<u>Annexure - A</u>

Green Bond Framework for Surat Municipal Corporation

1. Background and introduction to Surat Municipal Corporation

Surat is situated in the western region of India within the state of Gujarat. It is the second-largest city in the state after Ahmedabad with a population of 6,081,322 as per Census 2011. Recognized as one of India's most dynamic urban centres, Surat boasts a remarkable pace of growth primarily attributed to significant immigration from diverse regions of Gujarat and other states across the nation.

Surat Municipal Corporation (SMC) was established in 1966 as per the Bombay Provincial Municipal Act, 1949. Mandated with essential and discretionary functions, the Corporation has played a vital role in the evolution of Surat into a vibrant and dynamic urban centre that prioritises autonomy and sustainability along with the provision of basic amenities that can enhance the citizen's quality of life.

The Surat Municipal Corporation is committed to customer satisfaction and excellence and employs various methods to achieve this objective. It is dedicated to fulfilling its mission by providing civic amenities and promoting an administration that is responsive, contemporary, straightforward, accountable, and transparent. The Corporation is mandated to provide the following services for the city:

- 1. Water Supply and Sanitation
- 2. Sewerage System
- 3. Solid Waste Management
- 4. Road Development
- 5. Health Coverage for All
- 6. Primary Education
- 7. Fire Service
- 8. Urban Planning and Development
- 9. Places of Recreation

Context for Surat Municipal Corporation's Green Bonds

As part of the Paris Agreement 2015, India has adopted ambitious Nationally Determined Contributions (NDCs). The NDC targets announced in 2015 aim to reduce the emission intensity of the country's GDP by 33-35% by 2030 as compared to 2005 levels and increase the share of non-fossil fuel-based energy resources to 40% of installed electric power capacity by 2030. In addition, the NDC seeks to create an additional carbon sink of 2.5-3 billion tones of CO_2 equivalent through increased forest and tree cover by 2030. The Hon'ble Prime Minister has further enhanced this ambition to address climate change at COP 26. Achieving these commitments will require a

significant level of investment. Green Bonds have been identified as one of the instruments for mobilizing resources for green and climate-positive infrastructure.

Aligned with the Government of India's commitment, SMC is dedicated to fostering sustainable development through the implementation of "green projects." It has also developed **#Amrit Kaal Budget** aligning with the vision of the Government of India, with **seven key priorities**, one of which includes **Green Growth**. SMC has planned several green growth initiatives, including:

- 1. Development of a roadmap for achieving net zero emissions
- 2. Partnership with GIZ for green initiatives
- 3. Budget allocation towards the development of solar power plants and wind power plants
- 4. Carbon credit generation through solar and wind power generation
- 5. Procurement of 450 additional electric buses by 2024-25 to achieve the target of 1100 ebuses

For 2023-24, SMC had earmarked Rs 450 crore for "green projects".

SMC envisages financing a few of the infrastructure projects aimed at reducing SMC's carbon footprint by issuing "green municipal bonds," for which this Green Framework has been formulated, complying with the International Capital Market Association (ICMA) Green Bonds Principles, the Government of India framework for sovereign green bonds and SEBI's regulations regarding green municipal debt securities. This Green Bond Framework has been prepared with the support of the Indo-German Development Cooperation project, "Sustainable Urban Mobility- Air Quality, Climate Action and Accessibility (SUM-ACA)." This project is implemented jointly by the Ministry of Housing and Urban Affairs (MoHUA) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ)

The objective of this framework is to disclose information related to

- 1. Use of proceeds,
- 2. Project selection,
- 3. Management of proceeds, and
- 4. Reporting

This information will help investors and banks understand the key characteristics of the identified project.

This green bond framework sets forth SMC's obligation as an issuer of "green municipal bonds". SMC will fulfill all its financial obligations to investors regarding interest and principal payments on the due dates for the bonds issued under this framework. This is based on the security mechanism developed for the protection of bondholder interests. Payments of principal and interest on issuances under this framework are not conditional on the performance of the eligible projects. Investors in bonds issued under this framework do not bear any project-related costs. SMC reserves the right to modify this framework according to international best practices or to comply with the Government of India's environmental priorities and international commitments. Any proposed changes to the Green Bond Framework will be reviewed by an independent Green Bonds verifier.

The following sections provide details regarding the core components of the Green Bond Framework as outlined in the ICMA Green Bonds Principles.

2. Core Components of the Green Bond Framework

2.1 Use of proceeds

To align with India's objective of climate change mitigation, SMC is committed to using resources to develop "Green Projects" that achieve these objectives. The green projects will be screened based on the following principles:

- 1. Encourages energy efficiency in resource utilisation;
- 2. Reduces carbon emissions and greenhouse gases;
- 3. Promote climate resilience and adaptation;
- Values and improves natural ecosystems and biodiversity, especially according to the SDG principles.

SMC will use the proceeds raised from the issuance of municipal green bonds to finance eligible projects. These projects will be categorised based on the Government of India's green bond framework and fulfil the following criteria:

- 1. Be aligned with SMC's obligatory functions under the BPMC Act
- 2. Meet SEBI's criteria for eligible green projects.

Accordingly, the following category of projects has been identified by SMC as eligible for green bond financing –

Green Project Category	Environmental Objective	Eligibility Criteria	
Renewable Energy (SDG 7 and 13)	Climate change mitigation	Investments in solar/wind/biomass projects that reduce the use of energy from fossil fuels	
Energy Efficiency (SDG 7 and 13)	Climate change mitigation	Design and construction of energy-efficient and energy- saving systems in municipal buildings, including Support for public lighting improvements (such as the use of e.g. LED use).	
Clean Transportation (SGD 9, 11 and 13)	Climate change mitigation	Promote public transportation infrastructure, including electrification of public transport (e.g., metro rail systems, electric buses) and related infrastructure development for the same.	
Sustainable Water and Waste Management (SDG 6)	Climate change mitigation	Promote energy-efficient pumping systems for water supply, encourage circularity in water use and installation/upgradation of wastewater infrastructure (including transport, treatment, and disposal systems).	

		Water resource conservation and flood defence systems such as storm water drainage networks.
Pollution Prevention and Control (SDG 12 and 13)	Climate change mitigation, Environmental protection	Projects targeting the reduction of air emissions, greenhouse gas control, waste management, waste prevention, waste recycling, waste reduction, and energy/emission efficient waste-to-energy systems.

The projects funded by the proceeds from 2025-26 green bond issuances are attached in the annexure given at the end of this document with their estimated impact.

2.2 Evaluation and Selection of Projects:

SMC's goals and objectives towards Climate Change Mitigation and Environmental Protection

As mentioned above, SMC aligns with the Government of India's commitment to sustainable development through the implementation of "green projects," wherein SMC has developed a "Green Budget," identifying various Green Growth Initiatives. Below are certain initiatives and action plans developed by SMC, that align with the climate-related objective of Green Bonds:

- 1. Development of a roadmap for achieving net zero emissions
- 2. Development of the Surat Electric Vehicle Policy, 2021
- 3. Development of a Clean Air Action Plan in 2021
- 4. SMC created an Energy Efficiency Cell in 2001 with the objective of efficient energy utilization and a reduction of electricity expenses. The Cell works towards identifying energy conservation projects and their feasibility, developing wind power and solar power generation projects, and implementing the activities identified under the "Solar City" Programme of MNRE.
- 5. SMC is the only city that has developed infrastructure to generate more than 35% of its annual energy consumption through renewable sources
- 6. SMC has prepared a long-term Water Supply Master Plan to upgrade and modernize water treatment facilities to meet quality standards and ensure sustainable water supply
- SMC's waste-to-energy projects and initiatives to convert organic waste into biogas or compost after supply.

These goals and plans are integrated into the green bond framework, assuring investors that their funds are being used to support projects that contribute to climate mitigation and adaptation efforts while promoting environmental sustainability and community well-being.

SMC's Rationale for issuing the Debt instrument

- Funding Sustainable Infrastructure: SMC aims to finance sustainable infrastructure projects that contribute to environmental conservation, renewable energy adoption, and climate resilience in the city. Issuing a green bond allows SMC to raise capital specifically earmarked for these initiatives.
- Cost-Effective Financing:- By tapping into the green bond market, SMCs can access funding at competitive rates, potentially lowering borrowing costs compared to traditional financing options. This enables the municipality to implement projects more efficiently while maximising the impact of its budget.
- 3. Enhancing Public Image and Reputation:- Issuing a green bond demonstrates SMC's commitment to environmental stewardship and sustainable development, enhancing its reputation among investors, stakeholders, and residents. This can attract socially responsible investors and strengthen SMC's standing in the financial markets.
- 4. Meeting Regulatory Requirements:- SMC may be obligated to comply with environmental regulations and mandates related to carbon emissions reduction, waste management, and water quality improvement. Issuing a green bond helps SMCs fulfil these obligations while demonstrating compliance and accountability to regulatory authorities.
- 5. Driving Economic Development:- Investing in green infrastructure projects can stimulate economic growth, create job opportunities, and attract investment in Surat. By issuing a debt instrument dedicated to sustainable initiatives, SMC can catalyse local economic development while addressing environmental challenges.
- 6. Addressing Climate Change Risks:-Surat is vulnerable to climate change impacts, including floods, heat waves, and pollution. Implementing climate-resilient infrastructure and adaptation measures can help mitigate these risks and safeguard the city's residents and assets. Issuing a green bond enables SMC to fund projects that enhance Surat's resilience to climate change.
- 7. Demonstrating Leadership in Sustainable Finance:- By pioneering the issuance of green bonds in the municipal market, SMC sets an example for other cities and municipalities to follow suit. This leadership role not only promotes sustainable finance practices but also positions Surat as a frontrunner in the global transition to a low-carbon economy.

In summary, issuing a debt instrument such as a green bond aligns with SMC's objectives of promoting sustainability, addressing climate change challenges, and fostering inclusive economic growth in Surat. By leveraging the financial markets to fund green projects, SMC can achieve its environmental goals while delivering long-term value to the city and its residents.

Process followed to identify green projects

SMC has formed a **"Green Municipal Bond Committee,"** led by the Municipal Commissioner as Chairperson. The committee includes 4 to 5 members, such as the Deputy Commissioner, City Engineer, Chief Accountant, and Additional City Engineer.

The committee is tasked with the process of selecting projects to be financed by green municipal bond issuance. The committee evaluates projects considering the eligibility criteria of "green projects" as per SEBI guidelines, considering both environmental and social impacts.

SMC identifies potential projects that align with the sectors defined by SEBI as "green,"- which includes renewable energy, energy efficiency, sustainable management of water resources, clean transport, sustainable water, and green buildings. Relevant documents such as project plans, detailed project reports, technical specifications, environmental impact reports, and financial feasibility are reviewed to examine the project's alignment with the green bonds framework. Multiple stakeholders, such as project developers, consultants, and financial experts, are consulted to examine the project and compliance with SEBI guidelines. A thorough due diligence process is conducted to verify the accuracy and reliability of the projects, which includes site visits, technical assessments, and third-party verification, to ensure that the selected projects meet SEBI's guidelines.

Based on the procedures outlined above, SMC has selected the following projects for financing through the proposed green bond issuance. Also mentioned are the criteria that the selected project falls into as per the Climate Bonds Initiative Standards V4.0. A detailed description of each project, along with their capital costs and expected environmental and social impacts is given in the Appendix.

	Projects
1.	Installation of a 10 MW ground-mounted solar power plant
2.	Installation of a 6.3 MW Wind Power Plant
3.	Development of Kosad depot for electric bus operations
4.	Centralized Dry and Wet Waste processing Plant
5.	Augmentation and improved water supply systems to the city

Environmental management plan during the execution of projects:

During the execution phase, SMC remains steadfast in its dedication to implementing environmentally responsible practices. The following highlights essential measures undertaken by SMC to uphold environmental commitments throughout construction.

Stakeholder Engagement and Consultation	Identify stakeholders, including local communities, regulatory agencies, and other relevant parties. Establish mechanisms for ongoing communication, consultation, and feedback. Incorporate stakeholder input into decision-making processes.
Environmental Risk Assessment:	Conduct a comprehensive assessment of the potential environmental impacts associated with each project component. Develop strategies to mitigate and manage the identified risks.
<u>Site Management:</u>	Create buffer zones to protect environmentally sensitive areas. Deploy measures to control sediment and erosion, mitigating soil runoff. Efficiently handle construction waste by employing recycling and responsible disposal methods.
Water Resource Management:	Enforce strategies to avert water contamination, encompassing runoff supervision and sedimentation basins. Oversee and regulate water consumption during construction activities.

Air Quality Management:	Control dust emissions using water spraying, dust screens, and other appropriate measures. Utilise low-emission equipment and vehicles whenever feasible. Implement energy-efficient technologies and practices to minimize energy consumption. Develop strategies to monitor and reduce greenhouse gas emissions throughout the project lifecycle.		
Energy Efficiency and Carbon Footprint Reduction:			
Natural Resource Management:	Implement measures to conserve water resources, including water recycling and rainwater harvesting. Protect sensitive ecosystems and biodiversity through habitat conservation and restoration. Minimise soil erosion and land degradation through erosion control measures and sustainable land use practices.		
Waste Management and Pollution Control	Implement measures to minimize waste generation and promote recycling and reuse. Ensure proper handling, storage, and disposal of hazardous materials.		
Community and Social Impact Mitigation:	Maintain regular communication with the local community about construction activities and potential impacts. Address community concerns promptly and transparently.		
Emergency Preparedness and Response	Develop emergency response plans to address potentia environmental incidents or accidents. Provide training fo project staff on emergency procedures and protocols Coordinate with local emergency services and regulator authorities to ensure a timely and effective response.		
Monitoring and Reporting:	Establish procedures for evaluating the effectiveness of environmental management measures. Implement corrective actions and adaptive management strategies based on monitoring data and feedback. Continuously review and update the Environmental Management Plan to reflect changing conditions and emerging best practices. Ensure transparency and accessibility of environmental information to stakeholders and regulatory authorities.		
Environmental Training:	Provide environmental awareness training for construction personnel. Foster a culture of environmental responsibility		
Legal and Regulatory Compliance	Identification of all applicable environmental laws, regulations, and permits. Procedures for obtaining necessary permits and ensuring compliance throughout the project's lifecycle.		

2.3 Monitoring mechanisms for impact assessment

An appointed Executive Engineer will oversee green bond framework projects, including evaluating and monitoring project progress at every level. An annual audited report will be submitted to SEBI by SMC, which will provide the following details:

- 1. Utilisation of funds
- 2. Project development stage
- 3. Impact of the projects as per the indicators mentioned above

The officer will conduct comprehensive assessments independently, ensuring diligent oversight and effective management of each project's activities. Their responsibilities encompass thorough evaluation and supervision, ensuring alignment with project objectives and standards. With

executive officers designated from each department, there is enhanced coordination and specialized attention to the unique requirements and goals of the green bond initiatives. Additional monitoring will occur through reporting to various authorities specified in the reporting section below.

2.4 Management of bond proceeds

The net proceeds from the issuance of the Green Financing Instrument will be allocated to finance the identified Green Projects, to be referred as the 'Green Project Portfolio'. The bond proceeds will be transferred to the issue proceeds account by the Clearing Corporation in accordance with SEBI regulations. Thereafter, the proceeds shall be transferred into the designated holding account for these green projects by the banker to the issue after receipt of directions for the said transfer from the merchant banker and registrar. The net proceeds of the debt instrument will be credited to a separate bank account designated as the Green Bond Account so that it is easily identified appropriately documented. The unallocated proceeds will not be allocated to any greenhouse gasintensive projects that are inconsistent with the delivery of a low-carbon and climate-resilient economy.

Structure accounting system for monitoring green bond proceeds

SMC has a well-laid, fully computerised Internal Double Entry System in place, that shall be used to monitor the changes in the Green Project Portfolio, which will be regularly updated to reflect changes in proceeds financed.SMC is establishing accounts including the Escrow Account, Interest Payment Account, and Sinking Fund Account for servicing the Debentures. SMC had previously issued bonds, creating an exclusive charge on its own revenue and cash flows, and is now extending a first charge to NCD Holders for the present issue. These funds, including those from the Escrow Account, will be prioritised for debt service requirements. Additionally, detailed mechanisms for utilizing funds, maintaining minimum balances, and transferring amounts annually for interest payments and sinking funds are outlined later in this section, ensuring compliance with SEBI regulations.

The proceeds from the green bond will be managed through a separately assigned General Ledger Account Code (GLAC). This code is specifically designated to record and track transactions related exclusively to green bond-funded projects. This structured approach aids in earmarking, managing, and accounting for funding allocated to the nominated projects and assets. Furthermore, it enables the estimation of the share of the Net Proceeds being utilised for financing, ensuring transparency and accurate allocation of funds for the intended environmentally sustainable initiatives.

SMC proposes to use the proceeds from the green bonds for projects that have already been tendered. These projects are currently in progress, and the proceeds from the bond issue will be utilized to support their implementation. SMC, on a best-effort basis, will strive to fully allocate the net proceeds of any Green Finance Instrument within 24 months after the bond issuance to facilitate the utilisation of proceeds from the bond issue. SMC, on a best-effort basis, will strive to fully allocate the net proceeds of any Green Finance Instrument within 24 months (extension shall be granted as per CBS) after issuance as per the Climate Bond Standards (CBS) v4.0.At the end of the allocation period specified in the Certification, SMC will provide a Post-Issuance Verification Report by an Approved Verifier confirming that 100% of the proceeds have been allocated. In the case of any inadvertent delays in project execution, SMC will inform the trustee of the bond issue, stock exchange, SEBI, and Climate Bonds Initiative about any potential delays in the utilisation of proceeds and provide revised timelines for balance fund utilisation and obtain necessary approvals.

Eligible Green Projects financed by net proceeds of any Green Finance Instrument will not be affected by ex-ante changes to the Green Finance Framework and will remain in the Green Portfolio for as long as they meet the Eligibility Criteria prevailing at the time of the raising such Green Finance Instrument and remain internally/virtually allocated to an outstanding Green Finance Instrument.

Structured Payment Mechanism

Surat Municipal Corporation (SMC) is establishing accounts including the Escrow Account, Interest Payment Account, and Sinking Fund Account for servicing the Debentures. The SMC has previously issued Municipal Bonds, creating an exclusive charge on its own revenues and cash flows for the present issuance; SMC is extending a first charge to NCD Holders. These funds, including those from the Escrow Account, will be prioritized for debt service requirements. Additionally, detailed mechanisms for utilizing funds, maintaining minimum balances, and transferring amounts annually for interest payments and sinking funds are outlined, ensuring compliance with SEBI regulations. The Debenture Trustee holds various charges on these accounts, ensuring their proper utilization and management. All accounts are to be maintained with a scheduled commercial bank rated at least AA+. If the bank's rating falls below AA+, funds will be moved with the consent of the Debenture Trustee. Regular reporting to the Debenture Trustee and Rating Agencies is mandated to ensure transparency and compliance. Surat Municipal Corporation allows funds from the Escrow Account (meeting the minimum balance) and the Interest Payment Account (inclusive of the DSRA Amount) to be placed in fixed deposits. These deposits must be with a scheduled commercial bank holding a dual rating of AA+ or higher. Notably, the conditions of these fixed deposits are designed to permit premature withdrawal, providing flexibility in fund management while maintaining liquidity.

Investor Relations and Grievance Redressal:

Arrangements have been made to address investor grievances as expeditiously as possible. The Issuer strives to resolve the investor grievance within 30 days of receiving it. SMC has appointed a Compliance Officer who can be contacted for any pre-issue or post-issue related problems such as non-credit of funds in the DEMAT account, non-receipt of refund orders, interest warrants or cheques, etc. Investors may reach the Compliance Officer at the Issuer's head office, and alternatively, grievances can be emailed to "chiefaccountant@suratmunicipal.org."The Corporation is registered with the SCORES (SEBI Complaints Redress System) platform (SCORES ID: COMZ00551) to facilitate online compliant filling.

2.5 Green Bond Reporting

SMC is committed to providing investors and other stakeholders, such as stock exchanges and Climate Bonds Initiative, with transparent reporting on the allocation of proceeds from the green bonds and the environmental and social impact of projects funded by the proceeds, in accordance with SEBI regulations and Climate Bonds Standards V4.0.

Allocation Reporting

- 1. A statement on the climate-related objectives of the Bond.
- 2. The list of Nominated projects and assets to which Net Proceeds have been allocated.
- 3. Utilization of the proceeds of the issue as per tracking by the issuer using internal processes as disclosed in the offer document. This shall be verified by a report of an external auditor.
- 4. An estimate of the respective shares of the Net Proceeds used for financing and which nominated projects and assets have been reallocated.

5. Details of unutilized proceeds at the end of the reporting period and their deployment in financial securities as per treasury policies stated in the offer document.

Eligibility Reporting

Confirmation that the Nominated projects and assets continue to meet the relevant eligibility requirements applicable when obtaining the Certification.

Information on the environmental characteristics or performance of Nominated projects and assets, which is prescribed by the relevant Sector Criteria.

Impact Reporting

SMC is committed to transparent reporting on the allocation of green bond proceeds and the environmental impact of projects funded by those proceeds. This information will be provided to investors and other stakeholders. **Impact Reporting may include the following details:**

- 1. Report the impact of the project based on the indicators identified above for the nominated projects till the repayment of the amount raised through green bonds.
- 2. Provide the methods and the key underlying assumptions for the calculation of the performance indicators and metrics.

Reporting Authorities:

- 1. Trustee of the Issue
- 2. Registrar of the Issue
- 3. Credit Rating Agencies for the Issue
- 4. Auditors of the Issue
- 5. Securities and Exchange Board of India (SEBI)
- 6. Climate Bond Initiative (CBI)
- 7. Green Bond Framework Verifier (KPMG India)
- Government of India(GOI) for overall project monitoring (water project) through the AMRUT 2.0 portal

3. External Verification/ Certification

To ensure its Green Finance Issuance meets SEBI regulations and Climate Bonds Standards, SMC will engage KPMG Assurance and Consulting Services LLP (KPMG India) for pre-issuance verification.

Pre-Issuance Verification

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KPMG India will provide a verifier's report on the Green Financing Instruments' conformance with SEBI's requirements as outlined in circular SEBI/HO/DDHS/DDHS-RACPOD1/P/CIR/2023/023 dated February 06, 2023.

Post-Issuance Verification and Certification

Following issuance, SMC will engage an accredited verifier to conduct a post-issuance review to assess:

- 1. Allocation of proceeds usage
- 2. Ongoing eligibility of projects and assets
- 3. Adequacy and effectiveness of the Issuer's internal controls and systems
- 4. Management of unallocated funds

Based on a successful post-issuance review, SMC will then seek certification from the Climate Bonds Initiative, verifying adherence to the established Green Finance Framework.

Disclaimer

This Green Finance Framework (this "Framework") is intended to provide non-exhaustive and general information. The information contained in this Framework does not purport to be comprehensive. This Framework may contain or incorporate by reference public information not separately reviewed, approved or endorsed by Surat Municipal Corporation ("SMC") and unless differently specified in this Framework, the information contained in this Framework has not been independently verified by any independent third party. Accordingly, no representation, warranty or undertaking, express or implied, is made and no responsibility or liability is accepted by SMC as to the fairness, accuracy, reasonableness or completeness of such information. This Framework may contain statements about future events and expectations that are forward-looking statements. Forward-looking statements inherently involve risks and uncertainties that could cause actual results to differ materially from those predicted in such statements. None of the future projections, expectations, estimates or prospects in this Framework should be taken as forecasts or promises nor should they be taken as implying any indication, assurance or guarantee that the assumptions on which such future projections, expectations, estimates or prospects have been prepared are correct or exhaustive or, in the case of assumptions, fully stated in the Framework. You are cautioned not to place undue reliance on the forward-looking statements (as well as information and opinions) contained herein, which are made only as of the date of this document and are subject to change without notice. No representation is made as to the suitability of any Green Bonds or loans to fulfil environmental and sustainability criteria required by

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Appendix

Project 1: Installation of 10 MW (AC) ground mounted Solar power plant

Contribution to Sustainable Development Goal 7: Access to Sustainable and Modern Energy

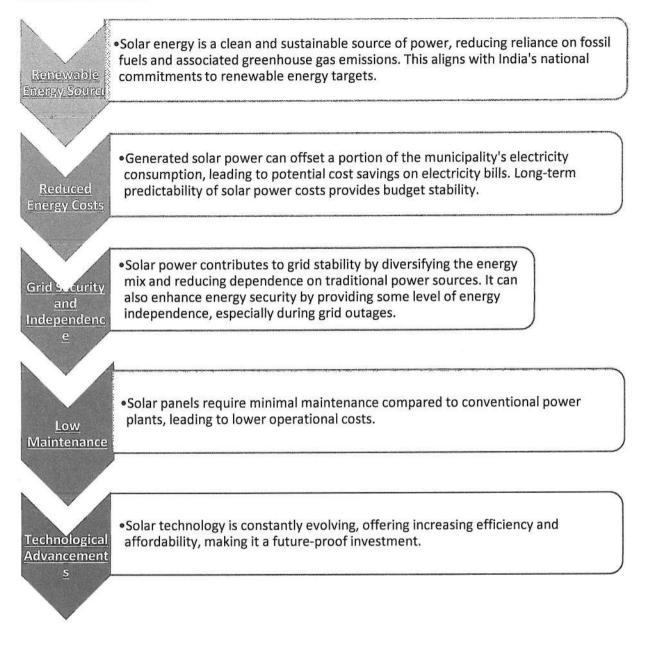
Contribution to National Mission/ Scheme: National Solar Scheme

Process and technology: Solar Photovoltaic Based Mono PERC Solar Technology comprising of solar modules, Solar Inverter, Transformer, Transmission Line, DC Cables, AC Cables, Earthing etc

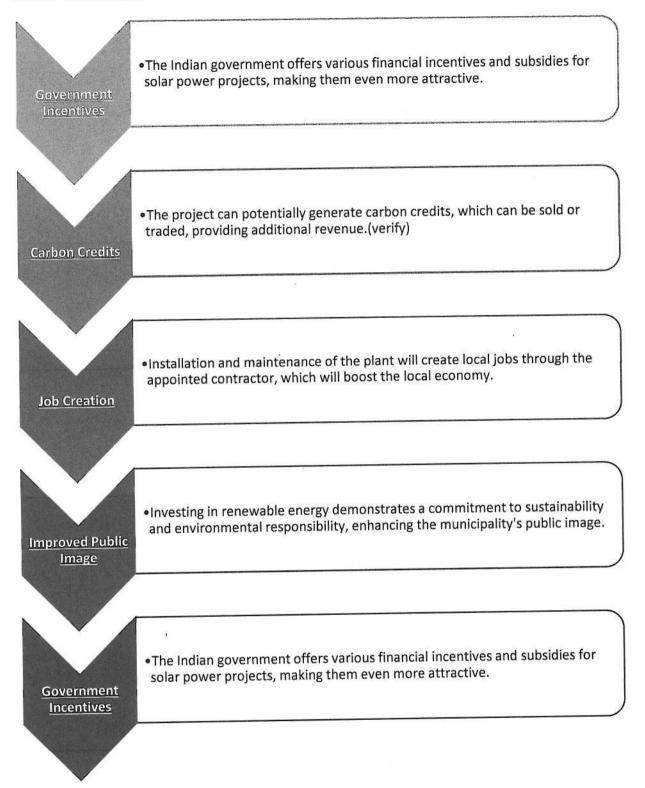
Approved project cost (Rs cr.)	SMC contribution / Grants (Rs cr.)	Borrowing through green bonds (Rs cr.)
55.56	25.56	30.00

SMC intends to install a 10 MW Solar Power Plant using the proceeds from green bonds. The Contractor employed will be responsible for the procurement and installation of the solar panels at the identified location and maintain it for the next 10 years. Additionally, Surat Municipal Corporation (SMC) has earmarked funds in its budget for a floating Solar Power Plant, estimated to cost Rs 0.20 crores. These initiatives underline Surat's commitment to expanding its renewable energy infrastructure and promoting sustainable development.

Technical Advantages:



Economic Advantages:



The project aims to install non-fossil fuel-based energy resources. The implementation of the project will support the Government of India in achieving its NDC targets and also cater to Sustainable Development Goal 7. Further, the project can also generate carbon credits, which can be sold in voluntary markets and generate further revenue. The table below provides the expected environmental and social impact of the project.

Installed renewable energy installed (MW)	10 MW
Annual renewable energy generated (MWh)	17.32 GWh
Annual GHG emissions avoided (tCO2)	19681.81 tCO2

Source: DPR document

Project 2: Installation of 6.3 MW Wind Power Plant

Contribution to Sustainable Development Goal 7: Access to Sustainable and Modern Energy

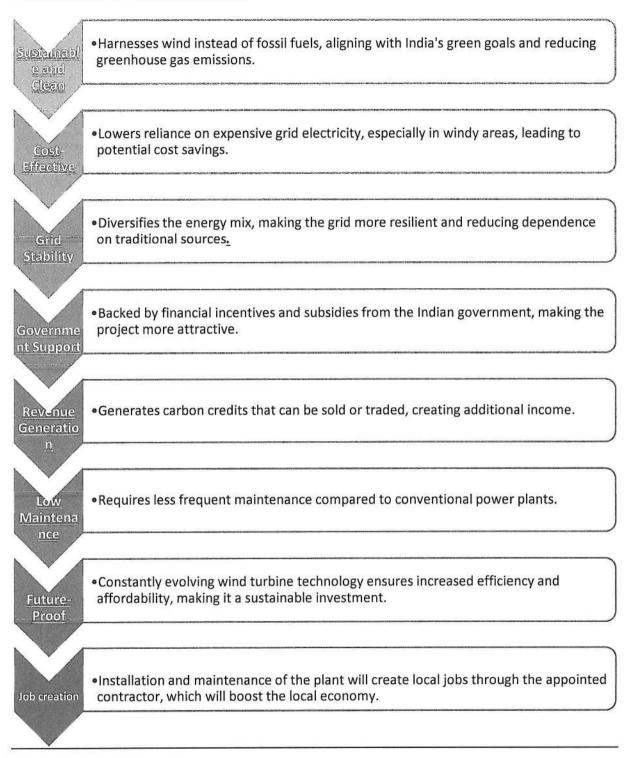
Technology used: Use of wind energy, upwind wind turbines will be used to generate electrical energy. Energy generated will be wheeled to HT connections of the water supply system, sewage disposal system & utilities through long-term Open Access under the "Gujarat Renewable Energy Policy 2023.

Machinery: Wind turbine generators, towers, nacelles, transformers, sub-station and power evacuation systems

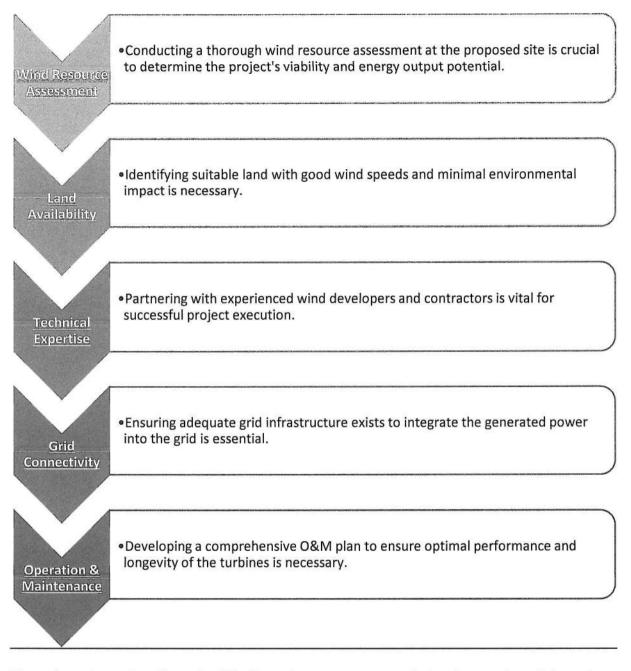
Approved project cost (Rs cr.)	SMC contribution / Grants (Rs cr.)	Borrowing through green bonds (Rs cr.)
56.10	12.28	43.82

The project aims to establish a 6.3 MW capacity wind power plant in Bhimguda-Wankaner site of Morbi District. It includes the installation of wind turbine generators, towers, nacelles, transformers, sub-stations, and power evacuation systems, along with a 10-year operations and maintenance plan. The electricity generated will be integrated with the HT connections of water supply systems, sewage disposal systems, and utilities in accordance with the Gujarat Renewable Energy Policy 2023.

Environmental and Economic Benefits:



Evaluation considerations:



The project aims to install non-fossil fuel-based energy resources. The implementation of the project will support the Government of India achieve its NDC targets and also cater to Sustainable Development Goal 7. The below table provides the expected environmental and social impact of the project

Installed renewable energy installed (MW)	6.3 MW
Annual renewable energy generated (GWh)	16.48
Annual GHG emissions avoided (tCO2)	18727.27
Source: DPR document	

Project 3: Development of Kosad depot for electric bus operations

Contribution to Sustainable Development Goal 11: Sustainable Cities and Communities

Contribution to National Mission/ Scheme: National Electric Vehicle Policy and Surat Electric Vehicle Policy

SMC is moving rapidly towards transitioning to electric vehicles, with an aim to decarbonise the transport sector. Towards this, the Corporation is already operating electric buses and is moving towards including more electric buses and municipal vehicles. Surat Sitilink, which is the public transit agency of Surat, is expected to increase its fleet size of e-buses to 1100 by 2025, with the addition of 450 new electric buses.

This project aims to facilitate the operations of electric buses from the Kosad bus depot. The Kosad depot will cater to the operation of 100 electric buses used for the bus rapid transit system, wherein the buses will be charged, maintained, and parked. The depot will cater to the provision of electric buses as a public transport mode and offer a sustainable mode of transit system to the city and also support in reducing congestion of the city. The addition of these new e-buses will enhance the frequency of the buses to citizens, hence improving the service levels of the bus service, which will facilitate in mode shift to public transport systems and increase the city bus service ridership.

These 100 electric buses, which are to be operated from Kosad depot, will be operated on a Gross Cost Contract (GCC) model, for which a concession agreement between JBM Ecolife Mobility Pvt. Ltd. and Traffic BRTS Project Cell, SMC was signed in August 2023 for 12 years. As per the agreement, JBM Ecolife will be responsible for the procurement, supply, operations, and maintenance of the buses and the charging infrastructure. 23 charging stations would be installed at the depot as part of the project. SMC would be responsible for the provisioning of routes for the bus operations, and handover of maintenance depots for charging of buses and operations of charging infrastructure.¹For the project, SMC will bear the cost of the e-bus operations, paying the private operator Rs 59.29 per km, which includes the cost of bus operations and charging infrastructure. SMC intends to raise the finances for depot development through green bonds. The below shows the contribution of SMC and the borrowings expected from green bonds for the project. The following components of the depot shall be developed using the green bonds finances:

- 1. Office building
- 2. Workshop
- 3. Parking shed for the electric buses
- 4. Water tank
- 5. Site development including landscaping, compound wall, washing platform, security cabin etc.
- 6. Electrification works
- 7. Fire system
- 8. CCTV camera

Annua	I cost paid by S	MC	to the priv	vate o	perator	Rs 41.5 crore
	Contribution opment	1	Grants	for	depot	Rs 4.29 crore
and the angender and	wing through G	reen	Bonds			Rs 4.19 crore

¹ The concession agreement says that SMC will provide possession and licenses to the operator to possess a depot at Kosad for e-bus operations

The project will also employ additional drivers, conductors and maintenance staff for the depot as per the agreement.

The project aims towards the development of clean transportation systems for the city of Surat, which will help climate change mitigation. The implementation of the project will support the Government of India achieve its NDC targets, and also cater to Sustainable Development Goal 11, by providing sustainable and affordable means of mobility to all people. The project will also help the city and India achieve the target as per the Electric Vehicle Policy. The below table provides the expected environmental and social impact of the project

Number of people expected to use the public transport system	~60,000 passengers per day (based on current ridership per bus per day)	
Number of buses	100	
Annual GHG emissions avoided (tCO2)	5296 kg CO2	

Project 4: Centralized Dry and Wet Waste Processing Plant

Contribution to Sustainable Development Goal 12: Sustainable Consumption and Production Patterns

Contribution to National, Mission/ Scheme: Swachh Bharat Mission 2.0- Objective of Garbage free cities

Process and Technology:

The dry and wet waste processing plant project envisages the construction of 3000 TPD of municipal solid waste, whilst ensuring efficient handling and processing of municipal solid waste to achieve maximum resource recovery, and minimum waste diversion. The processing plant includes the following phases, post which the inert waste left is sent to the landfill site.

- **Pre-sorting**: The pre-sorting area is the initial phase of the plant, for segregation, screening and reduction in size of waste material preparing for subsequent processes.
- Automatic Material Recovery and RDF processing: This process recovers valuable recyclable waste and produces RDF. It employs advanced technologies such as density separators, mechanised feeding and conveyor systems, ballistic separator with air density separator, automatic segregation bot, shredders, bailing wrapping machines, compost pads (using windrow mechanism) optical sensors, magnetic separators, RDF screening, and manual sorting.
- Compost pads:Compost Pads focus on composting waste using windrows from the Pre-Sort area, aiming to transform it into high-quality compost. Space constraints lead to mechanization and enzyme-based treatments to expedite the composting process.
- Composting section: This section is dedicated to refining composted solid waste. Its
 objectives include the screening of composted waste, storage, packaging, and proper
 disposal of rejected materials.
- Sheds: The plant will comprise of various sheds- pre-sorting shed, Material recovery facility shed, compost refining shed, and windrow pad shed

Approved project cost SMC contribution (Rs (Rs cr.) cr.)		Borrowing through green bonds (Rs cr.)	SBM grants
407.67	163.94	76.35	167.38

The main objective of the project is to develop a waste management park for Surat City such that it caters to all the necessary processes of Municipal Solid Waste Management (Treatment and Disposal), and efficiently manages the solid waste generated and treated in the city. To improve the efficiency of the SWM system for the city of Surat, Surat Municipal Corporation (SMC) has engaged to carry out detailed assessment of "Development of Dry Waste & Wet Waste Processing Plant Along with Necessary Infrastructure and its Operation & Maintenance for 10 years as whole at Block No. 197 & 199 at Umber, Surat as Per SWM Rules – 2016 Under Swachh Bharat Mission and Smart City Mission", This project envisages to construct & operate 3000 TPD MSW processing plant whilst ensuring to efficiently handle and process municipal solid waste (MSW) to achieve maximum resource recovery and minimum waste diversion. Initially, the incoming waste shall be treated at the Dry and Waste Processing Plant which shall have an average capacity of 3000 TPD waste after treatment shall be converted into byproducts like RDF, compost, recyclables, inert etc. and shall be disposed as per the Municipal Solid Waste Rules and guidelines 2016. The inert (20%) generated after processing of waste shall be then disposed to the Sanitary Landfill Cell proposed within the site. SMC proposes to raise the finances for the dry and wet processing plant through green bonds. The process and the technology used in the dry and waste processing plant is detailed in the below section:

Pre-Sorting Area:

- 1. Waste Reception: MSW is weighed, inspected, and manually sorted to remove bulky items. The Automatic Feeding System, using EOT crab cranes or Radial loaders, ensures smooth entry into processing.
- Screening & Shredding: Trommel screens (200 mm) process waste, while specialized shredders handle materials larger than 200 mm. Conveyors facilitate further sorting, especially for organic waste meant for RDF processing.
- 3. Grinding: Waste sized 30-60 mm is finely ground using a three-series waste grinder system before being transported to the RDF processing area for further treatment.
- 4. Waste Handling: Conveyors, manual sorting stations, and grinding processes ensure efficient material flow, setting the stage for effective resource recovery and sustainable waste management.

Automatic Material Recovery and RDF Processing: The Automated Material Recovery & RDF Processing Area is designed to recover valuable recyclables and produce high-quality RDF (Refuse-Derived Fuel) efficiently. This is achieved through advanced sorting, screening, and processing technologies to maximize resource recovery and sustainability.

- Material Sorting and Separation: 120 mmTrommel outputs sort the material based on their density. Further optical sensors are used for identifying recyclables, and magnetic separators extract metals.
- 2. RDF processing and refining: 10mm trommel screens remove metals and inert material. RDF fluff is manually sorted, baled, and wrapped for storage and transport.
- 3. Transportation: RDF bales are transported to storage pads.

Composting Pads: The Compost Pads are designed to convert organic waste into high-quality compost using mechanized systems and enzyme-based treatments to accelerate the composting process despite space constraints. The process and technology used is as detailed below:

1. Windrow formation and treatment: Material <120 mm is spread into windrows. Enzyme based treatment, water spraying, and controlled aeration aid decomposition.

- Aeration and turning: EOT mounted windrows turners turn windrows for uniform aeration. SCADA-operated compressors ensures controlled airflow to speed up decomposition and eliminate insect larvae.
- 3. Leachate treatment: Drain trenches collect leachate and transfer it to a centralized leachate treatment plant for proper disposal.
- 4. Mechanised aeration system with SCADA: Blower pumps provide controlled aeration to windrows. SCADA technology enables real-time monitoring and adjustment for optimal composting conditions. Sprinklers and piping systems apply water and inoculants to enhance microbial activity. The system aims to complete composting within 30 days.

Composting Section:The Composting Section focuses on refining composted solid waste through screening, storage, packaging, and proper disposal of non-compostable materials. The process follows a structured workflow using specialized machinery for efficiency.

- 5. Material Transfer & Loading: Compost windrows from the Compost Pads are transferred via Auto Feeding & Radial Loader Systems (30 TPH, six units) to ensure a steady flow into the processing line.
- 6. Primary Screening (15 mm Trommel): Six Trommel screens (15 mm, 30 TPH each) separate finer compost from larger particles, directing suitable material for further refinement.
- 7. Secondary Screening (4 mm Trommel): Three Trommel screens (4 mm, 30 TPH each) further refine the compost, ensuring only high-quality, finely screened material moves forward.
- 8. Magnetic Separation & Storage: Magnetic separation removes unwanted metallic contaminants, and the refined compost is stored for packaging.
- 9. Packaging (Dual Hopper Bagging Assembly): Three automated bagging machines efficiently pack the refined compost into bags for storage, transportation, and distribution.
- 10. Reject Handling: Non-compostable residues from the screening process are disposed of at the Scientific Landfill, ensuring proper waste management.

This systematic approach enhances efficiency, quality control, and seamless compost refinement and packaging.

Sheds: The facility consists of multiple sheds, each serving a specific function in the waste sorting, recycling, and composting processes.

- 1. Pre-sorting sheds: Process of initial manual sorting of large waste items, specialised segregation and segregation based on specific waste type undertaken in these sheds.
- 2. Material Recovery Facility Shed: Facility for sorting, cleaning and processing recyclable material of various sizes.
- 3. Compost refining sheds: Facility for compost screening, shredding and quality control.
- 4. Windrow pads A and B: Large open areas for the composting process, involving windrow formation, aeration, and enzyme treatment.

Technical Reasoning and Project Evaluation:

- Improved waste management: Consolidates waste management activities into a central location, improving efficiency and control over waste disposal.
- Reduced environmental impact-GHG emissions: The dry and wet waste processing plant diverts waste from the sanitary landfill site, reducing landfill space usage and minimised methane emissions from decomposing waste in anaerobic landfill conditions.

- Promotes public health: Solid waste can be a breeding ground for bacteria, viruses, and pests that can cause diseases. Proper processing and disposal of solid waste will help to prevent the spread of disease and promote public health.
- Supports economy: Recycling and composting programs can create new jobs in industries such as manufacturing and agriculture. Effective solid waste processing practices will also reduce costs associated with waste disposal, such as landfill fees, and generate revenue from the sale of recyclable materials.
- Technology selection: Evaluate various processing technologies considering waste composition, economic viability, and environmental impact.

The project aims to reduce GHG emissions, and land and water pollution and improve public health. The implementation of the project will support the Government of India achieve its NDC targets and also cater to Sustainable Development Goal 12. The below table provides the expected environmental and social impact of the project

Processing of waste	The dry and wet waste processing plant will		
	process upto 80% - 90% of the waste generated,		
	depending on the type of incoming waste.		

Project 5: Augmentation and improved water supply system to the city

Contribution to Sustainable Development Goals 6 and 11: Sustainable management of water and sanitation for all

Contribution to National Mission/ Scheme: AMRUT 2.0

5.1 Construction of Intake Well

Approved project cost	SMC contribution / Grants	Borrowing through	
(Rs cr.)	(Rs cr.)	green bonds (Rs cr.)	
87.09	70.76	16.33	

The main source of water for Surat is the River Tapi flowing through the city. Surface water is drawn by intake wells from perennial channels of the river throughout the year. Water thus drawn is treated by the water treatment plants and then the same is supplied to the citizens after post-chlorination. Presently, there is an availability of 2193 MLD of surface water-based intake wells meant for drawing surface water at different sources for the SMC area with a total treatment capacity of 1598 MLD. Water from all these sources is taken to treatment plants supplying water to the SMC region. SMC has developed well-established, networked water supply system to supply the drinking water to the Citizens of Surat City. The present gross average daily water supply to the citizens of Surat City is 1250 MLD with a net per capita water supply of 146 litres per day. The population coverage of Surat city is about 97.5% which includes the new area added to the Corporation limits in 2006.

Currently, there is no water source for the newly added area at the new North, West and South-West zone, and is being catered to by tankers. To cater to the current demand and supply gap, the proposed project of construction of an intake well at Variav of capacity 420 MLD has been developed. The newly added area which will be served with the project will have a 24/7 water supply, with metering.

The proposed intake well is to be constructed at the summer channel by sinking method, which ensures the availability of water in the hot and dry seasons as well.

Apart from this, by considering the scouring depth of River Tapi which is approximately 15-meter, the foundation level of the intake well is required to be built at (-30) meter depth of River

Area	2025	2030	2037	2052
Amroli, Kosad, Variav	43412	115766	719095	844133
South West Zone-I	47795	127454	509070	627255
South West Zone-II	78668	209782	929330	1130674
Newly added west zone	87036	232095	461260	749850
Newly added north zone	70527	188073	393063	614975
Total	327439	873171	3011818	3966887

As per population projection, the project will cater to population:

Source: Based on the population projection figures provided in the DPR

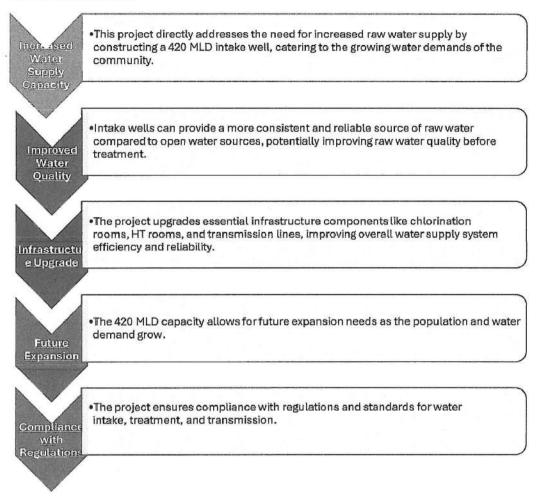
4 pumps of 315 KW will be required to pump the required amount of water to the water treatment plant at Variav. SMC uses energy-efficient pumps and undertakes energy audits every 3 years to check the efficiency, as per its energy policy. Suitable remedial measures are taken in case of any issue.

The plant machinery to be provided is:

Plant machinery:

- 1. Intake Well: to collect surface water from the river.
- 2. Approach Bridge: to provide a base for raw water transmission line and maintenance.
- 3. Chlorination Building: for the pre-chlorination process of raw water.
- 4. H.T. Room & Transformer Yard: to provide power to plant machinery.
- 5. Raw water Transmission line: to supply raw water to WTP from the Intake well.

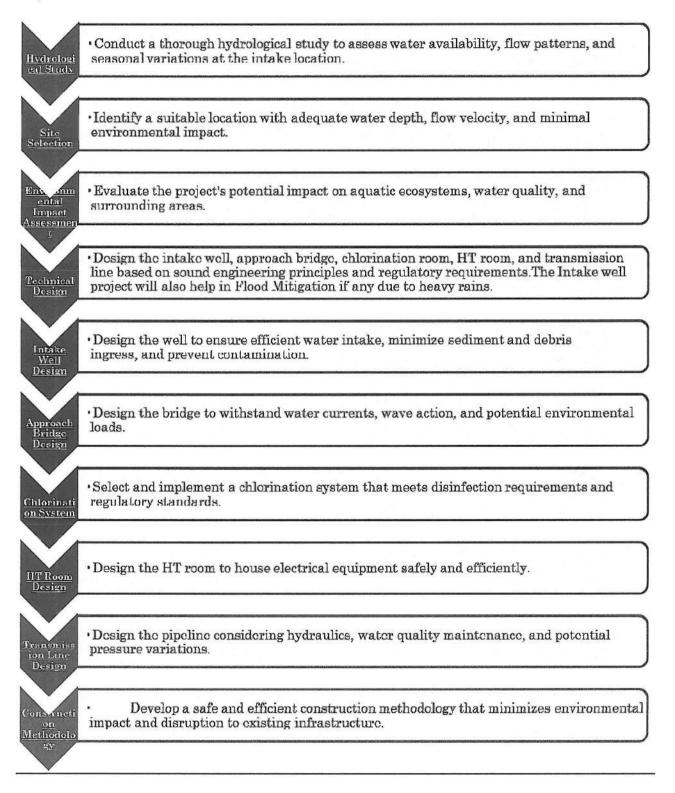
Technical Reasoning:



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Project Evaluation:



5.2 Augmentation and upgradation of Water Treatment Plant at Variav and Rander:

Approved project cost	SMC contribution / Grants	Borrowing through
for both WTP (Rs cr.)	(Rs cr.)	green bonds (Rs cr.)
250.07	220.76	29.31

Water Treatment Plant at Variav

As mentioned above, the water pumped from the proposed water intake well is pumped to the water treatment plant at Variav. For this, SMC proposes the development of a 250 MLD water treatment plant at Variav. The water from the intake well shall be joined to convey the raw water to the first unit of WTP. Water is treated by chemical coagulation, and precipitation followed by filtration and disinfection to meet the drinking water standards.

The clarifier sludge and backwash water of filter beds from WTP shall be collected in the dirty water sump and shall be pumped to the thickener feed sump for further treatment. Thickener will receive the dirty water from the 250 MLD treatment plant at Variav. In the RCC gravity sludge thickener; the concentration of sludge will increase from 1% up to 3-4 % by gravity settlement of the inlet solids.

The sludge thickener is designed to achieve a minimum solid concentration of 3-4%. The thickener shall be designed on a solid loading rate of max. 70 kg/sq.m./day with plant inlet turbidity of 100 mg/l. The minimum SWD shall be 4.0 m. The conditioning poly electrolyte shall be added to the thickener for enhancing gravity separation if required with the help of a poly dosing tank & pumps.

The underflow from the sludge thickener shall be collected in thickened sludge sump and pumped through screw pumps to centrifuge, while the supernatant from the thickener shall be collected in the filtrate sump and recycled to the primary unit of the 250 MLD proposed treatment plant. The centrate generated at Centrifuge shall be collected at Dirty Water Sump.

The overflow from the thickener shall be collected in the RCC filtrate Sump. The detention time provided for the filtrate sump shall be 15 minutes.

Filtrate shall be recycled by horizontal/vertical non-clog pumps to the stilling chamber of the proposed treatment plant. ZLD unit recycles almost 100% water which saves up to 10 MLD water and helps the environment by as no wastewater is to be released in drain.

Water Treatment Plant at Rander

Considering the increasing population in the western zone of Surat, the SMC has proposed to augment and upgrade the existing 250 MLD WTP to 360 MLD for the area to cater the area with potable water. The project will also cater to the complaints of colour and odour, which are not achieved by the existing WTP. Thus, a novel proven technology of advanced filtration by Ceramic filters is proposed. The proposed technology will fit in the existing RSF bed of WTP, thereby no new land will be required.

It is proposed to construct preliminary units for the pre-treatment of raw water from the Intake well. After preliminary treatment, the water will be taken for Advanced Ceramic filtration. The post chlorination will be applied after advance filtration and the water will be conveyed to the existing UGSR. The units proposed are as follows:

- 1. Cascade Aerator
- 2. Parshall flume
- 3. Flash mixer & PAC Dosing
- 4. Pre-Chlorination
- 5. Advanced Ceramic filtration (will be proposed in the Existing Rapid Sand Filter Bed)
- 6. Post-Chlorination

Advanced Ceramic Membrane Base Filtration Technology.

Ceramic membrane technology is robust and resilient filtration technology for future-proof plants and is making its mark on municipal water and wastewater treatment while also exploring a variety of industrial and application-based niches. Ceramics have surged to prominence in regional utility markets and have continued to innovate to optimize membrane performance and reduce costs.

Both projects will improve the quality of water, with enhanced performance for indicators such as color, turbidity, and pH value.

Benefits of the Variav project:

Parameters	Units	Average/Normal Limits (Before)	Targeted Parameter(After)
Colour (Apparent excluding turbidity)	Pt Co unit	23	< 15
Turbidity	NTU	5.0	<5.0
pH Value	-	8.1	6.5-8.5
Volume of water collected and/or treated(per year)	MLD	-	91250
Increased water efficiency of water treatment	percentage	-	4%
Number of households that have access to new potable water supply	%	95.22	97.43

Benefits of Rander plant

Parameters	Units	Average/Normal Limits (Before)	Targeted Parameter(After)
Colour (Apparent excluding turbidity)	Pt Co unit	23	15
Turbidity	NTU	5.0	<5.0
pH Value	-	8.1	6.5-8.5
Turbidity and TSS	NTU/ mg/L		<0.5
PFAS Removal	percentage	-	>99%
Volume of water collected and/or treated	MLD	-	58400

Source: DPR document

The project utilizes cutting edge technology of membrane filtration technology and a zero liquid discharge approach, which offer a multitude of advantages. The project directly addresses water scarcity concerns by treating wastewater and eliminating liquid discharge, increasing the availability of usable water. The water recovered from the ZLD process can be sold for various non-potable uses.

The ZLD process technology also minimizes environmental impact by preventing contaminated water from being released into water bodies, protecting aquatic ecosystems and public health. Maximizing water treatment and reuse will also reduce the dependence on freshwater sources, especially in water-stressed regions.SMC uses energy-efficient pumps and undertakes an energy audits every 3 years to check the efficiency, as per its energy policy. Suitable remedial measures are taken in case of any issue.



Project Evaluation:



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The project promotes sustainable resource management and aims to provide additional households with access to potable water. The implementation of the project will support the Government of India in achieving its NDC targets and caters to Sustainable Development Goals 6 and 11. The table below provides the expected environmental and social impact of the project

149650 MLD 327439 (by 2025), 873171 (by 2030)	
4%	
2	

Source: DPR document

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vare Dy. Commissioner Surat Municipal Corporation