

The University of Queensland - IIT Delhi Academy of Research Joint PhD Project

PROJECT TITLE	ENERGY EFFICIENT WATER SECURITY STRATEGIES
PROJECT CODE	UQIDAR 00180
PROJECT DESCRIPTION	<p>Water security is a major issue in Australia and India. Rapid urban growth, diminishing groundwater (in India), and expected drying climate reducing surface water runoff, means significant future risks. Energy is a major, and often overlooked cost of water supply security, both in Australia and India. Energy represents around 40% of the operating costs of many Indian water utilities, and is also significant in Australia, and this is expected to grow with climate change. This project builds knowledge and solutions regarding water-related energy spanning both centralised and decentralised systems. It seeks to answer questions such as “How much energy is influenced by centralised and decentralised water supply now and in future?” In order to implement this work it will be necessary to develop a protocol for water-related energy by reviewing, compiling and improving existing tools and methods. Case studies will be selected and undertaken. City-scale water security will be reviewed in case study cities (one in Australia, one in India) using data from UN, World Bank, Asian Development Bank, utilities etc. Current and future water-related energy will be quantified using the protocol. A ‘solutions compendium’, will be developed including a referenced database of technologies. This will include emerging technologies (eg decentralised wastewater management, recirculating showers, energy generation from wastewater, energy load management, social indexes eg regarding water budget and conservation behaviours, remote communications, artificial intelligence big data for new information options), as well as behaviour, pricing and governance options. Finally, an integrated water-energy planning process and workshop will be developed with key stakeholders in India and Australia. A program of agreed expected actions will be produced, aimed at embedding outcomes into organisational plans and strategies, to support implementation. This will support identification of energy efficient water security solutions and help charter a future of low-energy water security. The work will be supported by evidence-based decision-making through use of big data in urban water security issues.</p>
PROJECT OUTCOMES	<p>Major deliverables of this project include:</p> <ol style="list-style-type: none"> 1/ a protocol for water-related energy (a clear methodology for quantifying the energy impact of urban water supply and use). 2/ Two case studies of water-related energy in major metropolitan systems (one in India, one in Australia). 3/ A ‘solutions compendium’ (an indexed database of key solutions). 4/ Integrated planning workshops and program of agreed actions. Overall the project will support a global need to shift water security knowledge from the current "infrastructure-based" paradigm towards "risk-based" and low energy, low cost solutions.
ADVISORY TEAM	<p>Associate Professor Steven Kenway http://researchers.uq.edu.au/researcher/2197 s.kenway@uq.edu.au Advanced Water Management Centre The University of Queensland</p> <p>Associate Professor C. T. Dhanya http://web.iitd.ac.in/~dhanya/index.html dhanya@civil.iitd.ac.in Department of Civil Engineering Indian Institute of Technology Delhi</p>

TYPE OF
STUDENT
DISCIPLINE
BACKGROUND
OF STUDENT

Applications are open to i/a students [who meet eligibility criteria.](#)

Ideally, this project requires students with a background in hydrology, engineering, energy, modelling, water security interests.

IDEAL
CANDIDATE

Essential capabilities:

- Engineering and physical systems performance analysis. Modelling and database analysis.

Desirable capabilities:

- Stakeholder interviews, workshop process management.

Expected qualifications (Courses, degrees, etc.):

- B Eng (most forms of eng will be ok).
- Possibly B Science (if good physical systems quantification is part of their work).

APPLICATION
PROCESS

Apply online by the due date: <https://www.uqidar.org/students/how-to-apply/>