



Murphy, J., and Smith, A. (2013) Understanding transition-periphery dynamics: renewable energy in the Highlands and Islands of Scotland. *Environment and Planning A*, 45 (3). pp. 691-709. ISSN 0308-518X 278X

Copyright © 2013 Pion and its licensors

A copy can be downloaded for personal non-commercial research or study, without prior permission or charge

The content must not be changed in any way or reproduced in any format or medium without the formal permission of the copyright holder(s)

When referring to this work, full bibliographic details must be given

<http://eprints.gla.ac.uk/70012/>

Deposited on: 4 April 2013

Enlighten – Research publications by members of the University of Glasgow
<http://eprints.gla.ac.uk>

Understanding transition-periphery dynamics: renewable energy in the Highlands and Islands of Scotland

Accepted for publication

Final version submitted to *Environment and Planning A* on Friday 29 June (2012).

Dr Joseph Murphy

1 Longdyke Farm Cottages

Shilbottle

Alnwick

Northumberland

NE662HQ

Email: joseph@joseph-murphy.org

Dr Adrian Smith

SPRU

(Science and Technology Policy Research)

Freeman Centre

University of Sussex

Falmer, Brighton

BN1 9QE

UK

Email: A.G.Smith@sussex.ac.uk

Understanding transition-periphery dynamics: renewable energy in the Highlands and Islands of Scotland

Abstract

Over the coming decades the Highlands and Islands of Scotland will be transformed as new technologies and infrastructures are installed to exploit wind, wave and tide power. However, interactions between the region – understood as a sociospatial category shaped by history, culture and institutions – and these technologies are poorly understood and need to be appreciated in more detail before the changes gather momentum. In this paper we link and extend research around socio-technical transitions and resource peripheries and use this framework to analyse wind energy projects on the island of Lewis. Our analysis draws attention to transition-periphery dynamics and the ways in which renewable energy projects and particular locations are co-shaping each other through these. Building on this case study we suggest implications for the region as a whole, argue that the analytical-normative agenda of socio-technical transitions should be recast, and highlight the need for more research on socio-technical transitions and new resource peripheries.

Keywords

Socio-technical transition, resource periphery, transition-periphery dynamics, renewable energy, Scotland

Acknowledgement

The authors would like to thank residents of the island of Lewis who contributed their time and insights, Sarah Parry for her critical reading of various drafts, the Joseph Rowntree Foundation who supported earlier work and the Editors and anonymous referees for their valuable comments and encouragement.

Understanding transition-periphery dynamics: renewable energy in the Highlands and Islands of Scotland

1 Introduction

The UK's Climate Change Act (2008) contains mandatory targets to reduce greenhouse gas emissions by 34% (2020) and 80% (2050) relative to their 1990 level (DECC, 2009a). The Climate Change (Scotland) Act (2009) includes a more ambitious 2020 target of 42% and the same long term target (Scottish Government, 2009). This legislation combined with related debates around transition to a low carbon economy suggests that climate change is an increasingly important issue for policy and politics (Stern, 2006).

Although there is considerable uncertainty over how (and if) these targets will be met there is little doubt that renewable energy will play a key role. For example, Chris Huhne, the former UK Secretary of State for Energy and Climate Change, described renewable energy as one of the 'four key pillars' of the UK Government's climate change strategy, alongside clean coal and gas, energy saving and nuclear power (Huhne, 2011). More specifically, the UK's Low Carbon Transition Plan includes an increase in wind power from 6% to 31% of supply by

2020 (DECC, 2009a) and Scotland's Climate Change Delivery Plan contains a similar target (Scottish Government, 2009). In this context the UK Government and Scottish Government (in London and Edinburgh) are engaged in substantial discussions, particularly with major energy utility companies, over reform of electricity markets and infrastructure investment.

These developments have profound implications for the Highlands and Islands, the sparsely populated region of north and west Scotland. This area has large untapped renewable energy resources (wind, wave and tide) which are rapidly becoming valuable assets. Some large projects have already been completed, such as the 40 turbine Farr Wind Farm near Inverness. Others are underway or proposed such as the tidal flow project which will see 10 underwater turbines positioned in the deep water channel between the islands of Islay and Jura. In addition, the electricity infrastructure of the region is being upgraded to make it easier to export power south to the Scottish Lowlands and on into England (DECC, 2009b). The controversial Beaulieu to Denny power line upgrade is an example.

This background suggests the question which orientates this paper. How will renewable energy and the Highlands and Islands shape each other over the decades ahead? We believe that answers can be reached by linking and extending research around socio-technical transitions and resource peripheries. We explore these debates and define key terms later but we will clarify our understanding of the Highlands and Islands as a region here. A region can be understood as a sociospatial category shaped by history, culture and institutions (see discussion of Paasi's work below). Applying this definition to the Highlands and Islands identifies a complex area with a somewhat uncertain boundary whose evolution and integrity has been shaped over hundreds of years by such things as Gaelic culture and

language, the Crofters' Holdings (Scotland) Act (1886), and Highlands and Islands Enterprise – the regional development agency. Thus, although it glens and mountains are important, these (and similar features) do not define the region for the purposes of this paper.

The discussion draws on a wide range of evidence and experience. Murphy has a detailed knowledge of the Highlands and Islands after completing a 1,500 kilometre walk along the west coasts of Ireland and Scotland which applied an interpretive methodology to understand links between place, region and sustainability (Murphy, 2009; 2011a; 2011b, 2011c). Smith has extensive knowledge of transitions research and the role of community level experiments in sustainable development (e.g. Smith, 2007; Smith et al, 2005; Smith et al, 2010; Smith and Stirling, 2007). We focus on wind energy projects on the island of Lewis because these illustrate complex transition-periphery interactions with wider implications. The paper draws on an extensive review of secondary literature and interviews with key actors conducted in January 2012.

In the following section we summarise some of the literature on socio-technical transitions and resource peripheries, focusing on climate change, renewable energy and the Highlands and Islands. Section three explores wind energy on the island of Lewis off the west coast of Scotland and describes the evolution of three interrelated projects. In section four we analyse the case study from the socio-technical transition and resource periphery perspectives and offer preliminary answers to the question posed above. In the conclusion we provide a more subtle answer by linking approaches and exploring transition-periphery dynamics. Here we emphasise the ways in which renewable energy projects and communities are shaping each other, for example by providing a focus for debate and

encouraging the development of alternatives. Building on this we endorse the argument that the existing analytical-normative agenda of socio-technical transitions must become more sensitive to geography and we highlight new resource peripheries as sites where further research should be done.

2 Transitions and peripheries

We have argued that climate change and the policy agenda of transition to a low carbon economy have profound implications for the Highlands and Islands of Scotland as somewhere to generate renewable energy. Over recent years considerable effort has gone into understanding such socio-technical transitions and we begin this section with a review of related research. Whilst recognising its value, however, we also highlight its limitations. Most importantly it focuses on technologies which constitute transitions rather than where transitions occur. With this in mind we explore research which focuses on resource peripheries.

2.1 Socio-technical transitions

The dramatic reductions in greenhouse gas emissions being sought in Scotland and the UK suggest far more than the development of marginally cleaner or more efficient products and services. In fact they imply a wide range of changes including low carbon energy generating technologies, new smart grids for electricity distribution, products which use energy more efficiently, changes in consumer choices and habits, restructured energy markets and novel

regulatory institutions. Taken as a whole this represents a transformation of energy production, consumption and governance.

Innovation research suggests that such a transformation can be understood as the re-configuration of a socio-technical system (Rip and Kemp, 1998). In practice this means replacing or realigning actors, artefacts, discourses and institutions over an extended period to produce a new ensemble. Whilst recognising that there is scope for agency and purposeful action, research also emphasises the challenges. Most obviously, a new and disruptive socio-technical system must emerge from the context of an existing one which is dominant and deeply embedded (Unruh, 2000). This is difficult because multiple processes create powerful path dependencies and encourage incremental improvement of the existing system rather than radical change (Geels, 2002).

What does this mean in relation to energy? Consider, for example, all the elements which must combine to produce the 103 turbine Viking Energy wind project on Shetland (off the north east coast of Scotland). The list includes skilled workers, specialized knowledge, reliable technologies, investment capital, grid infrastructures, profitable markets, and available land. This is possible but the task is made more difficult by the fact that the existing socio-technical system is optimised for production, distribution and consumption of energy generated elsewhere from largely fossil fuels sources.

Over recent years the replacement of one socio-technical system by another has come to be referred to as transition and there is a burgeoning research literature. This takes a systems perspective and studies interactions between elements (social and technical) as a co-

evolutionary process. Much of the research draws on an understanding of historical socio-technical transitions to suggest ways in which future transitions can be shaped thus blurring the distinction between analytical and normative scholarship (e.g. Kemp et al., 1998; Loorbach, 2007; Rotmans et al 2001). In this paper we focus on energy but studies have also examined food, water, mobility and housing (Elzen et al, 2004; Scrase and Smith, 2009; Scrase and Mackerron, 2009; for a review, see Smith et al, 2010).

Within the wider debate the multi-level perspective (MLP) on socio-technical transitions has attracted considerable attention (Geels, 2002; Genus and Coles, 2008; Smith et al, 2005; Markard and Truffer, 2008; Rip and Kemp, 1998). According to the MLP radical innovation occurs in 'niches'. These are spaces of socio-technical agency which afford some protection to novel arrangements when they are unable to compete with the dominant socio-technical 'regime' (Jørgensen and Karnøe, 1995; Raven et al, 2008; Hodson and Marvin, 2010; Hommels et al, 2007). At the same time, according to the MLP, niches and regimes exist in the same 'landscape' context, although they can experience it differently. For example, pressure to reduce greenhouse gas emissions, coming from social movements or regulatory measures, might be welcomed in a renewable energy niche but experienced as a threat in the fossil fuel regime.

The MLP suggests that interactions between niche, regime and landscape explain transitions and the forms they take. It is the way they interrelate which determines whether and how a transition unfolds (Geels and Schot, 2007; Smith et al, 2005). For example, on rare occasions a socio-technical niche forms and grows, and hybrid versions emerge as aspects are appropriated into the existing regime. However, if further growth opportunities arise the

incumbent regime can be replaced producing a new socio-technical regime. The allure of the MLP is explained by the way it integrates diverse and complex socio-technical processes into a unified framework (Smith et al, 2010).

The normative agenda which accompanies the MLP is seen particularly in work on low carbon and sustainable transitions and concepts like 'transition management' and 'strategic niche management'. In this literature, for example, governments are encouraged to facilitate socially negotiated visions of future low carbon energy systems. These become points of departure which are back-cast to inform the deliberate creation of niches which might fulfil such visions in the future (Rotmans et al, 2001). The argument is made that such niches will become sites for reflexive learning, development and institutionalisation, leading to a desirable transition.

The MLP has already proved its worth by generating new insights into long-term socio-technical change and advancing related policy debates (Smith and Stirling, 2007). However, there are reasons to be cautious (Schot, 1998; Shove and Walker, 2007). For example, the framework has been criticised for having a limited understanding of society and politics compared to technology and for emphasising widespread long-term change at the expense of local and unique processes and outcomes. Transition management in particular runs the risk of being managerial and technocratic, overly focused on the goals of particular actors (government and business), and naive regarding power and justice (Smith and Stirling, 2010). These are areas where we will contribute by drawing on the resource peripheries perspective.

2.2 Resource peripheries

A number of scholars have argued that innovation research including the MLP is enhanced through dialogue with geography and vice versa (Bulkeley et al, 2010; Cooke, 2009; Coenen et al., 2011; Hodson and Marvin, 2009, 2010; Truffer, 2008). For example, Truffer and Coenen (2011, page 18) have observed that:

The regional studies literature is often not sensitive enough to analyze [socio-technical transformations]... The sustainability transitions literature on the other hand has an explicit focus on the formation of socio-technical systems but entertains so far an overly naïve conceptualization of space, scale and power.

This leads to a call for ‘geographies of (sustainable) transition’, which, we believe, can be generated using resource peripheries research.

Drawing on a diverse cases and literatures, Hayter et al (2003, page 15) characterise resource peripheries as follows:

At the root... is the economic geography of resource production: the extraction of a mineral, biotic or animal resource, which is often processed only to a limited degree and then sold elsewhere... Immobile resources, once delimited and deemed commercial, are removed *in situ*, and mobile ones systematically sought out and appropriated (harvested).

These authors add that resource peripheries are ‘deeply contested spaces’ where ‘environmental, cultural and geopolitical factors are intersecting with industrial dynamics’ and that ‘this contestation needs to be understood in terms of global-local dynamics that are not experienced or understood in cores and not simply the result of the manipulations of global actors upon powerless locals’ (Hayter et al, 2003, pages 15, 21). Although resource periphery – and similar concepts like resource curse (e.g. Ross, 1999) and resource frontier (e.g. Beinart and Hughes, 2007) – is often used in developing country contexts it is also used to study such things as mining, fishing and forestry in rich countries.

Over the past 15 years an extensive body of research and commentary has emerged which applies this idea – implicitly and explicitly – to the Highlands and Islands of Scotland and similar settings. One part of this literature focuses on conflicts over resource and infrastructure projects including the Lingerbay super-quarry (Dalby and MacKenzie, 1997; MacKenzie, 1998), the Bellanaboy gas terminal (Garavan, 2006 and 2007; Gilmartin, 2009), and the Barvas Moor wind farm (Macfarlane, 2010; MacKenzie, 2006a; Murphy, 2011c). Another part focuses on local initiatives which can be understood as efforts to overcome the problems associated with being a resource periphery e.g. community land buyouts (Dùthchas, 2001; MacAskill, 1999; MacIntosh, 2001; MacKenzie, 2006b).

Although this literature is diverse every contribution makes one or both of the following points. First, understandings of such things as ‘the land’ and ‘community’, often shaped by history and culture, can be mobilised by local people to resist unwelcome projects. Second, these ideas can also underpin alternative visions and perspectives around such things as

development and sustainability. For example, in relation to the Lingerbay super-quarry conflict, Mackenzie (1998, 509) argues that:

... members of the local community drew on historically resistant symbols of collective identity, crofting, the Gaidhealtacht, and observance of the Sabbath, to claim an alternative discourse of sustainability.

This suggests that the resource peripheries perspective can sensitise socio-technical transitions to the specificities of particular locations. Further, there is an existing body of research on the Highlands and Islands which can be used for this purpose. However, to actually analyse interactions between transition and periphery in a particular setting we need additional concepts, and, building on the work of authors like Garavan and Mackenzie, we believe that 'place' and 'region' have particular value.

Place has been a focus for debate in geography for many decades and research which uses the concept is diverse and extensive. It includes, for example, humanistic approaches which emerged in the 1970s and more recent work on its relational aspects. Massey (1995, 1996) made a seminal contribution in the 1990s when she stressed the hybridity of places, multiple competing accounts, 'the global construction of the local' and that places are always in the process of being made. Whilst recognising the value of such contributions our intention is not to engage in detailed debate about place but to refine transitions research using the concept and for this purpose a broad definition is sufficient. For example, Devine-Wright (2009, page 427) says that place is the 'physical aspects of a specific location as well as the variety of meanings and emotions associated with that location by individuals or groups.'

Definitions like this make the point that place does not mean location but instead refers to emotions, meanings and experiences. For our purposes Devine-Wright is particularly useful because he focuses on wind farms and argues that local opposition can be ‘... conceived as a form of place-protective action, which arises when new developments disrupt pre-existing emotional attachments and threaten place-related identity processes...’ Devine-Wright (2009, page 426).

The concept of region is similar in that scholars operationalise it in ways that cut across its popular meaning. For example, Paasi (1991 page 249 emphasis original) argues that

Region is a sociospatial unit... into which inhabitants are socialised as part of the reproduction of the society. Region is thus essentially a *social and cultural category* with an explicit collective dimension representing institutional practices sedimented in the *history of the region*...

In other work Paasi (2002, 2003, 2004) emphasises the role of history, culture and institutions in the production, reproduction and transformation of regions. He also distinguishes region from place with the former being collective (rather than individual) with a longer historical duration.

In this section we have introduced the socio-technical transitions and resource peripheries perspectives. We use these to analyse wind energy projects on the island of Lewis later in the paper. Table 1 summarises key aspects of our framework and argument.

[INSERT TABLE 1 HERE - Table 1. The socio-technical transition and resource periphery perspectives]

3 Wind projects on Lewis

We have argued that interactions between the Highlands and Islands region and renewable energy technologies need to be understood in more detail. We have also suggested that this can be achieved by linking and extending research around socio-technical transitions and resource peripheries. In this section we focus on the evolution of three interrelated wind energy projects on the island of Lewis. Whilst recognising that this is a limited sample in a particular area we nevertheless believe that these examples illustrate transition-periphery dynamics which have wider implications.

3.1 The Barvas Moor proposal

The island of Lewis lies over 50 kilometres from mainland Scotland (see Figure 1). It is the largest of the Western Isles and includes the main population and administrative centre of Stornoway – approximately 10,000 residents. Beyond Stornoway most people live in small coastal crofting communities and the land is divided into large estates.¹ Perhaps the most important estate, created in 1923 when Lord Leverhulme gifted the land to the people of the town, is owned by The Stornoway Trust (70,000 acres).

¹ Crofting is system of land tenure unique to the Highlands and Islands of Scotland. A croft is a unit of land located on a larger estate. The tenant is called a crofter and he/she pays rent to the landowner (see <http://www.crofting.scotland.gov.uk/>).

[INSERT FIGURE 1 HERE – Figure 1. A map showing Scotland, The Western Isles and north Lewis.]

The origins of the Barvas Moor wind farm proposal go back to the early 2000s when The Stornoway Trust was trying to secure a long-term future for the Arnish Yard – a small industrial site on the outskirts of Stornoway. Discussions were held with various potential partners including AMEC, the international engineering and management company, who suggested that the yard could have a future as part of a large wind farm development. The Stornoway Trust agreed to pursue the idea with AMEC and Lewis Windpower was set up to develop a proposal.

Scoping work identified lack of transmission capacity between the Western Isles and mainland Scotland as a – perhaps the – major challenge. Because the costs of installing a new interconnector would have to be borne largely – perhaps entirely – by the project, Lewis Windpower concluded that it would need to be a minimum of 600 MW to be economically viable. Also, as the size of the scheme came into focus it became clear that The Stornoway Trust did not have enough land to accommodate it. This led to discussions with the owners of adjacent estates – Galson and Barvas – who agreed to participate.

In 2004 Lewis Windpower submitted a planning application to erect 234 wind turbines on Barvas Moor – an area of blanket bog which occupies the centre of north Lewis. Although many actors continued to support the project the application also provided a focus for critics (see Figure 2) and a poll conducted at the time indicated that over 80% of the people living

on the Galson and Barvas estates were opposed. A revised application for 181 turbines was submitted in December 2006.

[INSERT FIGURE 2 HERE – Figure 2. ‘No Wind Factory On Lewis’]

People objected to the Barvas Moor proposal for various reasons but cultural arguments made by a loose collective of residents through the website *Mòinteach gun Mhuileann* (Moorland Without Turbines) were significant.² Many of these emphasised the meaning of the moorland, often using Gaelic language, for people who lived nearby. For example:

I came back home that evening [after learning about the proposal], greatly distressed by what I had seen... Memories flooded back of my mother, in failing health, making her annual pilgrimage to Allt an t-Sulaire, where her native (Port of Ness) village had their shielings. Here she would lay another stone upon a cairn, which she'd started building many years previously, on the ruins of her family shieling.³ Both my parents died in 1979, and our family continues this tradition every year since then. This is one of AMEC's chosen sites. (Dina Murray <http://www.mwtlewis.org.uk/>)

Various projects were initiated which highlighted the complex relationship between people and moorland including the art project *A-mach an gleann: A known wilderness*⁴ and

² <http://www.mwtlewis.org.uk/>

³ A shieling is a small stone building often many kilometres from permanent dwellings where families lived with their animals during the summer months.

⁴ <http://www.annecampbellart.co.uk/a-mach-an-gleann-paintings>

compilation of a glossary of over 120 words which Gaelic speakers use to describe peat and peat moorland (see Macfarlane, 2010). One resident of Barvas involved in *Mòinteach gun Mhuileann* (Moorland Without Turbines) summarised the strategy as follow:

Our aim was to show the significance of the moorland by defining it in a different way. Not just as a barren wasteland. That is how AMEC were defining it. (Interview)

The conflict became highly polarised between 2006 and 2008 and in April 2008 the Scottish Government rejected the proposal. In retrospect one of the people who initiated the project acknowledged that important arguments were made which the developers were unable to counter. However, he also reemphasised the problem of the interconnector.

Nobody would start with a 734 MW project if you could have a 50 MW one. Why would you go through all that trouble? The interconnector was the issue then and it is the issue now. (Interview)

3.2 The *Baile an Truseil* project

When the Barvas Moor proposal was being developed, the Galson estate was privately owned. However, compared to other private estates, it was unusual, because the owners had very little 'presence'. One person living on the estate at the time described the situation as follows: 'Ownership was never an issue here. They [the landowners] didn't do much for us but they never stopped us doing anything either' (interview). Significantly, however, the

Barvas Moor proposal changed things by raising the issue of land ownership and giving momentum to a community buyout of the estate.

The relationship between the Barvas Moor proposal and the community buyout was complex. Some people believed that owning the estate was a way to stop the project. Others did not think they could stop it but saw ownership as a way to 'make the best of a bad situation'. A smaller number of residents supported the proposal and simply wanted to secure as many benefits for the community as possible. The owners of the Galson estate, however, did not want to sell. This led to what one resident described as a 'forced voluntary' buyout. The context for this remark is the Land Reform (Scotland) Act (2003) which includes a provision for a forced buyout of estates by crofting communities.

In addition to the cultural arguments outlined above it is important to note historical ones which accompanied the community buyout of the Galson estate – in the context of the Barvas Moor wind farm proposal. In an interview one resident simply said that issues relating to the land are still 'close' in Galson. Another said that 'some of the older people are very conscious of the need to stake a claim and to fight for the land.' Such comments highlight the complex history of 'the land' on Lewis and elsewhere in the region. This includes The Clearances which began in the 18th century, the crofters war of the late 19th and various land raids and occupations in the early 20th century. Arguments often express the belief that land ownership in the form of large private estates across the Highlands and Islands lacks justice and legitimacy.

The community buyout of the Galson estate (56,000 acres) completed on 12 January 2007. As *Urras Oighreachd Ghabhsainn* (Galson Estate Trust) took ownership – and with the future of the Barvas Moor proposal still uncertain – it decided to pursue a community wind project. This was shaped by three key factors. First, large parts of the estate were beyond use because the previous owner had signed lease agreements relating to the Barvas Moor proposal. Second, close proximity to the electricity sub-station at Barvas was important due to limitations of the local electricity grid. More broadly, the proposal had to reflect the aspirations of the people living on what was now the community owned Galson estate.

Planning permission for a community owned wind project – three 900 kW turbines – at *Baile an Truseil* was given in the summer 2009. An application for grid connection followed. This has been granted but the project must cover the £650,000 cost of a new 33 kV cable to the Barvas sub-station. The community hope to erect the first turbine in 2012.

3.3 The Stornoway Wind Farm

When the Scottish Government rejected the Barvas Moor proposal Jim Mather MSP (the Minister responsible) also asked consultants Halcrow Group Ltd to identify ‘renewable energy potential’ in the Western Isles and ways ‘to deliver economic and community benefit’ (Halcrow Group Ltd, 2009 page 1). In addition to being motivated by a desire to secure benefits for the Western Isles this initiative can be understood as an attempt to soften the blow of a contentious decision and to manage the conflict. A wide range of national, regional and local stakeholders participated in the process leading to publication of ‘the Halcrow

report'. This was shaped in the aftermath of the Barvas Moor conflict and at the same time established the context for future proposals.

The Stornoway Wind Farm builds on the Barvas Moor proposal and the Halcrow report. Following the demise of the Barvas Moor proposal The Stornoway Trust decided that they still wanted to develop a substantial wind energy project on their estate. At the same time the Halcrow report identified an area where this might happen. A planning application was submitted to the Scottish Government by Lewis Windpower in June 2011 for a 151 MW scheme on the outskirts of Stornoway including 42 turbines. At the time of writing the Stornoway Wind Farm is still waiting for permission but it appears to be making progress through the planning system.

Around 10 years after The Stornoway Trust began to explore the possibility of a large wind farm on Lewis the future of renewable energy in this part of the Highlands and Islands is still uncertain. The number of wind energy projects has increased and there is growing interest in marine energy. The electricity generation and transmission sector, working with the government, is also taking a more strategic view of upgrading infrastructure across the region. The problem of the interconnector between the Western Isles and the mainland, however, has not been resolved, although the debate appears to have moved on to the question of capacity – rather than whether or not to install one.

4 Transition or periphery?

In the introduction we asked: How will renewable energy and the Highlands and Islands shape each other over the decades ahead? In this section we begin to answer this question by analysing developments on the island of Lewis and beyond from two perspectives: (i) renewable energy as a socio-technical transition; (ii) the Highlands and Islands as a resource periphery. The discussion suggests that both frameworks are useful although each one provides a partial explanation. This encourages us to focus on transition-periphery dynamics in the conclusion.

4.1 Co-evolution of a transition

The multi-level perspective (MLP) on socio-technical transitions argues that 'landscape' influences put pressure on a dominant 'regime' giving alternative socio-technical arrangements opportunities to emerge from 'niches'. Applying the first concept to contemporary debates around renewable energy in the Highlands and Islands underlines climate change as a key landscape influence. However, there are others. A significant example is Scottish independence which is a policy of the governing Scottish National Party (SNP).⁵ The argument is that renewable energy could make a valuable economic contribution to Scotland as an independent country in the future. This helps to explain the SNP's commitment to generate 100% of Scotland's electricity demand from renewable energy by 2020 (SNP, 2011) as well as references to Scotland as a 'renewable energy Saudi Arabia'. Another landscape influence is the debate around community action. In this debate the Findhorn Community, North Lochinver estate, Eigg, Gigha and others are cited as examples

⁵ The Scottish National Party (SNP) won a majority of seats in the Scottish Parliament in 2011 and plan to hold a referendum on independence in 2014.

of what empowered communities can achieve. There are also many examples of this influence shaping policy including the Scottish Government's Climate Challenge Fund which supports community level action on climate change. The concept of landscape, therefore, highlights various influences impacting on the energy regime in different ways.

In this context we can begin to analyse wind projects on the island of Lewis. For example, it can be argued that the ill-fated Barvas Moor proposal responded largely to the climate change agenda and commercial opportunities emerging in the 2000s. However, it was challenged by people living on the Barvas and Galson estates inspired in part by a more community oriented debate. Both of the initiatives which followed – the *Baile an Truseil* project and Stornoway Wind Farm – were nevertheless shaped by the original proposal. Rather than producing ideal types such complex interactions produce hybrid schemes shaped by agendas like transition to a low carbon economy and sustainable communities. This illustrates the point that landscape influences are doing more than merely exerting pressure on the existing regime. Rather they are exerting pressure in diverse and sometimes contradictory ways.

The concept of niche is useful in this context because it helps to explain the diversity of projects on Lewis and across the Highlands and Islands. Many of these are being advanced by utility and engineering companies in various kinds of relationship with local landowners and communities. In Fintree in Stirlingshire, for example, the nine-turbine expansion of the Earlsburn Wind Farm (15 turbines) by a multi-national wind developer includes a community turbine which will provide an estimated £6 million revenue over 25 years. Other projects, however, are entirely community owned. For example, people living on the off-grid island of

Eigg have installed a micro-grid which distributes a mix of wind, hydro and solar power. On the island of Gigha the community owns three 225 kW wind turbines and exports the power to the mainland giving them an income of £75,000-100,000 per year (Hunter, 2009, 2010). Compared to large schemes promoted by utility and engineering companies, such community owned projects reflect local ambitions and circumstances more directly. They are highly bespoke, relatively small-scale and amenable to local control. Viewed from this perspective the island of Lewis appears to be a microcosm of the Highlands and Islands. A bewildering array of renewable energy projects are emerging creating niches of many different kinds. Some of these fail, such as the Barvas Moor proposal, whereas others gather momentum, including the Stornoway Wind Farm and *Baile an Truseil* project.

Some of the difficulties being encountered on Lewis and elsewhere can be explained through the concept of regime. This draws on wider transitions research and emphasises the point that existing arrangements are deeply embedded – locked in – and powerful path dependencies mean that change is difficult and will tend to be incremental rather than radical. Applying this concept to the energy system on the island of Lewis and beyond draws attention, for example, to the existing transmission infrastructure. This has all the characteristics of a system which supplies a periphery including problems of capacity and reliability. The possibility of generating large amounts of renewable energy has drawn attention to this, but, at the same time, has illustrated how difficult it is to change the existing arrangements. Two compelling examples feature in the above discussion: the challenge of constructing an interconnector between mainland Scotland and the Western Isles and the problem of connecting the *Baile an Truseil* project to the Barvas sub-station.

To close this preliminary analysis it is worth reflecting on the value of co-evolution as the idea which underpins transition scholarship. The discussion leaves no doubt that the social and technical aspects of the energy system on Lewis and across the Highlands and Islands are co-evolving. However, this observation appears somewhat limited in a context where resource and infrastructure projects raise profound questions of power and justice and are associated with conflict. This problem of partial or limited explanation leads us to the resource periphery perspective.

4.2 Contesting a new resource

A recent article in *The Guardian* newspaper makes the following point: 'The boom in onshore wind power... is being dominated by a small number of private landowners who will share around £1bn in rental fees over the next eight years... Estate owners in Scotland – where 1,200 people own two-thirds of the land – have so far benefited the most' (Vidal, 2012). This draws attention to some of the complex issues which accompany the development of renewable energy in the Highlands and Islands including the legacies of the past, issues of justice and legitimacy today, and the merits of different possible futures which might be realised through renewable energy.

The resource periphery perspective is a valuable starting point for understanding some of these issues. Hayter et al (2003) argue that economic geography is key to understanding resource peripheries because costs of extraction and transportation play a central role. They also argue that such peripheries have become deeply contested spaces in recent years with various global factors intersecting with local ones in ways which are not experienced or

understood in cores. In many ways wind projects on the island of Lewis illustrate this in a straightforward way. For example, the costs associated with exporting power, including the interconnector, have played a key role. Similarly, as the example of the Barvas Moor proposal illustrates, the issue of wind farms is highly controversial.

However, whilst recognising these similarities, there are significant differences between our case and the notion of resource periphery articulated by Hayter et al (2003). For example, whilst acknowledging that these authors raise the issue of conflict we would emphasise the longstanding nature of politics on this periphery and the way this is being recast by relatively recent debates around climate change, energy security, Scottish independence and so on. In addition, the character of the resource is important. As Mackenzie (2006a page 392) notes, 'It is precisely because wind, as commodity, is divisible, that it is amenable to community initiative.' Whilst recognising the merits of the core-periphery and global-local perspective we are also cautious because many aspects of our case cut across these. For example, lack of awareness and sensitivity to the cultural arguments of *Mòinteach gun Mhuileann* (Moorland Without Turbines) is not restricted to decision makers in Edinburgh or London but can also be found on Lewis. More subtly, as Mackenzie (2006a page 396) argues in the context of land buyouts 'The wind becomes the means through which the 'local' – place – is not set in opposition to the 'global', but through which 'the very mechanisms of the global' are altered.'

In this context the concepts of place and region clarify some of the processes operating. Earlier we defined place as something which refers to the emotions, meanings and experiences of individuals which can nevertheless have wider social aspects and

implications. Amongst other things it helps to explain the relationship between people and where they live and why conflicts arise around resource and infrastructure projects (Devine-Wright, 2009, 2010; Garavan, 2007; Gilmartin, 2009; Mackenzie, 2006a; Murphy, 2011c). For example, in her paper on the Bellanaboy gas refinery conflict, Gilmartin (2009 page 279) observes that the accounts of local people evoke place in ways that are 'suffused with fear' and that their 'anger is palpable'. In relation to the same conflict Garavan (2007 page 861) describes 'visceral reactions'. Although the controversy surrounding the Barvas Moor proposal on Lewis did not reach the same level of intensity the same argument applies, as illustrated by the testimony of Dina Murray, Anne Campbell and others, and their decision to support Moorland Against Turbines.

Some of the more social dimensions of place – such as the way meaning informs social practices or shapes consciousness shared with others (Paasi, 1991 pages 239, 248) – are illustrated by the community buyout of the Galson Estate which led to the *Baile an Truseil* development. Although this initiative was given momentum by the Barvas Moor proposal it was made possible by a shared sense of community (although this should not be overstated or treated uncritically) with many dimensions including relationship with the land, history, religion, crofting and language. This is illustrated by comments around the land which in some cases refer back to conflicts in the 19th century. The fact that the buyout also led to an alternative wind project is not surprising. As Dalby and Mackenzie (1997 page 106) have argued:

...community organising against 'developments' represented as threatening generates or accelerates a search for alternative economic opportunities more in

keeping with the scale and cultural milieu articulated in the opposition to the 'external' threat.

Finally we can apply the concept of region. We argued that this does not refer to a bounded space but to a sociospatial unit which is constituted by history and culture where institutions play a key role in reproduction and transformation – what might be called region building. This draws attention to the fact that renewable energy in the Highlands and Islands is being introduced into a context of institutions which have been sedimented over hundreds of years at a time of significant debate and reform. Important examples include crofting communities (some maintaining traditional agricultural practices) and land holding in the form of large (usually private) estates. Renewable energy has the potential to reproduce or transform this setting over the decades ahead in a wide variety of different ways and new institutions are emerging as a result. The community owned estate of Galson including the *Urras Oighreachd Ghabhsainn* (Galson Estate Trust) is an example from Lewis. Examples with a remit covering the Highlands and Islands as a whole include Community Land Scotland and Community Energy Scotland. Such organisations are attempting to remake the region through community including community land ownership and community renewable energy.

5 Conclusion

So far we have used the transition and periphery perspectives in parallel to analyse wind projects on Lewis and elsewhere in the Highlands and Islands of Scotland. The discussion has confirmed that both are valuable whilst at the same time suggesting that each offers a

partial explanation. To close we will stress the value of dialogue between these perspectives and emphasise the importance of transition-periphery dynamics.

The examples discussed in this paper show how transition and periphery can shape each other in complex and unpredictable ways. Emerging in the early 2000s, the Barvas Moor proposal sought to implement a particular vision of renewable energy in the Highlands and Islands; large schemes developed by commercial operators serving national or international energy markets. The project garnered some local support but also provoked conflict and resistance. Significantly, some local people made arguments about culture, history and politics, informed by the area's experiences as a resource periphery. These arguments not only informed resistance to the Barvas Moor proposal but also encouraged a community land buyout of the Galson estate. This in turn led to the *Baile an Truseil* wind project which implemented a different vision of the renewable energy in the Highlands and Islands; bespoke, small scale and community owned. In the aftermath of this conflict the Scottish Government initiated a governance process – the Halcrow report – which identified sites across the Western Isles where renewable energy projects might be acceptable in the future. This informed The Stornoway Wind Farm proposal submitted by the Stornoway Trust in 2011 – one of the main partners of the failed Barvas Moor project.

Complex transition-periphery dynamics involved in this case, summarised in Table 2, have not been explored by transition researchers so far. However, developments elsewhere in the Highlands and Islands suggest that they have wider significance. For example, although the Viking Energy wind project on Shetland (mentioned above) which received planning permission in 2012 is similar to the Barvas Moor project which was denied permission in

2008 focusing on transition-periphery dynamics draws attention to the context of Shetland which since the 1970s has been shaped by a large resource and infrastructure project in the form of the Sullom Voe (oil and gas) Terminal.⁶ In contrast, on the community owned islands of Eigg and Gigha (also mentioned above) we see bespoke and relatively small scale renewable energy projects. Focusing on transition-periphery dynamics in these locations draws attention to the long history of land struggle in the Highlands and Islands as well as more recent history – before the community land buyouts – of neglect by absentee landlords. These projects are very different but all three draw attention to ways in which transition and periphery shape each other over long periods.

[INSERT FIGURE 3 HERE – Figure 3. Transition-periphery dynamics and wind power on Lewis]

The projects discussed in this paper also emphasise the point that it is too simplistic to merely contrast a world of community owned, small scale renewable energy, shaped by the ambition of sustainability at the local level, with a world of privately owned (corporate), large scale renewable energy, shaped by higher level concerns like climate change, nationalism and profit. In practice complex transition-periphery dynamics are producing hybrid schemes, each one unique and the result of particular interactions. However, the schemes involved are so diverse that we do not think such projects should be understood simply as niches which at some point in the future will coalesce to produce a single new (renewable) energy regime. Rather we see parallel regimes emerging comprised on the one

⁶ Interestingly, one resident who objected to the Barvas Moor proposal suggested in an interview that local reaction could have been different if a plan to build a peat fired power station on the moor in the 1970s had gone ahead.

hand by large schemes with some community involvement and on the one hand by relatively small community owned schemes often in the context of community land buyouts. That said it is worth noting that all will benefit from plans to upgrade and reengineer the national (Scottish and UK) electricity grid although in different ways.

This discussion has significant implications for transitions scholarship in its analytical and normative forms. In relation to analysis, for example, it not only supports the call for 'geographies of transition' (Truffer and Coenen, 2011) but illustrates one way this can be pursued. With respect to its normative aspects it not only illustrates what Scrase and Smith (2009, page 724) call 'messy, informal transition politics', thus raising further concerns about 'transition management', but emphasises the need for transition governance to facilitate multiple transition pathways.

To close we will emphasise the importance of new resource peripheries. Over the decades ahead, particularly in relation to the challenge of climate change, multiple socio-technical transitions will gather momentum in areas such as food, energy, transport and housing. It is likely, at the same time, that new resource peripheries will be created – perhaps on top of old ones. Renewable energy in the Highlands and Islands of Scotland, therefore, falls in the same category, potentially, as cultivation of biofuel crops and construction of solar power stations in developing countries. There will be opportunities for people and communities to shape these transitions in relation to their own goals and ambitions. By linking the socio-technical transitions and resource peripheries perspectives both scholars and transition managers can gain a better understanding of this process and its potential. This should make it less likely that communities will have insensitive projects imposed on them and more likely

that they will be able to shape projects which resonate in desirable ways with the specificities of regions and places.

References

Beinart W, Hughes L, 2007 *Environment and Empire* (Oxford University Press, Oxford)

Bulkeley H, Castan-Broto V, Hodson M, Marvin S, 2010 *Cities and Low Carbon Transitions* (Routledge, London)

Coenen L, Benneworth P, Truffer B, 2011 'Towards a spatial perspective on sustainability transitions', paper presented at the DIME (Dynamics of Institutions and Markets) Final Conference, Maastricht, The Netherlands, 6-8 April

Cooke P, 2009 'Transition regions: green innovation and economic development', The DRUID Society Summer Conference, Copenhagen Business School, Copenhagen, Denmark, June 17-19

Dalby S, MacKenzie F, 1997 "Reconceptualising local community: environment, identity and threat" *Area*, **29**(2) 99 – 108

DECC – Department of Energy and Climate Change, 2009a *The UK Low Carbon Transition Plan: National Strategy for Climate and Energy*, HM Government, London

DECC – Department of Energy and Climate Change, 2009b *Our Electricity Transmission Network: A Vision for 2020*, A Report by the Electricity Networks Strategy Group, Department of Energy and Climate Change, London

Devine-Wright P, 2009, “Rethinking nimbyism: the role of place attachment and place identity in explaining place-protective action” *Journal of Community and Applied Social Psychology*, **19**(6) 426 – 441

Devine-Wright P, 2010 *Renewable Energy and the Public: from Nimby to Participation* (Earthscan, London)

Dùthchas Project, 2001 *Area Sustainability Strategies for Peripheral Rural Areas: Dùthchas Final Report* (The Highland Council, Inverness)

Elzen B, Geels F, Green K, 2004 *System Innovation and the Transition to Sustainability: Theory, Evidence and Policy* (Edward Elgar, Cheltenham)

Garavan M, 2006 *Our Story: The Rossport 5* (Small World Media, Dublin)

Garavan M, 2007, “Resisting the costs of ‘development’: local environmental activism in Ireland” *Environmental Politics* **16**(5) 844 – 863

Geels F, 2002, “Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study” *Research Policy* **31**(8-9) 1257 – 1274

Geels F, Raven R, 2006, "Non-linearity and expectations in niche-development trajectories: Ups and downs in Dutch biogas development (1973-2003)" *Technology Analysis & Strategic Management* **18**(3-4) 375 – 392

Geels F, Schot J, 2007, "Typology of sociotechnical transition pathways" *Research Policy* **36**(3) 399 – 417

Genus A, Coles A-M, 2008, "Rethinking the multi-level perspective of technological transitions" *Research Policy* **37** 1436 – 1445

Gilmartin M, 2009, "Border thinking: Rosspport, Shell and the political geographies of a gas pipeline" *Political Geography* **28** 274 – 82

Halcrow Group Ltd, 2009 *Economic and community benefit study* (Halcrow Group Ltd, Edinburgh)

Hayter R, Barnes T, Bradshaw M, 2003 "Relocating resource peripheries to the core of economic geography's theorizing: rationale and agenda" *Area* **35**(1) 15 – 23

Hodson M, Marvin S, 2009, "Cities mediating technological transitions: understanding visions, intermediation and consequences" *Technology Analysis and Strategic Management* **21**(4) 515 – 534

Hodson M, Marvin S, 2010, "Can cities shape socio-technical transitions and how would we know if they were?" *Research Policy* **39** 477 – 485

Hommels A, Peters P, Bijker W, 2007, "Techno therapy or nurtured niches? Technology studies and the evaluation of radical innovations" *Research Policy* **36** 1088 – 1099

Huhne C, 2011, "We will break through barriers facing Scottish renewable", a speech delivered by Chris Huhne, Secretary of State for Energy and Climate Change, 22 March, Ref: 2011/028, Department of Energy and Climate Change

Hunter J, 2009 Keynote speech to the 2009 Community Land Conference, Tarbert, Harris

Hunter J, 2010, "Land for the People: why community ownership matters and how we can get more of it", a speech at the Festival of Politics, Scottish Parliament, 20 August

Jørgensen U, Karnøe P, 1995, "The Danish wind-turbine story: technical solutions to political visions?" in *Managing Technology in Society* Eds A Rip, T Misa, J Schot (Pinter, London) pp 57 – 82

Kemp R, Schot J, Hoogma R, 1998, "Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management" *Technology Analysis and Strategic Management* **10**(2) 175 – 195

Loorbach D, 2007 *Transition Management. New Mode of Governance for Sustainable Development* (International Books, Utrecht)

MacAskill J, 1999 *We Have Won The Land* (Acair Limited, Stornoway)

Macfarlane R, 2010 "A Counter-Desecration Phrasebook" in *Towards Re-Enchantment: Place and Its Meanings* Eds G Evans, D Robson (Artevents, London) pp 107 – 130

MacKenzie F, 1998, "'The Cheviot, The Stag ... and The White, White Rock?': community, identity, and environmental threat on the Isle of Harris" *Environment and Planning D: Society and Space* **16** 509 – 532

Mackenzie F, 2006a, "A working land: crofting communities, place and the politics of the possible in post-Land Reform Scotland" *Transactions of the Institute of British Geographers*, **31** 383 – 398

Mackenzie F, 2006b, "'S Leinn Fhèin am Fearann' (The land is ours): re-claiming land, re-creating community, North Harris, Outer Hebrides, Scotland" *Environment and Planning D: Society and Space* **24** 577 – 598

MacIntosh A, 2001 *Soil and Soul* (Aurum, London)

Markard J, Truffer B, 2008, "Technological innovation systems and the multi-level perspective: towards an integrated framework" *Research Policy* **37** 596 – 615

Massey D, 1995, "Places and their pasts" *History Workshop Journal* **39** 182 – 192

Massey D, 1996, "Politicising space and place" *Scottish Geographical Journal* **112**(2) 117 – 123

Murphy J, 2009 *At The Edge: Walking the Atlantic Coast of Ireland and Scotland* (Sandstone, Highlands)

Murphy J, 2011a, "Walking a public geography through Ireland and Scotland" *The Geographical Journal* **177**(4) 367 – 379

Murphy J, 2011b, "Walking paths through postcolonial political geographies" *Political Geography* **30** 239-240

Murphy J, 2011c, "From place to exile" *Transactions of the Institute of British Geographers* **36**(4) 473 – 478

Paasi A, 1991, "Deconstructing regions: notes on the scales of spatial life" *Environment and Planning A* **23** 239 – 256

Paasi A, 2002, "Place and region: regional worlds and words" *Progress in Human Geography* **26**(6) 802 – 811

Paasi A, 2003, "Region and place: regional identity in question" *Progress in Human Geography* **27**(4) 475 – 485

Paasi A, 2004, "Place and region: looking through the prism of scale" *Progress in Human Geography* **28**(4) 536 – 546

Raven R, Heiskanen E, Lovio R, Hodson M, Brohmann B, 2008, "The contribution of local experiments and negotiation processes to field-level learning in emerging (niche) technologies: meta-analysis of 27 new energy projects in Europe" *Bulletin of Science Technology Society* **28** 464 – 477

Rip A, Kemp R, 1998, "Technological change" in *Human Choice and Climate Change* Eds S Rayner, E Malone (Batelle Press, Columbus, Ohio) pp 327 – 392

Ross M, 1999, "The Political Economy of the Resource Curse" *World Politics* **51**(2) 297 – 322

Rotmans J, Kemp R, van Asselt M, 2001, "More evolution than revolution: transition management in public policy" *Foresight* **3**(1) 1 – 17

Schot J, 1998, "The usefulness of evolutionary models for explaining innovation: the case of the Netherlands in the 19th Century" *History and Technology* **14** 173 – 200

Scottish Government, 2009 *Climate Change Delivery Plan: Meeting Scotland's Statutory Climate Change Targets*, Scottish Government, Edinburgh

Scrase J, Mackerron G, 2009 *Energy for the Future: A New Agenda* (Palgrave, London)

Scrase J, Smith A, 2009, "The (non-)politics of managing transitions to low carbon socio-technical systems" *Environmental Politics* **18**(5) 707 – 726

Shove E, Walker G, 2007, "CAUTION! Transitions ahead: politics, practice, and sustainable transition management" *Environment and Planning A* **39** 763 – 770

Smith A, 2007, "Translating sustainabilities between green niches and socio-technical regimes" *Technology Analysis & Strategic Management* **19**(4) 427 – 450

Smith A, Kern F, 2009, "The transitions storyline in Dutch environmental policy" *Environmental Politics* **18**(1) 78 – 98

Smith A, Stirling, 2010, "The politics of social-ecological resilience and sustainable socio-technical transitions" *Ecology & Society* **15**(1) article 11

Smith A, Stirling A, 2007, "Moving outside or inside? Objectification and reflexivity in the governance of socio-technical systems" *Journal of Environmental Policy & Planning* **9**(3-4) 351 – 373

Smith A, Stirling A, Berkhout F, 2005, "The governance of sustainable sociotechnical transitions" *Research Policy* **34** 1491 – 1510

Smith A, Voß J, Grin J, 2010, "Innovation studies and sustainability transitions: the allure of the multi-level perspective and its challenges" *Research Policy* **39** 435 – 448

SNP – Scottish Nationalist Party, 2011 *Re-Elect: A Scottish Government Working for Scotland*, SNP Election Manifesto, <http://manifesto.votesnp.com/downloads>

Stern N, 2006, *The Economics of Climate Change – The Stern Review* (Cambridge University Press, Cambridge)

Thompson F, 1984/2003 *Crofting Years* (Luath Press Ltd, Edinburgh)

Truffer B, 2008, "Society, technology, and region: contributions from the social study of technology to economic geography" *Environment and Planning A* **40** 966 – 985

Truffer B, Coenen L, 2011, "Environmental Innovation and Sustainability Transitions in Regional Studies", Regional Studies Annual Lecture, Regional Studies Associations Conference, Newcastle, April 19 2011

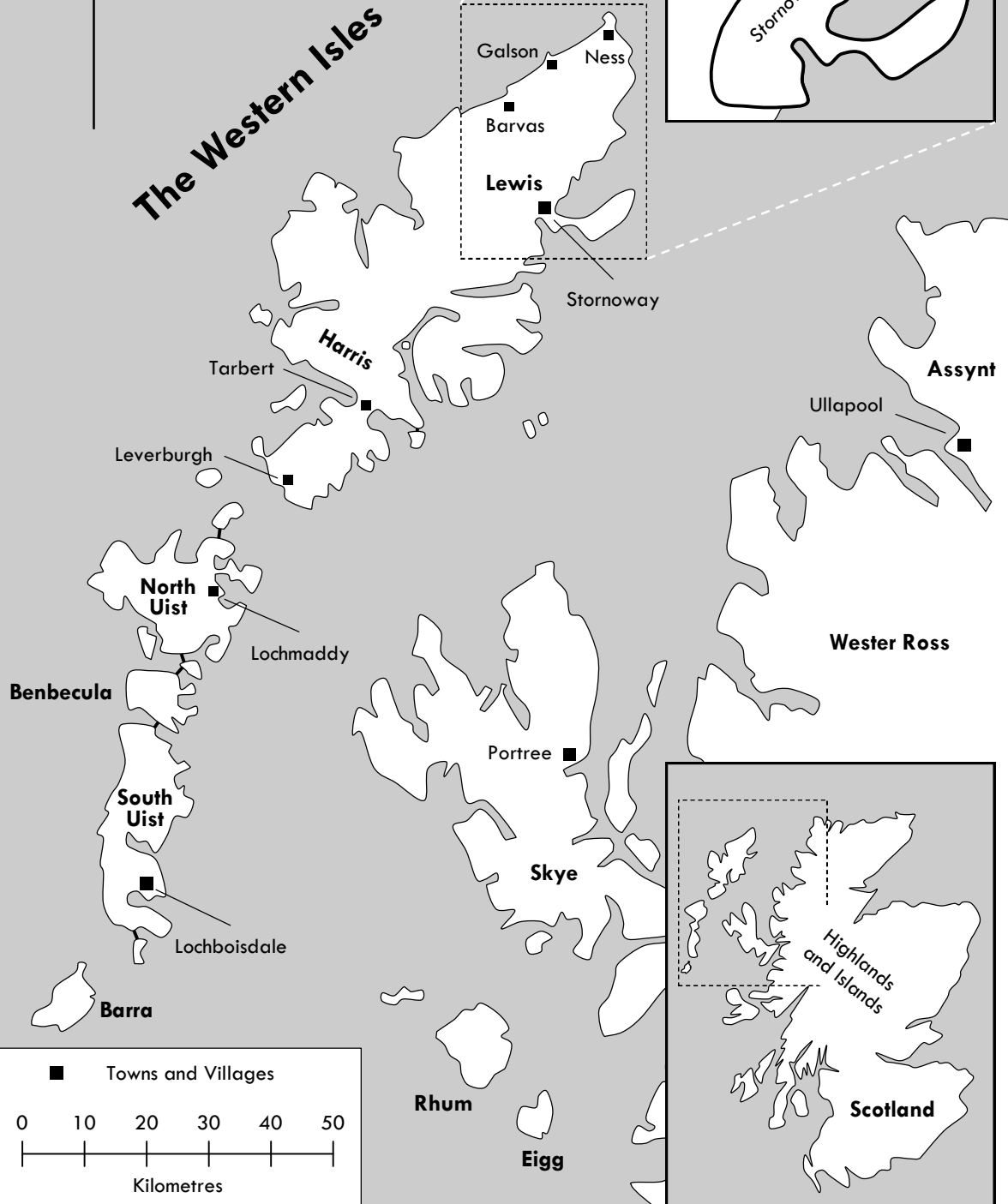
Unruh G, 2000, "Understanding carbon lock-in" *Energy Policy* **28** 817 – 830

Vidal J, 2012, "Wind turbines bring in 'risk-free' millions for rich landowners" *The Guardian* Tuesday 28 February

Northwest Scotland



The Western Isles





Gabhsann Bho Thuath
North Galson

NO 
WIND
FACTORY
On
Lewis

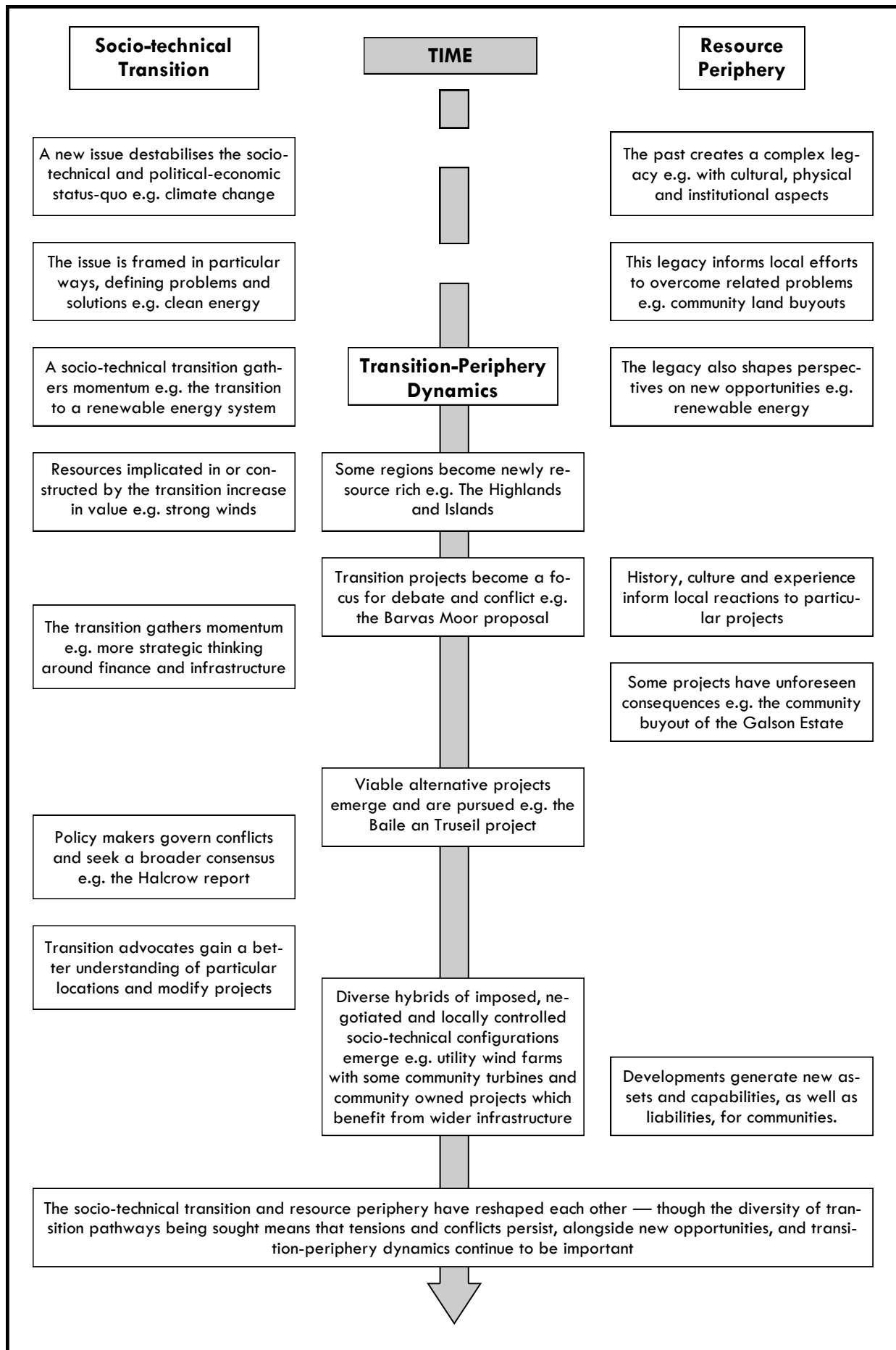


Table 1. The socio-technical transition and resource periphery perspectives

	Socio-technical transitions	Resource peripheries
Problem focus	Replacement of one socio-technical system by another over the long-term	Geographies (social, cultural, political and economic) of resource extraction including costs and benefits
Core concepts	Socio-technical, transition, landscape, regime, niche	Resource, periphery, core, region, place
Change processes	Existing socio-technical regimes come under pressure creating opportunities for alternatives which are nurtured in niche spaces	Political-economic processes create new resources whose exploitation can provoke local conflicts and give momentum to alternatives
Key Actors	Innovators, policy makers, transition managers	(Trans-national) investors and businesses, politicians, communities
Main Criticisms	Inattention to issues of power, justice, plurality and geography	Relatively unsophisticated treatment of technological change
Contribution from the other perspective	Resource periphery can help to explain why niches of particular kinds emerge and how landscape and regime processes interact with particular localities.	Socio-technical transition can help to explain why resources are re-evaluated, how exploitation is configured and regions/places reproduced or transformed.