

An Indian-Australian research partnership

Project Title:	Modelling Energy Transitions in India and Australia	
Project Number	IMURA0751	
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Research Clusters:

Research Themes:

Highlight which of the Academy's CLUSTERS this project will address? <i>(Please nominate JUST <u>one</u>. For more information, see www.iitbmonash.org)</i>		Highlight which of the Academy's Theme(s) this project will address? <i>(Feel free to nominate more than one. For more information, see www.iitbmonash.org)</i>	
1	Material Science/Engineering (including Nano, Metallurgy)	1	Advanced computational engineering, simulation and manufacture
2	<u>Energy, Green Chem, Chemistry, Catalysis, Reaction Eng</u>	2	<u>Infrastructure Engineering</u>
3	Math, CFD, Modelling, Manufacturing	3	<u>Clean Energy</u>
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

Define the problem

The energy sector in India and Australia are undergoing a transition. The electricity sector in India (and Australia) is predominantly based on coal. The Indian government has a plan to ramp up renewable installed capacity to 175 GW by 2022. By 2030 the nationally determined contribution commits to having 40% of installed capacity by non-fossil. The Indian government is also planning a significant thrust on electric vehicles. There are several issues related to the rapid growth of renewables (Solar and Wind) and electric vehicles. In this project it is planned to develop a large scale modelling framework to assess the impacts of possible transitions on the power system, cost of electricity supply and the economy.

The objective will be to create a transparent framework to assess possible rates of growth of electric vehicles, solar and wind. This could involve use of existing modelling tools like TIMES-MARKAL or PLEXOS and linking with large scale economy models (Input_output models) or the development of dedicated new tools. The goal will be to develop an appropriate modelling framework that can address questions of stranded assets, impact on economy as well as the operating and control strategies. The model would be developed for the Indian context. An analysis of the Australian context would also be attempted using this framework. The generic modelling framework developed would be useful to answer what if questions for policy makers. This would also help define feasible rates of growth and be useful for other countries facing similar transitions

Project aims

Define the aims of the project

The objective will be to create a transparent framework to assess possible rates of growth of electric vehicles, solar and wind. This could involve use of existing modelling tools like TIMES-MARKAL or PLEXOS and linking with large scale economy models (Input_output models) or the development of dedicated new tools. The goal will be to develop an appropriate modelling framework that can address questions of stranded assets, impact on economy as well as the operating and control strategies. The model would be developed for the Indian context. An analysis of the Australian context would also be attempted using this framework. The generic modelling framework developed would be useful to answer what if questions for policy makers. This would also help define feasible rates of growth and be useful for other countries facing similar transitions

Expected outcomes

Highlight the expected outcomes of the project

Development of an appropriate modelling framework to assess impacts of transitions in the energy sector
Use of the framework to provide insights and policy recommendations for India and Australia

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

The project will support the identified themes by delivering decision support frameworks for deployment of clean energy infrastructure

Capabilities and Degrees Required

List the ideal set of capabilities that a student should have for this project. Feel free to be as specific or as general as you like. These capabilities will be input into the online application form and students who opt for this project will be required to show that they can demonstrate these capabilities.

Electrical , Mechanical or Chemical Engineering with experience in the energy sector and an interest in modelling and optimisation

Potential Collaborators

Please visit the IITB website www.iitb.ac.in OR Monash Website www.monash.edu to highlight some potential collaborators that would be best suited for the area of research you are intending to float.

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, Systems Analysis and Control