

# Feasibility Study for Solar Power Supply to Stations and Level Crossing Gates on Bharuch Dahej Railway Line

## Executive summary

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The Bharuch Dahej Railway Company Limited (BDRCL) is a Special Purpose Vehicle (SPV) set up with the objective of the gauge conversion of the existing 63-kilometre narrow gauge railway line between Bharuch and the Port of Dahej in Gujarat to broad gauge. This project has been identified as an important port connectivity and gauge conversion project under the National Rail Vikas Yojana (NRVY) launched in December 2002. NRVY had been conceived primarily as a non-budgetary investment initiative for the augmentation of rail infrastructure in the country with focus on the three key areas of gauge conversion, port connectivity, and multimodal corridors to the hinterland.

With a view to be self-sustainable for meeting its energy needs and also aiming to (i) conserve energy, (ii) contribute to preserving the environment and (iii) use renewable energy sources of energy to the extent possible the BDRCL has requested TERI to assess the scope of solar power for meeting the energy needs of its level crossing gates, railway stations, service buildings etc.

On Bharuch Dahej railway line, excluding Bharuch which is part of Indian Railway network, all railway stations and level crossing gates (including 5 stations and 22 gates), one residential building and one office building were identified to be powered by solar PV systems. All the railway stations are similar (except Dahej railway station) in terms of load requirement and building architecture. Feasibility study has been conducted for Samni and Dahej railway stations. Similarly all level crossing gates (except gate 3) have same load requirement and building architecture, therefore, solar PV design has been worked out for level crossing gates 1 and 3. Further, solar PV sizing has also been worked for Dahej running room and Bharuch office building.

The sizing of the solar PV systems was done considering all the critical and non-critical loads of the railway stations, level crossing gates and the service buildings. The main electrical loads of the station building are tube lights, fans and computer systems. The railway station also has street lights, which illuminate 40-50m railway track before and after the railway station. It is observed that the energy requirement increases at night time due to lighting load of railway station's rooms and street lights.

Three options of system sizing are being proposed. Solar PV size, battery size, roof area required to install solar PV and area required for battery and PCU have been worked out to cater to 100%, 75% and 50% of station's load. Separate case has been worked out for Bharuch office building and solar PV sizing was done accordingly.

The financial analysis was done for those cases which are technically feasible in railway stations, level crossing gates, Dahej running room and Bharuch office building.