# Supporting Smart Urban Mobility and Built Environment in Four Indian Cities

## Overview Report



**Grant Ref # G 15 SSEF-140**

**Implemented by**

I·C·L·E·I
Local Governments for Sustainability

**Supported by**

SHAKTI
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Shakti Sustainable Energy Foundation works to strengthen the energy security of India by aiding the design and implementation of policies that support renewable energy, energy efficiency and the adoption of sustainable transport solutions.

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| | |
|---|---|
| ABD | Area Based Development |
| AMRUT | Atal Mission for Rejuvenation and Urban Transformation |
| BAU | Business as Usual |
| CBD | Central Business District |
| ECBC | Energy Efficiency Building Code |
| ICT | Information and Communication Technology |
| KMC | Kakinada Municipal Corporation |
| MLCP | Multi-level Car Parking |
| MoUD | Ministry of Urban Development |
| NMT | Non-motorized Transport |
| RESCO | Renewable Energy Service Company |
| ROW | Right of Way |
| SCC | Smart City Challenge |
| SCM | Smart City Mission |
| SCP | Smart City Proposal |
| TOD | Transit Oriented Development |
| ULBs | Urban Local Bodies |
| UMC | Udaipur Municipal Corporation |

# About the Report

The current overview report is part of the output report for the project "Supporting Smart Urban Mobility and Built Environment in Indian Cities" under Grant Ref: G 15 SSEF-140 , implemented during period of October 2015 to January 2017. The main objectives of the project were to broadly engage with state level officials in two states and have continuous on ground engagement with targeted authorities in cities on projects carried out under the Smart Cities Mission (SCM) concerning urban transport and built environment. This project also included an assessment of the existing urban transport scenario in the identified cities of each state as well providing handholding support to city teams for smooth initiation of the SCM.

The overview report presents the summary of the engagement process with the four project cities, the activities undertaken, the outputs and outcomes of these activities under the project along with the next steps/way forward.

# Smart Cities Mission: A Recap

With a vision to develop 109 Indian cities as smart cities by the end of year 2020, the Union Government of India launched the Smart City Mission (SCM) in June 2015. While the mission captures the aspirations of the citizens and the issues faced by cities in India, it presents unique challenges to local governments and agencies implementing it. Learning from the shortcomings of predecessor urban renewal and development programs, the SCM embodies a balanced mix of top-down and bottom-up approaches. It focuses on local actions with an integrated approach towards development to transform urban areas. It promotes peoples' participation, transparency in governance, stakeholder consultation and opportunities for local decision makers to design socially inclusive solutions that correspond to their specific local needs.

The idea of a smart city in India focuses on local actions and an integrated approach towards development to transform the urban scenery and ensure sustainability in the long term (see figure 1 and 2).
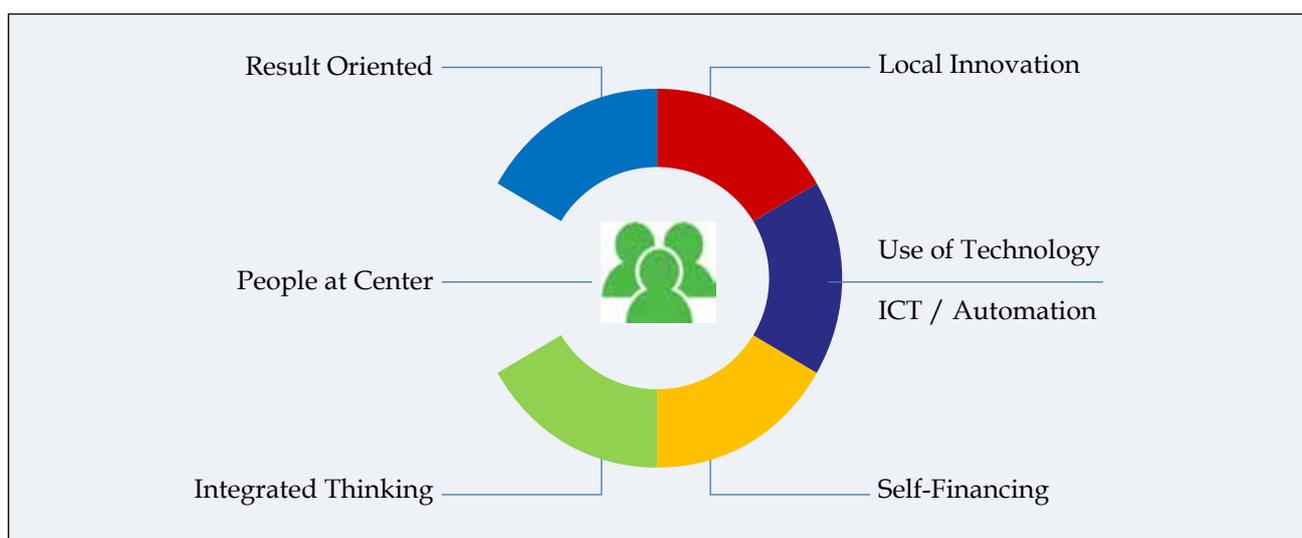


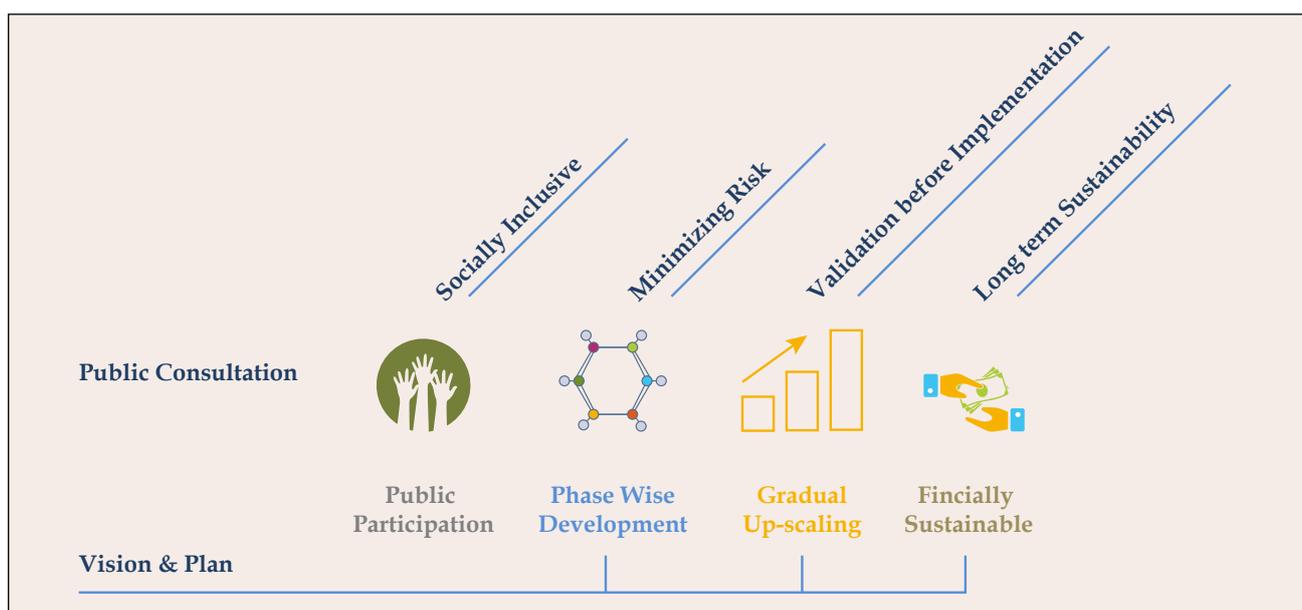**Figure 1.: Smart City Concept**



**Figure 2.: Sustainability indicators for Smart City Projects**

The Mission intends to empower the municipal administration with technical, institutional and fiscal capacity so that they can develop locally relevant strategies to improve urban management and service delivery. The success of SCM lies in the ability of cities to develop a holistic city development plan which is socially inclusive and self-sustainable along with a strategy to first execute implementation at pilot level in Area Based Development (ABD) zone with a plan for scale up to entire city.

The mission itself does not offer a large amount of funds to implement projects, but covers the cost of incubation of the process that a city needs to develop their capacity which will enable them to conceive smart development projects as well as allow for seeking gap funding from other sources. By covering 100+ large and fast growing cities, the SCM influences more than 48% of Indian citizens living in urban areas. Figure 3 shows the total percentage of urban population and the percentage which resides in cities covered under SCM.

## 31.2%   377,105,760 of 1,210,193,422 people
Net population lives in urban areas

## 48.8% (15.2%)   18,43,65,623 people
India's urban population lives in competing 106 smart cities

## 60.3% (9.1%)   11,11,98,933 people
India's urban population lives in selected 60 smart cities
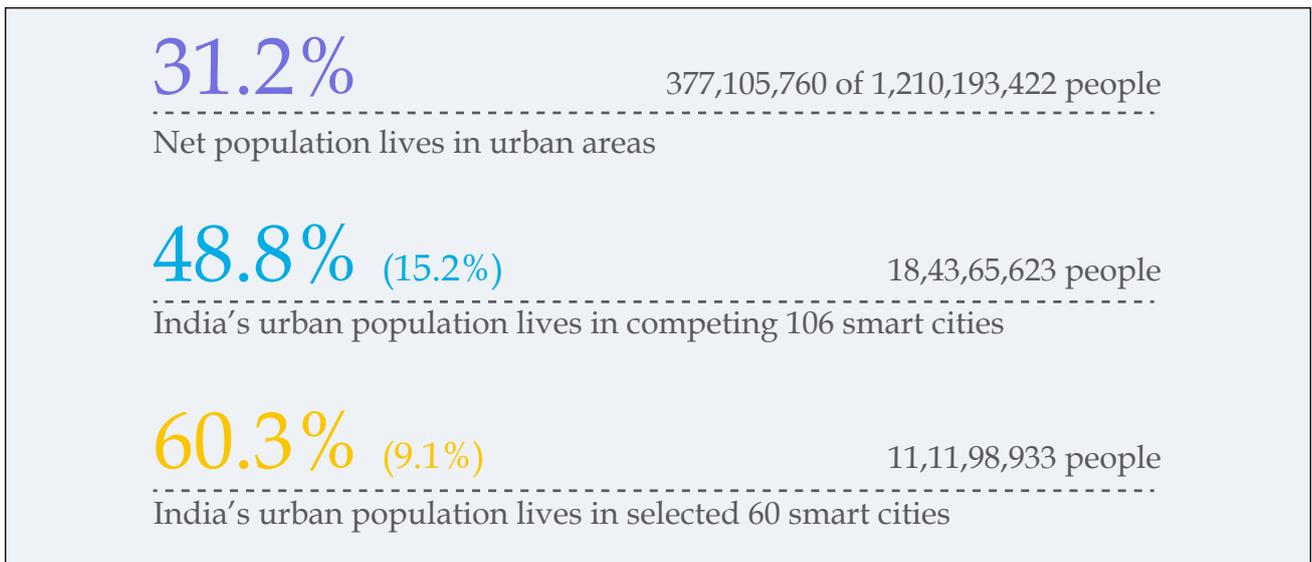
**Figure 3.: Significance of SCM**

# Handholding Support Project & ICLEI

During the first phase of round one, cities prepared draft smart city proposals (SCP) using a prescribed format by the MoUD, with support of state governments and external consultants. During this period, many encountered difficulties while preparing the proposals. Typical issues faced by the ULBs included difficulty of understanding the complex integration of various sectors with existing institutional segmentation and uncertainty regarding how their proposals align with the mission guidelines. The reasons behind such issues were limited technical capacity to understand smart solutions with existing human resources and that the scheme was launched as a challenge and the cities would be scored as per their SCPs.

To overcome this gap in capacity, a number of national, bilateral, multilateral and other international agencies came forward to extend their support to the local governments. This support to smart cities is expected to help local and state governments in following ways:

- Provide inputs to preparation/modification of SCPs
- Review and comment on the suitability and applicability of the proposals presented by consultants
- Capacity building of ULB staff and setting up technical teams to co-ordinate with consultants and other stakeholders

- Working with ULBs in preparing implementation plans and exploring financing options
- Developing strategies for replication and pan-city application of ADB proposals

ICLEI South Asia is involved with a number of cities participating in India's first ever smart city challenge. Out of the first 20 smart cites which were selected in March 2016, 11 of them are ICLEI's Member cities. ICLEI South Asia was involved as a hand holding agency with four cities in the top 20 list, providing inputs in Smart city plan improvements and later developing strategies in project implementation at a city level. This handholding support was offered in collaboration with Sandeep Gandhi Architects and with funding support from the Shakti Sustainable Energy Foundation (SSEF).

**11**
**Member Cities**

Pune
Bhubaneshwar
Jaipur
Surat
Solapur
Ahmedabad
Jabalpur
Vishakhapatnam
Guwahati
Coimbatore
Bhopal

**4**
**Hand Holding**

Jaipur

Udaipur

Kakinada

Vishakhapatnam

**Figure 4.: ICLEI South Asia's involvement in Smart Cities Mission in the First Round**

# Smart City Proposals of 4 Selected Cities

As part of the handholding project, ICLEI South Asia was engaged with four cities in two states – Rajasthan and Andhra Pradesh – focusing specifically on urban transport and built environment components of these cities. The essence of the smart city proposals for these four cities (Jaipur, Udaipur, Kakinada and Vishakhapatnam) are summarized below.

Jaipur city aspires to leverage its heritage and tourism potential through innovative and inclusive solutions and enhance quality of life of its citizens.
- Area under ABD covers 2.5% of entire city area within municipal corporation jurisdiction
- Jaipur proposes to improve tourism experience and enhance the visual appeal of walled city area (600 acres)
- Adaptive reuse of heritage buildings, IT connectivity and digitization for citizens and visitors.

Udaipur city plans to modernise the civic amenities of the area selected while preserving the lakes and its heritage which would tie in with the grand strategic vision of boosting tourism in the city.

- Area under ABD covers 5.1% of entire city area within municipal corporation jurisdiction.

Visakhapatnam envisions creating "A Resilient and Healthy Metropolis for People". The "city of destiny" is envisioned to become a leader in sustainability, healthy living, equality and innovation.
- Area under ABD covers 1.07% of entire city area within municipal corporation jurisdiction.
- Proposed 1,650 acres of beach front area for retrofit to serve as a test bed for brown field cities

Kakinada city envisions transforming from Pensioner's Paradise to become an economically vibrant city that is inclusive, livable and sustainable, based on its existing and potential strengths including the Port, Tourism and the Oil & Gas Sector.
- Area under ABD covers 17% of entire city area within municipal corporation jurisdiction
- Retrofitting 1,375 acres of centrally located land comprising mix land use for conversion to a smart area
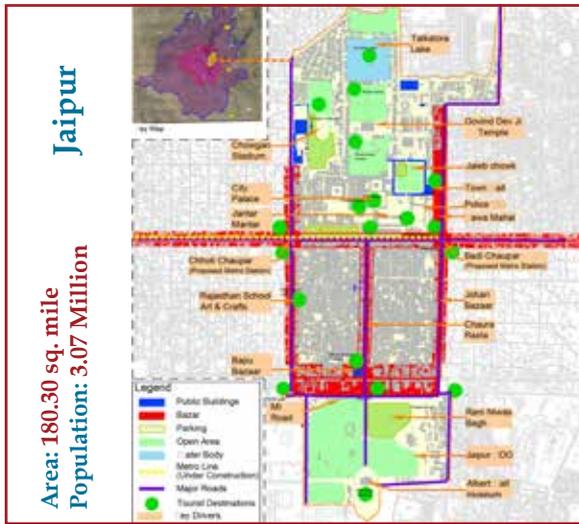


**Figure 5.: Jaipur ABD Zone Map and Highlights of Smart City Plan**
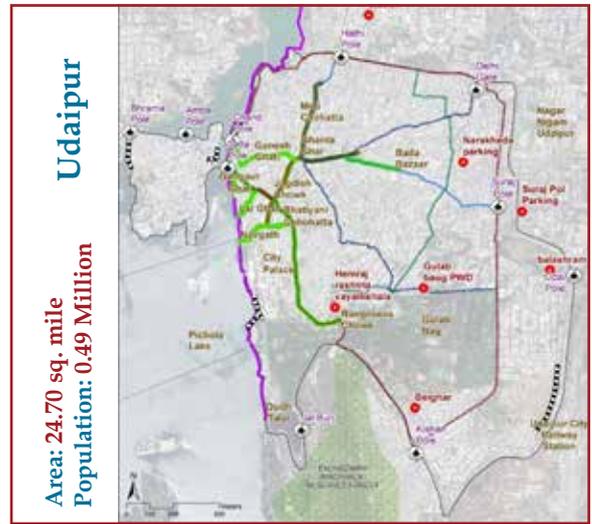


**Figure 6.: Udaipur ABD Zone Map and Highlights of Smart City Plan**
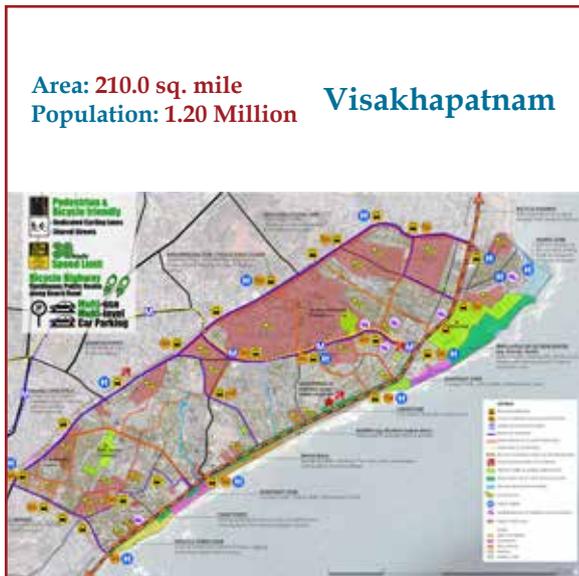


**Figure 7.: Visakhapatnam ABD Zone Map and Highlights of Smart City Plan**
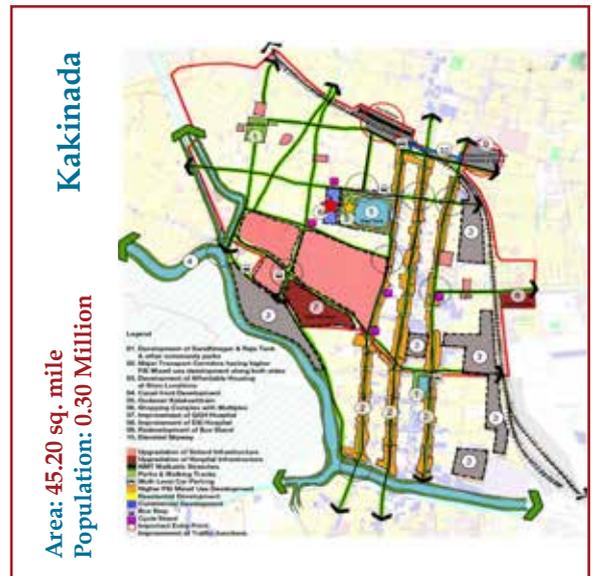


**Figure 8.: Kakinada ABD Zone Map and Highlights of Smart City Plan**

# Project Coverage

ICLEI South Asia's handholding support to smart cities covers two major sectors — urban mobility and built environment. Under these two broad categories, the project covered various urban improvement and sustainability approaches in line with the identified components of the selected cities (in their SCPs) such as:

**Urban mobility**
- Parking management – Policy, planning and infrastructure
- Road safety – Junction design and road improvement
- Non-motorised transport (NMT) – Infrastructure and facilities
- Electric mobility – E-rickshaw deployment strategy and management
- Multi-modal integration – Smart phone application
- Public transport – City bus deployment and bus terminal design
- Decongestion of roads – Parking policy, multi-level parking and road design

**Sustainable built environment**
- Energy efficiency in buildings – Policy and implementation strategy
- Renewable integration – Potential analysis and roll out
- Heritage conservation – Implementation and integration strategy
- Compact development – Policy and implementation strategy
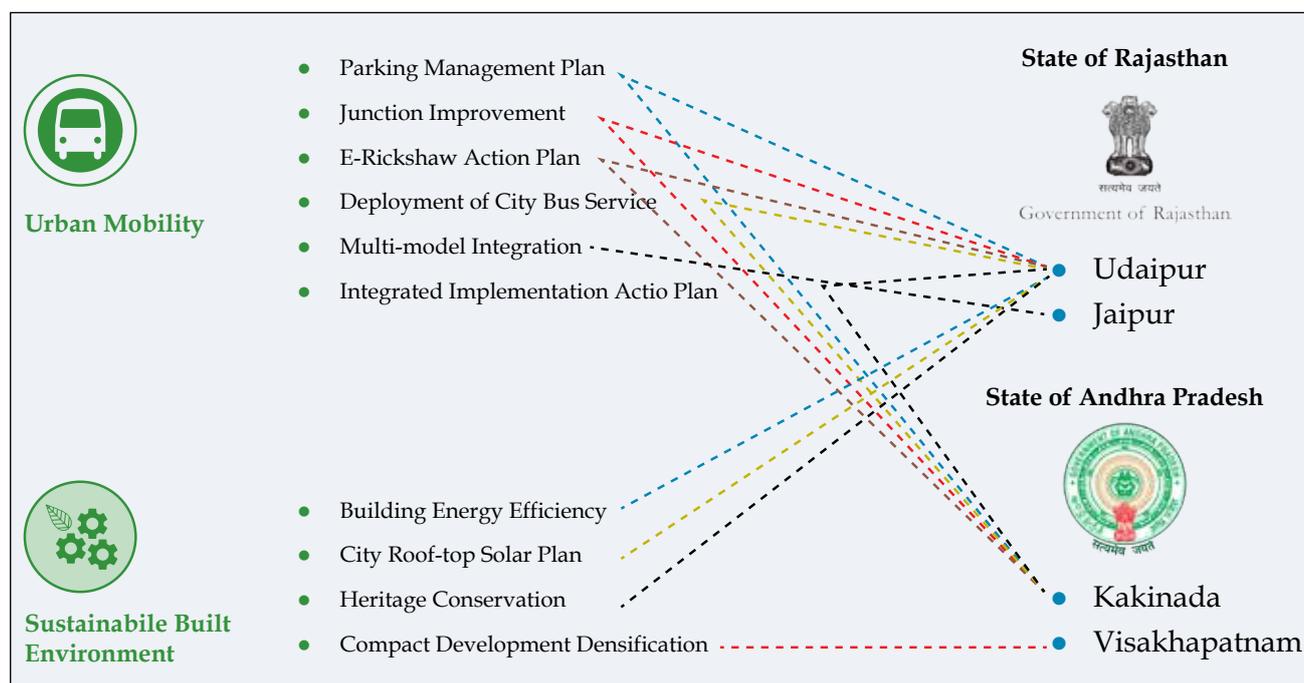


**Figure 9.: Engagement Map with Four Cities**

After selecting the cities, handholding support was offered based on their priority to implement measures, readiness to be involved (as expressed during formal and informal discussions with the city stakeholders). As per the cities' priority and level of urgency, technical support was provided to the cities. Figure 10 shows the level of engagement with each of the four cities for various projects being carried out under the Smart Cities Mission.

| | Udaipur | Jaipur | Kakinada | Visakhapatnam |
|---|---|---|---|---|
| **Urban Mobility** | | | | |
| ● Parking Management Plan | ▮▮ | ▮ | ▮▮ | ▮ |
| ● Junction Improvement | ▮▮▮ | ▮ | ▮▮ | ▮ |
| ● E-Rickshaw Action Plan | ▮ | ▮ | ▮▮▮ | X |
| ● Deployment of City Bus Service | ▮▮ | ▮ | ▮ | X |
| ● Multi-modal Integration | X | ▮▮ | X | X |
| **Sustainable Built Environment** | | | | |
| ● Building Energy Efficiency | ▮ | ▮ | ▮ | ▮ |
| ● City Roof-top Solar Plan | ▮ | X | ▮ | X |
| ● Heritage Conservation | ▮ | X | X | X |
| ● Compact Development Densification | ▮ | X | ▮ | X |

Legend:

| Intro discussion | Initial Presentation | Proposal Stage | DPR/Tender | Implementation |
|---|---|---|---|---|

**Figure 10.: City Wise Level of Engagement for Various Projects under Smart City Plan**

For all the four cities, transportation remained a priority sector for implementation and the bars in the Figure 10 show good level of engagement under that component. In the city of Jaipur and Vishakhapatnam, the engagement was very slow due to frequent change of commissioners during the support period. Table 1 shows the projects implemented in the four cities to fulfil their intents envisioned in their respective smart city proposal.

**Table 1.: Projects Implemented in the Four Cities**

| | Udaipur | | Kakinada | | Jaipur | | Vishakhapatnam | |
|---|---|---|---|---|---|---|---|---|
| | SCP | Support provided | SCP | Support provided | SCP | Support provided | SCP | Support provided |
| NMT | Restricted vehicular entry | - | Pedestrian & NMT Facilities | - | Barrier free walkways | - | Walking & bicycle lanes | |
| | Pedestrian friendly infrastructure | Street improvement plans | Bicycle stations | - | Enhance NMT infrastructure | - | Smart signage & cycle stand on bus stops | Discussions on NMT infrastructure integration with street improvement plans |
| | - | Junction improvement plans | - | - | - | - | Handicap accessible walkways | |
| PT | Electric Vehicles | E-Rickshaw Action Plan | Smart bus shelters | - | Public Bike sharing | - | E-rickshaws | - |
| | Modernized City Bus Service* | Tender for Deployment of City Bus service | E-rickshaw | E-Rickshaw Action Plan | Common mobility card | Multi-modal integration App. | - | - |
| | - | - | - | - | Multi-modal integration* | | - | - |
| Decongestion | Smart car parking | Parking Management Plan | Smart car parking | Parking Management Plan | Intelligent parking | - | Multi-level car parking | Discussions on street parking management plan |
| | - | MLCP integration with on street parking | Junction Improvement | Junction Improvement | - | - | - | - |
| | - | Junction Improvement | Organized vending zones | - | - | - | - | - |

| Sustainable built- environment | Udaipur | | Kakinada | | Jaipur | | Vishakhapatnam | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | SCP | Support provided | SCP | Support provided | SCP | Support provided | SCP | Support provided |
| | Smart Metering* | - | City Roof-top solar plan | - | Solar powered public buildings and public infra | | Rooftop Solar for public buildings and public infra | - |
| | 15% energy from Solar | City Roof-top solar plan | - | - | - | - | Smart metering | - |
| | Architecture restoration | ECBC Scoping Study (CEPT) | - | Urban densification | Adaptive reuse of heritage structures | ECBC Scoping Study (CEPT) | - | - |
| | Conservation of heritage urban fabric | - | - | ECBC Scoping Study (CEPT) | - | - | - | |

# Experience from Handholding Support

The core objective of SCM is to enable local governments to develop their future scenario plan and long term vision. To realize the objective of the mission, the MoUD reviewed the SCPs and scored cities based on integration and streamlining of on-going and upcoming projects, use of Information and Communication Technology (ICT), including feasible contemporary ways of managing urban systems, long - term vision and sustainability plan. Presently, more than one year since the selection of the first set of smart cities, most projects under the SCM are being executed as standalone initiatives, mostly due to capacity and institutional gaps on ground. Local authorities are focusing more on rolling out big projects, overlooking benefits of integrated implementation which will require more preparation time.
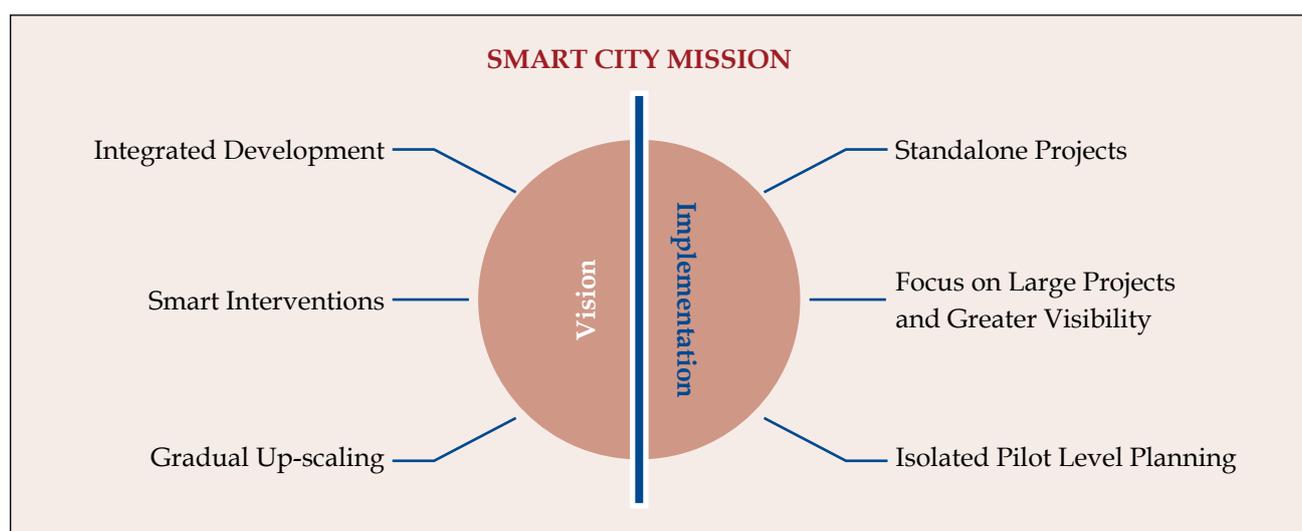


**Figure 11.: Smart City Plans: Vision VS Implementation**

This is largely because authorities prefer projects which have physical visibility over interventions such as policy and minor redesigning which have a greater level of sustainability. Also, the projects being planned under ABD are isolated in nature without having a city-wide implementation and scale-up plan.

**To overcome the above listed experiences, the cities must:**
- Adopt a system of sequential layering of various projects. This is much needed for resource-efficient implementation and optimization of inputs
- Have a pan-city vision while implementing pilot or ABD projects such that small projects complement each other at a city-wide scale
- While developing urban interventions, consider putting in place laws and policies that facilitate implementation and sustainability in long term

Based on the handholding initiative, the sections below describe the learnings from individual projects that were taken up city wise.

## Learnings from Individual Cases: Udaipur

### Parking Management Plan
As a solution to the city's critical problem of traffic congestion due to ad-hoc parking on roads, the city of Udaipur in its SCP listed smart parking system as a potential solution. As a part of the hand-holding

support, it was suggested that the city develops a holistic parking management policy instead of constructing individual MLCP under smart parking facilities. The parking management policy would include parking management plans for commercial and residential areas as pilots and propose Multi Level Car Parking (MLCP) infrastructure as and off street parking sites to regulate and reduce the demand. This would also be supported with parking pricing with a combination of on-road and off-road parking options citywide.

**Table 2.: Engagement under Parking Management in Udaipur**

| SCP Cmponent: | **Multi-level Car Parking** | | Listing in SCP: | ABD - Smart Parking | |
|---|---|---|---|---|---|
| Handholding Project: | **Parking Management Plan** | | Components: | Management of on and off street parking and integration with Multi-level parking structures | |
| Project Brief: | **Co-development of parking management strategy and policy for the city of Udaipur. Few locations were identified for the implementation of pilot projects** | | | | |
| Locations: | **Suraj pole** | **Hathi pole** | **Gulaab Bagh** | Duration: | Start: April 2016 | End: On-going |
| Outputs: | • 2 types of suveys    16-hour parking count to observe parking demand<br>                A user survey to understand the demand and willingness to pay<br>• Activity mapping was carried out to provide a street management plan<br>• Draft design solutions were shared with the city stakeholders before deciding pilot implementation<br>• Integration of technology solutions for revenue collection | | | | |
| Learning: | • **MCP structure takes 1.5 to 2 years to build and become operational**<br>• **Parking management plan need to integrate MLCPs with on street parking**<br>• **Plan must take into account the preferred choice of parking as per the need of the citizens (long / short term)**<br>• **Parking pricing introduced to provide a long term financially sustainable model** | | | | |
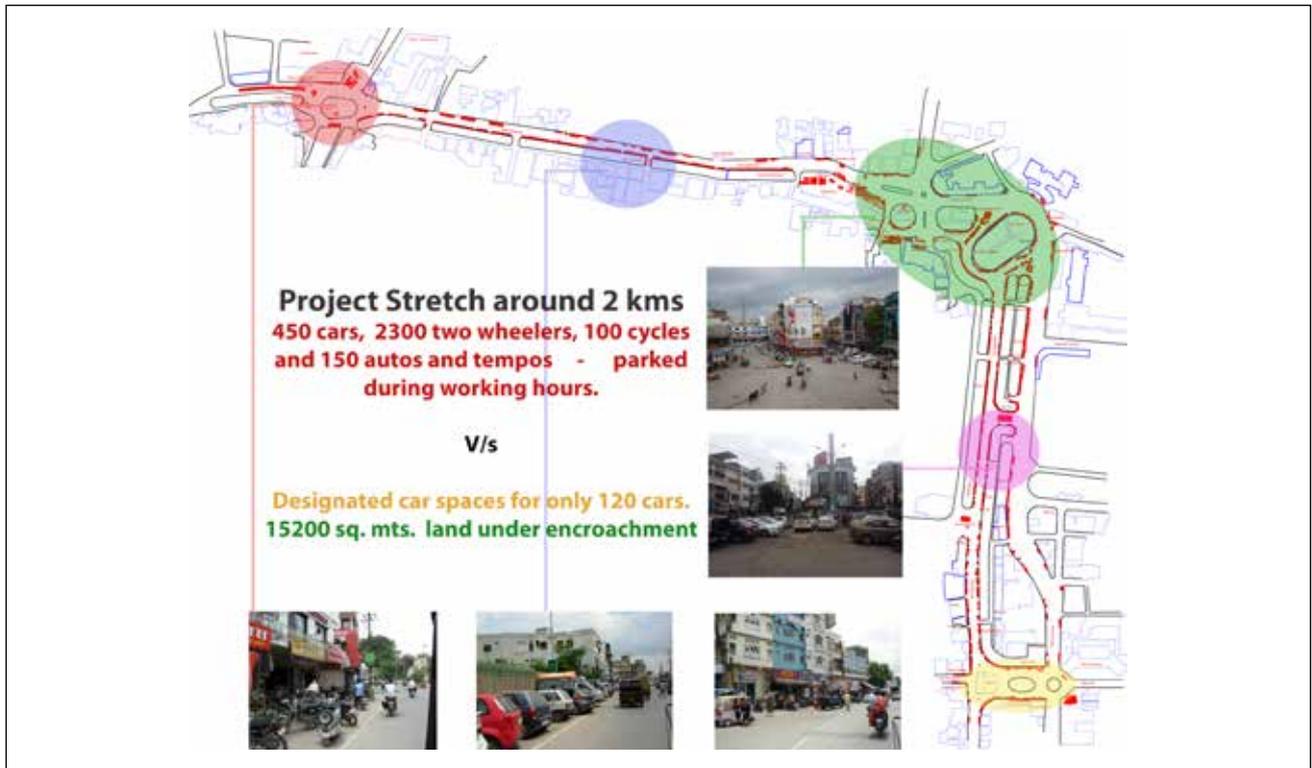


**Figure 12.: Map of Road Stretch in ABD Area with Facts and Figures**

As per discussion with UMC stakeholders, a commercial site near the main walled city area was selected for parking management plan and would soon be taken as a pilot experimentation to showcase that the parking principles, if applied well, can help in reducing the parking demand and regulating both on and off street parking spaces.

## Junction Improvement

In their SCP, Udaipur stressed upon improving traffic flow and pedestrian infrastructure in the ABD area which is also the city's core area. To address traffic congestion, pedestrian safety and walkability, the SCP listed various strategies to overcome these.

**Table 3.: Engagement activity and learning under Junction Improvement in Udaipur**

| SCP Cmponent: | Reduce congestion through improved traffic flow | | | Listing in SCP: | ABD - Intelligent Traffic Management | |
|---|---|---|---|---|---|---|
| Handholding Project: | Junction Improvement and Trafffic Management | | | Components: | Junction design, survey and feasibility analysis | |
| Project Brief: | Development of conceptual design of major city junctions providing access to ABD area. Project also includes activity survey mapping for all the junctions and geometric design proposals for three major junctions. Feasibility report for one of the junctions which had a flyover proposed as design improvement. | | | | | |
| Locations: | Hathipole | Delhi Gate | Surajpole | Duration: | Start: March 2016 | End: On-going |
| | Udai pole | Sewa Ashram | Kumharo ka Bhatta | | | |
| Outputs: | • Activity mapping and total station surveys were carried out for three out of eight junctions with a detail geometric plan solutions<br>• Design interventions included designated vending zone, parking and pedestrian walkways, signage, circulation design and improvement of junctions<br>• Pilot implementation was carried out for two major junctions followed by stakeholder consultation for further improvement and alterations wherever required | | | | | |
| Learning: | • Pilot project implementation provided flexibility to make improvements<br>• Temporary test structures gained confidence and sense of ownership to corporation and citizens<br>• The holistic design solution for the junction helped to provide better understanding on sustainable mobility solutions to city stakeholders. | | | | | |

Integrating the end results of listed strategies into one solution, ICLEI-SA suggested minor design changes in the city's major nodes. The key enabler that made the design acceptable was the numerous stakeholder consultations with concerned government officials and public's acceptability through pilot experimentation of the design with temporary barricading. At all levels citizens, public representatives, traffic police and city administrators were included in the design discussion. This not only made the consultation a two-way communication but also helped in execution with enhanced public participation and greater acceptability to adopt a change.

## City-bus Infrastructure Improvement

The city of Udaipur, to improve public transport scenario, listed modernization of city bus services as a pan-city initiative. The city had procured 40 buses and operated them with a private operator. As part of the handholding, inputs were provided on tender document for operation and maintenance of running the buses at a strategic level that were welcomed by the city.

**Table 4.: Engagement Activities under City Bus Improvement in Udaipur**

| SCP Cmponent: | **Modernization of city bus service** | | Listing in SCP: | Pan-City | |
|---|---|---|---|---|---|
| Handholding Project: | **City bus improvement plan** | | Components: | Procurement Plan, route rationalisation and integration strategy with existing IPT modes | |
| Project Brief: | **Review of working tender city bus in purview to introduce buses as an organised public transport system and related infrastructure followed by recommendation and suggestions for making tender document more holistic with integration to existing IPT fleet.** | | | | |
| Locations: | **Udai pole Bus stand** | **Pan City Interventions** | Duration: | Start: July 2016 | End: On-going |
| Outputs: | • Suggestions to improve the existing RFP document for bus procurement in Udaipur<br>• The suggestions included responsibility of operator, IT solutions expanded to the existing IPT fleet, improvement in emission norms. Capacity building for staff, payment to the operator to be based on minimum passengers travelled to make the system effective and long lasting.<br>• The suggestions also included a detail study to be carried out for route rationalization and select performance standards | | | | |
| Learning: | • **Procurement and operation of buses to be done only after travel demand analysis with proper route rationalization**<br>• **A thorough plan needs to be prepared integrating bus routes, enhanced revenue collection,  cohesion with other modes and incentivisation of performers**<br>• **Joint procurement helps in negotiation and cost optimization** | | | | |

Prior to ICLEI's engagement to provide hand-holding, UMC had already drafted the tender document for the procurement of buses. The tender document was reviewed and suggestions on improving the procurement plan and operation strategy was provided to the city. Understanding the benefits of the suggestions, UMC later decided to procure buses in pooled procurement model at state level that brought better negotiation opportunity and extended after sales support from the bus manufacturer.

## Energy Efficiency in Buildings

**Table 5.: Engagement Activity under Building Energy Efficiency in Udaipur**

| SCP Cmponent: | **N/A** | Listing in SCP: | N/A |
|---|---|---|---|
| Handholding Project: | **Energy Efficiency in Buildings** | Components: | ECBC implementation . Passive measures for energy efficiency |
| Project Brief: | **Scoping study for the city of Udaipur showcasing energy saving potential in buildings by implementing Energy Efficiency Building Code (ECBC)** | | |
| Locations: | **Pan City** | Duration: | Start: April 2016  End: Dec 2016 |
| Outputs: | • State level solutions for ECBC implementation and introduce a methodology which can identify linkages between property tax data and building energy data as a norm<br>• Provided recommendation for Udaipur to implement ECBC in a phase wise manner<br>• Calculated energy projections for all kind of land-use | | |
| Learning: | • **Formal recognition of energy efficiency measures and guidelines is critical for successful implementation**<br>• **Cities still needs to understand their role and know how of implementing EE measures**<br>• **Integration of Energy conservation measures with development controls and other related public policies**<br>• **More engagement of corporation is needed to develop implementable strategies** | | |

Although promoting energy efficiency in buildings was not part of the SCP, Udaipur intended to promote use of roof top solar and grid connected renewable sources to improve energy availability and reduce GHG emissions due to coal based energy production. To build a sustainable and smart city, it was suggested that the scope of energy saving in buildings should be looked into.  A scoping study in the form of a rapid assessment was carried out to estimate the potential energy saved by adopting the energy conservation policy. The study was carried out for the residential and commercial sectors to analyze energy savings by implementing the provisions of ECBC. This specific input was possible with technical support of Centre for Advanced Research in Building Science & Energy (CARBSE) center at CEPT University.



| | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|---|
| Energy Saving (Gwh) | 0 | 10 | 19 | 27 | 34 | 41 | 49 | 57 |
| BAU (Gwh) | 140 | 162 | 188 | 218 | 253 | 293 | 339 | 393 |
| ECBC (Gwh) | 140 | 152 | 169 | 191 | 219 | 252 | 291 | 337 |
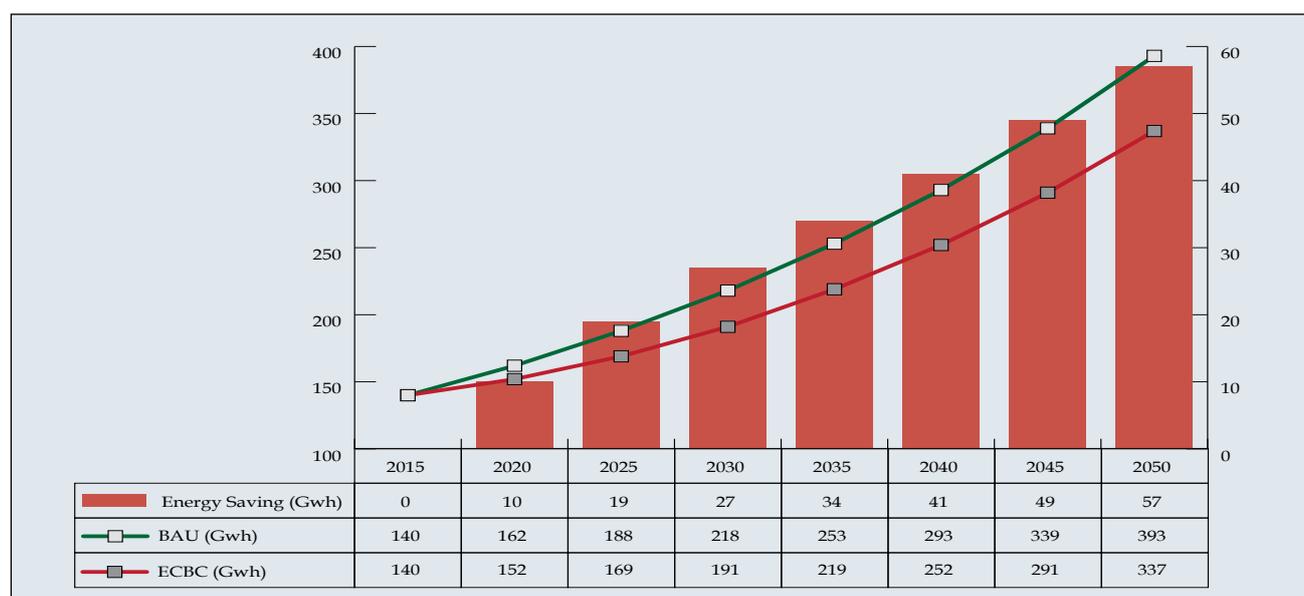
**Figure 13.: Energy Projections (Residential): BAU and ECBC**

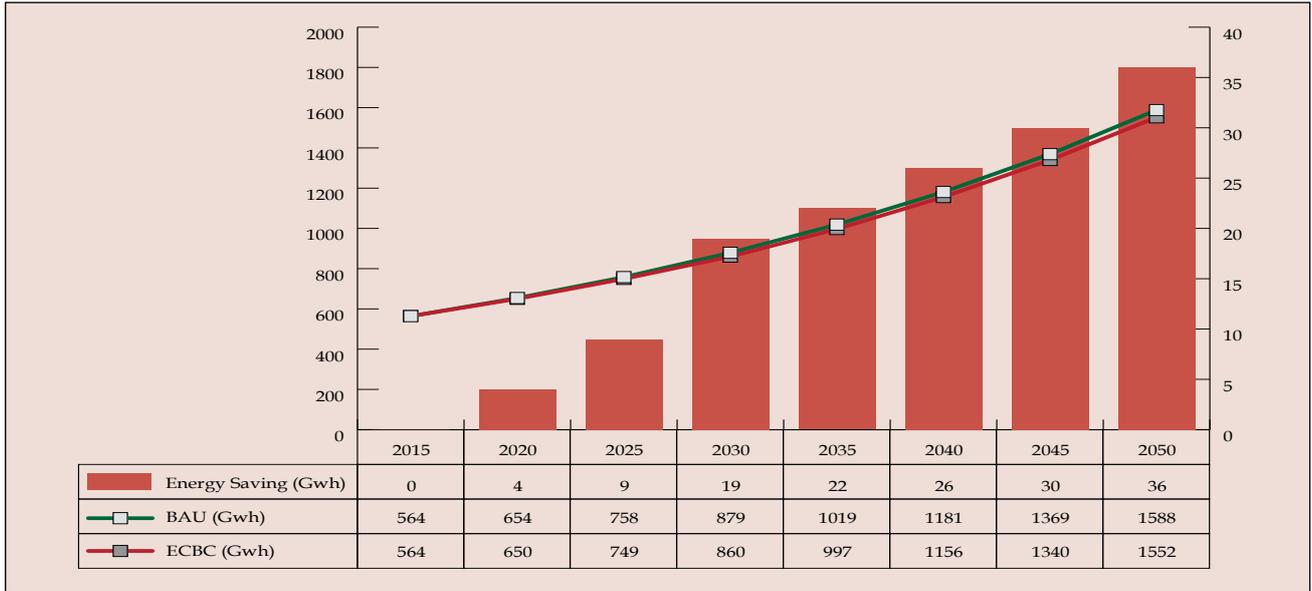| | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|---|---|---|---|---|---|---|---|---|
| Energy Saving (Gwh) | 0 | 4 | 9 | 19 | 22 | 26 | 30 | 36 |
| BAU (Gwh) | 564 | 654 | 758 | 879 | 1019 | 1181 | 1369 | 1588 |
| ECBC (Gwh) | 564 | 650 | 749 | 860 | 997 | 1156 | 1340 | 1552 |

**Figure 14.: Energy Projections (Commercial): BAU and ECBC**

## Roof-top Solar Plan for ABD Area

The city in its Smart City Vision mandated to meet at-least 15% of total energy demand in buildings through renewable sources in the ABD zone. As part of the hand-holding to the city, a study showing the renewable energy potential – if the grid connected roof-top solar project is realised in the ABD zone and the time for return of investment under RESCO model – was conducted.

**Table 6.: Engagement Activity under Roof top Plan in Udaipur**

| SCP Cmponent: | **15% energy supply from solar** | Listing in SCP: | ABD - Reduced Dependence on Grid based Power |
|---|---|---|---|
| Handholding Project: | **Roof-top Solar Plan** | Components: | Assessment of renewable energy potential through roof-top solar |
| Project Brief: | **Study showcasing potential of percentage solar energy generation through roof top solar installations in ABD area and city wide** | | |
| Locations: | **ABD and Pan City** | Duration: | Start: Aug 2016 · End: Dec 2016 |
| Outputs: | <ul><li>Secondary research for available built up area</li><li>Energy consumption for the given area in the BAU scenario</li><li>Built up area available for roof top installations</li><li>A plan was recommended that by installing roof top in only 20% of available roof top area, the city will be able to achieve the SCP target of 15% energy through solar</li></ul> | | |
| Learning: | <ul><li>**Mandate to produce renewable energy generation in buildings can be linked with land use and building size through construction permissions**</li><li>**Scheme must offer choice of financial models as per user type and scale**</li></ul> | | |

Built-up mass (approx. 482 acre)

Net Potential in ABD are for solar energy production: ≈ 18 MWp

Estimated annual renewable energy production: 25.06 Gwp

Estimated annual consumption BAU: 36.46 GWp

ABD area can generate up to 68.73% of its energy requirement
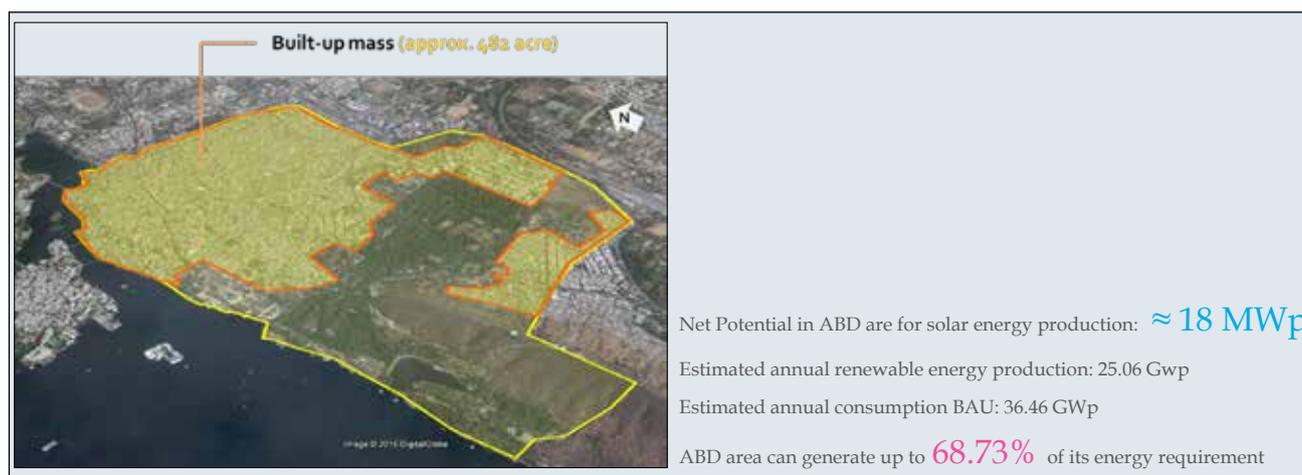
**Figure 15.: Map showing Area in ABD Zone Considered for Roof Top Solar Installations**

# Learnings from Individual Cases: Jaipur

## Public Transportation Multi-modal Integration Mobile App

Jaipur city required technical inputs to develop a web-based application to integrate public and intermodal public transport information for citizens. The ICLEI South Asia team, with invited partner TRAFI (a British company famous in building public transport applications) came on board to provide free-of-charge technical inputs to the city regarding the development of such an application. TRAFI, in the process, also offered to provide the required facility through their own application platform to explain the possible ways of going forward for the city.

**Table 7.: Engagement under Multi modal Integration in Jaipur**

| SCP Cmponent: | Multi-modal integration | | Listing in SCP: | Pan City - Smart Multi-modal mobility |
|---|---|---|---|---|
| Handholding Project: | **Multi-modal integration (Mobile application)** | | Components: | Providing recommendation for a mobile application to integrate all the public transport modes |
| Project Brief: | **Introduction of a mobile application enabling multi modal integration in the existing modes of public transportation** | | | |
| Locations: | **ABD and Pan City** | | Duration: | Start: Jun 2016 | End: Nov 2016 |
| Outputs: | <ul><li>Recommendations on MMI planning undertaking all transport interchange points such as Bus Terminals, Railway Stations, Airports and Metro Stations.</li><li>Designs shall include revised circulations planning, inclusion of drop-off/pick-up bays for buses, IPT and private vehicles. In addition these may include parking spaces for IPT and buses.</li><li>Integrated fare structuring will need to be achieved based on an understanding between different operators . Such as third party fare collector, for all the modes.</li></ul> | | | | |
| Learning: | <ul><li>**City need not re-invent systems and software already in use for the same purpose**</li><li>**Partnering with existing technology providers will save time and resources**</li><li>**Data gaps can be filled using data of existing apps as base for trend generation and plan systems accordingly**</li></ul> | | | | |

## Learnings from individual cases: Kakinada

### E-rickshaw Deployment and Operation Plan

In the absence of any formal system of public transportation, Kakinada, under the SCM stressed upon improving the intermodal public transportation facilities as well as the livelihoods of the urban poor. As part of the hand-holding provided to the city, recommendations on a deployment plan and a strategy for operating e-rickshaws in the city were developed. Technical surveys were conducted for mapping e-rickshaw routes and documentation prescribing minimum standards and technical specifications for e-rickshaws for procurement were designed. A policy document providing a long term strategy for operation of E Rickshaw was also prepared for the city.

**Table 8.: Engagement under E Rickshaw Deployment and Operations in Kakinada**

| SCP Cmponent: | **E-Rickshaw** | Listing in SCP: | ABD- Short term milestones for SPV | |
|---|---|---|---|---|
| Handholding Project: | **E-Rickshaw Deployment and operation Plan** | Components: | E-Rickshaw procurement and roll out strategy | |
| Project Brief: | **Introduction of appropriated model for procuring and operating e-rickshaws for the city. Survey and mapping of NMT, IPT & PT users and finalisation of e-rickshaw routes. Project also includes recommendation on e-rickshaw models and specifications .** | | | |
| Locations: | **ABD Area** | Duration: | Start: Jul 2016 | End: On-going |
| Outputs: | <ul><li>The E Rickshaw strategy included providing recommendation on E Rickshaw operating model and charging station model</li><li>This also included recommendation on responsibility of different stakeholders</li><li>A business model and cost assumptions were prepared for the E Rickshaw operations in the city</li><li>100 E Rickshaws have been procured and an operation plan is prepared including their integration with existing IPT modes.</li></ul> | | | |
| Learning: | <ul><li>**ULB need not procure and operate e-rickshaws at their own expenses or give e-rickshaws in exchange of old diesel rickshaws.**</li><li>**ULB can facilitate shift towards e-rickshaw through pricing rules, financial incentives and putting supporting infrastructure in place**</li><li>**Specifications of e-rickshaws and operation guidelines must be decided keeping in mind road safety measures and passenger comfort**</li></ul> | | | |
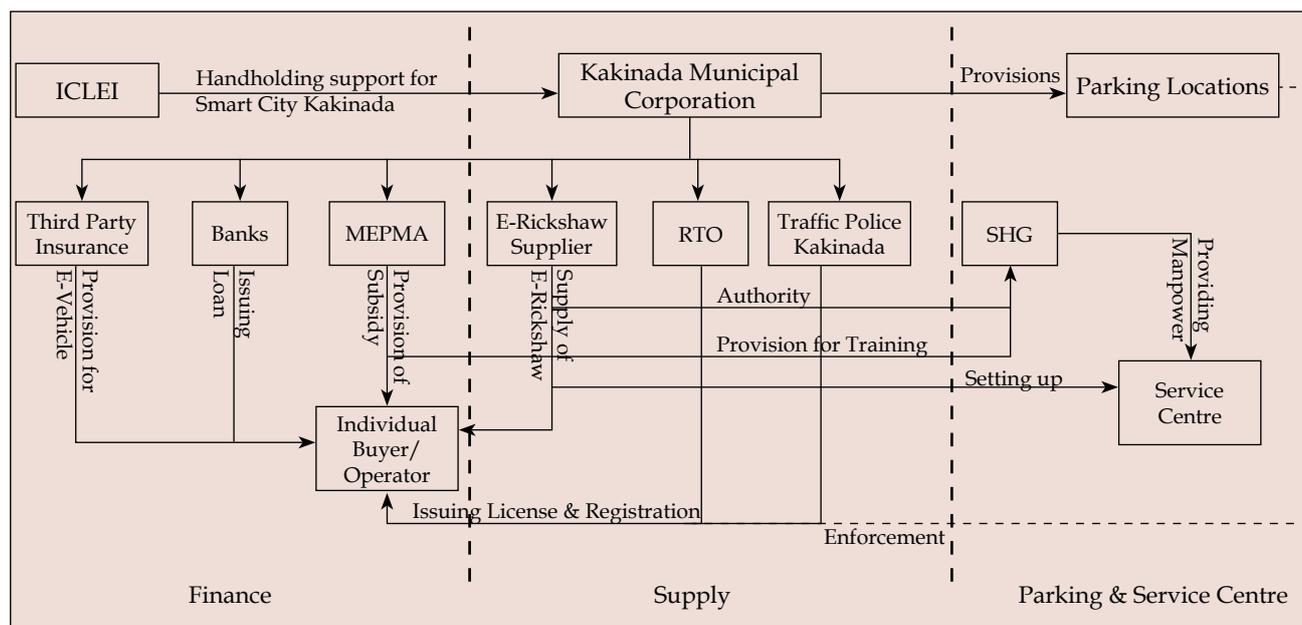
**Figure 16.: Roles and Responsibilities of Various Stakeholders under Operation of E-Rickshaw**

## Junction Improvement

Kakinada identified junction improvement as a potential solution to the city's problem of traffic congestion and road safety for pedestrians. Construction of a flyover at one of the city's major intersection – Tirumala Tirupati Devasthanam – was initially suggested by the city. Along similar lines of the experience with Udaipur's junction improvement initiative, ICLEI South Asia developed a proposal to re-design the junction instead of constructing a flyover. The suggested proposal included minor design changes in the present infrastructure at a marginal investment to achieve the desired impact.

**Table 9.: Engagement under Junction Improvement in Kakinada**

| SCP Cmponent: | **Junction improvement** | Listing in SCP: | ABD- Short term milestones for SPV |
|---|---|---|---|
| Handholding Project: | **Junction Improvement** | Components: | Activity mapping and junction improvement |
| Project Brief: | **Development of conceptual design of a major junction in ABD area. The intend of the design is to improve traffic circulation, provide equity and safety to NMT modes while organizing parking and vending areas.** | | |
| Locations: | **TTD Junction** | Duration: | Start: Sept 2016 · End: On-going |
| Outputs: | • Issues at the junction were recorded through activity mapping of road and built form inventory for adequate registration of the junction and associated arms.<br>• Traffic flow at junction was recorded, considering current traffic flow recorded through sample video recorded at peak hour.<br>• The analysis was conducted thereby, recommending the most suited option for the junctions. | | |
| Learning: | • **ULBs do not show much interest in projects having minor alterations even if those minor steps leads to greater results**<br>• **More focus on project visibility rather than smart interventions defeat the purpose of developing smart development plans** | | |
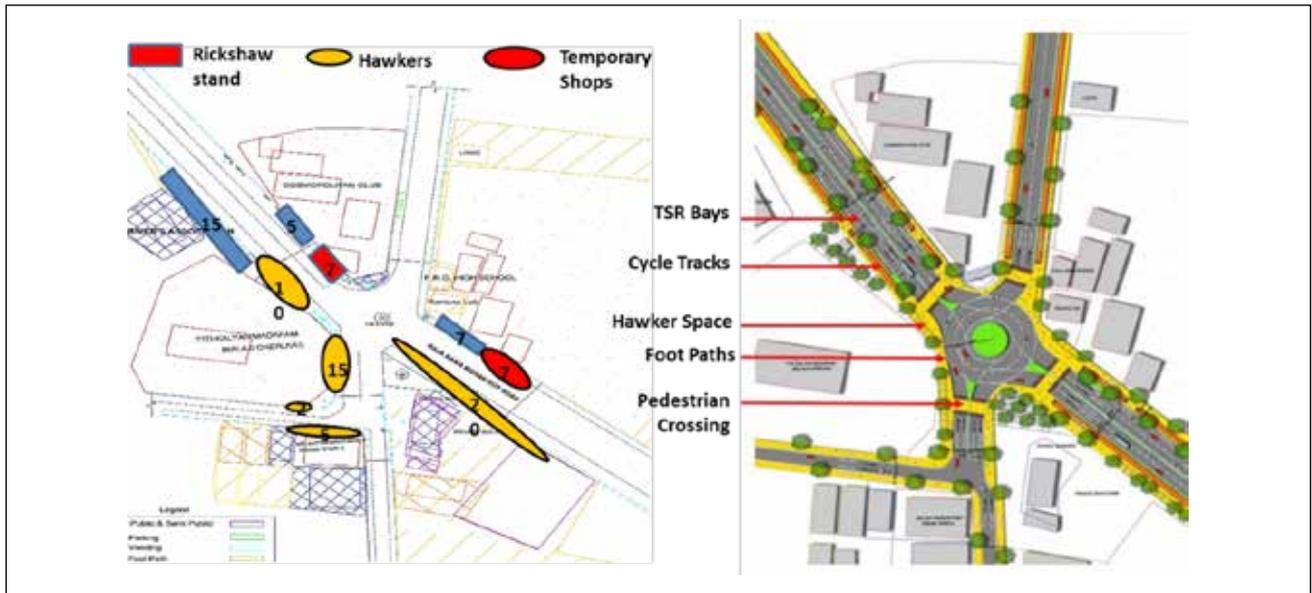
**Figure 17.: Tirumala Tirupati Devasthanam: Existing (left) vs Proposed**

## Development of Smart City Action Plan

The smart city concept advocates integration of development projects and practices to achieve higher efficiency and optimize resource need. While the concept of smart city development is new to Indian cities, there is a dire need for cities to develop their understanding holistically on implementing the area based project and expanding them to pan city level. Therefore, under the hand-holding support, discussions on the smart city action plan were initiated that covered the following topics:

- Generating **understanding** towards smart urban interventions
- Expanding vision for ABD projects to a pan city level and **pre-plan scale up**
- Finding **inter-linkages** and **dependencies** of various projects under SCM
- Sequencing and layering of projects to bring **resource efficiency**
- Developing an **implementation strategy** for smart city projects

The purpose of such an action plan was to build the cities' capacity to develop smart city projects in a holistic manner. This approach helped Udaipur and Kakinada understand the need of a policy framework for parking while providing modern infrastructure and facilities for the same. Below is a mapping of inter linkages of projects and plans listing an enabling framework required for the implementation of the listed projects.
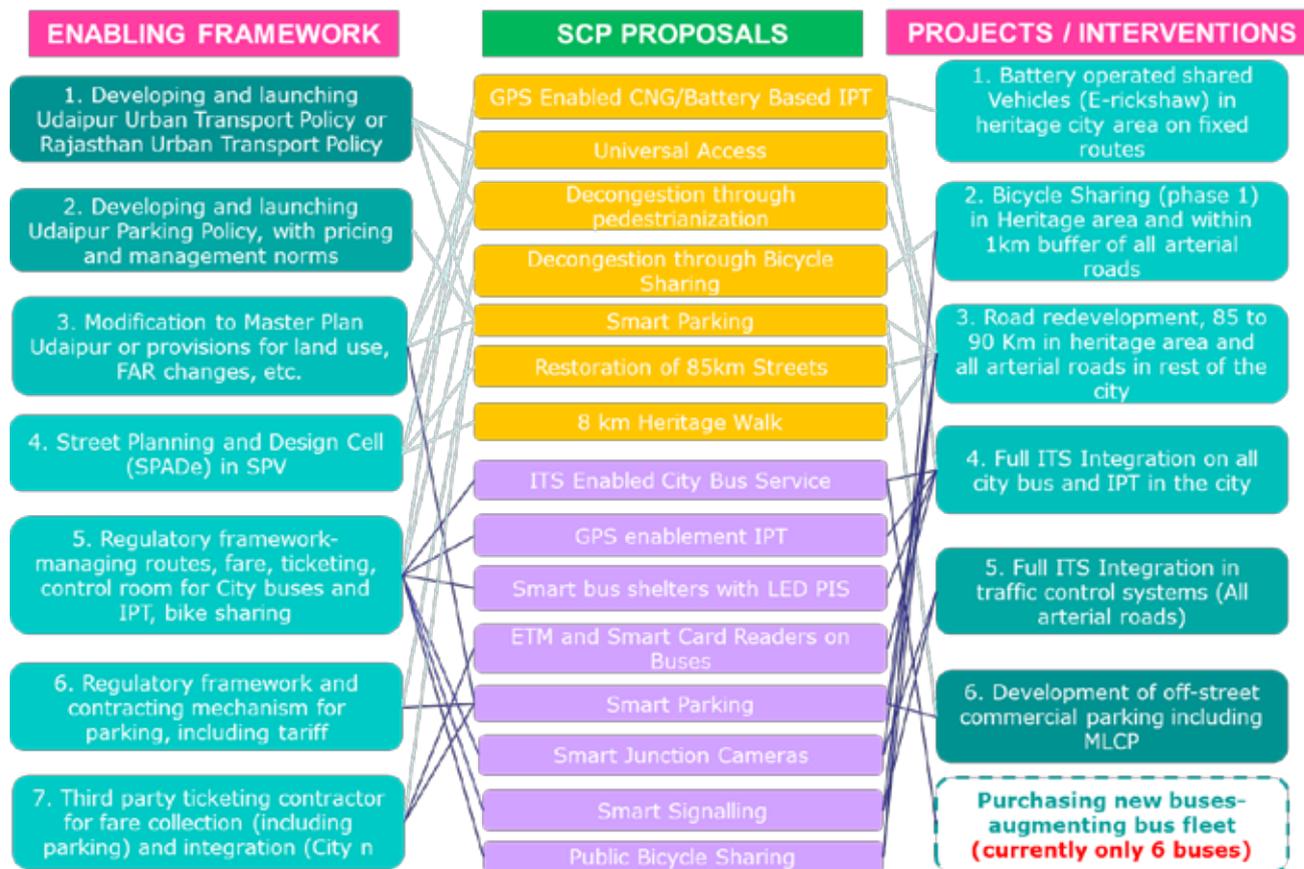
**ENABLING FRAMEWORK**

1. Developing and launching Udaipur Urban Transport Policy or Rajasthan Urban Transport Policy

2. Developing and launching Udaipur Parking Policy, with pricing and management norms

3. Modification to Master Plan Udaipur or provisions for land use, FAR changes, etc.

4. Street Planning and Design Cell (SPADe) in SPV

5. Regulatory framework- managing routes, fare, ticketing, control room for City buses and IPT, bike sharing

6. Regulatory framework and contracting mechanism for parking, including tariff

7. Third party ticketing contractor for fare collection (including parking) and integration (City n

**SCP PROPOSALS**

GPS Enabled CNG/Battery Based IPT

Universal Access

Decongestion through pedestrianization

Decongestion through Bicycle Sharing

Smart Parking

Restoration of 85km Streets

8 km Heritage Walk

ITS Enabled City Bus Service

GPS enablement IPT

Smart bus shelters with LED PIS

ETM and Smart Card Readers on Buses

Smart Parking

Smart Junction Cameras

Smart Signalling

Public Bicycle Sharing

**PROJECTS / INTERVENTIONS**

1. Battery operated shared Vehicles (E-rickshaw) in heritage city area on fixed routes

2. Bicycle Sharing (phase 1) in Heritage area and within 1km buffer of all arterial roads

3. Road redevelopment, 85 to 90 Km in heritage area and all arterial roads in rest of the city

4. Full ITS Integration on all city bus and IPT in the city

5. Full ITS Integration in traffic control systems (All arterial roads)

6. Development of off-street commercial parking including MLCP

Purchasing new buses- augmenting bus fleet (currently only 6 buses)

**Figure 18.: Action Plan Framework**

# Way Forward

ICLEI South Asia continues to work with the cities of Udaipur, Kakinada and Vishakhapatnam for smart city implementation in another phase of the project. The project team has learnt much from the interactions with city team and consultants and shared their learning and expertise with the city teams. The project team has also developed a web tool (www.smartcitywebtool.org) that aggregates information and documentation relevant to the smart city concept for easy access. ICLEI South Asia continues to populate it and share information with interested cities, decision makers and experts.