarly, the Federal Communications Commission updated environmental and historic preservation rules, put in place guardrails to address outlier fees and delays imposed at the state and local level, and streamlined the process for swapping out utility poles to add wireless equipment.²⁸

European Union

In 2020, the EU adopted regulations to accelerate 5G network installations by simplifying the deployment of small cell access points.²⁹ The Regulation provides for the following: (i) Specifies the physical and technical characteristics of small cells for 5G networks; (ii) Aims to help simplify and accelerate 5G network installations, which should be facilitated through a permit-exempt deployment regime, while ensuring that national authorities keep oversight; (iii) Lays out the specifications for a coherent and integrated installation, while providing national authorities with the means to oversee deployment of small cells; (iv) Provides that small antennas should be exempted from any individual town planning permit or other individual prior permits. Permits may still be required for deployment

²⁴ <https://www.5gradar.com/news/pound4m-uk-government-project-will-explore-using-street-furniture-to-host-5g-radio-kit>

²⁵ <https://www.itpro.com/mobile/5g/360828/street-lamps-bus-shelters-to-boost-5g-rollout-in-ps4-million-trial>

²⁶ 5G to deliver results in Asia-Pacific needs all stakeholders to collaborate, Analysys Mason, February 15 2019. Available here: <https://www.analysismason.com/research/content/white-papers/5g-collaboration-asia-pacific-rma18/>

²⁷ https://amta.org.au/wp-content/uploads/2019/08/AMTA-Fact-Sheets_Small-Cells.pdf

²⁸ Tele Geography. 2021. "FCC Commissioner Identifies Future 5G Bands, Boasts of Tower Turnaround", March 17, 2021

²⁹ The Commission adopts Implementing Regulation to pave the way for high capacity 5G network infrastructure, EC Regulation.

Available here: <https://digital-strategy.ec.europa.eu/en/news/commission-adopts-implementing-regulation-pave-way-high-capacity-5g-network-infrastructure>

on buildings or sites protected in accordance with national law or where necessary for public safety reasons; (v) allows for broader national measures in support of straightforward small cell deployment.

Survey Findings

The GSMA conducted a short survey with stakeholder companies³⁰ in India to examine the challenges they face on the ground. Below is a summary of some of the key challenges shared by them:

- **Absence of a regulatory framework on small cells**
The present rules on right of way are silent on small cell deployment and access to street furniture.
- **Lack of availability of backhaul**
There is a shortage of adequate backhaul and at reasonable costs which throws up significant challenges in deployment.
- **Lack of electrical power supply**
Permits from electricity boards are a challenge. Additionally street furniture need power back-ups.
- **Permits from residential bodies**
Small cells need to be deployed in residential areas, many of which are governed by residential welfare associations. These are self-regulatory bodies and it has been challenging to receive permits from them as they are not governed by existing rules.
- **Non-uniform implementation of RoW rules by states and municipal bodies**
The RoW rules have yet to be implemented by all states, union territories and municipal bodies. Many of them continue to impose their own costs and approval frameworks which are on the higher side.
- **High permit fees**
As mentioned earlier, the lack of implementation of the rules at the local levels leads to high and non -discriminatory fees.
- **Lack of sustainable infrastructure especially in select areas**
In densely populated urban areas especially marketplaces, congested areas such as in metro cities like New Delhi, it is challenging to get access to adequate street furniture for deployment.

Suggestions

- Amend RoW rules to incorporate provisions on small cell deployment
- Ensure uniform implementation of RoW rules across states, union territories and municipal bodies
- Reduce approval timelines for small cells to 15-30 days with automatic deemed approval after 30 days (through online portals)
- Effective use of spare capacity on existing backhaul networks -consider existing residential and business fiber networks for potential use in small cell backhaul

³⁰ Stakeholders that responded to this survey include companies : Airtel Bharti, Vodafone Idea, American Tower as well as the Cellular Operators Association of India (COAI).

- Encourage sharing of passive infrastructure to reduce costs
- Grid availability for electrical power supply, availability of smart poles at no/nominal costs for small cells, subsidized rates by electricity boards for small cells
- Reduction of permit fees in comparison to macro cells
- Streamline application processes, approval on batch/group basis, and deploy digital tools for processing

Benefits of streamlining the process for small cell deployment in India

The presence and quality of infrastructure is generally a key driver for most foreign investors. While physical infrastructure is likely to continue to play a pivotal role in attracting FDI into a country, the importance of digital infrastructure has been growing in recent years. Internet connectivity, good broadband and Wi-Fi availability and, more recently, the roll-out of fibre optics are important markers in this regard. Studies suggest that there exists a strong correlation between the average download speed of certain countries and the level of FDI projects that they manage to attract.³¹ As mentioned previously, small cells deployment and right of way contribute significantly to enhancing the broadband connectivity of the country. This is likely to attract much more FDI in a country that already struggles with such incentives due to low ARPUs (average revenue per user) and high regulatory costs. Furthermore, it will allow India to harness the potential for 5G driving a post-pandemic recovery and contributing to India's efforts in becoming a \$5 trillion dollar economy.

³¹ <https://www.investmentmonitor.ai/business-activities/infrastructure/fdi-drivers-infrastructure-and-the-rise-of-digital>

The Way Forward

To conclude, the following suggestions may be considered in light of the above discussions, to facilitate deployment of small cells in India:

- Adopting simplified and streamlined procedures for building/street furniture permits for small cells based on standardized size, installation requirements and radio characteristics.
- Designing guidelines to facilitate the acquisition of new sites and greater transparency on available assets such as towers, buildings and other structures.
- Granting easy access to existing street furniture such as traffic lights, bus stops, street lamps etc.
- State electricity boards /distribution companies to ease permits for usage of their poles for deployment.
- Exempting small cell installations from location registration requirements unless necessary for other reasons.
- Implementing uniformity in grant of access to public spaces/ structures for installing small cells across state and the local bodies.
- Updating the Right of Way Rules, 2016 to include deployment of small cells.
- Ensuring uniform implementation of the Right of Way Rules, 2016 by all the states and union territories.
- Reducing permit costs for small cells relative to those for macro cells.
- Facilitating access to electrical power, having a nearby power source for the wireless equipment to function.
- Facilitating deployment of backhaul and at lower costs.
- Ensuring access to spectrum and provision of adequate spectrum bands for backhaul with wider channel sizes in millimeter wave (e.g. E-Band) to augment capacities and improve site planning.
- Promoting stronger collaborations between industry and governments .e.g. creating a nationwide small cell information exchange (SCIX), a digital platform that would hold real-time information about availability, backhaul connectivity, monthly rent, and permit status for infrastructure capable of hosting small cells.³²
- Adopting a Whole of Government Approach³³ for RoW and small cell permits (if applicable) given the various government departments involved in the permit process.

³² <https://gsma.force.com/mwcoem/servlet/servlet.FileDownload?file=00P1r000025E2yhEAC>

³³ For more on Whole of Government Approach please see the latest GSMA report: https://www.gsma.com/asia-pacific/wp-content/uploads/2021/10/181021-Digital-Societies-in-Asia-Pacific-2021_final.pdf



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