



Open Call 1

Modelling Employment Shifts in India's Energy Transition

I. **PI Responsible:**

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II. **Description of the open call theme**

The energy transition extends far beyond changes in energy technologies. It constitutes a deep economic, social and political transformation, fundamentally reshaping the energy infrastructure, related supply chains and labour force. Globally, renewable energy sector generated employment for 16.2 million people in 2023, both direct & indirect, including 1.02 million in India, highlighting a 70% increase over the past decade (ILO, 2024). While employment creation is widely seen as a co-benefit of the energy transition, distributional impacts of these transitions are unevenly distributed across sectors, regions and socio-economic groups. Focusing only on aggregate job creation masks where jobs are created, where they are lost and who bears the costs of transition, underscoring the importance of analysing net and distributional employment impacts (Sharma & Banerjee, 2021).

The NZI project aims to produce high-resolution spatial mapping of India's future energy infrastructure across different scenarios. A core objective of this project is to quantify and spatially map net shifts in employment across India's energy and allied sectors informed by the high-resolution mapping of energy infrastructure.

Prior studies have examined employment creation in renewable energy and allied sectors and to a limited extent, employment decline in fossil-fuel-dependent industries (Tyagi et al; 2022, CEEW 2017, iForest, 2024, Das & Patil, 2025, Vishwanathan et al., 2018, Bataille et al., 2025). However, much of this literature remains focused on aggregate or sector-level estimates, with limited understanding of i) direct, indirect and induced employment impacts across sectoral supply chains and ii) nature and quality of employment created or displaced (Sharma & Banerjee, 2021). Critically, no prior study links the high-resolution mapping of India's future energy infrastructure with the net shifts in employment across sectors and regions. NZI's focus on high-resolution spatial mapping is expected to provide substantially more granular projections of net employment shifts across India.

With this project, we expect to estimate net employment shifts associated with India's net-zero energy transitions, capturing both job creation and job displacement across energy technologies & related sectors. Employment shifts will be estimated spatially and annually over the full NZI modelling horizon (FY 2026–2071), allowing analysis of when and where jobs are created and lost over time.



Collaborative work will first map key employment related energy activities for energy technologies across lifecycle stages and sectors to be included in the analysis, with a particular focus on those already represented in NZI's high-resolution spatial energy system modelling. These activities may include, but are not limited to

- fossil-fuel-based electricity generation and associated fuel supply chain
- renewable energy technologies and grid infrastructure
- manufacturing of energy technologies and components, construction, installation, operation, maintenance and decommissioning activities
- Primary energy producers, renewable energy, transportation, industry (including steel, cement, aluminum, chemicals) & waste sector

Collaborative work will then focus on estimating the spatial and temporal distribution of employment shifts across the identified technologies and lifecycle stages. A core emphasis of the study will be the generation of national- and state-level maps for energy infrastructure and related employment shifts, complemented by high-resolution case studies that illustrate where and when jobs are created or lost under different NZI scenarios. In addition, the project is expected to generate insights into the distributional nature of employment transitions, including shifts in the nature of jobs and workforce composition with implications on skills requirements and gender equity.

III. **Indicative research objectives of the open call**

Collaborative effort could:

- III.1. Identify the research methodology best suited to model and project net employment shifts, including direct & indirect shifts, associated with national and regional energy transitions in India, specifically when drawing on the results of high-spatial resolution energy transition model for FY 2026 –2071 under different NZI scenarios
- III.2. Estimate spatial and temporal patterns of net employment shifts across energy technologies and their related lifecycle stages with a focus on sectoral and regional heterogeneity
- III.3. Assess the distributional impact of the net employment shift including shifts in nature of jobs and its implications on gender equity and skilling requirements
- III.4. Select, populate, calibrate, and validate a spatially resolved employment model for India, capable of integration with the broader NZI modelling framework. Where existing models are found to be inadequate, this objective may extend to the adaptation or development of a suitable modelling framework, to be identified at an early stage and potentially requiring adjustments to the project timeline.

We are also open to well-reasoned proposals outside of this scope but broadly aligned with the ideas identified in this theme.

IV. **Suggested deliverables and timelines**

- i. A report on fine spatially granular net employment projections for India
- ii. Open-source data sets on spatially and temporally resolved employment shift estimates across diverse scenarios.
- iii. One publication under process in a reputed journal – within 1 year of the visit



V. Positions proposed along with duration of stay.

- Eligibility: The applicant should be a PhD Scholar or Post-doctoral Fellow associated with an academic institution and will need the supervisor's permission to work on the open call. Applicants will be assessed by a selection committee, based on their prior work and publications in the theme area and of the group they are associated with.
- Duration : 3-6 months, between July 2026 and May 2027

VI. Instructions for Applying

[Click here](#) to submit a 2-3 page research plan, a CV, and other basic details of your application.

Applicants will be assessed by a selection committee, based on their prior work and publications in the theme area and of the group they are associated with.

VII. Important Dates - Refer to [main page](#)

VIII. References:

- VIII.1. ILO , 2024; Renewable Energy and Jobs - Annual review 2024. (2025, November 19). International Labour Organization. <https://www.ilo.org/publications/renewable-energy-and-jobs-annual-review-2024>
- VIII.2. iForest, 2024; ICE to EV: Challenges, Opportunities, and the Roadmap for Just Transition in India's Automobile Sector. (2024, March). International Forum for Environment, Sustainability and Technology (iFOREST). ISBN 978-81-962786-2-5.
- VIII.3. Sharma, A., & Banerjee, R. (2021). Framework to analyze the spatial distribution of the labor impacts of clean energy transitions. *Energy Policy*, 150, 112158. <https://doi.org/10.1016/j.enpol.2021.112158>
- VIII.4. Das, A., & Patil, B. (2025). Implications of electricity system transition on employment: The gainers and the losers—a systematic literature review. *Renewable and Sustainable Energy Reviews*, 219, 115870. <https://doi.org/10.1016/j.rser.2025.115870>
- VIII.5. Bataille, C., Pai, S., Stiebert, S., Mishra, M., Patil, G., & Francis, L. (2025, June 1). Meeting climate targets will lead to major steel production technology shifts and preserve jobs. SSRN. <http://dx.doi.org/10.2139/ssrn.5278075>
- VIII.6. Council on Energy, Environment and Water, & Natural Resources Defense Council. (2017). Greening India's workforce: Gearing up for the expansion of solar and wind power in India. NRDC. Retrieved from <https://www.nrdc.org/sites/default/files/greening-india-workforce.pdf>
- VIII.7. Tyagi, A., Lata, C., Korsh, J., Nagarwal, A., Rai, D., Kwatra, S., Kuldeep, N., & Saxena, P. (2022). India's expanding clean energy workforce. Council on Energy, Environment and Water; Natural Resources Defense Council; Skill Council for Green Jobs.
- VIII.8. Vishwanathan, S. S., Fragkos, P., Fragkiadakis, K., Paroussos, L., & Garg, A. (2018). Energy system transitions and macroeconomic assessment of the



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<https://doi.org/10.1080/09613218.2018.1516059>