Indian Institute of Technology Delhi

School of Interdisciplinary Research (SIRe)

Project Proposal for Ph.D.

SIRe Project Number

2025-01-14

(will be assigned by SIRe)

Project Details (The research problem must clearly indicate the need for an interdisciplinary approach)	
Project Title	Study on Integration of Wind Turbine with Electric Vehicle Charging Station: A Hybrid Energy Solution
Project Summary (Minimum 500 and maximum 2000 characters)	The increasing prevalence of electric vehicles (EVs) requires a transition to renewable and sustainable energy sources to reduce dependence on fossil fuels. Electric vehicle charging stations may be powered by wind energy, an abundant and clean resource. This proposal examines the feasibility, technical specifications, and potential benefits of integrating wind turbines with electric vehicle charging infrastructure. The objective of the project is to develop a hybrid system that enhances energy efficiency, reduces carbon emissions, and improves the reliability of EV charging networks. Followings are the objectives of the project: • To study wind energy's potential as an additional or primary source for EV charging stations. • To study the wind turbine integration on the EV charging station and perform structural integrity analysis. • To design effective energy management system that makes the best use of electricity produced by wind. • Comparative and hybrid study and analysis of use of Solar Energy V/s Wind energy for EV Charging. • To perform the cost-benefit analysis to suggested system's long-term advantages.

Ph.D. Supervisors
(Supervisor 1 and Supervisor 2 cannot be from the same department of IITD)

Role	Name of Faculty	Academic Unit in IITD/Institute/University	Email ID (Official)
Supervisor 1	Rahul Goyal	Energy Science and Engineering	rahulgoyal@dese.iitd.ac.in
Supervisor 2	Deepak Kumar	Center for Automotive Research and Tribology	dkumar@iitd.ac.in

Project requirements (Student qualifications, experience required, etc)
***The candidate will be shortlisted based on common shortlisting criteria decided by ScRC (SIRe)**

- B.E./B.Tech. /M.E./ M. Tech/MSc. (Physics and Math) /MBA (Energy or Equivalent). or equivalent degree in Applied Mechanics/ Energy Engineering/ Mechanical Engineering/Design Engineering/Civil Engineering (with at least 65% marks or equivalent etc.).
- Candidates should have sound knowledge of the Fluid Mechanics, Electric Vehicle Charging Infrastructure, Computational Fluid Dynamics, Machine Learning etc.
- The priority will be given to candidates with own fellowships (NET, UGC, DST-Inspire etc.) and part-time candidates with the experience in relevant area of research.

Source of fellowship/funding and project number
(CSIR/UGC/DBT/ICMR/ICAR/NEET-PG/DST-INSPIRE/IRD/FITT Project details, if any)

Candidate with his/her own fellowship /Part-time

Role of Faculty Members involved:	
Supervisor-1	Hybrid Energy System Analysis, Wind Turbine Design and Installation,
Supervisor-2	Study on EV charging station, Cost-benefit analysis, Economic of EV charging station