CapaCITIES
Structuring “Bankable” Climate Resilient Infrastructure Projects
Defining climate resilient infrastructure

There is no standard definition of **low-carbon and resilient infrastructure** but it broadly focuses on **three themes**:

<table>
<thead>
<tr>
<th>Adaptation</th>
<th>Mitigation</th>
<th>Sustainable development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention that minimise impact of climate change.</td>
<td>Clean technologies which reduce carbon emissions at the same time resource efficient</td>
<td>Achieving sustainable development goals (SDGs) to contribute to national objectives and goals</td>
</tr>
</tbody>
</table>

### Adaptation
- Change in land use, relocation
- Emergency & business continuity planning
- Upgrades or hardening of building and infrastructure
- Residential programs promoting adaptation
- Health programs

### Mitigation
- Seal Buildings
- Green Infrastructure
- Water and Energy Conservation
- Smart Growth
- Capture and use of landfill and digester gas
- Carbon sinks
- Energy conservation and efficiency
- Renewable energy
- Sustainable transportation, improved fuel efficiency
What does “bankability” mean

Project or proposal that has sufficient **collateral, future cashflow, and high probability of success**, to be acceptable to institutional lenders for financing.

<table>
<thead>
<tr>
<th>Factors considered for Project Bankable and Investments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credibility of Sponsor</td>
</tr>
<tr>
<td>Location/Country/Political</td>
</tr>
</tbody>
</table>

Above risks needs to be addressed to the satisfaction of Lenders
### Factors impacting “Bankability”

**Bankability** focuses on *returns to investor a mode of cost recovery* whether through project or other sources, bankability for *low carbon and climate resilient projects* considers wider *climate change mitigation, adaptation and socio economic benefits*.

<table>
<thead>
<tr>
<th>Source of funding</th>
<th>whether the source of funding is public or private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure, financial model and type of financial instrument</td>
<td>the structure and type of funding instrument of the project directly impacts the bankability</td>
</tr>
<tr>
<td>Type of Project</td>
<td>whether the project is climate mitigation or adaptation projects.</td>
</tr>
</tbody>
</table>
Tools at various stages of Project Preparation

M1: Project Idea Stage
- Defined problem, baseline situation and envisaged situation
- Outlined potential benefits of the project related to climate change, Service level, SDG Impact among others

M2: Initial Screening Stage
- Defined project Objectives- Why?
- Existing arrangements and gaps outlined
- Project Scope defined
- Project benefits direct and indirect benefits defined
- Project Risks, constraints and dependencies outlined

M3: Pre-feasibility Stage
- Potential implementation solution identified
- High level cost estimates and revenue projections undertaken
- High level understanding of project funding and implementation structure
- Technical and financial prefeasibility completed

Minimum Maturity Level for bankable project
- Project Background
- Expected Outputs
- Impact parameters- social and economic benefits
- Bankability assessment of project revenue/ repayment model
- Risk and mitigation measures
- Stakeholder consultation

Project Concept & Pre-Feasibility
Feasibility & Structuring
**Project Concept & Pre-feasibility**

The process of project identification and appraisal should clearly indicate and incorporate considerations to the bankability—revenues, and cost recovery parameters, as well as focus on low carbon solution which are climate resilient.

- **Project Ideation** (Identification tool)
  - The first step towards project ideation is defining the problem/gap in the infrastructure service vis-a-vis a desired service level/target, as identified in various strategic plans.

- **Shortlisting (Screening tool)**
  - The second step is the screening tool that basically evaluate the project proposal and prioritize the most relevant subjects.
  - It basically examines three policy areas: climate change mitigation, adaptation and sustainable development.

- **Strategic Business case defining framework**
  - The next stage after the project idea is shortlisted is to define the project’s strategic business case.
  - The main objective of this stage is to identify and agree on the project objectives, mapping existing arrangement/situation, identification of business needs and potential scope of the project.

- **Solution Identification Tools and Approaches**
  - The purpose of this stage is to identify the best option/solution for the delivery of the project which offers best value for money to the city including wider social and environmental impact as well as economic value.
Project Ideation Stage: Objectives

The aim is to generate a large quantity of ideas that a citizen, city officials etc generate and then these ideas are screened in order to inspire new and better design solutions and products.

It is important at this stage when project idea is framed the considerations of bankability and climate change are duly incorporated.

Defining the problem/gap in the infrastructure service vis-a-vis a desired service level/target, as identified in various strategic plans.
Ideation Stage: Template Guidelines

01- Introduction of Proposed Project
Name, Sector and Type of Project

04- Requirements of Technical Expertise
Nature and extent of technical expertise required for project preparation

02- Project Rationale
Baseline situation of area and detailed explanation of project requirement in the area and how it is being implemented.

05- Climate Change Mitigation & Adaptation Potential
How project can reduce GHG emissions and does project has direct adaptation benefits and how project impact long term resilience of the infrastructure, Sustainability Potential

03- Alignment with Climate & Sustainable Development Agendas
SDG Benefits, NDC, CCAF & City Climatic Strategies

06- Project Implementation
Time Period, Mode of implementation (including external stakeholder engagement), availability of budget/finance for implementation with city
Project Screening Stage: Objectives

The aim is to screen climate change mitigation, adaptation and sustainable development and financial bankability. Project Screening depends on four parameters to prioritize the most relevant projects.

Parameters for Project Screening:

- **City Level Parameters:**
  - Willingness of City
  - Economic Driver
  - Strategic Alignment

- **State Parameters:**
  - Priority of the State
  - Leveraging State and National Schemessum

- **Project Impact Parameters:**
  - Climate Adaptation/Mitigation
  - GHG Reduction, Basis and Dimension
  - SDG Impact: Co-Benefits

- **Project Specific Parameters:**
  - Associated Risk
  - Nature and Extent of Technical Expertise for project preparation
  - Investment Required Revenue Model
Screening Stage: Template Guidelines

01 - Screening at City Stage
Willingness, Economic Driver, Alignment to Strategic objectives of city

02 - Project Rationale
Priority and Government Schemes of State

03 - Climate Change Mitigation & Adaptation Potential
How project can reduce GHG emissions and does project has direct adaptation benefits and how project impact long term resilience of the infrastructure, Sustainability Potential

04 - Alignment with Climate & Sustainable Development Agendas
SDG Benefits, NDC, CSCAF & City Climatic Strategies

05 - Screening of Technology & Technical Expertise
Risk associated with technology used, Nature and extent of technical expertise required for project preparation

06 - Project Potential
Priority (1-3)(1 being highest)- based on screening workshop qualitative assessment on above parameters
Ideation Stage & Screening Stage
Case 1: Setting up a Captive Solar Plan in Rajkot City
**Challenge**

- Municipal own energy consumption from grid -amongst biggest contributor to GHG emissions (as per GHG inventory’ 2019)
- Electricity is amongst biggest expenditure heads for city-burden on municipal finance

**Solution**

- Development of a solar plant to power own energy consumption of Rajkot (Water and Wastewater treatment plant) - contributing towards city target to reduce GHG emission by 18% by 2023 (CRCAP)
- Leveraging technical studies and scaling up pilot completed in Phase 1- Designed a bankable project to set up 10 mw captive solar power plant at multiple sites on EPC model (in line with power consumption profile and regulation of Gujarat Solar policy’ 2020)
### Application of Toolkit for Project Preparation-Ideation Stage

<table>
<thead>
<tr>
<th>Name of Proposed Project</th>
<th>Sector</th>
<th>Type of Project</th>
<th>Rationale</th>
</tr>
</thead>
</table>
| Setting up captive solar plan to replace existing institution grid energy consumption | Renewable Energy | Project identified under city climate action plan | Baseline Situation: The annual institutional electricity consumption of Rajkot Municipal Corporation is around ~60 mil units supplied by the DISCOM through a grid which is mostly powered by thermal energy significantly contributing to GHG emissions. Additionally, the city incurs significant expenditure towards electricity consumption.  
Envisaged Situation: Transitioning the consumption of the city by setting up captive solar plants financed through future energy savings. SDG Benefits Application of Toolkit for Project Preparation-Ideation Stage 12 3 |

**SDG benefits**

- [7] Affordable and clean energy
- [12] Responsible consumption and production
- [13] Climate action

*Note: SDG benefits are aligned with the global goals for sustainable development.*
## Application of Toolkit for Project Preparation – Ideation Stage

**Alignment to Nationally Determined Contribution**
- 40% cumulative electric power from non-fossil fuel by 2030
- Reduce emissions intensity by 33 to 35% by 2030

**ClimateSmart Cities Framework**
- Sector 1 (Indicator 2): Electricity derived from RE
- Sector 3 (Indicator 1): Clean tech, shared vehicles
- Sector 4 (Indicator 5 & 6): EE Water and WW system

**Alignment to City Strategic Plan**
- The Climate Action Plan for Rajkot City has been prepared under the CapaCITIES project. As energy use and GHG emission forecasting trend shows that energy consumption in various sectors.
- The Climate Resilient City Action Plan (2018-2023) proposes actions with an annual GHG emission mitigation potential of 14% by 2022-23, over the 2015-16 (financial year) baseline.

**Nature and extent of technical expertise**
- External consultant may be required for preparation of project DPR and procurement process

**Climate Change Mitigation Potential**
- Total annual electricity consumption of Rajkot is 50 million units translating to ~55,080 tCO2e GHG emissions per year i.e. 2.7% of city emissions. By replacing a portion of electricity consumption by solar the project would reduce GHG emissions.
### Application of Toolkit for Project Preparation—Ideation Stage

<table>
<thead>
<tr>
<th>Climate Change Adaptation Potential</th>
<th>Time Period of Implementation</th>
<th>Sustainability/Scale-up Potential</th>
<th>Mode of Implementation</th>
<th>Leverage Government schemes/implemented in city</th>
</tr>
</thead>
</table>
| The project would help in building long term resilience of the city municipal services by reducing dependency on conventional fuel-based electricity. | 6-8 months | The project can be implemented in phases and can be scaled up to replace marginal electricity consumption of RMC in future. | • Capital Expenditure Model/ Solar EPC (Capex model): Under this model the end consumer either through its own sources or through external debt financing incurs the capital investment for the solar plant generating output for its own.  
• RESCO model: Unlike a solar EPC or capex proposition, wherein the consumer owns the system and invests upfront, the RESCO model is a zero-investment model in which the consumer pays only for the electricity generated, while the solar plant is owned by the RESCO developer. | The project would support the target of Government of India towards development of 500 GW of RE capacity by 2030 and State RE Policy. |
### Application of Toolkit for Project Preparation - Screening Stage

<table>
<thead>
<tr>
<th>Willingness of City</th>
<th>Economic Driver of City</th>
<th>Alignment to Strategic Objective</th>
<th>Priority and Government Scheme</th>
<th>Climate Mitigation Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes - the project idea was preliminary discussed in the city’s budget committee meeting</td>
<td>NA</td>
<td>Towards achievement of target set under City’s Climate Resilient City Action Plan</td>
<td>State: RE Targets Yes- State RE Policy has conducive incentives</td>
<td>Yes, Climate Mitigation project, Reduced thermal energy emissions (+++): Operations of the Rajkot Municipal Corporation emitted 55,080 tCO2e, contributing to 2.7% of the city’s total GHG emission. This project would reduce 0.97 million tCO2e (to be confirmed at later stage) to be mitigated on average annually, through shifting to Solar for captive consumption</td>
</tr>
</tbody>
</table>
### Application of Toolkit for Project Preparation - Screening Stage

<table>
<thead>
<tr>
<th>Climate Adaptation Potential</th>
<th>SDG Impact</th>
<th>Maturity of Technology</th>
<th>Nature and extent of technical expertise</th>
<th>Project Potential</th>
</tr>
</thead>
</table>
| N/A                          | • Goal 7- Affordable & Clean Energy  
• Goal 11- Sustainable Cities & Communities | • Low /Mature- Similar projects being implemented across India | • Technical assessment by external consultant  
• Project structuring and financing support to be provided by an external project team. | • INR 50 Cr.  
(Project Cost to be financed by envisaged Savings)  
• Savings in electricity expenditure of RMC  
• Priority-1 |
Project Strategic Business Stage: Objectives

The project is considered strategic if it links to your strategic objectives with the goal of improving performance.

To identify and agree on the project objectives, mapping existing arrangement/situation, identification of business needs and potential scope of the project.

This stage is also referred as “Project Concept” which identify variables that make it suitable for funding.
01- Objectives of the Project
(Outcome the project seeks to achieve)

02- Existing and Future needs of city
Opportunities and problems in current situation and its future needs.

03- Project scope
Opportunities and problems in current situation and its future needs.

04- Requirements of Technical Expertise
The city should also identify the risks which are directly and indirectly associated in achievement of project outcomes and the plan for mitigating the identified risks.

Project Constraints
The city should specify any constraints specific to the project like policy decisions, rules, and regulations, among others.

06- Project Implementation
The city should identify any dependencies outside the project scope on which success of the project is dependent.
Project Strategic Business Stage
Case 2: Development of organics waste to bio CNG plant
# Challenge & Solution

## Challenge

- Bulk waste generators are responsible for managing their own waste, mostly this waste in improperly managed - ends up in mixed landfill or open burning- leading to GHG emissions and local air pollution.
- Waste management sector as per the GHG Inventory is responsible for ~ 363,000 tCO2e/year of carbon emissions: 80% of this can be mitigated by improving waste management systems. CCMC is looking for a long term self sustainable solution for management of organic waste embracing the concept of circular economy.

## Solution

- To reduce GHG emissions, properly manage the organic waste it is important the economic value of waste is embraced.
- Setting up of a 200 TPD organic waste to bio CNG plant on PPP can be a potential solution for all stakeholders:
  - City: Reduced cost of waste management and reduce quantum of waste in mixed land fill, additionally CNG can be used for city buses
  - Bulk waste generators: Established waste management solution (meeting their responsibility) as well bio CNG can be repurchased for cooking
  - Private Sector: A lucrative business opportunity with a captive consumer base
  - Additional revenue from carbon credits* from voluntary markets for emission reduction in
Objective of Project

Reduce the GHG emission on account of mixed waste dumping in the landfill to achieve the target identified in the strategic climate resilient city action plan.

Existing Arrangements

How is service currently delivered to citizens?

- Mixed waste ~500 TPD is collected and dumped at waste landfill in Vellalore.
- While bulk waste management is responsibility of generators- the waste is dumped often openly or disposed off in non-scientific manner.

City Future Needs

Problems associated and opportunities with the current arrangements:

- GHG emissions, air, heath, and environment hazard due to improper disposal of waste.
- It is estimated the per day waste generation increased annually by 8-10% as the city grows.
- Need of an effective and self-sustainable waste management solution for organic waste.

Project Scope

<table>
<thead>
<tr>
<th>Range</th>
<th>Core</th>
<th>Desirable</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>Management of organic solid waste for bulk waste generators ~100 TPD</td>
<td>Management of all cities organic solid waste ~ 200 TPD</td>
<td>Complete management of city solid waste</td>
</tr>
<tr>
<td>Service Requirements</td>
<td>Solution to collect and recycle bulk organic waste</td>
<td>Solution to collect and recycle complete city organic waste</td>
<td>Multiple solutions management city solid waste</td>
</tr>
</tbody>
</table>
Reduce the GHG emission on account of mixed waste dumping in the landfill to achieve the target identified in the strategic climate resilient city action plan.

**Existing Arrangements**

**Objective of Project**

**Project Scope**

City Future Needs

**How is service currently delivered to citizens?**

- Mixed waste ~500 TPD is collected and dumped at waste landfill in Vellalore
- While bulk waste management is responsibility of generators - the waste is dumped often openly or disposed off in non-scientific manner

**Problems associated and opportunities with the current arrangements**

- GHG emissions, air, heath, and environment hazard due to improper disposal of waste
- It is estimated the per day waste generation increased annually by 8-10% as the city grows
- Need of an effective and self-sustainable waste management solution for organic waste

**Preparation - Project Business Strategic**

**Project Risk**

<table>
<thead>
<tr>
<th>Identified Risks</th>
<th>Description</th>
<th>Mitigation Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Risk</td>
<td>Willingness of city leadership for charging bulk waste generators</td>
<td>Taking the city leadership on board since project inception</td>
</tr>
<tr>
<td>Service Risk</td>
<td>Risks associated with setting up waste management solution</td>
<td>To be transferred to private sector with defined service level arrangements</td>
</tr>
<tr>
<td>External Risk</td>
<td>Risk associated to non-supply of bulk waste in events like COVID-19 induced lockdown</td>
<td>Alternate sourcing plan for waste at least for minimum plant operations</td>
</tr>
<tr>
<td></td>
<td>Risk associated to climate change events floods</td>
<td>Design of the plant should consider resilience to such events</td>
</tr>
</tbody>
</table>

**Project Constraints**

Non-availability of segregated organic waste can be a key constraint towards the project, the city notifies the bulk waste generators about their responsibility to provide segregated organic waste.

**Project Dependencies**

Setting up a waste to bio CNG plant would be dependent on Government of India SATAT initiative for purchase of CNG and viability support from MNRE.
To identify the best option/solution for the delivery of the project which offers best value for money to the city including wider social and environmental impact as well as economic value.

Identifying potential implementation solutions that can be achieved by identifying potential service solutions.

Identification of critical success factors for the project, appraisal of various alternatives, assessment of cost benefits and risk associated with the short-listed options.
Solution Identification: Template Guidelines

01- Background
About the project

02- Service Scope
To be assessed in alignment with business needs and service requirement

03- Service Solution
To be defined by available technologies and best practices

04- Service Delivery
To be defined resources, by competencies, and capabilities—internal or external to city

05- Project Implementation
To be driven by deadlines, risks, economies of scale

06- Project Funding
To be driven by cost of public funding and value for money for alternate funding options
Solution Identification- Tools and Approaches

Case 3: Options framework to identify Electric Vehicle - Green Mobility Zone
Udaipur
Challenge & Solution

Challenge

- Udaipur Municipal Corporation has committed to reduce its GHG emissions by 18% by 2023, transportation sector accounts for 28% of total GHG emissions and is a major contributor to local air pollution
- The old walled city is epicenter for economic development and tourism activities but faces challenges such as congestion, local air pollution impacting the life of local population as well as tourism value of city.

Solution

- Catalysing transition to electric for 2w and 3w in walled city & promotion of NMT
- Powering EVs in the walled city through Renewable Energy
- Design of a public private partnership (PPP) program “Green Mobility Zone” program to convert walled city into EV only zone in a phased manner contributing towards city pledge to reduce GHG emission by 18% by 2023 (CRCAP)
Application of Toolkit for Project Preparation - Solution Identification

1. Background

Walled City, the major tourist hub and densely populated, faces challenges in terms of ambient pollution and congestion with ICE-based autos constituting as the main source of public transport.

2. Service Scope

GMZ is envisaged to be implemented in the area of 3.5 sq.km.

3. Service Solution

- Catalysing transition to electric for 2w and 3w in walled city & promotion of NMT
- Powering EVs in the walled city through Renewable Energy
- Design of a public private partnership (PPP) program "Green Mobility Zone" program to convert walled city into EV
Application of Toolkit for Project Preparation - Solution Identification

<table>
<thead>
<tr>
<th>Service delivery</th>
<th>Project implementation</th>
<th>Project funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>30% reduction in local transport based emissions</td>
<td>• Immediate</td>
<td>Public, Mixed, &amp; Private Funding</td>
</tr>
<tr>
<td>1500+ drivers livelihood enhancement through lifecycle savings from EV adoption</td>
<td>• Minimum in two phases</td>
<td></td>
</tr>
<tr>
<td>Reduced ambient &amp; noise pollution and improved traffic flow</td>
<td>• Maximum to three phase</td>
<td></td>
</tr>
</tbody>
</table>

Service Scope:
- Catalysing transition to electric for 2w and 3w in walled city & promotion of NMT
- Powering EVs in the walled city through Renewable Energy
- Design of a public private partnership (PPP) program "Green Mobility Zone" program to convert walled city into EV Service

Project implementation:
- Immediate
- Minimum in two phases
- Maximum to three phase

Project funding:
- Public, Mixed, & Private Funding
Project Feasibility and Structuring

Aspects of Project Feasibility and Structuring

- Value for Money analysis and affordability considerations
- Government support requirements and implications for fiscal costs and contingent liabilities (FCCL)
- Project structuring and risk allocation
- Consideration of the use of a PPP form of procurement and the associated project implementation arrangements
- Broad terms of the bid process, documentation and contracting
- Market attractiveness and bidder interest
- Roadmap for implementation

Economic Appraisal of Preferred Option

The focus of economic appraisal is on the public value of the project and all social, economic, and environmental costs along with the impact on citizen welfare are taken into consideration.

Procurement Strategy

The term procurement strategy refers to a long-term plan to cost-effectively acquire the necessary supplies from a list of efficient vendors who will deliver quality goods on time, abiding by the purchasing terms.

Financial Appraisal and Model

Financial appraisal is a method used to evaluate the viability of a proposed project by assessing the value of net cash flows that result from its implementation.
Economic Appraisal: Template Guidelines

01- Estimating Costs
Includes:
- Life Cycle costs
- Revenue Costs
- Fixed, Variable, Semi-variable costs
- Opportunity and Attributable costs
- Climate Resilience Consideration
- Inflation
- Contingent Liabilities

02- Estimate Benefits
The purpose of valuing benefits is to ascertain whether an option’s benefits are worth its costs, and to allow alternative options to be compared in terms of their net social value.

03- Risk Appraisal
A risk assessment of the preferred option is critical towards economic appraisal as it has a direct impact on cost and benefits.

04- Recording net present Social Value
Net present social value should be computed using the Social discount rate: as proxy for an alternate public welfare return closer to the Government bond rate (minimum return).
Economic Appraisal of Preferred Option

Case 4: Cost benefits assessment for setting up a captive solar plan in Rajkot City
**Application of Toolkit for Project Preparation- Economic Appraisal**

**Cost benefits assessment**

<table>
<thead>
<tr>
<th>Preferred Option</th>
<th>Public Sector Funding</th>
<th>Private Sector Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Undiscounted (In Cr.)</td>
<td>Discounted (In Cr.)</td>
</tr>
<tr>
<td>1. Direct cost to city</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Capital</td>
<td>₹20.68</td>
<td>₹20.68</td>
</tr>
<tr>
<td></td>
<td>₹22.18</td>
<td>22.18</td>
</tr>
<tr>
<td>1.2 Revenues</td>
<td>₹51.95</td>
<td>₹18.22</td>
</tr>
<tr>
<td></td>
<td>81.13</td>
<td>30.97</td>
</tr>
<tr>
<td>2. Indirect public cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Capital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2 Revenues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Wider Social Costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Capital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2 Revenues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Total Risk Costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Estimate risk costs</td>
<td>₹1.65</td>
<td>₹1.65</td>
</tr>
<tr>
<td></td>
<td>₹1.77</td>
<td>1.77</td>
</tr>
</tbody>
</table>

(Lifecycle Cost of equipment- including dumping costs and robust civil infra considering extreme climate event- INR 4.7 Cr per mw +10% dumping cost)

(Revenue O&M cost- preventive maintenance, staff salaries & repairs, transmission and distribution and insurance costs)
Procurement Strategy: Template Guidelines

01- Determine Procurement Strategy
- Local legislation for procurement - in line with state procurement guidelines
- Choice of procurement method and stage at which supplier should be involved

02- Defining Project Activities, service streams and outputs
Summarise the project service streams, outputs and anticipated timelines

03- Risk Allocation Matrix
To identify the risks in different phases of the project i.e., Design, Build, Funding and Operational (DBFO).

04- Contractual Arrangement
To identify the contractual frameworks which the city intends to use.
Procurement Strategy

Case 5: Procurement strategy for setting up a Captive Solar Plant in Rajkot
Application of Toolkit for Project Preparation—Procurement Strategy

Procurement Strategy

Identified procurement option as per VFM assessment:
- Technical Design by external consultant
- Engineering Procurement Construction (EPC) and O&M by contractor
- Single Procurement: National Contractor

Project scope

<table>
<thead>
<tr>
<th>Activity</th>
<th>Output</th>
<th>Service level arrangement</th>
<th>Timeline</th>
<th>Payment Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical design</td>
<td>BOQ and technical design</td>
<td>On submission of technical design</td>
<td>3 months</td>
<td>Fixed on output</td>
</tr>
<tr>
<td>EPC</td>
<td>Setting up plant as per design</td>
<td>Design and drawing and inspection by independent engineer</td>
<td>6 months</td>
<td>Fixed cost for equipment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Final payment based on quality of civil work as per design</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Energy output of the plant</td>
<td>Minimum assured energy output monitored through dashboard</td>
<td>Quarterly monitored</td>
<td>Performance Payment as per guaranteed output</td>
</tr>
</tbody>
</table>

1

2
Application of Toolkit for Project Preparation - Procurement Strategy

**Project Structure**

Captive Solar Plant(s) -> ULBS

50% of energy demand

Savings on account of electricity bill

Used to Finance Capital & Operations

Escrow Account
Application of Toolkit for Project Preparation - Procurement Strategy

**Risk Allocation Matrix**

<table>
<thead>
<tr>
<th>Risk Type</th>
<th>Public</th>
<th>Private</th>
<th>Shared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Risk</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Risk</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Implementation Risk</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance or availability Risk</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Revenue Risk</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Termination Risk</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Technology obsolescence risk</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financing Risk</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy Risk</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual value risk</td>
<td>✓</td>
<td></td>
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</tbody>
</table>

- Standard contract adapted with the inputs from technical consultants including climate resilient considerations
# Implementation Option Risk allocation (Captive Solar Example)

<table>
<thead>
<tr>
<th>Risk Type</th>
<th>Public</th>
<th>Private</th>
<th>Shared</th>
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</thead>
<tbody>
<tr>
<td>Design Risk</td>
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<td></td>
</tr>
<tr>
<td>Construction Risk</td>
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<td></td>
</tr>
<tr>
<td>Implementation Risk</td>
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<tr>
<td>Performance or availability Risk</td>
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<td></td>
<td>✓</td>
</tr>
<tr>
<td>Revenue Risk</td>
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<td>Termination Risk</td>
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<tr>
<td>Technology obsolescence risk</td>
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<tr>
<td>Financing Risk</td>
<td></td>
<td>✓</td>
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<td>Policy Risk</td>
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<tr>
<td>Residual value risk</td>
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</table>
Procurement Strategy

Case 6: Project strategy for setting up a Green Mobility Zone, Udaipur
Application of Toolkit for Project Preparation - Procurement Strategy

Project Structure

- **UMC**
  - Policy Support
  - Incentive Support
  - Infrastructure Support

- **GMZ Program and Policy**

- **Private Sector Partner(s)**
  - Awareness Campaign
  - Dealer and service network
  - Charging infrastructure
  - Financers network

**Outcome**
- Decarbonization of transportation and reduction of congestion
Procurement Strategy

Case 7: Project strategy for setting up a Waste to Bio CNG Solution for Organic Waste- Coimbatore
Application of Toolkit for Project Preparation- Procurement Strategy

**Project Structure**

1. Agreement with city on Bulk Waste Management Charges & Assurance

2. Concession Agreement - Appoint Collect, Transport and Process Wet Bulk Waste by Setting up Waste to Energy Plant on DBFOT

3. Purchase Agreement with City Gas/Oil Marketing Companies

4. Service Contract with BWG - Payment of Collection Fees
Financial Appraisal & Model: Template Guidelines

01- General
Interest Rate, Inflation, Taxation, Capital Charges-Depreciation and Amortisation Discount rates

02- Cost
- Preparation and transaction cost
- Construction phase cost: related to machinery, equipment and civil costs- life cycle cost including maintenance and disposal
- Operations phase cost: related O&M and staff
- Financial cost
- Risk contingency costs

03- Revenues
- User fees assumption
- Potential savings assumption
- Emission reduction calculation in case of low carbon technologies- and carbon revenues assumptions

04- Funding Options
- Funding structure
- Funding schedule
- Calculating project returns for the different elements of financing and payback
Financial Appraisal and Model

Case 8: Financial appraisal of setting up a captive solar plant in Rajkot
## Application of Toolkit for Project Preparation - Financial Appraisal

### Financial Appraisal Output:

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Particulars</th>
<th>Unit</th>
<th>Value</th>
<th>Source</th>
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<tbody>
<tr>
<td>a</td>
<td>Average electricity price (adjusted to demand charge)</td>
<td>INR/ Unit</td>
<td>6.30</td>
<td>Electricity bills of RMC</td>
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<tr>
<td>b</td>
<td>Annual increase in electricity charges</td>
<td>%</td>
<td>0.67</td>
<td>GERC-PGVCL Tariff Order 2021-22- tariff order enclosed as annexure 4.2</td>
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<tr>
<td>c</td>
<td>Electricity expenditure of RMC (1st year)(under no project scenario)</td>
<td>INR Cr.</td>
<td>4.67</td>
<td>annual output (6.9 mil units) * average electricity price (a) or (a)(1+B)(second year onwards)</td>
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</table>
# Application of Toolkit for Project Preparation - Financial Appraisal

## Financial Appraisal Output:

<table>
<thead>
<tr>
<th>No.</th>
<th>Electricity Expenditure in NO Project Scenario</th>
<th>Operating Expenditure</th>
<th>Scenario 1-70% Debt</th>
<th>Scenario 2-100% RMC Budget</th>
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<tbody>
<tr>
<td></td>
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<td></td>
<td>Interest Cost</td>
<td>Cash Flows to Project</td>
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A  Payback period  In years  7.15  6.00
B  IRR  13%  17%