100 SMART CITIES - MOVING AHEAD TO BUILD INDIA'S LIVABLE CITIES

National Institute of Urban Affairs

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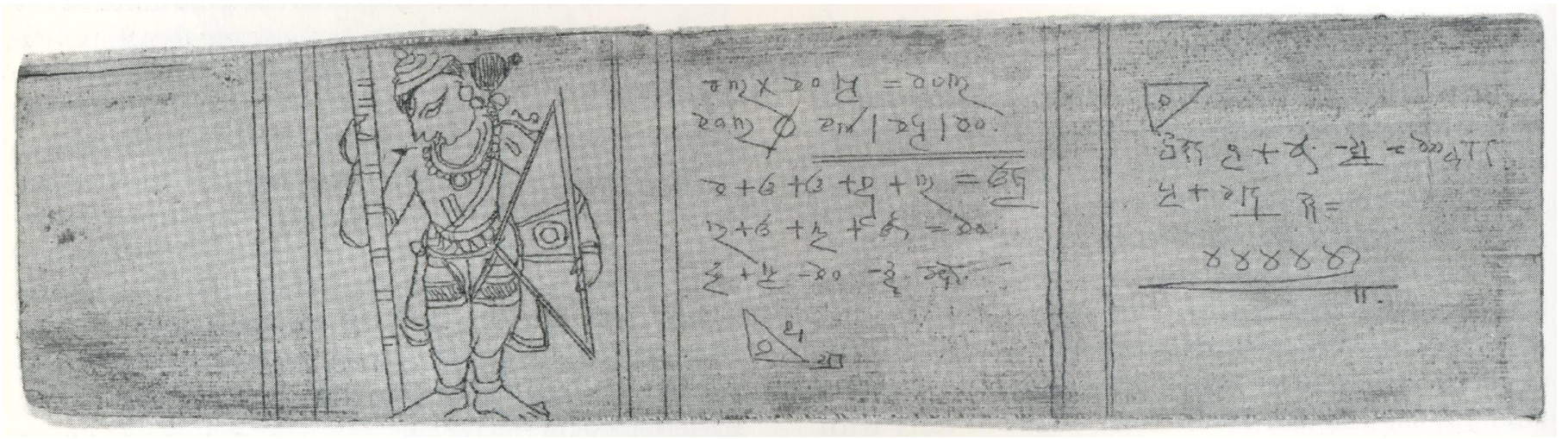
INDIAN SIGN	SUMERIAN SIGN	APPROXIMATE DATE OF USE	PHONETIC VALUE	PICTURE VALUE
		2750	BAR	a kind of shrine.
		3000.	GI.	reed.
		3000	GAN.	a land measure.
		3500	MAL. GA.	a dwelling
		3000	—	—
		2400.	GIL	(a doubled form of GI above)
		3000	GIR. AD.	a scorpion

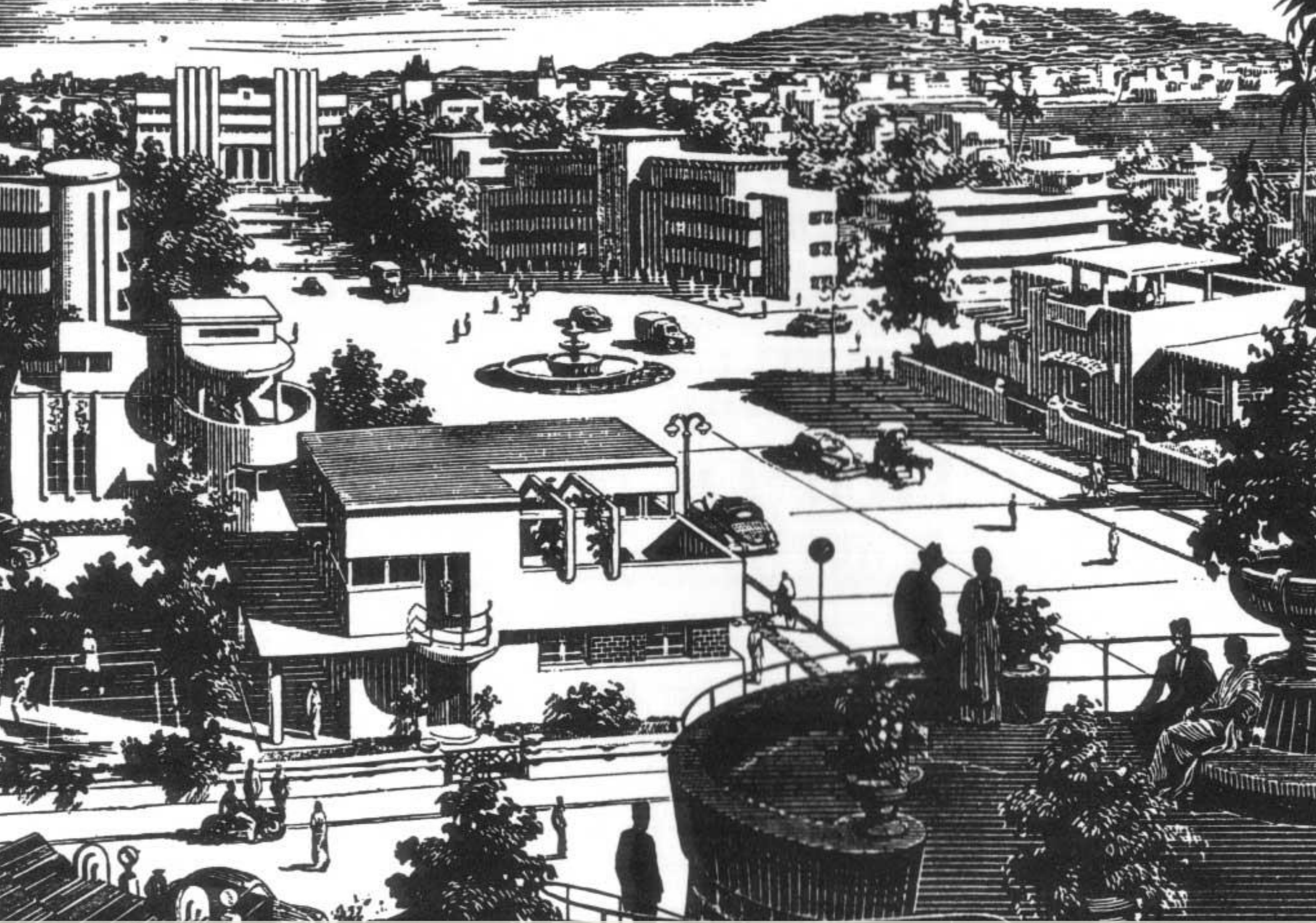
INDIAN SIGN	SUMERIAN SIGN	APPROXIMATE DATE OF USE	PHONETIK VALUE	PICTURE VALUE
		2800 -2700	KHA	Fish
		2400.	SAR.	360
		3,000	GAL.	great
		3000	SAG	heart. in
		2800 2400	BAD	Head
		3000	KU ŠU	to
		2800.	ŠU.	hand.
		2800	UŠ.	
		3000	E	house, plot of land



Jaipur, built in late 18th century

Chandni Chowk, c. 1900

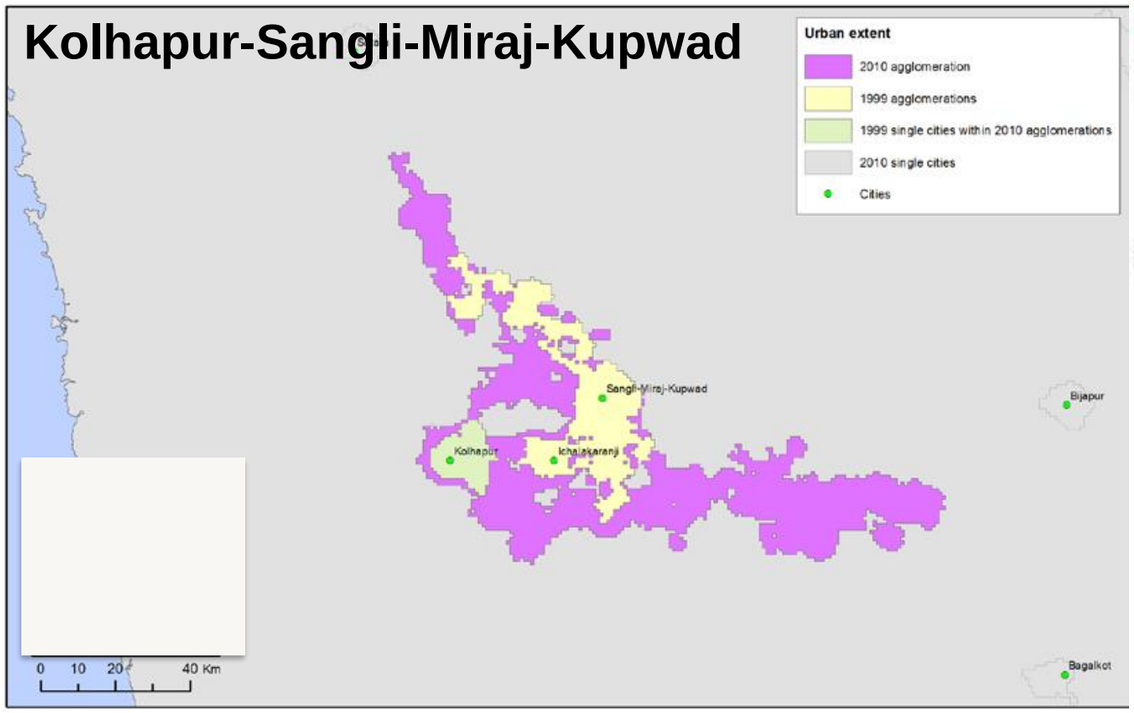
Mughal route map of Shajehanabad

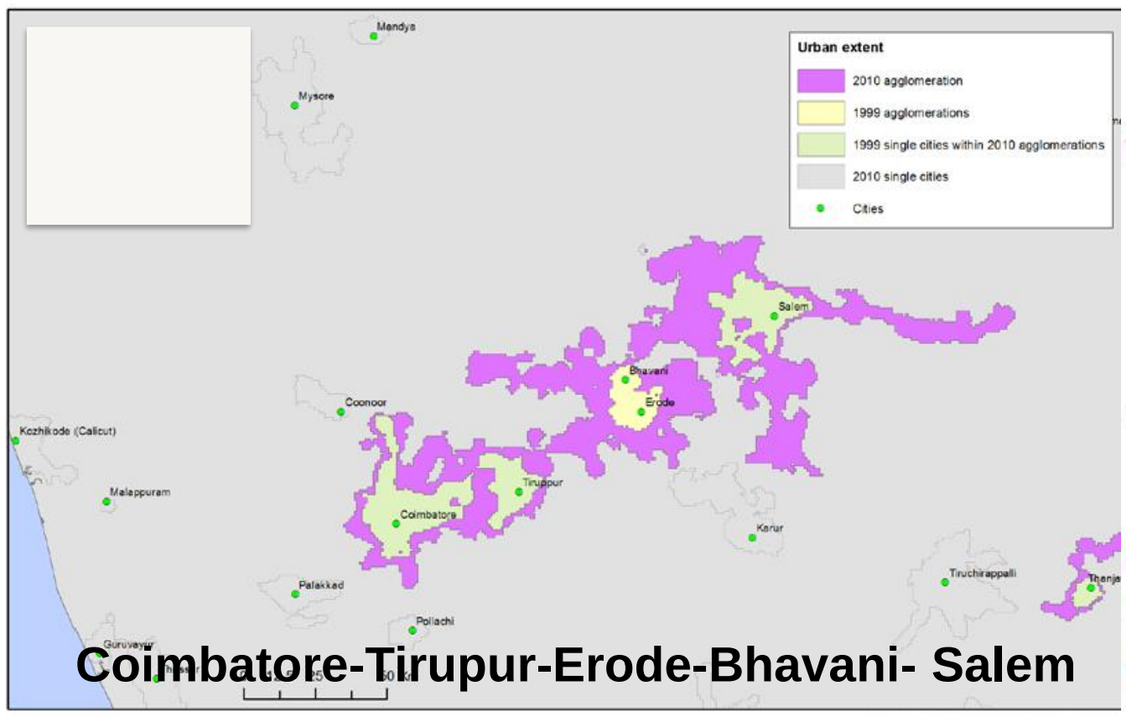


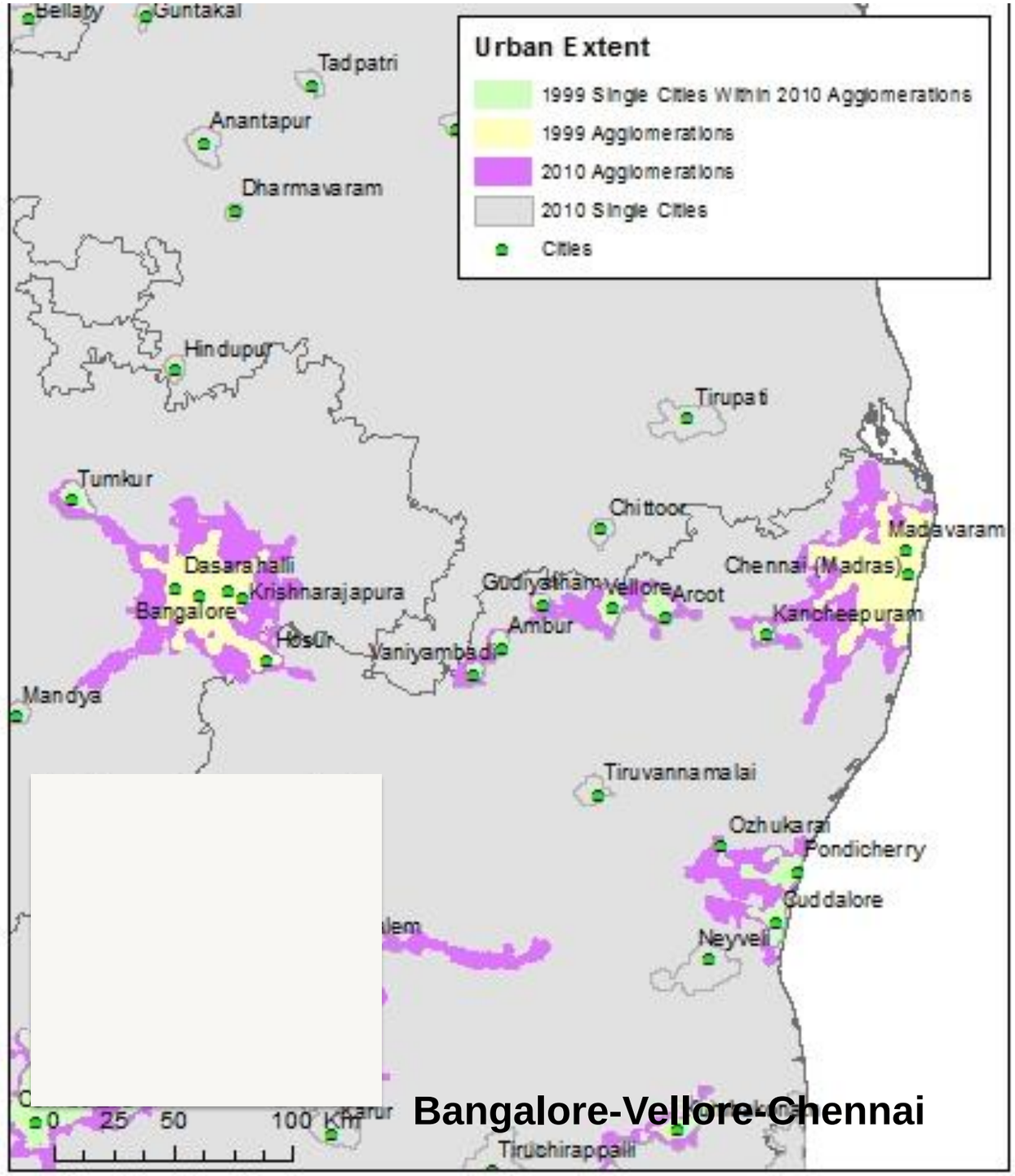
Advert for concrete, Journal of the Indian Institute of Architects, 1946

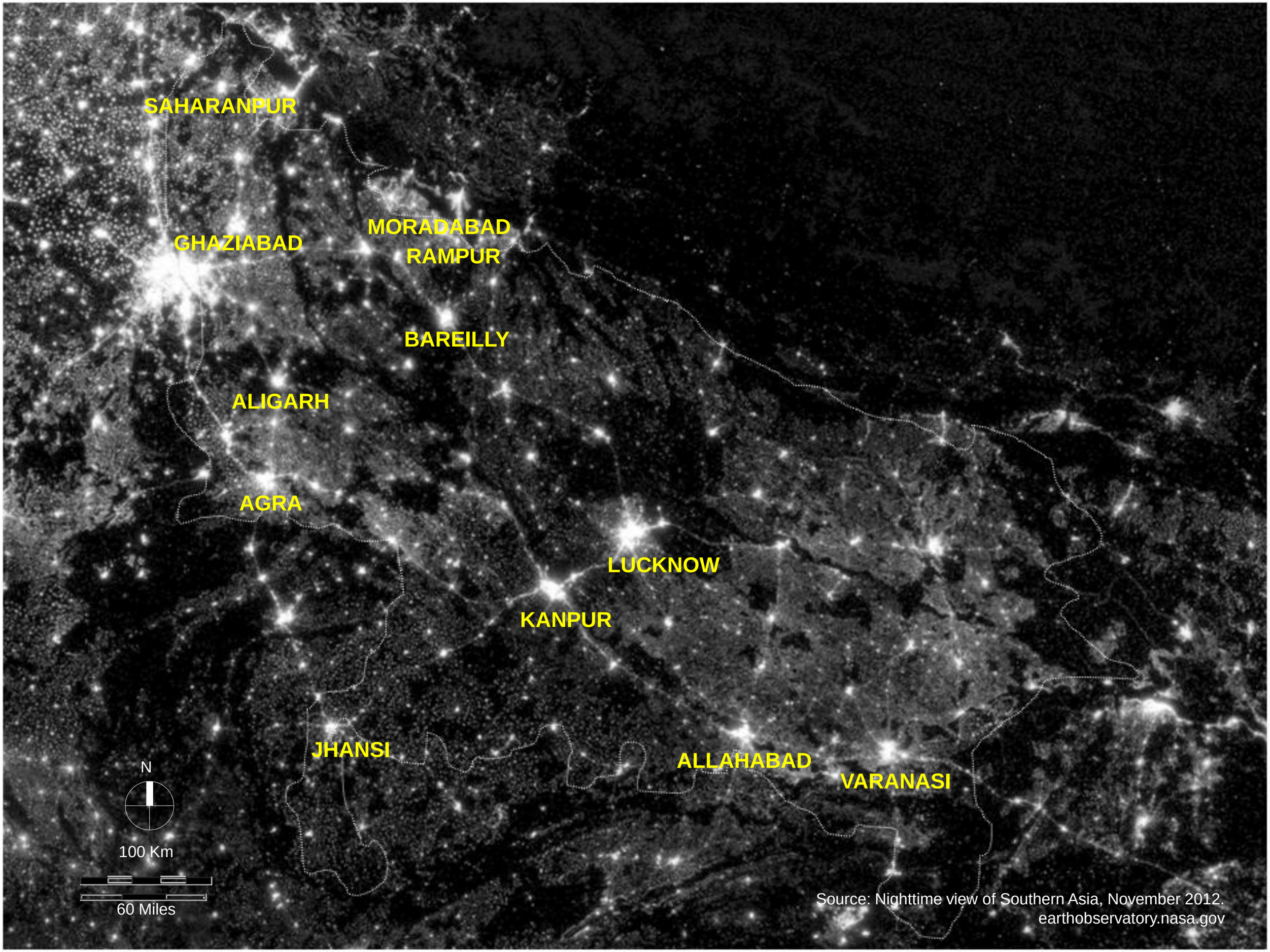
Urbanization – rapid spatial expansion (80% over last 10 years)

Peri-urban areas support 9% of the country's population and provide 18% of the employment on 1 per cent of the country's land area (12th FYP)







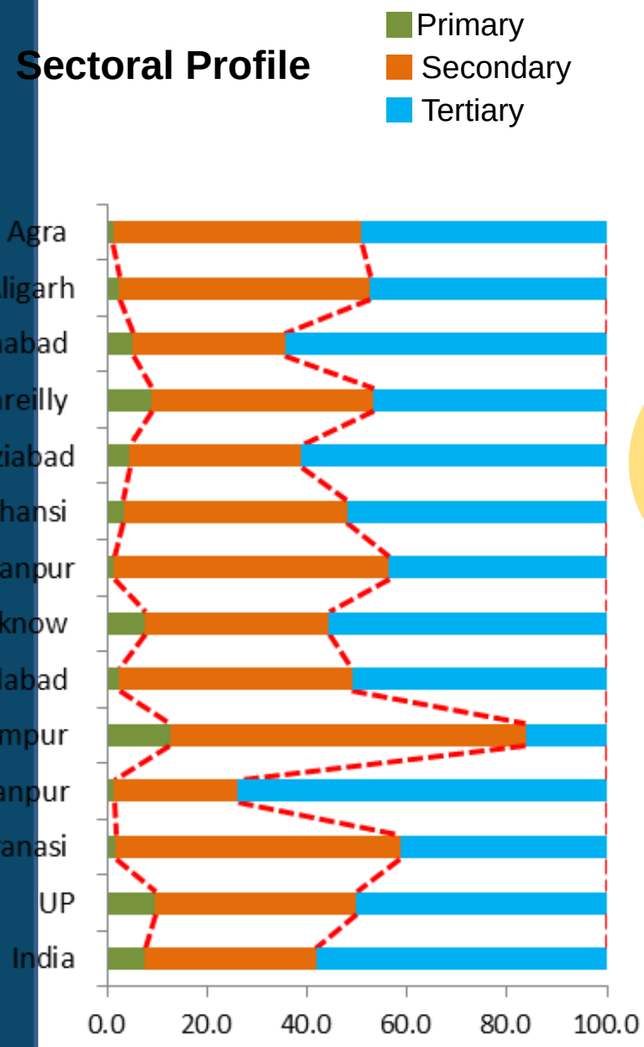

SAHARANPUR
GHAZIABAD
MORADABAD
RAMPUR
BAREILLY
ALIGARH
AGRA
LUCKNOW
KANPUR
JHANSI
ALLAHABAD
VARANASI
N
100 Km
60 Miles
Source: Nighttime view of Southern Asia, November 2012.
earthobservatory.nasa.gov

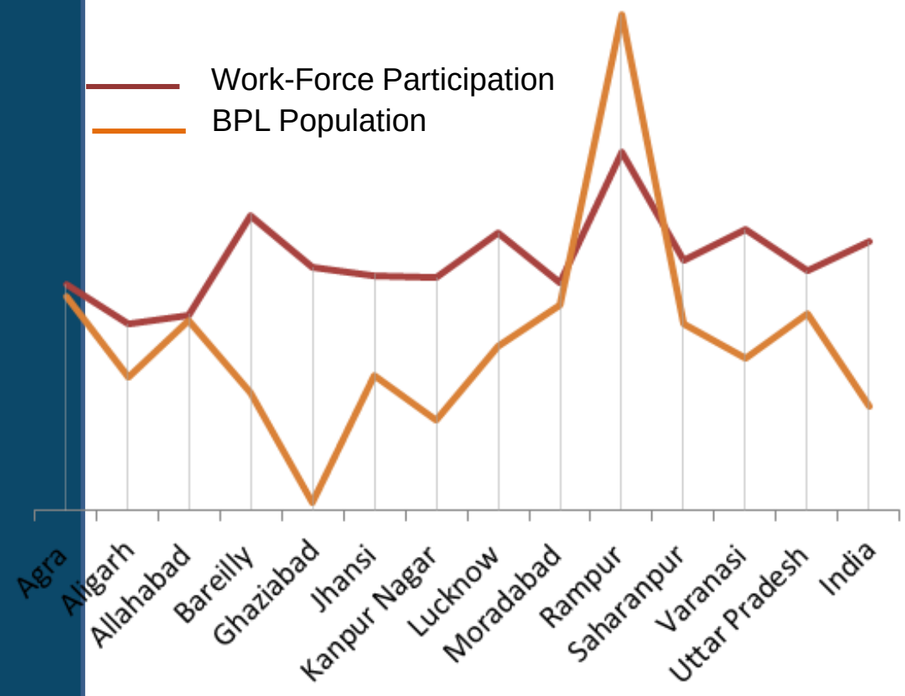
ECONOMY

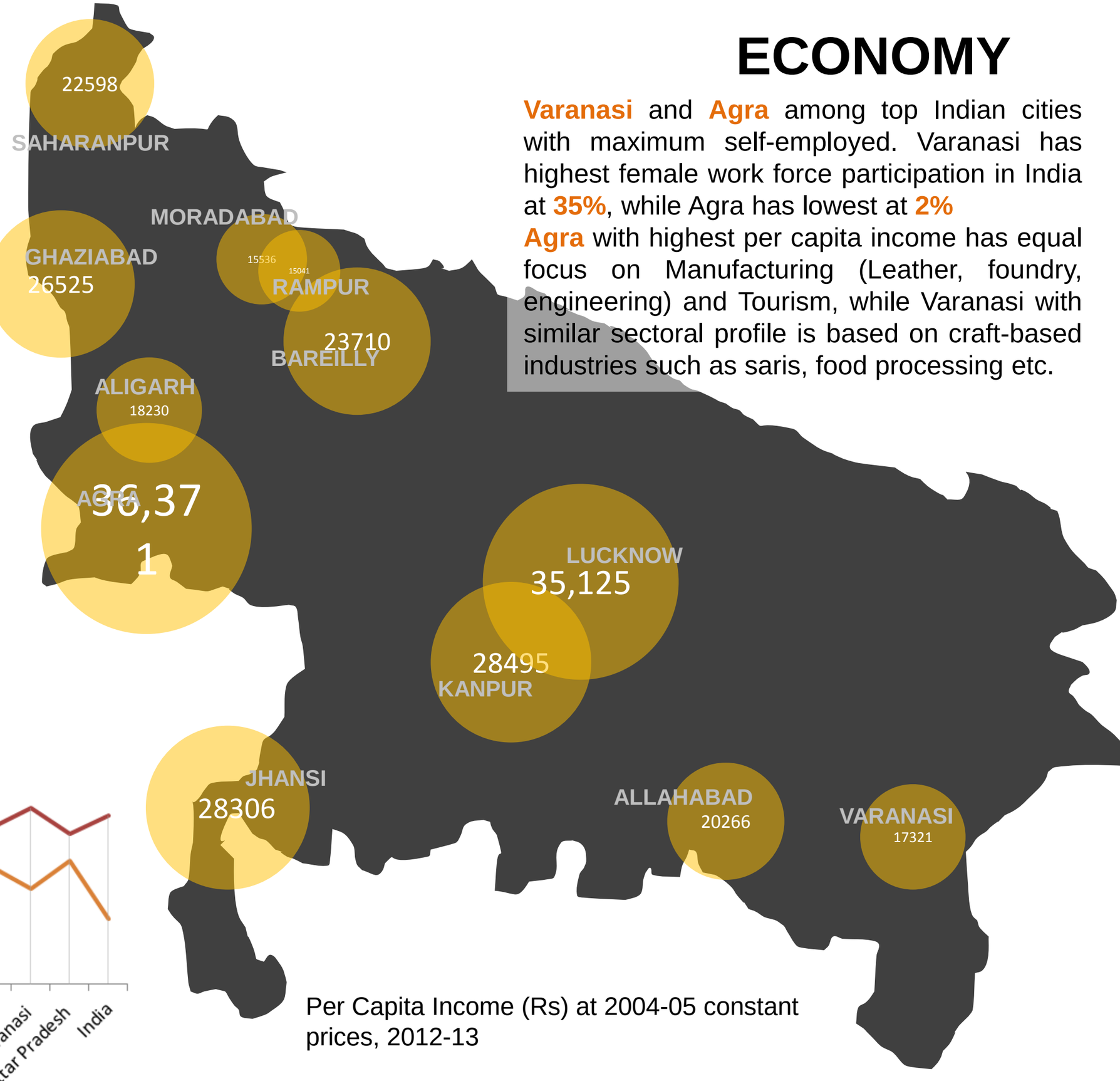
Varanasi and **Agra** among top Indian cities with maximum self-employed. Varanasi has highest female work force participation in India at **35%**, while Agra has lowest at **2%**

Agra with highest per capita income has equal focus on Manufacturing (Leather, foundry, engineering) and Tourism, while Varanasi with similar sectoral profile is based on craft-based industries such as saris, food processing etc.

Sectoral Profile

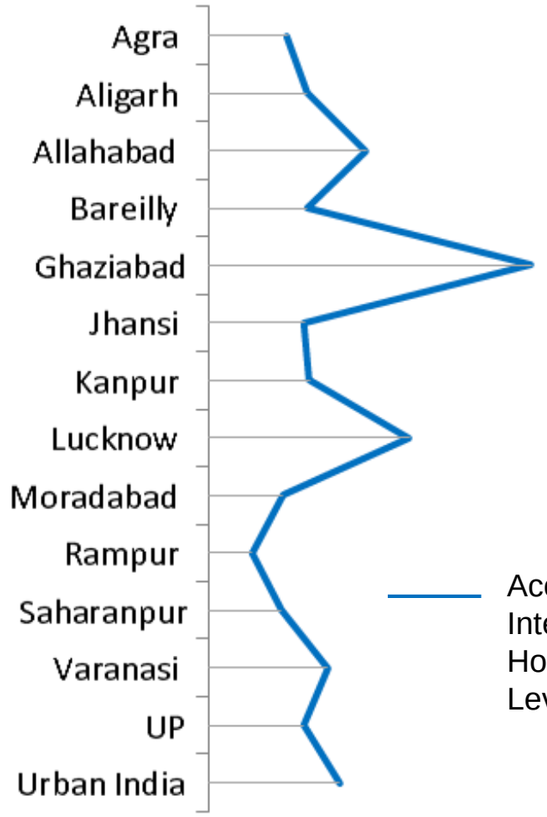






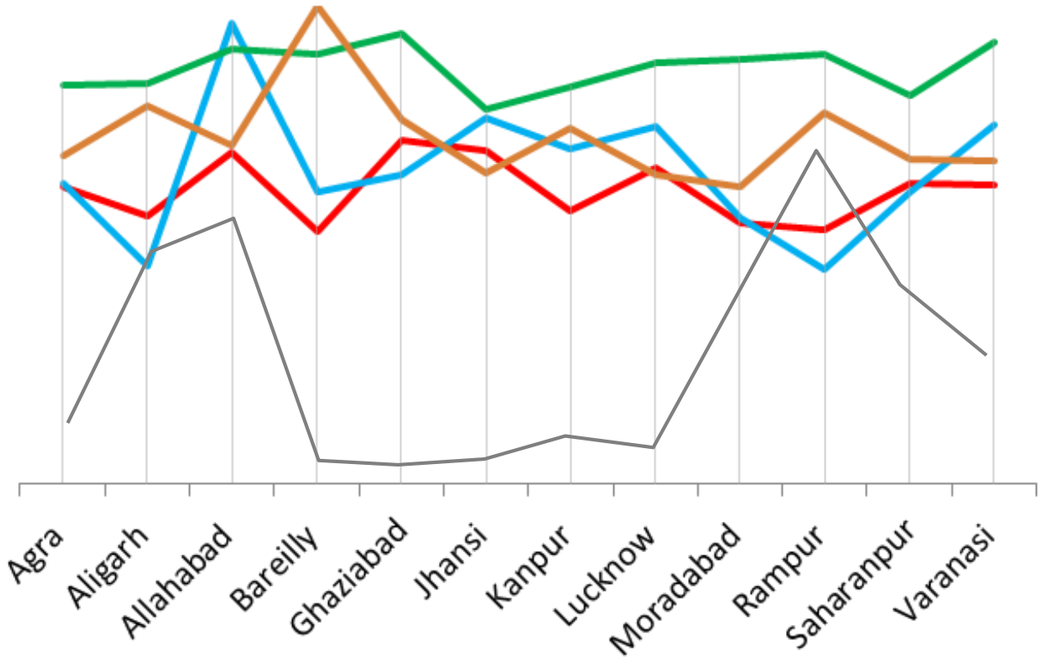
Per Capita Income (Rs) at 2004-05 constant prices, 2012-13

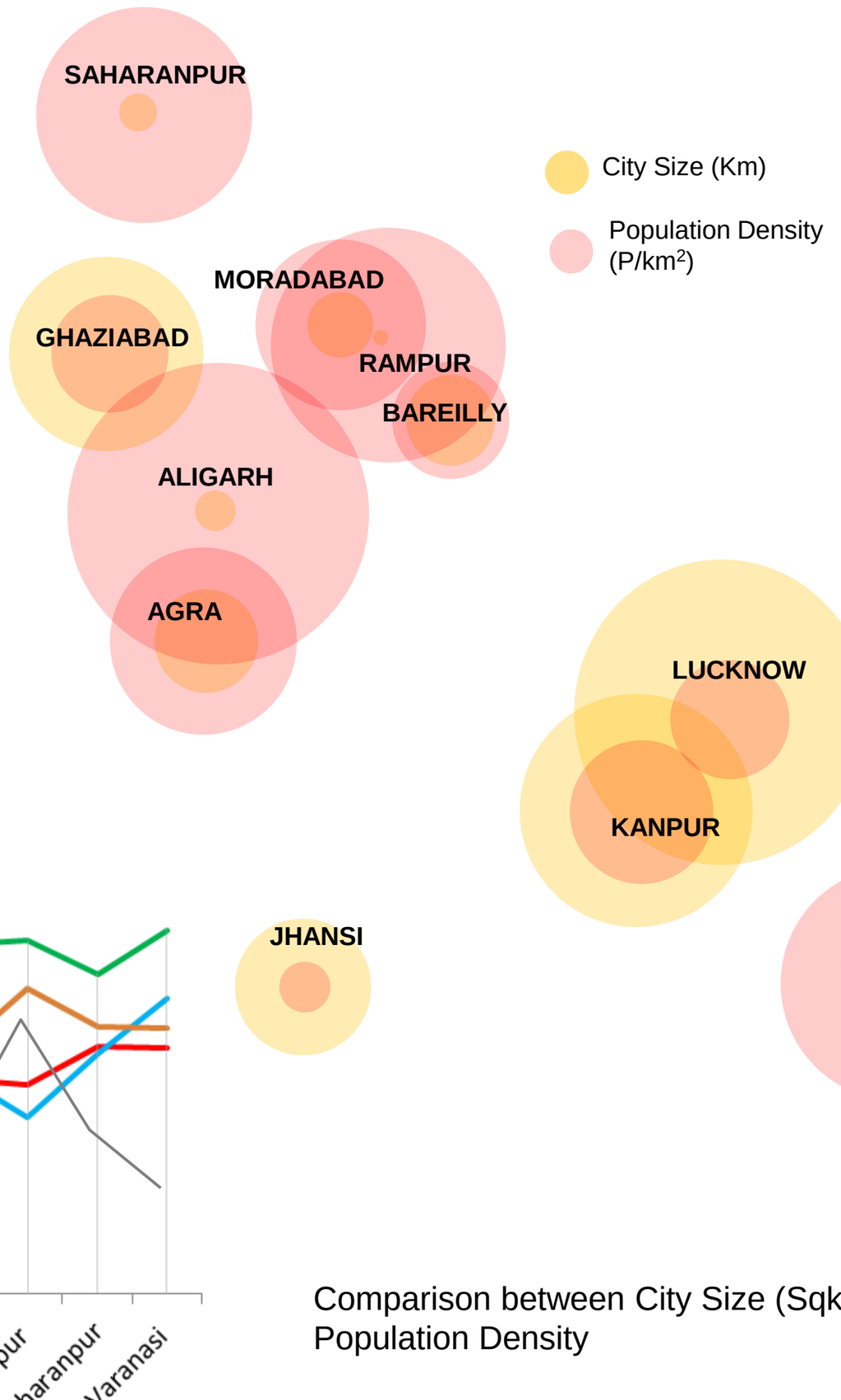
Source: Directorate of Economics and Statistics of Uttar Pradesh, Unit Level Data of NSSO on employment/unemployment 2012-13



Access to Internet at Household Level

Sanitation
Power
Water Supply
Housing
Road Density





Comparison between City Size (Sqkm) and Population Density

Source: Census of India, 2011


INDIA
States and Union Territories
AFGHANISTAN
PAKISTAN
CHINA
(TIBET)
NEPAL
BHUTAN
BANGLADESH
MYANMAR
SRI LANKA
JAMMU & KASHMIR
Srinagar
Jammu
HIMACHAL PRADESH
Shimla
Chandigarh
PUNJAB
HARYANA
Dehradun
UTTARAKHAND
DELHI
RAJASTHAN
Jaipur
UTTAR PRADESH
Lucknow
BIHAR
Patna
SIKKIM
Gangtok
ARUNACHAL PRADESH
Itanagar
ASOM (ASSAM)
Dispur
Shillong
MEGHALAYA
NAGALAND
Kohima
Imphal
MANIPUR
Agartala
TRIPURA
Aizawl
MIZORAM
JHARKHAND
Ranchi
WEST BENGAL
Gandhinagar
GUJARAT
Bhopal
MADHYA PRADESH
CHHATTISGARH
Raipur
(ODISHA) ORISSA
Bhubaneshwar
Diu
NAGAR HAVELI
MAHARASHTRA
Mumbai
TELANGANA
Hyderabad
ARABIAN SEA
BAY OF BENGAL
Panaji
GOA
KARNATAKA
ANDHRA PRADESH
Bengaluru (Bangalore)
Chennai
Puducherry
Mahe (Puducherry)
Kavaratti
LAKSHADWEEP (INDIA)
KERALA
TAMIL NADU
Karaikal (Puducherry)
Thiruvananthapuram
Port Blair
ANDAMAN & NICOBAR ISLANDS (INDIA)
INDIAN OCEAN
LEGEND
International Boundary
State Boundary
Country Capital
Map not to Scale
Copyright © 2014 www.mapsofindia.com
(Updated on 2nd June 2014)
1
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4

OPPORTUNITIEDS

- **UID Integration** with Planning and Execution
- **GIS enables integration** of planning, finance and management
- Fast growth in availability of **Big Data**
- **904 million** wireless subscribers (TRAI, Mar 2014)
- **Urban Tele-density** – 140 connections per 100 inhabitants
- **Youthful society** can fully utilize ‘Smart’ paradigm
- Innovation & Enterprise **Potential (**Frugal Technologies)
- **IT industry** among fastest growing in the country
- **High Acceptance of E-Governance**:
  In 2012, 98,000 Common Service Centres providing E-governance services; over 600 out of 1100 citizen and business services available electronically

THE BIGGEST CHALLENGE: LIVELIHOODS

- India will have about 400 million additional persons in the labour force by the year 2050.
- Agriculture and related activities that provide subsistence to about 220 million of the current workforce of 500 million cannot absorb this additional labour without further reducing levels of earnings.
- **There has to be a massive transfer of people from primary to secondary and tertiary sectors, and from rural to urban areas.**
- Industries and businesses are moving away from megacities into lower order cities or rural locations, while the informal sector is moving into the megacities.
- It is the **non-polluting tertiary activities** and growth of **select informal sector** that are driving the limited urbanization in million plus cities
- **Informal livelihoods must be integrated into urban plans and zoning regulations**: unorganized workforce gains access to markets and basic amenities

Smart City

MISSION TRANSFORM-NATION

"Drive economic growth & improve quality of life by enabling local development & harnessing technology as a means to create smart outcomes for citizens"

SALIENT FEATURES

- Competitive
- Citizen Engagement
- Area Based Development
  - Retrofit (500 acres+)
  - Redevelop (50 acres+)
  - Greenfield (250 acres+ with 80% 'green' buildings)
- Pan-city solutions
  - 10% Solar Power
  - ICT for service delivery
- Strategic Planning
- Replicability
- Convergence

SPECIAL PURPOSE VEHICLE

- Limited company incorporated under Companies Act, 2013 at City Level
- Plan, Appraise, Release Funds, Implement, Manage, Operate, Monitor and Evaluate Smart City Development Projects

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Citizen Engagement

THREE STEP PROCESS

Step 1

VISIONING EXERCISE
- Maximum engagement in visioning exercise
- Open ended- competitions (drawing, essays, logos)
- Close ended-(voting on priority areas identified by city authorities after engagement with selected citizens)

Step 2

AREA BASED DEVELOPMENT
- Citizens were involved majorly in selection of area from priority areas identified by city authorities
- Few cities involved citizens in identifying projects within ABD in addition to selection of area

PAN CITY SOLUTION
- Citizen aspiration based on priorities identified in visioning exercise
- Some cities in addition added solutions based on expert opinion which were not chosen by citizens

Step 3

FINAL SCP
- Cities shared the Draft SCP on MyGov or city websites

MEASURES OF CITIZEN ENGAGEMENT

I. Self Assessment
- 4 cities in Scenario 4
- Cities supported their claim with ongoing activities

II. Citizen Engagement Framework
- Three rounds as defined by SCP
- IAP2 (Int. Assoc. for Public Participation) framework used by Bhubaneshwar
- Other cities adopted three step process with some modifications

III. Future scenario
- All cities aspire for scenario 4
- Few cities have projects for citizen engagement on an ongoing basis

INCLUSION
- Mostly included elderly, women, youth and slum dwellers. Some cities also included children, alternate genders, tourists and migrants
- Focus on representative participation than individuals in many cities
- Locally relevant means were used in most cities to reach to maximum citizens; included street plays, songs, jingles, student competitions

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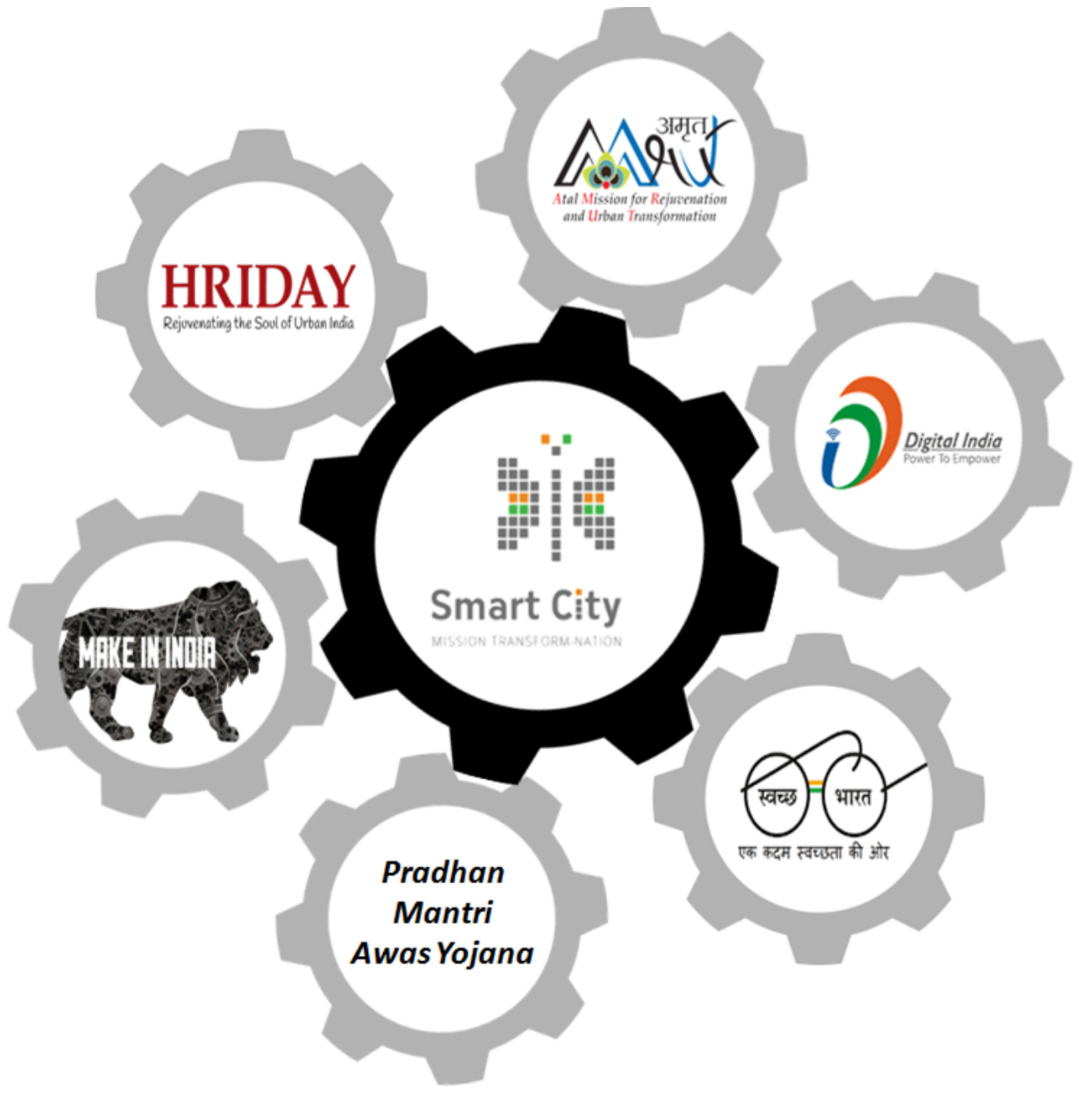
Convergence Agenda



12% of total budgets of 20 cities are through convergence

Government of India schemes and programs for convergence:

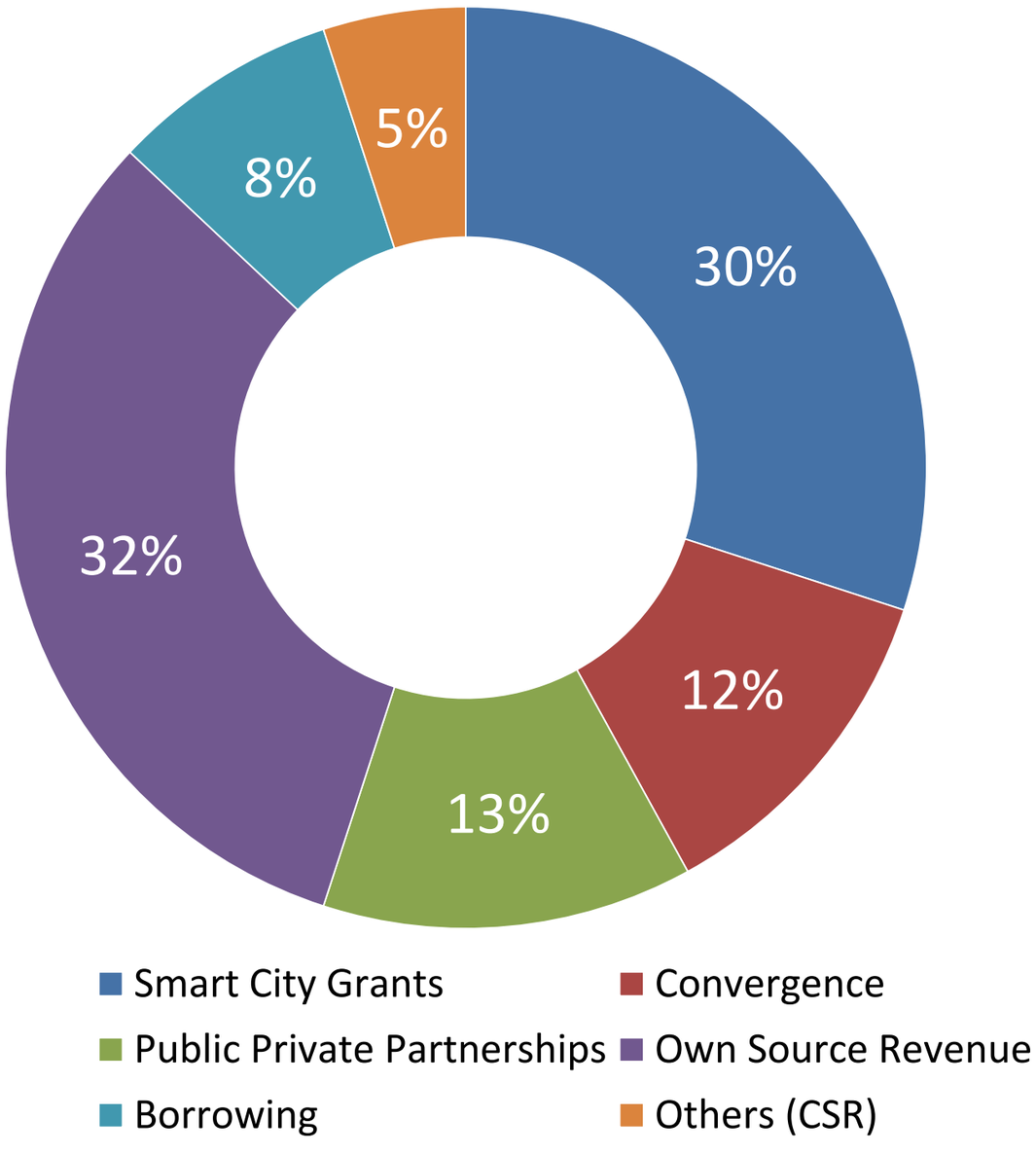
- AMRUT (water supply, sewerage, storm water drains, open spaces)
- HRIDAY (heritage conservation)
- Housing for All / PMAY
- Swacch Bharat (total sanitation)
- Digital India
- National Solar Mission
- National Urban Health Mission
- Make in India + Skill India
- National Livelihoods Mission
- IPDS (Integrated Power Development Scheme)
- FAME (Faster Adoption & Manufacturing of Hybrid & Electric Vehicles)

Solapur (46%) and Guwahati (35%) have highest convergence funding identified.

AMRUT (26%), IPDS (13%) and PMAY (6.5%) are the most identified sources of convergence funding

Financial Mobilization in 20 Lighthouse Cities

FUNDING SOURCES FOR LIGHTHOUSE CITIES



- Leverage factor: 2.2 of smart city grants
- Land monetization most widely used mechanism within own source revenue
- Borrowing is the least preferred option
- Ahmedabad (Rs 4110), Chennai (Rs 2918) and Surat (Rs 5820) have the lowest per capita expenditures in their smart city plans
- Solapur, Belgavi and Kakinada have the most diversified portfolios for resource mobilization.

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SUN
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Bikeri


SUN
BOX OFFICE


BSNL
Connecting India
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TITAN
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Connecting India
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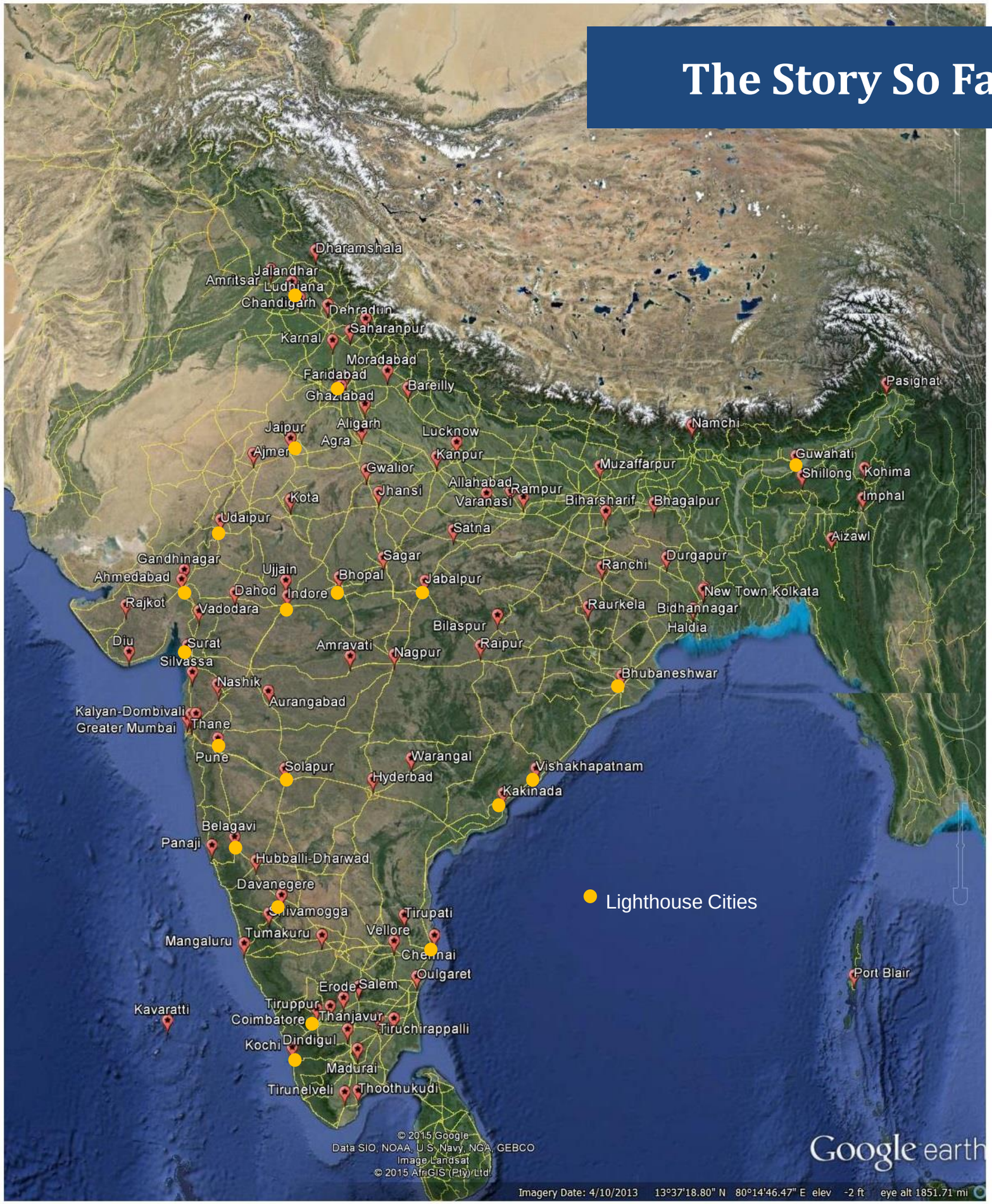
TRADE

The Story So Far and the emerging landscape



MILESTONES

- Target: 100 cities in 3 years
- Mission launched 25 June 2015
- 20 lighthouse cities identified
- 13 cities added through ‘fast track’
- Round 2 submissions on 30 June

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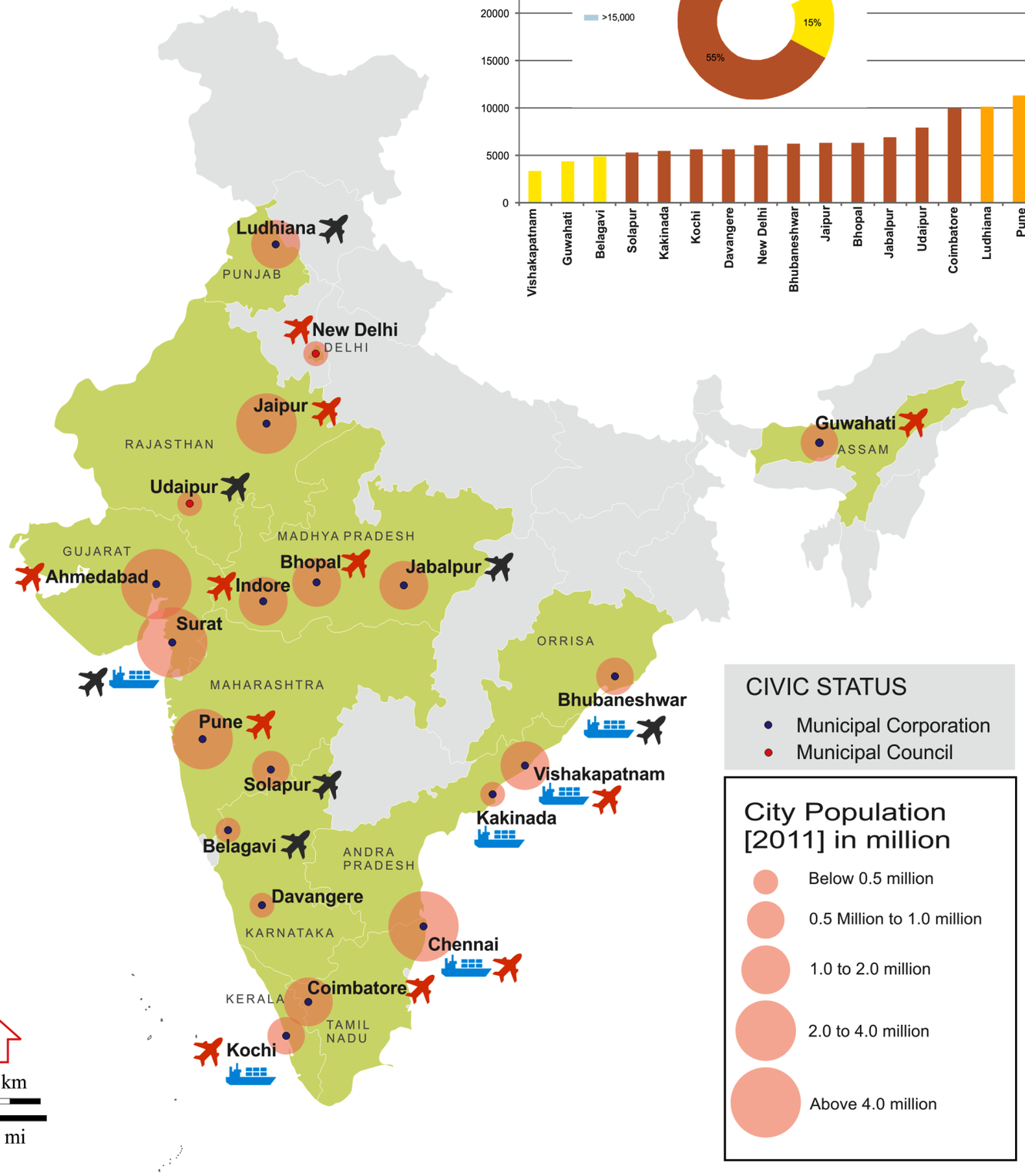
Profile of Lighthouse Cities

International Airport
Domestic Airport
Seaport



CIVIC STATUS
- Municipal Corporation
- Municipal Council

City Population [2011] in million
- Below 0.5 million
- 0.5 Million to 1.0 million
- 1.0 to 2.0 million
- 2.0 to 4.0 million
- Above 4.0 million

DIVERSITY

- Geographically spread in 12 states; hilly areas to semi-desert; coastal and landlocked; metropolitan and intermediary
- Port cities, market towns, tourist destinations, administrative cities and industrial cities
- Different civic status- Municipal Council/ Corporation
- Population size between 0.2 and 5.5 Million
- Total population = 35.2 million
- Density range from less than 5000/sqkm to more than 25000/sqkm
- Varying financial health: credit ratings, borrowing capacities, bonds

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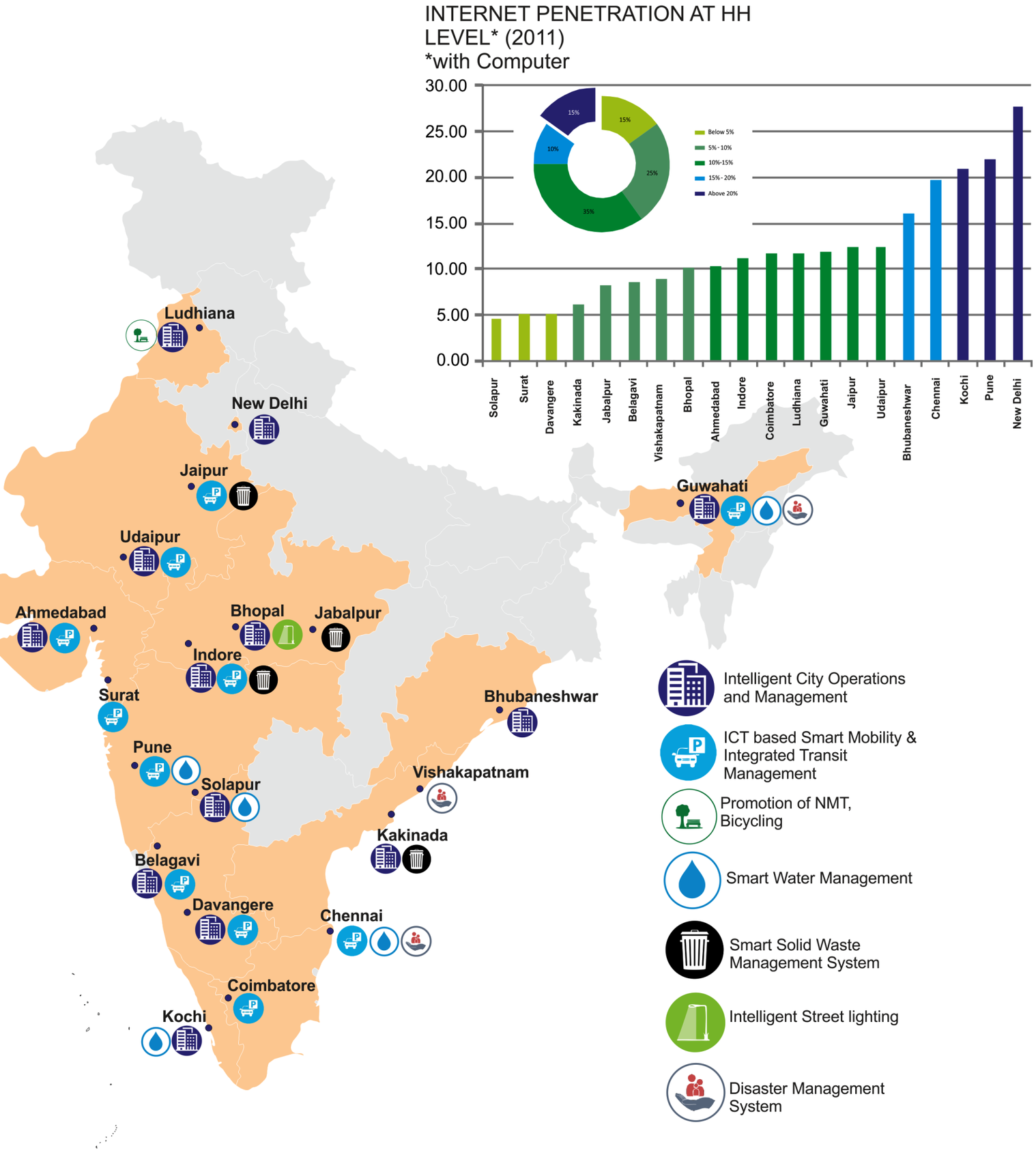
Smart City Plan Highlights
Pan City Proposals



PAN CITY PROPOSALS

- ITS and Urban Mobility (15)
- e-Gov services (8)
- Smart Water & Sewerage Mgt. (8)
- Smart Solid Waste Mgt. (7)
- Smart Energy Mgt. & LED Lighting (6)
- Control & Command center (5)
- m-Gov Services (4)
- Citizen engagement Platform (3)
- GIS Mapping & e-Town Planning (3)
- Security & safety (2)
- Smart Disaster Mgt (2)
- Smart education & health (1)
- Incident Response Center (1)

- **Smart sensors and devices (20)**
- **Open data, city dashboards, city apps (20)**

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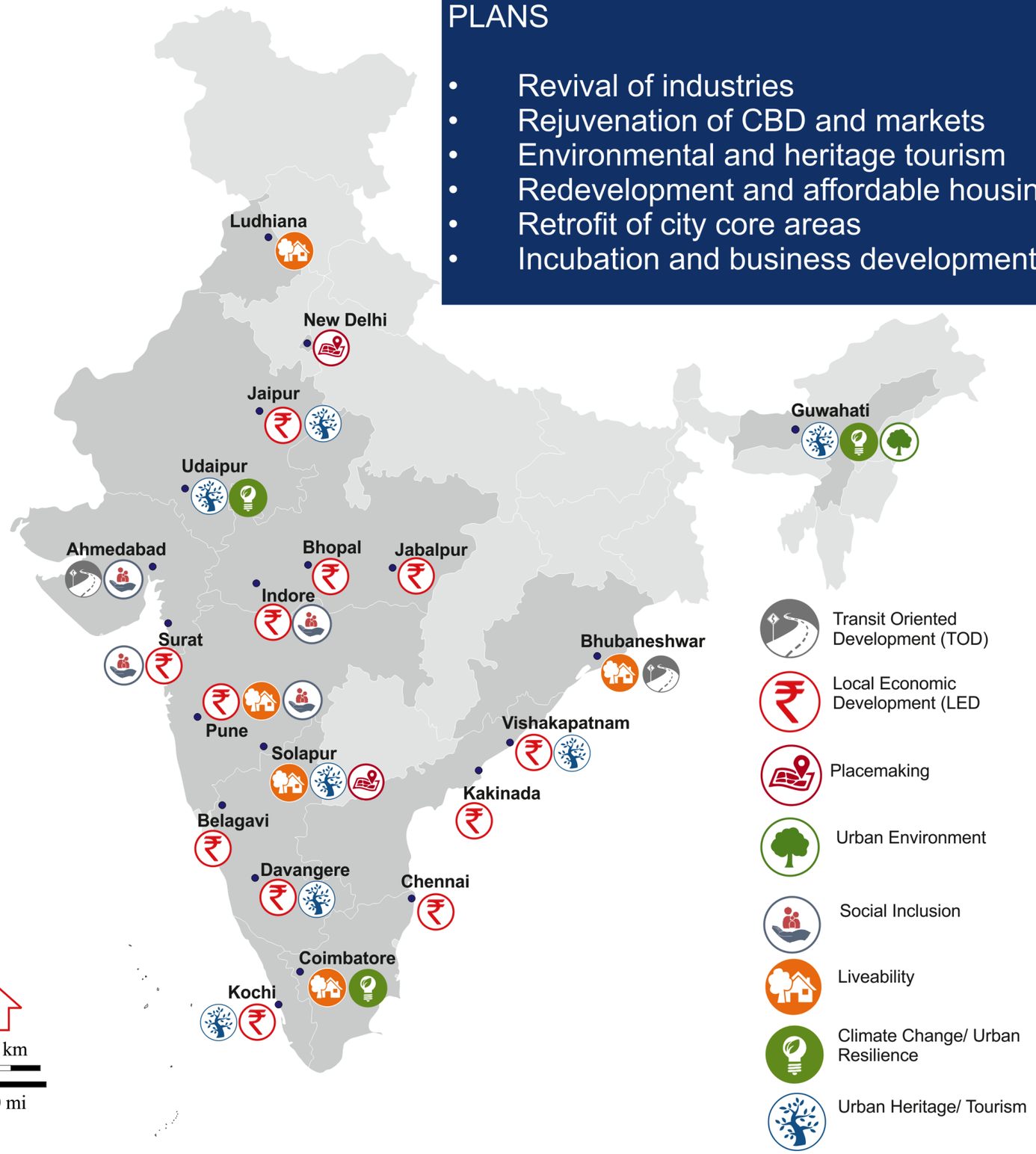
Smart City Plan Highlights
Area-based Proposals

KEY ECONOMIC DRIVERS IN SMART CITY PLANS

- Revival of industries
- Rejuvenation of CBD and markets
- Environmental and heritage tourism
- Redevelopment and affordable housing
- Retrofit of city core areas
- Incubation and business development centres



- Transit Oriented Development (TOD)
- Local Economic Development (LED
- Placemaking
- Urban Environment
- Social Inclusion
- Liveability
- Climate Change/ Urban Resilience
- Urban Heritage/ Tourism

AREA BASED PROPOSAL

- Affordable Housing (11)
- Open space management (11)
- Lake and river precinct (10)
- Transit infrastructure (9)
- Central business district and markets (7)
- Heritage area (7)
- Street facade improvement (3)
- Flood management (3)
- Incubation centre (6)
- Museum (2)
- Mega projects- Stadium, Convention centre etc. (2)

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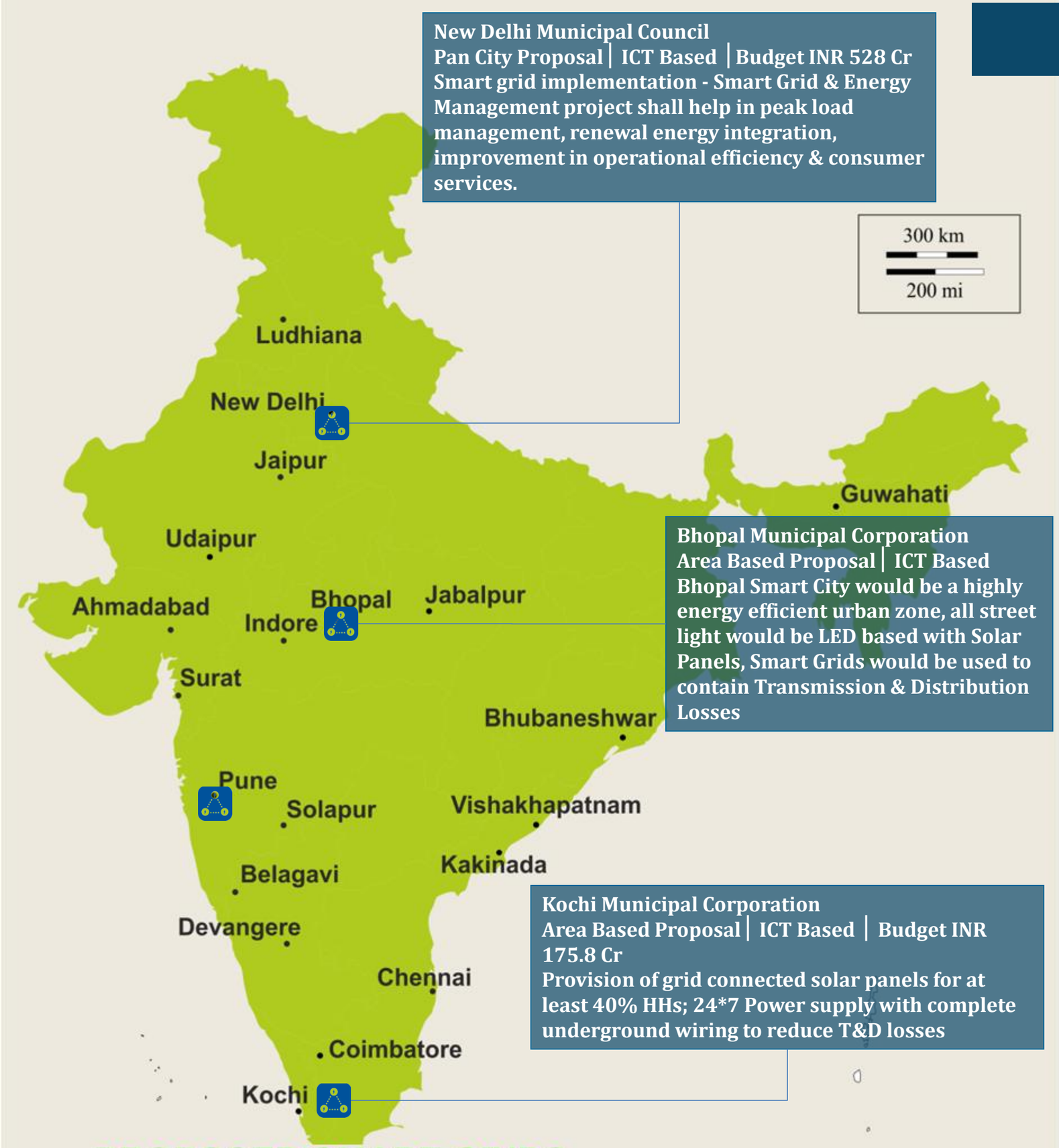
Energy in 20 cities



Energy related measures:

- Smart Grid
- Rooftop Solar Panels
- Air Quality Monitoring
- LED Street Lighting
- Smart Poles
- Smart Bus Shelters
- Wind Power Generation
- Greenway Projects
- Waste to Energy
- Smart sensors
- Smart Meters
- Central command and control Center

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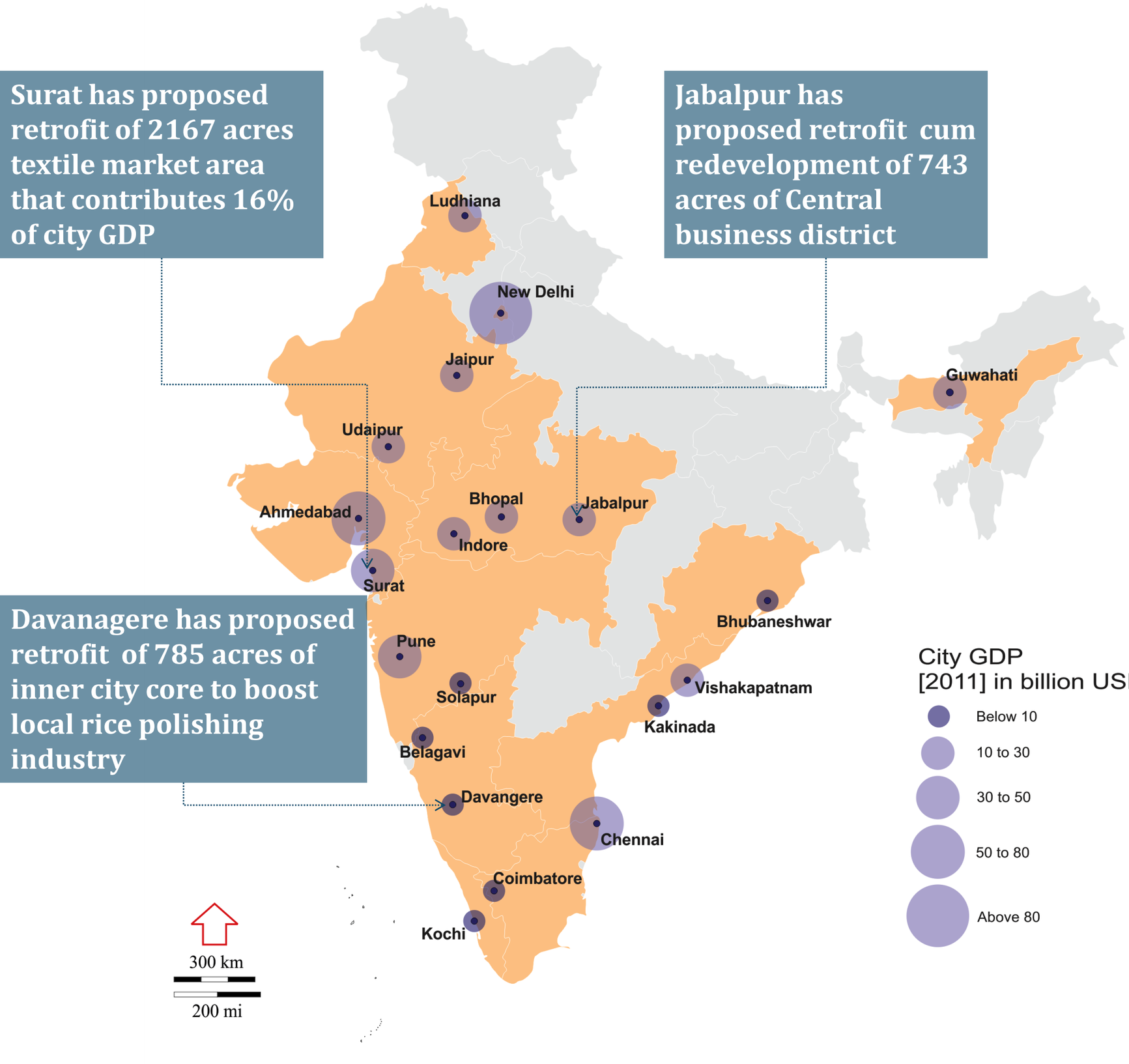
Planning for economic development

Surat has proposed retrofit of 2167 acres textile market area that contributes 16% of city GDP

Jabalpur has proposed retrofit cum redevelopment of 743 acres of Central business district

Davanagere has proposed retrofit of 785 acres of inner city core to boost local rice polishing industry



- **Business and Services**
  - Rejuvenation of CBD and markets in 11 cities
  - Knowledge hubs and incubation units are proposed
  - Retrofitting of urban heritage precincts to boost tourism sector

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Mobility Projects in 20 cities

- **Total Central and State Govt for 100 Smart Cities**: €13.2 Billion

- **20 Lighthouse Cities**
  - **Total Investments** – €6.8 Billion
  - **Integrated mobility projects as part of SCP** – 212 projects
    - **Total budget committed to 212 mobility projects** - €1.62 Billion

- **~25%** of budget for Mobility

- **NMT (Bicycle and Pedestrian Infrastructure)** - € 350 Million
- **Mobility ICT/ITS Systems -** €210 Million

- **Mobility Investment per capita** - €46

- **€1.62 Billion committed to integrated mobility across 20 cities**

- **NMT, smart parking, ITS, Public transit and TOD the most common.**

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Sustainability Projects in 20 cities

- **Guwahati proposed € 210 Million environmental retrofit of river and river precinct.**

- **Sustainability projects as part of SCP –** 256
- **Total budget committed to 186 projects –** €1.6 Billion
- **25%** of budget for Sustainability
- **Investment Average -** € 46/capita

Four scales of intervention

- **Green city design and resilient infrastructure** – € 968 Million
- **Energy efficient public transport-** €118 Million
- **Energy efficient and sustainable buildings -** € 307 Million
- **Smart energy systems and grids for cities-** € 339 Million

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Green Building Potential in 20 cities

Potential projects for intelligent and green buildings

- Ahmedabad: 75 Acre redevelopment
- Jabalpur and Indore: SPV monetizes 20 million sq. feet as residential and commercial space in redeveloped land.
- Bhopal: Unlock 350 Acres of underutilized prime land
- Slum redevelopment and affordable housing in 11 cities, mega projects in 2 cities

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EMERGING THEMES / CHALLENGES / OPPORTUNITIES

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TACKLING COMPLEXITY - 1

DEMOGRAPHY

- Annual growth rate of population: ~2.35 % **(2.76)**
- Average density: 8502 persons per square km.
- Average area of 20 smart cities: 135.6 sq.km. (Average area of Urban India: 12.92 sq.km.)
- 85.68 of the population is literate **(84.11)**
- 57.67 of the households live in self-owned houses **(69.1)**
- 28.3 of households live in congested houses **(32.9)**
- 18.1 percent resides in slum areas **(17.4)**
- Every 13th person is poor (~7%) **(13.7)**
- Youth: 17.9 % of total population **(19.6)**

ECONOMY

- Working age group: 60.25 % population **(65.2)**
- Workforce participation: 35.8 % **(35.5)**
- Per Capita Income: Rs. 43,797 per month (~584 Euro) **(Rs. 35,947)**
- Employment: Self-employed- 41.8% **(42.0%),** Regular wage/salaried employees- 42.1% **(44%),** Casual Labour- 16 % **(14%)**
- Sectors: Primary Sector 6.5% **(8%)**, Secondary Sector 35.2 % **(34%)**, Tertiary Sector 58.2% **(58%)**

TACKLING COMPLEXITY - 2

INFRASTRUCTURE

- 75.7 % households have access to tap water **(62.01)**
- 95 % households have access to electricity **(92.67)**
- 80.7 % households have toilet facilities within premises **(72.5)**
- 86.6 % households are connected to drainage **(81.7)**
- 9.5 % households have access to computer with internet **(8.2)**
- 65.35 % households have mobile phones **(64.3)**
- Mobility: Bicycle – 43.7% **(41.9)** , two-wheelers – 41.7% **(35.2%)**, four-wheelers – 12.2% **(9.7%)**

GOVERNANCE

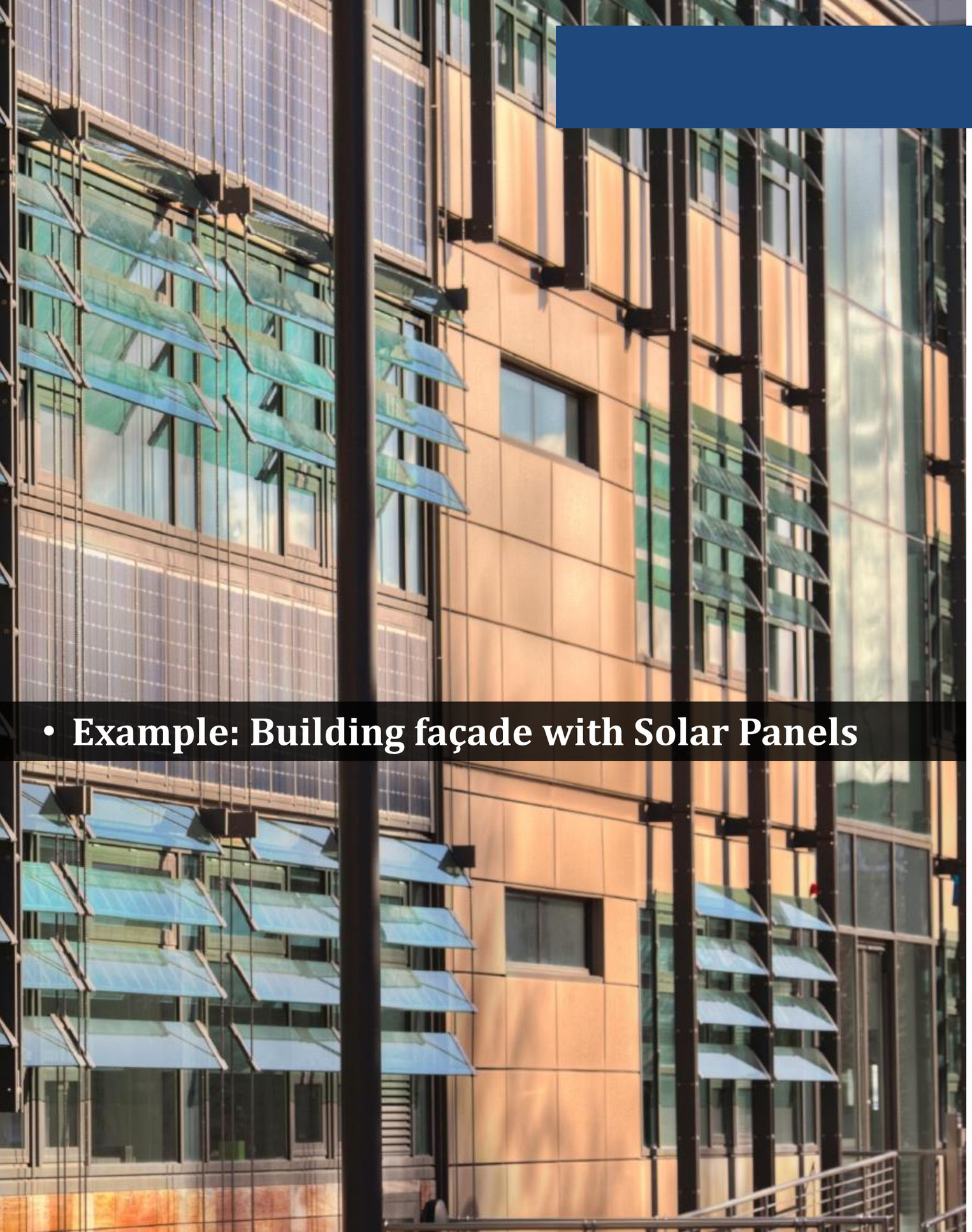
- Elections held regularly but tenure of mayor is not fixed (1.5 - 5 yrs)
- 50 % of the statutory towns do not have a development (master) plan
- On average, 25 % of the municipal budget is allocated for the poor
- ‘Own Revenues’ comprise ~ 50 % of the city’s earnings; grants and aid constitute the remaining half
- Property Tax comprises ~ 70 % of the ‘Own Revenues’; remaining comprises user charges, license fees and other taxes

TACKLING COMPLEXITY – 3

TWELFTH SCHEDULE (Article 243W): 18 MUNICIPAL FUNCTIONS

1. Urban planning including **town planning**
2. **Regulation of land-use and construction of buildings**
3. Planning for **economic and social development**
4. **Roads and bridges**
5. **Water supply** for domestic, industrial and commercial purposes
6. **Public health**, sanitation conservancy and solid waste management
7. **Fire services**
8. Urban forestry, protection of the **environment** and promotion of ecological aspects
9. Safeguarding **weaker sections**, including handicapped and mentally retarded
10. **Slum** improvement and upgradation
11. Urban **poverty alleviation**
12. Provision of urban amenities and facilities such as **parks, gardens, playgrounds**
13. Promotion of **cultural, educational and aesthetic aspects**
14. Burials and burial grounds; cremations, cremation grounds and electric crematoriums
15. Cattle pounds; prevention of cruelty to **animals**
16. **Vital statistics** including registration of births and deaths
17. **Public amenities** incl. street lighting, parking lots, bus stops and public conveniences
18. Regulation of **slaughter houses and tanneries**

Promoting Innovation



- **Example: Building façade with Solar Panels**

Energy

- Integrated Energy and E-waste Management policy
- Green Mobility

Building Construction and Materials

- Integrated Building Systems
- Research in Bamboo and recycled/ salvaged materials
- Research in Disaster Resilience

Urban Management

- Use of Big data in urban simulation and modeling
- Curricula of current architecture and urban planning institutions
- Urban Networks & Systems
- IOT, convergence of multiple networks and technologies
- Integrated city Management Platform
- Reliability, Security and Accuracy of data

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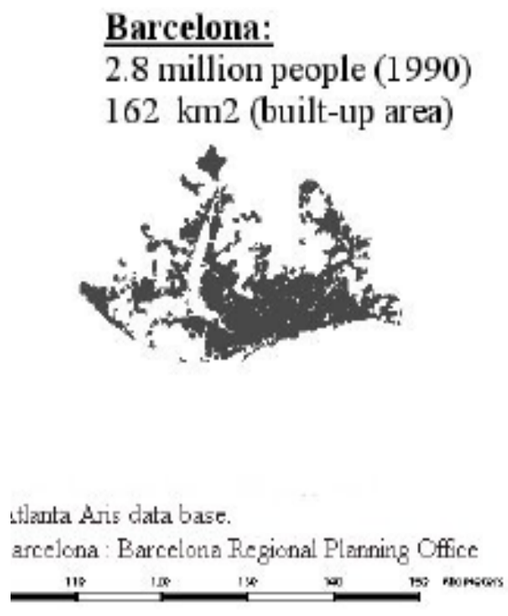
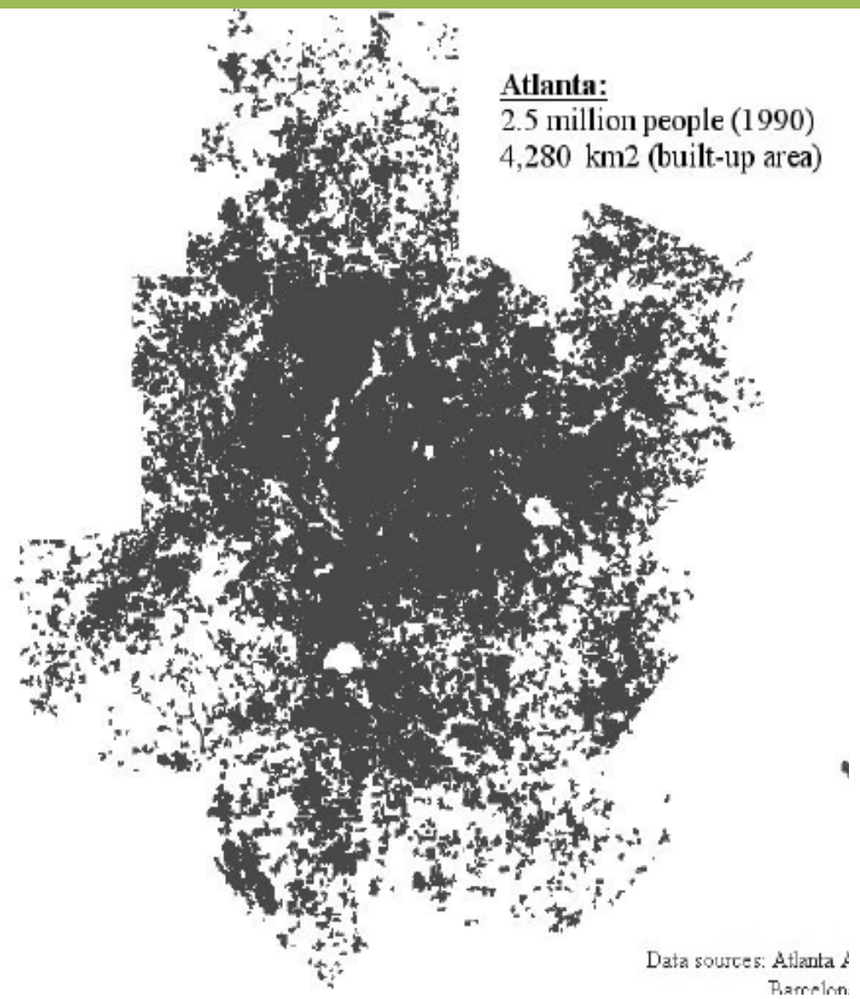
Selecting the Appropriate Role Models

Compact City



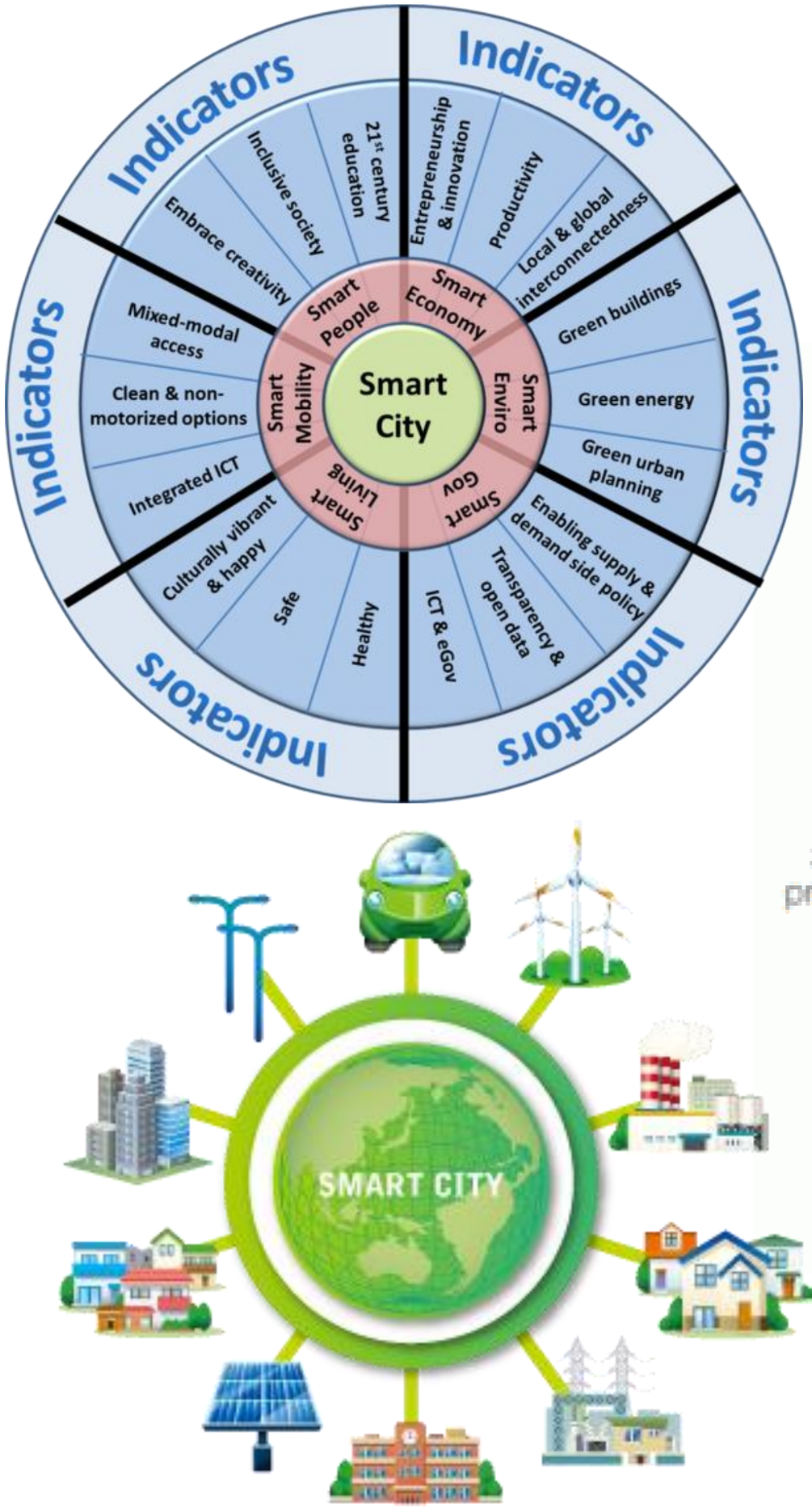
60% of the population of Barcelona is within 600m of a subway line (99kms of subway lines and 136 metro stations)

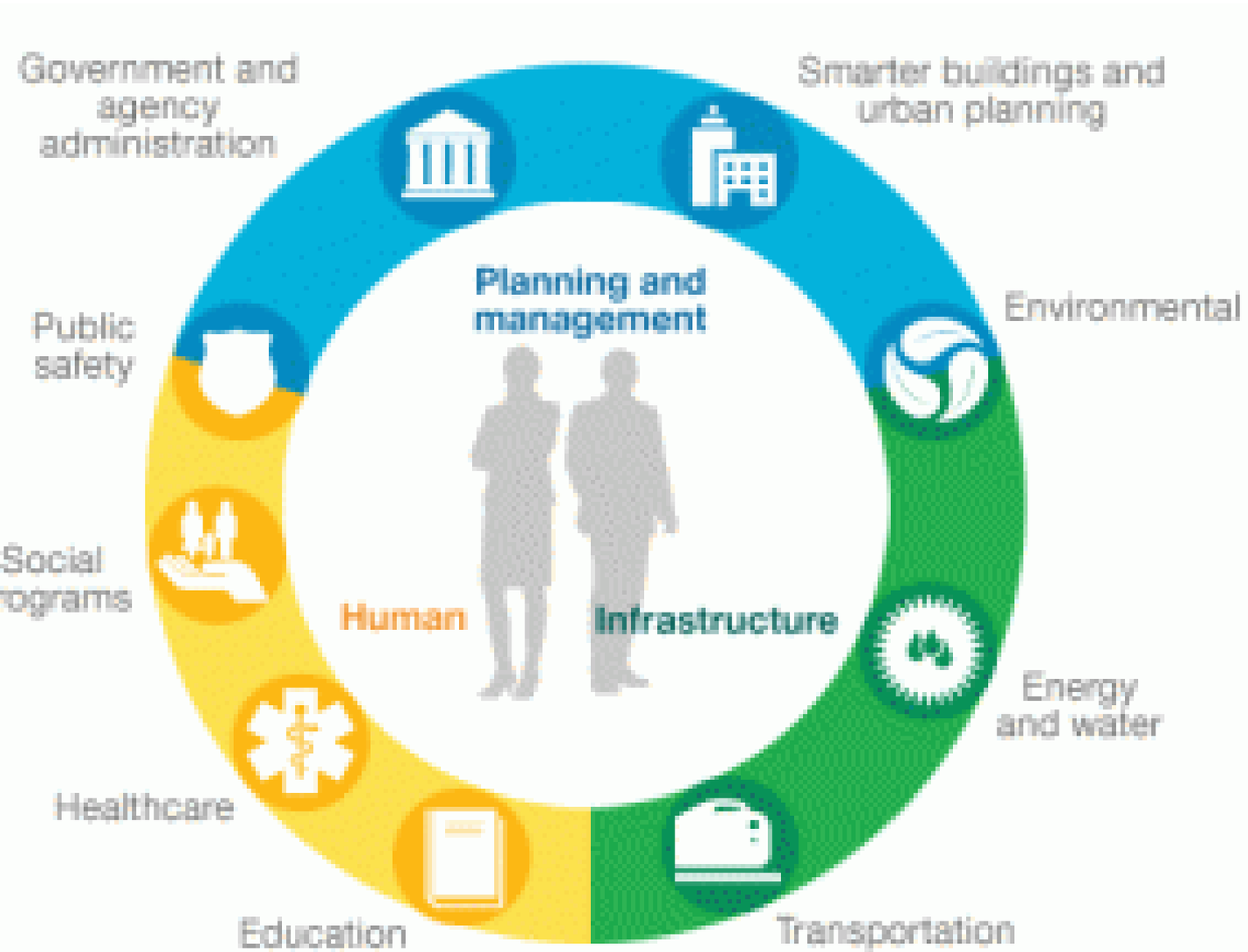
Urban Sprawl



To provide the same accessibility as Barcelona, Atlanta would have to build 3,400 km of metro line (compared to the current 74 km) and build 2,800 new railway stations

Thinking Holistic





THE SMART WAY AHEAD

- Promote e-Governance
- Leverage Diversity
- Decentralize development models
- Ensure Convergence
- Integrated policies and planning
- Support economic vibrancy
- Promote ‘decoupling’
- Build Public Trust

OPPORTUNITIES FOR INDO-GERMAN PARTNERSHIPS

- KNOW-HOW (SKILL INDIA)
- RESEARCH
- MAKE (TECHNOLOGY) IN INDIA
- INVEST IN PUBLIC-PRIVATE-PARTNERSHIP
- SUPPORT (START-UP) ENTREPRENEURS