Shunya Lab

PI: Prof. Tarun Sharma

❑ ***Energy Systems Optimization***

- Capacity Planning
- Production Cost Assessment
- Unit Commitment
- Economic Dispatch
- Load Flow Analysis.

❑ ***Decision Support***

- Flexibility assessment to inform strategic energy decisions.
- Integration with national energy planning models.

❑ *Data Pipeline*

- Extract Transform Load (ETL) workflows for Renewable Energy Sources
- Diverse data sources handling
- Quality and standardization

❑ ***Carbon Market***

- PAT Scheme Evaluation
- Indian Carbon Market Analysis
- IEEE SEFET sessions

Key Contributions:

- Published 9+ journal papers across energy system optimization, capacity planning, production cost, hydrothermal maintenance, unit commitment, and economic dispatch (Agarwal & Sharma, 2025; Bisht & Sharma, 2024; Sharma et al. 2019, 2020, 2022, etc.)
- Developed advanced modelling tools (notably, contributor to open-source R energy systems toolbox)
- Active international collaboration: Strategic Emission Reduction, NITI Aayog, Central Electricity Authority, Japan's energy research groups
- Organized major workshops at GNEC and IIT Roorkee
- Decision-support for policy and industrial stakeholders through robust data pipelines, predictive analysis, and informed strategic guidance