सत्यमेव जयते

Department of Local Self Government
Government of Rajasthan

FICCI

Federation of Indian Chambers of
Commerce and Industry

Udaipur Municipal Corporation

Udaipur Smart City Ltd



# Smart City Conclave

**21 May 2016: Udaipur, Rajasthan**

## THEME PAPER

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# 1. INTRODUCTION

The Prime Minister launched the flagship Smart City Mission, along with the AMRUT (Atal Mission for Rejuvenation and Urban Transformation) and the 'Housing for All' missions, on 25th June 2015, aimed at transforming urban India. There is a strong complementarity between AMRUT and the Smart Cities Mission in achieving urban transformation. While AMRUT follows a project-based approach, the Smart Cities Mission follows an area-based strategy.

## 1.1 Smart City Mission

The Smart City Mission is primarily targeted to provide core infrastructure and give a decent quality of life, a clean and sustainable environment and application of 'Smart' Solutions. The focus of the mission is on sustainable and inclusive development. The Mission will cover 100 cities distributed amongst the States and UTs and its duration will be **five years (FY2015-16 to FY 2019-20)**. The criteria for allocation of number of Smart Cities per state are based on the urban population and number of statutory towns in the respective state. The quota of smart cities allotted to each State/UTs.

The 3 key elements that are unique to this mission as compared to the previous urban reform programmes are:

i. Challenge or competition method to select cities for funding.

ii. Strategy of area-based development, which can then be replicated

iii. Citizen's involvement from conceptualisation stage till the end

## 1.2 Typical / Key Features of Smart Cities

- Promoting mixed land use in area-based developments
- Housing and inclusiveness- expand housing opportunities for all
- Creating walkable localities – reduce congestion, air pollution and resource depletion, boost local economy, promote interactions and ensure security
- Preserving and developing open spaces – parks, playgrounds, and recreational spaces
- Promoting a variety of transport options – Transit Oriented Development (TOD), public transport and last mile para-transport connectivity
- Making governance citizen-friendly and cost effective
- Giving an identity to the city – based on its main economic activity
- Applying Smart Solutions to infrastructure and services in area-based development

## 1.3 Strategy

Each Smart City Proposal (SCP) is expected to comprise **two types of interventions**:

a. A selected **Area-based development** like city improvement (retrofitting) Or city renewal (redevelopment) Or city extension (greenfield development) Or a mix thereof, and

b. A **Pan-city initiative** in which selected smart solutions cover larger parts of the city, so that the residents of areas outside that selected in (1) above also feel relevant (inclusiveness)

These models are briefly explained below

**a.** **Retrofitting:** An existing area of **minimum 500 acres** will be taken up in consultation with the citizens. Existing structures are largely to remain intact and more intensive infrastructure service levels and a large number of smart applications will be introduced in the area. This may be implemented in a shorter time frame, leading to its replication in other parts of the city. Examples are Local Area Development in Ahmedabad

**b.** **Redevelopment**: Redevelopment will effect a replacement of the existing built-up environment and enable

co-creation of a new layout with enhanced infrastructure using mixed land use and increased density. A **minimum area of 50 acres** has to beidentified by ULBs in consultation with citizens. Examples cited are Bhendi Bazar in Mumbai and East Kidwai Nagar redevelopment by NBCC in Delhi

c. **Greenfield Development**: Greenfield development will introduce most of the Smart Solutions in a previously vacant area (more than 250 acres) using innovative planning, plan financing and plan implementation tools (e.g. land pooling/ land reconstitution) with provision for affordable housing, especially for the poor. Unlike retrofitting and redevelopment, greenfield developments could be located either within the limits of the ULB or within the limits of the local Urban Development Authority. Example cited : GIFT city

d. **Pan City**: Pan-city development envisages application of selected Smart Solutions to the existing city-wide infrastructure. Application of Smart Solutions will involve the use of technology, information and data to make infrastructure and services better. Examples cited include intelligent traffic management system, waste water recycling and smart water metering.

### 1.4 Smart Cities Selection Process: 'City Challenge'

Each aspiring city has to compete in the City Challenge, including cities adopted by foreign countries like the USA. The selection will comprise two stages:

a. **Stage 1: Intra-State selection to identify cities for nomination to MoUD.**

Each state will use standardised criteria to pick candidate cities and nominate the same to MoUD. Some 15 parameters covering Existing Service Levels, Institutional Systems/ Capacities, ULB finances and Past track record and reforms have been provided by MoUD. Every state is guaranteed at least one city in the competition. MoUD will thereafter announce the list of 100 Smart Cities

b. **Stage 2: All India competition amongst shortlisted cities**

The 100 cities would have to prepare and submit their Smart City Proposals (SCPs) by a stipulated date (tentatively 100 days).

- **30%** towards **City Level Evaluation** parameterslike Vision and strategy and Credibility (Track record) of Implementation,
- **70%** towards **Proposal LevelEvaluation** parameterslike Impact of proposal, Cost Effectiveness, Innovation and Scalability and Consultative Process followed

## 2. City Profile - Udaipur

On the basis of the scoring done by the panel of experts, the top 20 cities have been selected for funding in the financial year (2015-16). Udaipur stands sixteenth in the ranking with 57.91% score.

### 2.1 Physical Settings

Udaipur is strategically guarded by the spectacularly green, lofty, and mineral-rich Aravalli hills and steel-blue lakes. The old city is mostly on a hillock, and new extensions are on a plain terrain, which is enclosed by a massive wall 5-feet thick and about 20 feet high and having about a 6-mile circumference, which was constructed during 1615-1734 AD. The wall has 10 gates.

The Udaipur district is divided into three regions based on physiographic and geological characteristics: tribal, desert, and plain regions. It has undulating topography, towards the western part of the district; series of Aravalli hills run along north east and south west direction.

A typical plain of gneisses and granites without any alluvium cover is observed to the east of Aravalli ridges. Soil characteristics of the district vary from clay loam to heavy clay.

The hydrogeological formations occurring in and around Udaipur city being mainly graywackes and phyllites, generally have poor ground water potentiality.

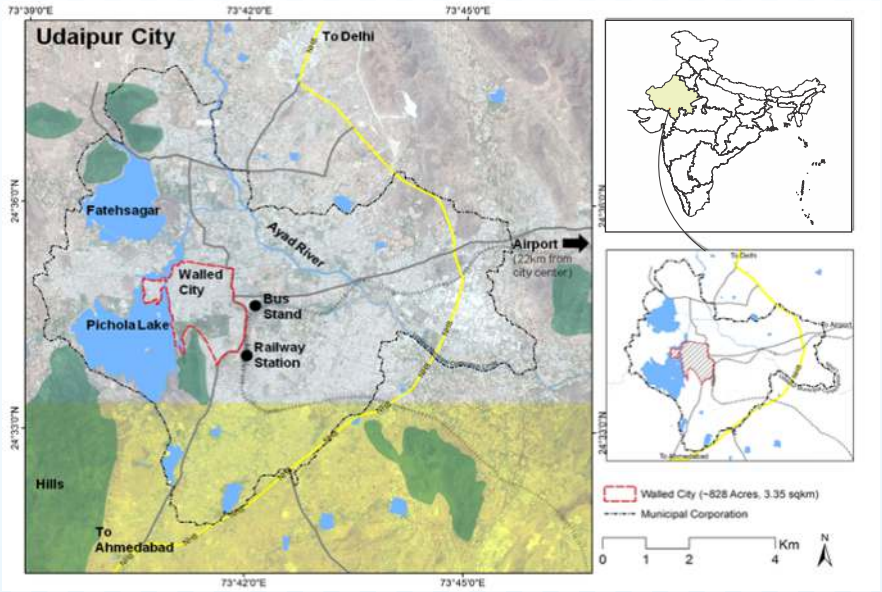



**Figure 1: Geographical setting of Udaipur**

## 2.2 Climate

Winter season is the favourable season to visit Udaipur. During the coldest month of January, days are bright, sunny, and warm with maximum temperature around 28.3°C. Mornings, evenings, and nights are cold with the minimum temperature around 11.6°C. During summer months, the average maximum temperature is around 40°C. Monsoon arrives in the month of July, and the average annual rainfall is about 637 mm. Monthly precipitation varies between 3.5 mm in January to 205 mm in the month of August.

## 2.3 Agriculture

Udaipur district falls under the humid southern plain as per the agriculture and water map of the state. The majorly crops grown in the district include wheat, malt, corn, guar, pulses, sugarcane, cotton, oil seeds, rice, and tobacco. Udaipur serves as a market centre for smaller towns of the region. The city has wholesale markets for various commodities ranging from food grains to building materials. Krishi Upaj Mandi is a centralized wholesale market for grains. UIT has also planned to develop a large sub-city centre. This is essential to meet the growing need for a formal and organized commercial space in the heart of city and decentralization of commercial activities from the walled city.

## 2.4 Mineral and industry

Industrially, Udaipur's development originated in the 1950s. Prior to the 1950s, only about 15 units were registered in Udaipur. These units were largely associated with the processing and manufacturing of mineral ores, metals, chemicals, and pharmaceuticals, as well as wooden toys, oil, and food products. The most important milestone in the development of mineral-based industries was the formation of Rajasthan State Mines and Mineral Corporation Limited.

On the basis of the development in the industrial sector, Udaipur is considered to be one among the leading districts of the state. This is merely due to the fact that Udaipur has a large variety of mineral resources as well as it is connected through rails and roads from all important trade centres of the state as well as country.

There are around 14678 commercial establishments in the city as on 2011 (covering shops and workshops). After 1955, various industries established themselves outside the city wall and near the railway station along the Udai Sagar Road. Most of these were associated with metals, automobiles, stone grinding, and auto-repair workshops.

## 2.5 Water resources

The Rajasthan state constitutes 10% of the country's area, but is bestowed with only 1.17% of its water resources. Ground water table all over the state is going down3. Major water resources for the city are lakes; Udaipur is dependent on its lake system, which is directly or indirectly the life source of the city in terms of surface water resources, tourism, and the ecosystem at large.

**Major Lakes and Catchment Area**

| Lake Name | Catchment Area (Ha) | Area of Lakes (Ha) |
|---|---|---|
| Pichola lake | 12700 | 696 |
| Fatehsagar lake | 2315 | 400 |
| Bada Madar lake | 7290 | 88 |
| Chotta Madar lake | 2534 | -- |
| Badi lake | 1820 | 146 |
| Chikalwas lake | 6450 | -- |
| **Total** | **33190** | |

*Source: Brief Note on Urban Environment - Rajasthan Pollution Control Board);*
*Conservation of lake of upper basin of Udaipur by Anil Mehta, T.Razdan, R.C. Purohit and L.L. Sharma*

### 2.5.1 Fatehsagar Lake

The lake is situated in the north of Udaipur city, as a part of the western lake frontage. The lake was constructed in the year 1678 AD and then renovated in 1889 AD by Maharana Fateh Singh. The dam of this reservoir is 720 m in length and about 100 m in breadth. The lake has a catchment area of 53.66 km. The greatest depth of lake lies near the middle of the dam, i.e., 13.4m. The total spread is 4.0 sq km.

### 2.5.2 Lake Pichola

The lake was initially constructed in the 14th century. Rana Udai Singh further raised its embankment in 1560 AD. Water spread of the lake is 6.96 sq km, and it has a maximum depth of 10.5 m towards the west where the Kotra River drains into the lake. The lake is the main source of drinking water. The Sisarma River, a tributary of Kotra, is the chief source of water to the lake.

### 2.5.3 Rang Sagar

This lake was constructed by Amar Singh Badava and is also called Amarkund after him. Constructed in 1668, this lake has a length of 1030 m, a width of 245 m, and a maximum depth of 7m. It is one of the smallest lakes along the western waterfront of Udaipur, and connects Pichola and Swaroop Sagar.

### 2.5.4 Swaroop Sagar

Swaroop Sagar lake is located in south of Rang Sagar and it is a part of Lake Pichola. The lake provides a combined water weir for Pichola and Rang Sagar. The lake also links Pichola and Rang Sagar with adjoining Fateh Sagar Lake through a canal. In monsoon, this canal is sometimes used to draw water in Fateh Sagar from Pichola Lake when Pichola reaches a high water level.

## 2.6 Forest resources

Forests constitute an important component of the physical environment of the state. Rajasthan state is largely arid. It has only 9.5% of the total geographical area recorded as forest. Most of the forests are dry deciduous type and concentrated in the Aravalli and Vindhyan hill systems in eastern Rajasthan with the western part having many grasslands. The forests are rich in flora and fauna. The forests of Rajasthan are spread unequally in the northern, southern, eastern, and south-eastern parts. As compared to other districts of Rajasthan, the Udaipur district has higher forest resources.

## 2.7 Demographic

As per the Census of India, the population of Udaipur in 2011 was 4.51 lakhs, and it is the 6th largest city among cities having more than 1 lakh population in the state. UMC population accounts for 2.65% of the urban population of the state and 74.14% of the urban population of the district. Area of the city has increased from 37 sq km in 2001 to 64 sq km in 2013.

The city has witnessed considerable population growth in the last four decades while acting as a magnet city for the surrounding region.

Table 1: Population Data

| Administrative unit | Population (lakhs) | | | % of urban population w.r.t. total population | Urban population comparison |
|---|---|---|---|---|---|
| | Total | Rural | Urban | | |
| Rajasthan | 685.48 | 515.00 | 170.48 | 24.87 | 2.65 |
| Udaipur District | 30.68 | 24.59 | 6.08 | 19.82 | 74.14 |
| Udaipur City | 4.51 | 0 | 4.51 | 100 | 100 |

*Source: Census 2011*

### 2.7.1 Average Household Size

In UMC, the number of households has increased from 78557 in 2001 to 94704 in 2011, recording a decadal growth of 21%. However, almost negligible change is noted in household size, i.e., 4.96 in 2001 to 4.76 in 2011.

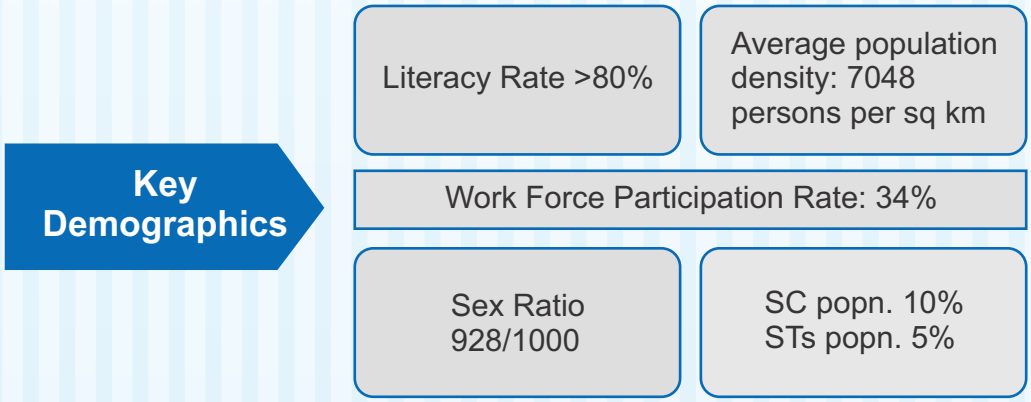



Figure 2: Demographics Data

### 2.7.2 Tourism

The population of the city is around 5 Lacs while it attracts 9 Lacs tourists annually.

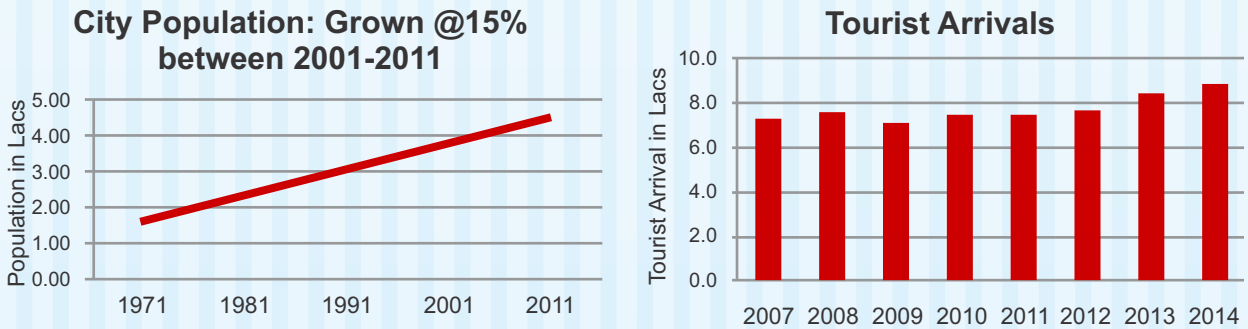



Figure 3: Population growth and tourist arrival data

## 2.8 Economic

Udaipur city has a diversified economic base. The four pillars of the city's economy are tourism, education, administration and trade, and commerce and industrial sectors. Udaipur District accounts for 9 percent of the state's industrial output while Jaipur is at the top with a share of 39 percent. The Gross District Domestic Product of Udaipur district has increased from Rs.6627.59 crores in 2004-5 to Rs. 11,936.4 crores in 2009-2010, at the current price. There are in all 18,127 industrial units in eight industrial areas in Udaipur District (31st March 2013); of these, 40 are registered medium and large units.

| Sr. No. | Category of industries | No. of units | Employment (nos.) |
|---|---|---|---|
| 1 | Agro-based industry | 1602 | 6300 |
| 2 | Beverages and Tobacco-based industry | 2 | 43 |
| 3 | Textile other than handloom industry | 3055 | 6471 |
| 4 | Handloom | 45 | 351 |
| 5 | Wooden | 2605 | 6532 |
| 6 | Paper | 82 | 963 |
| 7 | Rubber, Plastic, Petroleum, and Chemical-based | 769 | 8945 |
| 8 | Leather | 2287 | 4563 |
| 9 | Mineral | 2402 | 20627 |
| 10 | Basic Metal and Non-ferrous metal | 1267 | 6254 |
| 11 | Machinery and machine tools | 221 | 2475 |
| 12 | Electrical appliances | 55 | 1889 |
| 13 | Transport and Equipment and parts | 4 | 42 |
| 14 | Service and repairing | 3255 | 13927 |
| 15 | Miscellaneous manufacturing industry | 476 | 1997 |
| Total | | 18127 | 81379 |

Source: http://udaipur.nic.in/DIC/Brief%20Industrial%20Profile%20of%20Udaipur.pdf

Udaipur city serves as the market center for smaller towns of the region. The city has wholesale markets for various commodities ranging from food grains to building materials. Krishi Upaj Mandi is a centralized whole-sale market for grains. Moreover, Udaipur is also an educational hub with 3 universities, 6 colleges and more than 160 high schools. With its picturesque landscape, lakes, and historic significance, Udaipur is a major destination for most tourists visiting Rajasthan. Udaipur receives the fourth-largest number of tourists in Rajasthan following Mount Abu, Jaipur and Pushkar.

The tertiary / service sector has contributed more than 90 percent of the total workforce of the city. The major tertiary sector activities are trade, commerce, services, health and education. The secondary sector is the next major contributor; major industrial clusters and industries are located along Chittoragadh Road. The major industrial areas in and around Udaipur are Gudli, and Madari. Others include the Mewar IT park, Pratap nagar, and Bhamashah kaladwas.

### 2.8.1 Workforce Participation Rate (WFPR)

Udaipur being the district headquarters, there are a number of employment opportunities for people. As per 2011 Census, workforce participation is 34 percent at the city level, which is equal to the district s urban WFPR. The occupational pattern of the city as per the 2011 Census reveals that about 93 percent of the total number of workers is engaged in other economic activities (tertiary, service sector).

# 3. SWOT Analysis

## 3.1 Strengths

3.1.1 The city has a manageable scale to transform it into a Smart City with a population 5 Lakh and Municipal area of 64 sqkms

3.1.2 Easily accessible through road, air and rail. Excellent four-lane regional road connectivity with junction of Golden Quadrilateral and East-West corridors. Jaipur (450 kms) can be reached in 5-6 hours Ahmedabad (250 kms) can be reached in 3.5 hours. The city is serviced by 19 trains including luxury trains (Palace on Wheels and Royal Palace on Wheels) and about 13 daily flights from Delhi, Jaipur and Mumbai.

3.1.3 Clean and pollution free environment is a strong USP for the city

3.1.4 As a very popular destination it attracts about a million tourists (twice of its population), about 13% of foreign tourists visiting Rajasthan come to Udaipur to explore its diverse tourist attractions like lakes, culture, heritage, forts, monuments and Mewar architecture. Udaipur is also the entry point for visiting regional religious and historical destinations like Eklingji-Nathdwara, Kesariyaji, Galiyakot, Ranakpur, Kumbhalgarh, Haldighati and Chittaurgarh. Tourism is also the main economic driver providing employment to a majority of the population

3.1.5 13% of mineral and stone based industries of the State are located in this division which generates significant revenue

3.1.6 The city presents a model partnership with industry : Hindustan Zinc Limited (HZL) has established a 20 MLD STP to treat waste water and use recycled water for industrial purpose, while simultaneously helping to recharge ground water

3.1.7 Udaipur is the Divisional Headquarter of 5 other districts (Banswara, Chittaurgarh, Dungarpur, Rajsamand, Pratapgarh) and a regional trade and commerce hub

3.1.8 It is home to seven Universities including two Medical Universities and one Agriculture Technology University besides IIM Udaipur which makes it a regional educational hub.

3.1.9 The city has become regional centre for medical treatment with presence of 4 Medical Colleges, several quality private hospitals, dental colleges and a Cancer Hospital

3.1.10 Headquarter of West Zone Cultural Centre (which covers seven states) and a unique craft village which promotes traditional crafts, stage performances, music that attracts tourists

3.1.11 The Municipal Corporation is not only debt free, but it has strong reserves of over Rs 80 Crores, and recurring revenue is around 30% more than recurring expenditure, if average is taken of the last 10 years

3.1.12 The resistance to implementing a solution is low which is also reflected in the level of citizen participation while preparing the SCP as well as organising neighbourhood improvement activities and community involvement under the umbrella of Action Udaipur

## 3.2 Weakness

3.2.1 Infrastructure facilities like Sewerage and Solid Waste Management coverage is poor. Sewerage network in the city is around 20% and only that much of sewerage is treated. Solid waste management generation, door-step waste collection is largely absent and waste is sent to landfills without much processing (recycling)

3.2.2 Lack of civic awareness on heritage and conservation (insufficient heritage management): A large part of historic Mewar heritage is being lost to more contemporary architecture due to commercialization. This transformation does not match with the historic identity and culture of the city.

3.2.3 Absence of broad gauge connectivity to the city affecting industrial as well as commercial growth. It also has a bearing on tourist inflow.

3.2.4 Concentration of major commercial activities and constant expansion (increase) in hotels within old city area, causing severe congestion (mainly as a result of vehicular traffic).

3.2.5 Absence of efficient mass transportation facility within city. The main transportation mode is shared autos (Intermediate Public Transport or IPT) in the city (6,313), only 16 buses operate as City Bus Service (CBS). IPT is currently competing with CBS routes

3.2.6 International flight operations not yet initiated at the Airport

### 3.3 Opportunities

3.3.1 Upgradation of the airport to start international flights and ongoing conversion of railway line to Ahmedabad line to broad gauge will enhance tourist inflow greatly

3.3.2 Developing regional tourist circuit connecting places of tourist interest like Mt Abu, Nathdwara, Kumbhalgarh, Ranakpur and Chhitaurgarh with gradual improvement in infrastructure.

3.3.3 Opportunity to reduce the carbon footprint by phasing out diesel based IPTs and increasing the share of public transport by more than 100% in the next 3 years. Citizens engagement at different levels has revealed a unanimity on pedestrianising important streets to decongest the walled city area and promote heritage walks

3.3.4 Reduce dependence on Grid based power supply by promoting use of renewable energy through solar powered boats, solar farms, roof-top solar and solar water heaters to reduce carbon foot-prints

3.3.5 Investment in rejuvenation of Walled City will not only promote heritage conservation, but also give a strong boost to tourism and consequent economic upliftment of the local population

3.3.6 To enhance the experience of the waterfront for tourists, prevention of pollution and overall environmental improvement of lakes, through improvement in sewage and sanitation network

3.3.7 Conservation of ancient Ahar civilization site for tourist attraction

3.3.8 Enhancing the application of ICT for citizen services

### 3.4 Threats

3.4.1 Increasing water pollution due to inefficient drainage/sanitation

3.4.2 The increasing traffic volumes leading to air pollution and congestion

3.4.3 Historic Ahar River turning into a wastewater drain and is heavily polluted as a result of raw sewage inflow and dumping of solid waste at several places along the River stretch

3.4.4 Loss of heritage architecture/ buildings due to commercial pressures. Traditional houses in walled city risk demolition by their owners due to high maintenance/ repair required for these buildings.

## 4. Strategic focus and key stakeholders

The strategic focus of this plan is built on the bedrock of citizen consultation which overwhelmingly voted to focus on tourism as a key growth driver. Our strategy would involve modernising the civic amenities while preserving and strengthening the traditional heritage of the city to maintain its appeal for national and international tourists.

The focal point of this strategy would be to increase the tourist influx by 15-20%. This target is achievable if one situates it in the context of tourism ministry's data for 2014. According to the ministry's estimates tourism has grown by over 10% for both international and national tourists for the year 2014. If one were to juxtapose this jump against the backdrop of Planning Commission's estimate of creation of 78 jobs for every 1 million rupees invested in the tourism sector, then the money invested in area based development of the walled city area shall also contribute to building the job potential from tourism related activity.

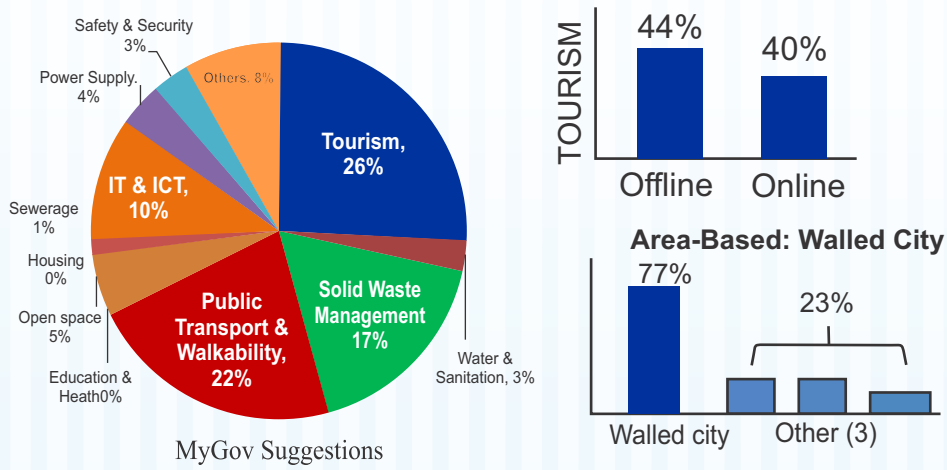



Figure 4: Results of stakeholder consultation

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## 4.1 Measures for Liveability and sustainability improvement:

4.1.1 Provision of modern civic amenities that meets the aspirations of every resident and visitor, through the upgradation of existing infrastructure with outcome based service delivery, public safety.

4.1.2 Mobility improvement : 30% reduction in carbon footprint as per low carbon mobility plan by decongesting vehicular traffic in walled city through pedestrianisation, efficient public transport, strengthening Udaipur's regional and international connectivity (as a critical prerequisite for a preferred tourist destination),

4.1.3 Improved public service delivery, transparency and efficiency in urban governance, and regular feedback loop from the citizens / beneficiaries

4.1.4 Conservation of city's identity particularly natural features, lakes, unique built heritage of walled city and cultural identity of Mewar

4.1.5 Sustainable urban form: Adoption of compact, dense, mixed-use development pattern whereby solutions to most daily needs are within 10 minutes. This would also promote social interaction and harmony

4.1.6 Strengthen citizen engagement achieved during the smart city planning and preparation of proposals. Encourage citizen voices, participation and satisfaction levels utilizing various means of communications (both face to face and online surveys) for getting feedback.

In parallel, city-wide improvement efforts would include

- Introduction of well organised bus-based public transport system for whole city with last mile connectivity through intermediate public transport,
- Efficient operational control of utilities through application of ICT like SCADA, GIS, Smart Grid and smart metering
- Comprehensive solid waste management through door to door, segregated waste collection, and comprehensive waste processing (RDF and composting).

In the next 5-10 years, the maximum developmental impact will be achieved through transformation of walled city and its adjoining lakes under the Smart City programme.

This retrofitting of walled city with modern infrastructure and simultaneously overhauling the utility service delivery of the entire city with smart infrastructure should transform the city and accelerate its evolution into a Smart City.

Following the strategy of enrolling maximum participation through both online and offline fora various means of engagement were adopted. In case of online consultation citizens were requested to write their vision and vote for the top priority sector in the discussions on www.mygov.in . Mobile apps (Action Udaipur), Udaipur smart city website, email, facebook and twitter were also used for taking feedback and disseminating information. Multiple strategies were adopted including building tasks, initiating discussion forum, blogs and conducting polls.

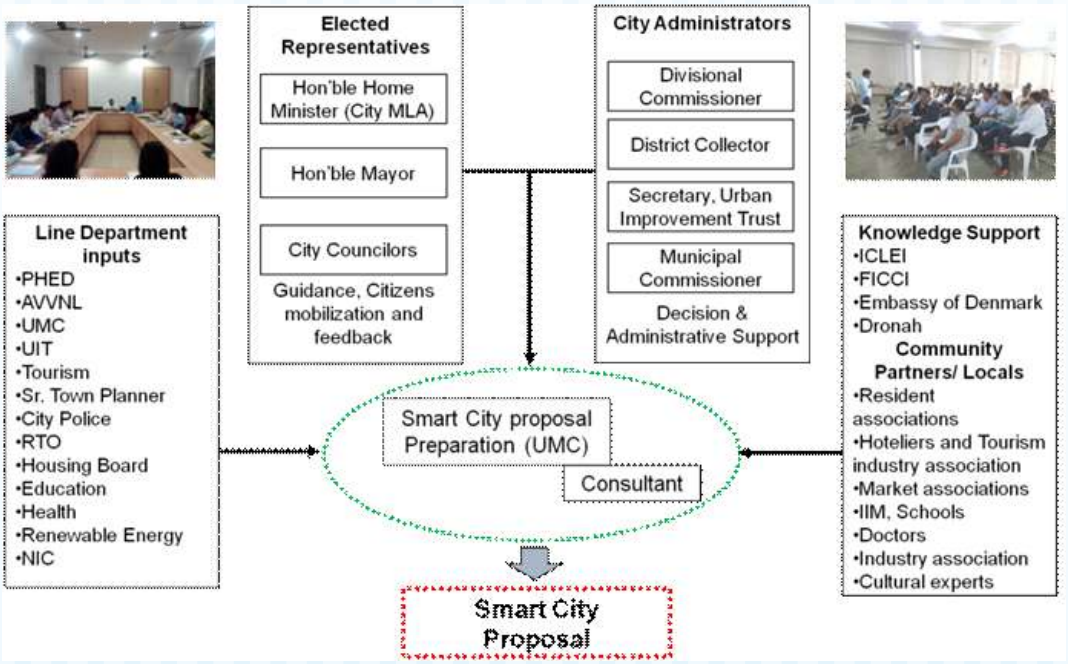



Figure 5: Different stakeholders involved in preparation of SCP

The offline engagement was conducted through extensive and relentless outreach programmes through ward meetings, institutional seminars and more than 250 opinion gathering points across the city. To motivate and get best results, a number of competitions such as essay writing, slogan writing, drawing and rangoli were organised. Regular coverage through print media, FM radio, pamphlets, whatsapp group, etc were other important means adopted for the citizen engagement.

## 5. Vision Statement

The Vision that has emerged from the strategy and consultative process is **"Eternal Udaipur: World's favourite Lakeside Heritage City"**.

The underlying philosophy of the Vision statement: Udaipur has been known as the Venice of the East for its unique setting of beautiful lakes and heritage architecture. While conserving its rich, legacy, the city would also innovate and adapt to the changing global environment to remain timeless in its appeal. It would thus create an urban ecosystem that encourages the existing residents, institutions and businesses to continue here, while also emerging as an attractive destination for new inhabitants from across the world. Tourism would continue to drive the economic and social transformation in the city as this will create the maximum job multipliers and consequent inclusive growth.

The vision relates to the city's profile and context in several ways.

5.1 Tourism would continue to drive the economic and social transformation in the city as this will create the maximum job multipliers and consequent inclusive growth. The potential is unlimited. The vision aims to strengthen the existing tourism base through conducive policy and infrastructure support, thereby fostering entrepreneurship and investment in a sustainable way. Local residents would be encouraged to conserve their ancestral homes and possibly convert some of them into homestays, cafes, cultural establishments, etc. to showcase the experience of traditional living of Mewar to the visitors.

5.2 The city's position on the waterfront is an important part of its sense of place and enhances Udaipur's distinctive role in the region and wider country. Every effort will be made to restore and preserve the lakes in their pristine state and glory by engaging with all stakeholders, and through interventions to prevent pollution. Allowing people to experience the water will therefore be an important aim of the vision

5.3 The city has a strong historic built fabric, mainly visible within the walled city, which is also the most visited part of Udaipur. The aim is to build upon Udaipur's century's old history by proposing a conservation area in the walled city to ensure any development is undertaken in a sensitive manner, and to use the built environment to promote the city and its identity.

5.4 Smart, resilient Infrastructure: Despite the heritage value, the infrastructure in walled city is in need of major upgradation to sustain the demands of growing tourism and urban activity. The smart city initiative presents the opportunity to overhaul the supporting infrastructure to international standards of hygiene, reliability and quality of water, power and clean transportation, etc. thereby making the area more resilient to future growth pressures. This can be scaled up to the entire city of Udaipur in a phased manner.

5.5 Efficient, citizen centric governance : Underpinning the success of all the above will be the making of public policy that focuses on the common man and make his life simpler and more comfortable. There is a lot of scope to introduce IT enabled business processes and automated monitoring of municipal infrastructure to achieve the above.

The overall goals and aspirations and public benefit outcomes (livability and sustainability improvement) over the next 5-10 years are explained below, largely in qualitative terms.

a. For the Walled city :

- Every citizen will get access to potable drinking water on 24x7 basis.
- All houses will have proper sewerage connections, and
- Lake water will be free of contamination,
- Assured power supply, along with improvement in safety and aesthetics as electric cables are shifted underground,
- Long term sustainability of roads by building dedicated ducts for water and city gas, and for power and telecommunication cables, also easing the maintenance for the civic agencies
- Comprehensive, improved solid waste management systems will improve the cleanliness of the overall surroundings, roads and open spaces in walled city
- Improved traffic circulation and significant comfort for pedestrians with restrictions on personal vehicular traffic; cycling and battery-operated services will cater to local movement thereby minimising air pollution.
- Smart car parking outside walled city boundaries will provide safe, organised, hassle -free spaces for the residents as well as the visitors.

- The experience of public spaces and tourist spots will be greatly enhanced through landscaping of the historic city gates or 'pols', temples, pedestrian paths, dedicated heritage walks, renovation of the ghats and waterfront, public conveniences and resting places, etc.
- Conservation of the old city gates, havelis, temples and historic buildings will enhance the historic and cultural significance of the area, both for tourists and the pride of the locals
- Social infrastructure (smart class-rooms in schools and strengthening dispensaries)
- Provision of emergency infrastructure (fire safety, small mobile ambulances)

b. For the entire city including walled city:

- People will have access to a highly efficient public transport system comprising of modern buses, supported by a modernised Intermediate Public Transit (IPT) system running on clean fuel that would cater to their last mile connectivity needs.
- ICT and e-governance will make life much simpler for the residents as they will be able to access information on most government-provided services on online / phone-based platforms at any time of their convenience. Transparency and accountability in service delivery will increase, as feedback loops get established from the users / beneficiary community.
- Safety and security will increase manifold leading to reduction in crimes, particularly for tourists, with closely monitored, non-intrusive, remotely monitored city surveillance measures based on IT.
- ICT based smart networks will also help the city administration and downstream agencies responsible for actual delivery of services in monitoring the maintenance, management and health of assets, their output parameters on real time basis, immediate fault identification, performance of agencies and officials, etc. in a granular fashion, enable possible optimisation of resources, disaster management and recovery, all of which will yield significant benefits over costs on a life-cycle analysis.

# 6. Smart City Proposal

## 6.1 Area Based Proposal

Area Identified: The Walled City adjoining Lake Pichhola, covering an area of 828 acres (3.4sq.km.), comprising 18 out of 55 wards. It comprises 5 % of Municipal area but houses 20% of the total population of the city. This area defines the unique identity of Udaipur and could have the maximum impact on its economy and people's lives when it becomes a Smart City.

Proposal:Comprehensive upgradation of the historic core through retrofitment of infrastructure to make it robust and efficient enough to sustain the pressures of human activity and tourism for centuries to come.

Key components:

- **24x7 water supply**, with source augmentation, SCADA, Smart metering
- Rehabilitation of existing Sewerage system and extension to left-over areas
- Rehabilitation of **Power** distribution network for assured supply, with **underground cabling, SCADA, smart metering, 15MW solar generation**
- Dedicated **underground ducts** for water & city gas, for power and telecom cables
- Restoration of 85km of road network, 8km of heritage walks (cobbled stone surfaced pedestrian paths)
- Improved traffic circulation through restriction on personal vehicles, **Pedestrianisation**, promotion of **cycling** and **battery-operated IPT services**
- **Smart parking outside** walled city boundaries for residents &visitors.
- Natural purification and **real time monitoring of lake water quality**
- Recycling of **waste** water and reuse for industry (Hindustan Zinc Ltd)
- Solid waste management with segregation at source, bins with sensors, solar compactors,IT based MIS dashboards
- Heritage **Building** Conservation

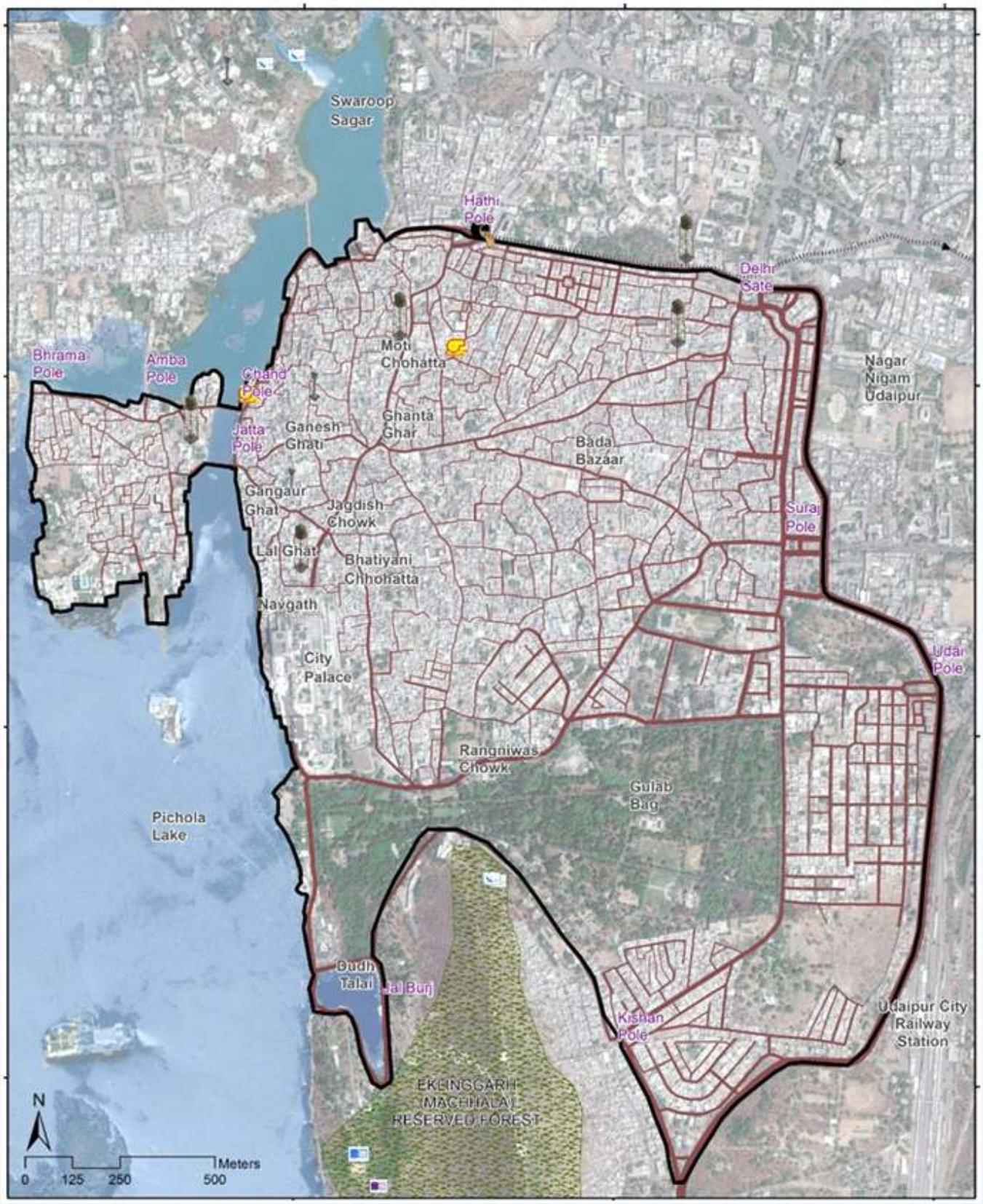



Figure 6: Area identified for Area Based Development - Walled city Udaipur

- **Improvement of Urban forms, public spaces** and tourist spots through landscaping of pols, artistic signages, wall mounted street lights, renovation of ghats & waterfront, public conveniences and resting places, etc.
- Shifting of stray cattle to cowsheds
- **Smart Classrooms** in Government schools
- Health ATM & **telemedicine**
- **Public wifi hotspots**
- **City surveillance** through smart cameras (about 500 nos)
- ICT enabled utility control (integrated with **City Command Centre**)
- Interactive map based, **mobile App** on tourist facilities,
- PNG/CNG supply

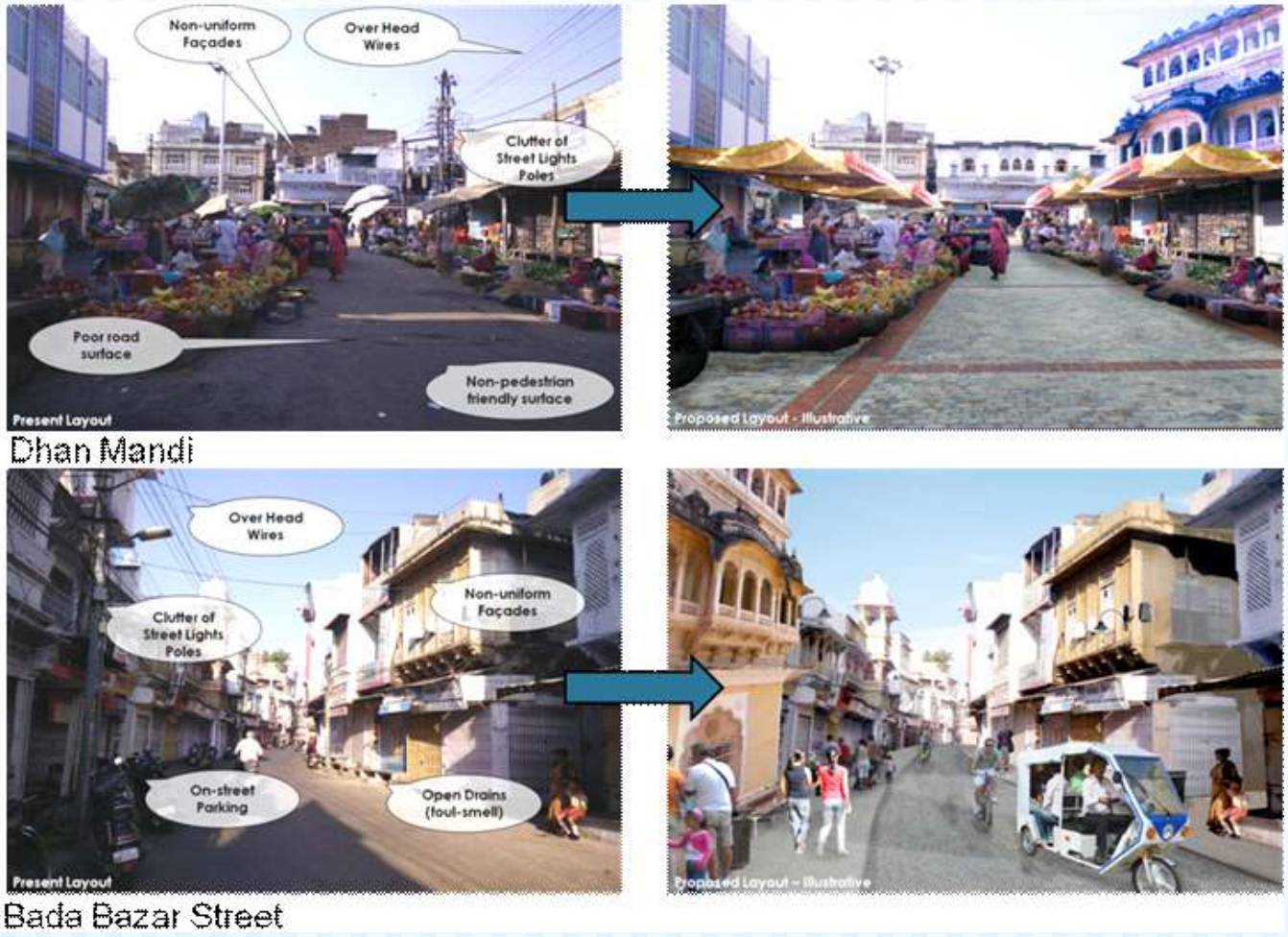



Figure 7: Proposed transformation after project implementation

## 6.2 Pan City Proposals(largely ICT based solutions)

A Pan city solution is an intervention the benefits of which should become visible and get perceived by residents of the entire city within the first couple of years itself.

As per the guidelines this solution would largely be based on ICT, possibly considering its potential for quicker implementation and roll out. The proposals include transport solutions and ICT based solutions for monitoring of various utility services.

The idea should be able to leverage the power of IT to enable various efficiency improvements, make governance transparent and processes simpler for people to access public services, particularly those who are deprived of other Smart City benefits by being located outside the area based development proposals.

### 6.2.1 Intelligent Transport Management System

- Reorganization of existing polluting and unsafe Intermediate Public Transport System (IPT) through introduction of GPS enabled BS III/BS IV four wheelers for controlling & monitoring and real time information dissemination
- Modernization of existing City Bus Service by introducing comfortable GPS enabled semi-low floor buses as per UBS II, integrated with Command & Control Centre for overall controlling & monitoring and real time information dissemination to passengers through Passenger Information System for reliability of the system, introduction of ETMs and integrated Smart Card for both IPT and public transport syestem along with GPR wallet to support other general transactions
- Development of continious footpaths, pedestrain crossing facilities with Pelican Signalling at major identified junctions and locations for the saftey of pedestrians and to make Udaipur as NMT friendly and walkable city
- Smart Traffic Signalling, development of a Traffic Management Centre- 24x7 surveillance syestem integrated with Road Accident Analysis System, Incident Management System for efficiency improvement & reduction of incidence response time and to provide safety & security to all
- Smart Parking Management System with VMS display for efficient utilization of parking space, smart metering for smart management of parking demand

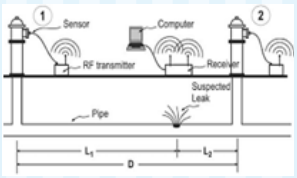
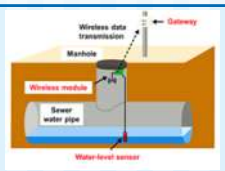
| | |
|---|---|
| **a.** | **Public Transport** |
| | • Onboard ITS enabled City Bus Service and GPS enablement of IPTs |
| | • Smart Bus Shelters with LED passenger info system, Electronic Ticketing Machines (ETM) & Smart Card readers |
| **b.** | **Dynamic Parking Info System, Sensor enabled parking** |
| | • Onboard ITS enabled City Bus Service and GPS enablement of IPTs |
| **c.** | **Surveillance System** |
| | • Smart Cameras at junctions with ANPR |
| | • Signal integration through ATS |
| **d.** | **Public Bicycle Sharing Scheme** |
| **e.** | **Multi functional App: Trip Planner and Info for Tourists** |

### 6.2.2 Citywide Smart Utilities

- The solutions in water supply include provision of SCADA system for all water supply pumping stations, Water Treatment Plants etc. The proposals also include replacement of existing domestic meters with meters with AMR provision. The entire data will be monitored and controlled from the central command centre.
- The solutions in sewerage include complete automation of pumping stations and monitoring and controlling of data from central command centre.
- The solutions in power include replacement of traditional push fit meters with advanced smart meters in the entire city. Also, Outage management system, Advanced metering system have also proposed under pan city.

| | |
|---|---|
| a. | **Water Supply and Sewerage** |
| | • SCADA enabled Water & Sewerage network |
| | • Automatic Meters Readers (AMR) |
| | • Leakage detection through smart sensors |
| b. | **Power** |
| | • Smart Grid and Smart Metering |
| | • Outage Mgmt System and Automatic demand response system |
| c. | **City Command and Control Centre** |
| | • GIS Mapping of utilities network and installations |
| | • Central Command & Control centre, with sub centres |
| | • OFC network and Wifi data access points |

## 7.Smart Infrastructure Interventions

| S.No. | Smart Infrastructure | Detail | Example |
|---|---|---|---|
| i. | **SCADA System for WS** | Udaipur functioning with traditional water supply without any automation. To improve the efficiency of the system, SCADA is proposed for 10 WTPs and CWRs. OHTs and GLSRs will also be connected to SCADA |  |
| ii. | **AMR Water Meters** | Presently, 100% connections are metered. But due to non functional meters, the cost recovery is 18% only. To improve billing efficiency and to reduce losses at individual house level, all connections, i.e., 105000 shall be connected with AMR meters |  |
| iii. | **Leakage Detection in WS** | The NRW in Udaipur is 42% and is to be reduced to 20%. It is proposed to install 16 systems each with 20 loggers covering entire distribution system to identify leaks in water supply system |  |
| iv. | **Smart Energy Meters** | Present meters don't offer two way communication. The existing meters (1,25,000) are to be replaced with Smart Meters and connected to SCADA which will enable two way communication between Control Centre and consumers |  |
| v. | **Manhole monitoring System** | One-third of manholes in walled city area are to be connected with sensors which will alert authorities in case of overflow |  |
| vi. | **Smart Parking Solutions** | On account of limited parking available in congested areas, it is proposed to develop new parking lots with smart sensors with 27,656 sensors which will indicate availability of parking |  |

| | | | |
|---|---|---|---|
| vii. | **Cameras** | 200 Cameras are proposed to be installed at important places which will help improve safety and security |  |
| viii. | **Wi-Fi Hot Spot** | These are proposed 500 locations which will help tourists and residents to access internet |   |
| ix. | **Water Monitoring Probes** | Real-time water quality monitoring probes to be installed in the Pichola Lake. |  |
| x. | **Health ATM & Water ATM** | Installation of Health ATMs and Water ATMs to ensure 24x7 access. Generic medicines can be taken from health ATMs with the help of paramedic staff during off-OPD hours |  |
| xi. | **Variable Message Sign (VMS)** | To display the real time information digitally across the city. |   |

# 8. Inclusion

## 8.1 Universal access

All public buildings, tourist locations, bus stops and footpaths will be have special access facilities for the differently abled, children and elderly through ramps, low floor design, wheelchair, resting places, special toilets, etc. information on the which shall also be available through apps.

## 8.2 Health ATM's and Water (RO) ATMs in slums

Provision shall be made for potable water through water ATMs / small RO facilities and Health ATMs to dispense generic medicines through standard protocols, particularly during off-OPD hours.

## 8.3 Night Shelters

To increase the outreach of Night-Shelters , information on availability of spaces at the shelters will be regularly displayed across the city through VMS boards.

## 8.4 Street vendors

Under NULM, all registered vendors will be provided with geo-tagged RFID/ GSM chips which can help them to sell their wares from authorised vending zones, and also serve as identification for direct benefit transfers through Bhamashah.

# 9. Success Factors

## 9.1 Area Based Development

9.1.1 Community buy-in and involvement:

The proposed retrofitting of Walled City would require very strong community support at all stages, particularly the planning & implementation stage of the project. Since the space available for provisioning of infrastructure is very limited due to the dense urban fabric, the local residents would be quite inconvenienced during execution. A strong IEC component will be embedded into the programme to counsel the community and local level elected representatives about the long term benefits of this

initiative (which will also positively impact their real estate valuations), and get their consensus on a very detailed implementation schedule and their support and cooperation for the project.

9.1.2 Convergence:

The Smart City Proposal intends to Converge different initiatives by the Government of India, State level programmes, multi-lateral funding etc. Smart City Udaipur proposal takes into considerations all such funding schemes. Works such as Solid Waste Management, Solar Energy Generation, Water Supply and Sewerage, PNG, RTIDF etc. are key schemes to access funds required by the city to make Area based Development smart.

9.1.3 Revenue sustainability:

Post project sustenance will largely dependent upon efficient operations and maintenance which in turn is dependent on the principles of full-cost recovery from the user of the services. UMC has widely consulted and informed the local community about the rationalization of user charges subsequent to development works under the Area based Retrofitting component. The project benefits and socio-economic impacts have been explained to the community during ward level consultations and people at large have supported this fact.

9.1.4 Land availability:

Ensuring the land availability for the Retrofitting Component targeting developments and upgradation in Walled City areas are crucial for project success. A significant portion of land will be required for development works. Several works e.g. re-placing power transformers from dense on-street locations to a more safer location will require land in that vicinity. It is proposed that the SPV can procure space/ land by offering Transferable Development Rights (TDR) in the affected area.

9.1.5 Any other exigency, uncertainties or challenges shall be countered through constant dialogue with the project beneficiaries without compromising the principles of commercial viability of utility operations.

9.1.6 Public Private Partnerships

Involvement of private sector is critical for success of Smart City project. The challenge is nature of projects required in the Area based Development have limited scope for private sector participation.

9.1.7 It is expected that components such as Solid Waste Management, proposed non-polluting Intermediate Public Transport (IPT) such as battery operated autos, parking, WiFi, Solar Energy Farm, Health ATMs etc. would attract private participation. Other core components of physical infrastructure such as water supply, sewerage, Utility Ducting, Heritage related may not show interest in these projects. Therefore, SPV will have to explore innovative ways to involve private sector participation for projects that are amenable to PPPs in some way.

## 9.2 PAN City

9.2.1 Conselling & mobilising local IPT operators regarding re-organization of their routes and upgradation to eco-friendly fuel vehicles once City Bus Service get introduced in the city

9.2.2 Enforcement related to banning unorganized parking even after providing adequate parking (either on-street or off-street).

9.2.3 IEC about the 'smart' aspects covered under the component 'smart utilities'. If the users of the facility see value in adopting for e.g. smart meters for water and power, its use and acceptance will be very significant.

9.2.4 Robust connection of Pan-City devices with the City Command and Control Room for ensuring safety and maximum efficiency in service delivery.

9.2.5 Levy of user charges and full cost recovery: This is critical for long term sustainability of the asset created. Some section of population may not value migration to 'smart meters' and consequent connection fee etc. Therefore, IEC about the benefits/ reduced life-cycle cost and flexibility of choices shall have to be provisioned.

## 10. Cost and Financing Plan:

The estimated total project cost is about Rs 1526 Crores.For financing, the grant from GoI and matching contribution from the GoR shall be used like a seed capital. All funding assistance, grants, contributions from the GoI, State Government under various missions and schemes that could relate to the Smart City initiative would be channelised through the SPV. This can be conceived like a large resource pool. The objective is to leverage the grant amount largely through convergence with Government schemes as far as possible, keeping borrowing requirements to modest levels so that the latter can be serviced by the SPV comfortably.

| Components | Estimated Cost of Project (2015 prices) | Cost of Project (with phasing over 5 years) | Funded by PSU/ PPP | Grant/ Equity from Smart City Mission | AMRUT | SPV Borrowings |
|---|---|---|---|---|---|---|
| | Rs. in Cr. | | | | | |
| Area based Development | 880 | 1104 | 253 | 741 | 75 | 36 |
| PAN City 1 (ITMS) | 186 | 227 | 147 | 69 | - | 10 |
| PAN City 2 (Smart Utilities) | 155 | 195 | - | 170 | - | 25 |
| **Total** | **1221** | **1527** | **400** | **980** | **75** | **72** |

The equity capitalisation of the SPV can be at Rs 200 Crores contributed equally by the GoR and the Udaipur Municipal Corporation (UMC). Out of Rs 500 Crores GoI support, Rs 100 Crore will be treated as UMC's contribution to equity while GoR will put in an equivalent amount as its share.

The Grant Support from GoI of Rs 500 Crores will be spread across 5 years. The distribution of GoI Grant has been assumed as maximum allocation of Rs 194 Crores in the first year, followed by Rs 98 Crores in the next three years. The above takes into account the deductions against the advance of Rs 2 Crores given to ULBs, and A&OE expenses of MoUD

**PPP / PSU participation:**Components like Solar Power generation will be implemented on PPP. City Gas distribution will be implemented by an oil & gas sector PSU or an agency shortlisted by MoPNG. ICT solutions like optic fibre network and command & control centre could be developed by agencies like BSNL & NIC with funds under Digital India and their own ministerial budgets. The total contribution expected from such PPP and PSU involvement is about Rs 400 Crore (26%).

**Convergence with other schemes of GoI:**

1. From the Amrut Mission Rs 75 Crores (out of the total Rs 150 Crores for the whole city) have been considered for the Area based development.
2. Comprehensive Solid Waste Management for the entire city will be taken up under the Swachh Bharat Mission with private participation utilising the Viability Grant Funding of 20% available under the scheme.
3. 30% capital grant will be availed from MNRE for solar power

**Convergence with other schemes of GoR:**

1. Under the 14th Finance Commission, a transfer of Rs 8 Crores and under the State Finance Commission another Rs 13 crores is expected for Udaipur this year. With a nominal escalation of 10% p.a. in the same, Rs 107 Crores is estimated over a period 4 years (2017-2020) for the Capex programme. These funds are used as contribution from ULB. Thereafter these funds to the extent of 20% is assumed to be available for O&M.

**Revenue Augmentation measures for SPV:**

1. Share of UMC Tax revenues

2. Share of Octroi Compensation
3. Income from Tourists
4. Smart City Development Fee for Walled City and PAN city
5. Revenue from parking
6. Revenue from leasing the Utility Duct from various telecom operators
7. Income from water and Power dept.
8. Other transfers/ funding from GoR (14th FC+SFC Grants)

## 11. Implementation Framework

We propose two tier structure of SPVs where one will be a Master SPV (as a holding or investment company)with subsidiary implementing vehicles for Walled City and Pan city initiatives.

The Smart city Master SPV will be an umbrella institution responsible for conceiving, planning, appraisal, deployment of funds, implementation, management of urban assets and service delivery, coordination with other institutions and departments, award of contracts / PPP concessions, monitoring, evaluation and governance (in the area under its jurisdiction) of the Smart City development projects.

It shall be responsible not only for functions that are being carried out by the Udaipur Municipal Corporation today, but also for functions like water supply, power distribution, sewerage that today are being discharged by parastatal agencies like the PHED, AVVNL, UIT respectively in Walled City Area. Accordingly powers & functions are being delegated to the SPV by a Government order.

The SPV will be a limited company incorporated under the Companies Act, 2013, in which the State Govt of Rajasthan and the UMC will be the promoters with equal shareholding.

The Chairman will be the Divisional Commissioner/ Principal Secretary (LSG). It will have the Mayor and Collector as Vice Chairmen and the Commissioner will be the CEO till a full time CEO is appointed. The Board of the SPV will have nominees of Central Government, State Government and ULB. There could be an advisory council comprising of councillors and eminent experts. A Facilitation Committee comprising the Secretary UIT, CEs of PHED& AVVNL, Regional Head NIC, DSP will assist / guide the SPV in its functioning & coordination with other departments.

Implementing SPV: The actual implementation will be carried out through subsidiary vehicles with the active involvement of the private sector, enabling the latter to bring in knowledge / technology, financial resources and outcome based delivery. The private sector can be inducted through the following formats:

- By awarding PPP concessions or EPC / construction contracts from the nodal SPV, or
- By creating subsidiary companies (project SPVs) of the nodal SPV, where the private sector can be allowed a majority stake.

The two tiered structure will enable induction of private sector energies at the implementation level while retaining transparency, facilitation and oversight by the Government at the apex level.

## 12. Priority Initiatives

2.1 MoU with FICCI, ICLEI and Singhania University for bringing in the expertise

2.2 Heritage:

2.2.1 For conservation of Walled City Bazaar's Rs 12crores has been sanctioned from GoR

2.2.2 Conservation of Baoris, Govt buildings and modification in Byelaws

2.3 Promotion of PT and NMTs

2.3.1 Bicycle Sharing Services (100 Bicycles @10 locations) on PPP basis

2.3.2 City Bus Services running on PPP basis

2.4 Solid Waste Management

2.4.1 Introduction of UG solid waste collector bins at 06 points (tender floated for installing 100 more bins)

2.4.2 Dashboard for monitoring the SWM vehicles

2.4.3 UMC has issued NIT for citywide door to door waste collection

2.4.4 Tender for solid waste processing is under finalization

2.5 National Lake Conservation Plan

2.5.1 MoEF has sanctioned Rs. 41.86 Crore for Fatehsagar lake and Rs. 84.75 Cr. for Pichola lake

2.5.2 08 new floating fountains with Aeration System shall soon be installed

2.6 Waste Water Treatment

2.6.1 Hindustan Zinc Limited is operating 20 MLD STP on the PPP agreement

2.7 Parking Development

2.7.1 Underground parking at Hathiwala Park through partial funding from RTIDF (GoR) and RUDF

2.8 Solar City Master Plan (Roof-top Plants on Govt buildings and Community Facilities)

2.9 Green Initiatives

2.9.1 Efficient LED street lighting, Development of Sajjangarh Biological Park and Bird Sanctuary at Gulab Bagh

2.10 Credit Rating

2.10.1 UMC is a revenue surplus ULB and hence subscription to its Municipal Bonds becomes more likely

# 13. Expected Outcomes

## 3.1 Quantitative

- Tourism growth by over 15-20%
  - o Pan-India, international tourist arrival increased by 10%, domestic by 12% (in 2014)
- 60,000+ jobs in the next ten years
  - o 78 jobs are created for every Million Rs. spent in Travel and Tourism
- Modal share of public transport from 3% to 10% in next five years and 32% (year 2041)
  - o Reduction in carbon footprint by 30% (from transport sector)
- Increase in departmental operational efficiency and hugely improved customer service experience
  - o 24x7 water supply and NRW reduction to 20%

## 3.2 Qualitatively

- Improvement in lake water quality
- Reduction in water borne diseases on account of laying of new sewerage system in walled city area
- Tourist's experience of walled city shall improve and they can able to enjoy the rich architecture/ heritage of Udaipur due to elimination of visual clutter (laying of utility duct)
- Better productivity due to reduction in travel time due to introduction of IPT

- Less time wasted in waiting at bus shelters as the proposed smart bus shelters will give passenger related information system
- Reduction in waiting time for parking at important locations as they would be provided with smart parking solutions
- Convenience to Citizens due to online bill payment facilities

## 14. Way Forward

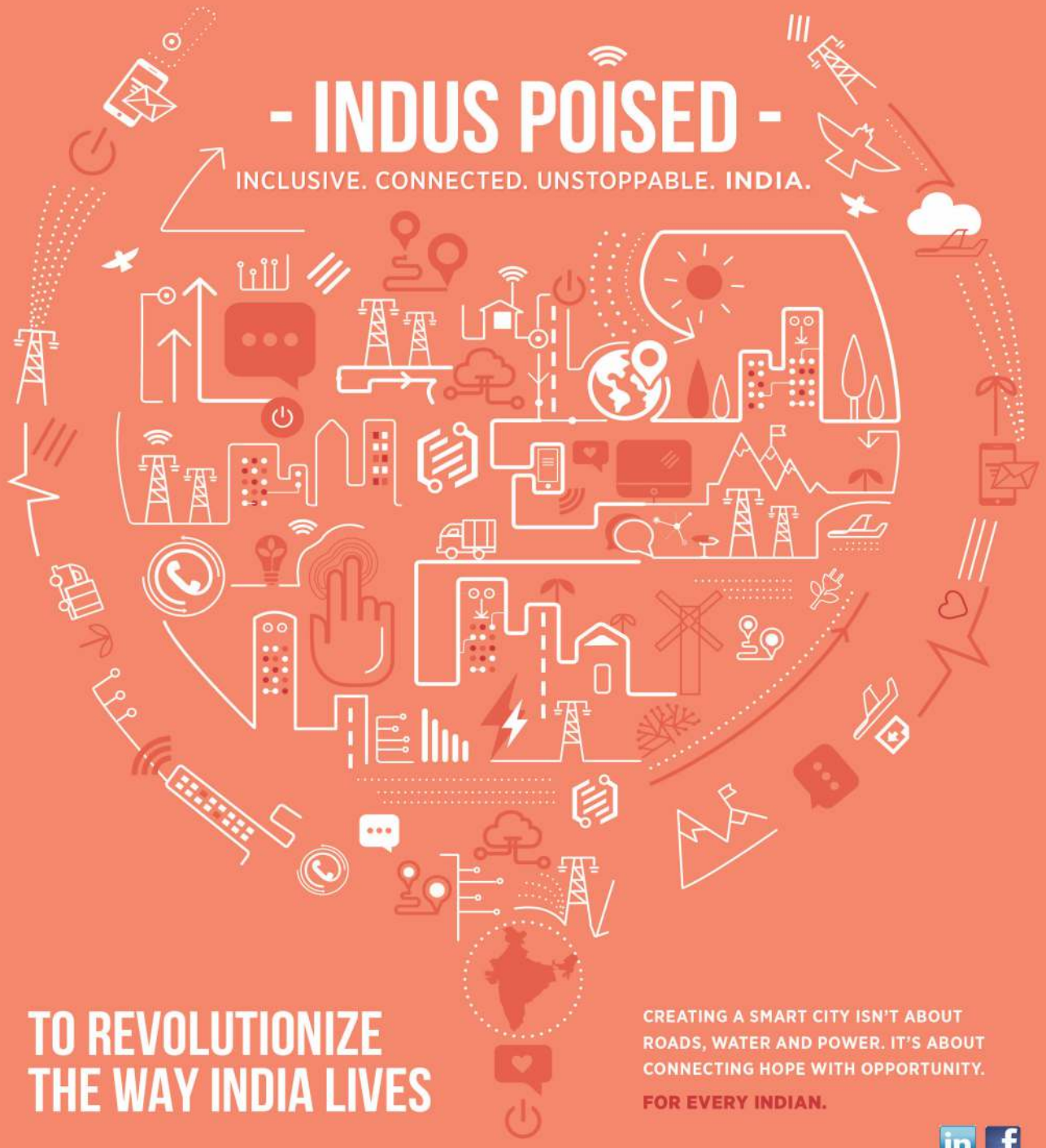
In reference to the Smart City Guidelines to implement the Smart City Proposal, city needs to constitute a SPV. The SPV will ensure coordinated and harmonious delivery of multiple municipal services, so as to achieve the implementation of the Smart City projects on a mission mode. It will be an umbrella institution responsible for planning, appraisal, deployment of funds, implementation, management of urban assets and service delivery, coordination with other departments, award of contracts, monitoring and evaluation of the Smart City development projects.

# NOTES

# NOTES

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