

Building Carbon Literacy: How the Irish press normalise public discussion about climate mitigation actions

Dr Brenda McNally

School of Communications, Dublin City University, Glasnevin, Dublin 9, Ireland

Email: brenda.mcnally@dcu.ie

In Leal Filho, Azeiteiro, Manolas and Azul (in press) *Handbook of Climate Change Communication*, Springer-Verlag: Berlin Heidelberg

Abstract

The aim of this paper is to extend current research on climate change communication by zoning in on communication about societal responses to climate change or Low Carbon Transition (LCT). Specifically, it contributes to thinking about communication strategies to foster public discussion about reducing carbon emissions. To do so, the research examines how news media represent LCT and thus act as resources for public talk about tackling climate change. This paper argues news media representations of LCT offer essential insights about the range of processes for LCT that are being made publically available and are therefore highly significant in terms of building carbon literacy and broadening public talk about carbon reduction activity. In particular, it highlights why communications strategies for building climate ‘smart’ publics in response to COP21 must consider the implications of how news media normalise LCT as a social issue. Drawing on an Irish case study, this research presents a novel method for analysing press representations of LCT and shows that press treatment constrains carbon literacy by deploying a limited range of topics. The paper concludes by offering insights for communication strategies aimed at building carbon literacy: fostering public discussion and dialogue about LCT can broaden public engagement with climate change.

Keywords: News Media Representations of Low Carbon Transition; Carbon Literacy; Thematic Analysis

Mapping Print Media and Carbon Literacy

Broadening public engagement with climate change is a challenge for communications research, due to the complexity of the phenomenon and the urgent need for citizen action. Furthermore, post COP21, public engagement with climate change must do more than raise awareness of, or teach people about, climate *impacts* (such as extreme weather) - it also requires information about climate *responses* (such as societal mitigation actions) which involves building carbon literacy. News media have a significant role in this process, as media representations shape public knowledge of climate change and media discourse influences public perceptions and opinion. However, few studies explicitly focus on how news media report about tackling climate change or the societal efforts to reduce carbon emissions and corresponding changes to daily life and expectations. Therefore, this study contributes to knowledge about climate change

communication by investigating public discussion about LCT. In particular, it targets news media treatment of LCT to shed light on the implications for carbon literacy in terms of raising awareness and knowledge about the range of processes for and public meanings of LCT. To do so, the research maps Irish press representations of LCT as a multifaceted issue - that is, as a process involving choices about a range of social, technical, financial and political dimensions. Insight about LCT as a multi-dimensional issue is crucial because how LCT is conceptualized in press treatment involves significantly different outcomes for future environmental sustainability (Nerlich, 2012).

It is generally agreed that media are powerful agents influencing public awareness, understanding and opinions of social issues. This role is particularly significant in public debates about techno-scientific controversies (Nelkin 1995) as well as discussion about global environmental change (Carvalho and Burgess, 2005; Corbett and Durfee, 2004; O'Neill, 2013). However, while media analyses of climate change can reference the solutions debate and address questions about carbon literacy, to date media studies have focussed on the definitional struggle and thus news media coverage and construction of climate science. As a result, comprehensive analysis of news media coverage of LCT as a multi-dimensional issue involving options for achieving broad social and environmental change is sparse. For example, recent studies have focused on local news and energy transition in Denmark (Horsbøl 2013), low carbon housing in UK print media (Cherry et al., 2013) and climate and energy policy (Uusi-Rauva and Tienari 2010). Therefore, targeted examination of the deployment of ideas about the multi-faceted concept of LCT is an important contribution to this literature.

This study employs the concept of carbon literacy to assess press representations of LCT. There are a number of approaches to understanding carbon literacy. The term is often used by community organisations to evaluate public understanding of the social or everyday dimensions of moving to a low carbon future¹. It is also used in transition studies in research aimed at developing 'effective communication' to improve low carbon consumer behaviour (Sharp and Wheeler, 2013). In other words, where the focus is on normative or instrumental communications in which public(s) are primarily understood to be 'consumers' and the purpose of communication is to achieve private sphere engagement (Hoppner & Whitmarsh, 2010). This study employs a broader definition of carbon literacy as the situated, contextual and scientific conceptualisations of LCT and knowledge about the multi-faceted approaches for moving to a low carbon future (Whitmarsh *et al.* 2011) and goes beyond simple information provision or knowledge and awareness of scientific facts. Thus, carbon literacy here acknowledges the socio-cultural and political implications of LCT.

As an arena for the production, reproduction and transformation of meanings about complex social issues, the habitual ideas about LCT that are normalised in media reports are highly significant. As Nisbet (citing Etzioni, 2006) notes, '[o]nce assumptions and legitimate authorities are established on a problem like climate change, it becomes "costly in terms of human mental labor to re-examine what has finally come to be taken for granted".' (2013 p.x). Additionally, more people engage with media representations of transition than they do with the planning or policy process (Roberts, Upham, McLachlan, *et al.*, 2013). Consequently, this study maps press representations of LCT in order to understand how it shapes the range of public meanings and

¹ For example, Turner (2013) claims 'it is the ability to understand the carbon implications at every scale in the landscape of our lives and lifestyles' thus involving energy consumption; transport; homes and offices.

resources made available for public discussion about how we respond to climate change as distinct from the ways it shapes understanding and awareness of climate impacts. . In other words, news media are an important resource for public talk about climate change – particularly those who may not already be interested or engaged. It argues that the public meanings about LCT deployed in print media contributes to carbon literacy and that mapping the prevalence of these press themes, can add to the toolkit of strategic communications

Limitations and Research Constraints

As the research maps Irish press representations, the findings are not representative. However, the study targets Irish press as an important domain to begin mapping carbon literacy. Significantly, this case study offers an opportunity to examine press treatment in the context of national economic and fiscal crisis following the global banking collapse. Notably, Irish public debate about transition, tied to the need to meet EU 2020 targets, has given rise to more economic arguments for decarbonisation and approaches to carbon management. Thus, while these findings are not generalizable, they are informative for wider audiences as Ireland is at the coalface of public debates about climate responses that could occur in other countries in the future. In addition, the study does not provide insights on public uptake of press representations, which requires further empirical research. However, the findings offer nuanced starting points for audience reception studies of climate mitigation actions.

The following section describes the method employed to map the range of meanings about LCT. The evaluation focusses on how press conceptualisation reduce the complexities of LCT to the social and/or human scale. In other words, the study assesses the plurality and social (re)contextualisation of themes. The aim is to illuminate the extent to which press treatment of LCT as a multi-dimensional challenge is ‘socialised’ or brought closer to the lived experience. This evaluation is informed by recent scholarship highlighting the significance of the socio-cultural and socio-political dimensions of LCT (Miller *et al.* 2013, O’Brien and Selboe 2015) as well as information and education about socio-technical change in public engagement studies (Corner *et al.*, 2014; Hibberd & Nguyen, 2013; Hulme, 2013; Whitmarsh *et al.*, 2013). Thus the discussion also examines how trends in deployment themes build carbon literacy, paying particular attention to how the prevalence of, and silences in, conceptualisations influence which public meaning(s) of LCT are routinely made available. The discussion then reflects on the implications for broadening carbon literacy.

Method

This research builds on a pilot study of Irish press representations of LCT (McNally 2015) which thematically analysed (TA) entire articles in elite and tabloid newspapers (see Table 1). The pilot study identified six dominant themes indicating a variety of conceptualisations about this multi-faceted challenge (see Table 2) and found that LCT is an increasingly newsworthy topic (compared to studies highlighting decreasing levels of climate change stories both in Ireland (Mullally 2017) and internationally (Hope 2014). Increasing press coverage of LCT highlights the need for careful consideration of the search terms employed to capture the shifting meanings of climate change, especially in the post-COP 21 context.

Table 1: Irish Newspaper Dataset

	Total No of Articles	Type of Publication
The Irish Times	212	National Broadsheet
Irish Examiner	58	National Broadsheet
Irish Independent	28	National Broadsheet
Sunday Business Post	21	National Sunday Paper
The Mirror & Sunday Mirror**	11	Irish Edition of UK Tabloid
The Sunday Tribune*	10	National Sunday Paper
The Sunday Independent	5	National Sunday Paper
Irish Daily Mail**	2	Irish Tabloid covering UK news
Total	347	
* The Sunday Tribune closed in February 2011.		
** Tabloid coverage was markedly low due to large number of stories <150 words.		

However, while the pilot study found that the Irish press provide a variety of conceptualisations about this multi-faceted challenge, it was primarily a broad-brush analysis. Therefore the current study examines individual references to LCT within articles. This in-depth analysis provides insights for more nuanced suggestions for building carbon literacy. Thus, this study innovates print media research of climate change by i) employing a novel method to adequately capture the widest range of press representations and ii) developing an original coding scheme to identify the different positions on what LCT means and/or how it is to be achieved. These are now briefly summarised.

Table 2: Data Sampling Frame (based on Press Themes about LCT from Pilot Study)

<i>Broad Press Themes about LCT</i> <i>(unit of analysis = entire article)</i>	<i>Total No. Articles</i>	<i>Total in Sample</i>
<i>Targets & Regulations</i>	120 (35%)	68 (35%)
<i>Environmental Concern & Climate Change</i>	70 (20%)	40 (20%)
<i>Protecting Economy & Costs</i>	63 (18%)	36 (18%)
<i>Sustainability & Technological Innovation</i>	51 (15%)	29 (15%)
<i>Negative &/or Critical</i>	38 (11%)	22 (11%)
<i>Radical Change (not incld in %)</i>	5 (-)	5 (-)
<i>Total</i>	347	200 (58%)

Data Collection and Sampling

The corpus of data used for analysis was composed of all articles from Irish national newspapers available on Lexis Nexis newspaper database on 3 August 2013 and 12 October 2013. To ensure

the final corpus provided an accurate account of the balance of technical, economic and social understandings of LCT, keyword searches for both expert and lay citizen conceptualisations of LCT were undertaken. The first keyword search included terms related to expert and technical discussion: ‘Low Carbon’, ‘Decarbonisation’ and ‘Decarbon!’. To shed light on possible lay citizen discussions the search included the list of Creative Carbon Compounds (Koteyko et al., 2010)². The authors argue these compounds reduce the complexity of climate change to the human scale and they can be used to study the ways in which the issue of carbon emissions is being framed. Their inclusion resulted in a more comprehensive dataset and therefore increased the value of the research findings.

The searches covered the period 1 January 2000 – 31 July 2013. This timeframe marks the early stages of Carbon Tax debate in Ireland up to the end of the Irish Presidency of the EU and final discussions of EU policy on LCT. The news organisations were chosen to provide a good cross section in terms of type of publication and ideological orientation and included broadsheets, tabloids and weekend editions. Articles selected were from across the spectrum of newspaper sections but excluded articles of less than 150 words and Letters to Editor as these were considered too short for analysis. After screening and removal of duplicates this yielded 347 usable articles. A sample of 200 articles (approx. 60% of dataset) was then drawn-up using random stratified sampling based on prevalence of themes in the pilot study (see Table 2). Thematic Analysis (TA), Codebook Development and Coding Strategy

The coding scheme categories were developed inductively following steps for TA outlined by Braun and Clarke (2006) and the coding process was carried out using nVivo software. TA is a particular type of qualitative content analysis that focusses on identifying recurrent ideas or themes in texts (rather than words). The TA was theoretically informed by the concept of framing from media studies. ‘Framing fundamentally asks how an issue is made meaningful’ (Horsbøl 2013 p.25). This was operationalised in the coding process using Entman’s definition (1993, p.52) ‘news frames are ‘manifested by the presence or absence of certain keywords, stock phrases, stereotyped images, sources of information and sentences that provide thematically reinforcing clusters of facts or judgements’. Thus, categories generated by drawing on the concept of framing are essentially dominant themes about what LCT means, involves or requires; or repeating patterns of ideas about the problem LCT solves or the processes for decarbonisation. Consequently, this approach to framing produces fine-grained insights suited to developing communications strategies.

However, it is important to note that the identification of particular frames does not imply that audiences will interpret their content in the manner described or that press frames influence audience attitudes or behaviour. Likewise, the study does not include important insights from news sources who are highly influential in news reporting about technoscientific debates (Anderson 2009, Maesele 2010). Finally, whilst informative, Irish press themes do not necessarily reflect the representations of LCT across broadcast and online media.

² This list contains the most commonly used words in online discussion about carbon management.

Trends in Irish Print Media Themes about LCT

The inductive TA generated 8 themes about carbon literacy (see Table 3). All the references to LCT were coded and the process allowed for the same unit of text to be included in more than one theme. This resulted in 1,063 references across the study sample.

Table 3: Prevalence of Irish Press Themes about LCT

Press Themes about LCT	Prevalence (% of Total References 1,063)
State/Sectoral Intervention and Regulations	299 (28%)
Financial and Market Measures	174 (16%)
Economic Growth and Efficiency	130 (12%)
Environmental Responsiveness	114 (11%)
Citizen Responsibility and Consumer Action	111 (10%)
Advocating Energy Transition	109 (10%)
Techno-Innovation & Low Carbon Solutions	92 (9%)
Future Scenarios	32 (3%)
Miscellaneous	2

State/Sectoral Intervention and Regulations

‘Her colleague, Liz McManus, said the proposed Bill was inadequate and that overall responsibility for the targets should rest with the Taoiseach, as recommended by a report she prepared for an Oireachtas committee.’

Climate change Bill to formalize emissions targets, Irish Times, 12.12.09

The most prevalent conceptualisation represents change as taking place through orderly top-down procedures which is at odds with generally accepted ideas of transition as disruptive and involving intermediaries (Geels and Kemp 2007) and analysis that claims ‘socio-tech systems emerge haphazardly, unpredictably and from left field’ (Urry 2011 p160). Significantly, as Stirling (2015) argues, the history of social and technical transformations suggests that change occurs in more ‘horizontally distributive forms, with hope-inspired collective action, social mobilisation and democratic struggle playing more dominant roles’ (*ibid.* p2). Therefore, the prevalence of this conceptualisation obscures the wide diversity of stakeholder and citizen interests that are necessary for the ‘horizontal politics’ associated with societal transformation. This category notably features calls for ‘transformative leadership’ and/or ‘radical transformation’, but beyond calls for these processes, there is no critical assessment of what this transformation might involve. While this conceptualisation brings climate change home as a local issue, it primarily focusses on evaluating local policy-making and critical assessment is restricted to discussion of government (in)action particularly around the Carbon Tax and Climate Change Bill.

Financial and Market Measures

'During the Celtic Tiger years, Ireland's greenhouse gas emissions spiralled out of control and it was speculated that the Government might have to spend more than EUR1bn in purchasing carbon credits to comply with Kyoto.'

We've turned the gas down, The Mirror, 23.10.10

This theme offers statements about financial solutions and generally promotes establishment actors' views on the economic utility of the Carbon Tax, Energy Tax and Carbon Markets. However, these are often decontextualized from references to environmental protection or social concerns. Thus, the primary concern is identifying the most cost-effective ways of meeting targets and reducing carbon emissions. As critics point out, this assumes status quo practices and values can be left unchanged and existing social arrangements do not need to be altered (Blue 2015). One of the most repeated references is to 'putting a price on carbon' as the 'tough measure' that will reduce (environmental) pollution, incentivise behaviour change and address need to meet Kyoto targets. This category also frames the public meaning of LCT within the logic of efficiency and promotes discussion of carbon calculus over societal transformation or questions about social distribution, ethics or consumption. It also avoids discussion of the 'systems' which create pollution and the contribution of markets and technology to the problem. Thus it places blame on citizens and businesses for creating emissions rather than the capitalist modes of production and consumption. Thus, it advances simplistic evaluations of financial measures, which are at odds with the complexity and scale of the problem.

Economic Growth and Efficiency

'The debate has moved on from one of strict compliance to reduce greenhouse gas emissions and increase the share of renewable energy, to a much more strategic discourse about how Ireland must prepare to become a low-carbon economy. We need to identify and plot a sustainable and affordable pathway to transition Ireland as a low-carbon country; but even more to be a world leader where we have a natural competitive advantage.'

We have potential to be world leaders in the green economy, Irish Independent, 1.12.11

This conceptualisation advances two perspectives on LCT both of which set the terms of debate within an economics and technology framework. The first, prior to Irish economic collapse in 2008 is critical of LCT and questions the economic value of the carbon tax and the costs for business. Post-2009 this category presents economic crisis and the need for regrowth as the main problem and describes the economic benefits of LCT. As a result, this category omits references to environmental protection or concern and asserts economic utility as the paramount paradigm for evaluating LCT. Overall, it advances public knowledge of the benefits of a low carbon economy with some critique of financial measures and 'onerous targets' on national competitiveness. This is highly significant in relation to shaping carbon literacy and public knowledge about the trajectory of transition pathways. As Nerlich (2012) points out, how the problem of transition is framed and discussed, influences which solutions are seen as possible and thus who are viewed as the responsible agents of change. Additionally, there is little discussion of social inequity or distribution issues associated carbon reduction activities or any

questioning of consumption. Instead, this category promotes elite rationales for reducing carbon emissions such as concerns about carbon tax and maintaining farming production.

Environmental Responsiveness

'ECONOMIC RECOVERY when it comes must involve Ireland developing a low-carbon smart, green economy, the Environmental Protection Agency (EPA) said yesterday. 'Launching the agency's annual highlights for 2008, EPA director general Dr Mary Kelly said the environment was an asset under threat and early warnings about the potentially catastrophic effects of climate change must be heeded.'

EPA calls for move to low-carbon economy, Irish Times, 3.04.09

This is the only theme to explicitly link LCT and climate change. However, it advances a number of positions on LCT and the environment and possibly represents the most distinctly Irish conceptualisation of transition, specifically in relation to highlighting inherent tensions involved in balancing economic and environmental rationales for LCT. Two views stand out: firstly, that environmental protection is too costly and will reduce national competitiveness and secondly, following the Stern report, arguments challenging earlier negative economic pronouncements on LCT and tackling climate change. Other references focus on the costs of climate change impacts and CO2 emissions penalties; calls for Climate Change law as well as the advantages of Ireland's low carbon farming model. Thus this category promotes the logic of efficiency with claims that 'climate policy can be consistent with good economics' and references to 'win-win solutions' as well as vague environmental rhetoric calling for 'imagination, innovation and new ways of working' but more often dramatic fear appeals emphasizing the need to 'save the planet'. It also draws on carbon calculus to legitimise food production goals and increasing agricultural emissions ahead of meeting climate targets. However, while linking economic crisis and environmental catastrophe presents some of the complexity of LCT, it lacks social critique. For example, there is very little discussion of the social impacts of LCT initiatives and the role advanced for citizens are primarily as carbon conscious consumers.

Advocating Energy Transition

'There is more to it for Ireland than reducing emissions, however important that may be. The country has world-class renewable resources in abundance -- wind and water being the two obvious examples -- but has yet to determine how best to develop these assets and the potential scale of the investment.'

We have potential to be world leaders in the green economy, Irish Independent, 1.12.11

This category promotes energy transition as the solution to energy security and a valuable contribution to economic rejuvenation, through the development of new green industries which will create 'thousands' of jobs. As a result, energy transition is discussed as a topic which affects everybody and is often personalised with references to impacts and benefits for farmers, households and commuters. Despite this however, discussion of clean and renewable (energy) technology is generally divorced from references to environmental protection, tackling climate

change or the social dimensions of energy change. Likewise references do not question energy consumption, the reality of the high carbon lock-in of our lifestyles, or promote societal responsibility. Instead, it prioritises the view that the only thing that has to change is the type of energy we use, rather than how much we are consuming. This conceptualisation also pays considerable attention to energy policy, infrastructure change and the most economically beneficial methods of energy generation, all of which are presented in techno-managerial language. Given that energy permeates everything we do, the lack of social (re)contextualisation is highly significant for carbon literacy as it makes energy policy invisible and thereby reduces public agency and ability to act to create change.

Citizen Responsibility and Consumer Action

'The Governmental commitments under the Kyoto protocol are only a start. Every person has responsibility to reduce their carbon footprint, and this must be done quickly now that the very obvious effects of climate change are upon us.'

Wiping your carbon footprint clean, Irish Times, 19.09.08

This is one of the two 'socially relevant' conceptualisations of LCT (see also 'Future Scenarios') and as expected, it presents a wide-ranging discussion relevant to citizen involvement with LCT, including references to political engagement, linking action to the causes of climate change as well as questioning consumption and societal distribution and inequity. However, references are generally framed within the logic of efficiency and the focus on behaviour change constructs individuals as the problem rather than high carbon lock-in. It also avoids discussion of systemic or structural problems and the causes of climate change or references to barriers to citizen and community action. In addition, although references are made to the need to change everyday lifestyles, they omit advice or evaluation directed at specific societal groups such as families, teenagers, mothers, fathers and thus fail to personalise the issue for readers.

Techno-Innovation and Low Carbon Solutions

'The EPA says these targets will be met because of improvements in the energy efficiency of homes and more fuel-efficient cars, including the rollout of electric vehicles.'

Recession fuels 'unprecedented' fall in emissions, Irish Independent, 23.10.10

This theme presents a constructive view of technological innovation as the means of achieving LCT with considerable discussion of how it will contribute to the low carbon economy. References repeatedly highlight the benefits of sustainable development especially clean and green energy as economic drivers. A second dominant idea promotes the efficiency of low carbon production associated with Irish farming and related expert concerns with measuring and validating carbon reduction. As a result, this category is also driven by the logic of efficiency, which highlights the production of economic benefits in environmentally friendly ways. The predominant view is of unproblematic technological advance - technology will address carbon reduction needs and citizens are positioned as unproblematic consumers of new low carbon products.

Future Scenarios

“We need to be thinking about the creation of a new transformational approach, involving a mutually beneficial partnership between business and Government, which will be in the long-term interest of current and future generations,” she added.

Nation can become ‘global hub for carbon credit trading’, Irish Examiner, 10.03.09

The marginal presence of this theme offers stark illumination of the extent to which the social dimensions of LCT are marginalised in press representations. Moreover, despite its potential to represent social concerns and aspirations, press treatment of this category offers a vague vision of a low carbon future dominated by elite claims-maker interest in LCT. Thus it offers few references to what a *future society* should or could be like, or discussion of ‘the constellations of social forces that might bring about such transition’ (Urry 2011 p140). This is significant for carbon literacy because it indicates that the underlying assumption reproduced in press treatment, is that LCT will not be driven by social forces, but rather by government/sectoral intervention and financial solutions. In addition, the deployment of ideas about a carbon constrained world is confined to establishment rhetoric which paints an optimistic economic vision of ‘profound change’ uniquely devoid of any social implications of technological transformation.

Implications for building Carbon Literacy

The analysis reveals that press treatment inadequately represents LCT as a local issue and fails to bring LCT closer to the lived experience, which is a key concern of emerging literature on public engagement with LCT (Bulkeley *et al.* 2011, Rowson and Corner 2015). Instead, the prevalent conceptualisations help to define a vision of LCT that is separate from discussion of the social and cultural implications and the need for social transformation. This has negative consequences for carbon literacy as it reduces ability of citizens to make informed choices about LCT, specifically in relation to seeing beyond economic priorities and fulfilment of individual interests.

The findings also highlighted the extent to which Irish press treatment normalises public meanings of LCT as involving unproblematic linear change, which is at odds with the history of transitions as unpredictable, messy and driven by intermediaries beyond elite and/or establishment actors. Thus, the study argues that Irish press treatment narrows the visibility of carbon as a social, material and cultural issue and that this was accomplished through a number of discursive tactics, notably (i) by employing the language and logic of elites; and (ii) the ‘crowding out’ of socially relevant topics and associated with this, a lack of social critique.

Perhaps the most distinctive feature of Irish press treatment is its focus on ‘Financial and Market Measures’ (16%) over ‘Technological Solutions’ (9%). The relative silence in press treatment of technological dimensions differentiates the Irish case from comparable studies of print media and LCT. However, discussion of the processes for tackling climate change is potentially one of the most important for shaping carbon literacy as it contributes to public debate about the alternate choices for achieving LCT. Furthermore, references to solutions are predominantly utilitarian,

repeatedly focussing on what they will achieve and incentivising behaviour change rather than on the problems they may create or the socio-cultural and political implications. In particular, the negative implications of financial or market measures for society or discussion about societal impacts of technical innovation is seldom raised. In addition, the focus on financial and market measures, which promotes responsibility at the level of liberal markets, leaves unasked and unanswered questions about consumption. Likewise, references rarely challenge the limits of technology in relation to the scale of the problem, the reality of ‘green growth’ or the viability of linear progress espoused by establishment figures. As a result, Irish press treatment offers little in terms of informing democratic struggle and political engagement with LCT and therefore presents a reductive and banal account of possible transitions pathway.

Suggestions for Communications and Journalism Praxis

The findings show that rather than broadening the conversation about LCT and adding to public resources for talking about climate responses, the Irish press normalise narrow public meanings and ideas about actions. In particular, it asserts the agendas, preferences and framings of LCT in line with powerful business and political actors. These limitations on plurality and social (re)contextualisation pose challenges for building carbon literacy and potential cognitive engagement with LCT.

The most important findings arising from this analysis however are its insights on the value-laden nature of press treatment of LCT and the implications of the lack of social critique. The findings illuminated how the dominant themes prioritise and reproduce existing patterns of social activity, thus promoting public knowledge of LCT as a process in which existing social arrangements are maintained rather than an opportunity for radical social transformation as called for by Hulme (2015) among others. Moreover, Hulme argues the focus on ‘carbon calculus’ normalises carbon management as ‘trust in numbers ahead of justice on the ground’. Thus, the problem with the expert-driven calculative approach to LCT that dominates Irish press treatment is that

it acts as a proxy for ethical choice and avoids or replaces discussion of ‘the pressing needs of wealth re-distribution, human welfare and social justice’ (*ibid.*).

By prioritising LCT as a government responsibility, Irish press treatment frames the challenge as ‘a matter best left to technocratic decision making and/or market forces’ (Maesele 2015 p398) and may therefore be said to impede democratic debate by contributing to processes of depoliticisation (*ibid.*). Thus, Irish press discussion of LCT primarily places responsibility for most of the difficult ethical, cultural, political and economic questions in the hands of politicians and, increasingly, business interests to work out. Overall, the analysis highlights the influence of elite interests in shaping carbon literacy and thus how powerful claims-makers establish their perspective on potential citizen action associated with LCT. This indicates the need for journalism praxis to present a range of new voices and alternate visions on LCT as this could broaden carbon literacy in new creative ways. It also underlines the need for communications strategies to challenge the dominant business-as-usual narrative and offer alternate insights. In particular, the findings highlight need to i) focus on social and local dimensions, and increase

awareness of transition as a socio-cultural and political issue and ii) translate techno-managerial and abstract language to more socially-relevant information.

Conclusion

While there is agreement about the need for greater public engagement and public talk about climate change, less is known about what this talk should involve. Analysing news media and press representations of LCT in terms of building carbon literacy offers novel insights for research and communication strategies aimed at engaging publics with responses to climate change. This study shows that rising Irish press coverage of LCT may constrain the possibilities for more diverse public talk about climate mitigation action, which has implications for broader public engagement. However, audience reception studies are needed to confirm whether this is the case. Additionally, future research should examine whether the patterns of press coverage identified in this study are replicated in other countries.

Bibliography

- Allan, S., Adam, B., and Carter, C., 2000. Introduction: the media politics of environmental risk. *In: S. Allan, B. Adam, and C. Carter, eds. Environmental risks and the media.* London: Routledge, 1–26.
- Anderson, A., 2009. Media, Politics and Climate Change: Towards a New Research Agenda. *Sociology Compass*, 3 (2), 166–182.
- Anderson, A., 2015. News media. *In: K. Backstrand and E. Lovbrand, eds. Research Handbook on Climate Governance.* Cheltenham: Edward Elgar Publishing Ltd, 320–331.
- Blue, G., 2015. Framing Climate Change for Public Deliberation: What Role for Interpretive Social Sciences and Humanities? *Journal of Environmental Policy & Planning*, 18 (1), 67–84.
- Braun, V. and Clarke, V., 2006. Using Thematic analysis in psychology. *Qualitative Research in Psychology*, 3 (2), 77–101.
- Bulkeley, B.H., Broto, V.C., Hodson, M., and Marvin, S., 2011. Cities and the Low Carbon Transition. *The European Financial Review*, (Aug-Sept), 24–27.
- Carvalho, A. and Burgess, J., 2005. Cultural circuits of climate change in U.K. broadsheet newspapers, 1985-2003. *Risk analysis : an official publication of the Society for Risk Analysis*, 25 (6), 1457–69.

- Carvalho, A. and Peterson, T.R., 2009. Discursive Constructions of Climate Change: Practices of Encoding and Decoding. *Environmental Communication: A Journal of Nature and Culture*, 3 (2), 131–133.
- Cherry, C., Hopfe, C., MacGillivray, B., and Pidgeon, N., 2013. Media discourses of low carbon housing: The marginalisation of social and behavioural dimensions within the British broadsheet press. *Public Understanding of Science*, 24 (3), 302–10.
- Corbett, J. and Durfee, J., 2004. Testing Public (Un)Certainty of Science: Media Representation of Global Warming. *Science Communication*, 26 (2), 129–151.
- Corner, A., Markowitz, E., and Pidgeon, N., 2014. Public engagement with climate change: the role of human values. *Wiley Interdisciplinary Reviews: Climate Change*, 5 (3), 411–422.
- Entman, R.M., 1993. Framing - Toward Clarification of a Fractured Paradigm. *Journal of Communication*, 43 (4), 51–58.
- Etzioni, A., 2006. Are public intellectuals an endangered species? In: A. Etzioni, A. and Bowditch, eds. *Public intellectuals: an endangered species?* Lanham: Rowman & Littlefield.
- Geels, F.W. and Kemp, R., 2007. Dynamics in socio-technical systems: Typology of change processes and contrasting case studies. *Technology in Society*, 29 (4), 441–455.
- Hibberd, M. and Nguyen, A., 2013. Introduction. *International Journal of Media and Cultural Politics*, 9 (1), 3–5.
- Hope, M., 2014. The pitfalls of analysing media coverage of climate change, in three graphs - Carbon Brief [online]. *Carbon Brief*. Available from: <https://www.carbonbrief.org/the-pitfalls-of-analysing-media-coverage-of-climate-change-in-three-graphs> [Accessed 3 Aug 2016].
- Hoppner, C. and Whitmarsh, L., 2010. Public Engagement in climate action: policy and public expectations. In: L. Whitmarsh, S. O'Neill, and I. Lorenzoni, eds. *Engaging the Public with Climate Change: Behaviour Change and Communication*. London: Earthscan, 47–65.
- Horsbøl, A., 2013. Energy Transition in and by the Local Media. *Nordicom Review*, 34 (2), 19–34.
- Howell, R.A., 2013. It's not (just) 'the environment, stupid!' Values, motivations, and routes to engagement of people adopting lower-carbon lifestyles. *Global Environmental Change*, 23 (1), 281–290.

- Hulme, M., 2009. *Why We Disagree About Climate Change: understanding controversy, inaction and opportunity*. Cambridge: Cambridge University Press.
- Hulme, M., 2013. *Exploring Climate Change Through Science and in Society*. Oxon: Routledge.
- Hulme, M., 2015. No living with climate change, with or without the Paris Agreement [online]. *Professor Mike Hulme's Site*. Available from: <http://www.mikehulme.org/2015/12/living-with-climate-change-with-or-without-the-paris-agreement/> [Accessed 14 Dec 2015].
- Koteyko, N., Thelwall, M., and Nerlich, B., 2010. From Carbon Markets to Carbon Morality: Creative Compounds as Framing Devices in Online Discourses on Climate Change Mitigation. *Science Communication*, 32 (1), 25–54.
- Maesele, P., 2010. Science journalism and social debate on modernization risks. *Journal of Science Communication*, 9 (4), 5–10.
- Maesele, P., 2015. Beyond the Post-Political Zeitgeist. In: A. Hansen and R. Cox, eds. *The Routledge Handbook of Environment and Communication*, Oxon: Routledge, 389-401.
- McNally, B., 2015. Media and Carbon Literacy: Shaping Opportunities for Cognitive Engagement with Low Carbon Transition in Irish Media, 2000-2013. *Razon y Palabra*, September (91), unpaginated.
- Miller, C. A., Iles, A., and Jones, C.F., 2013. The Social Dimensions of Energy Transitions. *Science as Culture*, 22 (2), 135–148.
- Monbiot, G., 2015. Keep fossil fuels in the ground. *The Guardian*, 10 Mar.
- Mullally, G., 2017. Fear and Loading in the Anthropocene: narratives of apocalypse and salvation in the Irish media. In: E. Byrne, G. Mullally, and C. Sage, eds. *Transdisciplinary Perspectives on Transitions to Sustainability*. Oxon: Routledge, 83–105.
- Nelkin, D., 1995. *Selling science: how the press covers science and technology*. New York: W.H. Freeman.
- Nerlich, B., 2012. 'Low carbon' metals, markets and metaphors: the creation of economic expectations about climate change mitigation. *Climatic Change*, 110 (1-2), 31–51.
- Nisbet, M. 2013. Forward. *Exploring Climate Change Through Science and in Society*. Oxon: Routledge.
- O'Brien, K. and Selboe, E., 2015. *The Adaptive Challenge of Climate Change*. New York'; London: Cambridge University Press.

- O'Neill, S.J., 2013. Image matters: Climate change imagery in US, UK and Australian newspapers. *Geoforum*, 49, 10–19.
- Roberts, D., Upham, T., McLachlan, P., Mander, C., Gough, S., Boucher, C. and Ghanem, P. 2013. *Low Carbon Energy Controversies*. Oxon: Routledge.
- Rowson, J. and Corner, A., 2014. How Framing Can Move Climate Change From Scientific to Social Fact. *The Guardian*, 23 May.
- Rowson, J. and Corner, A., 2015. *The Seven Dimensions of Climate Change: Introducing a New Way to Think, Talk and Act*. London:RSA/COIN.
- Sharp, A. and Wheeler, M., 2013. Reducing householders' grocery carbon emissions: Carbon literacy and carbon label preferences. *Australasian Marketing Journal (AMJ)*, 21 (4), 240 – 249.
- Turner, A., 2013. The Case For Carbon Literacy [online]. *Carbon Visuals Blog*. Available from: <http://www.carbonvisuals.com/blog/the-case-for-carbon-literacy> [Accessed 5 Aug 2015].
- Urry, J., 2011. *Climate Change and Society*. Cambridge; Malden, MA: Polity Press.
- Uusi-Rauva, C. and Tienari, J., 2010. On the relative nature of adequate measures: Media representations of the EU energy and climate package. *Global Environmental Change*, 20 (3), 492–501.
- Whitmarsh, L., O'Neill, S., and Lorenzoni, I., 2010. *Engaging the Public with Climate Change: Behaviour Change and Communication*. London: Earthscan.
- Whitmarsh, L., O'Neill, S., and Lorenzoni, I., 2013. Public engagement with climate change : what do we know and where do we go from here ? *International Journal of Media and Cultural Politics*, 9 (1), 7–25.
- Whitmarsh, L., Seyfang, G., and O'Neill, S., 2011. Public engagement with carbon and climate change: To what extent is the public 'carbon capable'? *Global Environmental Change*, 21 (1), 56–65.