

Genesis

Govt. of India Initiatives and Missions towards Urban Mobility



Atal Mission for Rejuvenation and Urban Transformation (AMRUT) Scheme, 2015

❖ Integration of pedestrian and public transport facilities



SMART Cities Mission, 2015

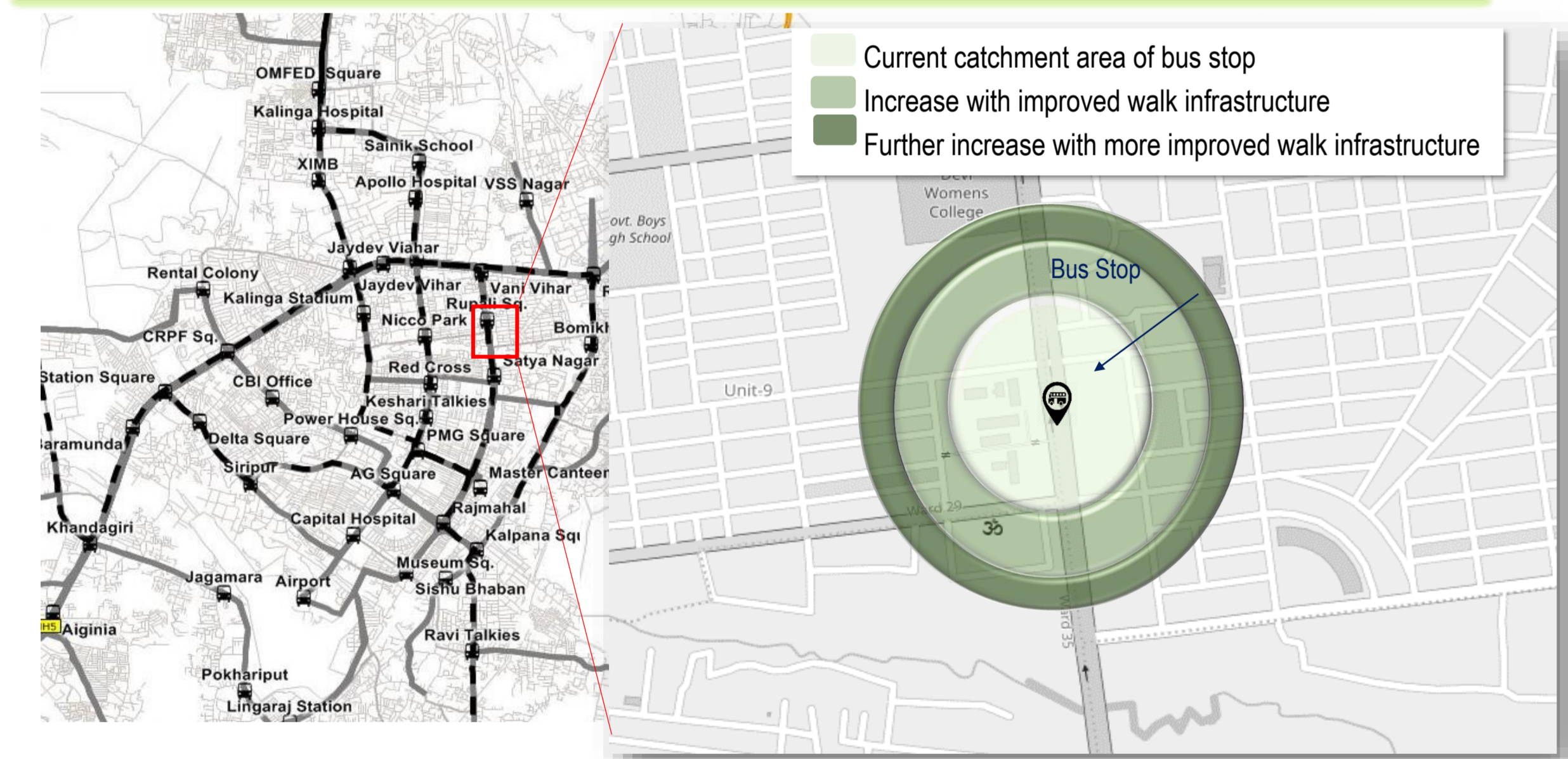
❖ Promoting Transit Oriented Development (TOD) with first-last mile connectivity

Objective

The objective of the work is to identify policy measures for rational improvement of walk-access facility within a catchment area of an urban local bus stop, by exploring various combinations of infrastructural components of walk-access.

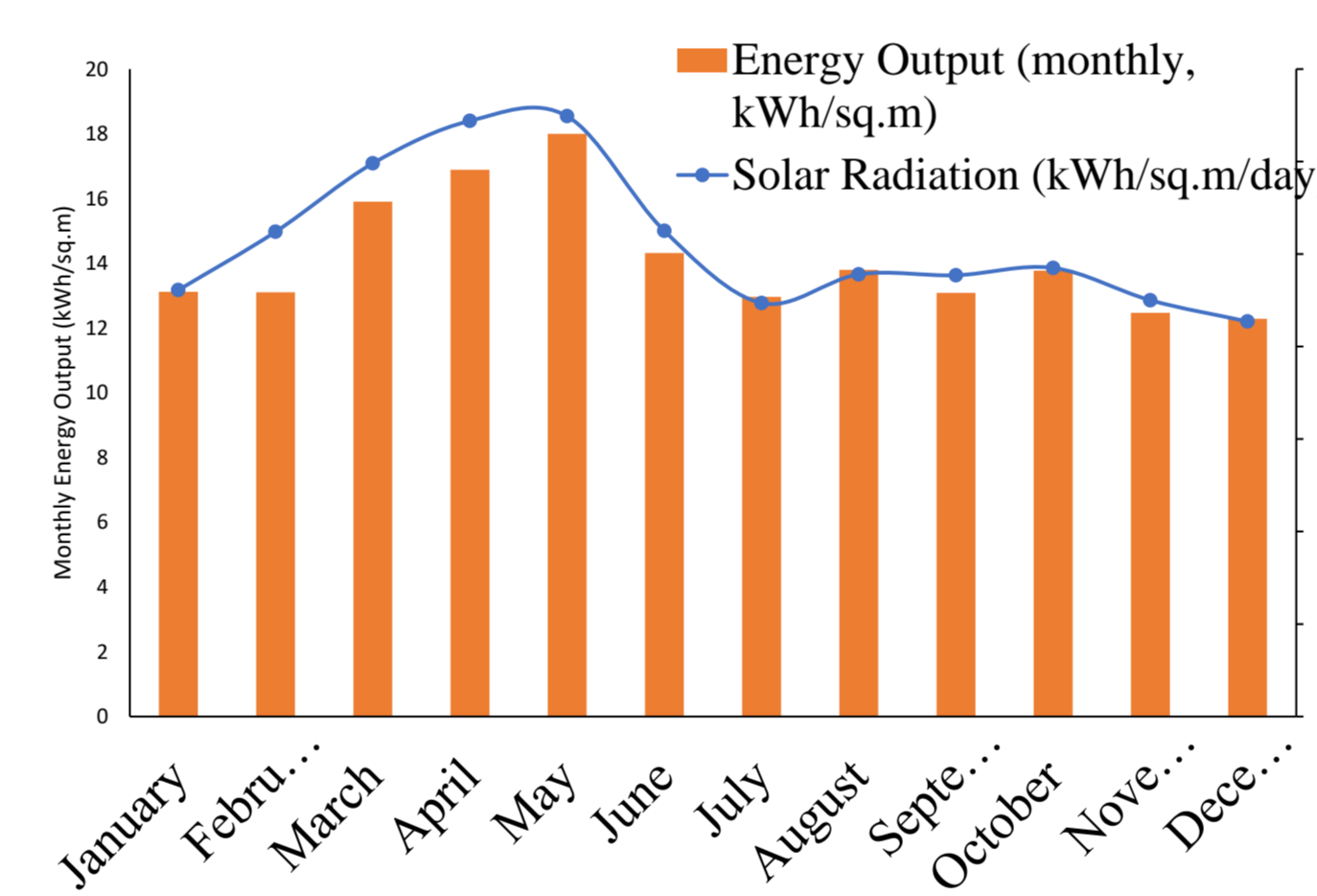
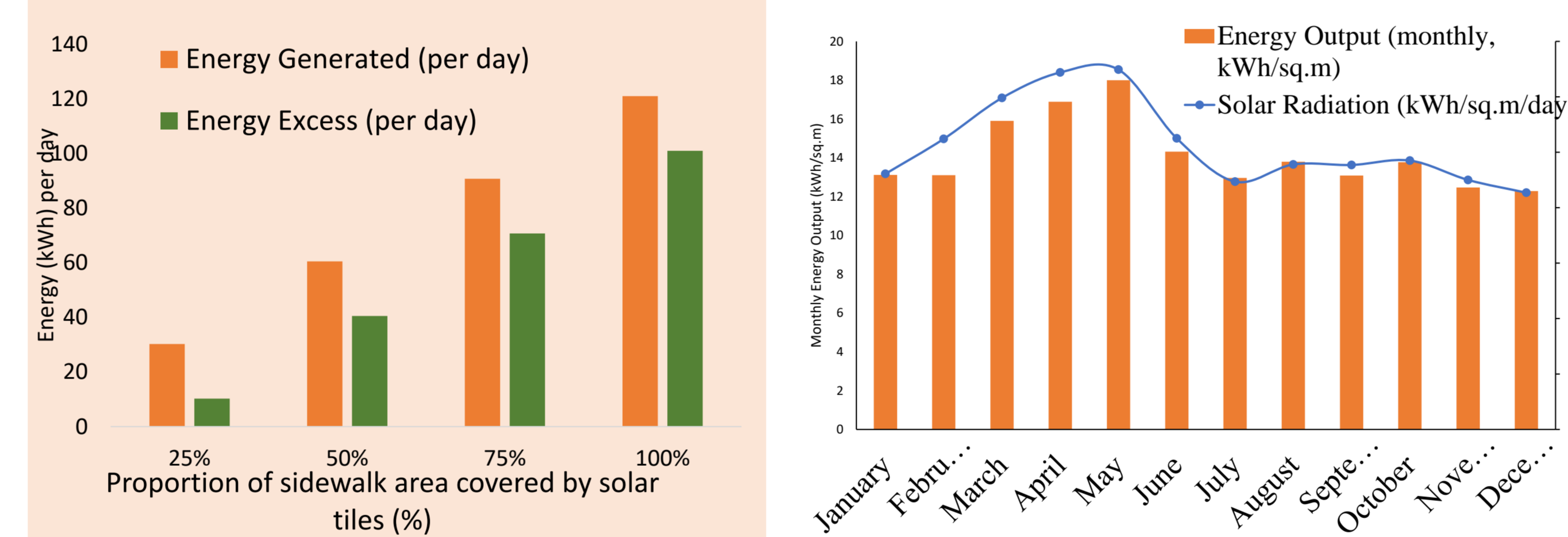
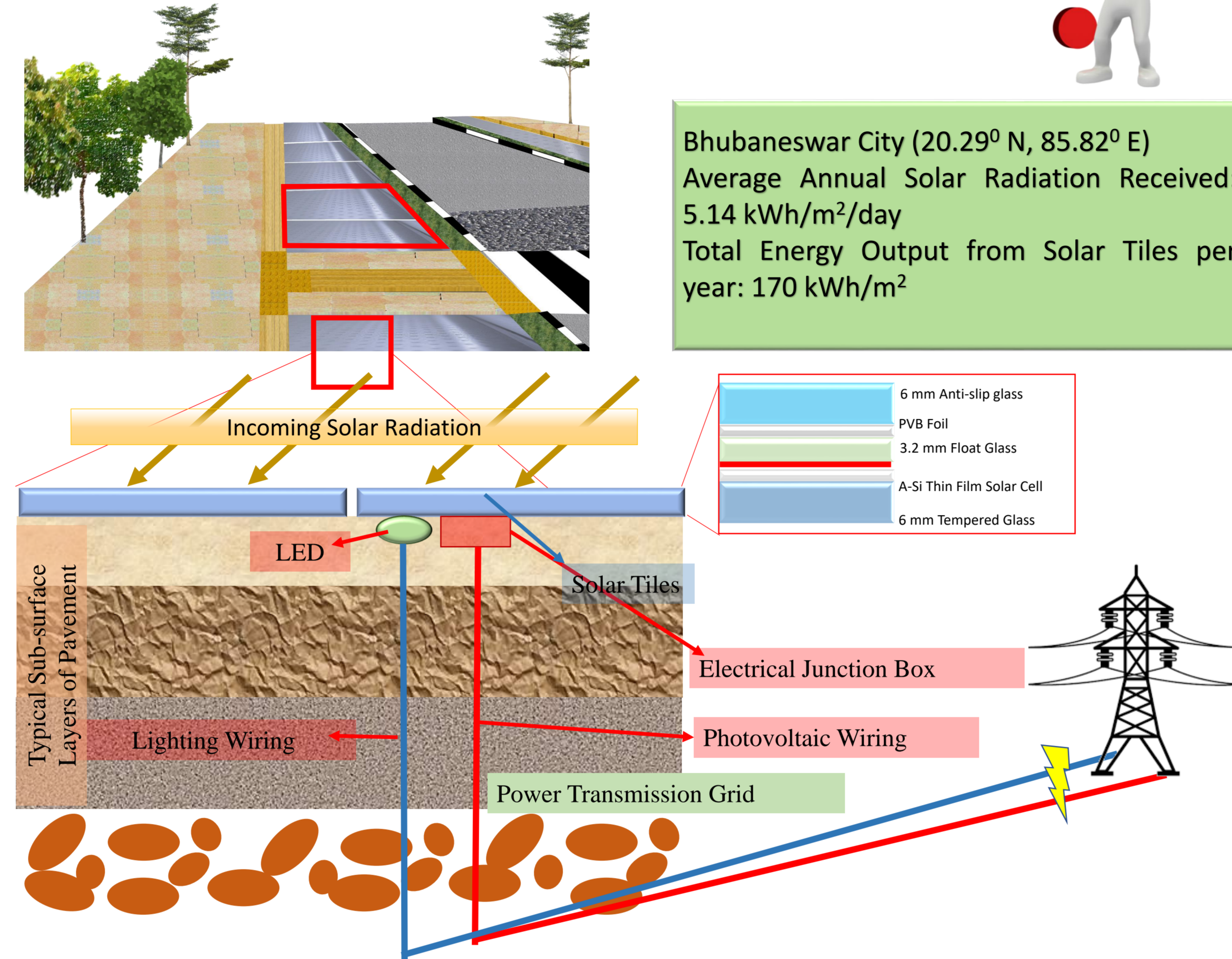


Possible Expansion in Bus Stop Catchment Area under Alternative Infrastructure Improvement Scenarios

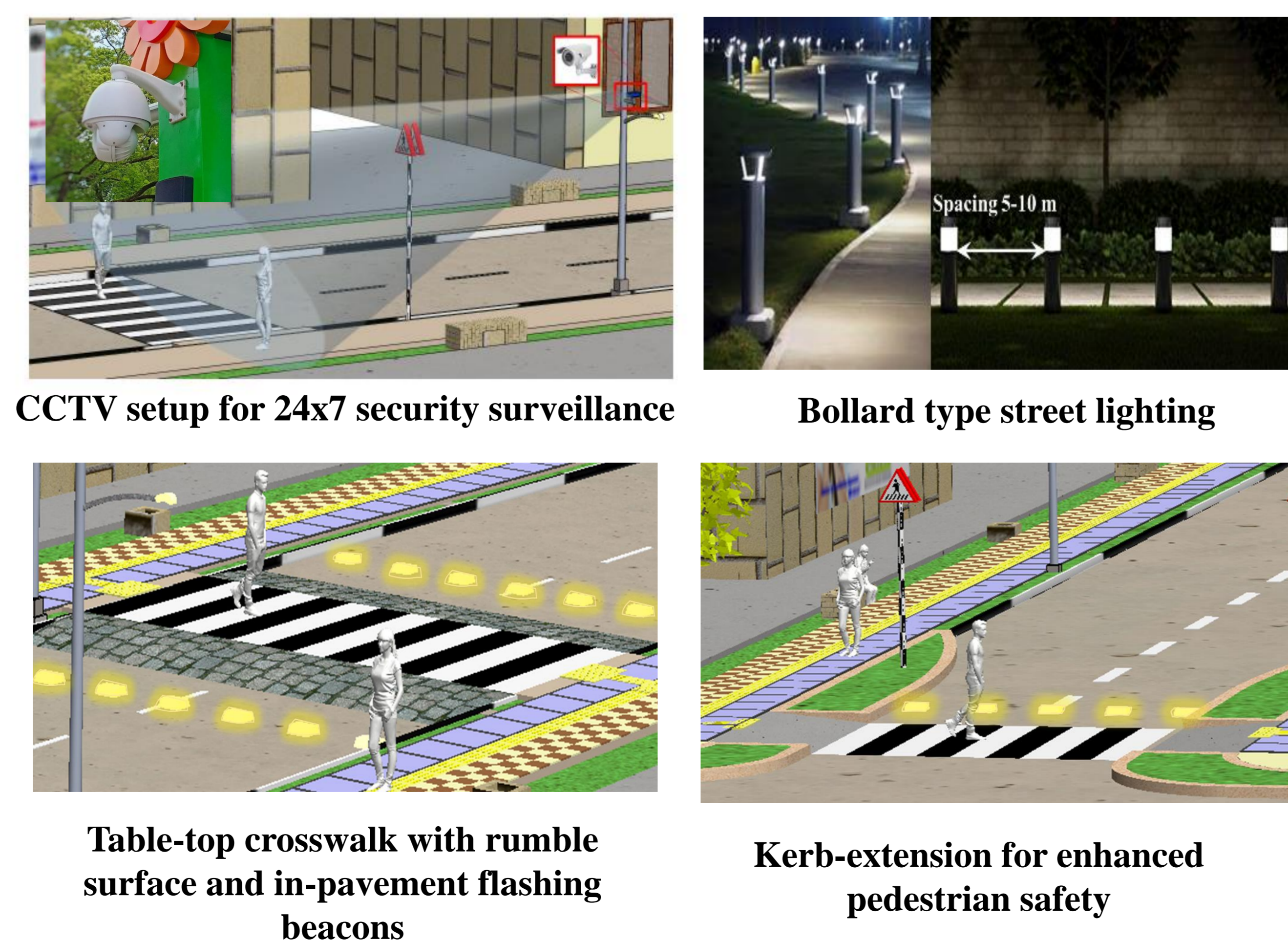


Investigating a Few Green Energy Solutions

Solar Pavements with Photo-voltaic Cells



Some other combinations of walk-access components



Stated Choice Experimental Design

Functional Attributes and their Levels

Attributes	Levels (incl. base level and functionally improved levels)
Type of Walkway	Current condition (Base level) + 3 functionally improved levels
Length of walk-access	Current length, (+)15%, (+)30%, (+)45%, (+)60%
Lighting and Security	Current condition (Base level), Bollard lighting, Bollard lighting + CCTV
Type of Crosswalks	Current condition (Base level) + 2 functionally improved levels
Headway of bus service	15 min (Base level), 10 min, 5 min
Journey Speed	20 kmph (Base level), 22 kmph, 25 kmph
Fare	Current fare, (+) 10%, (+) 20%, (+) 30%

Optimal Choice Card Design

$$M(X, \beta) = \sum_{q=1}^Q X'_q (P_q - p_q p'_q) X_q \rightarrow \text{Fischer Information Matrix of choice probability}$$

$$D_p(X) = |M(X, \beta)|^{-\frac{1}{k}} \leftarrow \text{Error component minimization} \rightarrow D_b(X) = \int \log |M(X, \beta)| \pi(\beta) d\beta$$

24 nos. of choice cards developed

Attributes	Choice Scenario 1	
	Access Condition Type 1	Access Condition Type 2
Type of Walkway	Unmarked and unpaved shoulder adjacent to the vehicular RoW	Raised pedestrian sidewalk, having paved surface but without buffer zone from traffic
Lighting & Security	Bollard lighting with medium to high intensity CCTV camera for continuous security surveillance	Pole mounted street light present at every 20-30 m, and having low lighting intensity
Crosswalks	Painted crosswalk present at intersection of access road with main bus corridor and also at every 100-200 m distance	Table-top crosswalk flushed with sidewalk, present at every 100-200 m distance, along with rumble surface and in-pavement flashers acting as traffic calming
Length of Walk-access/egress	Same as your current access/egress length	Your current access/egress length PLUS 30%
Journey Speed	20 kmph	22 kmph
Service Headway	10 mins	15 mins
Fare for Journey	Current Fare PLUS 30% (Rs. 3.00)	Current Fare PLUS 20% (Rs. 2.00)
Choice	<input type="radio"/> Type 1	<input type="radio"/> Type 2

Publications

- Roy, S., and Basu, D., 2019. An approach towards estimating critical value of waiting time at transit stops. *Journal of Traffic and Transportation Engineering*, Elsevier pub. (in press)
- Roy, S., and Basu, D., 2019. An evaluation of in-service infrastructural facilities of walk-access feeder paths to urban local bus stops. *Transportation Research Procedia*, Elsevier pub.
- Roy, S., and Basu, D., 2017. An approach of examining service condition of sidewalk facility in urban area. *Proceedings of the Eastern Asia Society of Transportation Studies (EASTS)*, Vol.11.
- Roy, S., and Basu, D., Demarcation of geographical boundary for developing walk-access infrastructure in urban bus stop catchment. *Second ASCE India Conference on "Challenges of Resilient and Sustainable Infrastructure Development in Emerging Economies" (CRSIDE2020)*, March 2-4, 2020. [Accepted]
- Roy, S., and Basu, D., Selection of intervention areas for improving travel condition of walk-accessed bus users with a focus on their accessibility: Evidence from urban India. *Transport Policy*, Elsevier pub. [Under review]
- Roy, S., and Basu, D., Classification of urban bus stop catchments for selecting appropriate sidewalk facility on access roads. *Current Science*, Indian Academy of Sciences. [Under review]

References

- Directorate of Urban Land Transport (DULT), 2014. Guidelines for planning & implementation of pedestrian infrastructure, Ver 1.0, Govt. of Karnataka, Bangalore.
- EMBARQ, 2014. Street design guidelines for greater Mumbai. EMBARQ India, Mumbai.
- IRC103:2012, Guidelines for Pedestrian Facilities, Indian Roads Congress, New Delhi.
- UTTIPPEC, 2009. Pedestrian Design Guidelines: "Don't drive...walk", Delhi Development Authority, New Delhi.

Intervention Areas Identified

Revised Importance Performance Analysis

Walk-access facility attributes

- Type of pedestrian walk-way
- Length of walk-access
- Types of pedestrian crosswalks
- Lighting facility and security for pedestrian safety

Characteristics of city bus service

- Headway of city bus service
- Journey speed
- Fare for journey by city bus