

# Indian Railways

## Global Ceiling Fan Competition

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### BACKGROUND

Indian Railways (IR) has a 2030 Net Zero emissions target. As a part of the IR Energy Efficiency Action Plan and Policy, comprehensive retrofits and appliance replacement for energy efficiency are being implemented across IR facilities.

Indian Railways has approximately one million ceiling fans installed, operating under harsh conditions, in areas such as platforms in over 8,000 railway stations, workshops, production units, and other weather exposed spaces in buildings. In many areas, like the station platforms, the ceiling fans operate continuously, at a fixed speed, and are exposed to wide variations in temperatures, rain, humidity and wind speeds. They are also prone to damage by birds and rodents. Most such fans operate continuously, often with just a one hour break every 24-48 hours. Majority of these fans use conventional technology, rated at 60-70 Watts, presenting a significant energy-saving opportunity.

Indian Railways has carried out large scale replacement of older ceiling fans with energy efficient BLDC fans over the last few years. While these fans have proven successful in indoor applications, when installed in weather-exposed areas, they experienced frequent breakdown due to damage to the electronic circuit because of high temperature, humidity, and dust and water ingress. Since these fans are operated at a constant speed, the benefit of energy savings due to variable speed operations, and the convenience of remote control are also not useful in such applications. Further, such damages are not covered under warranty, and repairs are expensive and time-consuming. So, even when there are savings in energy cost, the overall life cycle cost is much higher compared to conventional fans.

This situation is not atypical to the Indian Railways, there are millions of other ceiling fans used in similar conditions in India. There is a need to develop more efficient and rugged ceiling fans to address these issues.

### ABOUT THE COMPETITION

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This is an opportunity to develop the next generation of energy-efficient ceiling fans, which can operate efficiently and reliably. They should be able to withstand the harsh operating conditions and operate for extended durations.

The competition offers manufacturers, innovators and start-ups an opportunity to deploy their innovations in a real-world setting, with the potential of widespread uptake across Indian Railways. The competition seeks innovative solutions to replace the existing ceiling fans with highly durable, energy-efficient models. The applicants are encouraged to adopt environment-friendly manufacturing processes and materials with an aim to reduce embodied carbon. The applicants are free to suggest any size, technology, operating speed or other specifications to suit the requirement. The applicants will retain the IP of the designs, and a Non-Disclosure Agreement (NDA) will be signed with the selected applicants.

The competition will be held in two stages:

- a) Stage 1 – The objective of Stage 1 is to seek new and innovative ceiling fan designs and technologies and select five designs for field testing.
- b) Stage 2 – The five finalists will be installed and monitored for at least six months at two selected locations. The objective of Stage 2 is to select the winning design(s) which are energy efficient and provide reliable operations even in harsh conditions. The fans will continue to operate and will be monitored beyond the six-month period, for assessing their long-term energy use degradation, maintenance and breakdown issues, as well as ruggedness.

For the competition, the typical application requirements will be for station platforms, concourse areas, and waiting rooms.

- a) Railway platforms: Height of a standard railway platform is 4 meters, with a metal structure, and exposed sides.
- b) Concourse Area: These are double-height spaces (4-8 meters) with partially enclosed sides.
- c) Waiting rooms and offices in the vicinity of platforms: These spaces have a standard height of 4 meters with open doors and windows.

Drawings and reference photographs are provided in the annexure.

The fans will be installed for testing at specified locations (which will be provided to the applicants in stage II) on two railway stations to test for two different operating conditions.

1. Kakinada Railway Station: This station is located across the coastal line in Kakinada of Andhra Pradesh. It lies on Samalkot–Kakinada Port branch line of Howrah–Chennai main line and is administered under Vijayawada railway division of South-Central Railway. This location witnesses high humidity and windy weather conditions.
2. Anand Vihar Railway Station: This is a railway station in the Anand Vihar locality of Delhi, India. It is under the administrative control of the Delhi Division of the Northern Railway zone. This location witnesses harsh weather conditions during summer, monsoon and winter, as well as a highly dusty environment.

## **EVALUATION**

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A technical expert committee will evaluate the submitted applications and will recommend the selection of fans in Stage I and the awards in Stage II. The fans will be selected for high service value, ruggedness. They will be monitored for energy consumption, power quality, breakdowns, service and maintenance frequency, and associated costs.

## **WHO CAN PARTICIPATE IN THE COMPETITION**

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The competition is open for all national and/or global ceiling fan manufacturers. Any innovators, start-up companies with new ceiling fan technology can also apply. The proposed fans must be ready for installation as per the timeline given below. There is no application fee, and there is no limit to the number of entries per applicant.

## **DETAILS OF STAGE I**

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**Link for submission of application:** <https://bit.ly/globalceilingfan>

### **Submission Requirements**

Details to be submitted as a part of the application for the proposed fan(s) include:

- a) Name of the applicant
- b) Proposed technology(s)
- c) Power Factor
- d) Power Requirement (Wattage)
- e) Sweep Diameter (Millimeter)
- f) Air Delivery (Cubic meter per minute)
- g) Ingress Protection rating
- h) Rated lifespan
- i) Continuous run-time
- j) Innovation for energy efficiency and robustness of the proposed fan for weather exposed application
- k) Cost range
- l) Compliance to safety standard
- m) Low embodied carbon product
- n) Restriction of Hazardous Substance (RoHS) compliance

Note: Each of the proposed fan design / technology should be a unique application. Applicants can submit more than one application.

### **Timeline**

1. Launch of Competition and Application Start Date	December 10, 2024
2. Application Close Date	January 10, 2024
3. Announcement of Selected Applicants (five) for Stage 2	January 31, 2025
4. Details of Next Steps for Stage 2 for Selected Applicants	February 7, 2025

## **DETAILS OF STAGE 2**

Five products will be selected during Stage I. These will be installed at two railway stations, Anand Vihar Railway Station and Kakinada Railway Station.

### **Timeline**

1. Deadline for Installation of fans	April 30, 2025
2. Performance evaluation period	May 1 - October 31, 2025
3. Results announcement	November 30, 2025

### **Before Installation**

1. The locations and number of fans to be installed at each station will be discussed with the selected applicants by February 07, 2024.
2. Selected applicants will be required to submit performance reports (safety, energy efficiency, service value) from third-party accredited laboratories before installation.
3. Operating conditions of the fan:
  - a) Continuous operations with one hour break every 48 hours
  - b) Open to weather elements
    - Temperature
    - Humidity
    - Dust
    - Moisture
    - Water droplets
    - Windstorms
  - c) Constant speed operations
  - d) Exposed to birds and rodents.

### **Installation Stage**

1. Procurement, Permissions and Infrastructure: Fans will be procured from the applicants. Requisite permission from Indian Railways for the installation will be obtained and electrical supply required for the operation of fans will be arranged.
2. Location: The fans will need to be supplied and installed at the two selected locations.

### **Monitoring and Evaluation Stage**

1. Meters and sensors will be integrated with fan electrical circuits for measurement and verification. At the minimum, the following parameters will be recorded:
  - a. Energy Consumption
  - b. Power Quality
  - c. Service and maintenance frequency and associated cost
2. Fans will be in continuous operation for six months. This is the testing period for evaluating performance.
3. The fans will continue to be monitored and evaluated beyond the competition period.

## **Announcement of Results**

The results will be based on performance evaluation.

## **BENEFITS**

The competition offers the applicant an opportunity to be a leader for energy efficient ceiling fan market and drive innovation. All applicants will be provided with a certificate of participation.

- a) Opportunity to revolutionize the ceiling fan market.
- b) Gain visibility and exposure within the Indian Railways, a massive market with significant potential and exposure to millions of passengers every day.
- c) Entry to this competition will be free of cost.

## **ABOUT LOW CARBON COMFORT AND COOLING COLLECTIVE (LC<sub>4</sub>)**

The Global Ceiling Fan Competition is being organized by the Low Carbon Comfort and Cooling Collective (LC<sub>4</sub>) with Indian Railways as a partner, for seeking out the energy-efficient solutions for the challenges currently being faced by the ceiling fans operating under harsh conditions.

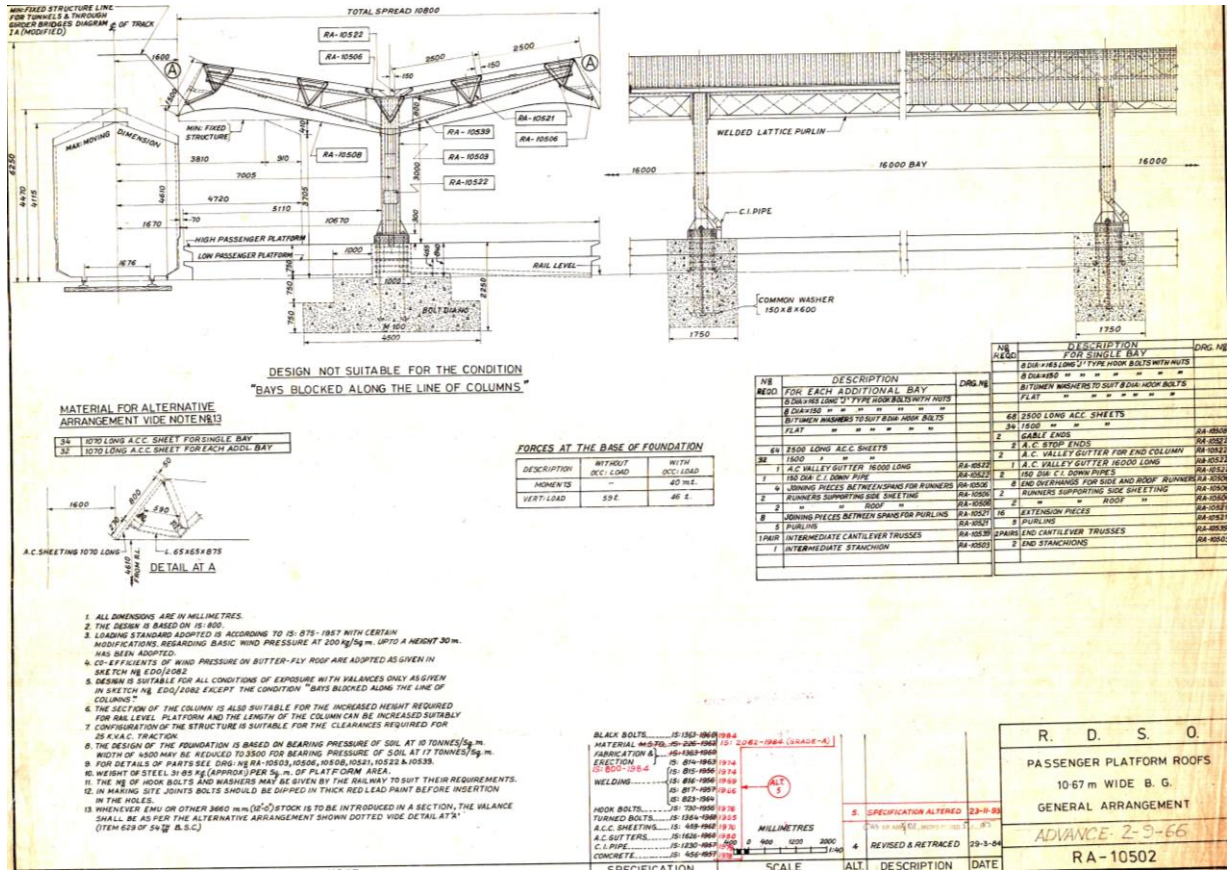
LC<sub>4</sub>, an initiative of USAID's South Asia Regional Energy Partnership (SAREP) program, is an outcome driven collective for addressing the challenges of reducing demand and carbon intensity of cooling (and heating) through tangible measurable actions on ground. LC<sub>4</sub> has a goal to reduce cooling related emissions in buildings through tangible and measurable actions.

## **CONTACT**

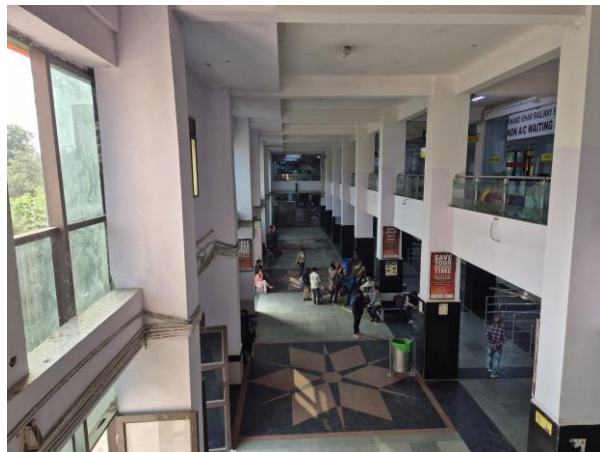
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**ANNEXURE**

Typical Section of a Railway Station Platform



Photographs of the concourse and ticket reservation area at Anand Vihar Railway Station



Photograph of the waiting area at Anand Vihar Railway Station

