

## Abstract

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This thesis addresses the question of why low-carbon energy technologies have not been adopted in two Australian remote island communities where the cost of supplying energy is high, and there are cheaper and more environmentally beneficial energy options available.

The research involved technical, economic and social analyses of issues relating to energy development on Lord Howe Island and Norfolk Island. In these locations there are a number of technically feasible and economically attractive low-carbon energy options available. On both Islands there are cost effective opportunities to increase the efficiency of electricity production and consumption. Solutions such as wind and solar photovoltaic energy technologies are technically feasible and are able to produce electricity at less than the marginal cost of diesel-fired electricity. On Lord Howe Island in particular, the use of solar water heaters is also an attractive option.

So why are these technologies not being used on any significant scale by the case study communities? There are some obvious barriers such as subsidy systems for diesel generation or the prohibition of distributed generation, but also a range of more complex issues. I examined issues relating to energy development through semi-structured, in depth, face-to-face interviews with members of the communities. These were supplemented by document analysis, social network analysis and community observation. Through interviews with seventy-eight participants, I identified several themes relevant to decision-making on energy options at the community level, and I will summarise them here. There was a good general awareness of energy options but poor knowledge and understanding of specific energy options among members of the communities. There was a lack of cause and effect relationships involved with energy usage, and few observable effects of consumption. Members of the communities had little knowledge of the impacts new energy systems would have on their lives, and were sensitive to perceived risks involved in switching to alternative energy options. There was a lack of community capacity to properly investigate alternatives due to busy political and social landscapes. The long history of political tension between the communities, their governing bodies and external institutions had resulted in disempowerment of large sections of the communities and poor levels of communication between these institutions. The long history of investigation of alternatives with little change had frustrated many. Due to these factors, there were low

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levels of engagement and participation in community level decision-making on energy options. Further to this, traditional cultural values of the communities relating to independence, self-sufficiency, and resilience conflicted with modern pressures to form allegiances with external institutions. These cultural values manifested themselves in the discourse on energy options as general resistance to outside involvement in the affairs of the Islands, an emphasis on the value of local knowledge and a willingness to accept non-optimal financial decisions. The high levels of social connectivity and small populations of the communities also affected decision-making on energy options. Personal relationships had a strong influence on the process and there was evidence of consensus decision-making that excluded those with conflicting opinions. The close coupling of institutions with individuals made the impacts of decision immediately visible within the communities, and there was a hesitation by many to disturb the status quo.

The findings were examined using five literatures: (1) the social acceptance of renewable energy technologies, (2) barrier models, (3) technology transfer and appropriate technology, (4) diffusion of innovations theory and (5) the “knowledge systems” approach. These literatures help to explain reasons for the poor uptake of low carbon energy technologies in the case study communities and to find possible solutions. They inform us that energy development is like to be successful if it: delivers financial and social and environmental benefits to local communities, seeks to inform communities on energy issues and involve them in planning and development, and is open and transparent. Models of both co-operative ownership and individually owned micro-generation have proven to be successful in European contexts, and because they encourage local participation and deliver benefits to local communities, these could be appropriate models of energy development for the case study communities. I further recommend the establishment of “boundary organisations” that can facilitate better communication, translation and mediation between groups of experts and decision makers. The “knowledge systems” approach informs us these organisations can develop rules, procedures and norms of accountability to balance trade-offs between stakeholders, and improve perceptions of salience, credibility and legitimacy of relevant actors and information.