WORLD RESOURCES INSTITUTE | WRI ROSS CENTER FOR SUSTAINABLE CITIES

IMPLEMENTING TRANSIT-ORIENTED DEVELOPMENT FOR ADVANCING CLIMATE ACTION IN CITIES

MOBILISE YOUR CITY WEBINAR

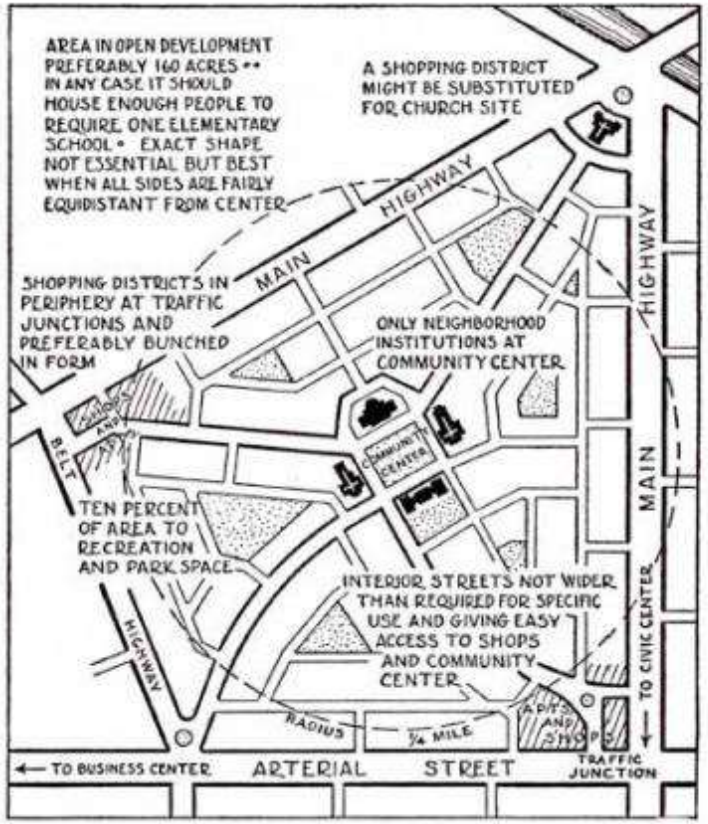
JAYA DHINDAW
DIRECTOR- URBAN DEVELOPMENT, WRI INDIA

GENESIS OF MODERN PLANNING

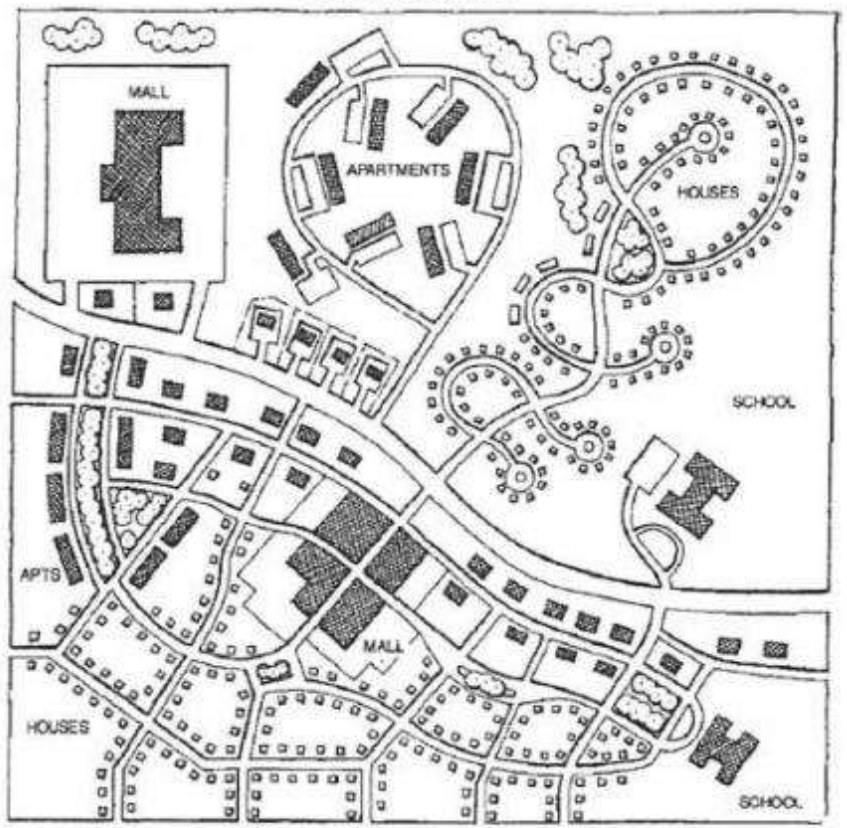
Zoning and the neighborhood unit -as planning concepts- evolved as **a response to the degenerated environmental and social conditions** fostered as a consequence of industrial revolution in the early 1900s

EVOLUTION OF THE NEIGHBORHOOD

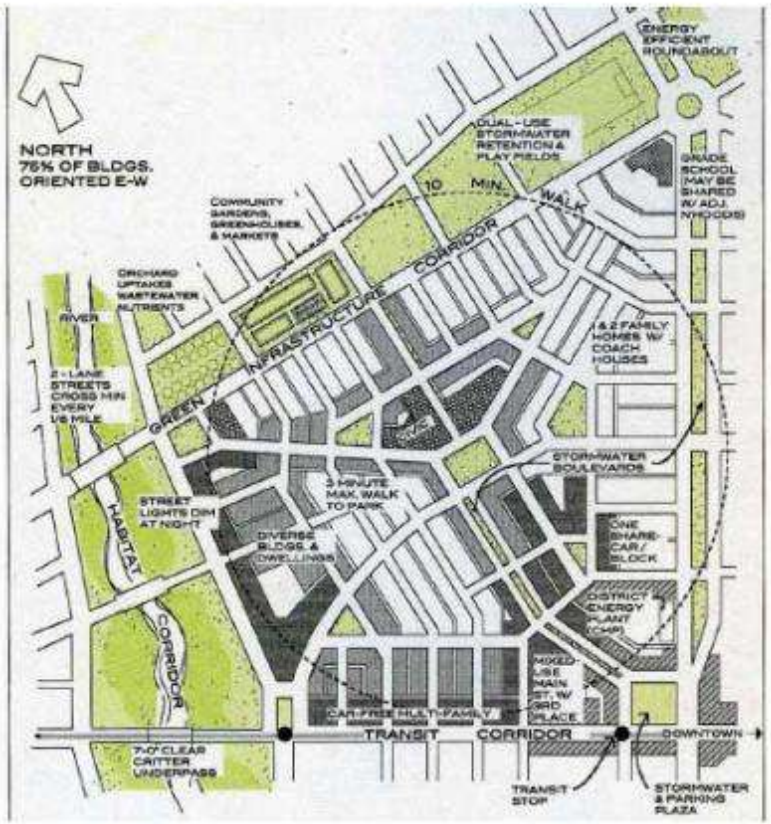
Neighborhood Organization



Suburban sprawl



Traditional neighborhood



1930

Perry's Neighborhood Unit

1980

New urbanist: Traditional neighborhood

2008

Doug Farr's Sustainable Neighborhood

Source: (STEUTEVILLE, 2017)

https://www.cnu.org/publicsquare/2017/10/31/25-great-ideas-new-urbanism

TRANSIT ORIENTED DEVELOPMENT (TOD)

Creation of compact, walkable, pedestrian-oriented, mixed-use communities centered around high quality mass transit systems

- TOD Institute

INDIA'S NATIONAL TOD POLICY (2017)

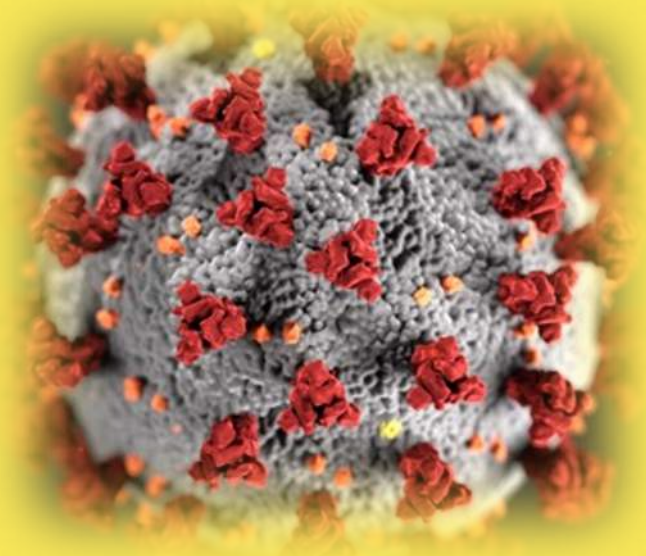
*TOD integrates land use and transport planning and aims to develop planned sustainable urban growth centers, having **walkable** and **livable** communes with **high-density, mixed land-use**.*

Citizens have access to open green and public spaces and at the same time transit facilities are efficiently utilized. TOD focuses on creation of high-density mixed land use development in the influence zone of transit stations…….TOD advocates pedestrian trips to access various facilities such as shopping, entertainment and work.

METRO RAIL POLICY (2017)

FULL-CIRCLE

From public health crisis to public health crisis…….and beyond…



INDIA'S NATIONAL TOD POLICY

*TOD integrates land use and transport planning and aims to develop planned sustainable urban growth centers, having **walkable** and **livable** communes with **high-density, mixed land-use**.*

Citizens have access to open green and public spaces and at the same time transit facilities are efficiently utilized. TOD focuses on creation of high-density mixed land use development in the influence zone of transit stations…….TOD advocates pedestrian trips to access various facilities such as shopping, entertainment and work.

METRO RAIL POLICY (2017)

COUNTER-NARRATIVE IN TIMES OF COVID-19

High population density in India associated with spread of COVID-19

Download PDF Copy

Reviewed by Emily Henderson, B.Sc. Jul 3 2020

Indian health experts say the findings of a US study — which suggest that population density is unrelated to COVID-19 infection rates — to be completely contradictory to their experience of dealing with the pandemic in India, a country with 1.3 billion people.

Population density, a factor in the spread of COVID-19 in Algeria: statistic study

Nadjat Kadi[2] and Mounia Khelfaoui

Author information · Article notes · Copyright and License information Disclaimer

Associated Data

Data Availability Statement

Abstract Go to:

Background

Since November 2019, the world has suffered the disastrous consequences of the COVID-19 pandemic. No country has been spared either socially or economically. Given the inevitability of the spread of this virus, researches have been active to understand and to counteract the factors that anticipate its spread. In this research, we endorse population density as a catalyst factor for the proliferation of COVID-19 in Algeria. We are interested in the relationship between population density and the spread of COVID-19 in Algerian cities. The latter is characterized by a disparity in the concentration of the

E&E NEWS

PUBLIC HEALTH

Denser Cities Could Spare Climate but Also Increase Virus Transmission

Though urban living has a smaller carbon footprint, it can make social distancing more difficult

High population densities catalyze the spread of COVID-19

March 2020 · Journal of Travel Medicine 27(3)

DOI: 10.1093/jtm/taaa038

Project: Epidemiology and Modeling of Covid-19

Authors:

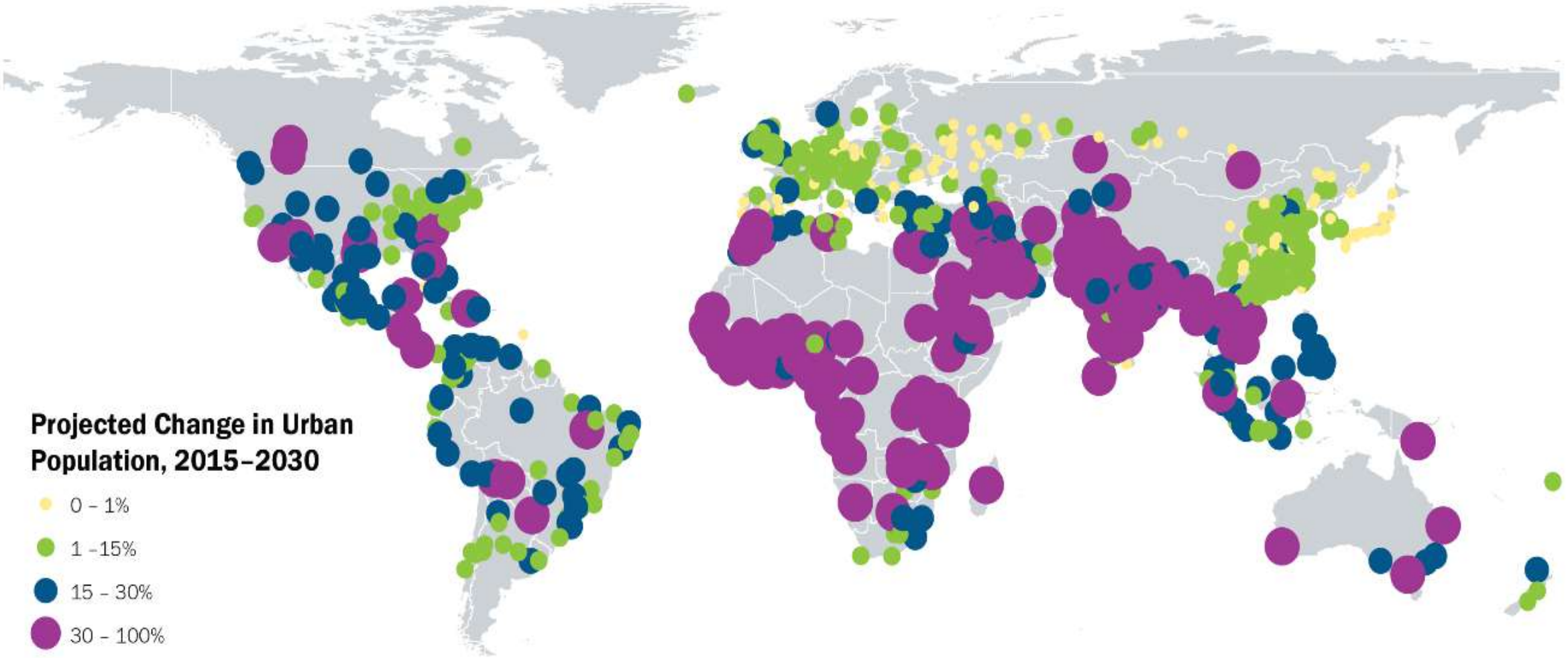
Joacim Rocklöv
41.63 · Umeå University

Henrik Sjödin
18.97 · Umeå University

Will COVID-19 Spell the End of Urban Density?

WRI INDIA | SUSTAINABLE CITIES

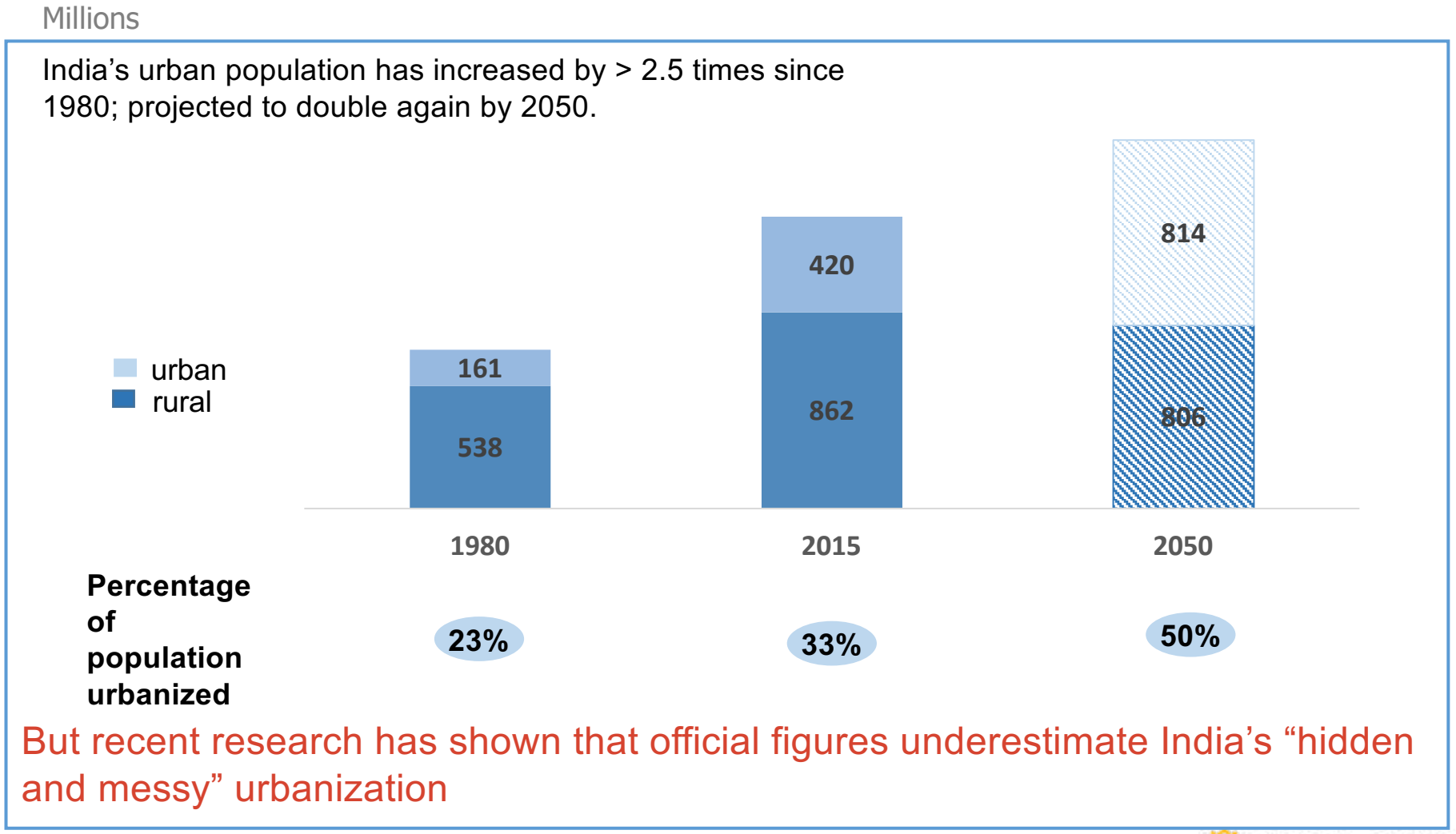
2015-2030 – UNPRECEDENTED URBAN GROWTH – ESPECIALLY IN S. ASIA & AFRICA



RAPID GROWTH & URBAN TRANSFORMATION

Urban population expected to almost double from 420 million in 2015 to over 800 million by 2050

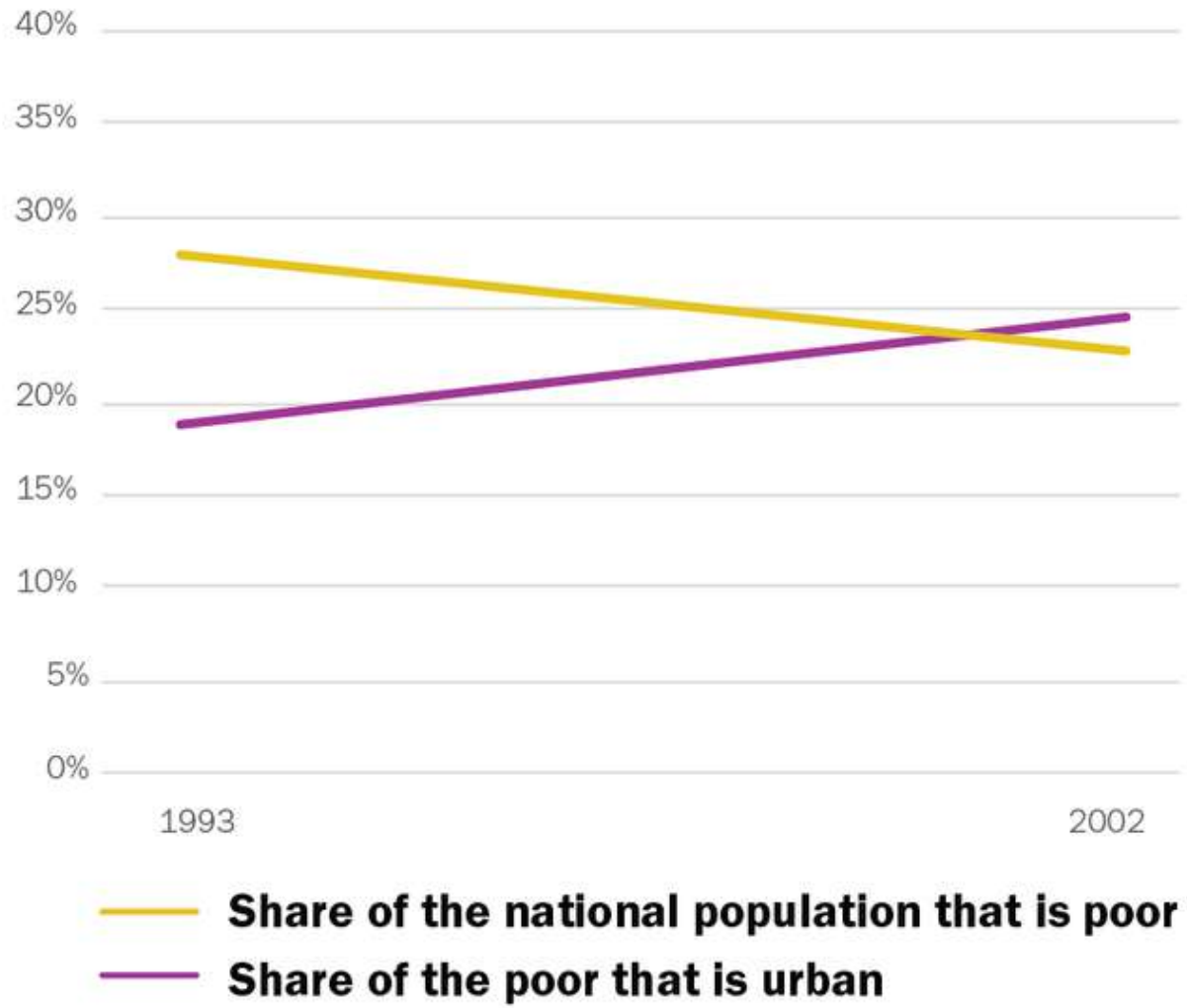
India's population split – 1980, 2015, 2050



But recent research has shown that official figures underestimate India's "hidden and messy" urbanization

SOURCE: World Urbanization Prospects, 2014

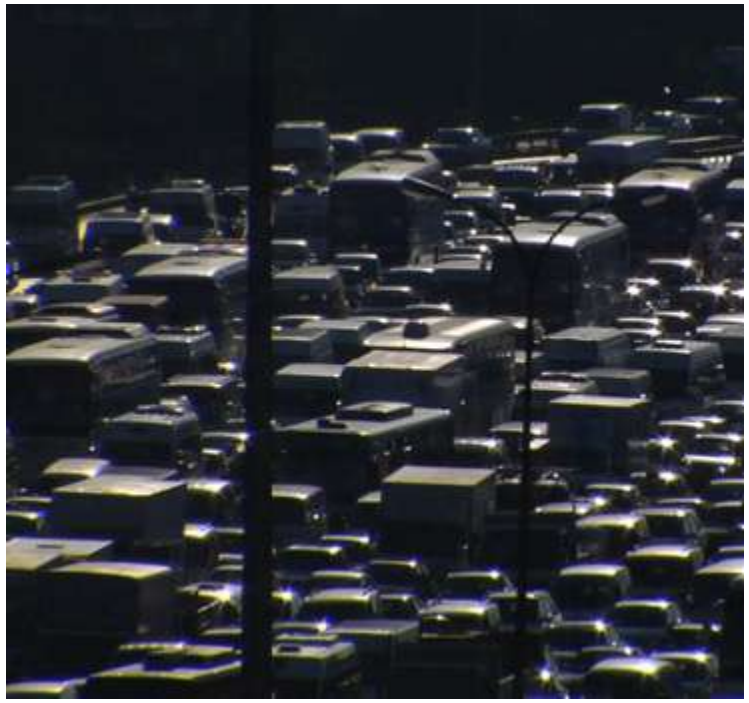
MORE OF THE POOR WILL LIVE IN CITIES



Source: Ravallion et al., 2007c: 8. *Note:* Example trend based on data from India.

PERSISTING PROBLEMS IN CITIES RISKING LOCK-IN

Congestion



30-70 Years

Sprawl

150 Years

Inefficiency

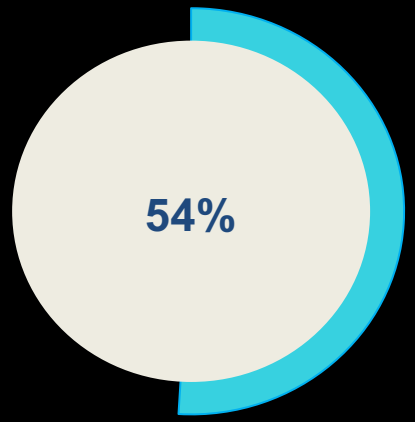
30-70 Years

BUSINESS-AS-USUAL IS UNSUSTAINABLE

Photo credits: (left) WRI Ross Center for Sustainable Cities, (Mexico, center) Pablo Lopez Luz, (Mexico, right) Ruimc77/FlickR

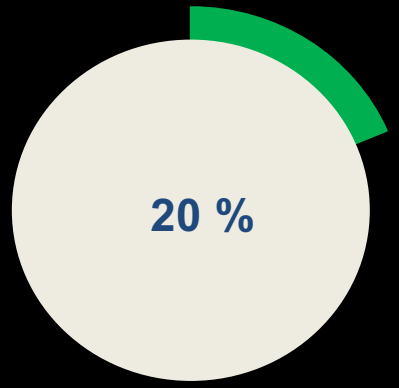
INDIA'S URBAN CHALLENGE

Water Stress



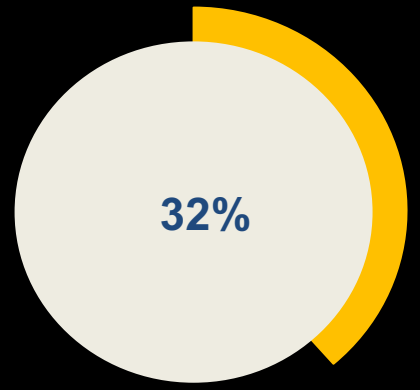
21 Indian cities - including Delhi, Bangaluru, Chennai and Hyderabad – will run out or by 2020, affecting 100 million people

Waste Treated



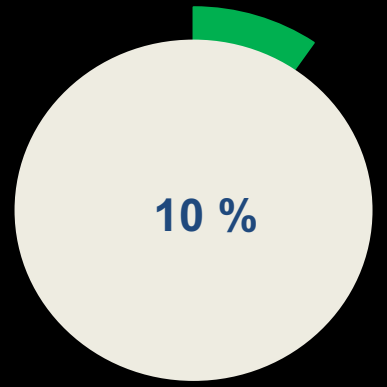
Annual waste generation in India is **62** million tonnes, expected to increase to 165 million tonnes by 2030, and 436 million tonnes by 2050

Building Energy Consumption

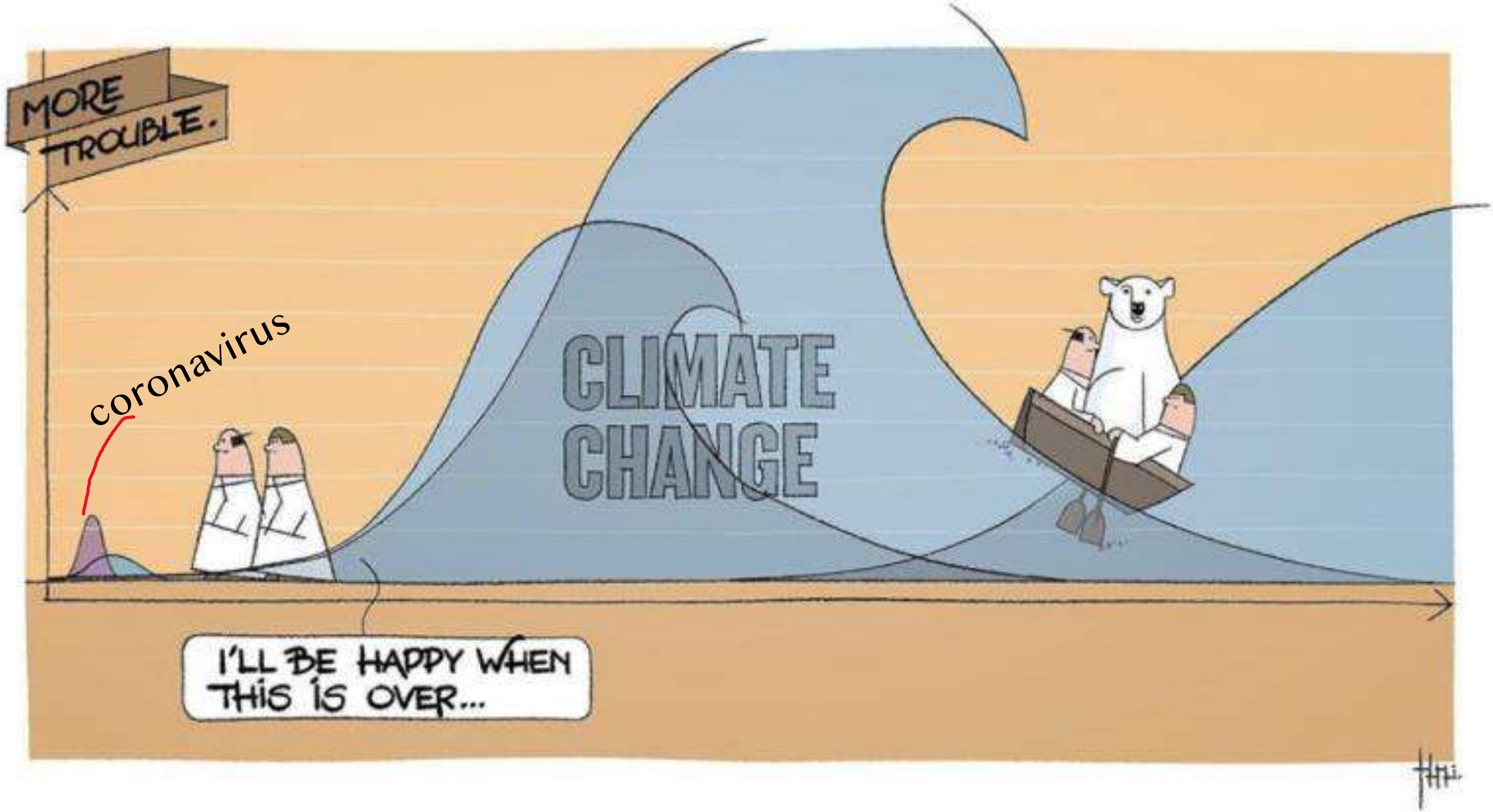


2°C pathway, needs **50%** reduction in building energy demand and related greenhouse gas (GHG) emissions by 2050

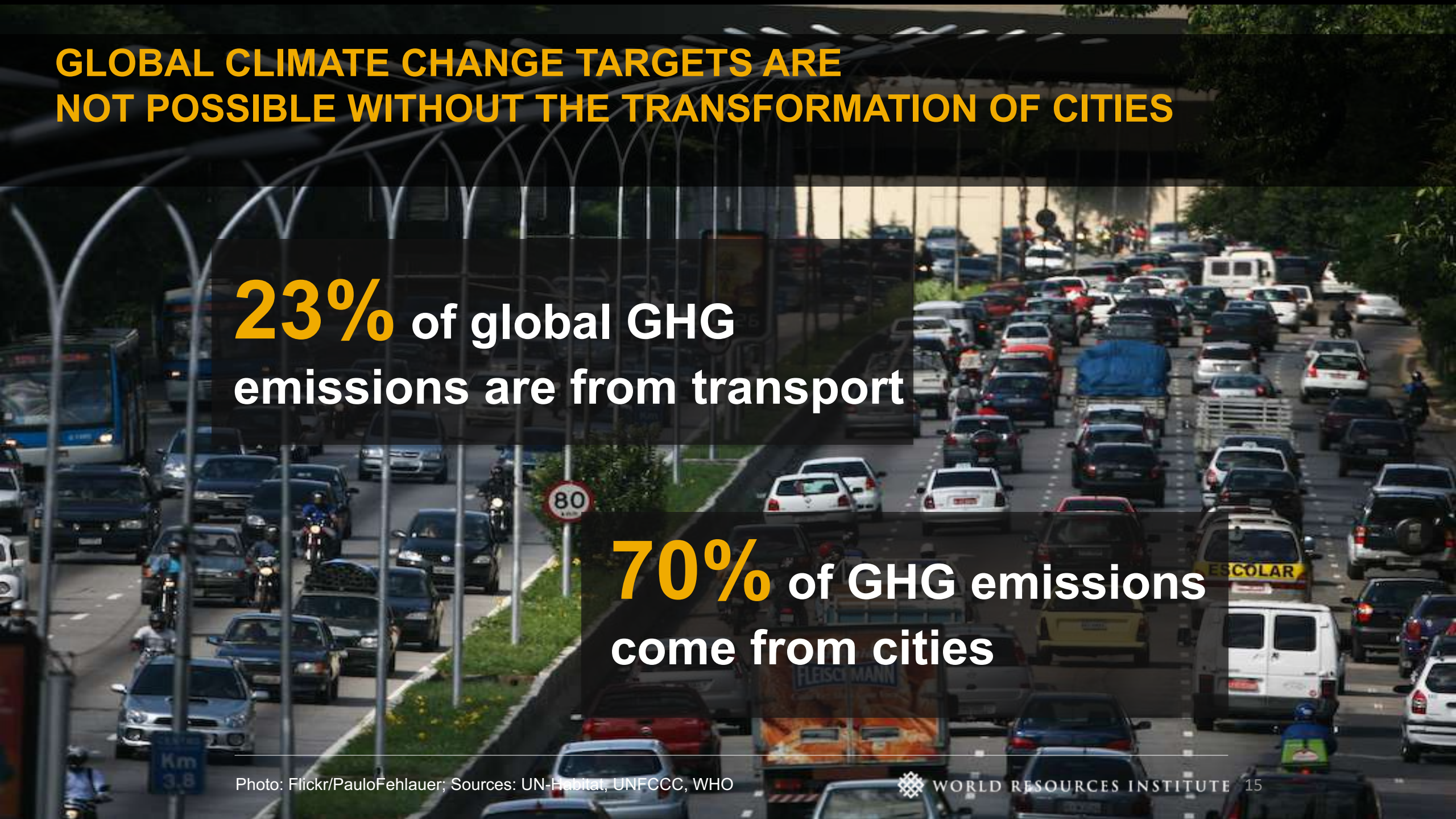
Private Car Usage



The economic cost of congestion in Delhi alone is **$8.9** billion per annum and could rise to **$15** billion by 2030


MORE TROUBLE.
coronavirus
CLIMATE CHANGE
I'LL BE HAPPY WHEN THIS IS OVER...

GLOBAL CLIMATE CHANGE TARGETS ARE NOT POSSIBLE WITHOUT THE TRANSFORMATION OF CITIES

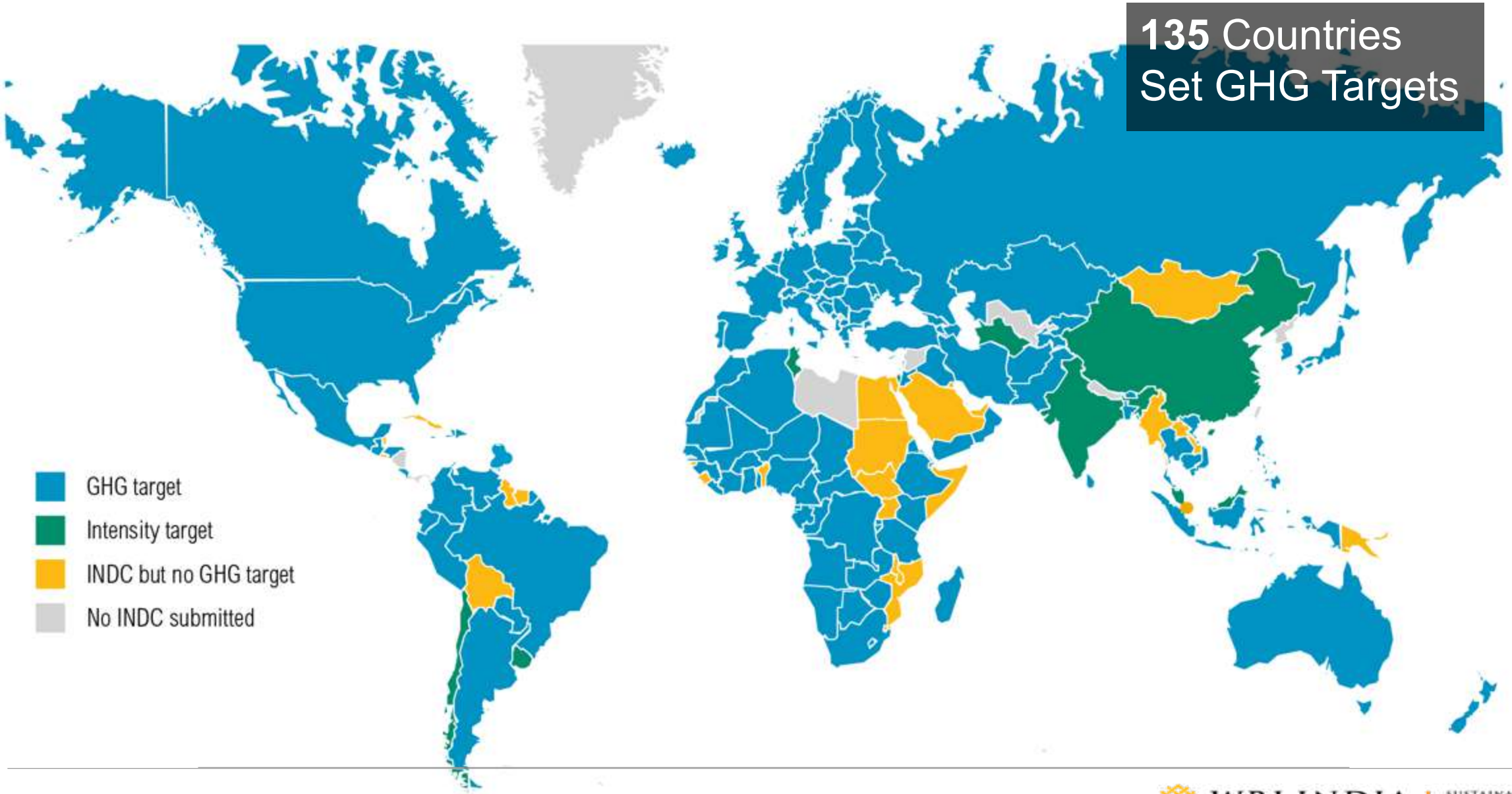


23% of global GHG emissions are from transport

70% of GHG emissions come from cities

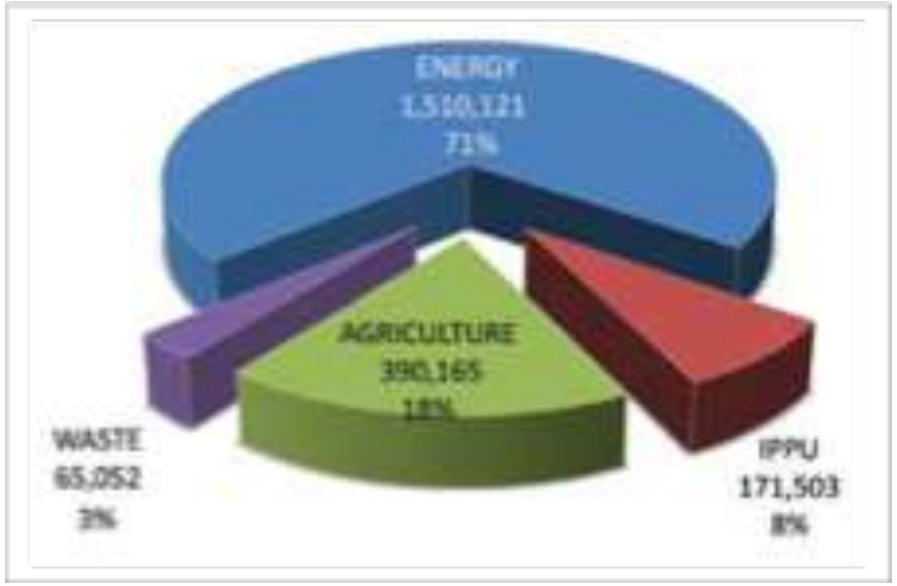
Photo: Flickr/PauloFehlauer; Sources: UN-Habitat, UNFCCC, WHO

PROGRESS ON NATIONAL COMMITMENTS?



Source: CAIT Paris Contributions Map/WRI

INDIA'S CLIMATE ACTION SITUATION



Source: https://unfccc.int/resource/docs/natc/indbur1.pdf

Key areas of action-

1. Renewable energy
2. **Sustainable Mobility**
3. Water preservation
4. Disaster resilient infrastructure
5. Low-carbon pathways

3rd largest GhG emitter

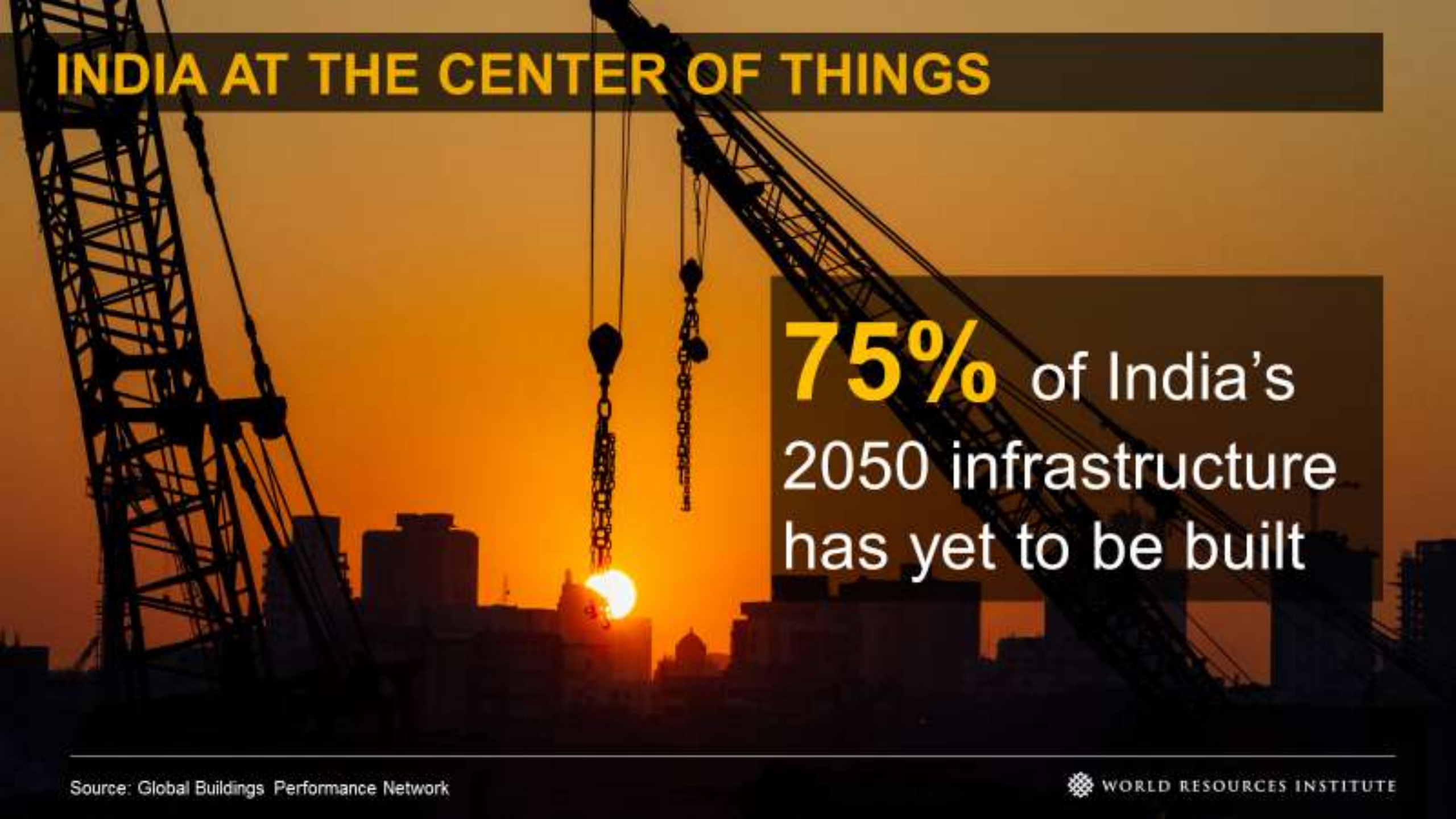
½ originate in urban areas

Per capita emissions is **1/3rd** of global average

*Prime Minister Modi said: "the scale of global action required to combat climate change is still lacking…We need a comprehensive approach to include **values, lifestyles,** and **development priorities** to combat climate change."*

Climate action summit, New York

INDIA AT THE CENTER OF THINGS



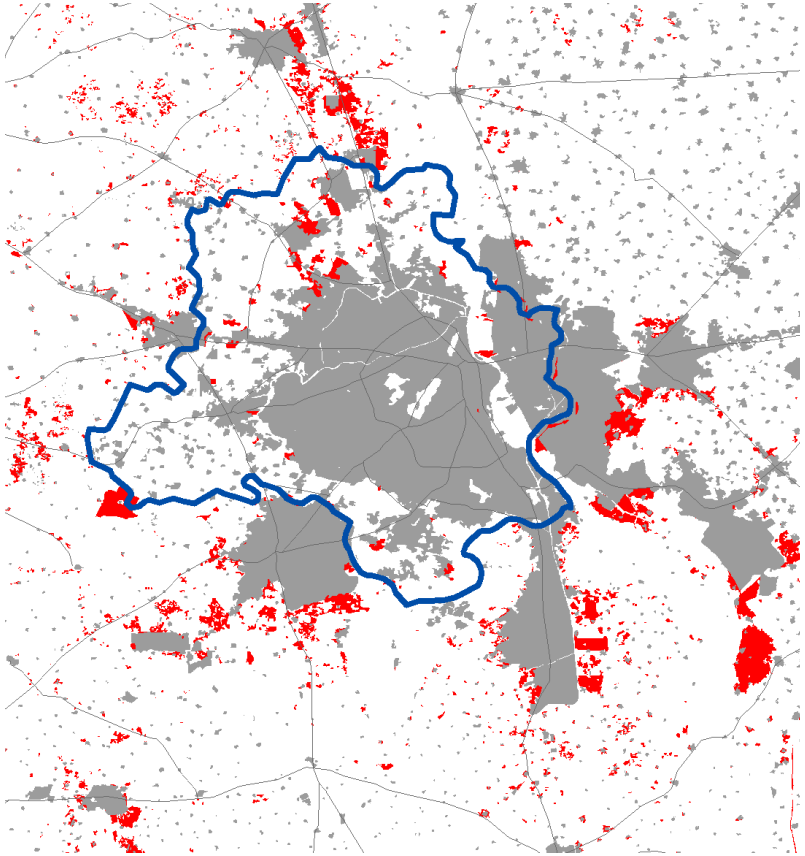
75% of India's 2050 infrastructure has yet to be built

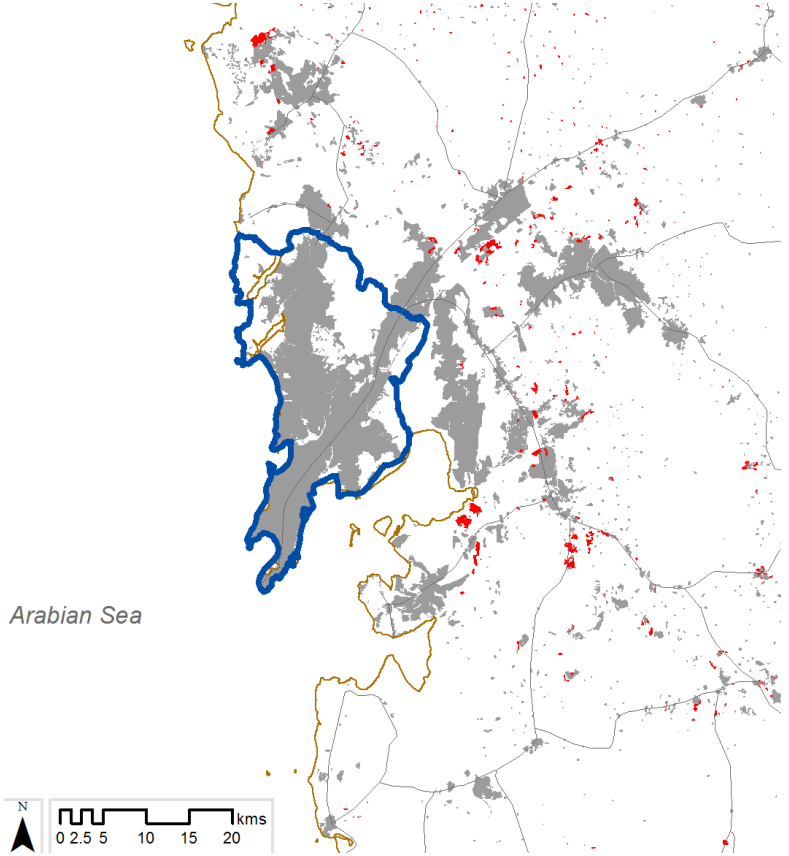
Source: Global Buildings Performance Network

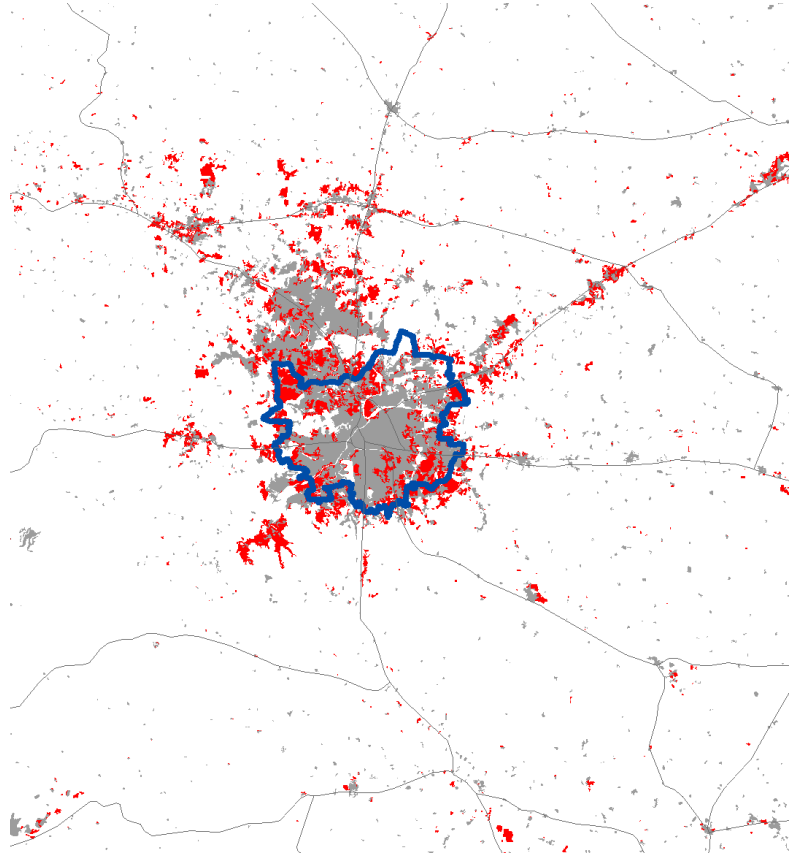
WORLD RESOURCES INSTITUTE

PLANNING ANEW

RI INDIA | SUSTAINABLE CITIES







Delhi NCR

54 sqkm/ year

Mumbai

5 sqkm/ year

Pune

42 sqkm/year

Municipal Boundary

Urban Area (2005-06)

Urban Area (2011-12)

- Rapid growth in satellite towns of Delhi (Gurgaon, Noida, Grt Noida, Faridabad etc)
- Mumbai, little movement in peripheries, but witnessing inner city redevelopment
- Pune capitalising on Mumbai's slow down, attracting new economies like IT/ ITES

Source: Generated by WRI India using data from Bhuvan NRSC

HIGH COST OF SPRAWL

Image Source: © Smart Prosperity Institute. Copyright provided.

ADDITIONAL COSTS OF URBAN SPRAWL

LOCATION LOCATION LOCATION!

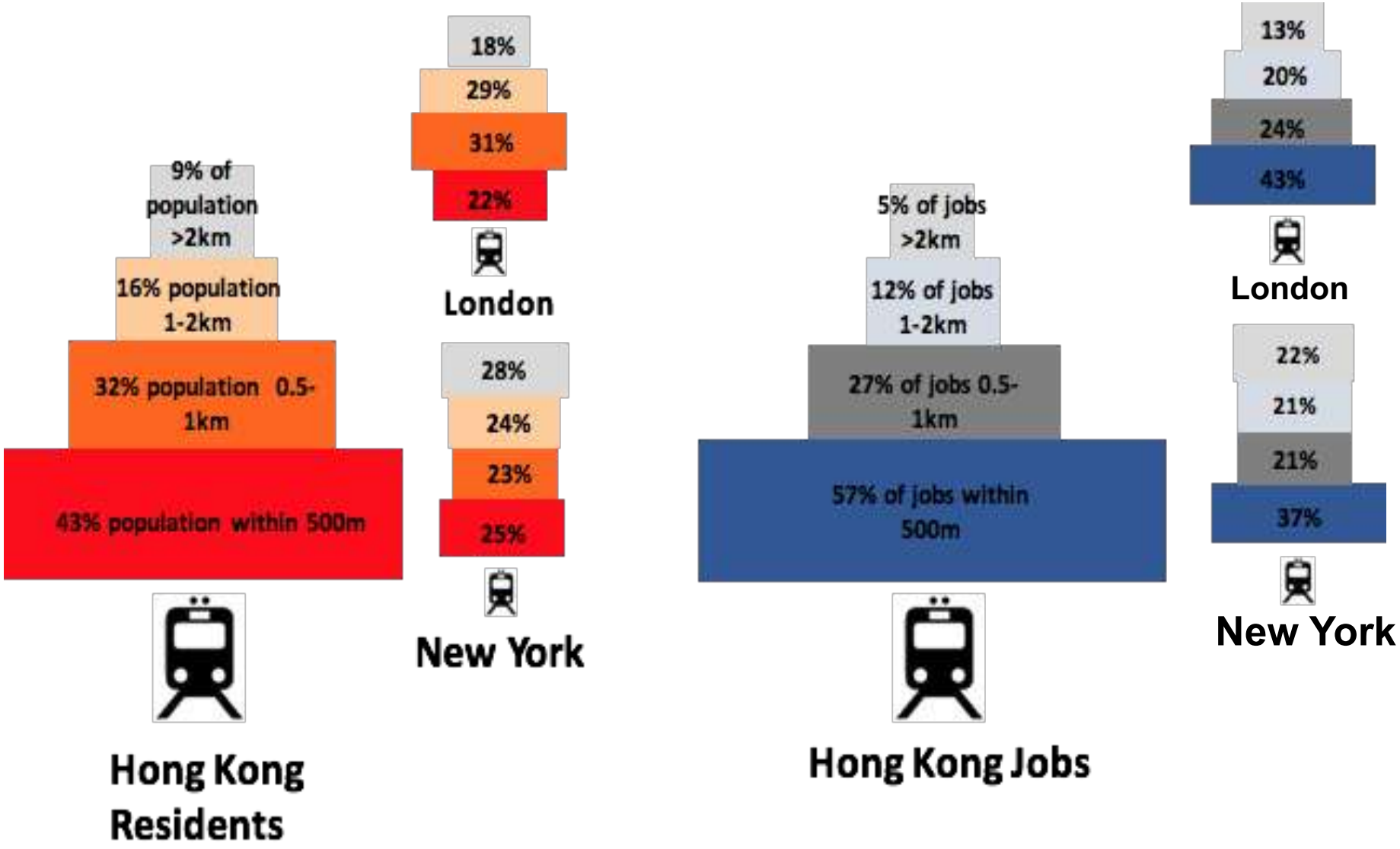


Image Source: LSE Cities.

Bangalore: 60% jobs within 60 mins

ALMOST ALL CITIES FAIL AIR QUALITY STANDARDS

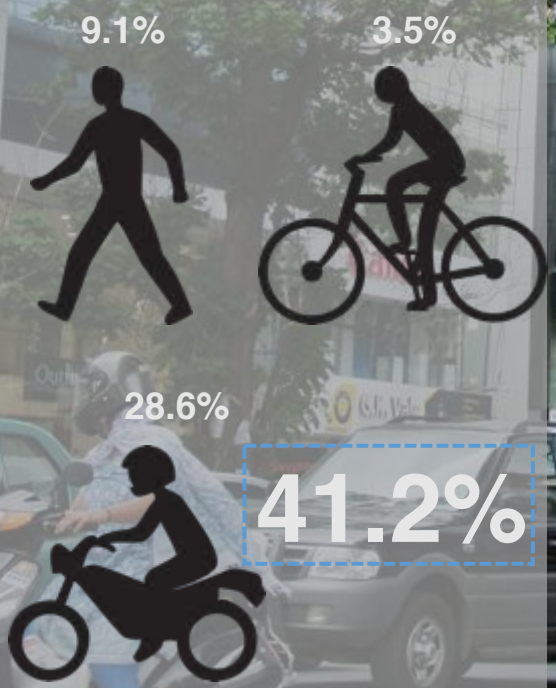
SOURCE: Mortality data from World Health Organisation:
http://apps.who.int/gho/data/node.wrapper.ENVHEALTH3

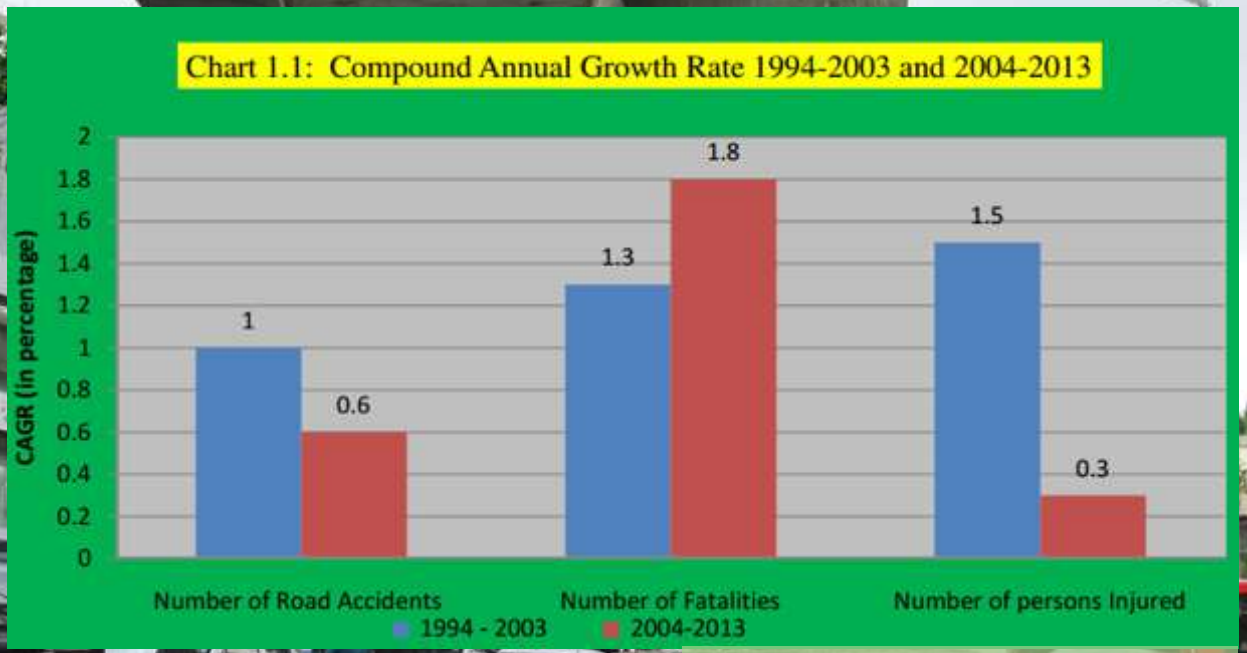
TRAFFIC FATALITIES

Traffic Fatalities (2013)

140 000

Traffic Fatalities





Data from MoRTH

Image source: WRI India

WRI INDIA

HIGH QUALITY PUBLIC TRANSPORT AFFECTS QUALITY OF LIFE

MASS TRANSIT PLAYS A MAJOR ROLE IN REDUCING URBAN EMISSIONS, AND LEADS TO BETTER GROWTH

Note: * Determined by composite rankings against a range of indicators. Based on ranking of 24 international cities with #24 being the top rank. For more information on these see PwC Cities of Opportunity available at http://www.pwc.com/us/en/cities-of-opportunity/

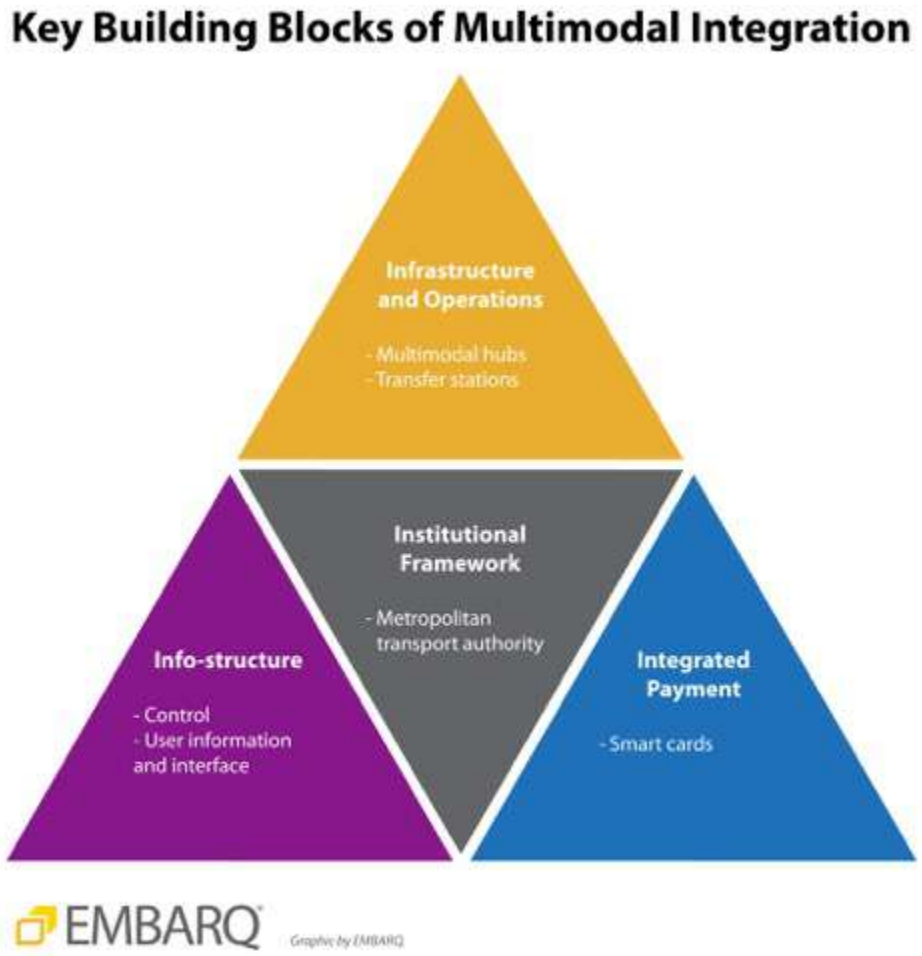
ACTION AREAS

- Sustainable Mobility
- Landuse-transport integration (TOD)

SOLUTION: PUBLIC TRANSPORT (EG: BUSES AND BRT SYSTEMS)

SOLUTION: MULTI-MODAL INTEGRATION

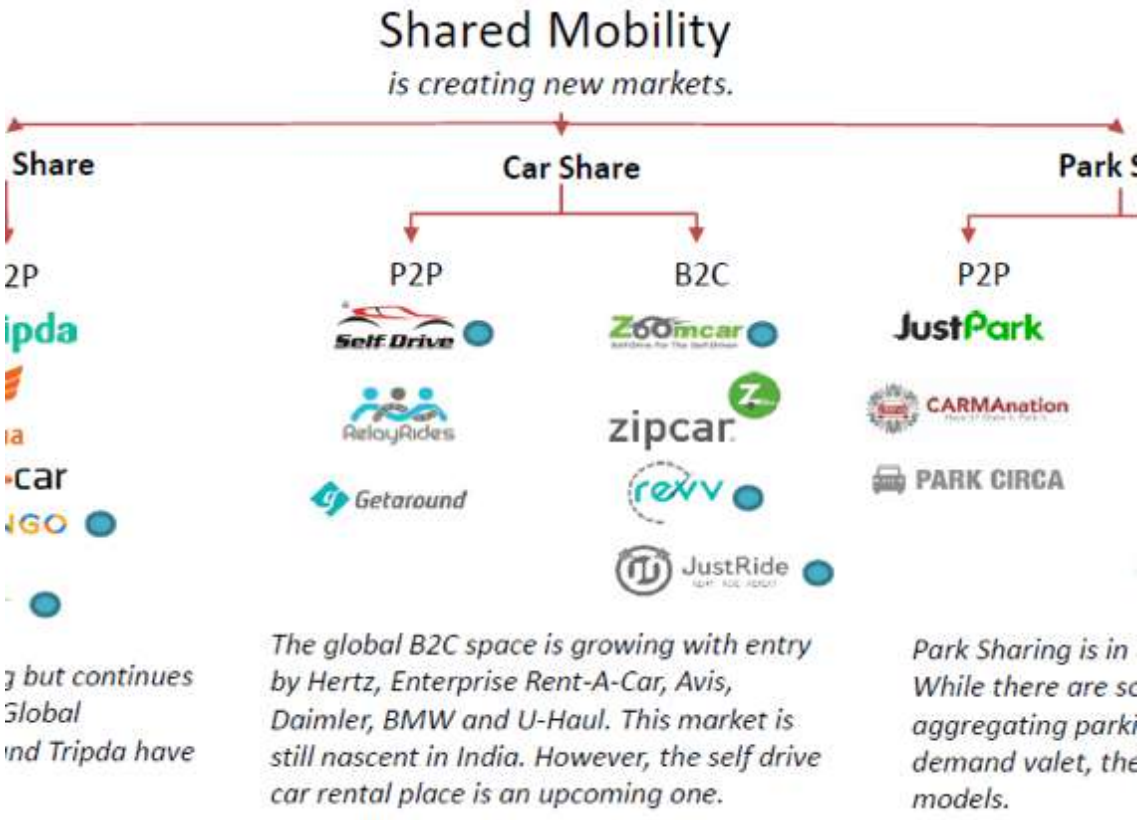
Integrate various modes of PT and IPT through schedule, fare, and physical integration



SOLUTION: NEW/CLEAN SUSTAINABLE MOBILITY

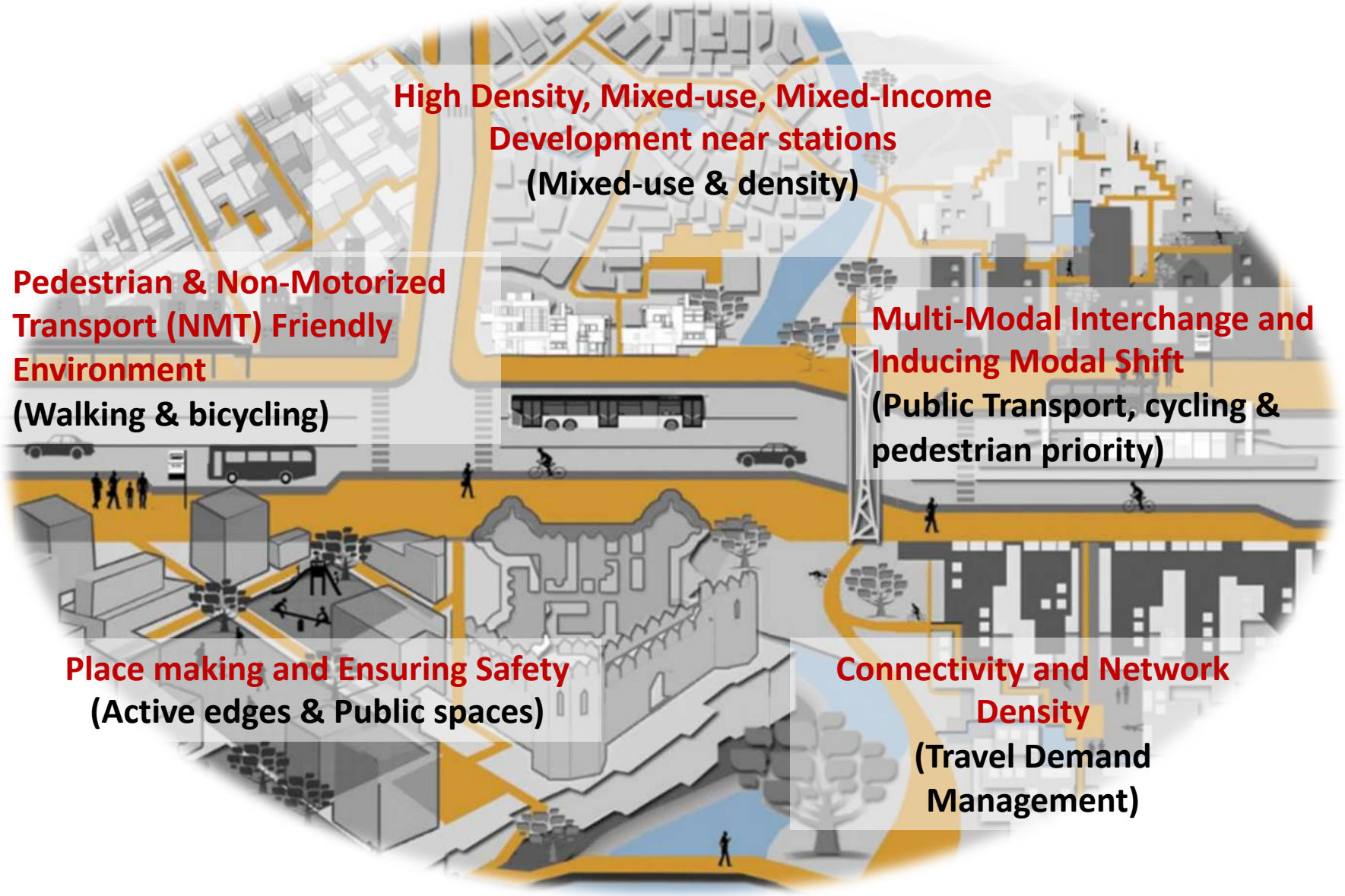
Electric vehicles

Shared Mobility



SOLUTION: LANDUSE AND TRANSPORT INTEGRATION

ELEMENTS


High Density, Mixed-use, Mixed-Income Development near stations
(Mixed-use & density)
Pedestrian & Non-Motorized Transport (NMT) Friendly Environment
(Walking & bicycling)
Multi-Modal Interchange and Inducing Modal Shift
(Public Transport, cycling & pedestrian priority)
Place making and Ensuring Safety
(Active edges & Public spaces)
Connectivity and Network Density
(Travel Demand Management)

BARRIERS TO IMPLEMENTING TOD

- Land (Amalgamation incentives, pooling)
- **Consumer demand/ jobs**
- **Infrastructure provisioning (for resource efficiency)**
- Regulatory (Scales of Plan)
- Governance (Institutional Coherence)
- Finance (LVC, PPP)

BEGIN WITH: NEIGHBORHOODS THAT MEET PEOPLE'S NEEDS

In order to live in cities that enable communities to experience full and purpose-driven lives, livable people-oriented neighborhoods should meet seven basic needs through urban planning, design strategies and physical interventions.

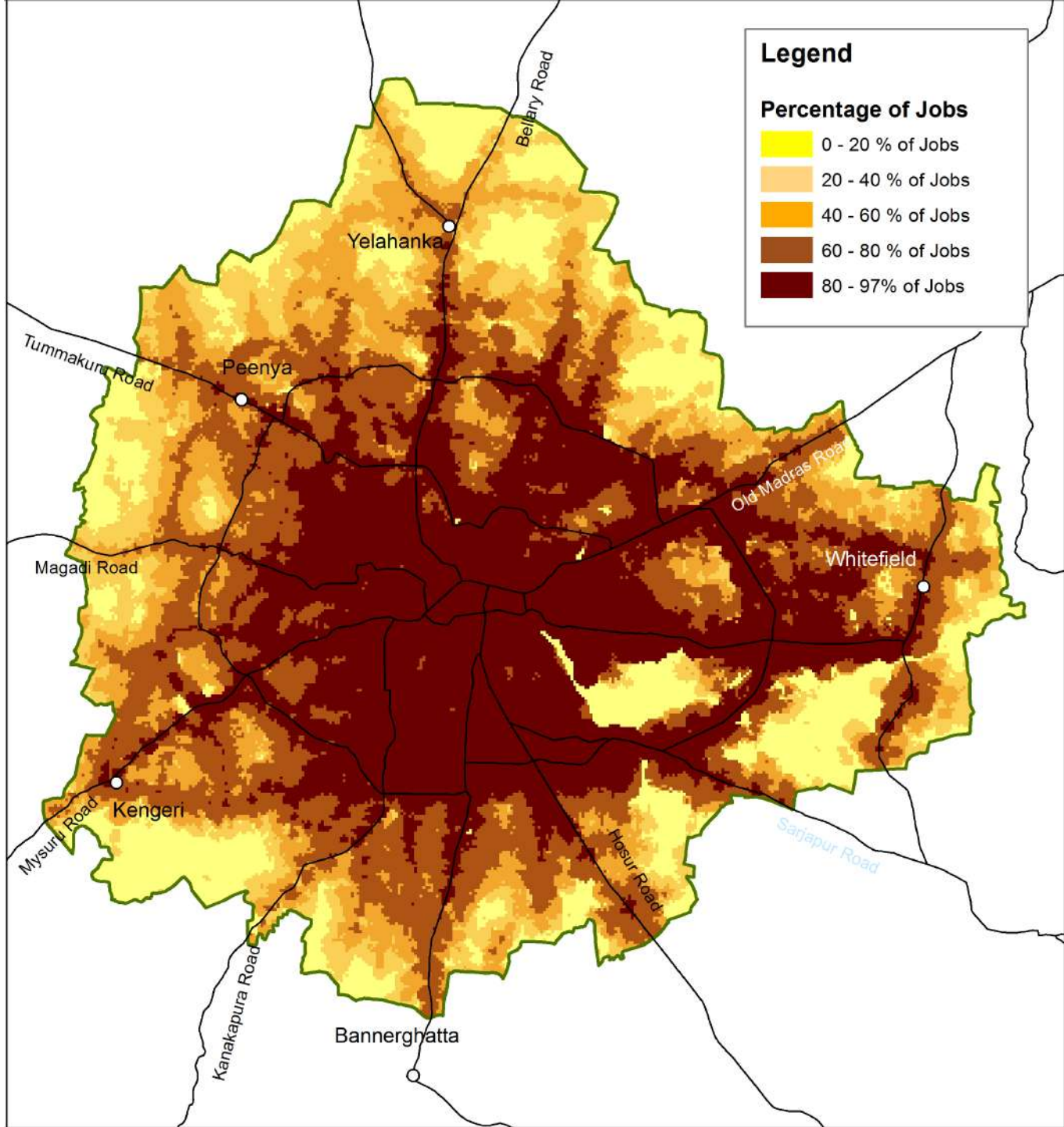
Livable neigborhoods

1. Basic services
2. Move
3. Feel safe
4. Be healty
5. Socialize
6. Flourish
7. Work

REGIONAL ACCESSIBILITY (60 MINS)

JOBS	POPULATION
0 – 20 %	2,44,661
20 – 40 %	4,68,235
40 – 60 %	9,63,473
60 – 80 %	22,57,396
80 – 97 %	45,09,957

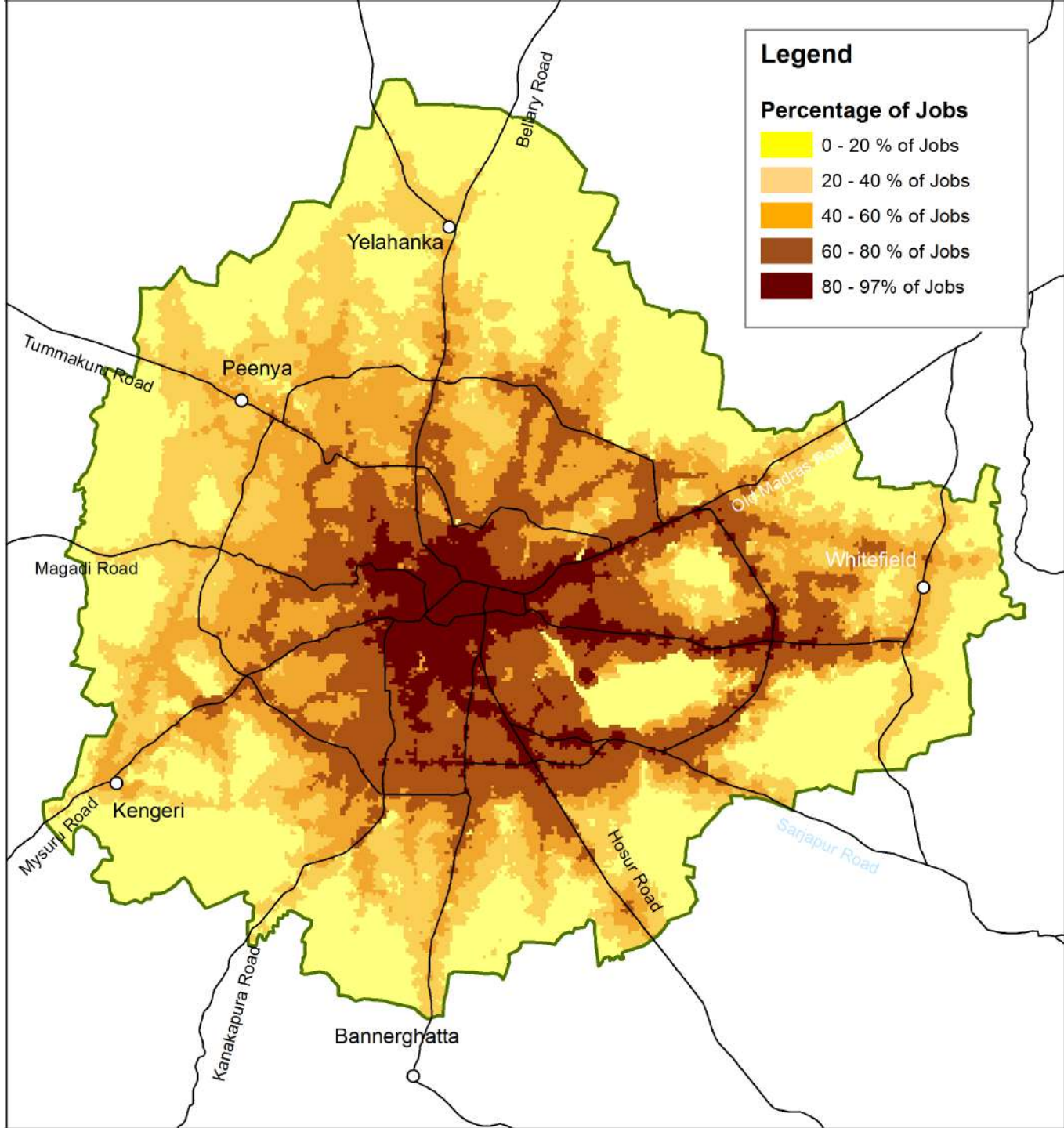
- Majority have good access to jobs within 60 minutes in normal case scenario

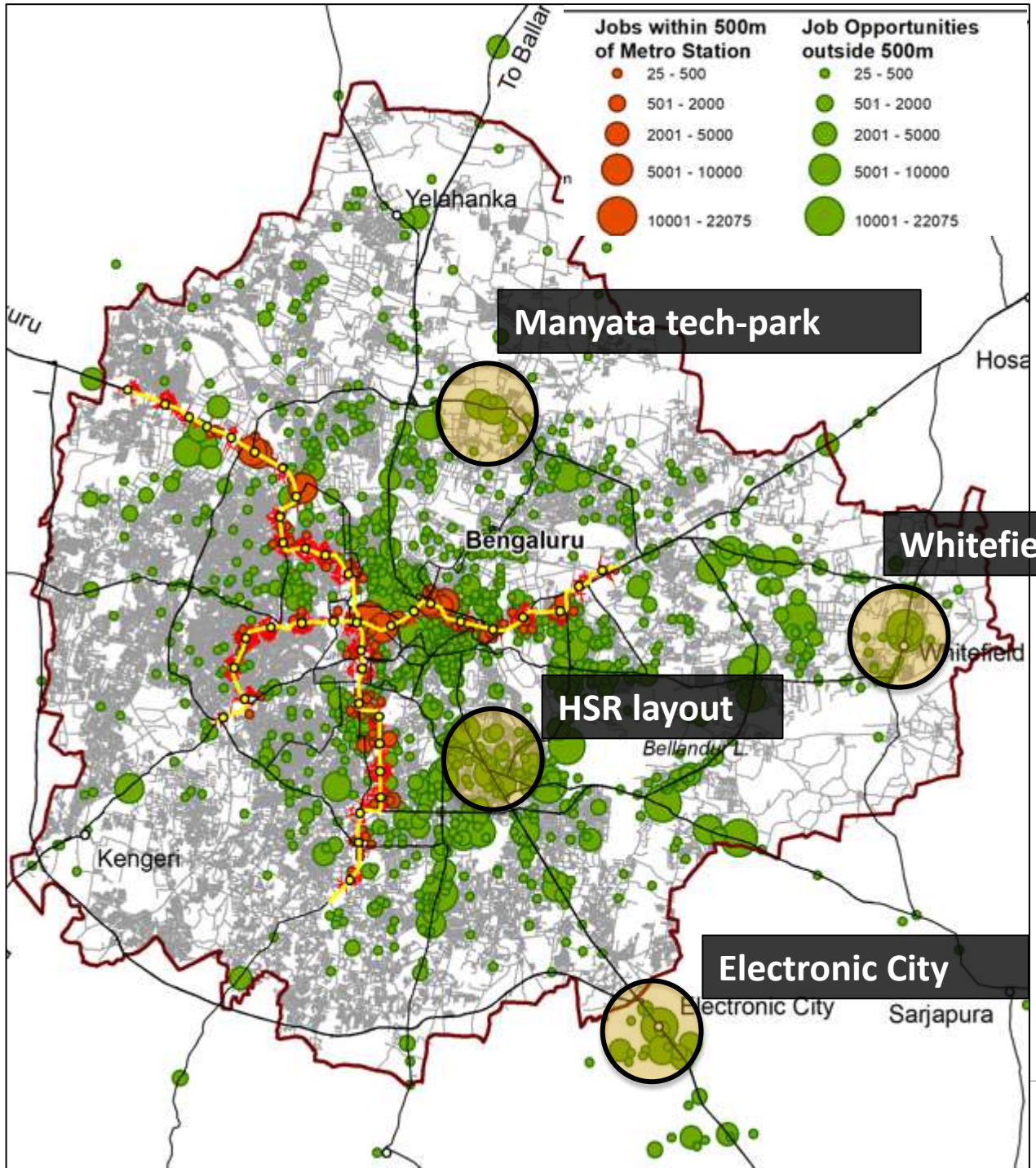


REGIONAL ACCESSIBILITY (60 MINS) WORST CASE

JOBS	POPULATION
0 – 20 %	10,93,490
20 – 40 %	15,56,066
40 – 60 %	23,61,129
60 – 80 %	26,88,847
80 – 97 %	7,44,141

- People living along major corridors have good access to jobs within 60 minutes of travel in worst case scenario





SOLUTION: JOBS DENSITY AROUND CORRIDOR

Major office nodes located away from city core are not well connected by metro as of today

only 7% jobs within 500m distance of station; 38% within 2kms

SOLUTION: STRATEGIES FOR ROAD INFRASTRUCTURE IMPROVEMENT

Character of road network	Strategic Focus
Dense network with a hierarchy *This is an ideal condition which most likely not present in any of the TOD zones*	**Focus on accessibility-** enhancement of road infrastructure conditions to create complete streets
Dense network of mostly local roads	**Focus on upgradation, along with accessibility-** Select roads can be upgraded to higher categories (higher width) based on contextual realities such as land availability, connectivity to larger networks outside the TOD zone etc
Thin road density	**Focus on augmentation (adding new roads), along with accessibility**- Alignment of new roads to be suggested based on availability of land, connectivity to existing roads of required hierarchy. Also, smaller local roads can be suggested to join missing links and thus to create a complete pedestrian network.

Existing...

Source: EMBARQ India | Marol, MIDC Project

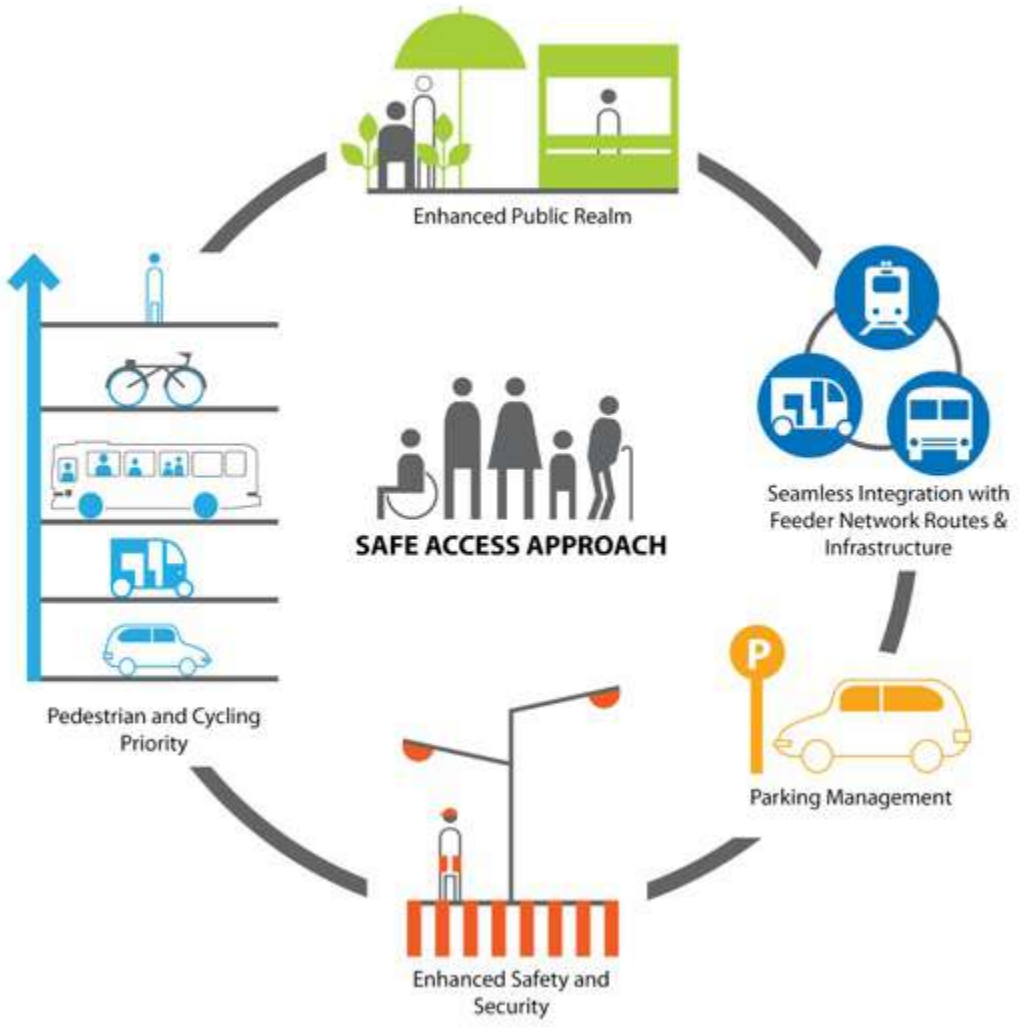
SOLUTION: COMPLETE STREETS

SOLUTION: NMT PRIORITY

Redesign roads to make them safer for all users esp. pedestrians and cyclists

Source: thehindu.com, henrikvaluer.wordpress.com

SOLUTION: SAFE ACCESS



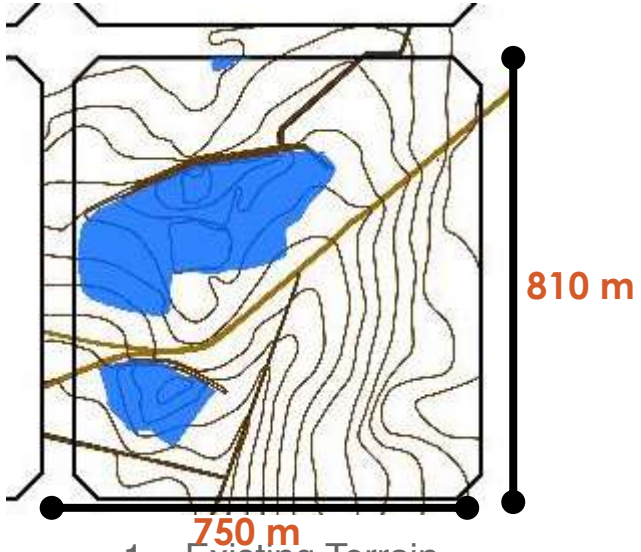
In the safe access approach the needs of “PEOPLE” lie at the centre of the strategies developed for station accessibility plans and station area improvements.

SOLUTION: TACTICAL URBANISM

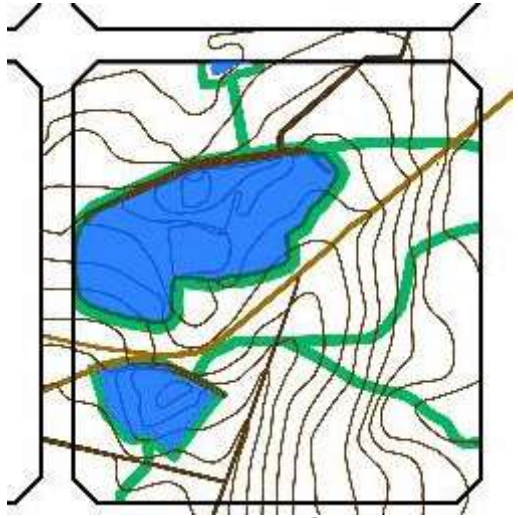
SOLUTION: OPEN AND CIVIC AMENITIES SPACES AUGMENTATION

	Strategy
Source-1: Public	▪ Existing Parks, playgrounds, civic amenities spaces owned by BBMP/ any other public authority ▪ Buffers of natural features which could be made accessible
Source-2: Private	A portion of open/ civic amenities space in large private developments will be publicly accessible
Source-3: Semi-public	Existing open space/ civic amenities spaces in institutional/ semi-public developments to be made accessible to public as a shared facility

SOLUTION: NATURAL RESOURCE PRESERVATION (NAYA RAIPUR)



1 – Existing Terrain


2 – Riparian Corridors


3 – Road network

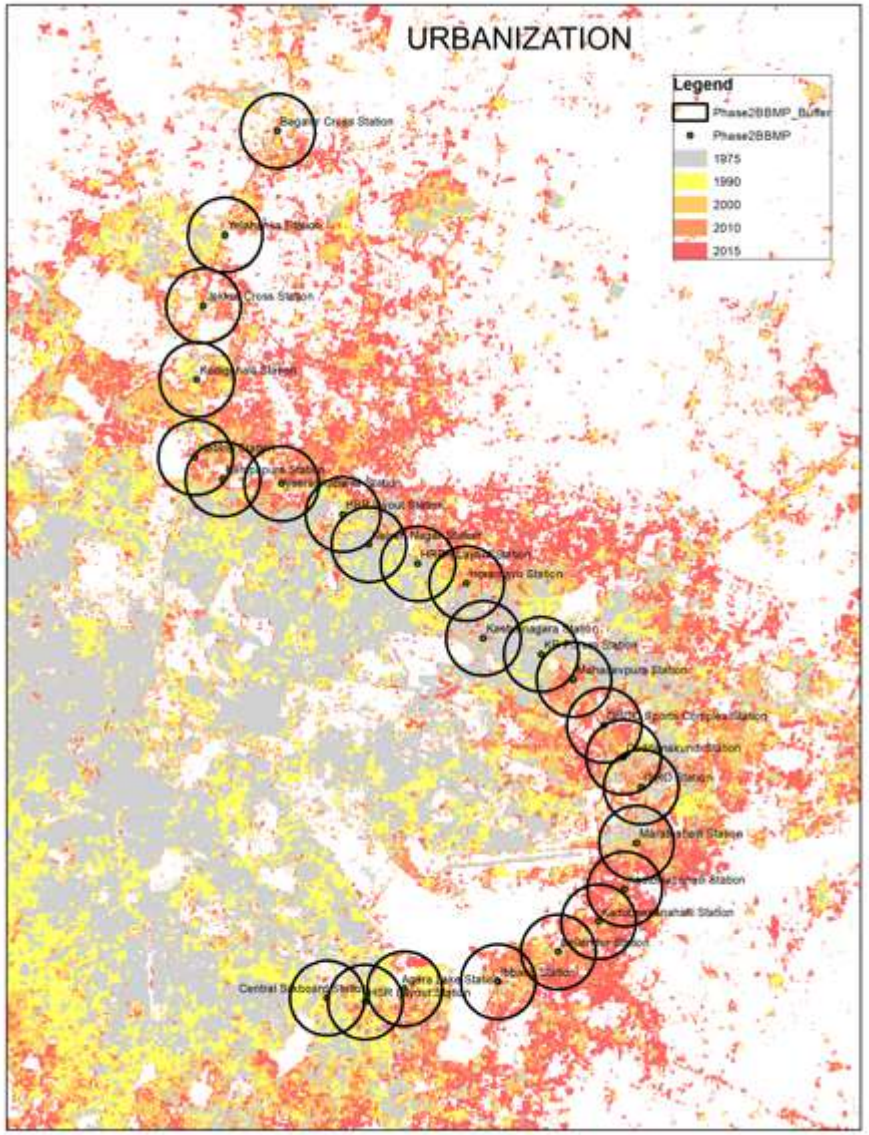

4 – NMT Network

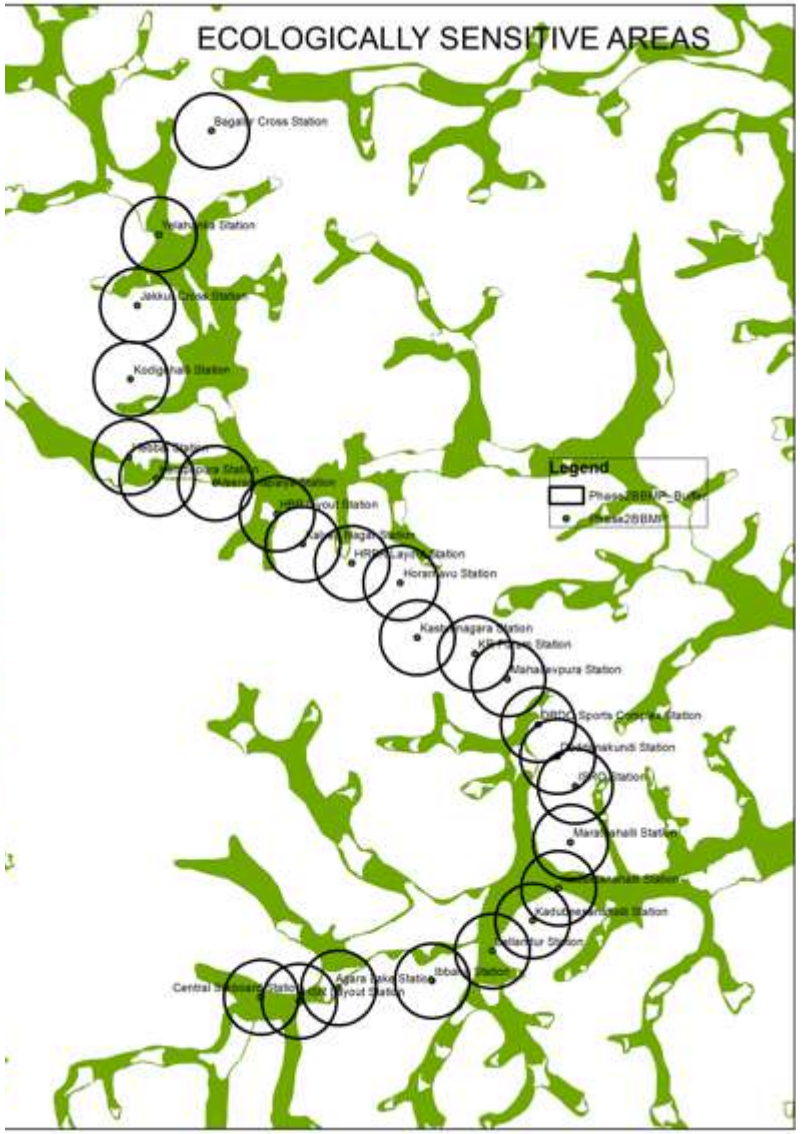

5 – Amenities and Commercial Areas aligned to the NMT and open spaces

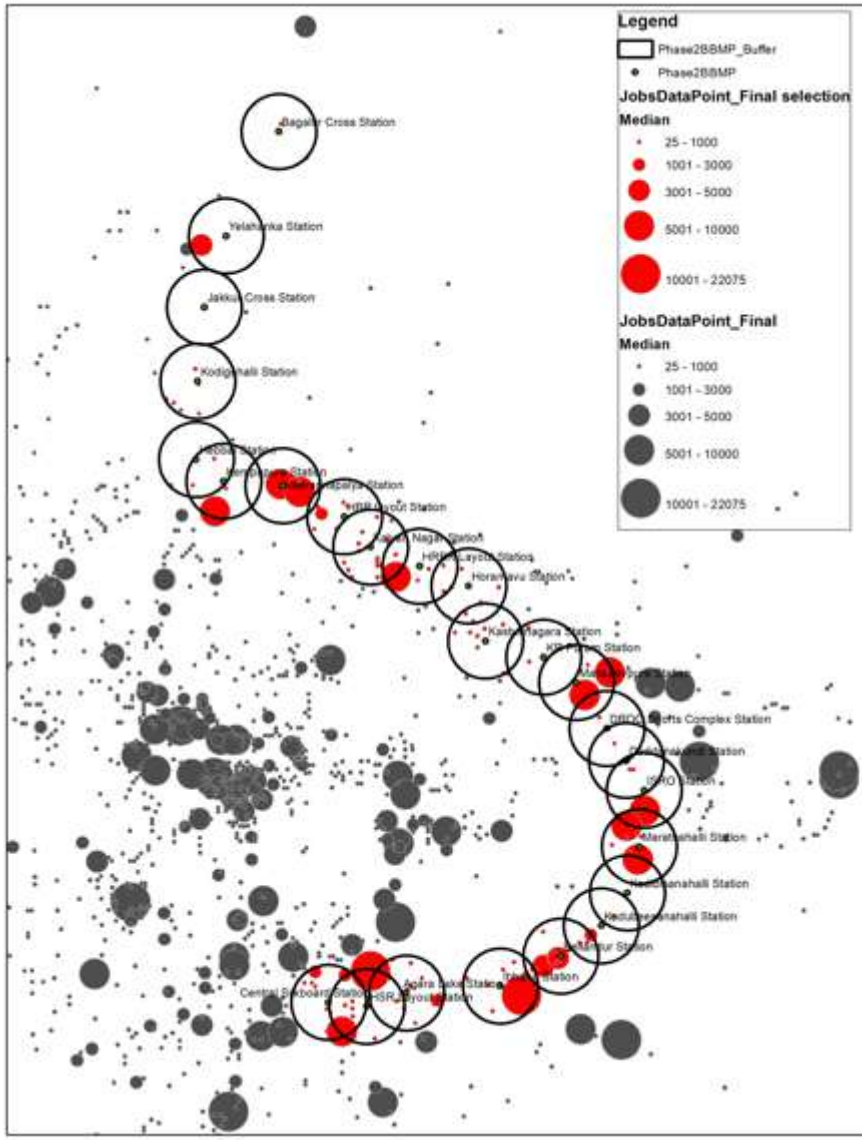

6 – Final layout

SOLUTION: PUBLIC SPACES (NAVANAGAR TOD: HUBLI-DHARWAD)

Solution: Resource efficiency



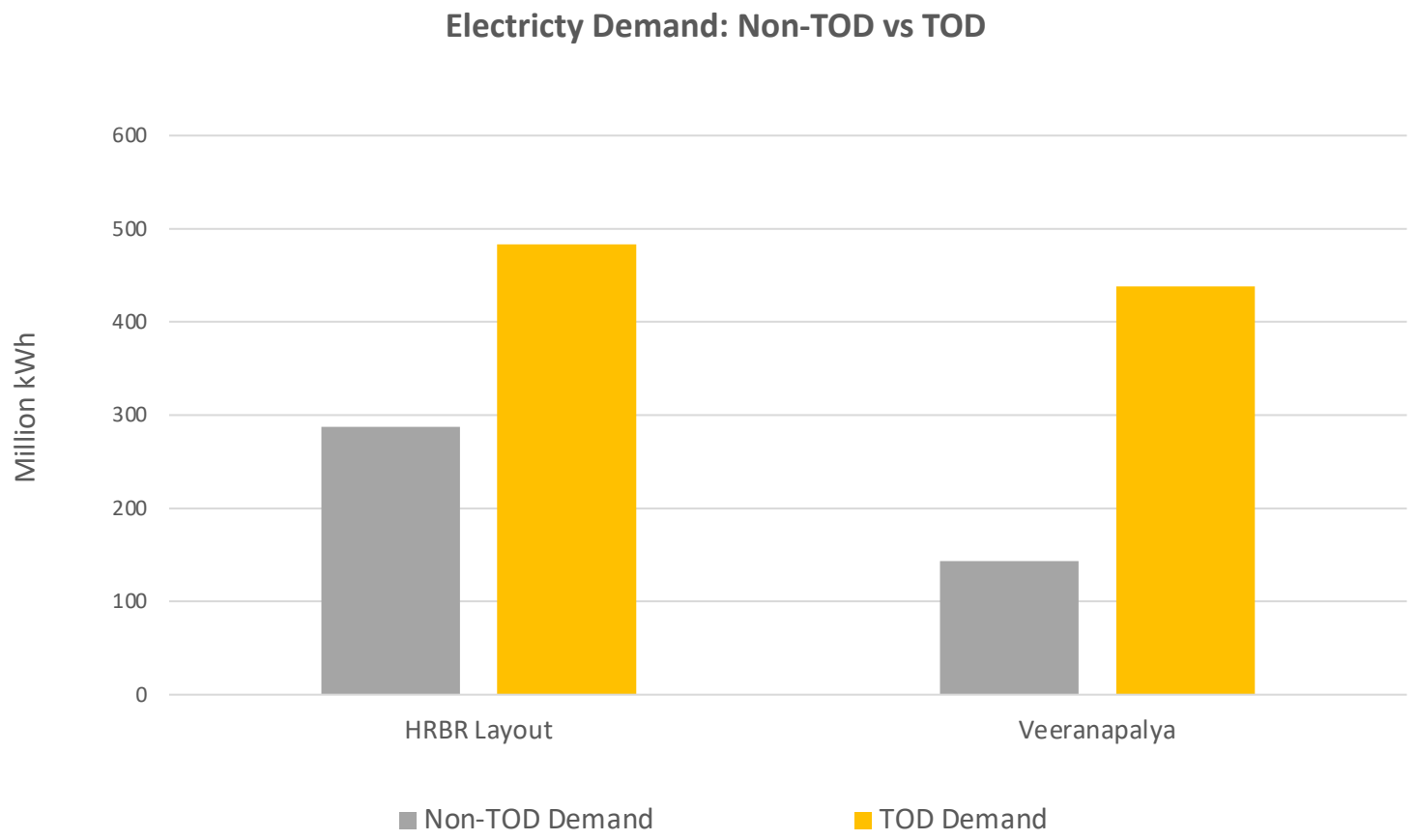




SOLUTION: RESOURCE OPTIMIZATION (BANGALORE METRO)

ENERGY DEMAND ASSESSMENT: NON-TOD VS TOD

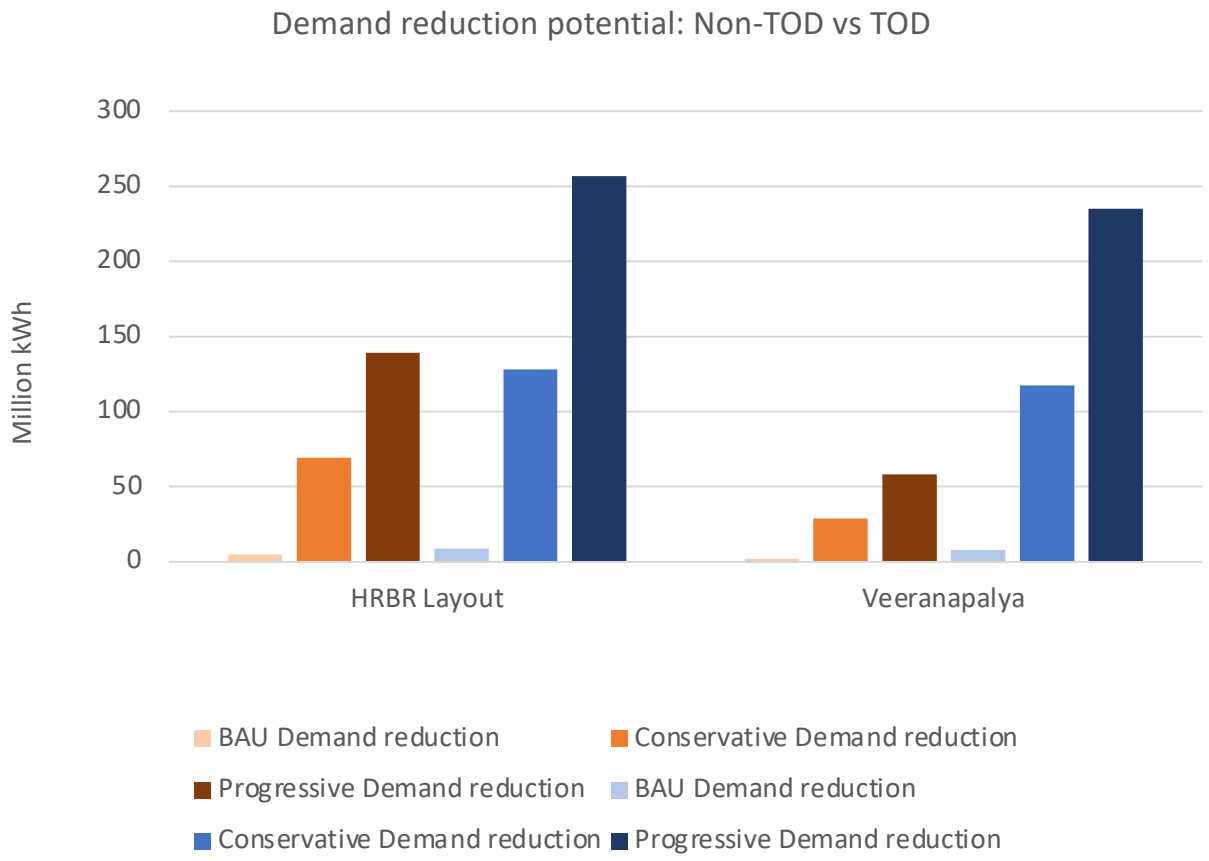
- 2000 kwh annual per capita demand (city wide average)



ENERGY EFFICIENCY POTENTIAL: CONSERVATION MEASURES

- Energy efficient appliances and behavioral change applicable in total building stock
- Conservation by passive building design applicable in new building stock only

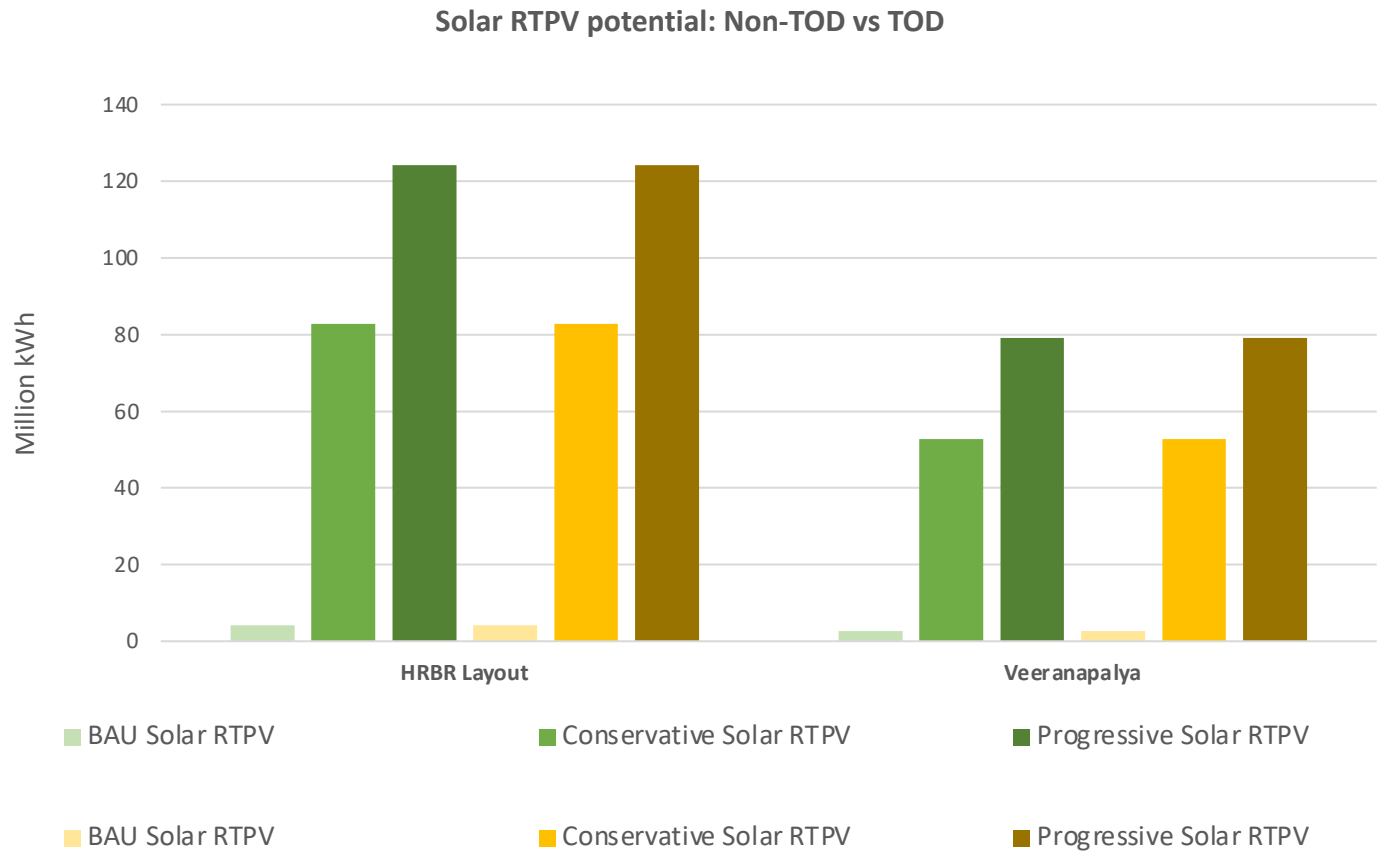
Scenario	% Savings by energy efficient appliances	% Savings by passive building design
BAU	1%	1%
Conservative	10%	20%
Progressive	20%	40%



ENERGY EFFICIENCY POTENTIAL: SOLAR RTPV

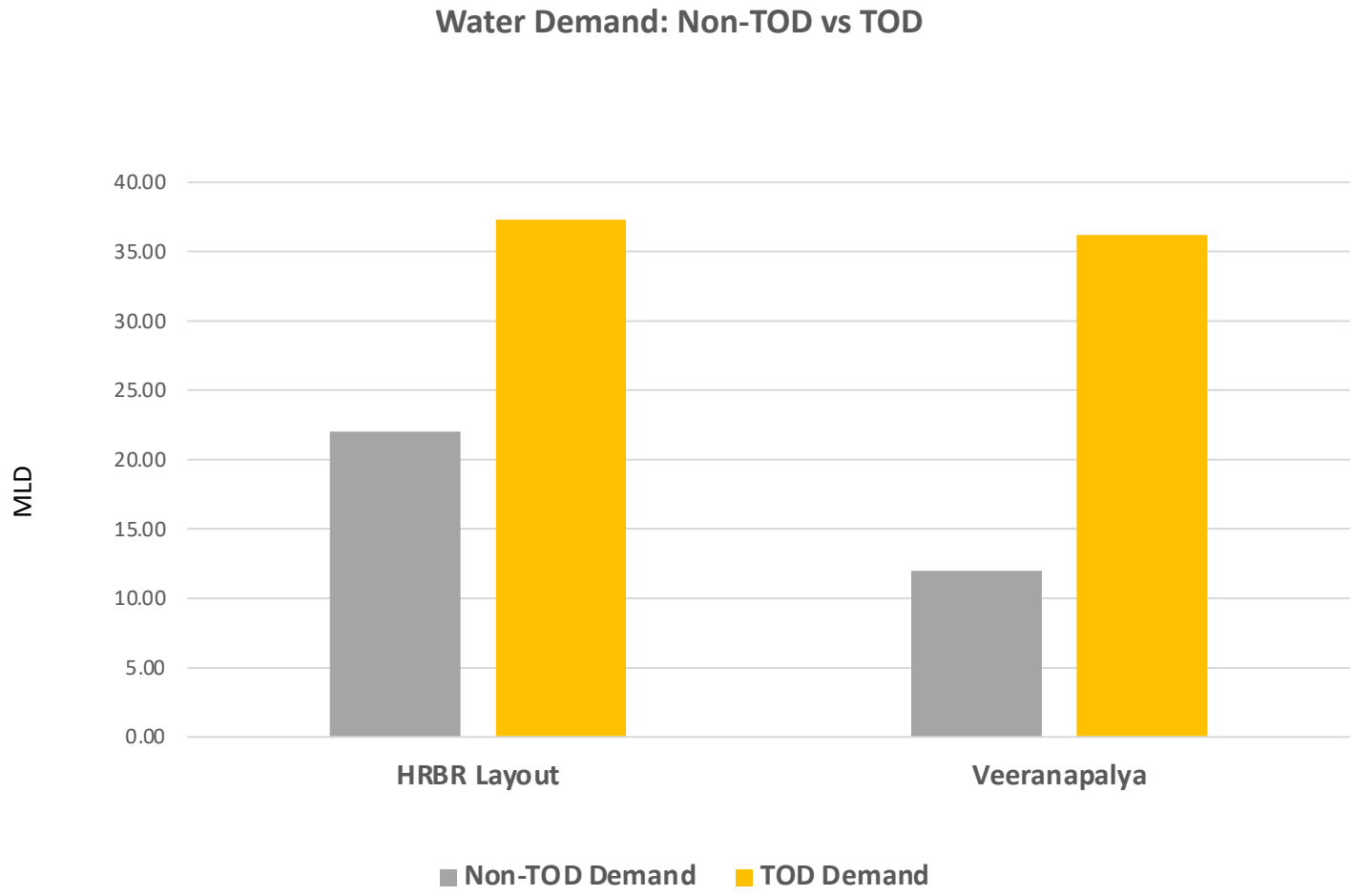
- Total roof area is calculated from the building footprint
- Electricity generation potential through solar RTPV per sq.m. per day: 4 kWh
- Usable roof area: 50%
- Sunny days a year: 250

Scenario	% of adoption of solar RTPV
BAU	1%
Conservative	20%
Progressive	30%



WATER DEMAND ASSESSMENT: NON-TOD VS TOD

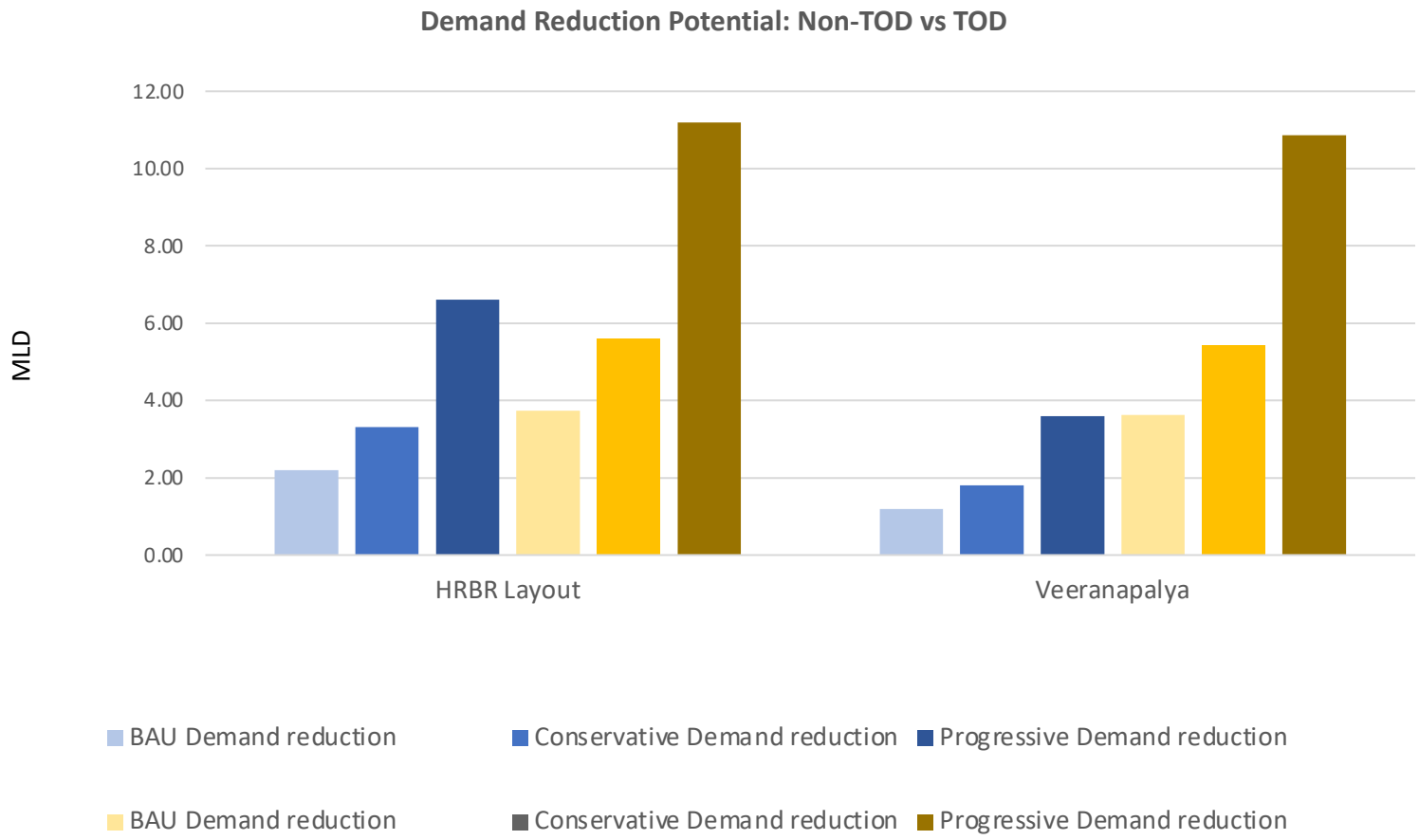
- Residential demand- 150 lpcd
- Commercial demand- 1.5 lit per sqm of commercial floor space



WATER EFFICIENCY POTENTIAL: CONSERVATION MEASURES

- Includes a range of water conservation measures

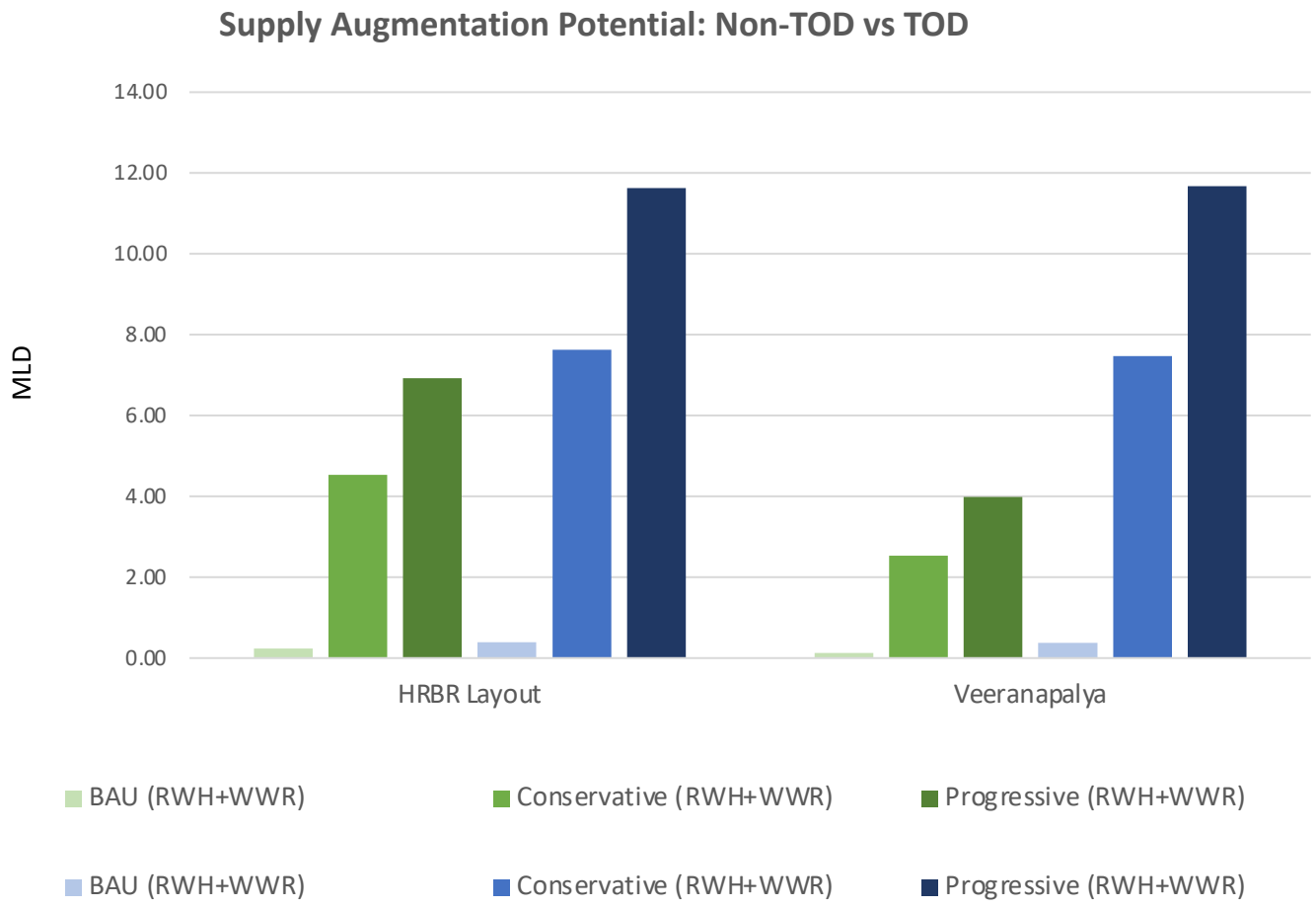
Scenario	Water saving potential (as a % of demand)
BAU	10%
Conservative	15%
Progressive	30%



WATER EFFICIENCY POTENTIAL: SUPPLY enhancement

- Average rainfall * roof area / days in a year
- Annual average rainfall in Bangalore: 931 mm

Scenario	% of rainwater harvested that can be used	% of demand met by wastewater
BAU	1%	1%
Conservative	5%	20% (domestic); 25% (non-domestic)
Progressive	10%	30% (domestic); 50% (non-domestic)

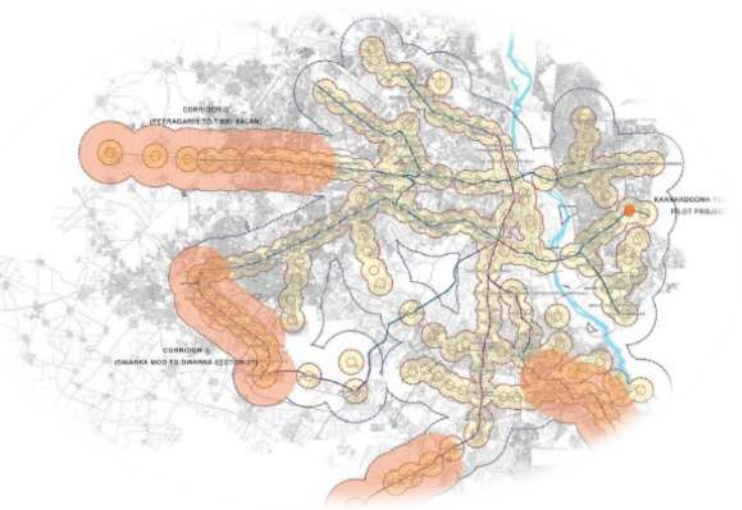


The opportunity

Game-changing solutions are out there

Managing Urban Expansion

Compact development



Improve Energy Efficiency

Smart, efficient buildings

Addressing congestion

Mass Transit, Bike sharing systems and other low impact modes

But solutions need *improvising*, *scaling* and *adapting* for maximum impact

- Source: UTTIPEC, DDA, WRI India)
- Photo credit: Anne Maassen