



Sale of development rights to fund public transportation projects: Insights from Rajkot, India, BRTS project



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ABSTRACT

Local governments throughout the world are facing fiscal constraints. At the same time, they face strong opposition to tax increases from their residents, who demand an increasingly higher quality of public infrastructure and services. The situation is further exacerbated in rapidly urbanizing developing countries that need to provide urban infrastructure at a fast pace. Such a situation has led many countries to actively seek new sources of local non-tax-based revenue such as the sale of development rights.

This paper analyzes the sale of development rights to fund Bus Rapid Transit (BRT) project in Rajkot, India; highlights the key success factors; suggests reforms that would increase the tools' effectiveness; and identifies the lessons learned from Rajkot's experience. Specific lessons include the following: the sale of development rights must be calibrated to the existing or planned capacity of infrastructure and services; the majority of revenues from such a sale are likely to accrue *after* the infrastructure project has been developed, while funds are needed *beforehand* to develop the project, therefore, this revenue-expenditure mismatch needs to be addressed; and the development rights' sale price must be indexed to inflation.

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1. Introduction

A rapidly increasing urban population, worsening traffic congestion and environmental pollution, and the high cost of gasoline have lent urgency to the development of public transportation systems in Indian cities. The Jawaharlal Nehru National Urban Renewal Mission (JNNURM)¹ and National Urban Transport Policy (NUTP)² have provided further impetus. As a result, several mega-cities such as Delhi, Kolkata, Mumbai, and Chennai are focusing on building capital-intensive, heavy-rail-based Metro systems. Others, including 'second-tier' large cities (those with a population of one million or more), are actively exploring utilization of a Bus Rapid Transit System (BRTS), either as a complement or an alternate to the more expensive Metro system.

Indeed, buoyed by the success of the 88-km-long Ahmedabad BRTS (CEUT, 2015), cities such as Rajkot and Surat are actively developing their own BRTSs. The development of these public transport systems faces significant funding challenges, however. Indian cities, similar to cities in other developing countries, are severely fiscally constrained. Many cities levy low or no property taxes. Sales tax revenues generated within a city boundary often accrue to the state and federal governments, not to the tax generating city. Moreover, cities' limited institutional and technical capacities and the lack of a robust legal framework make private investment in the infrastructure sector through a public-private-partnership (PPP) model high-risk for the investors and difficult to conceptualize and implement for the cities. Furthermore, cities spend up to 80% of their budgets on salaries (GOI, 2007: p. 223) leaving few funds for infrastructure maintenance, let alone the construction of new facilities. Finally, under-developed credit markets make it difficult to raise long-term debt at reasonable interest rates (Mathur, 2013). Therefore, cities have to rely on state and federal government funds for their capital and operating needs. The need for such funds far outstrips their availability, however. Facing such challenging financial situation, the next generation Indian BRTS projects are exploring non-traditional financing models, including the sale of development rights. While Indian

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¹ Launched in 2005 with an outlay of more than six hundred billion rupees (US\$10 billion), the JNNURM represents one of the largest nationally planned urban initiatives anywhere globally. Cities received JNNURM funds for development of urban infrastructure and services, among other uses.

² The NUTP emphasized the development of public and non-motorized transportation as the solution for cities' increasing traffic congestion and pollution problems.

cities have generated revenue through the sale or transfer of development rights before,³ their use for funding public transportation projects is new. Rajkot is the first city to sell development rights along a public transport corridor.

This paper identifies the steps the city of Rajkot has taken to implement sale of development rights along the BRTS corridor through the review of primary documents and secondary literature; in-person site visit; and in-depth interview with a local urban and transportation planning expert who was also involved in the planning of the Rajkot BRTS. The paper concludes by outlining broad lessons jurisdictions in and outside India can learn from Rajkot's experience.

2. Sale of development rights

Land value is determined by a host of factors, such as the characteristics of the land parcel (e.g., parcel geometry, slope and propensity to flood), its locational attributes (e.g., transportation accessibility), and the use allowed on the parcel.

Zoning ordinances prescribe the type of use, such as commercial, industrial, residential and recreational, and the maximum intensity of development allowed on a land parcel. The intensity of development is controlled through parameters such as the maximum permissible floor area to land parcel area ratio (also called the Floor Area Ratio, FAR, or Floor Space Index, FSI), building height restrictions, and minimum setbacks and parking requirements. On the one hand, because zoning ordinances grant land development rights, restrictive zoning reduces land development options and can negatively impact property values. On the other hand, zoning protects property values by not allowing incompatible uses in close proximity to each other; e.g., not allowing a polluting heavy industry in a residential neighborhood.

Traditionally, development rights have been considered to be permanently tied to the land. However, beginning the first half of the 20th century land ownership was increasingly considered to be ownership of a bundle of development rights. This view was especially popular in the US (Renard, 2007). Treatment of development rights as a bundle opened up the possibility of un-bundling them and selling them independently of the land to which they were originally tied. Tools such as the sale of development rights or the transfer of development rights (TDR) help un-bundle land development rights. Simply put, these programs allow a land owner to sell her land's development rights to the owner of some other parcel of land. The parcel from which development rights are sold or transferred is usually in the "sending area," while the parcel receiving the development rights is in the "receiving area."

The programs employing the sale or transfer of development rights usually limit the intensity of development or prohibit development in the sending area and allow development intensity in the receiving area to be higher than that prescribed by the underlying zoning (Johnston & Madison, 1997). The sending areas often include historic preservation districts, farmlands, environmentally sensitive lands and areas with poor infrastructure and facilities, while the receiving areas usually include areas targeted for high intensity development, e.g. neighborhoods around transit stations, and city centers and downtowns.

Alternatively, the program can be structured such that the sending and receiving areas are one and the same. In such cases, while the overall amount of development remains the same, its location within the area is determined by the sale and purchase of development rights. Finally, in another variant, called the sale of

development rights, there is no sending or receiving area. The government agency simply sells development rights (for example, additional floor area) for a fee—the tool used along the Rajkot BRTS corridor.

2.1. International use of sale of development rights or of TDR

From its first use in the beginning of the 20th century, when the New York City zoning ordinance of 1916 allowed the sale of air rights to adjacent lots (Giordano, 1988), the use of TDR and the sale of development rights have increased both nationally and globally.

In the US, state-level enabling legislation in 20 states allows cities and counties to use TDR (Landis, McGrath, & Smith, 2008). Apart from New York City, where TDR is extensively used to increase density in target areas, other regions, such as King County, WA and Montgomery County, MD have primarily used TDR programs to prevent urbanization of rural lands. Such lands are often environmentally sensitive and resource-rich. Moreover, some jurisdictions, such as Palm Beach County, FL, Seattle, WA, and New York City, NY, use the sale of development rights to promote affordable housing (HUD, 2009; Landis et al., 2008). Palm Beach allows developers to purchase development rights for the construction of affordable housing, while King County and New York City have designated affordable housing developments as eligible sending areas. Such a designation allows land owners to sell unutilized development rights if they construct affordable housing on their land.

The transfer or sale of development rights is growing globally. Sydney, Australia, uses the tool to preserve historic sites (Thompson & Maginn, 2012), while the commune of Lourmarin, France, uses it to protect agricultural areas (Renard, 2007), and Curitiba, Columbia, uses it to preserve both rural areas and heritage sites (Suzuki, Dastur, Moffatt, & Yabuki, 2009). Mumbai, India, allows sale of development rights to incentivize construction of affordable housing by private developers. The developers earn development rights in exchange for constructing affordable housing units and are free to sell these rights in the open market (Business Standard, 2012).

2.2. Normative basis for the use of sale of development rights to fund public transportation projects

Two rationales provide the basis for using revenues from the sale of development rights to fund public transportation projects. First, is the "beneficiary to pay" principle. Development of or enhancements to transit systems could accrue accessibility-related benefits to the neighboring properties. These benefits are positively capitalized into higher land values, and in turn, into the demand for more intense development (higher FSI). Arguably, because the properties benefit from the transit systems, they should also contribute to funding the systems (Smith & Gihring, 2009). Second, since the land values increase due to public investments, the entire windfall gain should not accrue to the land owners; rather it should accrue to the entity making the public investments or should be shared between the land owners and the investing entity.

Several empirical studies find public-transportation-led increases in property values (see, for example, Armstrong & Rodriguez, 2006; Gibbons & Machin, 2005; Golub, Guhathakurta, & Sollapuram, 2012; Lochl & Axhausen, 2010; Mathur, 2008; McMillen & McDonald, 2004). The increased land value can be captured in several ways, such as increased property tax revenues, the sale or joint development of public land in proximity to the transit system, the lease or sale of development rights around or above transit stations, or a levy of assessments by establishing a

³ For example, Mumbai has used grant of extra FSI to incentivize developers to construct affordable housing units.

special assessment district (SAD).

The above described mechanisms are part of the larger toolkit of land-based financing mechanisms, or land/property value capture mechanisms. Value capture mechanisms are increasingly catching professional and scholarly attention globally. This wide-spread interest is evident from the recent topical literature (see [Lari et al., 2009](#); [U. S. Government Accountability Office \(GAO\), 2010](#); and [Zhao & Larson, 2011](#)). This interest can only increase in the future given the persistent economic uncertainty, and constrained public funding for transit projects. Indeed, multi-lateral agencies such as the UN-HABITAT and the World Bank ([UN-HABITAT, 2015](#); [World Bank, 2013](#)) are actively promoting these mechanisms. Further, this group of mechanisms is also a key component of the “New Urban Agenda”—a three-pronged approach to urban development that integrates urban planning, urban legislation and urban finance—advanced by the UN-HABITAT ([UN-HABITAT, 2015](#)).

3. Rajkot BRTS

The Rajkot Municipal Corporation (RMC) began planning for a BRTS in the early 2000s. In 2006, the RMC took over the operation of the city bus system from the state government. Rajkot's City Development Plan (a document required to apply for JNNURM funding) had envisaged an efficient public transportation system by the year 2008, much needed because the city of 1.2 million had a virtually non-existent public transit system—a mere 13 buses operated by the state transportation corporation.⁴ The city residents' transport needs were being met by a slew of unregulated, accident-prone, para-transit operators mostly consisting of three- and four-wheeled auto-rickshaws ([RMC, 2007](#)).

Following this, in 2007, the RMC submitted a detailed project report (DPR) to the central government seeking JNNURM funding. The DPR envisages three BRT corridors. The 29-km-long first corridor, the Blue Corridor, is planned along the existing ring road, which, as the name suggests, rings the city of Rajkot. The second corridor, the 16.5-km-long Green Corridor, is planned along the city's north–south axis, and the third, the 18-km-long Red Corridor, is planned along the city's east–west axis (see [Fig. 1](#)). The combined length of these corridors is 63.5 km. The entire BRTS is envisioned as comprising three phases of development, with Phase 1 being further sub-divided into three parts (see [Table 1](#)). Land for a 10.7-km stretch of the proposed Blue Corridor was already owned by the RMC at the time of DPR preparation; this stretch was therefore planned as Phase 1, Part 1, to be developed first, and the DPR focuses on this stretch for detailed cost and financing estimates, including the potential for the sale of development rights.⁵ The total project cost was estimated at the time to be Rs. 1.1 billion, or US \$18 million.⁶

3.1. Sale of development rights

Compact, high-density development along the BRTS corridor was deemed desirable by RMC for successful coordination between land use and transportation, as well as to ensure adequate ridership on the BRTS. It was argued that the introduction of high-quality public transportation would spur real estate development, especially within the 250 m along either side of the BRTS corridor, since properties in this distance band were likely to see the most benefit from the BRTS. Therefore, these properties were targeted for revenue generation through the sale of additional floor space.

In Rajkot, in addition to building height and setback restrictions, the Floor Space Index (FSI) is a key parameter used by the city government to control building form and intensity of development. The properties along the Blue Corridor in the RMC area were already allowed a maximum FSI of 1.5,⁷ of which 0.68 was utilized on average, leaving an average unutilized capacity of 0.82. The RMC conducted a survey of buildings along this corridor, examined the existing land uses and the prevalent land prices, and conducted a development impact analysis. They concluded that, given the locational desirability and the forecasted impact of BRTS, this corridor would need a FSI of 1.5–1.7 over the existing 0.68 FSI, resulting in a potential additional demand for approximately 0.7–0.9 FSI (1.5–1.7 minus the current unutilized capacity of 0.82). Therefore, three options for sale of extra FSI were considered—sale of 0.50, 0.75, and 1.0 FSI. It was assumed that only one quarter of the existing residential and commercial land parcels would purchase additional FSI, and that only one half of the currently vacant land zoned for mixed-use would be developed, of which only one-fifth would purchase additional FSI. Finally, two price levels were assumed for the sale of FSI. The FSI for residential, commercial, and mixed land uses would be sold at a per-meter rate of Rs. 750, Rs. 1000, and Rs. 800, respectively, under the first price-level option; and at the per-meter rate of Rs. 1,500, Rs. 2,000, and Rs. 1,700, respectively, under the second price-level option ([RMC, 2007](#)). [Table 2](#) shows all the revenue-generation alternatives considered.

RMC selected the option to sell 0.75 FSI at the second price-level option, resulting in estimated revenue of just over Rs. 1.2 billion—a little more than the estimated project cost of Rs. 1.1 billion (see the shaded portion of [Table 2](#)). It is noteworthy that even the most conservative option—0.50 FSI sale at the first price-level option—was estimated to generate considerable amount of money, Rs. 413.3 million, or approximately 38 percent of the project cost.

3.2. Current status of the project

The 10.7-km-long Phase 1-Part 1 opened for trial service in 2012 ([RRL, 2012](#)) and for commercial operation in May, 2013 ([communicate Karo, 2013](#)). Eleven buses operate on this route at four-minute intervals ([Anadkat, 2013](#)). The final total project cost was Rs. 1.75 billion, 650 million rupees over the projected cost of Rs. 1.1 billion, an increase primarily due to the need to construct a 1.5-km-long overpass at a cost of Rs. 530 million ([RMC, 2010](#)). In 2012, the government of Gujarat State approved a 0.45 FSI increase in the parts of the city that were deemed to have a good public transportation system. Additionally, the state government allowed the RMC to sell 0.75 FSI within a distance of 250 m along either side of the BRTS corridor ([Anadkat, 2015](#)).

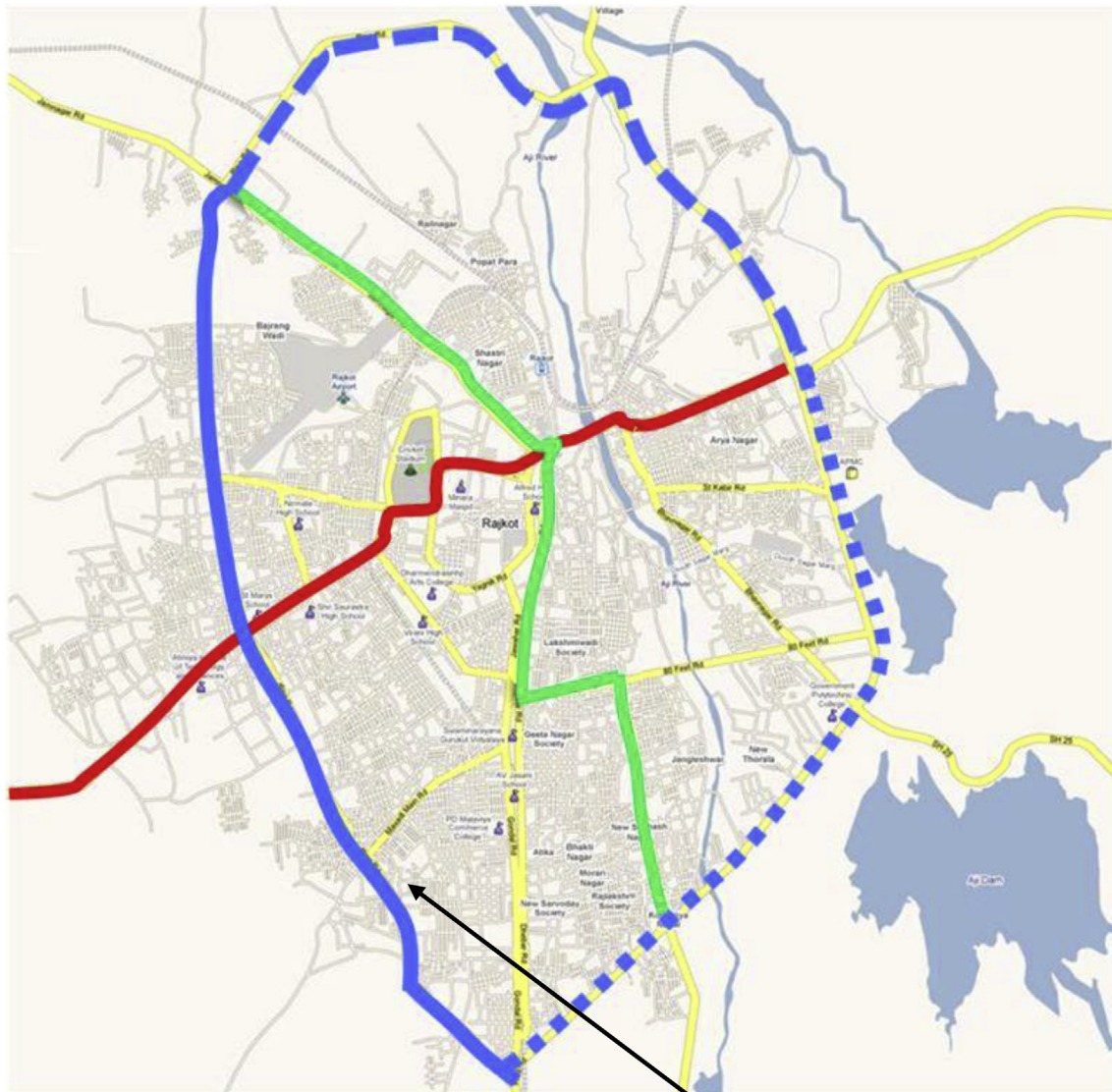
The FSI is being sold at the Jantri rate ([Anadkat, 2015](#)), which is the value of a square meter of land as assessed for the purposes of levying registration tax at the time of transfer or sale of land or real estate ([AMC, 2006](#)). The Gujarat state government divides each city within the state into several zones and then determines the Jantri rate for each major use within each zone. The state government revises Jantri rates only sporadically (the rates were last revised in 2011); therefore, these rates might not equal market prices. Rajkot is able to generate significant revenues from FSI sales as compared to the estimate because that estimate was based on much lower rates—for example, Rs. 1500 per square meter for residential use and Rs. 2000 for commercial use (see [Table 2](#))—while the Jantri

⁴ Against the norm of 370 buses per million population ([RMC, 2007](#)).

⁵ This stretch is shown with solid blue line in [Fig. 1](#).

⁶ At a dollar-to-rupee conversion rate of US\$1 = 60 Indian Rupees.

⁷ FSI = building area/land parcel area. Therefore, with a FSI of 1.5, a building with a floor area of up to 1500 square meters may be constructed on a 1000-square-meter parcel of land (1500/1000 = 1.5).



Blue Corridor, Phase 1, Part 1

Fig. 1. Various phases of Rajkot BRTS (blue, green, and red phases). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Source: Rajkot Rajpath Limited Available online at <http://www.rajkotrajpath.com/routes.php> Accessed July 16, 2014.

rates for various zones that fall within the 250-meter-distance-band along the Ring Road are often well above Rs. 10,000 per square meter (Anadkat, 2015).

The FSI sale began in 2013; as of mid-March, 2015, the FSI sale had generated Rs. 310 million. Owners of an estimated 25 percent of the total eligible land parcels have purchased additional FSI. With 75 percent of land parcels still remaining, and Jantri rates likely to rise significantly in future due to rapid increases in land values in the BRTS project area, it is estimated that FSI sales could generate revenue in excess of Rs. 2 billion (Anadkat, 2015), well exceeding the total project cost of Rs. 1.75 billion, and far greater than the RMC's projected estimate of Rs. 1.22 billion.

4. Insights from the case study and suggestions for improvement

The use of sale of development rights depends upon several factors such as the national or state-level legal and political environment, especially the laws and policies associated with property ownership, rights and taxes; and the demand for real estate. These factors may differ significantly among regions and countries. In spite of these variations, Rajkot's experience with the sale of development rights mechanism provides key and widely applicable insights that other regions and countries, especially those experiencing strong demand for well-served urban real estate, might

Table 1
Rajkot BRTS corridor phasing.

Phases	Description	Length in kilometers	Period of implementation as per the DPR	Actual period of implementation
Phase 1 (Part 1)	Development of Blue Corridor in RMC Area	10.7	2007–2009	2007–2012
Phase 2	Development of Red Corridor	16.5	2008–2009	Implementation not started due to lack of funds
Phase 3	Development of Green Corridor	18	2008–2009	Implementation not started due to lack of funds
Phase 1 (Part 2)	Development of Blue Corridor in RUDA area	9.26	2008–2010	Implementation not started due to lack of funds
Phase 1 (Part 3)	Development of Remaining part of Blue Corridor—National Highway Portion	9.14	2009–2011	Implementation not started due to lack of funds

Source: Authors; RMC (2007), Anadkat (2015).

Table 2
Estimated revenue from FSI sale.

Sale of additional FSI	Revenue generated is based on per-square-meter rate for additional FSI (in million rupees)											
	Option 1						Option 2					
	Residential	Commercial	Vacant mixed-use	Total (in million rupees)	Revenue as percentage of estimated project cost of Rs. 1100 million	Revenue as percentage of final project cost of Rs. 1750 million	Residential	Commercial	Vacant mixed-use	Total (in million rupees)	Revenue as percentage of estimated project cost of Rs. 1100 million	Revenue as percentage of final project cost of Rs. 1750 million
	Rs. 750	Rs. 1000	Rs. 800				Rs. 1500	Rs. 2000	Rs. 1750			
0.50	224.1	133.8	55.5	413.3	38%	24%	448.1	267.5	97.1	812.8	74%	46%
0.75	336.1	200.6	83.3	620.0	56%	35%	672.2	401.3	145.7	1219.1	111%	70%
1.00	448.1	267.5	110.0	826.6	75%	47%	896.3	535.0	194.3	1625.5	148%	93%
0.45 (State-Government-approved FSI sale)							403.3	240.8	87.4	731.5	66.5%	42%

Source: Authors' Analysis and RMC (2007).

find useful as they develop mechanisms to make sale of development rights a significant source for infrastructure development. Following is a list of the most crucial steps and strategies.

1. The FSI sales must be calibrated to the existing or planned capacity of infrastructure and services. Is there enough existing capacity within the transportation, water, sewer, and electricity systems to serve the new users of the additional FSI? If not, are there infrastructure projects in the pipeline that will augment capacity enough to meet projected needs?
2. Micro-level demand analysis should be conducted to estimate the real estate demand likely to be generated by a new infrastructure project. A BRT system passing through a neighborhood zoned for low-density residential development, where adequate transportation capacity exists, might not accrue the same monetary benefit to the neighboring properties as would a BRT system that passes through a high-density area with constrained transportation capacity.
3. The FSI sale price must be indexed to inflation. Because FSI sales are likely to occur over several years, if the price is not adjusted for inflation, the value of revenue from the FSI sale will decrease in constant-money terms. This is especially important for a high-inflation country such as India.
4. Agencies relying primarily on FSI sales for funding of projects would benefit from accurate and precise project cost estimates and the amount of extra FSI capacity that they will be allowed to sell. For example, the cost of Rajkot BRTS increased from Rs. 1.1 billion to Rs. 1.75 billion, primarily due to the unanticipated need to construct an overpass. Luckily for RMC, two factors helped recoup this cost: First, the state government allowed the city to sell an additional 0.75 FSI, not a lower value. Second, the

Jantri rates are higher than the FSI sale rates assumed in the DPR. Combined, these two factors have resulted in robust revenues from FSI sales.

5. For several reasons, the majority of revenues from FSI sales could accrue well *after* the infrastructure project has been developed, while funds are needed *beforehand* to develop the project.⁸ This revenue-expenditure mismatch needs to be addressed. It is noteworthy that the development of the remaining phases of the Rajkot BRTS has not begun due to a lack of funding (Anadkat, 2015). JNNURM, which funded Phase 1, Part 1, has been rolled back, and no new funding is forthcoming at present.

ULBs in developed countries such as the US often address this revenue-expenditure mismatch by issuing municipal bonds. However, the municipal bond market is weak in developing countries such as India; therefore, other financing mechanisms must be explored. For example, the state governments or the central government could provide low-interest loans on the condition that the loans would be repaid from FSI-sale-generated revenues.

⁸ Real estate developers might not be willing to purchase the FSI *before* the infrastructure project is complete because: a) they could be uncertain whether the project will finish at all, and if it would finish, whether it would finish on-time; b) they might not believe that the project meets a large unmet need; therefore, they might be unsure whether the project would increase real estate demand; c) they might be wary of the potential negative impacts of the project on their land parcels. For example, access to a land parcel might be severely compromised if the parcel is adjacent to an overpass. Furthermore, the overpass could generate noise- and pollution-related nuisances for neighboring land parcels.

6. Where multiple agencies are likely to stake a claim on the FSI-generated-revenues—for example, if one agency had developed BRTS in Rajkot, and the another the Ring Road, the demand for additional FSI generated by the BRTS and the Ring Road would need to be separately estimated in order for the FSI-generated revenue to accrue to the two agencies proportionally.
7. Finally, services impacts must be assessed. Increased FSI might require a city to augment other services, such as water supply and sewers. Monetary impacts of such augmentation need to be considered while developing a model for sharing FSI-generated revenues.

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