

An Indian-Australian research partnership

Project Title: **The value, implementation and uptake of distributed generation solutions in light of poor quality grid supply in low usage rural areas: the impact of technical, political and social factors**

Project Number **HSS0770**

Monash Main Supervisor
 (Name, Email Id, Phone) Prof Robert Thomson
 robert.thomson@monash.edu *Full name, Email*

Monash Co-supervisor(s)
 (Name, Email Id, Phone) Prof Dharmalingam Aranachalam
 dharmar.arunachalam@monash.edu

Monash Head of Dept/Centre (Name,Email) Prof Robert Thomson
 Head of School, Social Sciences
 robert.thomson@monash.edu *Full name, email*

Monash Department: School of Social Sciences

Monash ADGR
 (Name,Email) Nellie Georgiou-Karistianis
 Nellie.Georgiou-Karistianis@monash.edu *Full name, email*

IITB Main Supervisor
 (Name, Email Id, Phone) Prof Priya Jadhav
Jadhav_priya@iitb.ac.in, *Full name, Email*

IITB Co-supervisor(s)
 (Name, Email Id, Phone) *Full name, Email*

IITB Head of Dept
 (Name, Email, Phone) Prof. Satish B. Agnihotri
 sbagnihotri@iitb.ac.in *Full name, email*

IITB Department: Centre for Technology Alternatives for Rural Areas

Research Clusters:

Research Themes:

Highlight which of the Academy's CLUSTERS this project will address? (Please nominate JUST one . For more information, see www.iitbmonash.org)		Highlight which of the Academy's Theme(s) this project will address? (Feel free to nominate more than one. For more information, see www.iitbmonash.org)	
1	Material Science/Engineering (including Nano, Metallurgy)	1	Advanced computational engineering, simulation and manufacture
2	Energy, Green Chem, Chemistry, Catalysis, Reaction Eng	2	Infrastructure Engineering
3	Math, CFD, Modelling, Manufacturing	3	Clean Energy
4	CSE, IT, Optimisation, Data, Sensors, Systems, Signal Processing, Control	4	Water
5	Earth Sciences and Civil Engineering (Geo, Water, Climate)	5	Nanotechnology
6	Bio, Stem Cells, Bio Chem, Pharma, Food	6	Biotechnology and Stem Cell Research
7	Semi-Conductors, Optics, Photonics, Networks, Telecomm, Power Eng	7	Humanities and social sciences
8	HSS, Design, Management	8	Design

The research problem

In the last two years the government of India has significantly stepped up household electrification efforts with the Deendayal Upadhaya Grammen Jyotikaran Yojana (DDUGJY), which attempts to reach close to 100% household electrification. At the same time, there has been a scheme to restructure the debt or losses of many state distribution utilities. While rural electrification may not be the dominant part of many public distribution utilities, it is worthwhile considering if DDUGJY is sustainable considering the implicit

reluctance and poor quality of rural electricity supply in remote and sparse rural areas.

This project will address the question of the extent to which distributed renewable energy solutions can meet the requirements of rural areas. Is this the optimal solution techno-economically and socially, and with respect to the time it takes to implement? In addition, the project will examine the extent to which technical, political and social factors account for variation in the implementation and uptake of electrification and distributed renewable energy solutions.

These are important questions, considering the importance of reliable electricity supply for a good quality of life and human development, and considering India's broader energy policy objectives with respect to the promotion of sustainable development.

Project aims

Identify a suitable region with a particular set of socio-economic and geographic characteristics, and analyse the prospects and potential of grid electricity supply and other sources, such as kerosene, versus decentralized distributed generation considering techno-economic, social and developmental aspects. This analysis will be based on available secondary datasets along with primary data surveys.

Expected outcomes

The project should come up with a set of parameters that could use secondary datasets to identify areas/villages/hamlets suitable for decentralized distributed solutions. The parameters should include at first pass, secondary datasets such as GIS maps, census data, utility consumption / collection data etc., and in addition some primary survey data for more accurate projections.

How will the project address the Goals of the above Themes?

The project directly addresses the problems of the rural poor with regard to electricity distribution. It also addresses aspects of clean energy.

Capabilities and Degrees Required

The student should have an undergraduate or graduate degree in engineering from a reputed institute, with a strong academic record. The student will be required to carry out data analysis, perhaps GIS programming/analysis, and have an understanding of electrical distribution systems. An electrical engineer, or an energy systems engineer, is the preferred engineering discipline.

Potential Collaborators

Prof. Thomson is an expert on comparative policy analysis. He is part of an international research project that is comparing states' Nationally Determined Contributions. He is also interested in the development and application of models of collective decision-making.

Prof. Jadhav is an expert on energy policy, rural electrification and renewable energy. She has particular expertise in rural electrification, energy efficiency, energy usage in irrigation, technology and farmer behaviour, solar photovoltaics, organizational models in electricity distribution.

Prof. Aranachalam is a sociologist and social demographer. Dharma's current research focuses on: fertility and partnering, social cohesion, international migration, family and household structures, population research, ageing and health. Dharma's research also covers demographic issues in India. With respect to this project, his expertise in the quantitative analysis of Indian household data is highly relevant.

Outside of the IITB-Monash Alliance, this project will facilitate collaboration with colleagues in the John Hopkins School of Advanced International Studies, specifically Professor Urpelainen, the Director of the Initiative for Sustainable Energy Policy at John Hopkins:

<http://sais-isep.org>

Select up to **(4)** keywords from the Academy's approved keyword list (**available at <http://www.iitbmonash.org/becoming-a-research-supervisor/>**) relating to this project to make it easier for the students to apply.

Energy, modelling and simulation, humanities