Briefing Note

Community Energy Planning in Inis Oírr

Revealing our community's capacity to plan for our energy future

comhar caomhán teoranta
Inis Oírr, Árainn, Cuan na Gaillimhe.

OÉ Gaillimh
NUI Galway

Introduction

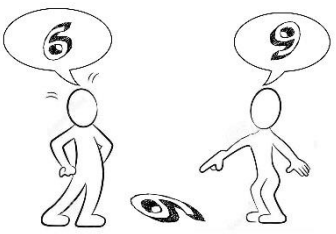
This Briefing Note provides an overview for communities, government and civil society actors interested in learning about experimental approaches to undertaking inclusive and collaborative community energy planning.

The role of communities has been identified as significant in the future success of Ireland's transition towards a decarbonised energy system. At the community level, there are different understandings of, and attitudes to, sustainability and energy use. This is particularly evident in island communities where social interactions, activities and services are compositionally divergent from those in mainland communities. This report reveals how the complex issue of community low carbon energy transitions requires investigation from multiple disciplinary perspectives. The innovative transdisciplinary methodology developed, applied and analysed in this research enabled a holistic investigation of the role of situated energy knowledges and community knowledge networks in successful collaborative design for a community's low carbon energy transition.

Core concepts

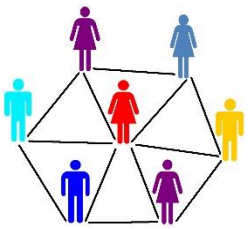
The core concepts adopted in this research question the way in which traditional policy based perspectives have conceptualised community low carbon energy transitions and their traditionally positivist, technological approaches. They illustrate current influencing factors in community low carbon energy transitions to highlight how both similar and divergent concepts, perspectives and disciplines interact. These concepts are inserted within the wider debate and research focus of community low carbon energy transitions and are used to reflect a series of practices and ideas around everyday energy practices and their situated and social dynamics.

Situated Energy Knowledges



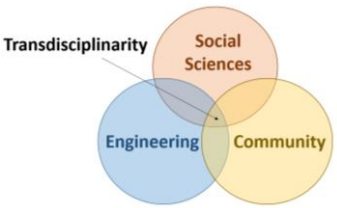
Energy knowledge that is particular to a specific situation and is situated, partial and political[1]. For example, two people can understand the same thing in completely different ways depending on where they stand in relation to it.

Community Knowledge Networks



The term "community knowledge networks"[2] argues that individuals already possess tacit or local knowledge of their energy practices in everyday life. It also argues that communities also have unique ways of sharing this knowledge among themselves.

Transdisciplinary Community Energy Planning



Transdisciplinarity involves collaboration between "non-scientists" and researchers. It also "transcends" the boundaries between disciplines creating a more fluid integration of knowledge

Background

Community low carbon energy transitions in ireland

Low carbon energy transitions are defined here as the process of decarbonising the energy system through the shift from fossil to low carbon energy sources coupled with a reduction of energy consumption[3].

Policy

In the policy arena, energy can be perceived in a multitude of ways, from individual and community energy consumption to low carbon energy production. Traditionally, energy policy in Ireland has aimed to reduce reliance on fossil fuels through addressing the energy performance of buildings and energy supply[4]. This has been coupled with a focus on achieving cost effective, stable and secure methods of energy provision to reduce greenhouse gas emissions and meet EU climate policy targets. Recent renewable energy development guidelines released by the National Economic and Social Council (NESC)[5] in Ireland have outlined the importance of meaningful consultation and community engagement in the development processes of low carbon energy projects to ensure more successful outcomes.

Academia

A review of literature has revealed that research on low carbon energy transitions has been predominantly quantitative in nature. However, more recently, literature has highlighted the effect of the individual's placement within a community on their understandings and perceptions of low carbon energy transitions. Low carbon energy transitions must be considered from the micro to the macro level of energy consumption and production. Rather than being defined as a conversion in terms of energy supply and use, low carbon energy transitions are more recently considered as a multi-faceted problem including both social and technical elements. Transitions towards a low carbon energy system are characterised by universal access to energy services, coupled with secure and reliable supply from several low carbon energy sources.

Energy in islands

The transdisciplinary methodology developed in this research requires a case study approach to enable a problem-centred merging of engineering and social scientific disciplines. A small offshore island case study community was chosen as it offers a unique social and geographic landscape with delineated geographic and social boundaries. Many different types of communities exist, communities are not homogeneous and there can be multiple communities of practice within a spatial community[6]. The term "community" is used in this research to designate a spatial community or a community of place. Small offshore islands offer an excellent community structure for investigation from both a social scientific and engineering perspective. These islands contain small populations with clearly defined community network boundaries, making in-depth qualitative studies feasible. From a technical energy planning perspective, energy consumption in small offshore islands is easily auditable due to their complete reliance on imported fuels.

Community knowledge and co-creative community energy planning

Due to the complex nature of perspectives of energy, community energy planning requires the consideration of several disciplinary perspectives and scales of energy consumption and production

Sustainability issues need to include knowledge from communities along with goals, norms and visions[7]. However, current policy does not acknowledge the situatedness of knowledge and perceptions and understandings of energy. The transdisciplinary approach outlined in this briefing note is a co-creative energy planning process where all types of knowledge are given legitimacy and equal respect including that of communities. Co-creative community energy planning is made possible by the concept of "mutual learning"* applied with an egalitarian ambition. In this process, local knowledge is equally valuable to scientific or technical knowledge.

Case study community – Inis Oírr

Inis Oírr's remoteness from mainland Ireland gives it a uniquely suitable position as an easily auditable community in terms of energy consumption. Inis Oírr is one of the Aran Islands, which consists of Inis Mór, Inis Meáin and Inis Oírr and is situated approximately 8 km off the west coast of Ireland in Galway Bay with a total land mass of approximately 5,254 hectares. Inis Oírr has a population of approximately 260 people[8]. Inis Oírr is in the Gaeltacht region in the West of Ireland and Irish is the spoken language. The housing stock on the island varies in size and ranges from 1 person households to 4 person households. The island that the tourists see when they visit Inis Oírr during the summer has little relevance to the lives of the islander's, aside from the fact that tourism provides many of them with a living. The large area of the island designated as National Heritage Areas and Special Areas of Conservation inhibit new developments on the island apart from the settled areas to the north. Inis Oírr is a small island with over 80 per cent of the island listed as protected in the National Parks and Wildlife Services (NPWS) map database[9] as being protected. The Aran Islands are known for their unique landscape features and are considered to be an extension of the Burren region, while also being part of the Gaeltacht (Irish speaking) area in County Galway. Inis Oírr Co-operative (Comhar Caomhán Teoranta) also exists on the island and is responsible for the day to day running of the island. There is a high level of energy awareness in the community in Inis Oírr and the staff of Comhar Caomhán Teoranta and the participants in the study were very eager to give their time to engage in planning for their energy future.

*In this research mutual learning is defined as a process of information exchange where knowledge is shared from science to society and vice versa[10].

Methodology

A transdisciplinary approach to community energy planning

Situated knowledges and place are defined as cross-disciplinary entities, however, there is little cross-boundary interest between the disciplines in investigating local attachments to place. Transdisciplinarity is fundamental to sustainability research and environmental concerns spawned its emergence as a concept.

What is transdisciplinarity?

Transdisciplinarity differs from interdisciplinarity in that it involves collaboration between "non-scientists" (or "practitioners") and researchers. Interdisciplinarity still relies on the borders around disciplines, their delineation and their "areas of overlap"[10]. In contrast transdisciplinarity "transcends or transgresses" the boundaries between disciplines creating a more fluid integration of knowledge. In its transcendence, transdisciplinarity facilitates the creation of "shared conceptual frameworks" across disciplines[12]. Transdisciplinarity "transcends entrenched categories to formulate problems in new ways"[13]. Epistemology is our systematic inquiry into, and theory of human knowledge generation and acquisition. A "transdisciplinary epistemology" should be seen fundamentally as one of knowledge co-production[14].

"Transdisciplinary methodology" refers to the integrative reasoning, logic or principles for guiding the collaborative research process of knowledge co-production[15]. Collaboration is often cited as being a fundamental part of transdisciplinarity[16].

Methodological approach

The methodology included several phases (Figure 1) beginning with the development of an initial survey, undertaking of focus groups, first phase of data analysis, follow-up individual interviews, second phase of data analysis, development of 3 draft technical energy plans, a community energy planning workshop and the final phase of data analysis *.

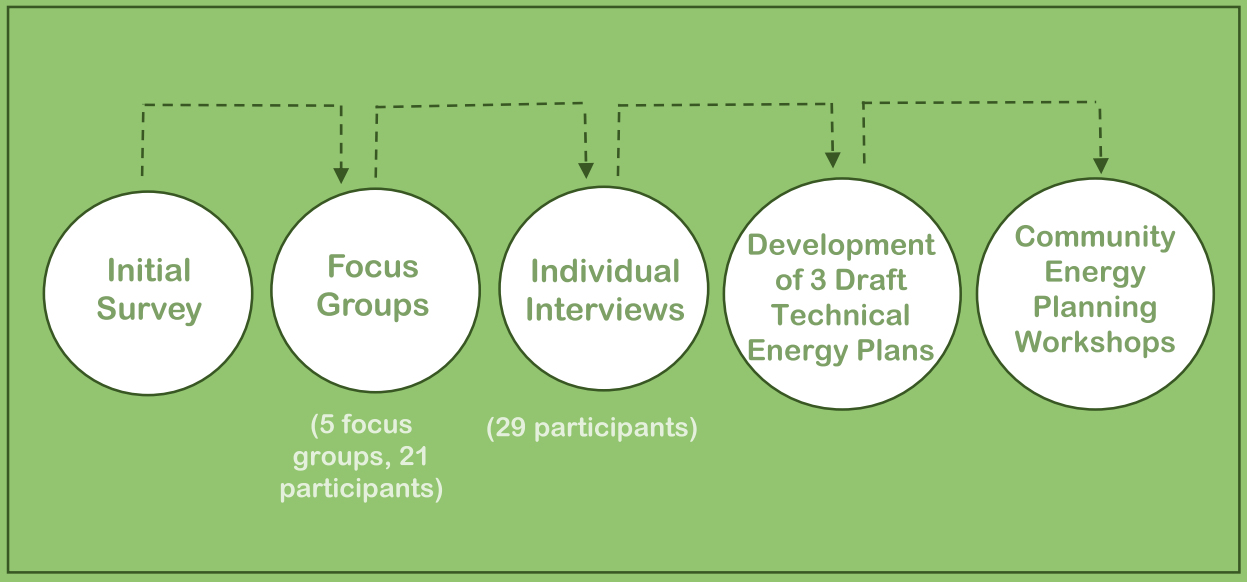


Figure 1: Overview of the research process developed for this work[17]

* For more information please see: HEASLIP, E. and FAHY, F., 2018. Developing transdisciplinary approaches to community energy transitions: An island case study. Energy Research & Social Science.

Results

This purpose of this part of this briefing note is to present the findings and discuss their implications for policy, Inis Oírr community and research

Building on results from this empirical study with residents in Inis Oírr, this research identified three mechanisms where situated energy knowledges mould perceptions and understanding of energy that are not present in existing literature. First - the role of the case-study community's peripherality in shaping its daily energy practices. Second – their geographic and climate based experiences and household energy adaptations to account for them. And third – the case-study community's previous experiences of external energy governance structures and how this affects their levels of participation in energy planning processes.

Understanding the energy landscape of Inis Oírr

Results from the gathering of proxy electricity demand data* for Inis Oírr revealed the impact the tourism industry has on their energy demand profile. As can be seen in Figure 2, the electricity demand for Inis Oírr increases significantly during the summer months, peaking in June and July, which are the busiest months for tourism.

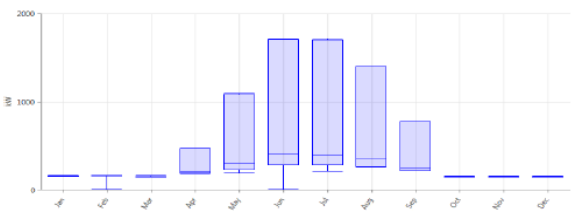


Figure 2: Proxy estimated yearly electricity demand profile for Inis Oírr in 2014 from HOMER software (source: Author)

Empirical data† revealed that participants' perceptions of a legacy of blackouts on the island had an impact on energy related decisions they made when building their houses. For example Enda explained:

"When we built the house first, there used to be a lot of electricity interruptions, so we went for the gas … so at least if you were cut out, you would still have the cooking facility or be able to boil the kettle on the ring."
(Enda, focus group 2)

And Melissa concurred with Enda saying:

"Most people… have oil, but they also have an immersion, so at least if the oil goes, at least you can heat your water, and you have a fire as well so you can have a back boiler."
(Melissa, focus group 2)

Other participants' narratives highlighted negative perceptions of the suitability of some technologies to the place-specific needs of islands communities. For example, Mitch explained his perceptions of the unsuitability of electric cars for island locations saying:

"With electric cars there would be a lot more microchips … the newer model cars … are a disaster … here … Because … at least with the old cars you could … hit them with a hammer and they would start … Newer models … it's a laptop you need!"
(Mitch, individual interview)

Participants' narratives illustrated the importance of utilising technologies that can be maintained by people living on the island. Several cited the impact of geographic remoteness and adverse weather conditions on their energy needs as a community.

*Hourly electricity demand data for Inis Oírr was not being recorded by Ireland's Transmission Service Operator (ESB) so a proxy demand profile was created using Inis Mór's demand data and altering it to account for Inis Oírr's smaller population.
† None of the participants are identified by name and pseudonyms are used throughout the briefing note.

Understanding situated energy knowledges in Inis Oírr

This section discusses the processes that influence the development of situated energy knowledges and community knowledge networks within the case study community. The participants' narratives revealed that their understandings of energy were not local, but technical and were not varied in their definitions. In contrast, participants' narratives revealed that understandings of local knowledge were wide ranging and varied. For example Amy defined local knowledge as:

"About the history and culture of a place. About the people … [and] how the community is, how it operates as a community, what its strengths are as a community and what things are difficult for the community."

(Amy, focus group 3)

Philip spoke about the importance of forward-planning when living on an island saying:

"Planning your day to planning your weeks ahead… School, work, play, you have to plan your freezer, your fridge … everything … You have to think ahead always… Forward thinking is a good island thing".

(Philip, focus group 1)

Geographic remoteness also had an impact on the energy practices of the participants. Cathal described how periods of sporadic isolation during inclement weather has created a need for a more self-reliant community saying:

"If something goes wrong with anything - if your car breaks down or your heating goes at home, you have to be … self-reliant, if you can't fix it yourself, you have to know who else is on the island to help you."

(Cathal, focus group 2)

Energy governance and communication within island communities

This section looks specifically at energy governance in island communities and how it is affected by geographic isolation. Participants' narratives highlighted the importance of the co-operative in their daily lives with Orla saying:

"They are like a mini class of government, everything rolled into one, every issue from the lifeguard on the beach to the rubbish, to the water, every single thing the co-op is involved."

(Orla, focus group 4)

Other participants spoke about the merits of having a co-operative that represents the community saying:

"… you have somebody to speak out for you when you have the co-op, so I think that is good".

(Brenda, individual interview)

Participants also spoke about the unique nature of land ownership in Inis Oírr and its impact on spatial planning stating:

"People [on the island] don't have plots of land that big…and … most … [people]… don't have all the land in one area … [they] … have three or four fields here and three or four somewhere else."

(Edward, individual interview)

Participants spoke about the difficulties in dealing with centralised governmental departments when living on an island saying:

"You have… invisible barriers that are there … the biggest barrier there … is dealing with… government bodies … [because]… bodies outside of an island, don't understand …[island life]."

(Philip, focus group 1)

Designing Inis Oírr's low carbon energy transition – a new approach

This section describes the application of the innovative transdisciplinary methodology developed for this work. It also reports on how the initial findings from the qualitative data are used to inform the design of the proposed technical energy plan. This section revealed the community in Inis Oírr's capacity to engage in the design of the low carbon energy transition pathway for their community.

The participants' narratives revealed there were several different characteristics that were important to them in an energy plan for their community. The results from the data analysis were entered into NVIVO[17] qualitative analysis software, and a table of desired characteristics was developed (Table 1). These characteristics were ranked in order of preference, where 1 was the characteristic that was mentioned the most amount of times by the most amount of participants and 16 was the characteristic that was mentioned the least amount of times.

Table 1: Characteristics for a Community Energy Project

Characteristics	No. of focus groups/ interviews discussed in	No. of times discussed
Affordable energy	10	24
Energy Independence	7	21
Energy that is good for the Environment	7	13
Local people involved in the project	5	6
Renewable Energy	4	9
Secure Energy	4	7
Comfortable Houses	4	6
Well Organised Project	3	7
Forward Energy Planning	2	3
Retrofitting of Houses	2	3
Reliable Energy	2	2
Community can Test Technologies Themselves	2	5
Technologies are Easy for Community to Understand & Fix	1	2
Adaptable for Individual Houses	1	1
State is Involved	1	1
Technologies are Easy to Use	1	1

Some of the participants' narratives statements about their energy needs were explicit and did not need interpretation, however, others were more tacit and the researcher had to interpret the data. The participants spoke at length about the importance of affordable energy, with Kenneth saying:

> *"You need to be able to make [the money] back, in a reasonable amount of time."*
> *(Kenneth, focus group 3)*

and Anita concurring:

> *"But… you don't mind paying the extra if you can rely on it. And easy to fix [is important too]."*
> *(Anita, individual interview)*

In order to overcome researcher bias, the table of characteristics was presented to the participants during the community energy planning workshop to determine whether the participants felt that it was a true reflection of their perceptions.

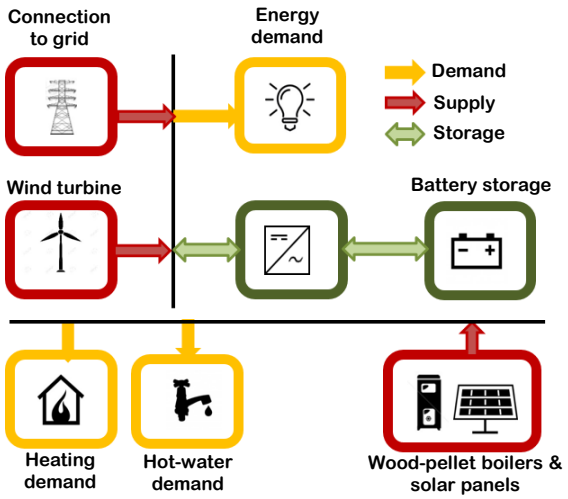
Community technical energy planning workshop

The table of characteristics and an overview of the initial findings from the research were presented to the participants during the workshop. The participants were divided into two groups and the methodology itself was described, as was the rationale behind the development of the draft technical energy plans.

Draft technical energy plan scenario 1

Draft technical energy plan scenario 1 was designed from a technical perspective, and did not take into account any of the list of characteristics outlined in Table 1. The scenario included solar panels to provide for the increased hot water demand and PV panels for the increased electricity demand during the summer months. The first scenario also includes a wind turbine to be placed on the northern side of the island. This scenario was not well received by the islanders with Philip stating:

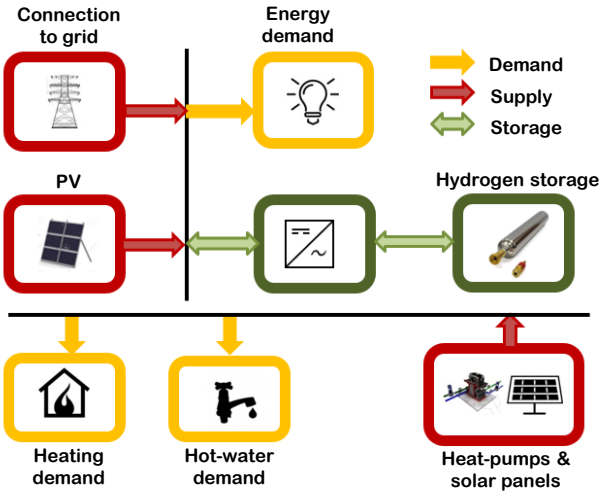
> *"A wind turbine could be imposing and out of scale completely to the island."*
> *(Philip, energy planning workshop 2)*



Draft technical energy plan scenario 2

Draft technical energy plan scenario 2 was influenced by the list of characteristics outlined in Table 1. It was proposed that the bulk of the electrical energy demand be met through photovoltaic panels (PV). The hot water and space heating demand is to be met by solar panels and heat pumps while energy storage was provided by hydrogen storage. This scenario was well received by the islanders with Amy stating:

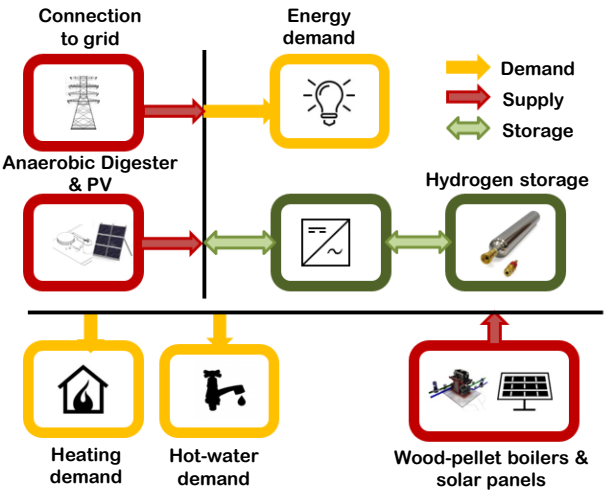
> *"It ... [has]... everything ... the backup to the backup."*
> *(Amy, energy planning workshop 2)*



Draft technical energy plan scenario 3

Finally, draft technical energy plan scenario 3 drew from several sources of data for its design; the initial qualitative findings, the list of characteristics described in Table 1 and the findings based on the participants' situated energy knowledge. The third scenario proposes that excess food waste during the summer months is used to supply Inis Oírr with electrical energy from an Anaerobic Digester and PV with the amount of PV becoming smaller as a result of the anaerobic digester. This was well received by the islanders with Evan saying:

> *"It is fantastic!"*
> *(Evan, energy planning workshop 2)*



Conclusion

The findings from the transdisciplinary methodology applied and tested in this research revealed avenues for Inis Oírr community, and other communities, to become more active in planning for their low carbon energy future.

This research revealed the importance of social scientific approaches to the energy problem and the complex social and spatial construction of understandings of energy and energy demand. This research successfully forged a new method for addressing low carbon energy transitions using two disparate disciplines in a successful manner. The empirical results deepened insights into the need for socially, culturally and locally sensitive energy policy. The holistic, transdisciplinary approach proved successful in integrating situated energy knowledges into technical energy planning. Empirical findings reveal that policy that attempts to alter energy practices and engage effectively with communities through increasing awareness must acknowledge place-based influences to be successful. This research also revealed multiple appropriate pathways for Inis Oírr to transition to a low carbon future that is suitable to their daily energy practices and understandings of energy.

References:

1: HEASLIP, E. 2017, Community Low Carbon Energy Transitions in Irish Islands: A Transdisciplinary Approach ', PhD thesis, Galway Mayo Institute of Technology, Galway, Ireland.

2: CATNEY, P., DOBSON, A., HALL, S. M., HARDS, S., MACGREGOR, S., ROBINSON, Z., ORMEROD, M. & ROSS, S. 2013. Community knowledge networks: an action-orientated approach to energy research. *Local Environment,* 18, 506-520.

3: BRIDGE, G., BOUZAROVSKI, S., BRADSHAW, M. & EYRE, N. 2013. Geographies of energy transition: Space, place and the low-carbon economy. *Energy Policy,* 53, 331-340.

4: DOCEANR 2012. National Renewable Energy Action Plan IRELAND. *Submitted under Article 4 of Directive 2009/28/EC* Dublin.

5: NESC 2014. Wind Energy in Ireland: Building Community Engagement and Social Support. National Environmental and Social Development Office

6: MAH, D. N.-Y., WU, Y.-Y., IP, J. C.-M. & HILLS, P. R. 2013. The role of the state in sustainable energy transitions: A case study of large smart grid demonstration projects in Japan. *Energy policy,* 63, 726-737.

7: LANG, D. J., WIEK, A., BERGMANN, M., STAUFFACHER, M., MARTENS, P., MOLL, P., SWILLING, M. & THOMAS, C. J. 2012. Transdisciplinary research in sustainability science: practice, principles, and challenges. *Sustainability science,* 7, 25-43.

8: CSO. 2016. *Central Statistics Office* [Online]. Available: http://www.cso.ie/en/census/census2016reports/census2016smallareapopulationstatistics/ [Accessed 9th September 2017].

9: ESRI. 2016. *National Parks and Wildlife Services Map Viewer* [Online]. Available: http://webgis.npws.ie/npwsviewer/ [Accessed 13th June 2016].

10: SCHOLZ, R.W., Mutual learning as a basic principle of transdisciplinarity, *Transdisciplinarity: Joint problem-solving among science, technology and society. Workbook II: Mutual learning sessions, 13-17.*

11: RUSSELL, A. W., WICKSON, F. & CAREW, A. L. 2008. Transdisciplinarity: Context, contradictions and capacity. *Futures,* 40, 460-472.

12: STOKOLS, D., HALL, K. L., TAYLOR, B. K. & MOSER, R. P. 2008. The science of team science: overview of the field and introduction to the supplement. *American journal of preventive medicine,* 35, S77-S89.

13: p3, MILLER, T. R., BAIRD, T. D., LITTLEFIELD, C. M., KOFINAS, G., CHAPIN III, F. S. & REDMAN, C. L. 2008. Epistemological pluralism: reorganizing interdisciplinary research. *Ecology and Society,* 13, 46.

14: REGEER, B. J. & BUNDERS, J. F. 2009. Knowledge co-creation: Interaction between science and society. *A Transdisciplinary Approach to Complex Societal Issues. Den Haag: Advisory Council for Research on Spatial Planning, Nature and the Environment/Consultative Committee of Sector Councils in the Netherlands [RMNO/COS].*

15: WICKSON, F., CAREW, A. L. & RUSSELL, A. W. 2006. Transdisciplinary research: characteristics, quandaries and quality. *Futures,* 38, 1046-1059.

16: HEASLIP, E. and FAHY, F., 2018. Developing transdisciplinary approaches to community energy transitions: An island case study. *Energy Research & Social Science.*

17: BAZELEY, P. AND JACKSON, K. eds., *2013. Qualitative data analysis with NVivo.* Sage Publications Limited.

Acknowledgements

I wish to thank the community in Inis Oírr for their engaged participation in the study. Thank you for your eagerness to take part, for sharing your unique energy knowledge and for playing a key role in the co-creative energy planning process. This project would not have been possible without your commitment and willingness to engage and share insights into your lives.

I would like to thank Galway-Mayo Institute of Technology (GMIT) for awarding me the "President's Forty Year Scholarship" to fund the research project. I would also like to thank all the members of staff of both schools for welcoming me, and providing me with advice throughout the research project. I would also like to thank my PhD supervisors, Dr Frances Fahy of NUI Galway and Dr Gabriel J. Costello of GMIT. Finally, I would like to thank my friends and family for their continued support and patience during the PhD.

I would also like to thank the manager (Paddy Croew) and staff of the Comhar Caomhán Teoranta for facilitating and supporting the research. Their support for and interest in engaging innovative energy research in their community is admirable and highlights how Inis Oírr is an ideal community for future energy research.

About the Author

Dr Eimear Heaslip

Dr Eimear Heaslip is a Postdoctoral Researcher in the School of Geography and Archaeology at the National University of Ireland, Galway.

Eimear is a transdisciplinary researcher with a background in architecture, engineering and social science. Eimear's research interests are in the field of sustainable consumption, environmental planning and community energy planning, specifically the social and cultural consequences of transitioning to low carbon societies. Eimear's research focuses on exploring, describing and analysing the development of situated energy knowledges and the role of community knowledge networks in community low carbon energy transition pathways. Eimear is currently working as a postdoctoral researcher on the Horizon 2020 funded ENERGISE project in NUI Galway. ENERGISE develops, tests and assesses options for a bottom-up transformation of energy use in households and communities across Europe. Eimear has received research awards from GMIT and the Geographical Society of Ireland. Eimear has also published in *Energy Research and Social Science* and the *Journal of Sustainable Development of Energy, Water and Environment Systems.*