Delhi Mumbai Industrial Corridor (DMIC) Project
India’s Urbanisation Prospects

**Demographics**

- **Yr 2030**
- 40% Population will be Urban
- 68 cities will have a population of more than 1 million
- 70% of net new employment will be generated in cities

*Source: India’s Urban Awakening: Building inclusive cities, sustaining economic growth - McKinsey Global Institute, April 2010*
Cities will account for nearly 70% of India’s GDP by 2030.

New DMIC Cities will help to meet pressures of urbanisation and also lead India’s economic growth for the next 20 years.

Source: India’s Urban Awakening: Building inclusive cities, sustaining economic growth
- McKinsey Global Institute, April 2010
The DMIC Corridor

DMICDC
DMIC States - Traditional Industrial Base

• Approx. 43% contribution to the country’s GDP

• Contributes to more than half of India’s industrial production & exports

• Accounts for over 40% of workers & number of factories across India

Source: Ministry of Statistics & Programme Implementation (Govt. of India), ASI, Labour Bureau
Industry as an engine of Economic growth

• Projected Industrial CAGR for DMIC region at 13% (2010–20)

• Projected Growth in Industrial output at 14 times (2010-2040)
  - China increased its industrial output more than 10 fold in 27 years (1978 to 2005)
  - Korea enhanced its industrial output by approx 13 times in 30 years (1970 -2000)
  - Japan increased its industrial output 8 fold in 30 years (1955 to 1985)
7 Nodes being developed in DMIC Phase 1

1. Dadri – Noida Ghaziabad IR, UP
2. Manesar – Bawal IR, Haryana
3. Neemrana – Khushkhera – Bhiwadi IR, Rajasthan
4. Pithampur – Dhar – Mhow IR, MP
5. Ahmedabad – Dholera IR, Gujarat
6. Nashik – Sinnar – Igatpuri IR, Maharashtra
7. Dighi Port IA, Maharashtra
Global Regional Cities: Blueprint for Smart Growth

Sustainable, smart cities of the 21st century

Transit oriented, walkable and livable cities

Interconnected roads, rail and communication systems providing speed, access and world wide connectivity.
ECONOMIC CASE STUDIES – World Class Cities: Iskandar Malaysia

MANAGEMENT CONCEPT

• Iskandar Regional Development Authority (IRDA) as a Federal statutory body responsible for realizing the vision and objectives of Iskandar Malaysia.

• IRDA is a single authority for promotions, approvals, implementations and regulations, aspires to carry best practices benchmarked against world standards.

• A Comprehensive Development Plan (CDP) steers the overall development framework including strategies for the physical, economic and social development as well as environment protection.

IRDA’s Role

Planning
- Establish policies, direction and strategies
- Integrate strategies with government policies
- Recommend new policies to enhance the competitiveness

Promotion
- Promote as trade, investment, logistic center, and tourist destination
- Facilitate and undertake economic, physical & social development.

Process
- Act as principal coordinating agent to receive, process and expedite the requisite approvals
- Render administrative services and assistance

IRDA’s Organization Structure

Prime Minister

Chief Minister of Johor

Board Members of IRDA

Chief Executive

Senior Leadership Team

Management of IRDA

DMICDC
Eco-Initiatives worldwide

Songdo IBD, Korea

- Built upon New Urbanism concepts
- Municipal zoning codes focused on Smart Growth, Transit Oriented Development, Green Growth

- Incorporating latest design standards and technologies
- reduce energy consumption,
- increase energy efficiency,
- utilize recycled and natural materials
- generate clean or renewable electricity.
Eco-Initiatives worldwide

Sino-Singapore Tianjin City, China

- At least 90% of trips within the Eco-city as Green trips i.e. cycling, walking or public transportation

- Renewable energy (solar and geothermal) at least 20%

- At least 60% of total waste to be recycled by 2013

- Carbon emission/unit GDP should not exceed 150 tonne-C per US$1 million.
Master Planning - Key sustainable dev. concepts

- Reduction of commuting needs for the workforce
  - Polycentric structure – with multiple CBDs and Industrial zones
  - Integration of land uses encouraging mixed-use
  - Affordable Workers Housing located near the industrial zones

- Neighbourhoods distributed around High access Mass Transit Corridors
  - Encouraging cycling & pedestrian modes over cars

- Recycling and Reuse of water and solid wastes
Master Planning - Key sustainable dev. concepts

- Energy sufficiency through use of renewables
- Conservation of better agricultural land & Protection of sensitive natural environment (Coastal zones, forests, sanctuaries)
- States following different models to acquire land
- Integration of existing villages into the new city
- SMART City - IT based real time Control and Governance
Best practices in Master Planning being brought in through international consultants

<table>
<thead>
<tr>
<th>Node</th>
<th>Consultants</th>
<th>Area (sq. km)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shendra-Bidkin Investment Region, Maharashtra</strong> <em>(Additionally EBP of Mega Industrial Park, Shendra of 84 sq. km)</em></td>
<td>M/s AECOM, Hong Kong</td>
<td>84</td>
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<tr>
<td><strong>Ahmedabad-Dholera Investment Region, Gujarat</strong></td>
<td>Consortium led by M/s Halcrow, UK</td>
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<td><strong>Manesar-Bawal Investment Region, Haryana</strong></td>
<td>Consortium led by M/s Jurong, Singapore</td>
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<td><strong>Khushkhera-Bhiwadi-Neemrana Investment Region, Rajasthan</strong></td>
<td>Consortium led by M/s Kuiper Compagnons, Holland</td>
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<td><strong>Pithampur-Dhar-Mhow Investment Region, Madhya Pradesh</strong></td>
<td>Consortium led by M/s Lea Associates South Asia</td>
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<td><strong>Dadri-Noida-Ghaziabad Investment Region, Uttar Pradesh</strong></td>
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<tr>
<td><strong>Dighi Port Industrial Area, Maharashtra</strong></td>
<td>M/s AECOM, Hong Kong</td>
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</tr>
</tbody>
</table>
Gujarat

Ahmedabad Dholera Investment Region
Vision for the DSIR

A world-class centre of industrial excellence & economic activity

A socially mixed & integrated urban area that provides jobs & houses to all sectors of the society

A city with high quality infrastructure, community & leisure services

A protected environment that takes a sustainable approach to use scarce resources incl. water, energy & farmlands

.. and targets

- To attract a resident population of about 2.0 million in the DSIR;
- To provide employment to more than 0.8 million people; and
- To develop 500,000 dwellings
Priority Industrial Sectors

- Illustration: Dholera Special Investment Region, Gujarat

Sector 1: General Manufacturing
Sector 2: IT/ITES Component
Sector 3: Electronic including High-tech industries
Sector 4: Automobile and Auto Ancillary
Sector 5: Agro and Food Processing
Sector 6: Heavy Engineering
Sector 7: Metals and Metallurgical products
Sector 8: Pharmaceuticals and Biotech

Total Industrial Area reqd. : ~1000 ha
Potential Industrial Employment : ~ 0.35 million by 2040

DMICDC
The Land Use Plan
Sustainable Development

- Polycentric structure with key commercial and community nodes
- Integration of land uses encouraging mixed-use development
- Focus on the interaction between land use and multi-modal transportation
- Focus on efficient infrastructure systems and renewable energy sources
- Integration of existing villages into the new city
- Conservation of the better agricultural land
- Protection of the sensitive natural environment
- Phased development programme allowing incremental growth
Transit and Walkability

- A **Compact city** that promotes the creation of neighborhoods and walkable places connected by transit

Figure shows 10 min walking distance

Proposed BRT In Phase I and...

LRT In the later phases

DMICDC
Promoting Mixed-Use Development
Integrating Existing Villages

Village Buffer Zone in the wider urban context

Development strategy for the Village Buffer Zone

DMICDC
Goals of the Development Plan

- Promote green environment

More than 30% of the area under green belts, agriculture & forests

DMICDC
Building a world-class infrastructure

Roads..
Proposed Rail connectivity at Dholera (initial phase)
Building a world-class infrastructure

Water

- Total Water Demand = 950 MLD
  - Phase I = 260 MLD
  - Phase II = 450 MLD
  - Phase III = 240 MLD
- In the early years supply from Narmada Canal via new branch canals or Pariyaj/Kanewal reservoir
- Dedicated water storage for DSIR
- In longer term Kalpasar Dam planned to provide fresh water
Building a world-class infrastructure

Power

- Total Power Requirement - 1,700 MW
  - Industrial: 1000MW
  - Social: 600MW
  - Mixed: 100MW
- Phase I = 400 MW
  - Proposed one 132kV substation in DSIR, to be fed from existing 132 kV substation at Dhandhuka
- Phase II = 800 MW
- Phase III = 500 MW
- Grid connection plus proposed captive gas power plant (270MW)
Consultations with village communities
Dholera on the road to Implementation

- Detailed planning for Phase-I (105 Sq Km) under GoG’s Town Planning Scheme almost complete.

- First round of Public consultation on Draft Development Plan completed. Second round being initiated.

- Regional Development Authority (RDA) established under the Special Investment Region Act (SIR Act) of Gujarat

- Detailed Engg of internal & trunk Infrastructure for Phase I being initiated
- Bunding of project site and harnessing of excess rain water through reservoirs

- Water Supply for Phase 1
  - 50 MLD from Periaj reservoir via Pipli
  - Desalination plant of 500 MLD

- Mega Industrial Park - 45 sqkm

- DPR for Phase 1 City Infrastructure - internal roads, drainage, sewerage, street lighting, ducting

... Handholding & Knowledge Partnership
- Industrial Workers Housing at Dholera (45 hectares)
- Administrative, marketing office and Exhibition cum Convention Centre at Dholera
- Public Transport within Dholera SIR (BRT / TRAM / LRT)
- Skill Development Centres (Phase-I)
- Solar Power Project in CRZ area
Pithampur-Dhar- Mhow – Master Plan

Total Area – 372.4 sq.km.  Population – 1.16 million
Create Techno-Industrial Mega Corridor

1. Integrated through a web of Transportation arteries
2. High tech and knowledge based industry mix
3. Smooth movement of goods, talent, capital & investments allow Mumbai to be complemented by specialized satellite cities

Reducing Stress on Mumbai,
Industrial Township, Dighi

- Population (2042): **1.6mn**
- Total area: **253 sqkm**
- Phase 1: 50 Sq.Km
- New integrated industrial and township enclave
  - 71% area under industries
  - Balance - residential & commercial use.
- Three major industrial clusters,
  - Engineering, Heavy Industry and Food Processing Park.
- Smaller, mixed-use centres in between
Rail connectivity from Dighi port to Existing Konkan Railways network

Railway and road dual bridge over Mhasla Creek

Up-gradation of SH-92, 95, 96 and 97

Dighi – Proposed Connectivity
Shendra-Bidkin Mega Industrial Park, Aurangabad

Area: 84 sqkm

Phase 1: 24 sqkm
Manesar – Bawal Investment Region

First Phase (88 sq km)

Site includes ~150 sq km of notified Bawal Industrial Area
The Concept Master Plan
Proposed Regional Connectivity

<table>
<thead>
<tr>
<th>Categories</th>
<th>Length (km)</th>
<th>Type</th>
<th>2011-2015</th>
<th>2015-2020</th>
<th>2020-2030</th>
<th>2030-2040</th>
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<td>EXPRESWAYS</td>
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<tr>
<td>Kundli-Manesar-Palwal Exp Way (Western</td>
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<td>Under Constructio</td>
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<td>6</td>
<td>8</td>
<td>10</td>
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<tr>
<td>REGIONAL EXPRESWAYS</td>
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<td></td>
</tr>
<tr>
<td>IGI-MAIR</td>
<td>55</td>
<td>Greenfield</td>
<td>6</td>
<td>6</td>
<td>8</td>
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<tr>
<td>Rohtak-Rewari</td>
<td>80.01</td>
<td>Greenfield</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td></td>
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<tr>
<td>Rewari-Daruhera-Bhiwadi-Sohna</td>
<td>35</td>
<td>Greenfield</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>6</td>
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<tr>
<td>Rewarii-Jhajjar (NH-71)</td>
<td>87.3</td>
<td>Greenfield</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>
MRTS: Delhi IGI – Bawal

Route: Delhi IGI – Gurgaon – Manesar – Rewari – Bawal

- Northern section (20 km)
- Southern section (~15 km)
- NH-8 section (60 km)
- Rewari section (25 km)
- Bawal

Total route length ~120 km
Can be extended up to Neemrana Node in Rajasthan

DMICDC
Concept Master Plan for KBN Investment Region

Area: **160 sq km**
Target Population: **1.3 million**

Investment Region target industries are Electronic, Automotive, Pharmaceuticals, Bio-tech and ICT.
Multi Modal Logistics Hub at Dadri

1000 Acres + 800 Acres site along Howrah-Delhi Line and the DFC

DMICDC
Greater Noida / Boraki Railway Station

- Conceived as a World Class Passenger Hub, integrated with ISBT and Metro
- Site: 160 ha site to north and west of Boraki
Resilient Water Strategy for DMIC
Diversified Water Resources

- Fresh Ground Water
- Saline Ground Water
- Surplus Flood Water During Rain
- Recycled Water From External Sources
- Recycle Water From Within Development
- Rain Water Harvesting

Water Resources Availability Study
Principles considered for IWRM Planning Process

- Consider all sources of water
- Accounts for all end users of water
- Consider water quantity and quality
- Stakeholders participation in the planning process
- IWRM decisions made at local and river basin levels are in-line with broader national objectives
- Sustainability in long range water resources planning
- IWRM strategies aimed at integrating social, economical and environmental goals
Decision model analysis to develop a Dynamic Water Operating Module

- Develop models for evaluating Water Supply Options for Technical and Economic Feasibility
- Model elements should include:
  - Demands from various sources
    - Potable
    - Non-Potable
- Supply from all possible sources (Yamuna River and associated canals, Groundwater, Reuse, Desalinization, Rain water harvesting)
  - Allow source prioritisation
- Capital and Operating Costs for Selected Treatment Approach
- Capital Improvement Program (CIP) Module
- Scenario Manager / Operating model to provide the water through year with “optimized” impact on cost, society and environment.
Challenges in DMIC Region needs “out of box” solutions

• Over exploited ground water in the region- deep GWT and saline ground water.

• Salt disposal challenges

• Average rainfall is not more than 400 / 500 mm

• Impact of climate variability

• Competitive water needs / demand in the region and changing priority
Opportunities in DMIC Region needs “out of box” solutions

• Ability to afford high cost of water due to relatively higher economic output from the DMIC region

• Availability of large sources of treated sewage in vicinity (Gurgaon / Delhi Najafgarh Drain)

• Decreasing cost of membranes for desalination and recycle

• Combination of natural and mechanical solution for salt disposal

• New city…… To plan and implement dual reticulation system
Aquifer Storage and Recovery

Storage of water through wells during times of excess for future recovery to meet peak, emergency, or long-term demands
Typical ASR Installation
Common ASR Applications

- Capture temporal sources for increased reliability / improved water quality
- Eliminate evaporative losses in reservoirs
- Avoid loss of riverine habitat associated with surface reservoirs
- Increase water treatment works / conveyance system / operational efficiency
Seasonal Storage

- Monthly Demand
- ASR Recovery
- Annual Average Demand
- ASR Storage

Months
Ahmedabad – Dholera Investment Region

Waste Water Treatment, Recycling & Water Harvesting
## Waste Water Generation in the DSIR

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>PHASE 1 (MLD)</th>
<th>PHASE 2 (MLD)</th>
<th>PHASE 3 (MLD)</th>
<th>TOTAL (MLD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Population (Target residents: 2 million)</td>
<td>59</td>
<td>116</td>
<td>63</td>
<td>238</td>
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<tr>
<td>Floating Population</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Existing villages within site with buffers</td>
<td>2</td>
<td>1</td>
<td>0.3</td>
<td>3</td>
</tr>
<tr>
<td>Industrial and Logistics</td>
<td>112</td>
<td>185</td>
<td>96</td>
<td>393</td>
</tr>
<tr>
<td>Leisure and Entertainment</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total Waste Water Generation</strong></td>
<td><strong>177</strong></td>
<td><strong>311</strong></td>
<td><strong>164.3</strong></td>
<td><strong>652</strong></td>
</tr>
</tbody>
</table>
Capacity of the proposed Treatment Plant at Dholera

<table>
<thead>
<tr>
<th>Treatment Plant</th>
<th>Total capacity</th>
<th>Capacity</th>
<th>Land Requirement (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase-1</td>
<td>Phase-2</td>
<td>Phase-3</td>
</tr>
<tr>
<td>STP-A</td>
<td>15</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>STP-B</td>
<td>71</td>
<td>10</td>
<td>61</td>
</tr>
<tr>
<td>STP-C</td>
<td>60</td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td>STP-D</td>
<td>71</td>
<td>10</td>
<td>51</td>
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<tr>
<td>CETP-1</td>
<td>82</td>
<td>82</td>
<td>14</td>
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<tr>
<td>CETP-2</td>
<td>114</td>
<td>64</td>
<td>50</td>
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<tr>
<td>CETP-3</td>
<td>95</td>
<td>40</td>
<td>55</td>
</tr>
<tr>
<td>CETP-4</td>
<td>144</td>
<td>45</td>
<td>70</td>
</tr>
<tr>
<td>Total</td>
<td>652</td>
<td>207</td>
<td>301</td>
</tr>
</tbody>
</table>

The treatment capacity will be in consonance with that of the waste water generation.
Proposed water treatment plants at Dholera

The sewerage system will have the following components:

- A main collection system at parcel level to receive wastewater at the outlet point of parcels of land.
- Trunk sewers collecting sewage from several areas and conveying it to the STPs/CETP;
- Sewage pumping stations to transport sewage to trunk mains or treatment plants;

The treatment capacity will be in consonance with that of the waste water generation.
It is proposed to re-cycle the treated waste water and use for irrigation of land and gardens, parks and agricultural fields.

Total irrigation demand of the DSIR would be about 410 MLD and total generation of waste water will be 652 MLD.

A huge quantum of irrigation demand will be met with the usage of treated water.
Pithampur-Dhar-Mhow Investment Region
<table>
<thead>
<tr>
<th>Demand Sectors</th>
<th>2011</th>
<th>2016</th>
<th>2021</th>
<th>2026</th>
<th>2031</th>
<th>2041</th>
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<tbody>
<tr>
<td>Phase-1</td>
<td>32.40</td>
<td>97.61</td>
<td>216.9</td>
<td>267.4</td>
<td>317.8</td>
<td>371.1</td>
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<td>Phase-2</td>
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<td>Phase-3</td>
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<td>Phase-4</td>
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<tr>
<td>Total Fresh water demand at consumer end</td>
<td>9.00</td>
<td>41.00</td>
<td>109.0</td>
<td>137.0</td>
<td>166.0</td>
<td>198.0</td>
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<td>Waste water Generated</td>
<td>8.00</td>
<td>35.00</td>
<td>93.00</td>
<td>116.0</td>
<td>141.0</td>
<td>168.0</td>
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<td>Recycled Water after tertiary treatment</td>
<td>3.00</td>
<td>25.00</td>
<td>89.00</td>
<td>110.0</td>
<td>131.0</td>
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<td>Recycled Water used for horticulture</td>
<td>5.00</td>
<td>10.00</td>
<td>4.00</td>
<td>6.00</td>
<td>10.00</td>
<td>25.00</td>
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<tr>
<td>Recycled Water; other usages</td>
<td>5.00</td>
<td>10.00</td>
<td>4.00</td>
<td>6.00</td>
<td>10.00</td>
<td>25.00</td>
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</table>

Projected Wastewater generated and treatment Gap

Recycled Wastewater Management

DMICDC
## Waste Water Recycling

### Zoning of Recycling System

<table>
<thead>
<tr>
<th>Sewage treatment Plant</th>
<th>Capacity, mld</th>
<th>Treated effluent in mld</th>
<th>Service Area (IR Zones)</th>
<th>Type of Utility</th>
<th>R-GLSR to be filled-up</th>
<th>R-GLSR Capacity, ml</th>
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</thead>
<tbody>
<tr>
<td>STP-1</td>
<td>25.00</td>
<td>21.25</td>
<td>IR 46,47, 48, 49, 50, 51, 52, &amp; 53</td>
<td>Horticulture, Ground water recharge</td>
<td>RGLSR-1 7.0</td>
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<td></td>
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<td></td>
<td></td>
<td>RGLSR-2 7.0 7.0</td>
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<td>IR 40, 41, 42, 43, 44, 45, EC (Outside IR), &amp; MMLH</td>
<td>Horticulture, Ground Water Recharge</td>
<td>RGLSR-3 7.0</td>
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<td>STP-2</td>
<td>29.00</td>
<td>24.65</td>
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<td>Horticulture, Ground Water Recharge</td>
<td>RGLSR-4 25</td>
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<td>STP-3</td>
<td>32.00</td>
<td>27.20</td>
<td>IR 30, 31, 32, 33, 34, 35, 36, 37, 38, &amp; 39</td>
<td>Betma Hills Regeneration, Horticulture, Ground Water Recharge</td>
<td>RGLSR is Not Required. (Direct Supply under Gravity)</td>
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<td>STP-4</td>
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<td>29.75</td>
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<td>Betma Hills Regeneration, Horticulture, Ground Water Recharge</td>
<td>RGLSR-5 30</td>
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<td>26.00</td>
<td>22.10</td>
<td>IR 11, 12, 13, 14, 20, 56, 57, 59, &amp; 60</td>
<td>Horticulture, Ground Water Recharge</td>
<td>RGLSR Not Required (Direct Supply)</td>
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<td>STP-6</td>
<td>33.00</td>
<td>28.05</td>
<td>IR 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, &amp; 27</td>
<td>Horticulture, Ground Water Recharge</td>
<td>RGLSR-6 28.0</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>180.00</strong></td>
<td><strong>153.00</strong></td>
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<td><strong>R-GLSR</strong></td>
<td><strong>153.00</strong></td>
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Water Harvesting and Ground Water Recharge
Shendra – Bidkin Industrial Park
### Water and sewerage generated and demand

<table>
<thead>
<tr>
<th>Water &amp; Sewerage Generation &amp; demand (Mld)</th>
<th>Year</th>
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<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>2022</td>
<td>2032</td>
<td>2042</td>
</tr>
<tr>
<td>Total Water Demand</td>
<td>94</td>
<td>211</td>
<td>335</td>
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<tr>
<td>Sewage generated</td>
<td>69</td>
<td>156</td>
<td>252</td>
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<tr>
<td>Water demand met by recycled water</td>
<td>64</td>
<td>146</td>
<td>231</td>
</tr>
<tr>
<td>Fresh Water demand</td>
<td>30</td>
<td>65</td>
<td>104</td>
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</tbody>
</table>

DMICDC
Recycling of waste water at Shendra

Tertiary treatment of waste water is proposed at subsequent stages of development
Membrane biological reactor

**SEWERAGE TREATMENT SYSTEM**
Choice of Treatment Technology

**Membrane Biological Reactor (MBR)**

**Technology:**
- Membrane bioreactor
- Prevailing commonly adopted technologies

**Advantages:**
- Smaller footprint requirement
- Treated Water is suitable for re-use
- Widely used for municipal and industrial wastewater
- Easier to maintain than the central treatment plant
- Operated in modular, facilitating future expansion or staged commissioning

**Typical MBR Reactor**
Mitigation measures to avoid water pollution proposed at Shendra

Standard good site practice should be implemented to control construction site runoff.

This should include use of sediment traps and oil filters.

Construction work close to the water bodies should be avoided if possible, especially during monsoon season.

Temporary or permanent devices need to be constructed to prevent water pollution due to increased siltation and turbidity.

All construction and demolition waste arising from the projects should be disposed off as per prescribed norms.
Mitigation measures to avoid water pollution proposed at Shendra

Oil and grease traps should be provided at fuelling locations to prevent contamination of water.

The sewage system for construction camps should be properly designed and built in order to prevent pollution of the nearby water bodies.

Major drainage channels running through the project site should be maintained.

 Appropriately sized vegetated buffers adjacent to water features/drainages channels should also be maintained.

Incorporation of sufficient storm water and wastewater treatment for the industrial park and residential complexes should be taken up.
Khuskhera-Bhiwadi-Neemrana
Investment Region

Waste Water Treatment, Recycling & Water Harvesting
## Waste Generation & Treatment

<table>
<thead>
<tr>
<th>Demand Sectors</th>
<th>Annum</th>
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<tr>
<td></td>
<td>2011</td>
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<td>Phase-1</td>
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<tr>
<td>Total Fresh water demand (Including UFW)</td>
<td>118</td>
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<tr>
<td>Waste Water Generated</td>
<td>72</td>
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<tr>
<td>Recycled Water after tertiary treatment</td>
<td>65</td>
</tr>
<tr>
<td>Recycled Water used by Industries</td>
<td>59</td>
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<tr>
<td>Recycled Water; other usages</td>
<td>6</td>
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<tr>
<td>Treatment Capacity</td>
<td>75</td>
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</table>

### Graphs

- **Total Fresh water demand (including UFW)**
- **Waste water Generated**
- **Recycled Water after tertiary treatment**
- **Recycled Water used for Industrial Use**

DMICDC
Sewerage Network design
## Capacity of Sewage Treatment Plants

<table>
<thead>
<tr>
<th>S. No</th>
<th>Description</th>
<th>Phase I</th>
<th>Phase II</th>
<th>Phase III</th>
<th>Total (Mld)</th>
<th>Nature of Plant</th>
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<tr>
<td>1</td>
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<td>46</td>
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<td>2</td>
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<td>39</td>
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<td>52</td>
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Location of Treatment Plants
Smart Community Initiatives
IT Based City Operations & Governance Platform

Command Center at
- DMIC HQ
- State Nodal Agency HQ
- Site HQ

Water
Energy
Public Safety
Transportation

Logistics
Skill Development

DMIC ATC Model

Customer Satisfaction

Funds, Guidance

Attract investments

DMICDC

Implement, Capacity Building

Service fee

Partner Industry

cash / kind

CSR, Competent Workforce

ATC

GIZ

Principles of interventions
- Capacity building
- Innovations
- Systems development
- Sustainability focus
## Technology (Skill Gap) Matrix

<table>
<thead>
<tr>
<th>Technical Areas</th>
<th>Manesar-Bawal IR</th>
<th>Pithampur-Dhar-Mhow IR</th>
<th>Dholera Special IR</th>
<th>Dadri-Noida-Ghaziabad IR</th>
<th>Khushkhea-Bhiwadi-Neemrana IR</th>
<th>Igatpuri-Nashik-Sinnar IR</th>
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<tbody>
<tr>
<td>Industrial automation &amp; Process Control</td>
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<td>Design and Manufacturing</td>
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<tr>
<td>Automobile mechatronics</td>
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<tr>
<td>Hydraulics &amp; pneumatic control</td>
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<td>Environmental engineering</td>
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<td>Testing and Calibration</td>
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<td>Soft Skills</td>
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<td></td>
<td>√</td>
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</tr>
</tbody>
</table>
Infrastructure Projects required

• **Internal Infrastructure Projects**
  - Land improvement schemes
  - Roadworks
  - Earthworks
  - Sewerage
  - Stormwater drainage
  - Flood management
  - Solidwaste management
  - Landscaping & signage
  - Captive power plant
  - Renewable energy plant
  - Street lighting
  - Telecommunications, Gas grid
  - Buildingworks
  - Light Rail Transport

• **Trunk Infrastructure Projects**
  - Laying of Railway Line
  - Power supply & distribution
  - Water supply & distribution
  - Airport Project at Dholera
  - Up-gradation of State Highway (SH)– 6
  - Proposed metro line between Gandhinagar, Ahmedabad & Dholera
Viability analysis: Considering project not viable through PPP

- Overall set of Projects
  - **Trunk Infrastructure Projects**
    - Laying of Railway Line
    - Power supply & distribution
    - Water supply & distribution
    - Airport
    - Highway
    - Ahmedabad Dholera Metro
  - Suitable for implementation through PPP

- **Internal Infrastructure Projects**
  - Land improvement
  - Roadworks
  - Earthworks
  - Sewerage
  - Stormwater drainage
  - Flood management
  - Solidwaste management
  - Landscaping & signage
  - Street lighting
  - Buildingworks
  - Telecommunications
  - Gas grid
  - Captive power plant
  - Renewable energy plant
  - Light Rail Transport
  - Suitable for implementation through PPP

Total cost of projects at current Price (Rs. 55,225 Crores)
Debt structuring and Break Even analysis

- Total equity requirement from developer Rs. 3,600 crores
- Debt requirement Rs. 5,450 crores
- 15 year loan tenor with 5 year moratorium

- Economic assumptions
  - Cost Escalation – 5%
  - Revenue Escalation – 8%
Sources of Funds

Application of Funds

Cash Flow Y-o-Y

Break Even

Closing (Cumulative) Cash Balance

DMICDC
Institutional and Financial Structure

**GoI Capital Grant, leveraged through Infra Bonds, Multilaterals**

The Fund will be set up as a Trust, administered by a Board of Trustees. It will be chaired by Secretary, DEA and will comprise Secretary, DIPP, FA (DIPP), representatives of Dept. of Expenditure, Planning Commission, and CEO & MD, DMICDC, who will also be the CEO of the Fund/Trust.

DMIC Apex Authority at GoI (chaired by FM)

State Apex Authority (Chaired by CM)

State Govt.

Land

DMIC Investment Node Nodal/ City Level SPV

GOI funding to SPV to be utilised for Non-PPP projects

PPP-able Infra Projects

Concessions to be granted by the Nodal/ City Level SPV (for internal infra) and State Govt. (for external infra)

Non PPPable Projects

DMICDC

GOI Grant will be Revolving in nature to enable development of more cities

DMIC Project Implementation Revolving Fund

Equity

Debt

Debt Service

Equity / Debt

Equity / Debt

Logistics Holding Co

Power Holding Co.

SPV 1

SPV 2

SPV 3

Water Holding Co.

Transport Holding Co.

SPV 1

SPV 2

SPV 3

DMICDC

(Knowledge Partner to the Fund)

State Apex Authority

(Nodal/ City Level SPV

SPV 1

SPV 2

SPV 3

DMICDC

(Knowledge Partner to the Fund)

SPV 1

SPV 2

SPV 3

Logistics Holding Co

Power Holding Co.

SPV 1

SPV 2

SPV 3

Water Holding Co.

Transport Holding Co.

SPV 1

SPV 2

SPV 3

DMICDC

(Knowledge Partner to the Fund)
Challenges

- Public funding Vs PPP
- Monetization of land values
- De-politicisation of land values
- Detailed Engineering & Programme Management
- Technology- Life Cycle cost of technology Vs Life
- Institutional System- Governance of new cities
- Challenge of Water and Sewage
Thank You