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Geological Survey of Ireland
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Review of Key Issues around Social Acceptance of Geoscience Activities & Earth Resources in Ireland

FINAL REPORT



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Note: Cover photograph from Grupo Antofagasta (Chile) sustainability reports
<http://www.aminerals.cl/mineria-sustentabilidad/reportes-de-sustentabilidad/>.



Plants grow in communal assemblages in the Burren pavement limestones (Photo: SLR Archive)

EXECUTIVE SUMMARY

SLR Consulting Ireland (SLR) was contracted by the Geological Survey of Ireland (GSI) in November 2015 to carry out a systematic review and gap analysis of the '*key issues around social acceptance of geoscience activities & Earth resources in Ireland*'. The focus was on core geoscience activities, including research, exploration and extraction of minerals, energy and water resources and to identify areas of research that the Irish Centre for Research in Applied Geosciences (iCrag, www.icrag-centre.org) may address in the future.

SLR carried out the study in three phases: literature review; stakeholder consultations with industry, academia, community and government sectors, followed by a final consultative workshop with key stakeholders. A dozen key issues and findings, with gap analysis, were identified through the study, which were prioritised by stakeholders at the final workshop. These are presented below for consideration for further research.

National and International Literature Review

A comprehensive literature review was carried out to determine the level of research into social acceptance of geoscientific activity across a range of sectors (*presented as Annex 1 of this report*). The study found that there is a significant body of research on social acceptance and public attitudes to renewable energies, particularly wind, both internationally and in Ireland. Similar research has been conducted in relation to mining and minerals in resource-rich jurisdictions such as Canada and Australia. There is almost a complete lack of research on 'social acceptance' of geoscience activity and development of earth resources in Ireland.

Social acceptance operates at three key levels: socio-political, market and community, respectively; it is largely at the latter level that determines whether geoscience activity is acceptable or not to the public. The term 'acceptance' in itself is nuanced, in that non-objection does not necessarily mean active support. However the term was retained throughout the report as it is widely used in the literature.

International frameworks which guide social engagement on public acceptance issues were first reviewed, followed by research pertaining to broader issues of acceptance of sub-sectoral geoscience and resource activities. Best practice by development agencies in effective community engagement in the developing world is now being introduced to the developed world as a key element for sustainable development of resources.

Political leadership is required at national and regional socio-political levels to deliver policy commitments and balanced spatial planning in the search for indigenous resources. At local levels, where 'social acceptance' in the current consideration resides, meaningful engagement on geoscience activity is critical, particularly in the research, exploration for and exploitation of resources, to earn the social licence to operate. Individual and collective decision making is not solely determined by the level of engagement or the information provided; rather an individual is influenced by the trustworthiness of the project proponent and the social dynamic in which s/he resides. The review indicates that similar issues influence social acceptance of both earth resources and energy technologies.

For resource projects to be socially acceptable, consideration of local values, transparency, procedural and distributional justice is required. Trust is crucial and is underpinned by faith in the regulatory/ governance systems to defend the public interest. Unfortunately, a conflation of public opposition to energy projects, coupled with the economic collapse in Ireland, may have undermined public trust in the regulatory system, as evidenced by the response to EPA research on the risks of 'fracking'.

The Government White Paper (December 2016) on Energy Policy adopts the concept of an 'Energy Citizen'. While Ireland has a well-established regulatory process and highly regarded investment climate for minerals development, current mineral policy does not address engagement with the citizens for development of major resource projects. The concept of a 'Resource Citizen' could be considered by policy makers, to inform national and regional spatial planning for resource developments, through proactive engagement with citizens.

The research indicates that the key issues to achieve social acceptance of geoscience activity and ultimately the 'social licence to operate' in Ireland are likely to be:

- ✚ Early and effective engagement with impacted communities (of locality and interest);
- ✚ The need for understanding of place attachment; shared values and issues of concern; understanding of local power relations:
 - *Impacts on Place* may include place, health and environmental impacts including visual intrusion, noise, traffic, biodiversity, identity and local well-being
- ✚ Procedural fairness, with transparent, equitable decision making by developers and policy makers.
- ✚ Distributional justice to ensure host communities gain socio-economically.
- ✚ Trust building among all parties – open, honest and transparency in all dealings.

These factors combine in complex ways and can be partly determined by previous community experience of major proposals, or cumulative impacts of other resource developments in the locality. The reactions to a local project can be strongly influenced by the wider regulatory context and broader societal values.

Public communications of geoscience activity are weak and should be focused on building balanced scientific understanding and awareness of the need, benefits and risks of geoscience activity through public outreach. The effective use of the web and social media to counterbalance misinformation is an issue for consideration.

Key Findings & Research Prioritisations from Consultations

Key Finding 1: Dearth of Research on Social Acceptance of Geoscience Activity

There is a significant body of research on social acceptance and public attitudes to renewable energies internationally and in Ireland. Similar research has been conducted in relation to mining and minerals in resource rich jurisdictions such as Canada and Australia. There is no research on social acceptance of geoscience activity in Ireland.

GAP 1: *There is a lack of academic research on social acceptance of geoscience activity and development of earth resources in Ireland.*

Key Finding 2: Attitudes to Geoscience Activity are broadly Positive to Neutral, except regards 'Fracking'

The Irish public will accept a range of geoscience activities in quarrying, exploration and mining and offshore oil and gas, providing there is strong regulation and environmental management. Of a range of activities, onshore shale gas exploration ('fracking') is the least acceptable activity to the Irish public and is vehemently opposed by host communities.

Respondents in the Irish minerals industry report a neutral to positive acceptance of quarrying, mineral exploration and mining, based on active engagement and positive economic impacts locally. All industry respondents report a negative legacy from the Corrib Gas and shale gas 'fracking' scenarios in terms of impact on future project proposals or developments.

SFI reports an increased awareness of science among the public and also an appetite to understand more scientific concepts.

There is weak public communication of either the benefits or the risks of geoscience activity by the geoscience industry. The public perception of 'risk' is thus more likely influenced by other sources, including NGOs.

GAP 2: *There is no academic research on public attitudes to, or appreciation of, the benefits or risks of geoscience activity in Ireland.*

Key Finding 3: Social Acceptance must be understood at Local Level

It is specifically at community level that geoscience activity is either acceptable or not to the public. The concept of 'nimby' is outmoded and simplistic in its response to genuine concerns. Resource developers must understand the potential impacts of proposals on issues of place, attachment, land and identity, coupled with understanding of social structures and power relations. Acceptance is nuanced, in that non-objection does not mean active support.

Modern quarries and mining projects have been positively received in Ireland due to improved communications and tangible socio-economic benefits, but it is felt that new extractive operations would face increased challenges in gaining social acceptance. Respondents in this research reported the primary concern as environmental impacts on their 'place' by geoscience activity.

GAP 3: *There is no site specific research or case studies on communities that have been impacted (positive or negatively) by geoscience activities in Ireland.*

Key Finding 4: Need for Improved Community Engagement Methodologies

The provisions of the Aarhus Convention provide rights to citizens to participate in environmental decision making. Meaningful, participatory engagement for geoscience activity at local level is requisite to build public understanding of risks and benefits. Engagement must commence at exploration and continue through feasibility, development, exploitation and closure stages to earn and maintain the social licence.

A more participatory and non-adversarial form of engagement is required to allow community input much earlier in the decision-making stages for project design. Information needs to be simplified and more accessible.

GAP 4: *Need for guidance on design and implementation of participatory, non-adversarial methodologies for social engagement and decision making in the geosciences in Ireland.*

Key Finding 5: Need for Public Trust in Procedural Process & Regulation

Procedural fairness in project development is requisite for acceptance, with transparent, equitable decision making by developers and policy makers, in which community stakeholders can have a valid and timely input.

Social acceptance relies to a large extent on public trust in strongly functioning regulatory and government institutions, acting in the public good. The planning approvals and environmental consents process must demonstrate consideration of local values and concerns.

Equitable distributional justice is required for resource projects to be socially acceptable, so that a social dividend may be realised locally.

GAP 5: *There is limited scholarly research on issues of public trust in either the procedural planning process or in geoscience regulation in Ireland to date.*

GAP 6: There is scant research on appropriate models for distributional justice and delivery of social dividends in the Irish context.

Key Finding 6: Understanding Social Decision Making & Logics for Action

There is currently weak understanding of why and how the public reacts to project proposals for development or exploitation of earth resources. Theories of social judgement indicate that there are zones of latitude within which people decide to accept or reject proposals.

Individual and collective decision making is strongly influenced by the trustworthiness of the project proponent and the social dynamic in which s/he resides.

The motivations for community action or opposition to resource projects are poorly understood from a socio-psychological perspective.

GAP 7: There is scant research on the understanding the motivations for public action in opposing geoscience projects in the Irish context.

Key Finding 7: Need for Improved Geoscience Education & Communication

Public communications of geoscience activity are perceived universally to be weak and should focus on building balanced scientific understanding and awareness of the need, benefits and risks of geoscience activity through public outreach. The public currently finds 'science' confusing with conflicting messages from scientists.

Public understanding of geoscience is weak and requires core education at primary and secondary levels to improve understanding of societal resource needs, sustainability and environmental issues. Geoscientists also need to develop improved communication skills and a number of positive models were identified to achieve this.

The effective use of the web and social media to counterbalance negative imagery and misinformation in popular culture and social media is an issue for consideration.

GAP 8: *Need for improved educational programming to build understanding and communication of earth resources and environmental sciences at all levels.*

GAP 9: *There is no research in Ireland on the role of popular culture and social media in influencing public attitudes to, and understanding of, geoscience activity.*

Key Finding 8: Expanded Policy for Minerals Development

Current mineral policy for development of mineral resources in Ireland requires to be expanded in relation to citizen engagement and spatial planning.

The White Paper on Energy (Dec. 2015) recognises the 'resource citizen'; a similar concept could be considered for minerals developments.

GAP 10: *Current policy for the development of the minerals sector in Ireland does not address citizen engagement and spatial planning considerations.*

Finding 9: Need for Political Leadership on Policy Delivery

Political leadership is required at national and regional levels to deliver balanced spatial planning in the search for indigenous resources. From the policy development perspective, local politics are allowed frequently to over-ride the national interest. From the community perspective, policy

is developed to meet national priorities and takes scant regard of concerns with regards to local impacts.

GAP 11: *There is lack of research on the nature of, or the degree to which, political structures undermine the delivery of national resource requirements in Ireland.*

Finding 10: Changing Corporate Culture:

Geoscience (and other) companies typically adopt a linear 'project management' approach towards project development. Corporate culture needs to move from single loop thinking to iterative thinking to embrace community engagement as a necessary part of resource development, much in the same way as the 'safety cultural revolution' of the past decade.

GAP 12: *There is lack of research on the nature of decision making and the reasons for significant shifts in geoscience business culture in Ireland.*

Understanding social acceptance of geoscience activity is crucial for regulators, policy makers and project developers. Negative social attitudes can be a major barrier to secure supplies of raw materials or meeting internationally binding renewable energy targets.

Based on these key findings and gaps, a number of Draft Research Proposals were formulated and presented to key stakeholders at a Consultative Workshop held on 3rd May 2016 at the Geological Survey of Ireland. The delegates prioritised the draft findings for future research and these are presented below.

PRIORITISED RESEARCH PROPOSALS

PRIORITY 5 = HIGHEST 1 = LOWEST	Identified Gaps/ Issues	Priority Topic for Research Potential Researcher
5	GAP 1: Lack of academic research on social acceptance of geoscience activity and development of earth resources in Ireland	Social acceptance of a range of geoscience activity is poorly understood in Ireland. Based on international experience of acceptance of renewable energy technologies, conduct research into the basis for social acceptance/ rejection and engendering trust in geoscience activity through a structured consultative research approach. <i>Social scientist with understanding of earth sciences, or vice versa</i>
5	GAP 3: Case studies in Ireland on socio-economic and environmental impacts of site specific geoscience activities on communities	Socio-economic and environmental research into the positive and negative impacts of resource developments on site specific localities in Ireland. Research suggestions include: ❖ Socio-economic impacts of operating mines at Navan (zinc) and Kingscourt (gypsum) on wider northeast area; ❖ Socio-economic impacts of mining and subsequent closure of Galmoy/ Lisheen in the Counties Kilkenny and Tipperary; ❖ Socio-economic impacts on North Mayo of the Corrib Gas development; ❖ Legacy issues of historical mining and options for post-mining after-use of sites e.g. Silvermines, Co Tipperary Socio-political-economic impacts on Leitrim-Fermanagh of shale gas exploration. Case studies may be beneficial in the development of public acceptance for future proposals. <i>Socio-economist, Environmentalist, Political scientist</i>

5	GAP 2: Lack of academic research on public attitudes to, or public appreciation of the benefits or risks of geoscience activity.	Design surveys and monitoring programme of <i>Public Attitudes to Geoscience Activity and Earth Resources</i> at regular intervals, akin to SFI barometers. Use of socio-quantitative and qualitative tools to assess data. The public perception of the risks related to geoscience activity is largely influenced by NGOs than by industry practitioners. Risk perception in Ireland requires to be investigated. Research is required to track perceptual trends and inform the design of appropriate engagement mechanisms. • <i>Social scientist with understanding of earth sciences, or vice versa</i>
4	GAP 4: Lack of guidance on design and implementation of participatory, non-adversarial methodologies	There is a strong need for applied guidance on how to engage effectively with communities and other stakeholders. Research into culturally appropriate methodologies of engagement and mechanisms to avoid conflict. Research is required on how improved engagement mechanisms can lead to more non-adversarial and participatory decision making for resource projects. • <i>Social scientist</i> • <i>Community engagement practitioner</i>
4	GAP 5: Limited scholarly research on assessment of public trust in procedural process or in public geoscience regulation.	The impact of diminished public trust in national institutions in the wake of the 2008 economic crash is not yet fully grasped in terms of its negative impacts on the democratic process. The reasons for when people move from trust in authority to diminished trust are not well understood. Research is required into the level of trust in the planning process and public regulators of geoscience activity, to understand the trust that exists and the mechanisms that may be required to strengthen or re-build that trust. An ancillary topic may be to investigate the impact on public trust of the dual regulatory/facilitatory role of Irish geoscience regulators, north and south of the Border. • <i>Socio-political scientist</i> • <i>Environmental / legal</i>

4	GAP 7: There is scant research on social 'logics' and decision making, which motivate public action in opposing geoscience projects in the Irish context	Social judgement theory provides an understanding of the latitude of people's decision making, and how they might move from rejection to acceptance. The 'logics for action' framework provides understanding of what motivates people to act or respond in a particular way. The motivation for collective protest against resource developments seems to be strong in Ireland, but what motivates a citizen to become an activist? What causes others to passively accept projects? • <i>Social Psychologist</i>
4	GAP 10: Current policy for the development of the minerals sector in Ireland does not address citizen engagement and spatial planning considerations	Research is required into developing an appropriate Mineral Policy policy to reflect resources needs, societal expectations and links to other areas of Irish and EU public policy. It should also accommodate the provisions of the Aarhus Convention on public engagement. Ireland has updated its Energy White Paper in 2015, with a requirement for engagement with the 'resource citizen' strongly articulated throughout. Linked to this, an updated National Geoscience Strategy could be developed for the island of Ireland. • <i>Geoscientist / Public Policy Expert</i>
3	GAP 6: Scant research on appropriate models for distributional justice and delivery of social dividends from major resource projects in the Irish context.	There is a need to develop appropriate and fair models of distributional justice for resource developments in Ireland. A number of models exist in UK and Europe, and there are models of distributional justice in e.g. Corrib Social Fund; wind energy projects. These aim to compensate those communities most directly impacted by mining, quarrying, gas, wind farms, grid pylons. • <i>Socio-economist</i> • <i>Social Impact assessor</i>
3	GAP 11: There is lack of research on the nature of, or the degree to which, political structures may undermine the delivery of national resource requirements in Ireland.	There is reasonable evidence, given the Irish political system, that politicians will opt to support a populist local cause versus legislating in the national interest, even occasionally against national policy objectives. Research could be conducted on the level to which political support for such populism contributes to or undermines the delivery of national resources requirements and geoscience activity. Examples could include Navan Zn/ Corrib Gas and / Leitrim shale gas experience. • <i>Political Scientist</i>

3	GAP 8: Need for improved communications and educational programming to build understanding of earth resources and environmental issues at all levels.	Educational policy is a major determinant in access to specific types of scientific knowledge and may also act as a barrier to same. Geoscience is not an educational policy priority in Irish schools curricula. Research is required into science policy development in primary and secondary levels – who develops such policy? Who decides what is included and what is excluded in term of curriculum development? And at what level is science programmed out? And how could it be scheduled in the curriculum? • <i>Educationalist / policy developer</i>
2-3	GAP 12: There is lack of research on the nature of decision making and cultural shifts in geoscience business culture in Ireland.	Shifts in business culture are poorly understood, but have been known to happen in terms of embracing e.g. environmental impact assessment for resource developments, or the adoption of proactive safety culture, over the past twenty years. Could such a cultural shift happen with regards to social engagement, where it will become the norm in business culture? • <i>Business Studies / Psychology</i>
1	GAP 9: There is no research in Ireland on the role of popular culture and social media in influencing public attitudes to, and understanding of, geoscience activity.	Popular cultural imagery of geoscience activity (especially mining/ oil and gas) are almost always negative. This has been exacerbated by rapid spreading of misinformation by social media. Does such messaging impact heavily on public attitudes and social acceptance of geoscience activity in Ireland? • <i>Media/ communications</i>
2-3	GAP 12: There is lack of research on the nature of decision making and cultural shifts in geoscience business culture in Ireland.	Shifts in business culture are poorly understood, but have been known to happen in terms of embracing e.g. environmental impact assessment for resource developments, or the adoption of proactive safety culture, over the past twenty years. Could such a cultural shift happen with regards to social engagement, where it will become the norm in business culture? • <i>Business Studies / Psychology</i>

2	GAP 8: Need for improved educational programming to build understanding and communication of earth resources and environmental issues at all levels.	Educational policy is a major determinant in access to specific types of scientific knowledge and may also act as a barrier to same. Geoscience is not an educational policy priority in Irish schools curricula. Research is required into science policy development in primary and secondary levels – who develops such policy? Who decides what is included and what is excluded in term of curriculum development? And at what level is science programmed out? And how could it be scheduled in the curriculum? • <i>Educationalist / policy developer</i>
1	GAP 9: There is no research in Ireland on the role of popular culture and social media in influencing public attitudes to, and understanding of, geoscience activity.	Popular cultural imagery of geoscience activity (especially mining/ oil and gas) are almost always negative. This has been exacerbated by rapid spreading of misinformation by social media. Does such messaging impact heavily on public attitudes and social acceptance of geoscience activity in Ireland? • <i>Media/ communications</i>

1.0 INTRODUCTION

SLR Consulting Ireland (SLR) was contracted by the Geological Survey of Ireland (GSI) in November 2015 to carry out a systematic review of the *'key issues around social acceptance of geoscience activities & Earth resources in Ireland'*.

In the terms of reference, the GSI requested that the review should be phased as follows:

- **Phase 1:** Systematic review of existing international and national literature/ research,
- **Phase 2:** Interviews with relevant key stakeholders, and
- **Phase 3:** A workshop for stakeholders, researchers, policy makers, public groups etc. with an interest in this area (with GSI to assist with this event).

Phase 1 comprised a national and international literature review of the topic 'social acceptance of geoscience activity and earth resources in Ireland' which was presented to the GSI December 2015 (the final version of which is included in *Annex 1* of this report). This report presents the results of Phase 2 consultations, which were undertaken across industry, academia, regulators, policy makers and among the public, including NGOs and community activists. The report also presents the prioritised findings of the Phase 3 Consultative Workshop, held with key stakeholders in early May 2016 at the GSI's offices.

The final prioritised research proposals are presented in the final chapter.

1.1 Objectives

The objectives of the project are to develop insights into the social acceptance of resource developments in Ireland, to understand what influences public perceptions of resource projects and to define areas for further research in collaboration with GSI's partners.

1.2 Scope

The scope for Phase 2 was to consult widely with stakeholders to understand core issues regarding social acceptance to determine likely areas suitable for research in the future.

1.3 Methodology

A definition of 'Geoscience' was presented to consultees prior to engagement, as follows:

'Geoscience' refers to a broad range of geological activities including the exploration and quarrying/ mining & extraction of natural resources (e.g. stone, sand & gravel, gypsum, metals, gas, oil, water), which require varying levels of mapping, sampling, surveying, drilling and excavation; geotechnical engineering (e.g. construction, pipelines, wind farms); research into geological hazards (e.g. flooding, peat slides; earthquakes); public research and information provision on aspects of groundwater, resources, environmental management, resource management, energy, climate change and earth systems.

SLR conducted a mix of qualitative and quantitative techniques to consult and engage with a range of stakeholders, using the following methods.

- (i) Direct interviews of public attendees at the BT Young Scientists' Exhibition in Dublin in January 2016, using a structured questionnaire;

- (ii) Online structured survey of targeted community activists and NGOs, as well as policy makers at local authority level;
- (iii) Direct telephonic and face-to-face interviews with members of industry, academia, national regulators, NGOs and community activists, using both structured and semi-structured formats;
- (iv) Attendance at third level student workshop on 'social licence to operate' in relation to ethics in business planning;
- (v) Reports and case studies from a range of sources, including some from the 'Phase 1 Literature Review'.

Respondents were geographically located in Ireland, Northern Ireland, Scotland, Sweden and USA and cover a range of age groups, gender and cultures.

The sectoral spread of consultees ranged from regulation, policy making, mineral exploration and mining, oil and gas developers; academia in geoscience, business and social science; heritage, planning and public engagement; and community development.

All data were aggregated and triangulated to provide confidence in responses from the various sources. The data were then analysed to formulate Draft Research Proposals for consideration.

In Phase 3, in advance of the final Consultative Workshop, the Draft Research Proposals were circulated to all consultees and feedback was sought. The workshop was held in the GSI in early May 2016, where delegates were presented with key issues, gaps and findings of the study, as well as papers from experts in the fields of research, policy, stakeholder engagement, risk communication, community activism and international development.

The draft proposals were considered by delegates and prioritised to present ranked Research Proposals for consideration by iCRAG for future research.

2.0 FINDINGS: CONSULTATION PHASE

The following section presents the findings of Phase 2 Consultations, presented by type. Questionnaires are presented in Appendix A.

2.1 Direct Research: BT YSE

SLR prepared a questionnaire (Appendix A-1), with the approval and support of the GSI, to carry out direct consultations with attendees at the three-day *BT Young Scientists Exhibition* festival at the RDS in Dublin, from 6-9th January 2016. In total, 81 people were directly surveyed from an estimated attendance of 60,000 people, including student researchers, teachers and the general public. This provides a snapshot of public opinion, although by virtue of attendance at BTYSE, may be sampling a more scientifically literate sub-population than the average.

Interviewees were from 17 counties, included both male and female respondents, with most respondents from the 41-65 years age grouping (Figure 1).

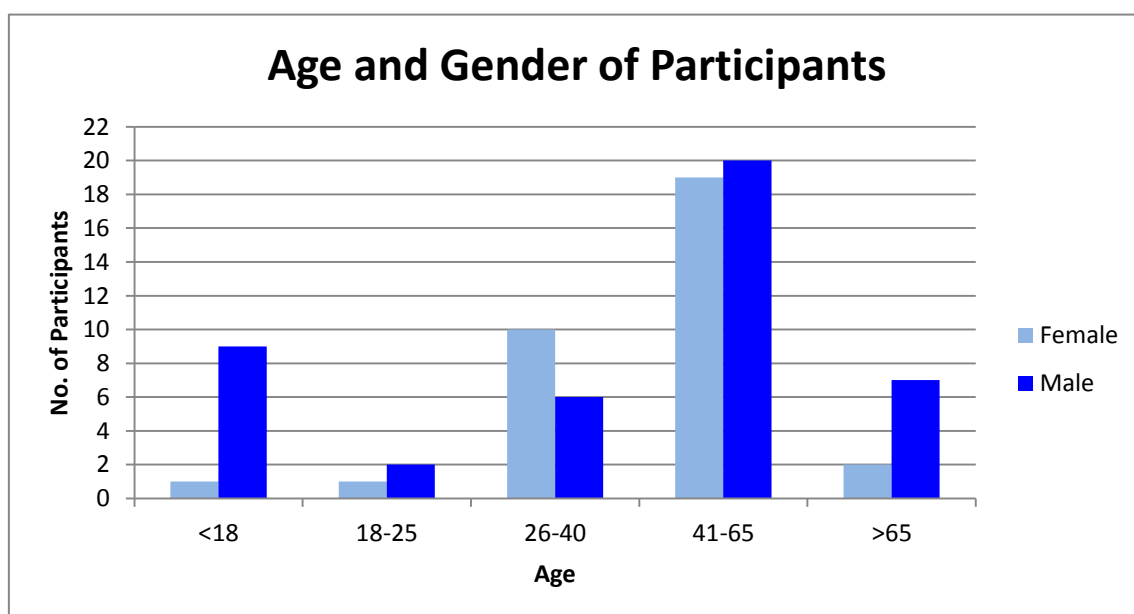


Figure 1: BT YSE - Age and Gender of Participants

A series of general 'perceptual' questions were asked first, to determine the level of awareness of resource activity and potential in Ireland.

Respondents (97%) overwhelmingly agreed that Ireland should explore for and exploit as much of its own resource and energy needs as possible in Ireland, versus importing resources. They also overwhelmingly (99%) supported geological research to understand how earth systems work (Figure 2).

While 35% were unaware that Ireland is a major producer of zinc metal in Europe, men were generally more aware than women of Ireland's importance in this regard (*true*). Although 21% of respondents did not agree that quarrying supplied 15,000 jobs in 2006, men were also more aware of quarrying as a major provider of jobs (*true*). Practically all respondents were aware that Ireland enjoys very high wind resources in a European context (*true*; Figure 2). Interestingly, older age groups demonstrated a higher awareness of the role of mineral resources in Irish society (Figure 3).

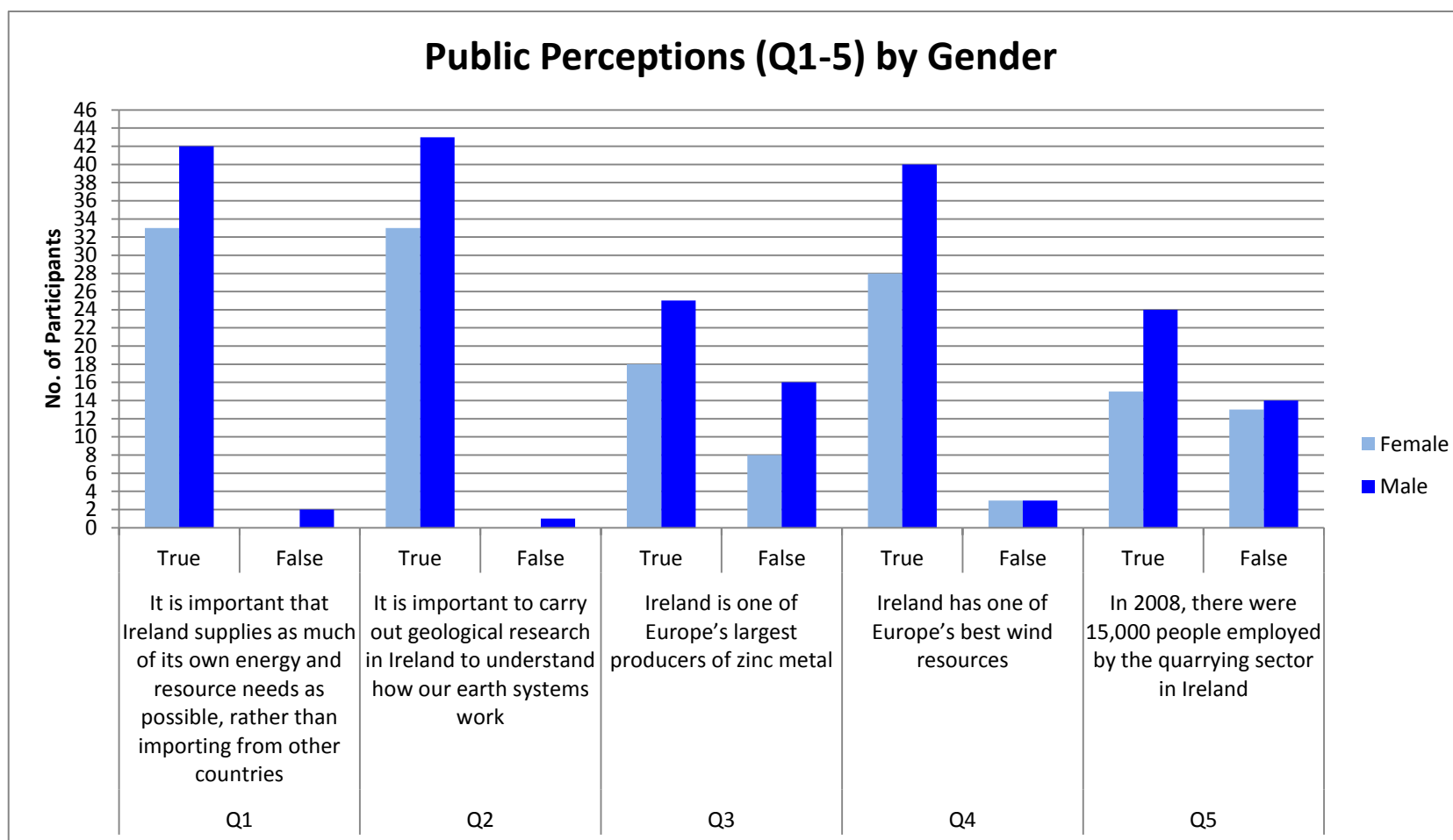


Figure 2: BT YSE – Public Perception of Resource Activity by Gender

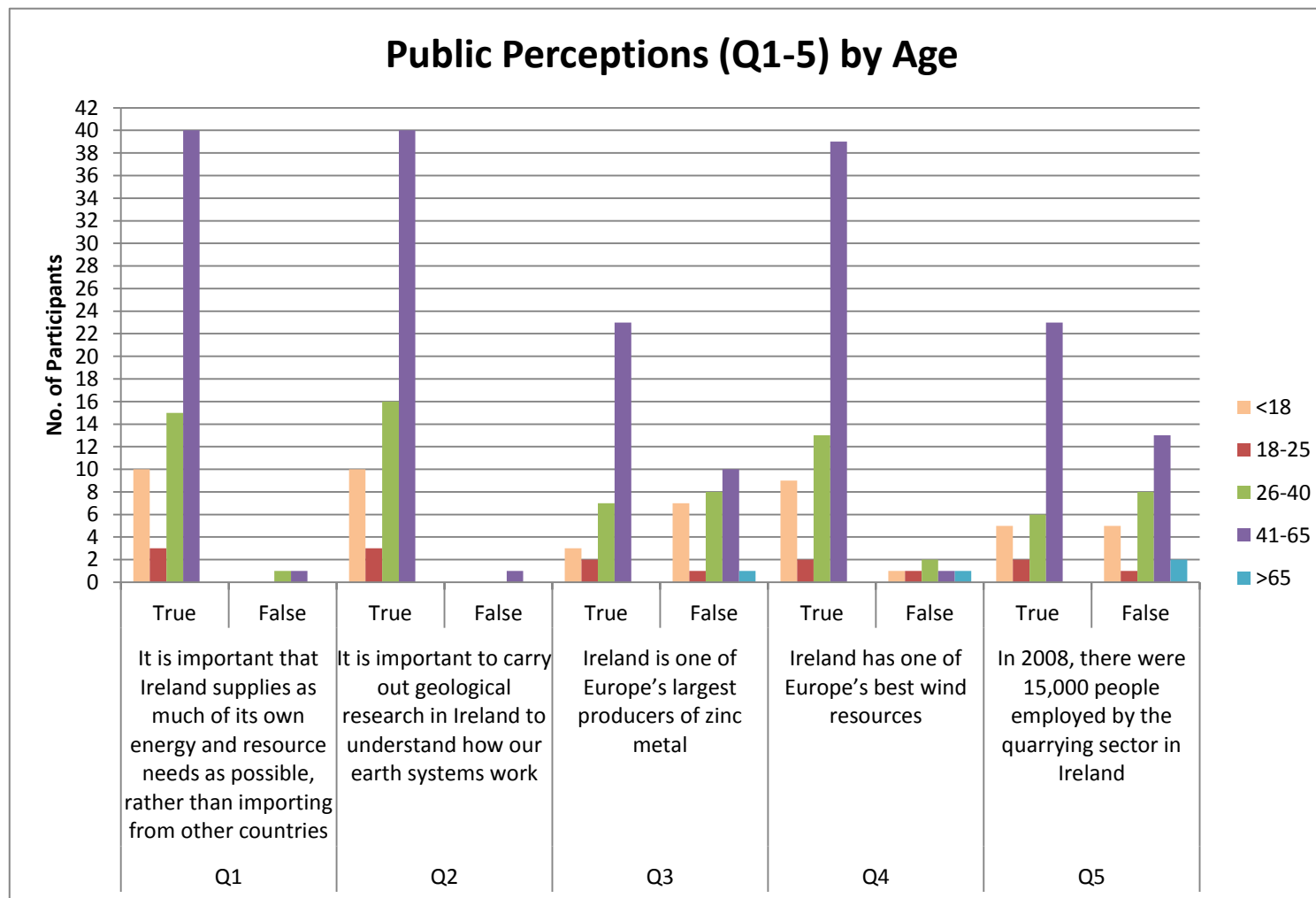


Figure 3: BT YSE – Public Perception of Resource Activity by Age

The subsequent set of questions (Q6-Q10) was designed to assess social attitudes to specific earth resource activity in Ireland. These related to quarrying, mining, oil and gas, shale gas and nuclear energy (see Figure 4 overleaf).

On a four-scale spectrum ranging from ‘*always agree*’ to ‘*always disagree*’, respondents were generally positively disposed towards geoscience activities, providing that strong regulation and environmental management were adopted.

This was particularly the case for quarrying (94%), exploration and mining of metals (84%), and offshore exploration for oil and gas (74%). When the question was asked whether exploration for shale gas (‘fracking’) should be allowed, the responses were more likely to be negative (60%) than positive (40%).

When asked whether nuclear power should be considered as a possible source of energy in Ireland, 46% were positively disposed to consideration of nuclear energy with strong regulation, while 45% were negatively disposed to nuclear energy.

Almost all respondents (94%) agreed that community consultation should be undertaken concerning extraction of earth resource in Ireland.

General Comments from the Public

General comments were invited from participants to the survey, and although many did not respond to this element, the essential feedback captures public perceptions relating to energy supply and demand, as well as the recognised need for increased public understanding of geology and earth resources (Table 1).

Should have energy conservation rather than nuclear energy
Question short term use of offshore gas
Public understanding of geology is very important
Conservation and environmental protection must always be taken into account
Q5 probably true but seems excessive
For Q9, agree with gas exploration / extraction but not oil - danger to environment is to great with oil exploration
We need a clear science discussion on energy and resources
Angry that Ireland is considering fracking for shale gas - bad for environment
Would love if someone was willing to come and speak to a class
The public need to understand (have explained) some of these processes
Irish geological resources need further funding to realise their full potential
Information to the public is very important - make them feel connected to the issue
Q9: disagree - should be owned by Ireland

Table 1: Comments by Respondents at BTYSE

The focus on energy and ownership of resources perhaps reflects the much wider debate in the national media on oil and gas exploration in Ireland, including public awareness of ‘fracking’, as well as the need for climate adaptation strategies.

A number of people left their contact details and indicated they would like to be kept informed of the research outcomes.

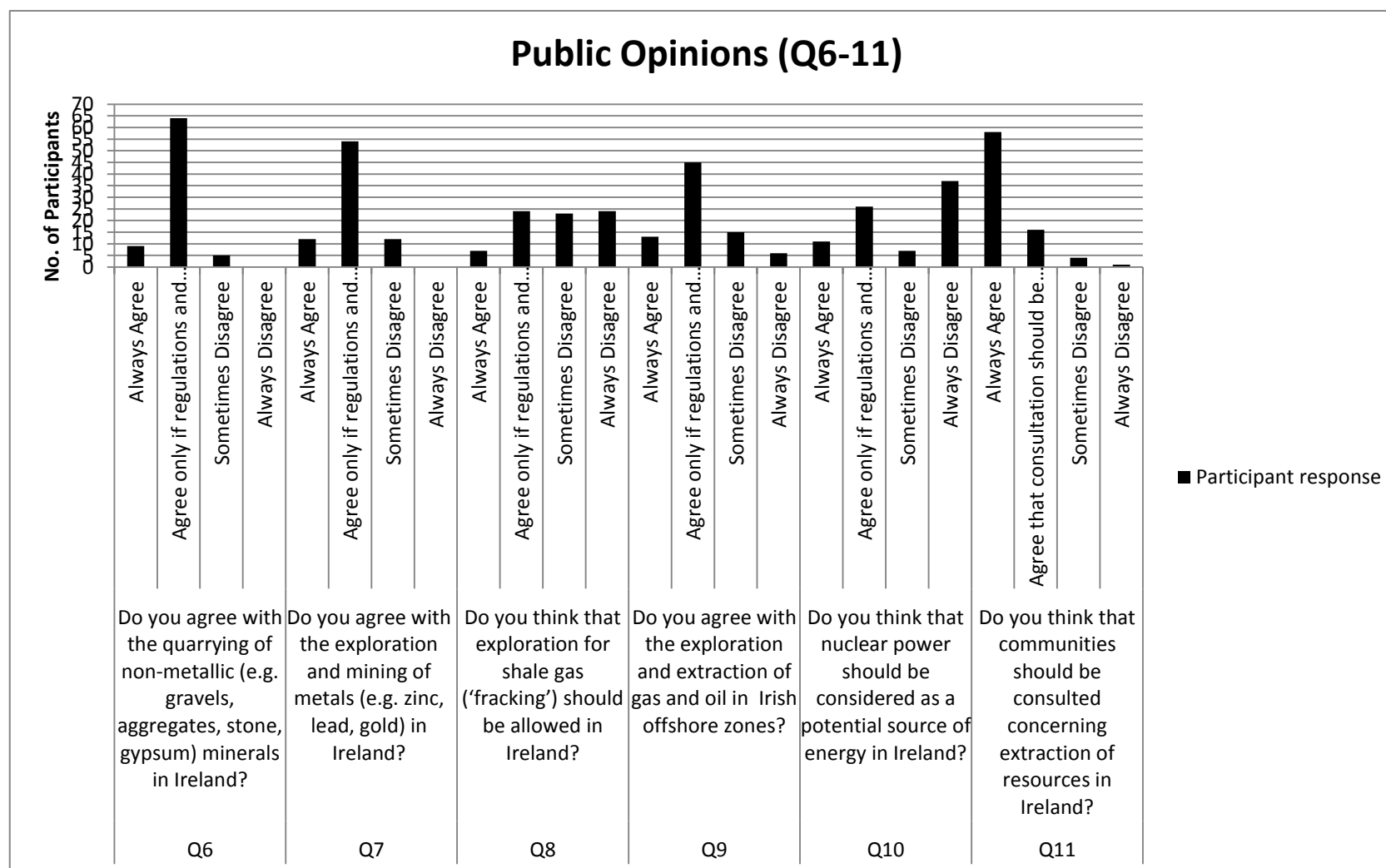


Figure 4: BT YSE – Public Perception of Resource Activity by Age

2.2 Research – Online Survey

An online ‘survey monkey’ questionnaire (Appendix A-4) was designed to assess public attitudes to geoscience activity and earth resources in Ireland from a broader audience of community activists, local authority policy makers, and energy and environmental NGOs.

The questionnaire was circulated to 84 people on SLR’s contacts’ database, who are known to be active in community development, planning, heritage and natural resources issues countrywide. Most of the people who responded were in the experienced age bracket (31-65 years), with men and women almost evenly represented (Figure 5).

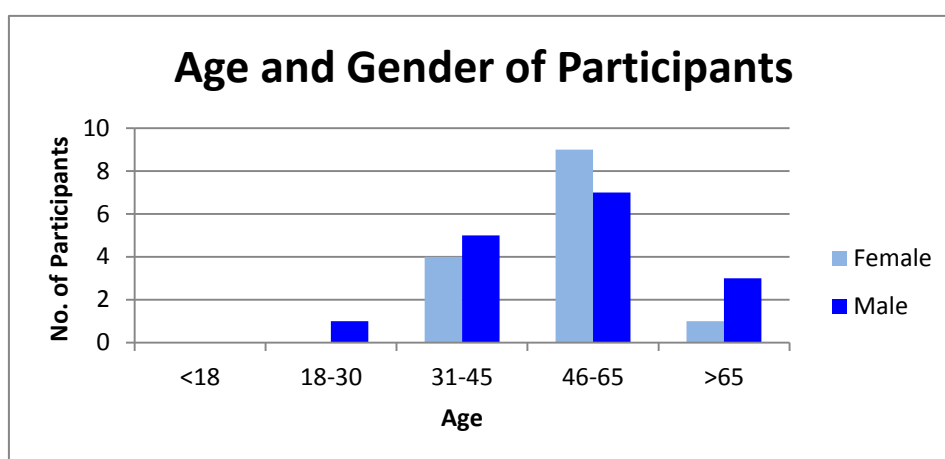


Figure 5: Online Survey: Age and Gender of Participants

The respondents to the online survey (n = 34, 40.5%), indicate a similar pattern to those interviewed by questionnaire at the BTYSE (see Section 2.1 above). Men and women report a fairly similar response to the questions (Figure 6).

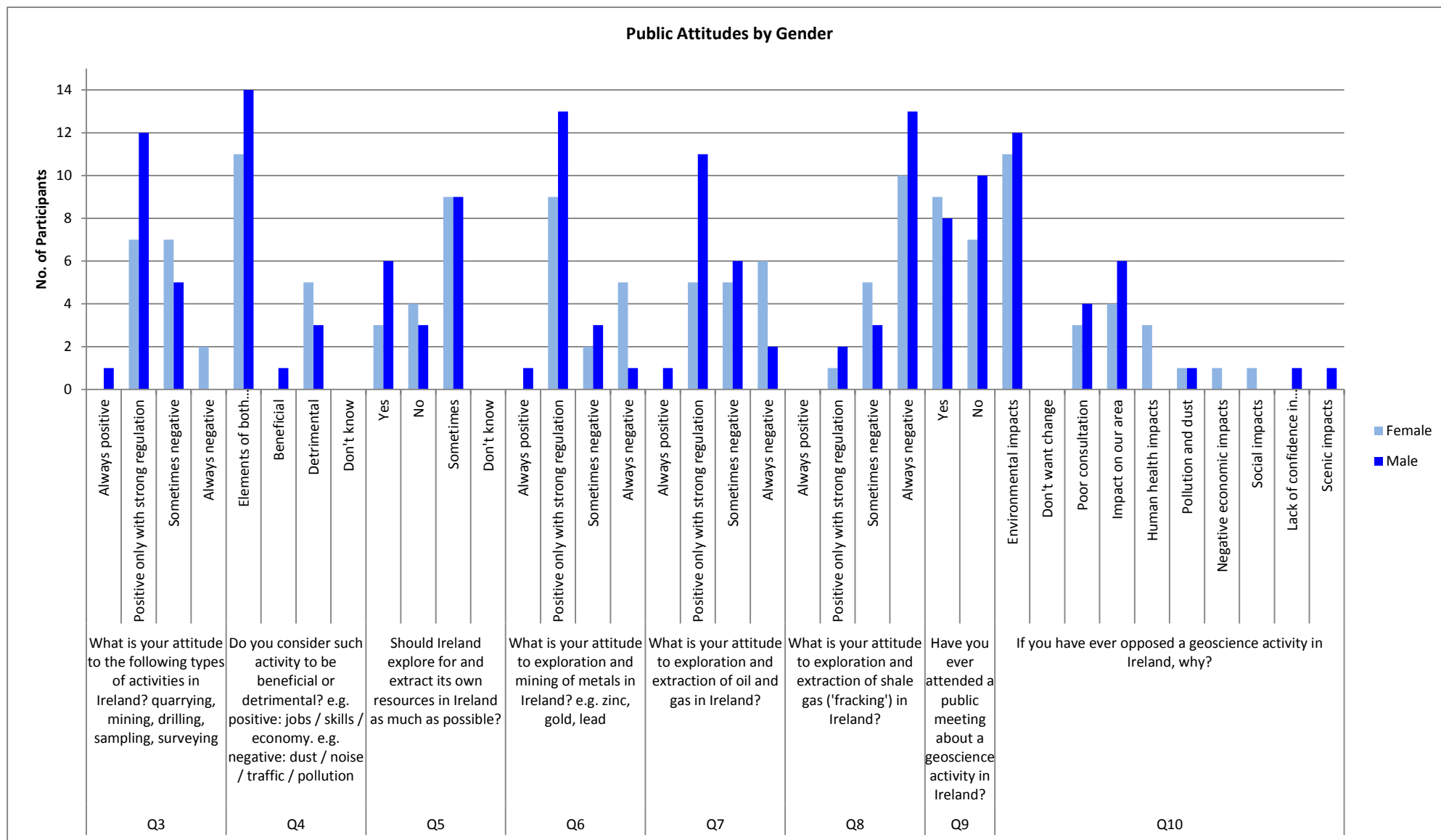
When asked about their general attitudes to quarrying, mining, drilling, sampling, surveying and such activities in Ireland, 59% of responses were positive, while 41% were largely negative.

When asked whether such activity was beneficial to Ireland, respondents indicated some ambivalence, with 77% saying it had both positive and detrimental effects, and 23% saying it had negative effects.

When asked whether Ireland should explore for its own resources in Ireland, a similar ambivalence was reflected with 26.5% in favour, 20.5% not in favour, and 53% saying sometimes.

Attitudes to mineral exploration and mining were largely favourable, with 68% broadly positive with strong regulation and environmental management, and 32% were negative.

Figure 6: Online Survey: Public Attitudes by Gender
(overleaf)



When asked about attitudes to exploration for and extraction of oil and gas in Ireland, 50% were broadly in favour with strong regulation, and 50% broadly negative. When this question was extended to exploration for and extraction of shale gas ('fracking'), the respondents were 8.8% positively disposed with regulation, while 23.5% were 'sometimes negative' and 67.6% were 'always negative' (Figure 6).

50% of respondents had attended a public meeting pertaining to geoscience activity or development in their area, and when asked why they may have opposed a geoscience activity, they responded as follows (Table 2 - *some respondents may have reported more than one reason*):

<i>Reason for Opposition to Geoscience Activity</i>	<i>%</i>
Environmental impacts	68
Don't want change in our locality	0
Poor consultation	21
Impact on our area	29
Human health impacts	9
Pollution and dust	6
Negative economic impacts	3
Social impacts	3
Lack of confidence in regulatory authorities	3
Scenic impacts	3

Table 2: Reasons for Opposition to Geoscience Activity

Environmental impacts are very obviously of key concern to those consulted (68%), as well as impacts on the locality (29%) and poor consultation process (21%).

2.3 Research – Direct Consultations

Following the completion of the questionnaire based research, SLR consulted with a number of people engaged directly in the geoscience industries (Appendix A-2), government, regulators and academics, including a number of social and behavioural experts in the fields of sociology and perceptual/ behavioural analysis, through both structured and semi-structures interviews in person and telephonically. Additionally, a number of NGO/ community activists were consulted to gain their views on social acceptance of geoscience activity (Appendix A-3).

Those surveyed were geographically located in Ireland, Northern Ireland, Scotland and USA to provide a range of perspectives on suitable areas for potential research into social acceptance of earth resources and geoscience activities, based on both national and international experience (Appendix B).

2.3.1 Industry

The minerals industry encompasses the quarrying, exploration and mining of aggregates, metals and industrial minerals.

Quarrying

The quarrying sector is embedded geographically across the island of Ireland over generations and there is generally a high degree of acceptance (see Section 2.1 above) of

established quarries and understanding of the activity. Over recent years, an increased level of environmental awareness has led to local concerns about noise, dust and traffic on rural roads, but this is generally counterbalanced by the economic spin-offs, primarily an appreciation of long term jobs in rural areas.

Established quarries of recognised brands are increasingly managed to meet regulatory requirements, with environmental screening and sensitive mitigation measures in place. Many quarry operators also connect directly with local networks and have mechanisms in place to deal with issues or complaints as they arise. In Northern Ireland, the Quarry Products Association has been very proactive in promoting the role of minerals in society and the value to the economy. There is an active programme of engagement with schools and communities, which serves to both increase awareness and to promote acceptance of quarrying activity.

While established operations tend to meet little opposition, new quarries or expansions of existing quarries have met with local opposition, frequently through well-organised local groups. Consultees commented on the effective use of social media by community groups to foment and organise such opposition.

There is a reported tendency for local opposition groups to act collectively to e.g. raise local finance to employ professionals to represent their concerns at e.g. public/ oral hearings. One industry respondent commented that opposition groups are increasingly focusing their resources on targeting niche elements of a proposal's Environmental Statement upon which to object, e.g. a specific habitat and fauna, rather than broad unfocused opposition. Another respondent commented on the influence of 'outside' and international campaigners in stirring up opposition to projects which many local people may have been willing to accept.

There is a recognition across the industry that social engagement must be undertaken, but there is uncertainty as to when (at what stages of a project) and how (process) that might best be done. There is a need to balance information-giving and meaningful engagement, with the potential for fear-mongering at the options stage (too early). It is recognised that technical data and information must be presented in an accessible format that community stakeholders can relate to and understand.

The 'oral hearing' of the planning process is conducive to 'gladiatorial' style of engagement between citizens and developers; it was suggested that this adversarial system could be reviewed to allow a more positive dialogue to avoid unnecessary conflict.

In the UK, a working paper of the '*Beyond Nimbyism*' national research project¹ commented on the potential failings of the mechanisms of public engagement and the decision making process. The latter may oblige oppositional or citizens groups to become obstructive, as there is little other place in the traditional decision making process for people to voice their concerns prior to project planning application².

Respondents also commented that the current practice of public consultations may need to be revised e.g. public 'town hall' meetings can be gladiatorial in style, with hecklers and lack of respect for diverging views. Such events may aggravate sensitive situations, versus

¹ Birmingham, J., Barnett, J. and Thrush, D. (2006). *The Limitations of the Nimby Concept for understanding public engagement with Renewable Energy Technologies*. Beyond Nimbyism, Working Paper 3; School of Environment and Development, Univ. Manchester. www.sed.manchester.ac.uk/research/beyond_nimbyism.

See also www.geography.exeter.ac.uk/beyond_nimbyism

² Irwin, A. (1995). *Citizen Science: A Study of People, Expertise and Sustainable Development*. London: Routledge.

smaller ‘open day’ meetings where individuals can ask questions without fear of aggressive reprisal. Some concerns were expressed that the planning system may provide too much leeway for vexatious objections, which may cause undue delays in the approvals process. The role of the local authorities as the ‘honest broker’ between the citizens and the developer must be seen to be fair and transparent, to confirm public trust.

It was observed that the way in which citizens engage in public consultation has changed and many now opt for avoidance versus direct engagement – with signs on gates and doors that they are not available for consultation. This is creating a difficulty where developers may wish to actively engage with local citizens, but the citizens do not wish to engage, or will only do so through a third party spokesperson.

The very nature of social engagement presents a conundrum, in that the process aims to persuade communities to accept a project that they may not want in the first place.

Mining

The modern era of zinc mining in Ireland has operated over recent decades without significant social opposition. This may reflect both strong engagement with local communities and effective regulation, legally and environmentally. At Navan, Co Meath, the world class *Tara Mine* employs more than 500 people and is a major economic driver in the county. Since it opened in 1979, mine management adopted an ‘open door’ social policy, engaging with community representatives to provide inputs on issues of concern. The company is currently undertaking community consultations regarding mine tailings expansion, continuing this tradition. However, it is felt that should the mine be at development stage now, the community acceptance may not be as high as it was originally.

Zinc mining was carried out over three decades in counties Tipperary (*Lisheen*) and Kilkenny (*Galmoy*) until closure in 2014-2015. Throughout the mining period, a high level of community engagement was adopted and no significant social pushback recorded. With rare exceptions, farmers and communities appeared to accept (or at least not reject) the extractive industries. Furthermore, when the mines ceased, the sentiment in local media was of regret at the loss of employment rather than delight in the closure of operations.

The Galmoy Mine closed in 2014 and local newspapers reported that it was a major loss of good, well-paid employment³. Some fears were expressed about the environmental legacy, but these were assuaged by the well-executed mine closure plan and rehabilitation programme. The *Lisheen Mine* in Co. Tipperary closed in late 2015. The local media commented that in its 17-year life, the mine had employed 400 people and generated an estimated €28 million in wages annually, much of which was spent in the local economy. It was a major source of funding to local groups in the surrounding areas, and concerns focus on the well-resourced site and how it might be used for the future benefit of the community⁴.

These media reports would suggest a relatively high level of local support for well managed and strongly regulated mines in Ireland.

In Northern Ireland, Dalradian Gold is proposing to develop a gold mine at *Curraghinalt*, Co Tyrone. During the exploration phase, community relations were largely positive, with significant local employment and business spin-offs from the activity. However, as the project is moving through the planning process, it is proposed to use cyanide for gold processing at the site. There is significant local disquiet focused on fear of pollution. The

³ <http://www.kilkennypeople.ie/news/kilkenny-news/69459/Galmoy-Mine-closure-had--detrimental.html>

⁴ <http://www.thurles.info/2016/01/25/farewell-lisheen-mine-moyne-co-tipperary/>

company is undertaking public meetings to allay these concerns and adopting an open approach. The outcome of the planning process is awaited, and while public concerns have been expressed, there has not been radical social opposition observed to date.

Hoffman (pers. comm.) reported on his research on public attitudes to mining in Kentucky, USA⁵. The work focused on both attitudes towards, and knowledge about, mining in three distinct populations in coal mining and non-mining districts. He examined the theoretical foundations to educational and community engagement efforts, as well as industry-public communications, which identified key attitudes and misconceptions about mining. It was clear that those communities who lived close to, and had significant employment in, Kentucky's coal mines were significantly more knowledgeable and more positive towards mining, while the converse equally applied. This research also identified that the only information that mainstream film and popular media communicate about mining is overwhelmingly negative and frequently outdated ('canary in the coal mine' imagery). It was concluded that how the mining industry communicates with the public needs to be significantly improved to counter-balance negative popular imagery.

Hoffman's research concurs with opinions of those surveyed within the mining industry in Ireland, particularly on the need for counter-balancing only negative imagery on mining in the media.

Mineral Exploration

Respondents from the mineral exploration industry reported a generally neutral to positive public attitude towards their work. Many recalled conducting exploration activities in past decades, without either consultation or conflict. However, the controversial Croagh Patrick gold exploration campaign of the 1980s, opposed on cultural and religious grounds, left a negative legacy of distrust. Respondents also noted a hardening of attitudes among the general public towards their activities in the past five to ten years, with refusal for drilling access now as high as 10-15% in some areas. Some of this negativity may be conflated with the Corrib Gas and Northwest Basin shale gas 'fracking' controversies, but is also perceived to reflect increased public awareness of environmental issues. The industry has adopted a more pro-active and consultative approach as a result and all respondents now actively engage with host communities prior to and during exploration activities.

Two respondents⁶ who have managed advanced exploration projects in rural Ireland in the past five years emphasised the need for early and proactive communication, with ongoing engagement with landowners, 'near neighbours' and schools during operations. Transparency in all dealings is requisite and community members should be treated respectfully and fairly (a "nothing to hide" attitude) in order to build trust. Landowners are paid moderate sums as compensation for access and disruption to farm activities. Creation of local employment and training opportunities for young people is central to delivery of social benefits, while local accommodation, transport and food providers also gain economically from the geoscience activities. This helps in establishing local support. It was remarked by other respondents that in some instances, local people may be willing to accept an activity on balance, while ideologically driven opponents, many from outside the focal area, may 'stir up' opposition to resource projects.

⁵ Thanks to Josh Hoffman, who forwarded links to his work: Hoffman, Joshua M., "A framework for understanding the public's perspectives of mining applied to the Kentucky coal industry" (2013). *Theses and Dissertations--Mining Engineering*. Paper 4. http://uknowledge.uky.edu/mng_etds/4/

⁶ Thanks to David Blaney of BRG, and Paul Gordon of SLR, previously of Lundin Mining.

An open approach with meaningful engagement has worked successfully to date from the mineral exploration industry's perspective, in that companies in Ireland have been able to largely continue their activities without social rejection or conflict. However, it must be noted that SLR's Phase 1 research (see Annex 1) shows that 'silence' should not be equated with acceptance and that a 'silent minority' may resent exploration or mining activity, but may not want to 'go against' their neighbours who stand to benefit. Acceptance may be complex.

A recurring theme in the interviews was the sense that the public did not have a good understanding of geoscience activities in general, and adopt a 'passive acceptance' stance, with limited appreciation of the role that minerals play in daily life. However, there was also recognition that local people displayed a natural curiosity about exploration and were pleased to be shown maps/ drill sections etc. This interest is reflected in recent SFI research on understanding of science in Ireland (see Section 2.3.2 below).

Many respondents commented on the need for improved scientific communication on one hand, and improved scientific literacy in Ireland at primary and secondary levels on the other, so that companies, local authorities, administrators and citizens could engage more actively in discussion on geoscience activities. Industry respondents encouraged the promotion of the national GeoParks network as the 'geoscience interface' in this regard. Others suggested that geoscience students should be trained in consultation methodologies.



Photo of core at Tara Mines core shed: from SLR Archive

A number of people commented on the fact that Ireland does not have a written Mineral Policy, in the way that we have an Energy Policy, with a requirement for citizen engagement. There was a suggestion that we need a *National Geoscience Strategy* to continue the impetus built by the *National Geoscience Programme 2007-2013*⁷. There was some discussion also on whether there was a need for community engagement to be part of the licencing process. Most industry respondents felt that they were already engaging in effective consultation and did not see the need for this to be prescribed in the licence.

An issue was raised by respondents concerning the overlapping regulatory and facilitatory roles of the authorities for minerals development, both south and north of the border. While all mineral and mining investment is subject to strong regulation, some respondents felt that regulators could be perceived as pro-industry given the role played in attracting inward investment⁸, promoting favourable terms for industry players, which may be perceived to conflict with the public interest. This could be interpreted negatively by social and community partners in certain instances and may contribute to undermining trust in public institutions.

⁷ *Putting Our Knowledge Of The Earth To Work For Ireland*. National Geoscience Programme (2007-2013). Jointly published by the Royal Irish Academy and the Geological Survey of Ireland.

⁸ <https://www.fraserinstitute.org/studies/annual-survey-of-mining-companies-2015>

Oil & Gas

A series of interviews was held with hydrocarbons industry leaders. The respondents in this group also felt that the public was largely neutral towards geoscience activity as they do not understand it, unless it visited their own 'back yard'. Geoscience is not promoted and therefore is 'below the radar' for many citizens. Industry respondents, similarly to the minerals industry, felt that the public has a very poor understanding of the role of resources in everyday life.



The need for improved science education at schools level was raised, to improve public understanding of geoscientific issues. A core Leaving Cert subject on Earth Sciences was suggested, to cover oil and gas, mining, wind and environmental resources, including balanced risk and socio-economic issues. Another respondent commented on how astute the Irish public is, being well educated and informed – the 'man on the street' should not be under-estimated.

Historically, oil and gas exploration and operations were undertaken offshore, with limited requirement for direct social engagement at exploratory stage. Most companies did however, confer with fishing organisations and continue to work largely positively with this constituency.

There is acute awareness among industry players of the negative legacy left by the lengthy Corrib Gas controversy (1997-2016), where there was a high degree of social rejection and conflict. Despite documented socio-economic gains in Erris over the past decade, the legacy is a bitter one, with long term reputational damage for the industry.

The Corrib controversy contributed to a high level of distrust among the Irish public concerning oil and gas exploration, fuelled by community suspicion that government is too supportive of industry. There is a perception that Irish licencing terms are too lenient and that *"Ireland is giving away its resources for nothing"*, supported by a largely antagonistic media. On the other hand, there is suspicion, advocated on social media, that companies are hiding information from communities and cannot be trusted. The industry has learned a hard lesson from the Corrib experience and realises that communities and stakeholders have to be engaged meaningfully at a much earlier stage in the design process; the DAD (decide-announce-defend) approach no longer holds and a MUM (meet-understand-modify) approach must be the way forwards (see Annex 1).

There have been recent examples of positive onshore engagement, e.g. the Kish foreshore licence case, where extensive consultation was undertaken with stage agencies, community groups, sailing clubs, recreational and conservation groups in a highly populated area of affluent south Dublin. An open door policy was adopted in this instance, but public meetings were avoided, where were perceived to lead to negative engagement.

The Leitrim shale gas exploration experience has had a negative impact for onshore gas exploration in Ireland, with continued and vehement opposition to 'fracking' (see Section 2.3.3 below, also Annex 1). Public opinion is firmly set against it based on a high degree of

fear and environmental concerns (see Sections 2.1 and 2.2 above). Efforts to promote the potential benefits of indigenous shale gas are met with a high degree of mistrust.



Photo from SLR Archive

There is a feeling among industry players that once a project is announced, an opposition group is set up. Protests have become more vigorous and effective, as social media has allowed opposition groups to organise across geographies and communicate readily. Supporters (the 'silent majority') do not organise as such and thus the media focus on the negative voices. It is argued that a concerted effort is needed to counter-balance misinformation in the public domain. However, this is fraught, as any company trying to redress misinformation is immediately seen to be on the 'back foot' and in defensive mode.

The key lessons from the oil and gas sector is that communication and effective engagement with host communities must happen at a much earlier stage in the process; waiting to engage when a project is at feasibility stage is too late.

The lack of political leadership for indigenous resource development was commented upon, and populist local stances are frequently taken by national politicians against the national interest, without fully understanding the issues. Jobs and value adding economic benefits are tangible, and people at large understand this. However, the industry is challenged to source specialist skills locally and thus often cannot fulfil the agenda of local job creation.

A dedicated Minister for Natural Resources was also suggested. A further suggestion was to create a National Oil Company, with the State as an equity partner, as a mechanism to increase public acceptance of geoscience activity in the hydrocarbons industry.

There is cognisance among industry consultees of a shift in expectations among communities and the public at large. There has been a noted decline in trust among the public of authority, regulators and industry at large, following the financial crash of 2008. There is ultimately a need to rebuild this trust.

The engagement with geoscience minerals and hydrocarbons industry players has underlined the need for the following to gain social acceptance:

- ✚ Early, proactive, transparent and meaningful engagement with host communities
- ✚ Improved consultative processes and decision making mechanisms to allow respectful dialogue and voicing of local concerns in a non-gladiatorial fashion;
- ✚ Tangible and positive socio-economic benefits need to come from the activity
- ✚ Need for concerted policy and guidelines on how to engage well with the public
- ✚ Improved scientific literacy through long term educational policy
- ✚ Political leadership, with clearly defined regulatory and facilitatory functions.
- ✚ Recognition of the conundrum in that the process of stakeholder engagement aims to persuade communities to accept a project that they may not want in the first place.

2.3.2 Academia

A range of academics in disciplines ranging across geoscience, business, ethics, behavioural sciences and sociology were consulted by direct, unstructured interviews.

Awareness of Need for Public Engagement

The geoscience academic community is cognisant of the need for increased public engagement in all aspects of geoscience activity. Many individual academics make efforts to engage the public through field trips and talks to make their work accessible and relevant. Good examples include the engagement by academics in National Heritage week annually, and the effort to engage with communities in West Clare on the development of a Global Subsurface Geological Interpretative Centre.

The newly established *Irish Centre for Research in Applied Geosciences (iCRAG)* has been established to support cutting edge research into critical aspects of raw materials, marine, water and energy resources in the coming decades. Underpinning its four core research platforms, iCRAG has adopted a series of research 'spokes', one of which is '*Public Perception and Understanding*' (PPU). This spoke will support robust social science research, drawing from the social, economic and psychological fields to build deep understanding of public acceptance of the range of geoscience activities. This current study aims to define key aspects of research for the PPU to address.

Effective Communication for Improved Public Understanding

Effective communication of science and ongoing public engagement and education are seen as critical to achieving this, to overcome perceptual barriers and potential areas of misunderstanding among geoscientists and the public.

There is a tendency for companies who engage in the public domain to be techno-legalistic in their communications approach, which can be immediately off-putting for non-technical members of the public. This was keenly evidenced in the 2014 EirGrid consultation process for the roll-out of the national grid upgrades. The public rejected the proposals for a range of reasons, including overly technical messaging (see *Phase 1 report in Annex 1*).

iCRAG is keen that young geoscientists are trained in effective communication techniques, including clear use of language, and participative methodologies for engaging with the public in a meaningful way. iCRAG is also acutely aware that geoscientists must avoid speaking in an 'echo chamber', where all we may be doing is speaking to ourselves. Geoscientists must be able to communicate the benefits of their work to the average citizen, who is frequently very interested.

As with industry players, academics feel that as science becomes ever more specialised, it becomes less accessible and even confusing to the average citizen, creating a space in which people may accept inaccurate or misleading information that they can understand. This reflection is interesting in the context of recent surveys in the USA and Ireland.

An article in *National Geographic* in March 2015⁹ reflected on the numbers of people in America who doubt scientific principles and commented that "*in this bewildering world we have to decide what to believe and how to act on that. In principle that's what science is for.*" The report found a very low level of scientific understanding, coupled with low levels of trust in science, among average American citizens. The American Geosciences Institute (www.americangeosciences.org) is strong on the need for communication, policy and

⁹ National Geographic, March 2015. *Why Do Many Reasonable People Doubt Science?* <http://ngm.nationalgeographic.com/2015/03/science-doubters/achenbach-text>

advocacy, and provides a focus for education, outreach and public engagement¹⁰. The AGI have established a *Centre for Geoscience and Society* which has a dedicated ‘critical issues’ portal for researchers and policy makers. The current list of critical issues focuses on Climate, Energy, Hazards, Mineral Resources and Water. As yet, social acceptance of resource developments is not defined as a ‘critical’ issue.

In Ireland, recent SFI¹¹ research was conducted into public understanding of science, technology, engineering and maths (STEM) in Ireland (see Box), with different results.

Science Foundation Ireland (SFI) *Science in Ireland Barometer (October 2015)*

- + 58% of Irish people are interested in STEM, but only 51% feel informed about it.
- + 83% of people think that science is important to meeting the challenges we face as a society, where 87% support government investment in it and 88% feel that science is good for the economy and will deliver jobs.
- + Critically, 49% of Irish citizens trust ‘scientists’ but want some clarity and consistency in what they hear, and dislike conflict within the science community.
- + The SFI study suggests that there is need to ‘democratise’ science, where <60% of Irish citizens feel empowered to discuss the impacts of science and technology on society.

It is easy to assume that people (‘Joe Public’) do not understand science, a frequent comment from both academic and industry consultees. However, people can take on board scientific concepts if presented to them in an accessible manner. Certainly, the SFI data suggests that a lack of scientific knowledge does not equate to a lack of interest in science, but many citizens do not know what to believe due to conflicting information, and find the scientific messages they receive are confusing. Such confusion, coupled with environmental concerns, has the potential to undermine public trust in (geo)scientists.

Other consultees admired the ability of non-scientific community actors and activists to deal with technical information and to make sense of it in forming their oppositional stances.

Need for Improved Methodologies of Engagement

The need for improved scientific understanding was raised across the consultative spectrum. There are some imaginative methodologies by the academic community to engage the public more readily in science.

The University of Limerick is piloting the ‘*Campus Engage*’¹² concept, to address community-based scientific research and learning by placing third level students in a community to conduct relevant research. This adopts community centred approaches that focus on understanding or investigating social issues of community concern through supported research. The community may engage in research design, collection and analysis of data, with student and campus support, sharing findings to inform policy and practice across various disciplines.

This facilitates students to have a ‘real world’ experience while supporting communities to understand more about the scientific process in areas such as the environment, energy and engineering. Such an approach would contribute towards improved understanding of geosciences, and may be a useful model for iCrag to consider.

¹⁰ <http://www.americangeosciences.org/education>

¹¹ *Science in Ireland Barometer (October 2015)*. Millward Brown research on behalf of Science Foundation Ireland. <http://www.sfi.ie/discover-science-engineering-dse/guidance-and-best-practice/publications/science-foundation-ireland-science-in-ireland-barometer.html>

¹² <http://www.campusengage.ie>

A study in Scotland by Dr. Jen Roberts (pers. comm.) and collaborators at the University of Strathclyde, involving communities in deliberation on wind farm policy through *Citizens' Juries*¹³, found that people readily participate in complex policy issues, once they are supported to do so in a collaborative and well organised social space. The convenors found that the initial Information and Reflection phases of deliberation were critical in how the jurors weighed up key issues to form their responses, but that common themes and concerns emerged as the process evolved. By reason of having to form and express their opinions on issues within the juries meant that people engaged more actively. It was also found that the jurors enjoyed a good deal of satisfaction from having participated in the 'jury' process.

A recent online survey in the UK on public attitudes to shale gas¹⁴ found that demographics, politics and environmental values were the strongest determinants of people's attitudes to these issues. Where people are presented with factual scientific and economic information, and while prior attitudes predict how that information is framed, participants became more positive when presented with information, particularly those who were most ambivalent to start with. On balance, people ranked the risks of shale gas to be higher than the benefits.

Research thus suggests that people will engage positively with accessible scientific information and will actively participate in decision making on complex matters where facilitated to do so.

The National Economic and Social Council (NESC) conducted extensive research on effective processes for community engagement to achieve energy transition, to identify best practice in Ireland and internationally¹⁵. Many issues in relation to social acceptance of wind energy in particular were identified (see Section 3.3.2 in Annex 1, Literature Review); however, Ireland does not have a national entity which assimilates best practice in social attitudes, engagement mechanisms or behavioural analysis across different sectors, which could form the basis for developing a national 'Framework for Engagement'.

Changing Culture of Corporate Decision Making

The *Centre for Nonprofit Management (CNM)* at the School of Business, Trinity College, Dublin is focused on research of sustainability and ethics in business development. The school investigates theories of company structure, culture and management ethos; as well as social innovation and social sustainability issues. Dr. Gemma Donnolly-Cox of the CNM, has been involved in collaborative research on sustainability and community responses to company practices in a number of sectors¹⁶. It is clear that corporate culture needs to change to embrace a new means of inclusive decision making to gain social licence.

From the CNM perspective, there has been relatively little research on models of corporate decision making for social sustainability here in Ireland. Similarly, there has been scant research on social models for action on the 'community side' of resource development. The School of Business teaches modules on these topics and one of the SLR researchers was invited to attend a workshop on social sustainability and business ethics in TCD on 10/03/16, as an observer.

¹³ Roberts, J. and Escobar, O. (2015). *Involving Communities in deliberation: a study of three citizens' juries on onshore wind farms in Scotland*. University of Strathclyde, ClimateXChange.
http://www.climateexchange.org.uk/files/5614/3213/1663/Citizens_Juries_-_Full_Report.pdf

¹⁴ Whitmarsh et al. (2015). *UK Public Perceptions of Shale Gas, Hydraulic Fracturing and Role of Audience Message and Contextual Factors on Risk Perceptions and Policy Support*. Applied Energy, Vol 160, pp. 419-430.
<http://www.sciencedirect.com/science/article/pii/S0306261915010727>

¹⁵ National Economic & Social Council. *Wind Energy: Building Community Engagement and Social Support*, NESC No. 139, July 2014

¹⁶ Including the controversial issue of 'mountain-topping' and 'valley-filling' for long term coal extraction in West Virginia, USA. See: <http://earthobservatory.nasa.gov/Features/WorldOfChange/hobet.php>

A large group of TCD Masters level students were introduced to the principles of corporate stewardship and 'social licence to operate' (SLTO) in business development. The students then formed working groups to decide how to introduce sustainability principles into their business decision making, to earn the SLTO across retail, infrastructure, forestry, cocoa production, wind energy and hydrocarbons sectors. The outcomes were encouraging, with the students readily grasping the need for early and open consultation with impacted communities, and the need for distributional justice to 'give something back' through ethical practices, employment, training, micro-credit and SME supports, green energy initiatives etc. The students also recognised the need for establishment of KPIs and monitoring of initiatives through continued engagement with the host communities.

From the students' perspectives, it is clear that the traditional top-down 'Decide-Announce-Defend' (DAD) approach (see *SLR Phase 1 report, Annex 1*) can no longer be applied, and more consultative methodologies must be applied in the (business) decision making process.

This concept is gaining support across the geoscience industry at large, suggesting that corporate culture will change radically in the coming years. A recent Chatham House dialogue¹⁷ suggested that the cultural change that companies underwent in the past twenty years in regards to safety management, which delivered both safer work places and improved bottom line performance, now needs to be undertaken in relation to delivering community benefits from extractive industries.

Many resource companies see social engagement as an appropriate business expense that reduces risk, prevents project delays and ultimately adds to the bottom line¹⁸.

Understanding the Rationale for Community Action

Understanding the rationale for human behaviour is essential to understanding why people act in a particular way in response to development proposals. The sociological concept of '*Logics of Action*' provides a framework for understanding what motivates people to decide / act for or against a given proposal (see box below).

The Weberian theory of action¹⁹ is based on how human behaviours relate to cause and effect in the social realm. It assumes that people vary their actions according to social contexts and how they will affect other people; when a potential reaction is undesirable, the action is modified accordingly. Action can be a 'basic action' (that has meaning) or an 'advanced social action', which also has meaning but is advanced towards other actors and causes action or inaction. There are varying types of social action, such as rational action (taken without considering the impacts – 'the end justifies the means') or instrumental action (actions are planned and taken only after consideration of the means to achieve a goal and likely outcomes). Such actions are affected by human emotions, traditions and concern for what others may think of us.

Rational theorists argue that all social action is rationally (egoistically) motivated: actions are taken for the greatest amount of (self-) gain and efficiency. Social Action models argue in favour of the 'looking glass' self where our sense of self develops as we reflect on others and what they think of our actions. The Institutions model argues for complex roles and actions being devoted to a societal function.

¹⁷ Chatham House (2013). *Revisiting Approaches to Community Relations in Extractive Industries: Old Problems, New Avenues?* Energy Environment and Resources Summary. www.chathamhouse.org

¹⁸ <http://www.miningfacts.org/Communities/What-is-the-social-licence-to-operate/>

¹⁹ Weber, Max (1991). *The Nature of Social Action*. Runciman, W.G. 'Weber: Selections in Translation', Cambridge University Press.

Such 'logics' will influence how people will respond to a geoscience project or proposal and how they make decisions, and whether they will collectivise in action to achieve a goal.

There is relatively little research in this area in respect of geoscience activity in Ireland.

Psycho-Social Responses to Project Proposals

Community and social engagement experts have reflected on the psycho-social and emotive aspects of responses to resource development issues. One commented that the engagement process is inherently flawed from the outset, designed for gladiatorial style 'all or nothing' engagement, that creates more problems than it solves. Citizens have genuine fears and concerns in e.g. the use of cyanide in gold processing at Curraghinalt, and will object accordingly, while it is recognised that there are some political elements that will oppose any proposal (one respondent called them 'antivists' versus 'activists'). It was also noted that project developers need to be aware of the emotional attachment to place and land and that objectors cannot simply be 'bought off'.

There is a need to restructure the process away from adversarial engagement to working with emotional intelligence. It was recommended that a human-centred approach should aim to find common ground initially and work outwards through respectful dialogue to define possible ways forward. As one respondent said, "*the objective is to diminish the potential for conflict in a principled way; listen to understand, not to respond*". It was observed that organisational culture (see also Section 2.3.2), needs to change in relation to resource developments. Organisations need to move from 'single loop' linear thinking to 'double loop' iterative thinking (the 'Planning Onion'; Figure 7²⁰), by embracing cultural change, where stakeholders are actively engaged from project design stages.

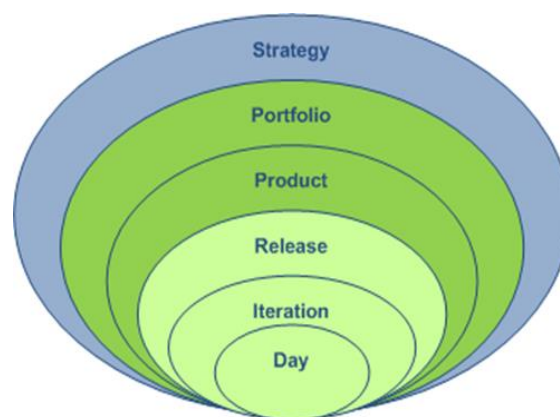


Figure 7: The Planning Onion

In such a model, the planned project advances at a speed that 'goes slow to go fast' to accommodate public participation. What may seem costly in the beginning may be cost effective in the end. This applies for minerals, mining and energy developments; a new corporate mode of thinking is required to mainstream the process of social engagement.

Understanding Behavioural Economics

The emerging field of Behavioural Economics²¹ is influenced by experimental psychology and involves repeated observation of economic behavior to reveal the underlying principles of economic decision-making. Behavioural economics has the potential to inform regulatory

²⁰ See www.informit.com and www.agileadvice.com for an 'agile approach' to project planning.

²¹ <https://www.esri.ie/research/behavioural-economics/>

policy through examination of the capacity of Irish consumers to interpret complex choices. This mainly relates to economic choices, but the results may also inform how policy-makers influence behavioural change; this may have application for minerals and energy policy in Ireland. A recent discussion at the Irish Wind Energy Association²², in relation to economic choices in social acceptance of wind projects, reported that people are more likely to accept wind projects if discounted electricity is offered to local residents. This has been found to be more effective in winning support than e.g. shared ownership models of the wind project.

D Jeanne Moore at the National Economic and Social Council (NESC) has researched methods for inducing behavioural change in the transition from a carbon dependent economy²³. NESC found that giving citizens a say in the type of distributional benefits was the most effective means of inducing changed behavior, through choices of ownership, reduced bills or community enhancement measures.

The engagement with academic players, who fully recognise the need for stakeholder engagement, has underlined the following issues and needs:

- ✚ Need for improved public understanding of geoscience, while recognising that people will engage positively with accessible scientific information;
- ✚ Need for improved methodologies for engagement;
- ✚ People will actively participate in decision making on complex matters where facilitated to do so; positive models have been proposed;
- ✚ Major changes are required in corporate culture to embrace citizen engagement for project development, adopting 'looped' thinking versus linear thinking;
- ✚ Need to understand the 'logics for action' and motivations of protest;
- ✚ Need to understand the 'human terrain' of psycho-emotional responses to project proposals;
- ✚ Need to move from an adversarial engagement approach to that which works to diminish conflict in a principled way;
- ✚ Need to understand behavioural economics and how this impacts on rational choices that people make in relation to earth resource developments.

2.3.3 Community Sector

As well as the online survey, consultations were held with a few key community actors and community engagement experts to understand their attitudes to, and acceptance/ rejection of, geoscience activity.

Awareness of & Attitudes to Geoscience Activity

The term 'geoscience' was explained to include quarrying, exploration, mining, oil, gas, shale gas and related research and development activity, as well as earthquakes, volcanoes and peat slides. Community actors reported a low level of awareness of geoscience activity in their locality. However, they and NGOs felt broadly neutral towards quarrying, exploration and zinc mining, recognising the need for raw materials, so long as they are well regulated, responsibly managed and rehabilitated. One respondent said that there were good examples of mines around the country (citing Navan and Kingscourt), but that the EPA needed to step up and be seen to be strongly regulating mining activity. Such views were reflected also in the BTYSE consultations and online surveys (see Sections 2.1 and 2.2). There is recognition also that resource developments create long term jobs in rural areas.

²² Anderson, R. (RES) at IWEA Annual Conference 2016 "Energy Matters", 23-24 March 2016. www.iwea.com – see also Irish Times report, 24 March 2016.

²³ National Economic and Social Council, 2014. *Wind Energy in Ireland: Building Community Engagement and Social Support*. NESC Publications, No. 139.

However, when the discussion focused on exploration for onshore fossil fuels, respondents were largely negative towards this type of geoscience activity, particularly shale gas. Community activists believe there needs to be much more public engagement around Ireland's energy policy, with a focus on low carbon, climate adaptative strategies versus continuance of fossil fuel options. There has been a call from active NGO/ community groups with a number of academics, to establish a '*Citizens' Convention for a Post-Carbon Ireland*' (www.postcarbonireland.org), launched in February 2015, to include de-carbonisation, climate change and adaptive measures onto the political agenda.

Engagement in Public Consultation Process

When asked about participation in public engagement exercises, most had not been directly consulted about geoscience activity. One NGO respondent commented positively on Coillte's consultation process through a nationally representative panel. A number of respondents had attended a public meeting about e.g. shale gas exploration or wind project proposals. Another had protested against the Croagh Patrick gold project in the 1980s, on the grounds of the spiritual significance of the site. Feedback on public meeting mechanisms was largely negative, reflecting the almost inevitable "*punch and judy*" show", with poor chairmanship, heckling and intimidation of contrary opinions reported. This is unsatisfactory to both community opponents and project proponents and rarely achieves any level of meaningful dialogue or mutual understanding.

The community sector is largely disenchanted with the 'social engagement' process, being wary of both 'soft propaganda for fossil fuels' and 'green washing' by developers. There is a sense that 'the people' are not being listened to and that industry-supportive policy is being developed by Government without meaningful engagement with the citizens.

Distrust in Regulator

Anti-'fracking' activists residing in Leitrim, Fermanagh and Cavan have broad community and local political support, and are adamant that they do not want shale gas development to proceed. A significant level of cynicism and distrust in the role of regulators in fossil fuel projects was expressed by community activists, some related to Corrib and some to shale gas activities. There is a sense that policy makers will change regulations to suit industry in regards to 'fracking' and Leitrim activists (www.loveleitrim.com) do not see the point in conducting public research (e.g. by the EPA) on the risks of shale gas at all as they assert that they simply will not accept it under any guise (Figure 8²⁴).



Figure 8: EPA - Trusting the Regulator?

²⁴ Image from : <http://www.loveleitrim.org/love-leitrim-home-page/photo-gallery>

A community activist remarked on the appointment of industry personnel to state boards which influence policy and decision making. This contributes to community mistrust in resulting policy or decisions, which are perceived to be taken against the public good and wishes of communities, particularly in relation to energy policy.

Distrust of the Planning Process

The Strategic Infrastructure Act (2006) is perceived to be flawed by some community and NGO respondents in that it places the national interest ahead of local interests. It has thus the potential to undermine trust in a fair planning process in response to local concerns²⁵. It was commented by another NGO that there is a structural deficiency in the planning process in that the developer of a project is also producing the EIA. It was suggested that there should be an expert independent '*Public Advocate*' who would advise and adjudicate for the citizen on EIA submissions, to provide confidence and impartiality in the approvals process. Such comments in themselves suggest a low level of trust, arguably unjustifiably based on their track record, in public bodies such as the EPA and An Bord Pleanála.

2.3.4 Public Administration

A number of people working in national and local public administration in planning, provision of geoscientific information, mapping and public communications were consulted.

The overall perception of public attitudes to geoscientific activity was broadly positive, but respondents commented on hardening of attitudes and the need for improved communication skills by geoscientists. The Tellus programme www.tellus.ie has been very successful in communicating the need for baseline geological and environmental data to the public and has permitted an unprecedented level of engagement with citizens of surveyed areas across the island in recent years. However, it is acknowledged that people are less deferential towards public bodies and may be fearful of divulging information to a government body, linked to a deep-rooted cultural suspicion of authority.

The respondents commented on the natural curiosity of the Irish public in issues concerning geology and groundwater, but that for a large segment of the community, geoscientific technical data may be unintelligible. People's cultural and historical values influence how they receive data and perceive risk, particularly in relation to behaviour of groundwater (holy wells, water divining etc.) and flooding risk.

There is a need for more engagement directly with the policy makers, engineers and architects, as well as the public in relation to spatial planning for minerals; the role of minerals in everyday life; where water supplies come from and the need to protect sources; potential for geothermal heat for e.g. district heating schemes, all of which would build understanding of the need for sustainable management of earth resources.

On more contentious issues, it is felt that extensive public debate is required prior to introduction of new policy or development measures. Examples cited included the issuance of exploration licences for non-conventional gas in onshore Ireland, while not explaining the potential risks of 'hydraulic fracturing' (fracking) to the public; the controversial proposal for large scale pumping of surface water from the Lower Shannon to Dublin, without presenting other less impactful alternatives; the introduction of septic tanks charges (pertaining to groundwater protection) and household water charges, without fully explaining the rationale. Each issue has led to significant public disquiet and oppositional movements as a result and

²⁵ Third party appeals are allowed under the Act and An Bord Pleanála frequently turns down planning applications on the grounds that they do not address local concerns.

it is felt that NGOs are largely commanding the public debate; geoscientists need to communicate more effectively to balance the public conversation.

2.3.5 Regulator/ Policy Maker

Some clear issues emerged from the consultations regarding regulatory aspects of social acceptance of geoscientific activity.

Issues of Trust

The role of policy makers and regulators is crucial for public confidence in the entire resource planning and licensing systems. Regulatory agencies must be seen to be impartial and working for the public good in safeguarding public health, safety and environment. Robust governance, legislation and policy must be enacted to build and maintain this trust.

Balancing Competing Interests

It was mentioned by a number of industry respondents that there needs to be a clear division between the facilitatory and regulatory arms of government (see Section 2.3.1 above) to create trust in public institutions and their decision making. However, regulators are frequently balancing issues of national security of supply, sustainability and economic competitiveness, presenting significant challenges when faced with an increasingly demanding public that may be focused on single (local) issues.

Clarity of Decision Making

On the geoscience regulatory side, the relevant policies and licencing systems are administered with absolute probity. Where inter-disciplinary aspects of a given proposal e.g. licensing, water and environmental impacts, are spread across a number of regulatory divisions, there is potential for lack of clarity in decision making, and even conflict in the remit of different departments. The system may also be prone to political interference in response to populist or NGO pressures regarding locally contentious issues, contrary to the terms of a given licence. Where this happens, the potential conflict of interest in decision making will fundamentally undermine public trust in the process.

Public Engagement

There is an argument that stakeholder engagement should be an intrinsic requirement of the licensing system that would help to prevent misunderstanding and conflict at a later stage. The UK Offshore Operators have a defined Community Charter which all licensees must sign up to, regarded as delivering best practice. Oil and gas industry respondents were broadly in favour of such a mechanism, while mineral exploration industry respondents felt there was not a need to build stakeholder engagement into the licencing system, as they already actively engage with host communities.

Under the provisions of the Aarhus Convention, which was signed into Irish law in 2012, citizens are entitled to participate in public environmental decision making. The establishment of the *Public Participation Networks* (PPNs) at local authority level in Ireland is a welcome development in this regard and will allow active engagement of citizens in public policy making (see Phase 1 Report). The Draft Minerals Development Bill (2015) which is passing through the committee stages of the Oireachtas, makes provision for the Aarhus Convention. For all minerals developments, environmental screening for appropriate assessment will be required, with implementation of mitigatory measures to reduce impacts of proposed exploration or mining. Public engagement is not explicitly required, but is implicit in the intent of the Bill at key development stages.

Notwithstanding the negative legacy of many historical mines, it was remarked by one respondent that many of Ireland's modern mines can be upheld as examples of best practice

in being both well-run and well-regulated mines, where lands have been rehabilitated post-mining to agricultural grade e.g. in the cases of Galmoy and Lisheen zinc mines.

It is recognised that early engagement is the best approach. Ultimately:

- ✚ Social acceptance is critical to deliver new mineral and energy resource bases and their related infrastructure. This is becoming more challenging and regulators and industry must adopt best practice in carrying out resource assessment and development.
- ✚ New strategies for public engagement are required given the need for rapid acceptance to meet internationally binding climate targets and to foster security of affordable supply of our own resources on this island.

2.4 Communications & Public Perceptions of Risk

In Phase 1 (Section 3.4, Annex 1) of this study, a short review was undertaken of public perceptions of risk of geoscience activity. The sector has not been strong on the communications of risks, but it is recognised that “risk perception and scientific risk assessment ... must be part of any informed decision making process”²⁶.

The International Risk Governance Council (IRGC) assert that risks, including technical, social or environmental, “may be complicated or amplified by untimely, incomplete, misleading or absent communication”²⁷. Effective communication requires a two-way flow of not just ‘top-down’ messaging by government, policy makers or scientists to lay people, but also bottom-up messaging from the concerned public.

The International Council of Metals and Mining (www.icmm.org) report a communication barrier between the industry and other stakeholders, as the mining industry struggles to shape views of the industry amongst media stakeholders. It appears that NGOs are more influential in shaping government stakeholders’ views about the mining industry and its risks than are mining industry associations or management.

However, for the purpose of transparency, social engagement must be underpinned by strong communication of risks, as well as the benefits of any resource activity.

Effective Communication of Risk & Benefits

People perceive risks very differently due to differing social contexts and interpretations of the language used to convey risk.

There are different constructs used to describe ‘risk’ in terms of event frequencies, probabilities and consequence, as well as vulnerability and exposure. The communication of such concepts can be problematical, particularly as emotion also plays a part in how people perceive risk. For many, perception and actual experience influences how the message of risk is being processed.

This means that in order to effectively communicate risk, the geoscientist must be able to understand and address the likely perceptions of the public in processing the likelihood of e.g. flooding risk. The media play a large role in framing such messaging. A study by the

²⁶ Dowd, A-M., Boughen, N., Ashworth, P. and Carr-Cornish, S. (2011). *Geothermal Technology in Australia: investigating social acceptance*. Energy Policy, V.39, no. 10, p. 6301-6307.

²⁷ IRGC (2010). *The Emergence of Risks: Contributing Factors*. Geneva.

UCD Earth Institute²⁸ on reportage in the national print media on intense flooding episodes in Ireland in 2009 and 2014 respectively, focused on the more human aspects of 'citizen as victim' versus potential policy solutions that had evolved over the five-year period.

Fear of change influences people on how they will perceive risk or change behaviour. The framing of risk messaging is critical and how it is delivered will influence people's perceptions. In certain instances, people feel 'over consulted' and will only engage where the issue is going to have a direct impact on their homes or valued places.

In the proposals for industrial scale wind farms by Mainstream Energy and Energy Bridge in the Irish Midlands in 2014, a 'top down' approach was adopted by the project developers. Confidential land leasing deals were made with landowners, without significant community consultation, causing rifts within communities²⁹. The proposal then shifted to energy export to the UK, supported by proposals to build another interconnector to the UK by the Irish government. The affective responses by a number of communities was to oppose the project, on the basis that (i) lack of respect: they were not consulted; (ii) lack of distributional justice: the communities would have to live with the impacts of industrial scale wind farms, while the developers and landowners would get the benefits; (iii) national benefits were not well communicated in terms of trade/ export (despite the fact that Ireland imports energy from UK); and (iv) a general sense of industry and government being too cosy.

This was a classic case of the 'DAD' approach to development, fuelling a sense of unfairness in that the beneficiaries would be private developers (and possibly the UK energy consumer) while the Irish citizen was left with the negative impacts.

²⁸ <http://www.ucd.ie/earth/research/naturalhazardsrisk/>

²⁹ See <http://www.windawareireland.com>

3.0 KEY FINDINGS & GAP ANALYSIS

In the first phase of this study, a comprehensive literature review was carried out by SLR to investigate the level of research into social acceptance of geoscience activity across a range of sectors in Ireland and internationally (*attached in Annex 1*). The second phase focused on direct and indirect consultations with industry, academia, government and community sectors. The key findings of both phases of the research are presented below, followed by gap identification.

Key Finding 1: Dearth of Research on Social Acceptance of Geoscience Activity

- ✚ There is a significant body of research on social acceptance and public attitudes to renewable energies, particularly wind, both internationally and in Ireland.
- ✚ Similar research has been conducted in relation to mining and minerals in resource rich jurisdictions such as Canada and Australia.
- ✚ There is no research on social acceptance of geoscience activity in Ireland.

GAP 1: There is a lack of academic research on social acceptance of geoscience activity and development of earth resources in Ireland.

Key Finding 2: Attitudes to Geoscience Activity are broadly Positive to Neutral, except regards 'Fracking'

- ✚ The Irish public will accept a range of geoscience activities in quarrying, exploration and mining and offshore oil and gas on the basis of strong regulation and environmental management.
- ✚ Of a range of activities, onshore shale gas exploration ('fracking') is the least acceptable activity to the Irish public and is vehemently opposed by host communities. Public attitudes to debating nuclear power as part of the energy mix are more positive than might be expected.
- ✚ International research indicates that people who live closer to and work in e.g. mines are more accepting than people who live farther away from the activity.
- ✚ Respondents in the Irish minerals industry report a neutral to positive acceptance of quarrying, mineral exploration and mining, based on active engagement and positive economic impacts locally.
- ✚ All industry respondents report a negative legacy from the Corrib Gas and shale gas 'fracking' scenarios in terms of impact on future project proposals or developments.
- ✚ SFI reports an increased awareness of science among the public and also an appetite to understand more scientific concepts.
- ✚ There is little public communication of either the benefits or the risks of geoscience activity by the geoscience industry. The public perception of 'risk' is thus more likely influenced by other sources, including NGOs.

GAP 2: While SFI provides a barometer of public attitudes to science in general in Ireland, there is no academic research on public attitudes to, or appreciation of, the benefits or risks of geoscience activity.

Key Finding 3: Social Acceptance must be understood at Local Level

- ✚ Broadly, 'social acceptance' has three levels of application: socio-political; market and community, respectively. It is specifically at community level that geoscience activity is either acceptable or not to the public.
- ✚ Resource developers must understand the potential impacts on complex issues of place, place attachment, land and identity, coupled with understanding of social structures and

power relations. Respondents in this research reported the primary concern of environmental impacts on their 'place' by geoscience activity.

- ✚ The concept of 'nimby' is outdated and simplistic in its response to genuine concerns.
- ✚ Communities are heterogeneous in their responses to project proposals; acceptance is nuanced, in that non-objection does not mean active support.
- ✚ Modern quarries and mining projects have been positively received in Ireland due to improved communications and tangible socio-economic benefits, but it is felt that new extractive operations would face increased challenges in gaining social acceptance.
- ✚ Communities in Ireland have been negatively impacted by poorly communicated energy proposals that created intra-community conflict. On the other hand, some positive local socio-economic impacts have resulted from e.g. the Corrib gas project.

GAP 3: There is no site specific research or case studies on communities that have been impacted (positive or negatively) by geoscience activities in Ireland. Socio-economic research into the impacts of resource developments may be beneficial for future proposals.

Key Finding 4: Need for Improved Community Engagement Methodologies

- ✚ Best practice in effective community engagement in the developing world, led by the international financing and development agencies, is now being introduced to the developed world as a key element of sustainable resource development.
- ✚ The provisions of the Aarhus Convention provide rights to citizens to participate in environmental decision making. It is transposed into Irish law and is being interpreted that companies will need to demonstrate public engagement, under the terms of licence agreements for minerals and energy projects.
- ✚ Meaningful, participatory engagement for geoscience activity at local level is requisite to build public understanding of risks and benefits.
- ✚ Engagement must commence at exploration and continue through feasibility, development, exploitation and closure stages to earn and maintain the social licence.
- ✚ A more participatory and non-adversarial form of engagement is required to allow community input much earlier in the decision-making stages for project design.
- ✚ Information needs to be simplified and more accessible. Research in Scotland indicates that if technical information is presented accessibly in a facilitated process, then people can make well informed decisions on complex resources issues.

GAP 4: Need for guidance on design and implementation of participatory, non-adversarial methodologies for social engagement and decision making in the geosciences in Ireland.

Key Finding 5: Need for Public Trust in Procedural Process & Regulation

- ✚ Public perception of procedural fairness in project development is requisite, with transparent, equitable decision making by developers and policy makers, in which community stakeholders can have a valid and timely input.
- ✚ Too often, the only time that community stakeholders can engage in project development process is at oral hearing / planning stage, which lends itself to adversarial style of objection.
- ✚ Social acceptance relies to a large extent on public trust in strongly functioning regulatory and government institutions, acting in the public good.
 - A conflation of public opposition to energy projects and anger generated by regulatory failures in the economic collapse of 2008, may have undermined public trust in the geoscience and environmental regulatory systems.
 - The combined regulatory and facilitatory role of Irish regulators may require to be re-examined, as it has the potential to undermine public trust in strong regulation.

- ✚ The planning approvals and environmental consents process must be open and transparent to the public, and must demonstrate consideration of local values and concerns.
- ✚ Equitable distributional justice is required for resource projects to be socially acceptable, so that a social dividend may be realised locally.

GAP 5: There has been limited scholarly research on assessing public trust in either the procedural planning process or trust in geoscience regulation in Ireland to date.

GAP 6: There is scant research on appropriate models for distributional justice and delivery of social dividends in the Irish context.

Key Finding 6: Understanding Social Decision Making & Logics for Action

- ✚ There is currently weak understanding of why and how the public reacts to project proposals for development or exploitation of earth resources.
- ✚ Theories of social judgement indicate that there are zones of latitude within which people decide to accept or reject proposals, which can shift with time and experience.
- ✚ Individual and collective decision making is not determined solely by the level of engagement or accessible technical information; rather an individual is influenced in his/her decision by the trustworthiness of the project proponent and the social dynamic in which s/he resides.
- ✚ The motivations for community action or opposition to resource projects are poorly understood from a socio-psychological perspective. The 'logics for action' which underpin sociological theory, provides a useful framework in which to understand the reasons why people collectivise to protest.
- ✚ The emotional responses to resource developments can often hinge on issues of place attachment and land ownership; developers must be wary of being seen to try 'buy off' people.

GAP 7: There is scant research on the understanding the motivations for public action in opposing geoscience projects in the Irish context.

Key Finding 7: Need for Improved Geoscience Education & Communication

- ✚ Public communications of geoscience activity are weak and should be focused on building balanced scientific understanding and awareness of the need, benefits and risks of geoscience activity through public outreach.
- ✚ There is an increasing public appetite for scientific information and understanding – the public currently finds 'science' confusing with conflicting messages from scientists.
- ✚ Public understanding of geoscience is weak and requires core education at primary and secondary levels. Suggestions included the development of school courses in Earth Resources Management to improve understanding of societal resource needs, sustainability and environmental issues.
- ✚ Geoscientists also need to develop improved communication skills and a number of positive models were identified to achieve this.
- ✚ The effective use of the web and social media to counterbalance misinformation in popular culture and social media is an issue for consideration.

GAP 8: *Need for improved educational programming to build understanding and communication of earth resources and environmental sciences at all levels.*

GAP 9: *There is no research in Ireland on the role of popular culture and social media in influencing public attitudes to, and understanding of, geoscience activity.*

Key Finding 8: Expanded Policy for Minerals Development

- ✚ Current mineral policy for development of mineral resources in Ireland requires to be expanded in relation to citizen engagement and spatial planning. Other than landowners, the draft Minerals Development Bill (2015) has no specific requirement for effective community engagement.
- ✚ The provisions of the Aarhus Convention on the need for public engagement in environmental decision making has led to establishment of 'Public Participation Networks' countrywide. Requirements for engagement are now making their way into licensing terms for resource developments.
- ✚ The recently published White Paper on Energy (Dec. 2015) recognises the 'resource citizen' with whom policy makers and developers must engage; a similar requirement could be considered for minerals developments.
- ✚ Irish geoscience industry players have low awareness of the implications of the Aarhus Convention.
- ✚ There was a suggestion that a new *National Geoscience Strategy* needs to be articulated for the island of Ireland.

GAP 10: Current policy for the development of the minerals sector in Ireland does not address citizen engagement and spatial planning considerations.

Finding 9: Need for Political Leadership in Policy Delivery

- ✚ Political leadership is required at national and regional levels to deliver balanced spatial planning in the search for indigenous resources.
- ✚ From the policy development perspective, local politics are allowed frequently to override the national interest.
- ✚ From the community perspective, policy is developed to meet national priorities and takes scant regard of concerns with regards to local impacts.

GAP 11: There is lack of research on the nature of, or the degree to which, political structures may undermine the delivery of national resource requirements in Ireland.

Finding 10: Changing Corporate Culture:

- ✚ Geoscience (and other) companies typically adopt a linear 'project management' approach towards project development. Corporate culture needs to move from single loop thinking to double loop thinking to embrace community engagement as a necessary part of resource development, much in the same way as the 'safety cultural revolution' of the past decade.
- ✚ A people-centred design process must be considered for all project development.
- ✚ The Irish geoscience industry recognises the need to move from seeing stakeholders as 'passive bystanders' to engaging in proactive community strategies.
- ✚ Industry is undergoing a cultural change as it understands that failure to gain social acceptance will prove costly in the longer term.

GAP 12: There is lack of research on the nature of decision making and the reasons for significant shifts in geoscience business culture in Ireland.

All of these issues and findings combine in complex ways in the realm of 'social acceptance'. Attitudes to geoscience activity can be partly determined by issues of place and attachment, community experience of previous proposals, or cumulative impacts of other resource developments in the locality. The reactions to a local project can be strongly influenced by trust in the wider regulatory context and broader societal issues and values.

Understanding public attitudes to geoscience activity is crucial for regulators, policy makers and project developers alike. While it is easy to dismiss negative public stances as 'nimbyism', the reality is the situation is more complex and negative social attitudes can be a major barrier to e.g. providing secure supplies of raw materials as well as meeting internationally binding renewable energy targets.

By broadening the understanding of social perspectives, needs and attitudes at an early stage of project development, the aim should be to avoid conflict through improved engagement mechanisms and transparent decision making in the public domain.

Based on the above findings and gap analysis, draft Research Proposals were formulated based on a thorough analysis of the literature review and stakeholder feedback, for consideration at a plenary Workshop of consultees.

4.0 FINAL CONSULTATIVE WORKSHOP

The final phase of the review of social acceptance was a consultative workshop with key stakeholders. The workshop, entitled “*Identifying Key Research priorities for Public Perception and Understanding of Geoscience Activity in Ireland*”, was held on 3rd May 2016 at the Geological Survey of Ireland offices in Dublin.



4.1 Workshop Attendees

Representative key stakeholders, many of whom were engaged during the online and direct consultations, were invited to attend a workshop to discuss the key findings of the study and prioritise the draft research proposals to be addressed by iCrag.

In total 48 delegates from the industry, academic, local and national government, statutory agencies, research and community sectors attended (Appendix B). All registrants were provided with copies of the Agenda and Draft Research Proposals in advance.

4.2 Workshop Presentations

The workshop programme is attached below in Table 3. A range of presentations were delivered covering:

- Key findings emanating from Phases 1 and 2 review;
- Effective stakeholder engagement to build community support;
- Social acceptance from the community perspective;
- Communication of risk to the public; and
- International learnings and development perspectives around social engagement.

Extensive Q&A with discussion on the review findings and various presentations was held by participants.

The presentations are attached on CD in Annex 2.

Table 3: Workshop Agenda

Time	Topic	Chair/ Speaker
9:30am	REGISTRATION	Tea & Coffee
SESSION 1: RESEARCH FINDINGS ON SOCIAL ACCEPTANCE OF GEOSCIENCE ACTIVITY & RESOURCES IN IRELAND		Chair: Dr. Aoife Braiden , Research Manager, Geological Survey of Ireland
10:00am	Opening Remarks: <i>Context for the GSI Research</i>	<i>Dr. Aoife Braiden</i>
10:15am	Presentation of the Research Findings <i>Key issues, gap analysis, draft research proposals</i>	Dr. Deirdre Lewis , Technical Director - SLR Consulting
10:55am	Q&A/ Discussion on Research Findings	
11:15am	TEA/ COFFEE BREAK	
SESSION 2: NEW MEANS OF SOCIAL ENGAGEMENT		Chair: Dr. Marie Cowan , Director GSNI
11.30am	Social Engagement : Avoiding Conflict <i>Exploring the 'human terrain' of project development to avoid conflict</i>	Mr. Jason Donaghy Social Leadership & Conflict Resolution Expert, Northern Ireland
11.55am -	Building Community Engagement and Social Support: <i>Insights from the Wind-Energy Sector</i>	Dr. Jeanne Moore: Policy Analyst, National Economic & Social Council (NESC)
12.20pm –	Social Acceptance: <i>The Community Perspective</i>	Ms. Theresa O'Donohue , Coordinator: People's Energy Charter. Representative of Feasta on the Environmental Pillar
12.45pm	Q&A/ Discussion on Engagement Process	
13.00h	LUNCH	
SESSION 3: Public Perceptions of Geoscience Activity		Chair: Mr. Sean Finlay , Geoscience Ireland
14.00 pm	Effective Communication of Risk to the Public <i>Flooding risk in Ireland</i>	Dr. Eoin O'Neill , Lecturer, UCD Planning & Environmental Policy; UCD Earth Institute
14.20pm	Achieving & Maintaining Broad Community Support for Projects: <i>Lessons from the Developing World</i>	Eddie Smyth , Intersocial Consulting – International Social & Resettlement Expert
14.40pm	Mineral Deposits of Public Importance: <i>EU Minatura H2020 Project</i>	Mr. Gerry Sutton , Senior Research Fellow, MaREI, University College Cork
14.50pm	Q&A/ Discussion	
SESSION 4: WORKSHOPS: AGREEING THE RESEARCH TOPICS		Chair: Dr. Deirdre Lewis , SLR
15.00 – 15.45	Working Groups Potential Research Priorities	<i>Working Groups Topics</i> 1. Methods for Effective Engagement 2. Social Psychology: Understanding Community Action and Social Responses 3. Socio-Economics & Risk Analysis 4. Education & Communication of Geoscience activity
15.45	Plenary Sessions	Work Group Rapporteurs to report to Plenary
16.00h	CLOSING REMARKS	Mr. Koen Verbruggen , Director, Geological Survey of Ireland

4.3 Working Groups

Four facilitated working groups were asked to prioritise the twelve draft research proposals using a pre-defined matrix and to identify any gaps therein.

The draft research topics were grouped thematically and delegates were asked to rank each item in order of priority (5 highest – 1 lowest).

Thematic Grouping of Draft Research Topics				
Understanding public attitudes	Public trust	Community Engagement	Corporate culture	Public Communication
Place attachment	Public policy	Fair process	Distributional justice models	Education
Logics for Action	Leadership	Methodologies		
Case Studies				

Table 4: Thematic grouping of Research Proposals

The results of the exercise are presented in Table 5 below. The numbers represented in each box refer to the number of individual respondents to that topic. Many also wrote specific comments on the type of research required in each field.

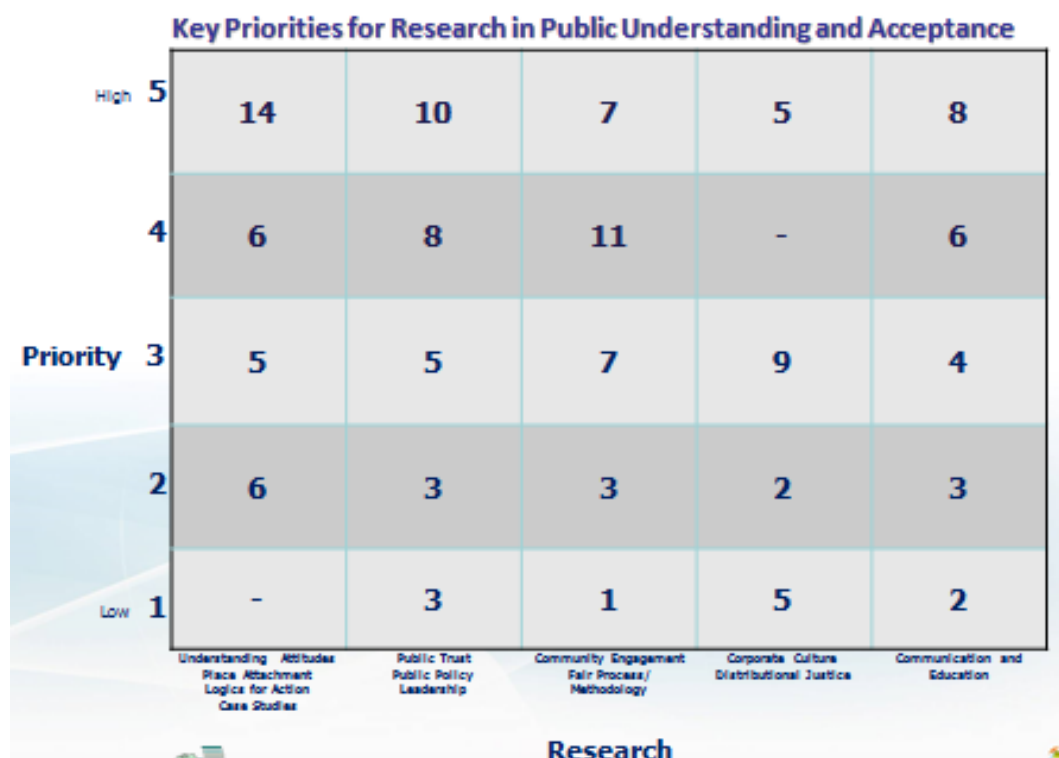


Table 5: Results of the Research Prioritisation Matrix

Analysis of the responses from the four workshops show that the delegates prioritised:

1. Research into understanding public attitudes to resource activity and logics for action; development of in-depth case studies and understanding the concept of place attachment (20 responses in rank 4-5);
2. The next priority grouping fell firmly within the field of researching public trust; public policy and political leadership (18 responses in rank 4-5);
3. The third grouping ranked the understanding of procedural process and community engagement methodologies (18 responses in the rank 4-5);
4. Public communication of geoscience (14 responses in rank 4-5). However, it was commented in the workshops that public education and outreach are being addressed elsewhere within iCrag's remit.
5. A grouping of distributional justice earned third priority (9 responses in rank 3).

The final ranked Priority Research Proposals are presented below in Chapter 5 (Table 6).

4.4 Gaps Identified in Workshop

The delegates to the workshop were broadly in agreement with the draft research findings. However, in the course of the discussions and workshopping, a number of 'gaps' were highlighted which could be considered as aspects of future research:

- ✚ *Building Public Trust:* Could resources have provenance certification so that consumers would know where products (metals, minerals, hydrocarbons, energy sources) come from? Instruments for certification of resources could be developed (as for forestry or food).
- ✚ Communities continue to be cynical when there is cross-over from industry to state boards, and of government officials to private industry boards. There needs to be a distance between big industry and policy makers.
- ✚ *Learning from other Sectors:* There is no overarching agency in Ireland that seeks to combine learnings in stakeholder engagement from different sectors to develop a Framework for Engagement.
- ✚ *Public Participation Networks* established in each local authority area under the provisions of the Aarhus Convention could be utilised effectively to engage proactively with a range of community players.
- ✚ *Value of Geoscience in Irish Society:* Need to update the *Economic Value of Geoscience Activity in Ireland (2007)* study.
- ✚ *Morality and ethics of geoscience activities:* we need to examine issues of corporate, public and individual morality.

5.0 PRIORITY RESEARCH PROPOSALS

The Final Research Proposals are based on the key findings and gap analysis in the review, and ranked according to the Workshop feedback.

Table 6: Priority Topics for Research based on Stakeholder Feedback

PRIORITY 5 = HIGHEST 1 = LOWEST	Identified Gaps/ Issues	Priority Topic for Research Potential Researcher
5	GAP 1: Lack of academic research on social acceptance of geoscience activity and development of earth resources in Ireland	Social acceptance of a range of geoscience activity is poorly understood in Ireland. Based on international experience of acceptance of renewable energy technologies, conduct research into the basis for social acceptance/ rejection and engendering trust in geoscience activity through a structured consultative research approach. <i>Social scientist with understanding of earth sciences, or vice versa</i>
5	GAP 3: Case studies in Ireland on socio-economic and environmental impacts of site specific geoscience activities on communities	Socio-economic and environmental research into the positive and negative impacts of resource developments on site specific localities in Ireland. Research suggestions include: ❖ Socio-economic impacts of operating mines at Navan (zinc) and Kingscourt (gypsum) on wider northeast area; ❖ Socio-economic impacts of mining and subsequent closure of Galmoy/ Lisheen in the Counties Kilkenny and Tipperary; ❖ Socio-economic impacts on North Mayo of the Corrib Gas development; ❖ Legacy issues of historical mining and options for post-mining after-use of sites e.g. Silvermines, Co Tipperary Socio-political-economic impacts on Leitrim-Fermanagh of shale gas exploration. Case studies may be beneficial in the development of public acceptance for future proposals. <i>Socio-economist, Environmentalist, Political scientist</i>

5	GAP 2: Lack of academic research on public attitudes to, or public appreciation of the benefits or risks of geoscience activity.	Design surveys and monitoring programme of <i>Public Attitudes to Geoscience Activity and Earth Resources</i> at regular intervals, akin to SFI barometers. Use of socio-quantitative and qualitative tools to assess data. The public perception of the risks related to geoscience activity is largely influenced by NGOs than by industry practitioners. Risk perception in Ireland requires to be investigated. Research is required to track perceptual trends and inform the design of appropriate engagement mechanisms. • <i>Social scientist with understanding of earth sciences, or vice versa</i>
4	GAP 4: Lack of guidance on design and implementation of participatory, non-adversarial methodologies	There is a strong need for applied guidance on how to engage effectively with communities and other stakeholders. Research into culturally appropriate methodologies of engagement and mechanisms to avoid conflict. Research is required on how improved engagement mechanisms can lead to more non-adversarial and participatory decision making for resource projects. • <i>Social scientist</i> • <i>Community engagement practitioner</i>
4	GAP 5: Limited scholarly research on assessment of public trust in procedural process or in public geoscience regulation.	The impact of diminished public trust in national institutions in the wake of the 2008 economic crash is not yet fully grasped in terms of its negative impacts on the democratic process. The reasons for when people move from trust in authority to diminished trust are not well understood. Research is required into the level of trust in the planning process and public regulators of geoscience activity, to understand the trust that exists and the mechanisms that may be required to strengthen or re-build that trust. An ancillary topic may be to investigate the impact on public trust of the dual regulatory/facilitatory role of Irish geoscience regulators, north and south of the Border. • <i>Socio-political scientist</i> • <i>Environmental / legal</i>

4	GAP 7: There is scant research on social 'logics' and decision making, which motivate public action in opposing geoscience projects in the Irish context	Social judgement theory provides an understanding of the latitude of people's decision making, and how they might move from rejection to acceptance. The 'logics for action' framework provides understanding of what motivates people to act or respond in a particular way. The motivation for collective protest against resource developments seems to be strong in Ireland, but what motivates a citizen to become an activist? What causes others to passively accept projects? • <i>Social Psychologist</i>
4	GAP 10: Current policy for the development of the minerals sector in Ireland does not address citizen engagement and spatial planning considerations	Research is required into developing an appropriate Mineral Policy policy to reflect resources needs, societal expectations and links to other areas of Irish and EU public policy. It should also accommodate the provisions of the Aarhus Convention on public engagement. Ireland has updated its Energy White Paper in 2015, with a requirement for engagement with the 'resource citizen' strongly articulated throughout. Linked to this, an updated National Geoscience Strategy could be developed for the island of Ireland. • <i>Geoscientist / Public Policy Expert</i>
3	GAP 6: Scant research on appropriate models for distributional justice and delivery of social dividends from major resource projects in the Irish context.	There is a need to develop appropriate and fair models of distributional justice for resource developments in Ireland. A number of models exist in UK and Europe, and there are models of distributional justice in e.g. Corrib Social Fund; wind energy projects. These aim to compensate those communities most directly impacted by mining, quarrying, gas, wind farms, grid pylons. • <i>Socio-economist</i> • <i>Social Impact assessor</i>
3	GAP 11: There is lack of research on the nature of, or the degree to which, political structures may undermine the delivery of national resource requirements in Ireland.	There is reasonable evidence, given the Irish political system, that politicians will opt to support a populist local cause versus legislating in the national interest, even occasionally against national policy objectives. Research could be conducted on the level to which political support for such populism contributes to or undermines the delivery of national resources requirements and geoscience activity. Examples could include Navan Zn/ Corrib Gas and / Leitrim shale gas experience. • <i>Political Scientist</i>

3	<i>GAP 8: Need for improved communications and educational programming to build understanding of earth resources and environmental issues at all levels.</i>	Educational policy is a major determinant in access to specific types of scientific knowledge and may also act as a barrier to same. Geoscience is not an educational policy priority in Irish schools curricula. Research is required into science policy development in primary and secondary levels – who develops such policy? Who decides what is included and what is excluded in term of curriculum development? And at what level is science programmed out? And how could it be scheduled in the curriculum? • <i>Educationalist / policy developer</i>
2-3	<i>GAP 12: There is lack of research on the nature of decision making and cultural shifts in geoscience business culture in Ireland.</i>	Shifts in business culture are poorly understood, but have been known to happen in terms of embracing e.g. environmental impact assessment for resource developments, or the adoption of proactive safety culture, over the past twenty years. Could such a cultural shift happen with regards to social engagement, where it will become the norm in business culture? • <i>Business Studies / Psychology</i>
1	<i>GAP 9: There is no research in Ireland on the role of popular culture and social media in influencing public attitudes to, and understanding of, geoscience activity.</i>	Popular cultural imagery of geoscience activity (especially mining/ oil and gas) are almost always negative. This has been exacerbated by rapid spreading of misinformation by social media. Does such messaging impact heavily on public attitudes and social acceptance of geoscience activity in Ireland? • <i>Media/ communications</i>

6.0 CLOSURE

This report has been prepared by SLR Consulting (Ireland) with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Geological Survey of Ireland; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

Appendix A - Survey Questionnaires

Appendix A-1 Questionnaire employed at BT Young Scientists' Exhibition,
RDS Dublin, 6-9th January, 2016

APPENDIX A-1

Survey of Public Perceptions of Geoscience Activities SLR is conducting a survey to get an idea of the public's attitudes towards Geoscience activity in Ireland, and would be very grateful if you could spare a few minutes to fill out a short questionnaire. Geoscience includes a broad range of activities related to geology and the study of earth systems. These include the exploration, discovery and extraction of natural resources (e.g. water, metals, aggregates, gas, petroleum); the management of natural hazards including flooding, volcanoes, tsunamis and earthquakes, and provision of scientific evidence on matters such as energy sources, climate change and research into how our planet works. 						
ALL DETAILS PROVIDED BELOW ARE CONFIDENTIAL AND WILL ONLY BE USED FOR STATISTICAL PURPOSES PLEASE TICK YOUR RESPONSES IN THE BOXES PROVIDED ✓						
Your Gender: Female ☐ Male ☐ Your Age: <18 ☐ 18-25 ☐ 26-40 ☐ 41-65 ☐ >65 ☐ Your County:						
Q1	It is important that Ireland supplies as much of its own energy and resource needs as possible, rather than importing from other countries				True	False
Q2	It is important to carry out geological research in Ireland to understand how our earth systems work				True	False
Q3	Ireland is one of Europe's largest producers of zinc metal				True	False
Q4	Ireland has one of Europe's best wind resources				True	False
Q5	In 2008, there were 15,000 people employed by the quarrying sector in Ireland				True	False
Q6	Do you agree with the quarrying of non-metallic (e.g. gravels, aggregates, stone, gypsum) minerals in Ireland?	Always Agree	Agree only if regulations and environmental protection are enforced	Sometimes Disagree	Always Disagree	

Q7	Do you agree with the exploration and mining of metals (e.g. zinc, lead, gold) in Ireland?	Always Agree		Agree only if regulations and environmental protection are enforced		SometimesDisagree		Always Disagree	
Q8	Do you think that exploration for shale gas ('fracking') should be allowed in Ireland?	Always Agree		Agree only if regulations and environmental protection are enforced		Sometimes Disagree		Always Disagree	
Q9	Do you agree with the exploration and extraction of gas and oil in Irish offshore zones?	Always Agree		Agree only if regulations and environmental protection are enforced		SometimesDisagree		Always Disagree	
Q10	Do you think that nuclear power should be considered as a potential source of energy in Ireland?	Always Agree		Agree only if regulations and environmental protection are enforced		Sometimes Disagree		Always Disagree	
Q11	Do you think that communities should be consulted concerning extraction of resources in Ireland?	Always Agree		Agree that consultation should be undertaken at key stages		SometimesDisagree		Always Disagree	
Have you any Comments you would like to add ?									
If you would like to be included in further consultation, please leave your name and email address (in BOLD PRINT please)									
NAME				email:					

APPENDIX A-2

INDUSTRY / GEOSCIENTIST QUESTIONNAIRE

GSI Public Perceptions of Geoscience Activities in Ireland

On behalf of the Geological Survey of Ireland, SLR is conducting a survey of *Public Perceptions of Geoscience Activities in Ireland*, and wish to engage with you to determine your own experience of such perceptions and attitudes.

'Geoscience' refers to a broad range of geological activities including geology, geochemistry and geophysics for exploration and extraction/ mining of natural resources (e.g. aggregates, metals, hydrocarbons, water); geotechnical engineering (e.g. construction, pipelines, wind farms); research and mitigation of geological hazards (e.g. flooding, peat slides; volcanoes, tsunamis, earthquakes); research and information provision on aspects of resources, energy, climate change and understanding of earth systems.

We would like to gain an insight into your own experience of public attitudes to geoscience activity in Ireland, through the following questions. All information will be treated strictly confidentially and aggregated for analytical purposes only.

Name (optional)

Organisation (optional)

Email/ Tel (optional)

No.	Question	Response	Notes
1	In which area of geoscience activity are you / have you been engaged?	Quarrying/ Exploration/ Mining/ Oil & Gas/ Energy/ Engineering/ Research/ Public Service/ Other	Circle relevant
	Do you have a qualification in geoscience?	Yes : Diploma BA BSc MSc PhD Other	Circle relevant
2	How long have you been active in/ working in geoscience in Ireland?	<5 >5-10 >10-20 >20yrs ?	Circle relevant
3	In general, do you feel that geoscience activity is accepted by the public in Ireland?		
	<i>Please elaborate....</i>		
4	Did you ever have to pro-actively engage with the public in order to carry out your activity(s)?		
	<i>If so: Where? When?</i>		
	<i>How did you engage?</i>		
5	If so, was your experience generally positive? Neutral? Negative?		
	<i>Please give examples?</i>		
6	Did you ever encounter public opposition to your activity(s)?		
	<i>If so, what was the basis for opposition??</i>		
7	Have you noticed changes in public		

No.	Question	Response	Notes
	attitudes over times? <i>If so, please comment?</i>		
8	If you have noticed changes in public attitudes to geoscience over time, why do you think this has occurred?		
9	Are there lessons to be learned in relation to public attitudes, based on recent geoscience activities? Are there measures / approaches that geoscientists could/ should adopt to increase public acceptance of geoscience activity in Ireland? <i>If yes, please explain?</i>		
10	Are there geoscience activities being carried out in Ireland that you personally are uncomfortable with? <i>Please elaborate...</i>		
11	Do you think that geoscience activity is well promoted in Ireland? <i>Please give examples...</i>		
12	What aspect(s) of public acceptance of geoscience do you feel you least understand? <i>What could the research community do to address it?</i>		
13	Are there areas of public policy that you feel could be improved to increase public acceptance of geoscience activity in Ireland? <i>Please elaborate....</i>		
	Any additional Comments		

APPENDIX A-3

DIRECT PUBLIC QUESTIONNAIRE

GSI Public Perceptions of Geoscience Activities in Ireland

On behalf of the Geological Survey of Ireland, SLR is conducting a survey of *Public Perceptions of Geoscience Activities in Ireland*, and wish to engage with you to determine your own experience of attitudes.

'Geoscience' refers to a broad range of geological activities including the exploration and quarrying/ mining & extraction of natural resources (e.g. stone, sand & gravel, gypsum, metals, gas, oil, water), which require varying levels of mapping, sampling, surveying, drilling and excavation; geotechnical engineering (e.g. construction, pipelines, wind farms); research into geological hazards (e.g. flooding, peat slides; earthquakes); public research and information provision on aspects of groundwater, resources, environmental management, resource management, energy, climate change and earth systems.

We would like to gain an insight into your attitude to geoscience activity in Ireland, through the following questions. All information will be treated strictly confidentially and aggregated for analytical purposes only.

Name (optional) _____

Organisation (if any) (optional) _____

Email/ Tel (optional) _____

No.	Question	Response	Notes
0	<i>Interviewer to present a short description as above of what is 'geoscience' activity....</i>		
1	Where in Ireland do you live?	County.....	
	Age group? Male / Female?	Age: M/ F	
2	Are you aware of any 'geoscience' activity close to your home / work/ in your area? <i>e.g. quarry, mine, drilling, sampling, surveying, other?</i>		
3.	Would you say that your attitude to that activity in your area is <i>Positive/ Neutral/ Negative?</i> <i>Other?</i>		
4.	Do you consider it to be beneficial or detrimental to your area? <i>Please elaborate (e.g. positive impacts: jobs, skills, local economy/ or adverse impacts: traffic, noise etc?)</i>		
5.	Have you ever been directly consulted about a geoscience activity by anyone <i>e.g. a researcher, geologist/ developer?</i>		

No.	Question	Response	Notes
	<i>If so, how were you consulted (direct conversation/ telephone)? How did you respond?</i>		
6.	Have you ever attended a public meeting about a geoscience activity in your area? In Ireland? If so, on what project/ issue? <i>Did your thoughts on the issue change before/ after the meeting?</i>		
7	Was your experience of direct/ public consultation generally positive/ neutral/ negative? <i>In your experience, could the consultation process be improved?</i>		
8	Have you ever <u>actively</u> opposed any aspect of geoscience activity(s) in Ireland? <i>Please elaborate on type of activity you opposed and why?</i>		
9	Have there been changes in public attitudes in your area towards geoscience activity over time? <i>If so, why do you think this may have happened?</i>		
10	Do you think that the reasons for geoscience activities are well explained to citizens in Ireland?		
11	Would you consider that you are well informed about geoscience activities in Ireland in general? <i>If so, what are your main sources of information about geoscience activity?</i>		
12	Are there approaches that geoscience projects could adopt to increase public acceptance of, and confidence in, geoscience activity in Ireland? <i>If yes, please elaborate</i> Any additional Comments?		

APPENDIX A-3

ONLINE SURVEY/ COMMUNITY/ PUBLIC ADMIN QUESTIONNAIRE

GSI Public Perceptions of Geoscience Activities in Ireland

SLR is conducting a survey of *Public Perceptions of Geoscience Activities in Ireland* on behalf of the Geological Survey of Ireland. To capture a range of attitudes countrywide, we would be delighted if you could fill out the following 3-minute survey.

'Geoscience' refers to a broad range of geological activities including the exploration and quarrying/ mining & extraction of natural resources (e.g. stone, sand & gravel, gypsum, metals, gas, oil, water), which require varying levels of mapping, sampling, surveying, drilling and excavation; geotechnical engineering (e.g. construction, pipelines, wind farms); research into geological hazards (e.g. flooding, peat slides; earthquakes); public research and information provision on aspects of groundwater, resources, environmental management, resource management, energy, climate change and earth systems.

No.	Question	Option 1	Option 2	Option 3	Option 4	Option 5
1	In which <u>county</u> in Ireland do you live?	Enter COUNTY				
2	What gender are you?	MALE	FEMALE			
3	What age group are you?	<18	18-30	30-45	46-65	>65
4	Are you aware of any geoscience activity happening in Ireland? <i>e.g. quarry, mining, drilling, sampling, surveying?</i>	YES	NO	DON'T KNOW		
5	Would you say that your attitude to such activity is:	POSITIVE	NEGATIVE	NEUTRAL	DON'T KNOW	
6	Do you consider such activity to be beneficial? <i>e.g. jobs/ skills/ economy</i>	YES	NO	SOMETIMES	DON'T KNOW	
7	Do you consider that activity to be detrimental? <i>e.g. traffic, noise, dust, environmental impacts</i>	YES	NO	SOMETIMES	DON'T KNOW	
8	Should Ireland locate its own resources in Ireland as much as possible?	YES	NO	SOMETIMES	DON'T KNOW	
9	What is your attitude to exploration and mining of minerals in Ireland? <i>e.g. zinc, gold, lead</i>	POSITIVE	NEGATIVE	NEUTRAL	DON'T KNOW	
10	What is your attitude to exploration and extraction of oil and gas offshore Ireland?	POSITIVE	NEGATIVE	NEUTRAL	DON'T KNOW	
11	What is your attitude to exploration and extraction of shale gas ('fracking') in Ireland?	POSITIVE	NEGATIVE	NEUTRAL	DON'T KNOW	
13	Have you ever attended a public meeting about a geoscience activity in Ireland?	YES	NO			
14	Have you ever actively opposed any geoscience	YES	NO			

No.	Question	Option 1	Option 2	Option 3	Option 4	Option 5
	activity(s) in Ireland?					
15	If you have opposed, why?	Environmental impacts	Don't want change	Poor consultation	Impact on our area	Other
	Any comments?	Free flow box				
	Thank you!					

All information will be treated confidentially

Appendix B

List of Consultees

GSI Social Acceptance of Geoscience Activity: Public Consultations & Survey Contact List			
Name	Organisation	Address	Sector /Geography
Direct Consultations			
Academia			
Dr Gemma Donnolly-Cox	Centre for Non-Profit Management	TCD Business School	Academia
Dr Jen Roberts	ClimateXChange	Univ. Strathclyde, Scotland	Academia
Dr Ben Teschner	Colorado School of Mines	Golden, Colorado	Academia
Dr Josh Hoffman	US House of Representatives Natural Resources Committee	Washington D.C. USA	Academia/ Policy
Dr Maeve Boland	American Geosciences Institute	Virginia, USA	Academia/ Policy
Dr Julian Menuge	School of Earth Sciences	UCD, Dublin 4	Academia
Dr Valerie O'Brien	School of Social Sciences	UCD, Dublin 4	Academia
Dr. Karin Beland Lindahl	University of Lulea	Lulea, Sweden	Academia
Dr. Eoin O'Neill	UCD Earth Institute	UCD, Belfield Dublin 4	Academia
Dr Jeanne Moore	National Economic & Social Council	NESC, Dublin 1	Public Policy
Dr. Marcus Lange	MaREI Centre	UCC, Cork	Academia
Mr. Gerry Sutton	MaREI Centre	UCC, Cork	Academia
Dr Chris Bean	Dublin Inst. Advanced Studies	Merrion Sq. Dublin 2	Academia
Mr Fergus McAuliffe	iCrag	UCD, Dublin 4	Academia
Professional Bodies			
Marie Fleming	President IGI	Dublin 2	Professional body
Siobhan Tinnelly	immed. Past President IMQS	Dublin 24	Professional body
Nick O'Neill	Secretariat, Petroleum Infrastructure Programme	Dundrum, D14	Professional Body
Dr. Sean Finlay	Geoscience Ireland - Convenor	Beggars Bush, Dublin 4	Public Sector/ PPP
Private Sector / Industry			
Alan Kelly	EirGrid Community Liaison Team	Ballsbridge Dublin 2	National Grid
Paul Gordon	Lundin Mining	Kilbricken Project, Co Clare	Exploration & Mining
Dave Blaney	BRG/ Glencore	Pallasgreen Project, Co. Limerick	Exploration & Mining
Tony Hand	New Boliden, Tara Mines	Navan, Co Meath	Mining
Gareth LI Jones	Geothermal Association of Ireland	Dublin / secretariat	Geothermal Energy
Fergus Cahill	Past CEO of INPC and IOOA	Dublin	Oil & Gas
Steve Boldy	CEO, Landsdowne Oil & Gas	Dublin	Oil & Gas
Paul Griffiths	CEO, various oil companies	Dublin	Oil & Gas
Fergal Murphy	CEO, Kinsale Energy	Cork	Oil & Gas
John O'Sullivan	CEO, Providence Resources	Dublin	Oil & Gas
Eddie Smyth	InterSocial Consulting	Mountrath, Co Laois	Mining/ Energy
NGO/ Community Sector			
Alan Hill	Community Development expert	Tullaghan Co Leitrim	Community expert
Jason Donaghy	Social engagement expert	Fermanagh	Social Leadership
Liam Breslin	Love Leitrim Campaign	Ballinaglera, Co. Leitrim	Anti Fracking Activist Community Activist
Ruairí Ó Conchúir	Mountaineering Ireland	Dublin / Clare	National Recreation
Frank Nugent	Irish Uplands Forum	Dublin	Conservation & Recreation
Theresa O'Donohoe	People's Energy Charter / Transition Ireland.	Environmental Pillar - social partnership of 28 NGOs	RE/ environmental activist
Mr Tom Byrne	Wicklow Uplands Council/ Irish Uplands Forum	Co Wicklow	Farmer/ Community activist

Public Sector			
Dr. Eibhlin Doyle	EMD	DCENR, Dublin 2	Public Sector
Dr Marie Cowen	GSNI	Belfast, NI	Public Sector
Ms. Mairead Glennon	Tellus Programme	GSI, Dublin 4	Public Sector
Ms. Taly Hunter-Williams	Groundwater programme	GSI, Dublin 4	Public Sector
Mr. Eoin Kelleher	Environmental Planning Officer	Kerry County Council	Public Sector
Indirect by Online Survey			
Local Authority			
Eileen Horgan	Tipperary County Council	Tipperary	Public Sector
Sharon Casey	Cork Heritage Officer	Cork	Public Sector
Tom O'Neill	Limerick Heritage Officer	Limerick	Public Sector
Labhaoise McKenna	Tipp Heritage Officer, Clonmel	Tipperary	Public Sector
Paul Mulcahy	Area Engineer –Tipp CoCo	Tipperary	Public Sector
Jim O'Mahony	Senior Planner, Tipp CoCo	Tipperary	Public Sector
Andrew Hind	Cork Co Co - Planning	Cork	Public Sector
Anthony Coleman	Limerick Co Co Community & Enterprise	Limerick	
Gerry Sheeran	Limerick CoCo- Senior Planner	Limerick	
Anthony Coleman	Limerick Co Co Community & Enterprise	Limerick	Galtee Mountains
Tom O'Neill	Limerick CoCo – Heritage Officer	Limerick	
Pat Dawson	NPWS Recreation Manager	Killarney National Park	Public Sector
Padruig O'Sullivan	NPWS – Park Ranger	<i>also Beaufort Community Council</i>	Public Sector
Ian Douglas	Mayo County Council / Planning	Mayo	
Paul Stack	Kerry Co Co - Senior Planner	Kerry	Public Sector
Eoin Kelleher	Kerry Co Co - Planner/ Ecologist	Kerry	Public Sector
Dr Noreen O'Mahony	KCC/ Economic Development	Kerry	Public Sector
John Griffin	KCC/ Tourism	Kerry	Public Sector
Joseph Gilhooly	Director Services, Leitrim Co. Council	Carrick-on-Shannon, Co Leitrim	Public Sector
Sinead McDermott	Leitrim Tourism	Carrick-on-Shannon, Co Leitrim	Public Sector
Statutory Agencies/ Semi-State Bodies			
Mary O'Brien	Coillte - Outdoor Recreation, Munster	Kinvara Hse, Dublin Hill, Cork	
Eimear Whittle	Failte Ireland - Southeast	Waterford	
Josephine O'Driscoll	Failte Ireland, Cork - Kerry	Cork	
Declan Murphy	Failte Ireland Southwest	Killarney Co Kerry	Tourism
David McInerney	Inland Fisheries Ireland (Director, Clonmel)	Tipperary	
Séan Breen	NPWS	Kilkenny-South Tipp-East Cork	
Garret McGrath	Waterways Ireland	Carrick-on-Shannon, Co Leitrim	Public Sector
Matthew Kennedy	SEAI	Dublin	
John McCann	SEAI	Dublin	
Paul Kenny	Tipperary Energy Agency	Tipperary	
Bernardine Maloney	ESB Manager Corporate Affairs	Dublin	
John Lynch	Bord na Mona	Dublin	

National Agricultural/ Rural/ Energy / Representative Bodies			
Liam Kelly	Muintir Na Tire - National Council	Waterford-Tipperary	
Marian O'Dwyer	Muintir/ ICA	National	
James McCarthy	IFA Kerry	Kerry	National Rural Body
Sean Brosnan	IFA Chair, Kerry	Kerry	National Rural Body
Frank Nugent (Chairperson)	Irish Upland Forum	Dublin / Wicklow	National Recreation
Jim Brennan	IFA Rural Affairs Committee	Tullaghan, Co Leitrim	National Rural body
Tommy Cooke	Meitheal na Gaoithe (Wind Cooperative)	Kilkenny	
Justin Rutherford	Meitheal na Gaoithe (Wind Cooperative)	Kilkenny	
John Fogarty	Templederry Wind	Community Co-Op	
Paddy Gallen	Inishowen Co-Operative, Donegal	Carndonagh, Co Donegal	Cooperative
LEADER/ Rural Development Companies			
Carmel Fox	CEO, Ballyhoura Development Ltd,	Co Limerick	Ballyhoura
Pádraig Casey	Ballyhoura Development Limited	Co Limerick	Ballyhoura Hills
Isabel Cambie	Tipp Development Company	Tipperary	Galtee Mountains
Noel Spillane	South Kerry Dev Prog/ LEADER	Cahirciveen, Co Kerry	
Patricia Deane	SKDP/ RRO	Cahirciveen, Co Kerry	MacGillicuddy's Reeks
Ashling Cartwright	Leitrim Development Company/ LEADER	Drumshanbo, Co. Leitrim	Rural Development
Brian Smyth	Leitrim Development Company/ LEADER	Drumshanbo, Co. Leitrim	Rural Development
Community Activists/ Outdoor / Recreation/ Tourism			
Kevin O'Donnell	Knockmealdown Active	Kilmaneen	Knockmealdown Mountains
Michael Desmond	RRO / Walking Guide	Deerpark, Ballymaearby	Comeragh Mountains
Seamus Butler	NARGC / Game conservation	Marlhill, Ardfinann.	Knockmealdown Mountains
Tony Musiol	South Tipperary Tourism Company	Clonmel/ Cahir	
Mark Rylands	Knockmealdown Active	Kildanoge, Ardfinnan	Knockmealdown Mountains
Jim Flynn	Ballyhoura Fáilte	Main street, Kilfinane, Co Limerick	Ballyhoura
Helen Morrissey	Aherlow Fáilte	Co Tipperary	Galtee Tourism
Mo Larkin (sec)	Galtee Mountains Walking Club	Tipperary	Galtee Mountains
John O'Sullivan	Kerry Mountain Rescue	Killarney	MacGillicuddy's Reeks
Donal Dowd	Cappanalea OEC	Kerry	MacGillicuddy's Reeks
Cara Doyle Herrity	Wicklow Upland Council	Rathdrum Co Wicklow	Rural Development
Brendan Dunford	Burren Beo	Kinvara Co Galway	Conservation & Land Manage
Matthew Busby	Mournes Heritage Trust	Co Down	Upland Management
Rosemary Kerrigan	Chair SLNCR Community Group	Manorhamilton, Co. Leitrim	Outdoor Recreation
Julian Carlier	SLNCR Community Group/ Ecologist	Manorhamilton, Co. Leitrim	Outdoor Recreation
Teresa Lennon	Fenagh Visitor Centre	Fenagh, Co. Leitrim	Community/ Recreation Tourism
Gerry Darcy	Ballinamore/ Cavan-Leitrim-Rail	Cavan/ leitrim	Community/

			Recreation Tourism
Enda McGloin	Drumshanbo/ LCC member	Leitrim	
Siobhan McGloin	Landowner/ Community Activist	Glenade, Co Leitrim	
Community Activist Sector			
Liam Breslin	Love Leitrim/ Ballinglera	Leitrim	Anti Fracking Activist
Henry Fingleton	Midlands Alliance	Westmeath	Anti-Wind Activist
Tom Byrne	Irish Land League/ Irish Uplands Forum/ Wicklow Uplands Council	Wicklow	Farming/ Activist
Dr Mike Maunsell	Mountain Research Ireland	NGO	
Valerie Freeman	Coastal Concern Alliance	Dalkey Co Dublin	NGO
Denis Dennison	Abbeyfeale Community Development	Abbeyfeale, Co Limerick	Angling Group
Mike de Jong	CREWE Community Alliance	Strokestown, Co Roscommon	Renew Energy NGO
Henry Fingleton	People Over Wind/ Midlands Alliance	Co Laois	Anti-Wind NGO
Phil Kearney	Convenor - Aarhus Convention in Ireland	Dublin	Aarhus
Theresa Carter	Coordinator Regional Transition Hub	Co Clare	NGO/ People's Charter
Private Sector - Recreation & Tourism			
Pat Walsh	Aherlow Co-Op – Manager	Bansha, Co Tipperary	Galtee Mountains
John English	Mitchelstown Caves	Co Tipperary	Galtee Mountains
Paddy Caplice	Estate Agent/ Cahir Dev. Assoc.	Cahir Co Tipp	Galtee Mountains
Nathan Kingerlee	OUTDOORS IRELAND. Commercial Guide	Galway	Outdoor Recreation
Michael Crawley	Mór Active	Cahirciveen, Co Kerry	Outdoor Recreation
Murt Dineen	Black Ridge Mountaineering	Killarney	Outdoor Recreation
John Aherne	South West Walks	Kerry	Outdoor Recreation
Aidan Browne	Bundoran Surf	Bundoran, Co Donegal	Private/ Recreation Tourism
Moss Fitzgerald	Kilbehenny Community Dev Assoc.	Kilbehenny, Co Cork	Galtee Mountains
John Cronin	Cronins Yard	Beaufort, Co Kerry	MacGillycuddy's Reeks
Aidan Browne	Bundoran Surf	Bundoran, Co Donegal	Private/ Recreation Tourism
Adrienne Diamond	Adventure Gently	Leitrim	Private/ Recreation Tourism
Eileen Gibbons	Electric Bike Trails	Leitrim village, Co Leitrim	Private/ Recreation Tourism
Nuala McNulty	Tawnylust	Tawnylust, Manorhamilton,	Private/ Recreation Tourism
Karen McManus	Equestrian trails	Drumshanbo, Leitrim	Private/ Recreation

ATTENDEES AT CONSULTATIVE WORKSHOP, GSI, DUBLIN - 03 MAY 2016

Name	Organisation
Aisling Soden	SFI
Alice Mitchinson	SLR Consulting
Anne Monaghan	Dalradian Gold
Andrew Gaynor	GSI
Aoife Braiden	GSI Research Manager
Balz Kamber	TCD
Brian McConnell	GSI
Chris Bean	DIAS
Damhnait Gleeson	SFI
Dave Blaney	BRG
Dave Hanley	Principal Officer, DCENR
Deirdre Clayton	iCRAG
Deirdre Lewis (<i>speaker</i>)	SLR Consulting
Dorothy Stewart	EPA
Eddie Smyth (<i>speaker</i>)	Intersocial Consulting
Eibhlin Doyle	EMD, DCENR
Eoin Kelleher	Kerry County Council
Eoin O'Neill (<i>speaker</i>)	UCD
Fergus McAuliffe	iCRAG
Gareth Jones	Geothermal Association of Ireland
Gerry Stanley	GSI
Gerry Sutton	MaREI / UCC
Jason Donaghy (<i>speaker</i>)	Jason Donaghy Consulting
Jeanne Moore (<i>speaker</i>)	NESC
Jennifer Craig	iCRAG
John Walsh	iCRAG
Kara English	PAD, DCENR
Karl Kent	Consultant / Planning Advisor
Ken Wright	Wright Consultancy International
Koen Verbruggen	Director- GSI
Margaret Keegan	EPA
Mairead Glennon	GSI
Margie McCarthy	SFI
Marie Cowan	Director- GSNI / DETINI
Marie Fleming	IGI (President) / ARUP
Matthew Mawson	IAEG (President)
Mick Hanrahan	PAD, DCENR
Mike Murray	Kinsale Energy Ltd.
Nick O'Neill	PIP Secretariat
Ray Scanlon	GSI
Sean Finlay	Geoscience Ireland
Siobhan Tinnelly	IMQS / Tobin Consulting Engineers
Shane Lavery	SLR Consulting
Sophie Preteseille	GSI
Taly Hunter Williams	GSI
Theresa O'Donohoe (<i>speaker</i>)	People's Energy Charter/ Transition / Environmental Pillar
Tom Byrne	Irish Uplands Forum / Wicklow Uplands Council
Tony Hand	Boliden Group

ANNEX 1

Phase 1: Review of the National and International Literature on Social Acceptance of Geoscience Activity and Earth Resources

**Research conducted by SLR Consulting Ireland on behalf of
the Geological Survey of Ireland
(December 2015)**

ANNEX 2

Consultative Workshop : 03 May 2016

Presentations

Identifying Key Research Priorities for Public Perception and Understanding of Geoscience



Geological Survey of Ireland
PROC 24/2015

Review of Key Issues around Social Acceptance of Geoscience Activities & Earth Resources in Ireland



Annex 1: Review of International and National Literature & Research

December 2015
SLR Ref: (160504).501.0026.00005.Rev0

Cover Photo:

***Keep it In the Ground* protest at Cliffs of Moher, Co Clare
(scanned photograph from: *Irish Times*, 15/11/15)**

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EXECUTIVE SUMMARY

SLR Consulting Ireland (SLR) was contracted by the Geological Survey of Ireland (GSI) in November 2015 to carry out a systematic review of the '*key issues around social acceptance of geoscience activities & Earth resources in Ireland*'. The focus was on core geoscience activities, including research, exploration and extraction of minerals, energy and water resources.

In the first phase, a comprehensive literature review was carried out to determine the level of research into social acceptance of geoscientific activity across a range of sectors, and to conduct a gap analysis of research areas that the Irish Centre for Research into Applied Geosciences (iCRAG) might help to fulfil. The study found that there is a significant body of research on social acceptance and public attitudes to renewable energies, particularly wind, both internationally and in Ireland. Similar research has been conducted in relation to mining and minerals in resource rich jurisdictions such as Canada and Australia. There is almost a complete lack of research on 'social acceptance' of geoscience activity and development of earth resources in Ireland.

Social acceptance operates at three key levels: socio-political, market and community, respectively; it is largely at the latter level that determines whether geoscience activity is acceptable or not to the public. The term 'acceptance' in itself is nuanced, in that non-objection does not necessarily mean active support. However the term was retained throughout the report as it is widely used in the literature.

International frameworks which guide social engagement on public acceptance issues were first reviewed, followed by research pertaining to broader issues of acceptance of sub-sectoral geoscience and resource activities. Best practice by development agencies in effective community engagement in the developing world is now being introduced to the developed world as a key element for sustainable development of resources.

Political leadership is required at national and regional socio-political levels to deliver policy commitments and balanced spatial planning in the search for indigenous resources. At local levels, where 'social acceptance' in the current consideration resides, meaningful engagement on geoscience activity is critical, particularly in the research, exploration for and exploitation of resources, to earn the social licence to operate. Individual and collective decision making is not solely determined by the level of engagement or the information provided; rather an individual is influenced by the trustworthiness of the project proponent and the social dynamic in which s/he resides. The review indicates that similar issues influence social acceptance of both earth resources and energy technologies.

For resource projects to be socially acceptable, consideration of local values, transparency, procedural and distributional justice is required. Trust is crucial and is underpinned by faith in the regulatory/ governance systems to defend the public interest. Unfortunately, a conflation of public opposition to energy projects, coupled with the economic collapse in Ireland, may have undermined public trust in the regulatory system, as evidenced by the response to EPA research on the risks of 'fracking'.

The Government White Paper (December 2016) on Energy Policy adopts the concept of an 'Energy Citizen'. While Ireland has a well-established regulatory process and highly regarded investment climate for minerals development, current mineral policy does not address engagement with the citizens for development of major resource projects. The concept of a 'Resource Citizen' could be considered by policy makers, to inform national and

regional spatial planning for resource developments, through proactive engagement with citizens.

The research indicates that the key issues to achieve social acceptance of geoscience activity and ultimately the ‘social licence to operate’ in Ireland are likely to be:

- ✚ Early and effective engagement with impacted communities (of locality and interest);
- ✚ The need for understanding of place attachment; shared values and issues of concern; understanding of local power relations:
 - *Impacts on Place* may include place, health and environmental impacts including visual intrusion, noise, traffic, biodiversity, identity and local well-being
- ✚ Procedural fairness, with transparent, equitable decision making by developers and policy makers.
- ✚ Distributional justice to ensure host communities gain socio-economically.
- ✚ Trust building among all parties – open, honest and transparency in all dealings.

These factors combine in complex ways and can be partly determined by previous community experience of major proposals, or cumulative impacts of other resource developments in the locality. The reactions to a local project can be strongly influenced by the wider regulatory context and broader societal values.

Public communications of geoscience activity are weak and should be focused on building balanced scientific understanding and awareness of the need, benefits and risks of geoscience activity through public outreach. The effective use of the web and social media to counterbalance misinformation is an issue for consideration.

Emerging research topics have been identified on the basis of the above research.

Future Phases:

In Phase 2 of the research, consultations with key stakeholders will be taking place by direct and indirect communications channels. The final element of the project will be a plenary Phase 3 Stakeholder Workshop, in which the core issues around social acceptance of geoscience activity and earth resources will be discussed to identify agreed topics for future inter-disciplinary research.

1.0 INTRODUCTION

SLR Consulting Ireland (SLR) was contracted by the Geological Survey of Ireland (GSI) in November 2015 to carry out a systematic review of the *'key issues around social acceptance of geoscience activities & Earth resources in Ireland'*.

In the terms of reference, the GSI requested that the systematic review should be phased as follows:

- **Phase 1:** Systematic review of existing international and national literature/ research,
- **Phase 2:** Interviews with relevant key stakeholders, and
- **Phase 3:** A workshop for stakeholders, researchers, policy makers, public groups etc. with an interest in this area (with GSI to assist with this event).

This report provides the results of the Phase 1 review of the international and national literature and research in to social acceptance.

1.1 Objectives

The objectives of the project are to develop insights into the complex area of social acceptance of resource developments in Ireland, to understand (i) what influences the decision to accept/ reject a project; (ii) to understand what might be done to increase acceptance of resource developments; and (iii) to define areas for further research in collaboration with GSI's partners.

The 'public acceptance' platform of the fledgling Irish Centre for Research into Applied Geosciences (iCRAG) aims to carry out research into public attitudes towards resource developments to build an understanding of the psycho-social context in which such attitudes are formed.

The focus will be on social acceptance in the natural resources (minerals, hydrocarbons, water) and broader geosciences fields, taking cognisance of lessons learned from the renewable energy sector and related infrastructure. This review looks at specific factors that influence social acceptance in Ireland, where possible, and international experience to inform potential future strategies.

While the review is by its nature broad-based, case studies and international comparisons have been used to help understand the forces that influence social acceptance of geoscience activities and which can be used to define the scope of future research.

1.1.1 Desired Outputs

Following an initial meeting by SLR researchers with Mr. Koen Verbruggen, Director of the GSI, and Dr Aoife Braiden, Research Manager for GSI, on 13th November 2015, it was understood that the review should:

- Identify gaps in our understanding of the issues at play in terms of social acceptance;
- Communication requirements of geoscience to a non-scientific public audience; and
- Inform recommendations for future research in this critical field.

1.2 Methodology

SLR commenced the study by undertaking a comprehensive literature search and review of available data, which was combined to inform the following narrative (Phase 1 of the Study). A detailed bibliography has informed this research (Appendix A).

Limited consultations with relevant stakeholders have taken place in Phase 1, using our international company networks initially to identify pertinent studies in other jurisdictions (Appendix B).

Much of the specific research on the topic relates to public attitudes and support for renewable energies and particularly wind farming, both in Ireland and internationally, rather than 'core' geoscience activity. However, based on SLR's national and international work, as well as anecdotal reports from colleagues in UK, Australia, South Africa, Canada and USA, geoscience projects are experiencing social 'push-back' increasingly across the mineral exploration, mining, geothermal, CCS, shale gas and other disciplines, an issue which is now underpinning policy change and even election platforms in resource rich jurisdictions¹.

Links were made through the American Geological Institute² (currently rebranding as the American Geosciences Institute www.americangeosciences.org) to various academic studies in USA, with early stage consultations with those authors by email/ skype.

Results of the Phase 1 review are presented below. Advanced stakeholder engagement will be undertaken in the next phase.



¹ Andrew Hutton, SLR Australia, *pers. comm.* Nov 2015.

² Thanks to Dr. Maeve Boland, Director of Geoscience Policy at the AGI, for these links.

2.0 CONCEPTUAL FRAMEWORK

The research is framed within the context that geoscience activity is essential to the supply of raw materials to the economy and to addressing the challenges associated with balanced social and environmental development in Ireland. Hence, social acceptance of geoscience activities is essential.

2.1 What is Geoscience?

The term 'geoscience' has not been widely adopted in either official reports or public discourse, although the meaning is clear to practitioners and academics working in the field.

Based on the Central Statistics Office's (CSO) NACE³ classification of economic sectors, geoscience activities may be broadly grouped into 'core' and 'non-core' activities, as defined in the prior GSI study on the economic value of geoscience activity in 2007⁴. These may be simply classified as follows (Table 2.1).

Table 2.1 Definition of Geoscience Activity

Core Activities :	
Provision of public sector services and information at local and national levels.	Public and private geoscientific research
Exploration for and production of minerals	Geology, geochemistry, geophysics
Exploration for and production of petroleum and gas, non-conventional gas	Geotechnical engineering
Production of peat	Hydrogeology and water management
Quarrying of stone and aggregates; and products derived there from	Aspects of environmental and waste management
Non-Core Activities :	
Landscape based tourism	Arts & Crafts : sculpture, bronze casting, jewellery
Aspects of Archaeological investigations	

For the purposes of this report, the review will focus on those core geoscience activities which encompass the research, exploration and extraction of minerals, energy and water (earth resources) within the raw materials cycle in the circular economy (Figure 2.1).

³ NACE is a statistical classification of economic activities in the EU. The acronym is derived from the French title 'Nomenclature générale des Activités économiques dans les Communautés Européennes'. See <http://www.cso.ie/en/surveysandmethodology/classifications/classificationofindustrialactivity/>

⁴ *Economic Study of the Impact of the Geoscience Sector in Ireland (2007)*. Geological Survey of Ireland. Report carried out on behalf of the GSI by CSA Group and Jerome Casey & Associates.

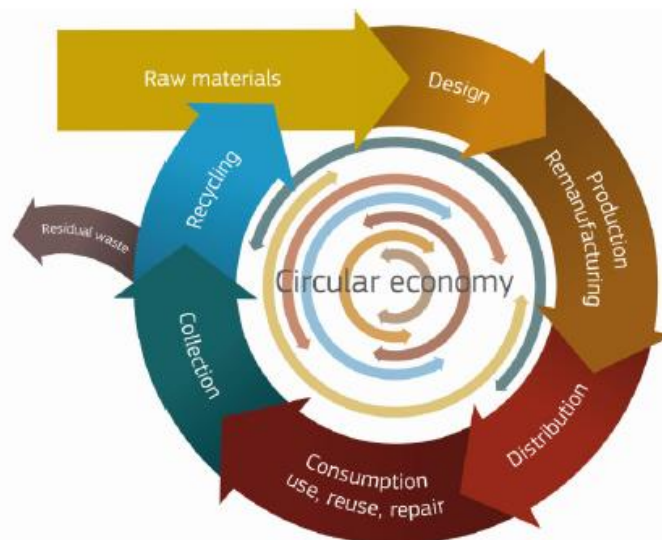


Figure 2.1 Earth Resources in the Circular Economy (EU Horizon 2020)

Despite the fact that earth resources are used in every aspect of daily life, they continue to have a low profile in the public mind. The use of industrial minerals for both the construction and comfort of homes, for example (Figure 2.2)⁵, is poorly appreciated by the average citizen.

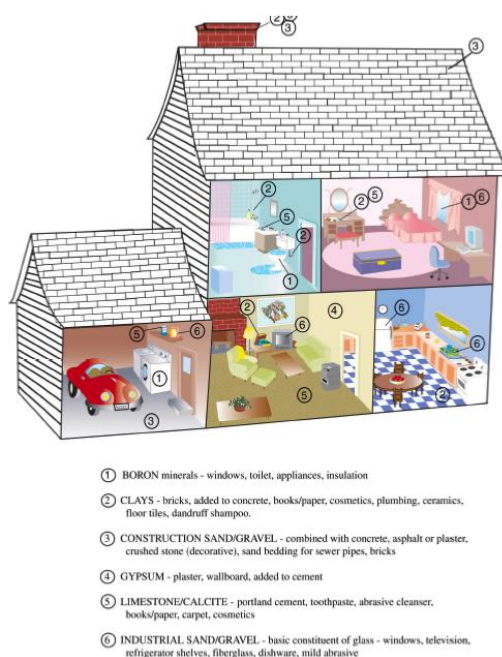


Figure 2.2 Industrial Minerals used to Build Homes

In the EU, the recognition that critical minerals and elements are required to support every aspect of modern life led to the development of the Raw Materials Initiative, which now underpins much of the Horizon 2020 research thrust⁶. In the USA and elsewhere, efforts

⁵ Galloway, J., Weathers, J. and Frank, D. (2001). Consumer Uses of Industrial Minerals in San Francisco Bay Area – Houses to Interstates. USGS Publication. <http://pubs.usgs.gov/bul/b2188/b2188ch8.pdf>

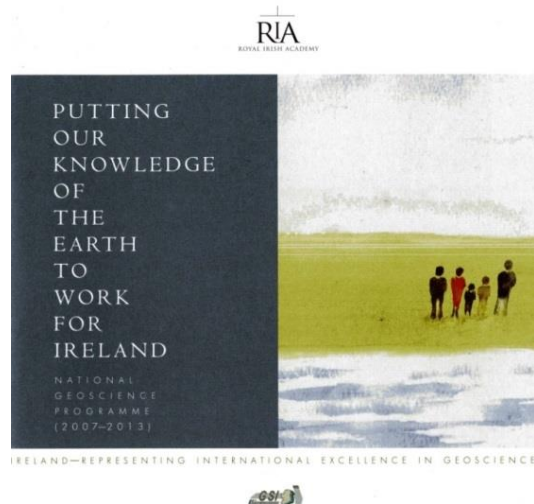
⁶ <https://ec.europa.eu/programmes/horizon2020/en/area/raw-materials>

are being made to redress this gap in public knowledge by promoting information on the metals and mineral products used in everyday products and renewable technologies by professional and industry bodies⁷. The American Geosciences Institute (AGI) provides a forum for research and discussion on critical issues⁸ facing society, recognising that minerals and materials are key components for manufacturing, communications, energy and innovation in the modern economy. The AGI promotes research on the role of global supply, demand and flow of minerals in supporting economic and strategic decision making, as a societal good.

Much more is required globally to build public and political understanding of the role of geosciences in supporting sustainable socio-economic development.

2.2 Geoscience in the Irish Economy

The geoscience sector has an immediate impact on the wellbeing, quality and standard of living in Ireland. The Royal Irish Academy, the GSI and the Geological Survey of Northern Ireland developed the collaborative all-island *National Geoscience Programme (NGP, 2007-2013)*⁹, based on the potential of geoscience research and activity to drive socio-economic development and resource sustainability in Ireland. The NGP estimated conservatively that geoscience-based industry contributed more than €2 billion annually to the all-island economy, derived largely from mining, quarrying and natural gas production, including potential production from the Corrib Gas field.



In 2007, the GSI published research entitled '*Breaking Ground*' on the value of the geoscience sector to the Irish economy¹⁰, the first integrated study internationally to evaluate the full national contribution across the range of 'core' and 'non-core' geoscientific activities. The total direct value added to the Irish economy was €3.3 billion, representing 2.2% of Gross National Product (GNP). The geoscience sector also made a substantial indirect contribution to GNP, because of the low import content of its inputs. Thus the combined direct and indirect contributions of geoscientific activity and earth resources to the economy was €4.24 billion (3.0% of GNP), employing 30,000 people, or 1.4% of total employment (based on 2006 data, at the height of the so-called '*Celtic Tiger*').

⁷ https://www.mineralseducationcoalition.org/sites/default/files/uploads/mec_fact_...

⁸ <http://www.americangeosciences.org/critical-issues>

⁹ *National Geoscience Programme (2007-2013) - Putting our Knowledge of the Earth to Work for Ireland* was launched in 2007 jointly by GSI and the Royal Irish Academy (RIA).

¹⁰ CSA Group (2007). *Economic Study of the Impact of the Geoscience Sector in Ireland (2007)*. Op.cit. published as '*Breaking Ground*' - Geological Survey of Ireland (2008).

In 2013, the Exploration and Mining Division (EMD) of the Department of Communications, Energy & Natural Resources (DCENR) commissioned a study¹¹ to evaluate the economic contribution of mining and mineral exploration in Ireland. It found that the gross value added by core geoscience activities to the Irish economy is €274 million through employment, wages and salaries, capital expenditures and taxes, which is broadly distributed across the regions, thus contributing to balanced spatial development.

Thus, from the perspective of secure indigenous resource supply, economic impact, employment and balanced regional development, it is critical that geoscience research, exploration and extractive activity continues in a way that it is broadly socially acceptable.

2.3 Social Context for the Study

The social and economic context for geoscience activity and resource development has changed markedly in recent years. The economic collapse in Ireland in 2008 spawned an inchoate public anger that continues to be expressed where people feel powerless or disempowered. It heralded an unprecedented breakdown of trust among the Irish citizenry in government and public institutions, an outcome that is potentially having significant long term consequences for the democratic process.

Scarcely a day passes without reports of community protest in the media pertaining to minerals, shale gas, energy, water and/ or the requisite infrastructure to harness these resources for societal benefit.

The vehement opposition to the large scale exploitation of wind resources by commercial companies in the Midlands in 2013-14¹², or to exploration for unconventional shale gas ('fracking') in Leitrim demonstrates that citizens will vent their anger where they feel decisions are being taken without their meaningful input¹³. Recent opposition to the national transmission grid upgrade by EirGrid (2014-15)¹⁴ has also demonstrated that citizens can force policy u-turns by well organised, collective political protest¹⁵.



Photo: SLR Archive

Public opposition to Grid 25 transmission grid upgrades forced an embarrassing policy u-turn for the grid operator and Government, Ireland, 2014

¹¹ Indecon (2013). *Assessment of Economic Contribution of Mining and Mineral Exploration in Ireland*. Report prepared on behalf of DCENR, Ireland.

¹² <http://www.crewe-ireland.org/index.php/news-events;>

¹³ www.loveleitrim.org

¹⁴ <http://www.irishtimes.com/news/environment/rural-ireland-rises-up-against-eirgrid-plans-for-pylon-network-expansion-1.1596798> (2014)

¹⁵ <http://www.independent.ie/irish-news/news/eirgrid-announces-underground-option-for-controversial-grid-west-pylon-project-30376255.html>

Non-social acceptance can be highly costly. Community objections to safety and environmental aspects of the Corrib Gas development in Co. Mayo since the early 2000s delayed the project by more than twelve years. It was originally expected to commence operation in late 2003 but is now expected to come onstream in early 2016. The capital cost of the project was estimated at \$714 million¹⁶ but a more recent report estimates the current cost at €3.4 billion¹⁷.

Field consultative experience by the authors suggests that citizens feel strongly that they are not being consulted in a meaningful way in project developments, despite significant expansions of the consultative process by public and private bodies. The old ways of communicating 'at' people are no longer enough. Community activists are seeking increasing inputs to national, regional and local policies on resource management and development that impact directly on communities and are finding that legal challenges can be financed locally through crowdfunding mechanisms¹⁸.

Ireland is not unique in this form of social response to resource development. 'Natural resource stress' internationally rarely operates in isolation; it is linked to other economic, institutional and political variables to generate a range of effects that impact on the overall ability of the state to exploit its resources for societal good¹⁹.

In short, social acceptance is critical if we are to develop and realise the socio-economic value of Ireland's earth resources, while reducing our environmental footprint and reliance on imported raw materials. However, the factors that determine 'social acceptance' must be explored further to understand people's reactions.

2.4 Social Acceptance

The concept of 'social acceptance' of geoscience or other resource developments often focuses on communities that live within a zone of influence of the specific proposal. This '*social area of influence*' consists of people potentially directly and indirectly impacted by the project, which may be both 'communities of place' and 'communities of interest'²⁰. The former tend to be the residents who physically live in the zone, while the latter may be NGOs or people with a shared interest in the type of development, who reside outside the zone. Social acceptance thus becomes a more complex, heterogeneous and far-ranging concept. There has been significant research conducted on this concept in relation to renewable energies, and particularly wind resources, in the past decade or so.

By way of illustration, broad social, political and market acceptance of renewable energies (REs) secured a strong foothold in Europe from the 1990s onwards. However, while 'society' at large may accept the policy need for REs, it is at the level of community (i.e. local) acceptance that the greatest challenge is currently perceived to lie²¹. Wüstenhagen et al²² (*in consideration of wind energy*) suggested that social acceptance should be viewed as a broad concept in which all societal actors accept a given concept/ resource development, which is composed of three inter-dependent sub-elements:

¹⁶ Wood Mackenzie, 2003, Internal Report to Shell.

¹⁷ As reported in the Irish Examiner 21 July, 2014

¹⁸ <http://www.independent.ie/irish-news/communities-50000-war-chests-to-fight-wind-farms-30621216.html>.

¹⁹ International Risk Governance Council (2010). *The Emergence of Risk: Contributing Factors*. IRGC Geneva.

²⁰ Stamford M. (2004). Community Ownership: the best way forward for UK Wind Power. MSc. Dissertation. www.uea.ac.uk/env/all/teaching/eiaams/pdf_dissertations/2004/Stamford_Mike.pdf

²¹ UK Sustainable Development Commission, 2005, ii.

²² Wüstenhagen, R. Wolsink, M. Burer, M.J. (2007) *Social Acceptance of Renewable Energy Innovation*. Energy Policy Vol. 35 Iss.5. pp 2683-2691.

- (i) *Socio-political acceptance*: regarded broadly as “public opinion” and therefore reflected in the tone of debate in the media and politics about the value and viability of the resource. This element of acceptance has a direct impact on the degree of support offered by national bodies, planning policy and decision makers, etc. While several indicators demonstrate that ‘public acceptance’ for renewable energies are high in many countries, however, this may have (mis)led policy makers to believe that social acceptance is not an issue. The link between global and local, and general support for policies to effect positive investment and development decisions is not straightforward.
- (ii) *Market acceptance*: relates to the degree to which financial institutions, in the broadest sense, accept resource development e.g. mining and as such is reflected in the way banks and developers view the viability of the investment. For example, the evolving financial support regime for wind energy in Denmark influenced the growth in wind generating capacity from the mid-1990s onwards, to its current world leading position in community ownership of wind farms.
- (iii) *Community acceptance*: often conflated in people’s minds with social acceptance more generally, but relates more narrowly to the degree to which people living in the immediate surroundings accept specific resource projects and who often bear most of the direct external impacts of a development.

These aspects of social acceptance are summarized in Table 2.2.

Aspect of Social Acceptance	Meaning
Socio-political acceptance	Refers largely to national “public opinion” and is therefore reflected in the tone of debate in the media and politics about the value and/or viability of a project’s development. The level of acceptance has a direct impact on the degree of support offered by national institutions via policy supports, incentives, etc.
Market acceptance	Refers to the degree to which financial institutions accept the validity of a project and will reflect the way banks and project developers view the viability of the investment (i.e. will make the requisite investment). The level of market acceptance will also demonstrate whether developers and consumers are willing to accept the project(s) as part of the resource supply mix of the country.
Community acceptance	The degree to which people living in the immediate surroundings and who often bear most of the direct external impacts of the proposed project(s), accept the relevant resource development.

Table 2.2 Aspects of Social Acceptance for Resource Development

While the socio-political and market levels of acceptance are required for sustainable development, it is at the level of community acceptance of geoscience activity that this research will largely focus. In Ireland’s clientelist political system, lack of community acceptance has possibly also led to reduced levels of acceptance at the broader socio-political level for resource development such as wind in the period 2000-2015.

It is easy to dismiss non-acceptance at community level simply as ‘NIMBY’ism²³, but research has consistently shown that the issue is much more complex, linked to psycho-

²³ NIMBY: Not in my Back Yard

social issues such as mistrust, place attachment and sense of procedural or distributional unfairness, all of which may contribute to negative attitudes and fear of resource developments²⁴.

The concept of 'place attachment' is highly relevant in the Irish context, when resource development projects are proposed. The emotional attachment to place plays a huge role in the psychological response to any proposed physical change. Developers should not dismiss emotions as 'irrational', but should work to minimise the impacts and allay fears in an open and honest way²⁵. Place meanings and place politics are central to the politics of natural resource management. In northern Sweden, where forestry and mining are critical to the regional economy, increased mining activity in recent years has impacted heavily on local communities, including the traditional Sami people, hinging on issues such as place attachment, hunting patterns and cultural values. However, conflicting place meanings can also divide the various actors²⁶. Where communities are already under socio-economic pressure, the imposition of 'outside' activities may induce conflict and cause fragmented communities to cleave further; conversely, where there is strong social capital, communities may be more open to accepting the resource activity. In all instances, an open and deliberative process of engagement is critical to identifying alternative pathways and resolving conflict²⁷ (see also Section 3.3.3 below).

Further research argues that the concept of 'acceptance' is in itself flawed and reduces a complex area of social consideration to either acceptance or opposition and is insufficiently nuanced to consider the array of public responses²⁸. A useful argument is provided by Batel et al. whereby '**acceptance**' seems to involve a reaction to something external and one which is mainly characterised by passivity and non-decision, and '**support**' seems more clearly to be action-oriented, to imply agency for and engagement with something.

This argument suggests that 'acceptance' may be too passive and that 'social support' would be a better term. These terms may be disaggregated²⁹ to mean:

- ✚ *Disengaged or passive tolerance* (little or no community engagement of any kind and/or many objections)
- ✚ *Active objection* (high engagement but mainly opposition)
- ✚ *Mixed response* (some pockets of support and of objections or scepticism, but no consensus or critical mass either way)
- ✚ *Active support* (few objections, extensive engagement; in favour of the scheme)

The key message is that a low level or absence of objection is not indicative of public support necessarily. The term 'acceptance' is used widely in the literature and is used throughout this report, but taking on board these nuances.

²⁴ Devine-Wright, P. (2009). Rethinking NIMBY-ism. *J. Community and Applied Social Psychology*. 19. 426-441.

²⁵ Devine-Wright P. (2013). *Social Acceptance of Low Carbon Energy-associated Infrastructure*. In: http://issuu.com/edi_quarterly/docs/quarterlye5i1/1.

²⁶ Beland Lindahl, K., Baker, S., Waldenstrom, C. 2013. *Place Perceptions and Controversies over Forest Management: Exploring a Swedish Example*. *J. Environmental Policy & Planning*. <http://dx.doi.org/10.1080/1523908X.2012.753316>

²⁷ Dr. Karin Beland Lindahl, University of Lulea, Sweden. *pers. comm.* See also: Beland Lindahl, K., Baker, S., Rist, L., and Zachrisson, A., 2015. *Theorising pathways to sustainability*. *International J. Sustainable Development & World Ecology*. <http://dx.doi.org/10.1080/13504509.2015.1128492>

²⁸ Batel, S., Devine-Wright, P. and Tangeland, T. (2013). *Social acceptance of low carbon energy and associated infrastructures: A critical discussion* *Energy Policy*. Vol.58, Pages 1–5

²⁹ Devine White, P. *pers comm.* in correspondence to SLR (06/02/14).

2.5 Social Licence to Operate

Linked to social acceptance is the '**social licence to operate**³⁰ (SLTO or SLO). While a resource developer may be granted a legal permit to explore, operate or develop a particular project, s/he must also seek a social licence, requiring proactive and deliberative engagement. Such a social licence is "granted" by the host community and may allow the developer to proceed, but it is frequently intangible, dynamic and critically non-permanent. Thus it must be earned and maintained to reduce risk of project delays and cost over-runs.

Internationally, it is recognised that management of social acceptance (or resistance) reduces project risk. Community conflict can cost in the order of US\$20 million per week for large extractive operations³¹, while non-social acceptance was recently ranked as the third highest risk facing mining operations globally³².

A conceptual model may be drawn to demonstrate the complex and fluid interactions required to earn and maintain the social licence. The latter is subject to four 'benchmark' levels of withdrawal, acceptance, approval and identification/ sense of ownership, which straddle three boundary conditions: legitimacy, credibility and trust (see Figure 2.3)³³.

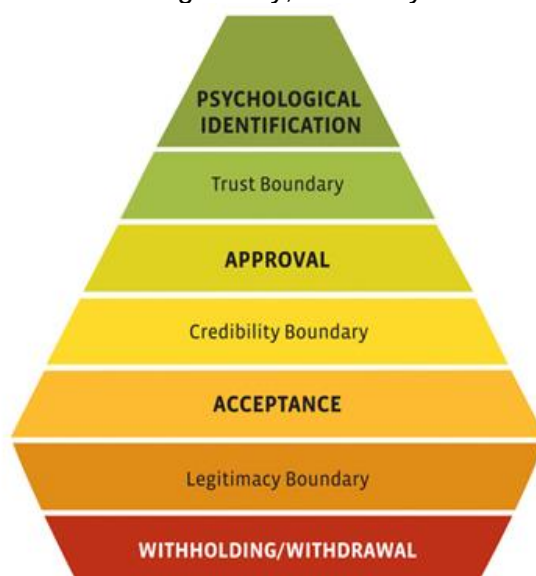


Figure 2.3 Measuring the Social Licence (after Thomson & Boutilier 2011)

The proponent must address the 'soft' boundary conditions to achieve the appropriate levels of 'social licence' at each stage of the project through pro-active engagement with the hosts communities. The challenge is to negotiate these critical levels and traverse the 'acceptance' boundaries pragmatically throughout the project life cycle, to build legitimacy and credibility with the host community. This process provides a solid framework to build the critical boundary condition of trust.

This form of open engagement maps and builds an understanding of what concerns those most impacted, assesses potential impacts and demonstrates commitment to their mitigation and management. If the SLTO is 'earned', the developer may be expected to contribute to the social development of the community(s) in which the company is planning

³⁰ Ian Thomson, Robert G. Boutilier, 2011, *Modelling and Measuring the Social License to Operate: Fruits of a Dialogue between Theory and Practice*.

³¹ *Cost of Company Community Conflict in the Extractives*. Harvard Kennedy School 2014.

³² *Business Risks Facing Mining & Metals 2014-2015*. Ernst and Young, 2015.

³³ www.sociallicense.com

to operate, which may demand a longer term commitment with proactive participatory mechanisms to involve those most impacted throughout the project life.

“Engagement is the process, while social licence is the outcome”³⁴

3.0 LITERATURE REVIEW

There is an extensive literature on the topics of ‘public’ or ‘social’ acceptance for earth resource developments. Much of this research attempts to understand the reasons why ‘society’ accepts or does not accept aspects of resource development.

In the following sections, the international framework guidance on social engagement to inform public acceptance issues were first reviewed, followed by a review of the broader issues and research pertaining to acceptance of specific geoscience activities.

3.1 Regulatory & Policy Frameworks for Social Acceptance

Based on evolving thinking in the international development (aid) arena over the past three decades, it was recognised that effective community engagement is a key element for sustainable development of resources. Interestingly, therefore, we are seeing best practice which has emerged and been formalised in the developing world, being introduced to the developed world.

3.1.1 International Regulatory Frameworks for Social Engagement

The International Finance Corporation (IFC), a member of the World Bank Group, developed a series of *Good Practice Notes* since 2003 on social and environmental practice³⁵ for companies investing in resources in developing economies. The IFC Sustainability Framework (2012) sets out key Performance Standards³⁶ which articulate clear commitments, roles and responsibilities related to environmental and social sustainability. Where risks are identified, it is recommended that the developer employ an *Environmental and Social Management System (ESMS)* throughout the life of the project. The IFC’s guidelines recognise that the management of social issues can be challenging and less measureable than environmental factors, but recommends early identification and proactive management of social wellbeing through the lifetime of a project.

The internationally adopted *Equator Principles* (EPs, 2013) commit more than 80 financial institutions in 36 countries to the implementation of ten core principles for environmental and social sustainability for financing of projects. The EPs have focused corporate responsibility on social/ community development, labour standards, respect for indigenous peoples and the need for consultation with locally affected communities for resource development. They also provide a platform for engagement with a broad range of interested stakeholders, including non-governmental organisations (NGOs) and industry bodies. The member institutions will not provide project finance to projects that do not comply with the principles.

Based on the essential EPs and lessons learned over decades of the Environmental Impact Assessment (EIA) process³⁷, guiding principles for management of environmental and

³⁴ http://www.icoe2014canada.org/wp-content/uploads/2014/11/1-ColtonJohn_3-3.pdf

³⁵ IFC Good Practice Note: *Social Dimension of Private Sector Projects* (2003)

³⁶ IFC Policy and Performance Standards on Environmental and Social Sustainability (2012) www.ifc.org

³⁷ EU Guidelines for Assessment of Indirect and Cumulative Impacts (1999)

social impacts have been elaborated by the EU and European Bank for Reconstruction & Development³⁸ among others. These now provide an internationally systematic approach for social engagement during resource project developments.

A range of other international guiding principles and performance standards for social impact, public participation and community engagement have been developed, including the *ISO 26000*³⁹ process on social management systems for resource developments. The latter has not yet been widely adopted, despite recommendations for effective and iterative communications through the project life cycle, with integrated management of all social aspects of project development for long term or complex projects.

The *UNECE Aarhus Convention*⁴⁰ and the related *Maastricht Principles*, provide for protection of the environment, but fundamentally acknowledge the right to public participation in environmental and planning decision making, linked to government accountability.

In 2000, the *Kimberley Process* was launched as a joint initiative of governments, industry, and civil society, driven by the international community to prevent diamonds from fuelling conflicts and atrocities against human rights. The Head of the EU Delegation to the UN 2014 Assembly noted that the Process assisted governments in responding to new situations of conflict and violence. He stressed that industry and civil society were essential to the process, demonstrating the need for public (and NGO) involvement in policy making and legislative processes, and how now, for those without certification, is has led to the inability to legally trade diamonds without what is effectively a 'social licence'⁴¹.

Central to the various international frameworks is that community stakeholders have the right to be informed (adopting the principle of 'fair informed and prior consent' - FIPC) of the project's intent and to be involved in the procedural process to inform any decisions they may need to make about the process and/ or contribute to mitigation and monitoring plans.

3.1.2 Minerals & Mining: Voluntary Frameworks

Public engagement to increase social acceptance takes place within the context of various levels of governance, framed by international conventions and agreed principles, while underpinned by regulatory responsibilities provided by government. It is increasingly necessary to demonstrate compliance with industry norms and principled practice, which are increasingly referenced by national regulators⁴².

In the international minerals sector, a number of extra-governmental, voluntary initiatives have been developed in the past 25 years or so, by in-country mining associations and international institutions (see Figure 3.1). These frameworks are rooted largely in environmental concerns pertaining to adverse impacts of mining, but increasingly focus on social impacts and the need for community participation in decision making.

✚ The 1993 *Whitehorse Mining Initiative* in Canada (Figure 3.1) focused on environmental concerns and respectful engagement with aboriginal landowners, which informed a series of international voluntary initiatives.

³⁸ EBRD Environment and Social Policy: Performance Requirements (May 2014)

³⁹ ISO 26000: Guidance on Social Responsibility for Developers (2010)

⁴⁰ The UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters is the official name of *The Aarhus Convention*.

⁴¹ December 2014 UN General Assembly: <http://www.un.org/press/en/2014/ga11602.doc.htm>

⁴² In Queensland, Australia, and in Greenland, regulators focus on the direct social impacts associated with mine development on host communities and require the development of social impact management plans.

- ✚ The Mining Association of Canada (MAC) has progressed its thinking from the original *Whitehorse Mining Initiative* to its most recent *Towards Sustainable Mining* strategy. Building on lessons learned on sustainable development issues in the 20+ year period, MAC has changed from a multi-stakeholder, partnership approach to a more focused agenda that addresses a few tangible and 'do-able' concerns by its members. This approach reflects a broader corporate tendency to address social and environmental issues through targeted corporate social responsibility (CSR) initiatives⁴³, which are increasingly audited by NGOs to compare actual vs performance indicators⁴⁴.

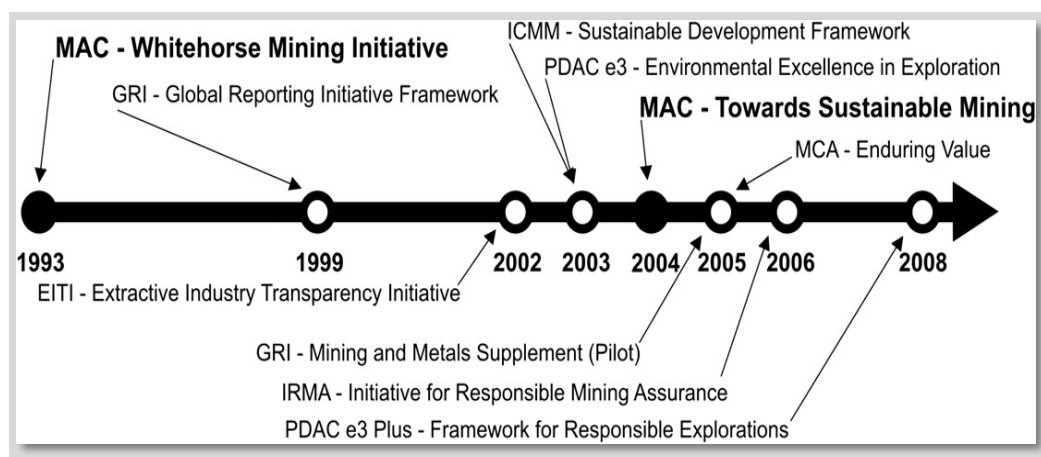


Figure 3.1 PDAC: Development of Non-State Initiatives in the Minerals Sector

- ✚ The *Global Reporting Initiative* (GRI)⁴⁵ and the *Extractive Industries Transparency Initiative* (EITI)⁴⁶ have been widely successful in addressing transparency in governance of natural resources in developing countries, as well as increasing transparency in corporate investment practices and mining revenue flows. The principle of stakeholder engagement underpins much of the narrative. Applicant countries are expected to abide by EITI principles in order to qualify for multi-lateral aid across a range of measures, including social sustainability.
- ✚ The *Prospectors and Developers Association of Canada* (PDAC, www.pdac.ca) has proactively developed practical guidelines (e3 series) for health & safety, environmental and social sustainability in exploration for mineral resources⁴⁷. These advocate an open, transparent and proactive engagement with host communities throughout the project life cycle. In the Fall 2015 issue of CORE journal, the PDAC dedicates significant coverage to the obligation to consult and engage with host communities, most particularly in the case of First Nation communities, who have a legal right to be consulted.
- ✚ The *International Council for Mining and Metals* (ICMM www.icmm.org) provides directional guidance to international mining and exploration companies on a range of 'sustainability' topics, including the need for more participative engagement mechanisms with communities and impacted interests. The complexity of gaining consent, through appropriate representation, dialogue and fair compensation requires transparency, benefit sharing, and fundamentally the building of trust among all parties.

⁴³ Fitzpatrick, P., Fonseca, A., McAllister M.L. (2011). *From the Whitehorse Mining Initiative Towards Sustainable Mining: lessons learned*. Journal of Cleaner Production 19 (2011) 376-384

⁴⁴ www.csr21.org for example

⁴⁵ www.globalreportinginitiative.org Global Reporting Initiative: G4 Sustainability Reporting Guidelines

⁴⁶ <https://eiti.org/>

⁴⁷ <http://www.pdac.ca/programs/e3-plus>

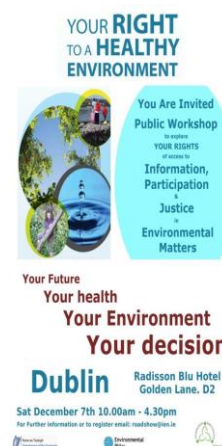
3.1.3 Irish Policy Framework for Social Acceptance

The Aarhus Convention (see Section 3.1.1 above) addresses the right of the public to participate in environmental decision making, including the interaction between the public and authorities in a democratic context.

Aarhus is becoming increasingly important in the Irish context since the Environmental (Miscellaneous Provisions) Act 2011 provided for the requirement that judicial notice be taken of the Convention.

These provisions address energy, mining, infrastructure, waste, water and industrial projects requiring environmental impact and industrial / emissions licences, and underpin much of the discussion on social engagement in energy and resource development in Ireland.

Aarhus also provides for the right to challenge the substantive or procedural legality of public decision making.



The Irish energy legal and policy framework provides a renewed focus on the concept of energy citizenship, reflecting that stakeholder participation is a critical element of energy strategy. The DCENR's *Green Paper on Energy Policy*⁴⁸ identified six priorities (P1-6) where the P1 **Empowering Energy Citizens** stated that "*the citizen remains at the centre of energy policy, and energy users must be informed and proactive contributors to the ongoing evolution of the Irish energy market, as challenges and difficult choices lie ahead*". Following a lengthy public consultation process, the White Paper on Energy Policy⁴⁹ was launched on 16 December 2015 and Chapter 4 'From Passive Consumer' to Active Citizen', enshrines this principle in Ireland's transition to a low carbon economy.

Public participation in decision making for energy projects is both demanded and expected by communities. For example, non-governmental organisations (NGOs) and Transition Ireland <http://transitiontownsireland.ning.com/> are advocating strongly for meaningful consultation and inputs to renewable and conventional energy policy under the provisions of the Aarhus Convention.

The national People's Energy Charter was ratified in late 2013 – see <http://pecireland.eu/>. The PEC and Transition Networks, north and south, are actively collaborating for much more effective public participation and input to energy policy, with a clear agenda to decarbonise the Irish economy to address climate change concerns.

The *Working Group on Citizen Engagement and Local Government (2013)*⁵⁰ proposed the establishment of 'People's Participatory Networks' (PPNs) for citizen engagement in public decision making, based on a review of European practice and recommendations of the Council for Europe⁵¹. PPNs are being rolled out countrywide, to provide networks for engagement with ordinary citizens when considering planning or resource developments.

⁴⁸ Dept. Communications, Energy & Natural Resources *Green Paper on Energy Policy in Ireland* (May 2014).

⁴⁹ Dept. Communications, Energy & Natural Resources: *Ireland's Transition to a Low Carbon Energy Future 2015-2030 - White Paper on Energy Policy in Ireland* (December 2015).

⁵⁰ Department of Environment, Community & Local Government (2014)

⁵¹ <http://www.environ.ie/en/Publications/Community/CommunityVoluntarySupports/FileDownload,36779,en.pdf>

It is likely that demands for public participation would now be extended to any large scale minerals, hydrocarbons, renewable energy and/ or water management project proposals or consents. While the PPN are primarily focused on local government decision making, these networks may provide a mechanism for active civic engagement with geoscience activity in any given sub-sector.

There is a well-established regulatory process and highly regarded policy investment climate⁵² for minerals development in Ireland. However, current mineral policy does not address engagement with the citizens on development of major resource projects. The concept of a 'Resource Citizen' could be considered by policy makers, to inform national and regional spatial planning for resource developments, through proactive engagement with citizens.

The recently published *Minerals Development Bill (2015)* does not make specific reference to stakeholder or community engagement under the provisions of Aarhus, either for prospecting or mining, but does make reference to consideration of 'factors in assessing the public interest'⁵³ by the Minister when granting of licences.

There is a significant and possibly far-reaching variance in Ireland between what is happening at policy level for social engagement in the management of energy resources, relative to that of mineral resource projects.

3.2 Dynamics of Social Acceptance

The need for earth resources and related geoscience activity is essential to maintain socio-economic development in Ireland. As discussed above (Section 2.4), there are different levels of socio-political, market and community acceptance, but the complex environmental, economic and social risks of resource developments pose a significant challenge to social acceptance. The dynamics of decision making must be understood.

3.2.1 Wicked Problems

'Wicked problem' is a term from social planning⁵⁴ to describe multi-dimensional issues where there is incomplete or contradictory knowledge; a diversity of opinions involved; interconnections with other complex problems; and significant policy and economic considerations. The situation where society at large needs and uses multiple earth resources, but may reject the means of exploring for, discovering or extracting them, may be referred to as a "wicked problem".

All wicked problems have strong moral, political and professional dimensions and are thus difficult to resolve; there is no 'right/ wrong' answer. Wicked problems require an interdisciplinary approach, respect for different perspectives and active inclusion of stakeholders that are directly affected. It is rare to find a true solution and improving the situation is the best that may be achieved.

⁵² <https://www.fraserinstitute.org/studies/annual-survey-of-mining-companies-2015>: the Fraser Policy Perception Index (PPI) measures policy attractiveness of 109 jurisdictions internationally, comprising survey responses to policy factors that affect investment decisions: administration of regulations, environmental regulations, regulatory duplication, legal and taxation regime, uncertainty concerning protected areas, infrastructure, socio-economic and community development, trade barriers, political stability, labour regulations, geological databases, security, and labour and skills. In 2015, Ireland had the highest PPI score of 100. Among the top 10 ranked jurisdictions are Wyoming, Sweden, Saskatchewan, Finland, Nevada, Alberta, Western Australia, New Brunswick, and Portugal.

⁵³ Chapter 2, Part 4, *Minerals Development Bill (2015)*, No. 69/2015. Houses of the Oireachtas, Ireland

⁵⁴ Rittel, H. & Weber, M. (1973). *Dilemmas in a General Theory of Planning*. Policy Sciences 4, 155-169.



'Wicked' problems have complex inter-woven dimensions, without a simple solution

Although this concept was developed 40 years ago, the authors advocated 'clumsy solutions', which should be stakeholder inclusive, transparent and inter-disciplinary, with iterative and adaptive approaches.

This prescient idea may inform 21st century circumstances, where sustainability requires *'the development of systemic contexts that produce goods, services and amenities that people need or value, at an acceptable cost, for as long as they are needed or valued'*.⁵⁵

'Clumsy solutions' may thus be required to deliver social acceptance of geoscience activity.

3.2.2 Factors which Influence Social Decision Making

The means by which society accepts or rejects a geoscientific activity or resource development is influenced by a range of socio-psychological considerations. Evolving social dynamics in the context of resource proposals or developments can lead to significant social stress and even outright conflict (see Section 2.3 above).

Social Judgement Theory⁵⁶ (SJT) suggests that a message will be accepted or rejected based on an individual's cognitive map. SJT can be used to explain how views are created and how extreme views form. It recognises that individuals have categories of judgement ('latitude'), which they use to evaluate messages by 'ego involvement' - the higher the ego-involvement, the harder to persuade, but the lower the ego-involvement, frequently the narrower the latitude. These latitudes may be categorised as:

- Acceptance – based on a positive individual experience
- Non-commitment – neither accept or reject a proposition
- Rejection – consider the message to be false.

Individuals may distort messages to anchor them closer or further from their own position, through the processes of:

- Assimilation – perceives the message to be close or aligned with one's own attitude, and
- Contrast – perceives the message to be further from one's own attitude.

⁵⁵ Kaputka L. et al. (2010). IEAM 6: p.774

⁵⁶ Sherif, M. and Horland, C. (1961). Social Judgement. New Haven, CT: Yale University Press.

The message is accepted or rejected based on the level of ego-involvement and whether it falls within the individual latitude of acceptance. The more an individual has vested in an opinion, the more likely the shift to the latitude of rejection. This may also mean they will be both defensive and contrary to opinions not aligning with their own. Thus persuasion (to accept a resource development) is likely to have the best chance of success if the message is assimilated within the latitude of acceptance⁵⁷.

A further element in the social dynamics of decision making is that people make decisions differently in groups than they do as individuals⁵⁸. For example, an individual is less likely to act in the face of an emergency when the person is part of a group (e.g. is less likely to call the ambulance when witnessing an accident in a busy street). The individual perceives his/her responsibility to be less and hopes that someone else will act. This is referred to as 'bystander apathy'. Similarly, individuals will make more risky or extreme decisions as part of a group than as an individual. People tend to look to others around them for social clues on how to act, known as 'pluralistic ignorance', which can either accentuate or decrease social acceptance of the risk of a given issue.

In all aspects of geoscience activity, there are uncertainties and gaps in knowledge. In the face of such incomplete information, social consensus is not the norm and conflicting values and interests lead to 'facts' being contested. Cognitive bias and emotions may have a greater effect on decision making than expected – logic and rationality ("common sense") are not always to the fore in 'sensemaking', the process of generating and evaluating hypotheses to explain ambiguous data (IRGC, op. cit.).

Trust has been identified in multiple studies as having a profound effect on decision making by the public⁵⁹. Trust, in fact, is used as a tool for the reduction of cognitive complexity; it is more important to build trust than to build technical understanding. SLR field experience indicates that in many resource proposals, people complain that they were not consulted by the developer or were given insufficient information with which to make an informed decision. However, the provision of more 'information' to the public does not necessarily increase the level of acceptance. Most people will not inform themselves to reach a considered opinion – they are more focused on the quality and mode of communications, and rely on a sense of trust to make their decision. The Dutch national research programme for carbon capture and storage (CATO) found that public attitudes towards the implementation of CCS were co-determined by trust in the stakeholders⁶⁰.

Research over the past decade on public attitudes towards implementation of renewable energy technologies indicate that personal, psychological and contextual factors combine to shape public acceptance⁶¹. While positive attitudes may come with trust, the perception of fairness is central to the building of that trust. In a study of societal acceptance of wind farms in Australia⁶², four common themes were identified among the generally high levels of public support:

⁵⁷ See also for further discussion: Hoffman, Joshua M., "A framework for understanding the public's perspectives of mining applied to the Kentucky coal industry" (2013). *Theses and Dissertations--Mining Engineering*. Paper 4. http://uknowledge.uky.edu/mng_etds/4/

⁵⁸ International Risk Governance Council (2010). *The Emergence of Risk: Contributing Factors*. IRGC Geneva

⁵⁹ Earle, T.C. and Cvetkovich, G.T. (1995). *Social Trust: Towards a Cosmopolitan Society*. Praeger, Westport CT.

⁶⁰ Terwel, Bart (2013). *The Importance of Public Trust in the Context of CO₂ Capture and Storage*. Leiden University. In: http://issuu.com/edi_quarterly/docs/quarterlye5i1/1

⁶¹ Devine-Wright, P. (2005a). *Reconsidering Public Acceptance of Renewable Energy Technologies: A Critical Review*. In: Jamasb T., Grubb, M., Pollitt, M. (Eds), *Delivering a Low Carbon Electricity System: Technologies, Economics and Policy*, Cambridge University Press.

⁶² Hall, Ashworth and Devine-Wright, P. (2013). *Societal Acceptance of Winds Farms: Analysis of Four Common Themes across Australian case Studies*. *Energy Policy*, Volume 58, July 2013, Pages 200–208

- (i) Trust,
- (ii) Distributional justice,
- (iii) Procedural justice and
- (iv) Place attachment.

These four factors are likely to come into play within a more general decision making framework for earth resources and are key elements to be considered when developing policy and engaging with the public for geoscience activity.

Proactive engagement to build trust with impacted communities through participatory decision making takes considerably more time than unilateral decision making. However, this is potentially offset by the gain in time at the project implementation phase⁶³. Time is lost upfront, not at the implementation phase, which allows for more predictable commissioning of projects, typically at lower cost (see Figure 3.2 below).

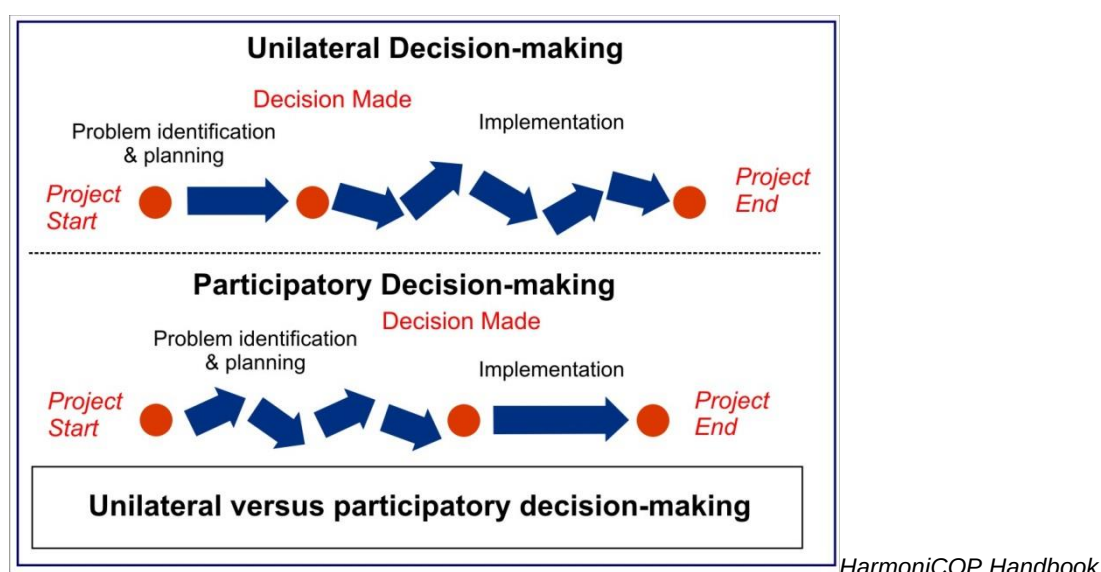


Figure 3.2 Model for Effective Participative Decision Making

In considering the requirements for social acceptance, project managers and researchers thus need to understand the social dynamics of decision making in impacted local communities, as not doing so may lead to unintended cascading effects including project delays, which could otherwise be prevented or mitigated with appropriate measures.

3.2.3 Community Engagement

Meaningful stakeholder engagement is required to involve local communities at all stages of the project life cycle, from research to exploration, feasibility, development and decommissioning. Such an approach has been shown to increase the likelihood of planning success⁶⁴.

If people feel distanced or excluded from decisions that affect them, it is likely to encourage suspicion and hostility towards those decisions. Wolsink in a series of papers contends that a lack of communication among local people, developers and decision makers is the

⁶³ <http://www.ecologic.eu/1625> - from the European project on harmonising collaborative planning (HarmoniCOP) Handbook, 1, 2, 3.

⁶⁴ Jones, C. and Eiser, J. (2009) 'Identifying predictors of attitudes towards local onshore wind development with reference to an English case study', *Energy Policy* 37: 4604–4614

‘perfect catalyst’ for converting local scepticism and negative attitudes towards wind farms into actual actions against specific projects. He states *‘if local interests are not given a voice in the decision making processes, conditional supporters may turn into objectors’*⁶⁵.

Public attitudes towards wind power are fundamentally different from attitudes towards wind farms, which causes misunderstandings about the nature of public support for renewables. Acceptance and non-objection are not the same thing – see the discussion in 2.4 above. Planners or developers may assume support for renewables can be generated by information campaigns on the environmental benefits, whereas opposition to renewable energy schemes can be dismissed as a selfish ‘NIMBY’ attitude. The visual impacts of wind farms on landscape values is by far the dominant factor in explaining why some are opposed to wind power and others support it. Moreover, feelings about equity and fairness appear to be the key decision making determinants, rather than selfishness.

Research and guidance documents repeatedly suggest that the way to address this is to inform, consult, and engage with the public and stakeholders⁶⁶. Trust building and meaningful engagement along a spectrum of empowerment, depending on the complexity of the project, is required to gain social acceptance for resource development⁶⁷ (Figure 3.3).

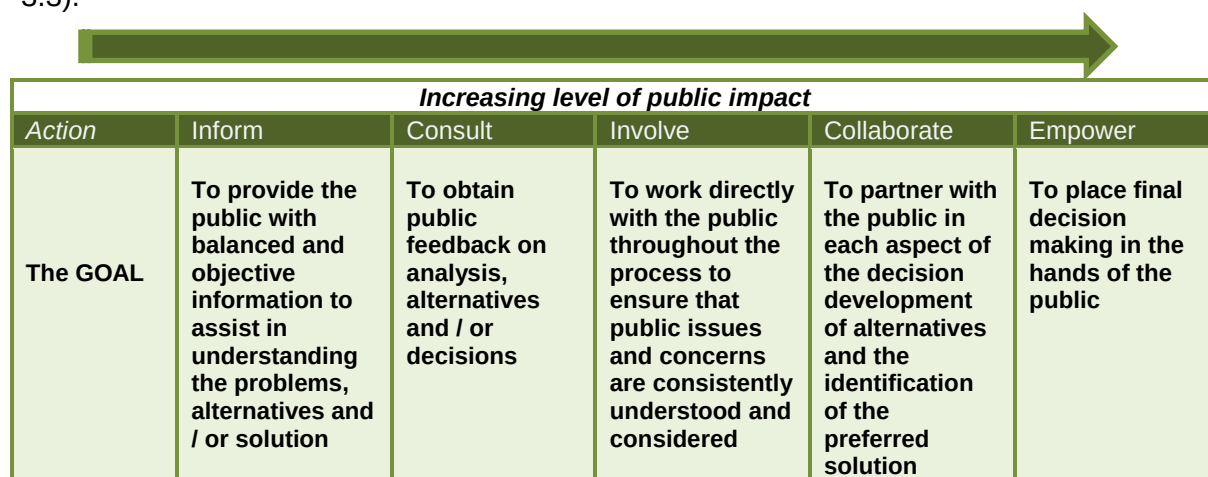


Figure 3.3 Public Participation Spectrum (Monaghan Model, 2005)

Different levels of engagement need to be employed at different stages of a project and possibly with different types of stakeholders⁶⁸. Eltham et al. recommend that developers and planning authorities need to engage local populations early so that concerns and objections can be addressed through effective dialogue between stakeholders⁶⁹.

However, the view that consultation offers a relatively simple solution to overcoming public scepticism of resource developments also overlooks the fact that public participation is a complex process through which different motivations, power differentials and other social attributes play out, with consequences that do not always align with the outcomes desired

⁶⁵ Wolsink (2007a) Planning of renewables schemes: Deliberative and fair decision making on landscape issues instead of reproachful accusations of non-cooperation, *Energy Policy* 35: 2692–2704.

⁶⁶ Wolsink, M. (2007). Wind power implementation: The nature of public attitudes: Equity and fairness instead of ‘backyard motives’. *Renewable and Sustainable Energy Reviews*, Vol. 11, Iss. 6, 2007, Pages 1188–1207

⁶⁷ *Monaghan Model: Best Practice for Community Consultations* (2005). Cavan-Monaghan LEADER Partnership.

⁶⁸ The Monaghan Model, 2005, op cit.

⁶⁹ Eltham, D. Harrison, G. P. Allen, S. (2008) *Change in public attitudes towards a Cornish wind farm: Implications for planning*, *Energy Policy* 36: 23–33

by regulators or project developers⁷⁰. Indeed some would argue that in remote communities in outback Australia, the corporate mining engagement process to gain 'social licence' is filling a vacuum in local service delivery that takes the form of patronage rather than partnership⁷¹.

3.3 Social Acceptance of Earth Resources

There is a large body of research on the subject of social acceptance of resource developments internationally. However there is significantly more specific research on what influences acceptance of renewable energies, particularly wind, than in more 'traditional' geoscientific resource (mining, oil, gas) activities. The latter tend to be reflected in site specific studies versus reflectance of more general societal issues.

The following section reviews the literature for specific resource research and developments, by type (wind, mining, CCS, geothermal, hydrocarbons, nuclear, etc), for ease of reference. This is followed by a discussion of the salient issues and gap analysis.

3.3.1 Social Acceptance of Geoscientific Research

The **Tellus Project** was a joint public research exercise undertaken by the Geological Survey of Northern Ireland (GSNI) and the British Geological Survey (BGS) to systematically map the geology, geochemistry and geophysical architecture of NI. It has delivered a world class datum of geoscientific, environmental and public health information, which is used for spatial planning and resource management.

Tellus deployed a very deliberate public engagement programme highly successfully, with the result that the programme was rolled out with almost zero 'social' objection among community stakeholders, despite low flying aircraft and surveyors crossing privately and publicly owned lands. The follow-up Tellus Border (<http://www.tellusborder.eu/>), completed in 2013 by the GSI, produced contiguous (with NI) information to support characterisation of resources, land-use planning and an environmental baseline. It employed the same public consultative approach and similarly did not have any significant social 'push back' in its research activities. The ongoing Tellus work in Ireland (www.tellus.ie) has been equally successful in its public engagement, with no social opposition.

It may be argued that the combined Tellus research was non-contentious, temporary in nature, without a significant physical impact and purely for public good. It therefore did not attract negative publicity or opposition. However, there are positive lessons in that proactive engagement with the public on geoscience matters that impact on daily lives can be hugely beneficial to delivery of projects.

More recently, the mood for public research has not been so positive. The anti-'fracking' 'Love Leitrim' www.loveleitrim.org movement feels so strongly about exploration for shale gas by hydraulic fracturing ('fracking'), as to seek to terminate public research by the Environmental Protection Agency into the risks of fracking and argue that the results cannot be trusted as '*the research is sponsored by the oil and gas industry*' (see Figure 3.4).

⁷⁰ Campbell, H. and Marshall, R. (2000). Public Involvement and Planning: Looking beyond the One to the Many. *International Planning Studies*, Vol 5, Iss. 3, 2000, 321-344.

⁷¹ Cheshire, L. (2010). *A corporate responsibility? The constitution of fly-in, fly-out mining companies as governance partners in remote, mine-affected localities*. *J. Rural Studies* 2010, Vol. 26 No. 1 pp. 12-20.



Figure 3.4 Images from 'Love Leitrim' www.loveleitrim.org

Opposition to academic geophysical research by the Dublin Institute of Advanced Studies (DIAS) in the Lough Allen Basin in Leitrim was based on the perception of 'trojan horse' activity to facilitate fracking⁷². The situation was defused but perhaps marks a change in public trust in the rationale for 'public good' research.

3.3.2 Social Acceptance of Wind

Extensive research on public attitudes to, and acceptance of, wind farms provides salient lessons that could be applied to geoscientific activity in Ireland.

Devine-Wright⁷³ and other workers⁷⁴ suggest that community acceptance is driven by complex issues of process, place and justice (see 3.2.2 above).

Bell et al.⁷⁵ commented on variable social responses to wind farming in the UK and identified (i) the social gap between high support for wind energy as reported in surveys, but the low success rate for wind farm applications; and (ii) the 'individual gap' whereby an individual supports wind energy in general, but opposes a local wind farm. Three explanations of the gaps were provided – democratic deficit, qualified support, and NIMBYism. As discussed above, the concept of 'nimby' in this context is outmoded and simplistic (see Section 2.5).



Photo: Meitheal na Gaoithe

Windfarm at Derrybrien, Co. Galway

⁷² Prof. Chris Bean, DIAS, *pers. comm.*

⁷³ Devine-Wright, P. (2005a). *Reconsidering Public Acceptance of Renewable Energy Technologies: A Critical Review*. In: Jamasb T., Grubb, M., Pollitt, M. (Eds), *Delivering a Low Carbon Electricity System: Technologies, Economics and Policy*, Cambridge University Press.

⁷⁴ Hall, Ashworth and Devine-Wright, P. (2013). *Societal Acceptance of Winds Farms: Analysis of Four Common Themes across Australian case Studies*. *Energy Policy*, Volume 58, July 2013, Pages 200–208

⁷⁵ Bell, D., Grey, T., Haggett, C. and Swaffield, (2013) *Revisiting the Social Gap: Public Opinion and Relations of Power in the Local Politics of Wind Energy*. *Environmental Politics*, 22. 1, 115-135.

A study by the UK Energy Research Centre⁷⁶ on public attitudes towards and acceptance of energy transition indicates that citizens are concerned about how energy is supplied, used and governed. On the supply-side there is a strong public commitment to renewable energy production and a corresponding shift away from fossil fuels. On the demand-side, the public supports adoption of new technology and infrastructure to encourage changes in lifestyles to increase efficiency and reduce demand. The public values identified include:

- Efficiency and minimising waste and overall energy usage;
- Protection of the environment and nature – conscious and respectful;
- Ensuring security through reliability, affordability, availability and safety;
- Autonomy and power at national and personal levels;
- Social justice and fairness - open, transparent and fair systems; and
- Improvement and quality of life – thinking in terms of long term trajectories.

The UKERC concluded that public acceptability of any particular aspect of energy system transformations will be conditional upon how well it fits into this value system.

Other workers suggest that the lack of input to decision making is a critical element of the degree to which communities are prepared to host wind projects proposed by external developers. Krohn et al. suggested that “*decision making over the heads of local people is the direct route to protest*”⁷⁷. Similarly, Wolsink suggested that “*local resistance to wind projects does not focus on the turbines themselves but on the people (usually outsiders) who want to build the turbines...especially if locals are denied access to the process*”⁷⁸.

A survey by Sustainable Energy Ireland of 1200 Irish people indicated that people’s viewpoints on wind farming are critically influenced by the nature of the planning and development process: the earlier, more open and participatory the process, the greater the likelihood of public support⁷⁹.



Protests against proposed Midlands industrial scale wind farms, Ireland 2013

Photo: <http://www.windawareireland.com>

⁷⁶ Parkhill, K.A., Demski, C., Butler, C., Spence, A. and Pidgeon, N. (2013). Transforming the UK Energy System: Public Values, Attitudes and Acceptability – Synthesis Report (UKERC: London)

⁷⁷ Krohn, S. and Damberg, S. (1999). *On public attitudes towards wind power*. Renewable Energy Volume 16, Issues 1–4, January–April 1999, Pages 954–960

⁷⁸ Wolsink, M. (2000). *Wind power and the NIMBY-myth: institutional capacity and the limited significance of public support*. Renewable Energy, Volume 21, Issue 1, 1 September 2000, Pages 49–64

⁷⁹ Sustainable Energy Agency Ireland (2003) *Attitudes Towards the Development of Wind Farms in Ireland* http://www.seai.ie/Renewables/Wind_Energy/Attitudes_towards_Wind_Energy_in_Ireland/

Ireland has failed to meet 1990 Kyoto Protocol greenhouse gas emissions reduction targets, due to over reliance on fossil fuel electricity generation, private transport and agricultural emissions, respectively. Recent research by SEAI (2015) indicates that Ireland's onshore wind energy may offer a leading role in decarbonising Ireland's electricity supply, accounting for 18.2% of electricity generation in 2014⁸⁰. Market and socio-political acceptance (see Section 2.4) have largely supported the deployment of wind infrastructure in Ireland. However, despite the national imperative to meet Kyoto and more recent COP21 targets, there is evidence that community acceptance of wind farming is decreasing in Ireland, based on recent protests against both wind farms and the requisite transmission grid infrastructure upgrades to deliver it from the resource-rich west to the populous east.

The National Economic & Social Council (NESC) sought to examine public opposition and acceptance of energy infrastructure⁸¹, and how social support for the transformation of Irish energy and wind in particular, may be better achieved through effective community engagement. As part of the research, a review was conducted of social engagement practices in Scotland, Denmark, Germany and other jurisdictions to identify appropriate models for adoption in Ireland⁸².

Different engagement approaches are adopted in each of the three jurisdictions. It was found that Denmark, with strong political leadership, has high levels of social acceptance of wind farming, with participative decision making at all levels of government in energy systems. The tradition of small scale, locally owned wind farms with tangible benefits of community ownership and strong grid interconnections with neighbouring jurisdictions serve to support the high levels of public acceptance of wind farming. Both Germany and Denmark engage in deliberate and participatory engagement processes, which empowers communities to solve problems and take 'ownership' of project developments.

In Scotland, although there has been significant wind deployment, there has been a declining level of support, largely due to the cumulative visual impacts of wind farms. Changes to the UK planning system in the early 2000s, with a 'planning is a burden to growth' thrust, have led to concerns that environmental sustainability and the ability of local communities and NGOs to influence planning outcomes, have diminished⁸³. However, the UK retains intentional mechanisms for community participation and co-ownership at local level in wind farming opportunities.

In Ireland, the NESC study (2014) involved extensive stakeholder consultations across five case study areas to determine issues of concern and success factors for wind deployment, against a backdrop of increasing public mobilisation against industrial wind farming and transmission grid upgrades in 2013-14. Several strategic elements were highlighted:

1. *Policy*: community activists feel that energy policy making is too top down, without a genuine national debate on options for energy supply (wind, other renewables) and demand side transformations, such as reduction, efficiencies and retrofitting of the built environment.
2. *Environment/ Place*: people are concerned about the visual, noise and intrusive nature of wind farms in their 'place' and on the environment. Many stakeholders are accepting

⁸⁰ Howley, M., Holland M., Dineen, D. and Cotter E., Energy Policy Statistical Support Unit, Sustainable Energy Authority of Ireland (2015), *Energy in Ireland, 1990-2014*.

⁸¹ National Economic & Social Council. Wind Energy: Building Community Engagement and Social Support, NESC No. 139, July 2014

⁸² NESC research was undertaken by SLR Consulting to examine how social acceptance might be furthered in the development of wind energy in Ireland. <http://www.nesc.ie/en/publications/publications/nesc-reports/wind-energy-in-ireland-building-community-engagement-and-social-support/>

⁸³ Cowell and Owens, S. (2006). *Governing space: planning reform and the politics of sustainability*. Environment and Planning C: Government and Policy 2006, volume 24, pages 403 - 421

- if the wind farms are placed at a distance from homes, while others believe that the mountains and bogs are precious wild environments to be protected from development.
3. *Planning*: there is a perception that the Strategic Infrastructure Act 2006 disempowers communities and does not allow sufficient consideration of genuine community environmental concerns regarding large scale developments⁸⁴.
 4. *Procedural justice*: the lack of meaningful community engagement, in advance of project design, was judged to be unfair. Developers employ PR professionals to deliver their message, which may distort the information provided in the national media. This has a negative impact and works against community acceptance.
 5. *Distributional justice*: there is need for tangible delivery of benefits to host communities, but also for standardization of those social dividends⁸⁵. There are also issues of distributional and social justice relating to the lack of benefits for those living close to wind projects i.e. the landowner gets paid but the near-neighbour gets nothing but adverse impacts. This can lead to unintended conflict in communities otherwise⁸⁶.
 6. *Management of Social Benefits*: there is a need for effective management models for the disbursement of community gain measures, to prevent perceived unfairness or conflict. This could be supported by a transparent National Benefits Register for each project, so that community gain measures are fair, transparent and can be monitored.
 7. *Distrust of government / agency decision making* – a sense of disempowerment and Government being too ‘cosy’ with developers (in relation to the proposed Midlands wind export project) and of decisions taken in advance of consultations in the case of EirGrid, thus rendering engagement meaningless.

Thus, community acceptance could be greatly improved if the decision-making process is open and transparent, and the outcome perceived to be fair. Issues of environmental justice and distributional benefits for communities also influence acceptance of resource developments⁸⁷. NESC recommended three components to further energy transition⁸⁸:

1. An intentional, participatory, and problem-solving process (which underpins the German and Danish energy models), as part of a national discussion to design an energy policy and implementation strategy that is in line with society’s goals.
2. An effective, open and inclusive process of public participation;
3. Enabling and intermediary organisations which support the kind of problem solving and entrepreneurialism necessary to initiate renewable energy options.

NESC suggested *four key tools for improved citizen engagement* in energy transition, which are relevant in the consideration of acceptance of geoscience activity:

1. Incorporation of progressive solutions into the design of energy solutions locally, including shaping of local benefits and value-sharing;
2. Inclusive processes for consultation and participation in problem solving through community energy forums;
3. Engagement and resourcing of intermediary organisations to bring expertise, facilitation and support for energy possibilities in a given area;

⁸⁴ Note: the An Bord Pleanála decision in 2015 to reject the proposal for an industrial scale wind farm at Cluddaun, Co Mayo, submitted under the SIA 2006, would not support this perception.

⁸⁵ These currently range from a suggested €1000/ MWe by the Irish Wind Energy Association to proposals from Mayo County Council of €10,000 / MWe in relation to industrial scale projects in that county.

⁸⁶ Bristow G., Cowell R. and Munday M. (2012). *Windfalls for Whom? The evolving notion of ‘community’ in community benefits from wind farms*. *Geoforum* 43, pp.1108-1120.

⁸⁷ Cowell, R. Bristow, G. Munday, M. (2011) Acceptance, acceptability and environmental justice: The role of community benefits in wind energy development, *J. Environmental Planning and Management*, 54:4, 539-557

⁸⁸ National Economic & Social Council. *Wind Energy: Building Community Engagement and Social Support*, NESC No. 139, July 2014

4. Linking of locally negotiated outcomes and energy plans to a key national institution such as SEAI, to validate local agreements and create a process of benchmarking nationally.

Many of these recommendations have been adopted in the recently published White Paper on Energy Policy in Ireland⁸⁹. Could such models be adopted for Resource Citizens as for Energy Citizens in Ireland?

Ireland is part of a group of ten countries who have officially committed to the International Energy Agency's *IEA Wind Implementation Agreement, Task 28*, which is charged with collecting and disseminating current knowledge on how to increase acceptance of wind energy projects, to facilitate implementation of climate targets⁹⁰.

Ireland's strategy has been to promote local acceptance of wind policy by information provision through guidelines, case studies, seminars and field trips. The *IEA Wind Task 28 Expert Group* recommended that regulators and developers should seek to uphold "procedural justice" by ensuring all those involved in the decision making process have adequate opportunities to have their say, are provided with appropriate information, and are treated with respect. The IEA research has shown that those projects with high levels of local participation are more likely to be accepted and successful, while projects that might otherwise be viable can actually be rendered unacceptable as a result of poor decision making processes⁹¹.

It is likely that many of the lessons of wind energy deployment concerning meaningful public engagement, fair procedural and distributional process, with consideration of community concerns, values and aspirations could be applied in the context of public acceptance of geoscience activity in Ireland.

3.3.3 Social Acceptance of Minerals and Mining

In the classic mineral project life cycle from exploration through development, extraction and decommissioning, the levels of legitimacy, credibility and trust vary significantly, depending on the level of social engagement that takes place at each stage of project development (Figure 3.5)⁹².

⁸⁹ DCENR (16 Dec. 2015). *Ireland's Transition to a Low Carbon energy Future 2015-2030*.

⁹⁰ IEA Wind Task 28, State-of-the-Art Report – see www.socialacceptance.ch

⁹¹ www.iea.org IEA Wind Publications Task 28: Social Acceptance of Wind Power Systems (2011)

⁹² Cited in http://www.icoe2014canada.org/wp-content/uploads/2014/11/1-ColtonJohn_3-3.pdf (after Thomson & Boutilier 2011)

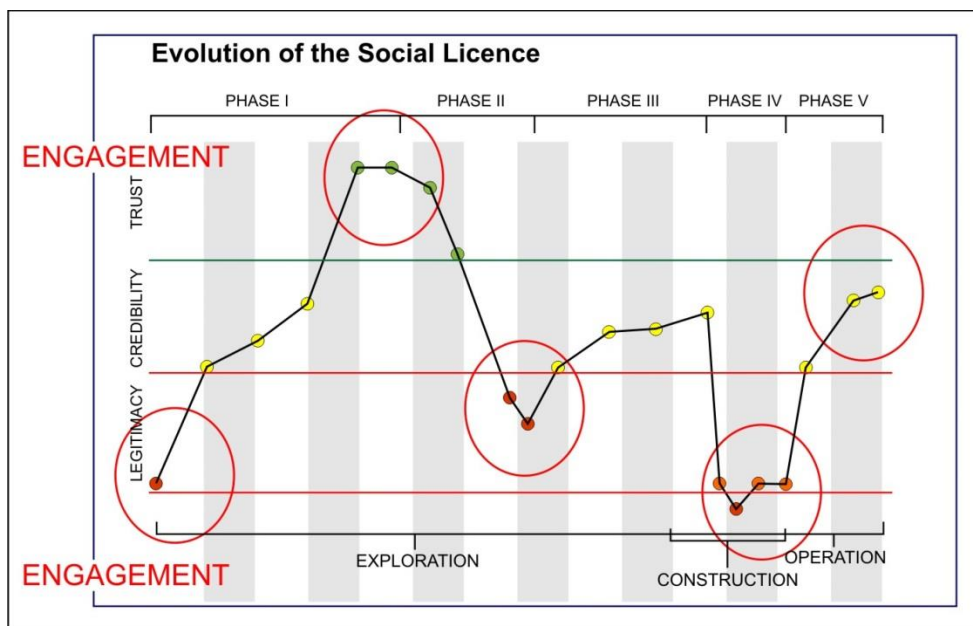


Figure 3.5 Evolution of the Social Licence linked to Engagement

In general, the social acceptance of the risks associated with resource developments is temporally linked to the stages of a project and closely mirrors the boundary conditions of the 'social licence to operate' model (see also Figure 2.3)⁹³.

Thus at the exploration stages, with high levels of person-to-person engagement among geologists and community stakeholders, trust is high. As the project moves towards development, trust plummets, as the focus shifts to technical and economic feasibility of the project. At construction stage, legitimacy is bordering on unacceptable, linked to the level of direct impacts on daily life in the community in the advancing stages of the activity. However, as the project goes into production, jobs are created and credibility is restored with the positive economic benefits generated in the community (see Figure 3.5).

Social Acceptance of Mineral Exploration and Mining in Ireland

There is a dearth of pure research on acceptance of, or public attitudes towards, exploration and mining in Ireland. However, recent experience and media reports provide interesting glimpses into the public state of mind.

The Tynagh zinc-lead mine in Co. Galway was discovered almost fifty years ago, and subsequently, base metal mines at Silvermines, Gortdrum, Navan, Lisheen and Galmoy were developed without significant public opposition, but perhaps not with significant public support either (see Section 2.4 above). Importantly, three of the former projects were developed prior to the introduction of modern mining legislation and regulation, when consideration of environmental and social impacts was not part of the application process. The non-opposition to the most recently opened mines (Galmoy, Lisheen) in the 1990s, with strong environmental regulation and a level of community engagement, may correlate with a high level of acceptance⁹⁴. Although Ireland continues to be a major, albeit declining, zinc producer in Europe⁹⁵, based on widespread local opposition to a range of other

⁹³ See Thompson, I. and Boutilier, R. (2011). Modelling and Measuring the Social License to Operate; Fruits of a Dialogue between Theory and Practice.

⁹⁴ Batel et al (2013) op. cit.

⁹⁵ Indecon (2013), op. cit.

resource developments in the past decade, there is no doubt that social acceptance will be a critical aspect of risk management for mining activity in the future (see Section 2.5 above).



Photo: SLR Archive

Recent discussions with New Boliden staff⁹⁶ at Navan Mine, Co. Meath, which employs c. 700 people, confirm that the company has embraced an 'open door' policy to their operations since the mine opened in 1979, and have a pro-active outreach programme with schools and universities. Boliden do not carry out routine surveys of community attitudes to, or levels of acceptance of, the mining operation, and have not received significant negative feedback at community level. The community is kept informed of e.g. blasting schedules, and the company has engaged in proactive consultation about planned expansion of the tailings storage facility. The transparent approach and positive socio-economic impact of the mine in the hinterland of Navan is likely a key factor in this level of acceptance.

In Northern Ireland, there was strong socio-political and community resistance⁹⁷ to the controversial proposals for lignite mining and a related power station in North Antrim in 2002, with a 3-year moratorium applied to exploration in 2007. The planning application attracted more than 32,000 objections in 2002, including those of local councillors, on the grounds of environmental impact and pollution concerns, and the moratorium was subsequently applied. The project has not advanced due to lack of socio-political and local support.

The most recent metallic mine project to advance to planning stage on the island of Ireland is the 3.5 Moz Curraghinalt gold deposit in County Tyrone, being developed by Dalradian Gold Corp. Although the project has met with individual opponents, there has been strong socio-political acceptance and insignificant local pushback to date⁹⁸. As the project advances towards development and planning consents, there has been local disquiet expressed about the use of cyanide in the processing of ore. The company has gone to significant lengths to engage meaningfully to assuage such fears through open dialogue.

⁹⁶ Thanks to Mr. Tony Hand, New Boliden Tara Mines, December 2015

⁹⁷ <http://www.belfasttelegraph.co.uk/news/northern-ireland/will-lignite-mining-rear-its-head-again-when-temporary-ban-ends-28553850.html>

⁹⁸ <http://www.belfasttelegraph.co.uk/news/northern-ireland/gold-mining-hopes-for-tyrone-hills-30795898.html>

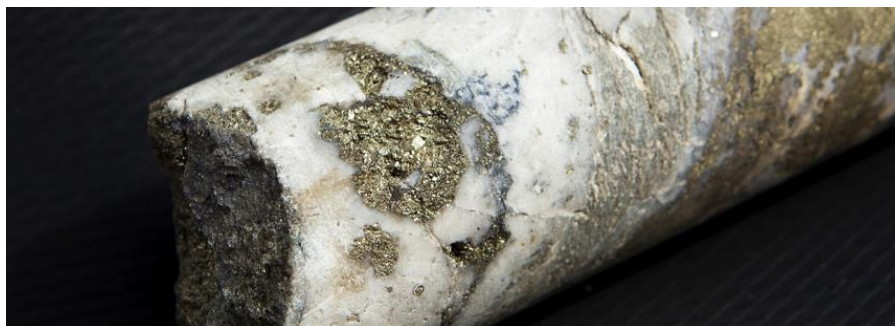


Photo: SLR Archive

Exploration in Ireland for base metals in the Midlands has historically proceeded without major public opposition. This may be due to the fact that exploration is relatively low impact with a high level of local engagement which helps to build trust (see Figure 3.5). The most recently discovered zinc deposits, at Pallasgreen, Co. Limerick and Kilbricken, Co. Clare, each of which has undergone advanced exploration campaigns, have not been advanced to planning application. However, the projects retained a high level of social support in the immediate surrounds through effective and ongoing engagement with landowners and local communities⁹⁹.

However, it has not always been so. Exploration for uranium in Donegal and Wicklow in the 1970s and 80s met with opposition, linked to anti-nuclear protests at Carnsore Point and reports of multinational companies 'exploiting' Irish resources¹⁰⁰. The campaign in the late 1980s against gold mining at Croagh Patrick in Mayo is perhaps the greatest example of public opposition to mining to date in this country. This effectively blocked the project going ahead and a motion to ban gold mining in Mayo was passed by the local authority. Elsewhere, Irish companies meet social opposition in progressing their exploration projects. A recent example is the Karelian Diamonds' diamond exploration project at Utsjoki in Northern Finland, which was rejected by communities, supported by international groups, due to impacts on aboriginal communities' lands and salmonid rivers¹⁰¹.

An interesting view of social acceptance of mining is how historical mining is regarded. The Arigna coal (anthracite) mine in Co. Roscommon closed in July 1990, and a series of '25 years on' media reports in 2015 have highlighted both the historical legacies of poor environmental and labour conditions, and also the socio-economic impacts of closure. It was described by one contributor that when the mine closed it was '*like a death in the family*'¹⁰². In 2003, the Arigna mine was opened as the Arigna Mining Experience¹⁰³, turning the defunct mine into a highly successful and award-winning geotourism attraction. This project is rooted in the mining community and has fostered pride in their mining legacy.

Social Acceptance of Mining Internationally

Mining in resource-rich jurisdictions such as Canada, USA, Australia and South Africa historically enjoyed high levels of social acceptance given their economic importance to those economies. However, the relationship between mining and society is changing and

⁹⁹ Thanks to Mr. Dave Blaney, BRG and Mr. Paul Gordon, formerly Lundin Mining, November 2015

¹⁰⁰ See WSM <http://www.wsm.ie/c/uranium-mining-ireland-view-1980>

¹⁰¹ http://yle.fi/uutiset/local_opposition_buries_plans_for_diamond_mine_in_northern_finland/7979205

¹⁰² <http://www.rte.ie/radio1/sunday-miscellany/programmes/2015/0712/713432-sunday-miscellany-sunday-12-july-2015/?clipid=1925050#1925050>

¹⁰³ www.arignaminingexperience.ie

the sustainability debate has firmly moved from a purely environmental focus to the need for more engagement with host communities¹⁰⁴.

A recent survey of attitudes to mining in Australia by CSIRO made some interesting findings¹⁰⁵. Mines are considered to be important in job creation, wealth generation in rural areas and contributors to regional infrastructure. While mining is recognised as important to the economy, public acceptance and support is contingent upon management of mining impacts, strong governance and the distribution of benefits across society. CSIRO used regression analysis to determine the factors that govern acceptance (Figure 3.6):

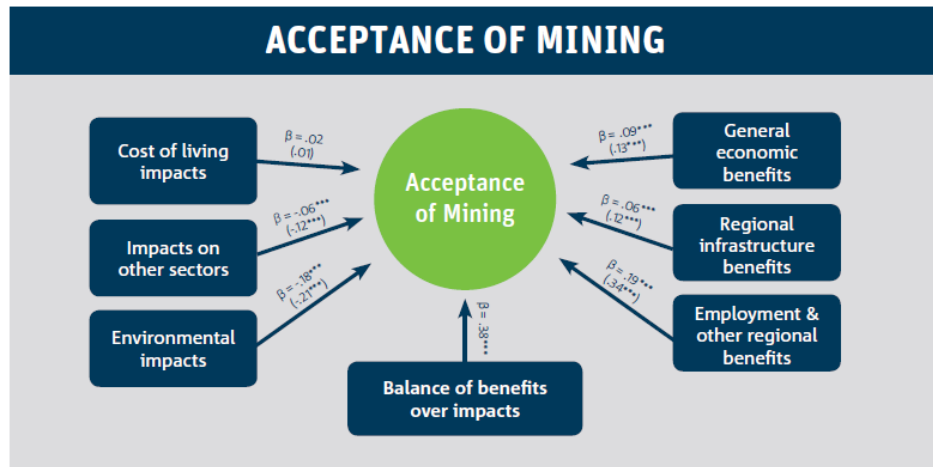


Figure 3.6 CSIRO Australia: Factors Influencing Acceptance of Mining 2014

Australians will accept mining when the industry is responsive to their concerns, when benefits are shared equitably, and when the legislative and regulatory frameworks are in place to provide confidence. These hinge on procedural fairness; distributional fairness and strong regulatory capacity. Trust in the industry was found to be a key element of acceptance to facilitate the 'social licence, bolstered by transparency, fairness and strong governance.

This study mirrors many of the key elements highlighted in studies of acceptance of wind energy and provides a foundation for understanding the relationship between industry and government, and society's acceptance of mining through a 'social licence to operate'.

¹⁰⁴ Institute for Environment and Development & the World Business Council for Sustainable Development, (2002): *Breaking New Ground: Mining, Minerals, and Sustainable Development*, United Kingdom and United States of America: Earthscan Publications Ltd.

¹⁰⁵ Moffat, K., Zhang, A., Boughen, N. (2014). Australian attitudes toward mining - Citizen survey - 2014 results. <https://publications.csiro.au/rpr/pub?list=SEL&pid=csiro:EP146276&sb=RECENT&expert=false&n=1&rpp=550&page=1&tr=1&q=PID%3A%22csiro%3AEP146276%22&dr=all>



The *International Council for Mining and Metals* (ICMM www.icmm.org) provides guidance to international mining companies on a range of ‘sustainability’ topics, including the need for participative engagement mechanisms with communities and impacted interests. While it originally focused on impacts of mining on indigenous people or in under-developed regions¹⁰⁶, there is an increased research interest in the social impacts of mining on communities at large.

An international survey of attitudes by the ICMM in 2014¹⁰⁷ reported that only a quarter of stakeholders positively perceive the mining industry's progress towards sustainable development. Environmental concerns, social licence to operate, and regulation continue to be issues of concern relating to resource extraction:

- ✚ Climate change is of greatest concern among NGOs and stakeholders in Australasia
- ✚ Water usage and management is the most important concern among all stakeholder groups in Europe and Latin America.
- ✚ Tailings management, in the wake of the Mount Polley mine disaster, in Canada.
- ✚ Stakeholders continue to prioritise reduction of environmental impacts as the most important issue for the industry to address, followed closely by:
- ✚ Improvement in community relations.

Common cross-cutting themes suggested to address environmental challenges include engagement with local communities; monitoring usage and investment in new technologies for water usage, waste management, emissions etc. Stakeholders suggested that engagement and communication in partnership with relevant organisations, governments, and local communities would allow more transparency about the benefits and risks of each project.

The ICMM recognises that the complexity of negotiating the social licence through appropriate representation, dialogue and fair compensation requires transparency, benefit sharing and fundamentally, the building of trust among all parties. Strong government at national and local levels is required to support such efforts.

Mechanisms for sharing community benefits or funds need to be teased out with beneficiaries, in deciding how that fund should be administered¹⁰⁸ (Figure 3.7 below).

¹⁰⁶ ICMM *Good Practice Guide: Indigenous People and Mining*. 2nd ed.

¹⁰⁷ ICMM (2014) *Stakeholder Perception Study: Tracking Progress* <http://www.icmm.com/document/8615>

¹⁰⁸ International Council on Mining & Metals, (2005): *Leading by Example: Making a Difference through Partnership – Annual Review 2005* <http://www.icmm.com/publications/2005>

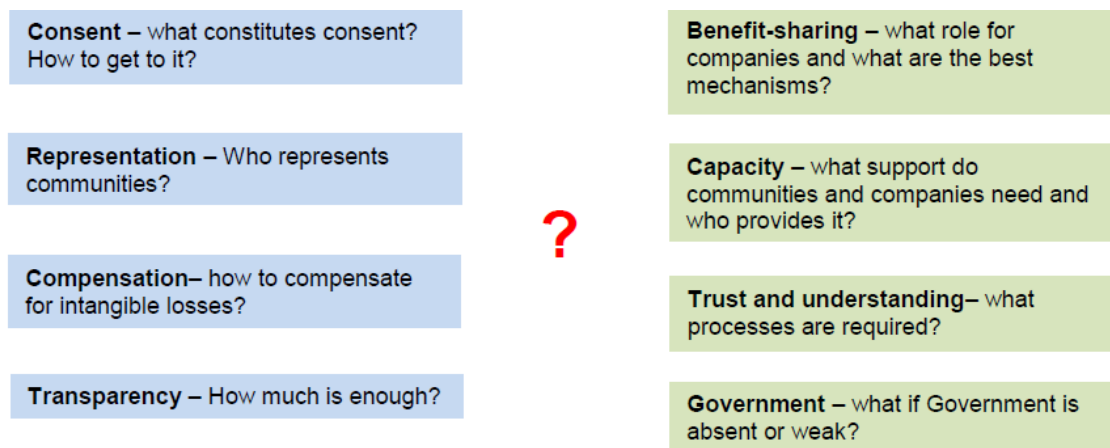


Figure 3.7 Negotiating the Social Licence

From: ICMM *Good Practice Guide: Indigenous People and Mining*. 2nd ed.

In Australia, the Centre for Social Responsibility in Mining (CSR) at University of Queensland provides focal research on the social impacts of mining, as well as independent advice and research on building more sustainable relationships with communities; social impacts of mining on aboriginal communities; cumulative impacts of mining, and mining-induced resettlement and displacement.

The CSR links social policy and mining¹⁰⁹, and the effectiveness of embracing psycho-sociological thinking in promoting social acceptance.

A CSR study in Indonesia reported that mining-related infrastructure (roads, rail, housing, water supply etc) and related employment can support broader social and development objectives. Early and effective social engagement at the design stage is required to enable the active participation of impacted communities. Meaningful engagement can address social and environmental concerns with minimal conflict, while making it more likely projects will obtain community acceptance¹¹⁰.

There tends to be a focus on single ‘footprint’ impacts of individual mines. However, in Australian studies of coal mining in the Hunter Valley, cumulative impacts are identified as most important to communities because cumulative impacts are what people actually experience. One further development may be the ‘straw that breaks’ the social acceptance of the project, irrespective of socio-economic gains¹¹¹. The assessment and management of cumulative impacts requires greater collaboration amongst stakeholders and presents a major challenge for both governance and risk management. Partnerships among mining companies, government and community stakeholders to address concerns require greater coordination and resources, but are yet uncommon within the industry. Communities (and local governments) continue to demand that greater attention be paid to management of cumulative impacts, which has the potential to benefit both communities and strengthen the industry’s social licence to operate.

¹⁰⁹ Kemp, D. and Owen, J. (2015). *Social Science and the Mining Sector: Contemporary Roles and Dilemmas for Engagement*. In Price, S. and May Robinson, J. (Ed.), *Making a difference? Social assessment policy and praxis and its emergence in China* (pp. 60-83) New York, NY United States: Berghahn Books.

¹¹⁰ Devi, B. et al. (2015) Socio-ecological tools in the development of mineral infrastructure. Indonesia initiative, AIIRA Research Report, Rev. 27/11/2015. <https://www.csr.uq.edu.au/publications/socio-ecological-tools-in-the-development-of-mineral-infrastructure>

¹¹¹ Franks D. Brereton D. and Moran C. (2008). Coal Mining: Managing the cumulative impacts of multiple mines on regional communities and environments in Australia. <http://www.iaia.org/IAIA08Calgary/documents/Franks%20et%20al%20Coal%20Miningn%20IAIA%202008.pdf>

In Canada, much debate has taken place within the mineral policy community¹¹² about whether or not meaningful progress has been made towards more sustainable mining practices since the Whitehorse Mining Initiative (see Section 3.1.2). The trends suggest that voluntary community initiatives to gain social acceptance should not be expected to replace the comprehensive regulatory responsibilities provided by government.

However, such agreements can be a key determinant in conflict resolution. In the lengthy Voisey Bay nickel mining¹¹³ controversy in Labrador, local government and community opposition in relation to the lack of defined local benefits caused major delays in commissioning the project (discovered in 1993). Between 1997 and 2002, the company, INCO, engaged in an innovative socio-environmental assessment and throughout the process, engaged other stakeholders in active negotiations on the project's potential contribution to local and regional sustainability. The resulting Impact Benefit Agreement was *"heavily influenced by the precedent-setting assessment, which imposed a 'contribution to sustainability' test on the proposed undertaking"*. As well as the legacy of years of conflict, there were significant differences culturally and in terms of power among the participants in these negotiations. However, the transparent agreements were a major element in conflict resolution, which granted the project the social licence to proceed.

Elsewhere, and in response to greater expectations by communities and regulators, the practice of social impact assessment (SIA) is being adopted by mining companies to reduce the negative impacts of their activities and deliver benefits to host communities, which is linked to the social acceptance process. The Queensland State Government now requires that mining companies follow their guidelines in SIA¹¹⁴ and community engagement when developing mines, in an effort to enhance social acceptance and defuse conflict before it occurs. Similarly, the Greenland Government¹¹⁵ requires SIA for mining project developments to improve the distributional benefits of mining.

In northern Sweden, recent research on the impacts of mining and forestry logging indicates that controversies among communities, the state and industry over environmental impacts and resource management are frequently played out in specific 'places', in settings linked to place attachment and cultural values. The mining activity may accentuate existing or legacy conflicts in communities and a reconciliation process is required. Beland Lindahl et al¹¹⁶ advocate the adoption of the STEPS Framework¹¹⁷ and place-based frame analysis. These work to provide a framework for alternative actions or pathways, which can be used to resolve contested spaces, defray conflict and identify potential for collaboration in achieving more sustainable outcomes for all parties. This works on the basis that optimal pathways can address complex dynamics of place, environmental and cultural values and resource management, reflecting divergent stakeholder perspectives.

¹¹² Fitzpatrick, P., Fonseca, A., McAllister M.L. (2011). From the Whitehorse Mining Initiative Towards Sustainable Mining: lessons learned. *Journal of Cleaner Production* 19 (2011) 376-384

http://www.repositorio.ufop.br/bitstream/123456789/1513/1/ARTIGO_Whitehors%20MiningInitiative.pdf

¹¹³ Gibson, R. (2006). Sustainability assessment and conflict resolution: Reaching agreement to proceed with the Voisey's Bay nickel mine. *Journal of Cleaner Production*, Volume 14, Issues 3–4, 2006, Pages 334–348.

<http://www.sciencedirect.com/science/article/pii/S0959652605000466>

¹¹⁴ <http://www.statedevelopment.qld.gov.au/resources/guideline/social-impact-assessment-guideline.pdf>

¹¹⁵ *Guidelines for Social Impact Assessment for Mining Projects in Greenland*, Bureau of Minerals and Petroleum, Greenland (2009).

¹¹⁶ Beland Lindahl, K., Baker, S., Rist, L., and Zachrisson, A., 2015. *Theorising pathways to sustainability*.

International J. Sustainable Development & World Ecology. <http://dx.doi.org/10.1080/13504509.2015.1128492>

¹¹⁷ STEPS: Social, Technological, & Environmental Pathways to Sustainability

Corporate Social Responsibility

Increasingly, companies have focussed on Corporate Social Responsibility (CSR) measures in an effort to build their social licence. A survey by the Minerals Council of Australia found that 25 major companies surveyed had spent A\$34.7 billion on CSR services and activities in 2011-2012¹¹⁸, to convert '*natural endowment to social capital*'. However, the industry appears to use this form of funding to rebut accusations that they are not passing on benefits of mining to citizens, rather than in a spirit of distributional justice.

CSR measures are monitored by international NGOs keen to promote transparency and 'fair play' to communities. A recent comprehensive analysis was undertaken on the transparency of CSR measures for 200+ resources (mining, oil and gas) companies listed on the London Stock Exchange and AIM markets¹¹⁹. Major companies with greater resources score more highly, as might be expected.

Other studies suggest that CSR reporting can be something of a 'whitewash'. The case of the giant *Bajo de la Alumbrera* porphyry Cu-Au deposit in Argentina¹²⁰ indicates that even where conflict exists, only 'positive' results get reported in the CSR data and that there was a dearth in reporting of contentious economic, social and environmental indicators from the project in the period 2009-2011. The mine 'manages stakeholders' rather than engages with them, and did not include anti-mining groups. Critical voices were not heard and thus were not reported.

The conclusion is that CSR reports do not reflect multi-stakeholder concerns and are not an effective way to gain social licence, despite the reported trends. The authors recommended that effective and meaningful stakeholder engagement is the way forwards.

3.3.4 Social Acceptance of Conventional Oil & Gas

The Kinsale Head and Corrib gas fields are the only commercial discoveries of natural gas to date in Ireland. Kinsale was developed in the 1970s without social opposition, and enjoyed high levels of public acceptance (or at least not opposition) due to the low visual and physical footprint of its offshore location. The Corrib Gas Project includes the development of the Corrib gas field 50km offshore Co. Mayo, linked by a pressurised gas pipeline to an onshore processing plant at Bellanaboy, and onwards to the distribution network.



The Corrib project attracted significant and sustained controversy over 15 years owing to concerns about safety of the pipeline close to populated areas, environmental impact,

¹¹⁸ See:

http://www.minerals.org.au/data/assets/pdf_file/0017/32804/Aus_min_industry_fact_sheet_Nov_2008_v4.pdf

¹¹⁹ <http://www.csr21.org/content/csr21-transparency-index>

¹²⁰ Murguía D. and Kathrin Böhring, K. *Sustainability reporting on large-scale mining conflicts: the case of Bajo de la Alumbrera, Argentina*. Journal of Cleaner Production, Volume 41, February 2013, Pp 202–209.

alleged planning irregularities and a public debate on the relatively low benefits to citizens from state resources.

The *Shell-to-Sea* campaign was one of the most effective and disruptive grassroots movements in Ireland, while the jailing of five local men, known as the *Rosspport Five*, was arguably the single biggest corporate PR failure observed in this country. These opponents gained international attention in their sustained opposition to the project.

The Corrib Gas controversy has contributed to the erosion of public trust in the state's institutions to protect the public interest, and raised very significant questions about state policy and procedural process, as well as questions of resource beneficiaries in the exploitation of Ireland's natural resources¹²¹. The effectiveness of community alliances and the power of 'place identity'¹²² in rejecting 'top-down', public decision making was also demonstrated.

It is argued that by the time the delayed project comes on stream, it will pay almost no tax at all due to the legitimate ability of the company to write off exploration and development costs against future profits¹²³. This has negative resonance with the citizens.

There are no producing oil fields in Ireland, although sub-economic resources have been defined in the Spanish Point field in the Porcupine Bank off the west coast. Providence Resources announced in July 2012 that it had discovered an economic find at the Barryroe field, 70km off the coast of Cork, but later revised the amount of oil obtainable downwards¹²⁴. The field has not progressed to production. Thus public engagement either of acceptance or opposition to oil discovery is impossible to gauge. There was a weak public campaign to ban exploration offshore County Dublin in 2012¹²⁵ but this dissipated as exploration activity reduced.

In Nigeria, studies have identified natural resource stress as a driver of widening social gaps between rich and poor and weakening of local and regional governance, with ethnic or inter-community conflicts leading to conflict and violence in extreme situations¹²⁶. The long running conflict in the Niger Delta is directly related to perceptions of inequitable distribution of the spoils of hydrocarbon production. Arguably this has had a significant detrimental effect on the overall socio-economic development of Nigeria, with ethnic differences accentuated rather than integrated.

3.3.5 Social Acceptance of Unconventional Hydrocarbons

Technological advances in hydrocarbon production have meant that 'unconventional' oil and gas reserves can be won from 'tight' sedimentary sources, in particular shale gas and shale oil sands, through hydraulic fracturing or 'fracking'. While technically feasible, such production raises significant social concerns regarding safety, environmental and geological impacts on e.g. groundwater, all of which require acceptance of the risks to be feasible.

¹²¹ Storey, Andy, (2009). *The Corrib Gas Case Study*, Afri Publications.

¹²² Gilmartin, Mary (2009). *Border Thinking: Rosspport, Shell and the Political Geographies of a Gas Pipeline*. Political Geography 28, 274-282.

¹²³ <https://irishoilandgas.wordpress.com/>

¹²⁴ https://irishoilandgas.wordpress.com/2012/04/14/journal_barryroe/

¹²⁵ <http://www.irishexaminer.com/ireland/crude-alert-the-facts-behind-irish-oil-and-gas-exploration-210841.html>

¹²⁶ IRGC (2010). *The Emergence of Risks: Contributing Factors*. Geneva.

Although ‘shale gas’ has revolutionised the economics and geopolitics of energy in the United States in the past decade, the regulatory, liability and safety regimes for shale gas extraction in e.g. Leitrim are not fully integrated in Ireland. Regulation is one of the principal tools of risk governance for emerging risks¹²⁷ and must be both sound and trustworthy to gain social acceptance of the risks. Strong regulation is also required to build public trust in the management of natural resources (see Section 3.3.3 above).

There is currently a moratorium on fracking in Ireland, until the 2-year EPA research programme into the potential impacts of fracking on the environment and human health has been completed; the final report is expected in the latter half of 2016¹²⁸. Recently there have been claims that EPA has commissioned a ‘cheerleader’ of the fracking industry to be involved in the research, which the EPA has denied¹²⁹. Shale gas fracking has been banned in France, Bulgaria, Germany and Scotland, until there is proof that it will not harm the environment or people.

A study on public perceptions of shale gas in the UK¹³⁰ shows that fracking was gradually becoming more accepted as ‘clean’ gas became viewed as the preferred transition fuel that complements renewable energy. But following the nationally publicised ‘Battle of Balcombe’ in August 2013, where exploratory drilling protestors in West Sussex vastly raised the profile of fracking, surveys have recorded an ongoing decline in public acceptance, and the events in Balcombe are now seen as a tipping point in social approval.

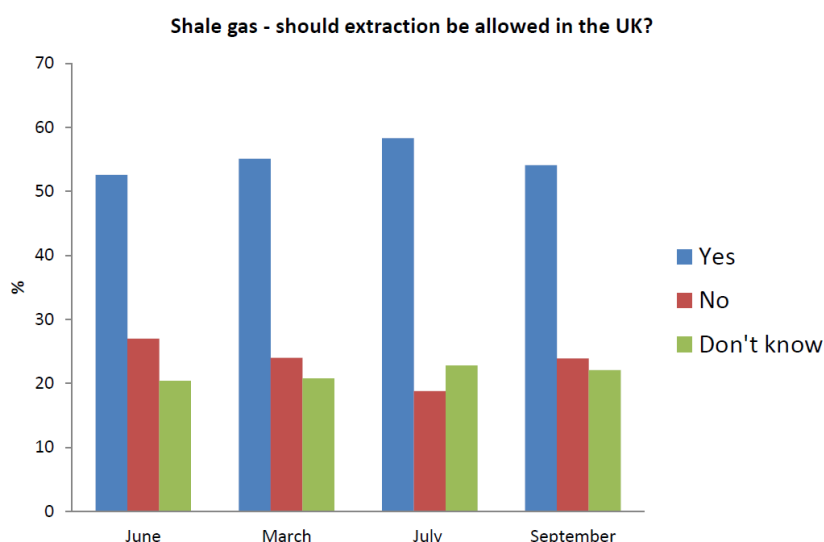


Figure 3.8 Should shale gas extraction be allowed in the UK?

June 2012-September 2013, from O'Hara et al (2013).

In Australia, research is being carried out on the socio-economic impacts of coal seam gas exploration in western Queensland¹³¹. A suite of indicators are being developed to measure those impacts by inclusive dialogue among multiple stakeholders as well as

¹²⁷ IRGC (2010). Op. cit.

¹²⁸ <http://www.epa.ie/researchandeducation/research/researchpillars/water/ugee%20research/#.VmQzOGcnxoK>

¹²⁹ <http://www.irishtimes.com/news/environment/epa-denies-hiring-fracking-cheerleader-to-conduct-study-1.2244719>

¹³⁰ O'Hara, S., Humphrey, M., Jaspal, R., Nerlich, B., and Poberezhskaya, M., 2013. *Public perception of shale gas extraction in the UK: The impact of the Balcombe Protests in July-August 2013*. University of Nottingham.

¹³¹ Uhlmann, V, Rifkin, W, Everingham, JA., May, K. (2014). Prioritising indicators of cumulative socio-economic impacts to characterise rapid development of onshore gas resources. In: *The Extractive Industries and Society*

technocratic input, to capture both quantitative and qualitative perspectives. Ultimately, the acceptance of gas exploration and extraction will depend on earning the SLTO.

The intense opposition towards fracking has illustrated the need for institutions to recognise, accommodate, and allay diverse views in policy making, as well as making the decision process for such policies more comprehensive and transparent.

Many citizens feel that decisions have been made without proper evaluation of the risks and benefits, and there has been a lack of public consultation; consequently, this has led to the perception that decision making bodies are only acting in their own best interests¹³² (see Figure 3.8). There is also concern expressed about the current knowledge of the technology required for, and impacts of, fracking.

3.3.6 Social Acceptance of Geothermal Energy

Political and public acceptance of geothermal energy as a “green”, economically feasible energy source is much weaker than for most other “alternative” energy sources¹³³, likely reflecting the lack of awareness of geothermal energy by both the public and of policy makers. An internet-based public awareness and opinion study on energy in Québec, Canada, suggested that deep geothermal energy is not currently widely known, except in regions where it is being exploited, and indicated that the majority of people in the area did not know the difference between shallow and deep geothermal energy¹³⁴. This lack of knowledge highlights the need for public outreach to raise awareness and acceptance levels for the development of geothermal energy.

As people are concerned with climate change, the need for alternative energy sources is becoming increasingly recognised by the public. The study in Québec shows there was support from most residents for deep geothermal energy, with only a small decrease in the level of support if a pilot project were to be carried out in the region. Even when hydraulic fracturing was introduced as a means of facilitating geothermal energy production, overall most respondents were favourable towards the idea of the pilot project.

Public support for geothermal energy is influenced by the complexity of the energy source; potential environmental impacts; the rate of implementation and size of geothermal projects (it is considered better to begin with smaller projects to acclimatise local people to the presence and benefits of new, local energy sources); political support, to gain public acceptance and necessary state support for development; and the absence of simple and easily applied technologies – this latter point also explains the lack of support from industry (Popovski, 2003).

A study on public perceptions of deep geothermal energy in Australia¹³⁵, found that support for geothermal energy was lower than solar, wind, wave and tidal energies, but greater than that of nuclear, oil and gas, carbon storage (CCS), biofuels and hydro-power. However, following the workshops, participants wanted more information on both geothermal and CCS due to concerns about leaking CO₂, water consumption and induced seismicity, as well as fears of townships having to relocate to accommodate facilities. CSIRO research in

¹³² Williams, L., MacNaghten, P., Davies, R., and Curtis, S., 2015. *Framing ‘fracking’: Exploring public perceptions of hydraulic fracturing in the United Kingdom*. Public Understanding of Science.

¹³³ Popovski, K., 2003. *Political and public acceptance of geothermal energy*. The United Nations University, Geothermal Training Programme, Short Course September 2003.

¹³⁴ Malo, M., Moutenet, J-P., Bédard, K., and Raymond, J., 2015. *Public Awareness and opinion on Deep Geothermal Energy in the Context of Shale Gas Exploration in the Province of Québec, Canada*. Proceedings World Geothermal Congress, 2015.

¹³⁵ Dowd, A-M., Boughen, N., Ashworth, P. and Carr-Cornish, S. (2011). *Geothermal Technology in Australia: investigating social acceptance*. Energy Policy, V.39, no. 10, p. 6301-6307.

Australia¹³⁶ found that the factors that influenced acceptance of geothermal energy included knowledge; perceived risks and benefits; beliefs about climate change and energy issues; trust in institutions; sense of place and project proximity to built-up areas. Allied to these was the need for procedural justice.

Public perceptions of deep geothermal energy in Germany demonstrated that a wide variety of perceptions focused on risks of seismicity, potential benefits, trust (in the operating company) and only then acceptance. The participants in the research iterated clearly that fair and open planning decision making processes are a pre-requisite for project success. They also suggested that geothermal projects should be aligned with community objectives of decarbonisation, addressing fuel poverty and energy efficiencies¹³⁷.

Negative perceptions may hinge on adverse environmental impacts of geothermal energy, such as noise, smell, visual and water pollution, and the potentially negative impacts on other economic activity such as agriculture or tourism¹³⁸. Even where there is a generally high level of acceptance of geothermal energy e.g. in Iceland, there are heterogeneous perceptions¹³⁹. Research consistently recommends that opportunities and concerns must be addressed at community level to build trust.

3.3.7 Social Acceptance of Carbon Storage

With rising levels of CO₂ and the continued dependency on fossil fuels, lower-emission technologies with CO₂ capture and storage (CCS) provide an option for more environmentally sustainable energy production while 'transiting' to decarbonisation.

Recent experimental research shows that lay people's trust in stakeholders affects their acceptance of CCS implementation, as people tend to trust environmental NGOs, who are perceived to have public-serving motives, more than industrial stakeholders (irrespective of their perceived organisational competence concerning CCS)¹⁴⁰. The study also shows that people are more accepting of CCS policy decisions when they know that relevant stakeholders will be given an opportunity to express their opinions during the decision making process. Other findings from engagement workshops held in rural Queensland, Australia, demonstrated that participants from the community had more positive attitudes towards CCS with increased knowledge¹⁴¹. These studies accentuate the need for community education to increase social acceptance of new energy technologies.

An international study in 2006¹⁴² found that there were poor levels of awareness (4-22%) of CCS in USA, Japan, UK and Sweden. The level of awareness of CCS as a carbon abatement option may have changed in the intervening years. A study of perceptions of CCS in Switzerland reported fears of over-pressurisation of the storage reservoir

¹³⁶ Romanach, L., Carr-Cornish, S. and Ashworth, P. (2012) *Towards an understanding of social acceptance for the development of geothermal energy in Australia*. CSIRO Science into Society Group. AGEC 2012.

¹³⁷ Wallquist and Hollenstein (2012). *Cited in: Energy from the Earth: Deep Geothermal as a Resource for the Future*. Eds. Hirschberg, Wiemar. and Burgherr (2014). Vdf. Hosschulverlag AG.

¹³⁸ Canan (1986) cited in: Wallquist and Hollenstein (2012). *Cited in: Energy from the Earth: Deep Geothermal as a Resource for the Future*. Eds. Hirschberg, Wiemar. and Burgherr (2014). Vdf. Hosschulverlag AG.

¹³⁹ Krater and Rose (2009) cited in: *Cited in: Energy from the Earth: Deep Geothermal as a Resource for the Future*. Eds. Hirschberg, Wiemar. and Burgherr (2014). Vdf. Hosschulverlag AG.

¹⁴⁰ Terwel, B.W., Harinck, F., Ellemers, N., Daamen, D.D.L., 2011. *Going beyond the properties of CO₂ capture and storage (CCS) technology: How trust in stakeholders affects public acceptance of CCS*. International Journal of Greenhouse Gas Control, 5, 2, 181-188. <http://www.sciencedirect.com/science/article/pii/S1750583610001507>

¹⁴¹ Ashworth, P., Pisarski, A., and Thambimuthu, K., 2009. *Public acceptance of CO₂ capture and storage in a proposed demonstration area*. Journal of Power and Energy. <http://pia.sagepub.com/content/223/3/299.short>

¹⁴² Reiner (2006). *Cited in: Energy from the Earth: Deep Geothermal as a Resource for the Future*. Eds. Hirschberg, Wiemar. and Burgherr (2014). Vdf. Hosschulverlag AG.

(‘exploding balloon’), leaking CO₂ and induced earthquakes. Others suggested that society should be reducing our emissions versus burying them and considered CCS as misplaced effort and time instead of developing renewable energies¹⁴³. This reflects a high degree of mistrust in energy corporations and it is felt that CCS will simply permit the continued use of coal with large embedded and vested interests in existing energy systems.

Gross (2007) analysed community perspectives on CCS and deep geothermal which reported the need for procedural justice, to include early engagement, fairness, transparency, having voice heard, respect for diverse opinion, impartiality of decision making and distributive justice. These requirements link strongly to the social acceptance of project development, while cooperative approaches enhance acceptability¹⁴⁴.

In a study of the ‘*minefield of stakeholder participation*’, an interesting case study on the Barendrecht CCS Demo Project in Holland¹⁴⁵ demonstrates the need for regulators to also engage with local communities prior to granting licences to large companies to develop CCS projects. The national government supported the project as it contributed to ‘socio-political’ carbon abatement targets and removed the decision making from local government through new planning legislation. This created outrage and fomented such opposition that the project had to be abandoned. Inherently, the value framework of the local citizens was not considered as valid and trust broke down completely. The project was abandoned in 2009.

The Dutch national research programme on CCS has iterated the need for trust among all parties and ‘throwing’ more information at people does not increase their acceptance of projects. Quality and respectful communication is required¹⁴⁶.

3.3.8 Social Acceptance of Water Technologies

As the population and demand continue to grow, water-recycling, desalination and aquifer recharge are emerging as potential solutions to sustained delivery of water supplies.

Public acceptance for why water resource technologies is most commonly affected by perceptions of trust in authorities (e.g. water authorities and local government)¹⁴⁷, the effectiveness of water schemes, and knowledge about, and experience with, using water from alternative sources¹⁴⁸. As with most technologies, public engagement is crucial to gain social acceptance for such projects.

¹⁴³ Wallquist et al. (2009). Cited in: *Energy from the Earth: Deep Geothermal as a Resource for the Future*. Eds. Hirschberg, Wiemar. and Burgherr (2014). Vdf. Hosschulverlag AG.

¹⁴⁴ Gross (2007) Cited in: *Energy from the Earth: Deep Geothermal as a Resource for the Future*. Eds. Hirschberg, Wiemar. and Burgherr (2014). Vdf. Hosschulverlag AG.

¹⁴⁵ Brunsting, S. and Dijkstra, S. (2013). *Navigating the Minefield of Stakeholder Participation*. In: http://issuu.com/edi_quarterly/docs/quarterlye5i1/1

¹⁴⁶ Terwel, Bart (2013). The Importance of Public Trust in the Context of CCS. CATO. In: http://issuu.com/edi_quarterly/docs/quarterlye5i1/1

¹⁴⁷ Mankad, A., and Walton, A., 2015. *Accepting managed aquifer recharge of urban stormwater reuse: The role of policy-related factors*. Water Resources Research <http://onlinelibrary.wiley.com/doi/10.1002/2015WR017633/full>

¹⁴⁸ Dolnicar, S., Hurlimann, A., and Grun, B., 2011. *What affects public acceptance of recycled and desalinated water?* University of Wollongong, Faculty of Commerce – Papers (Archive).



*Flooding at Dromineer, Lough Derg, 2015 ICMM
Photo: SLR Archive*

The recent proposal to pipe surface water from the River Shannon by Irish Water is determined by the need for increased water supply for the Eastern and Midlands Region. It is estimated that population and industry growth will generate a demand for at least an additional 330 million litres of water per day by 2050, as research indicates that current infrastructure and supply are insufficient to meet future population growth¹⁴⁹. As the plan evolved, there was strong local opposition among various communities along the Shannon, but the opposition wave moved downstream as the proposed intake point was explored along the Lower Shannon. As the final decision was announced in November 2015 that the offtake point would be at Parteen, Co Limerick, there has been significant negativity expressed at local authority and at community level¹⁵⁰. The Shannon Protection Alliance¹⁵¹ has indicated that it will strenuously object to the plan on the grounds of environmental sustainability and breach of EU rules. Most of the opposition centres on fears that the proposed offtake from the Shannon will reduce water levels during dry spells and have detrimental effects on fisheries, tourism and ecology. Others argue the focus should be on water efficiencies and infrastructural improvements to reduce leakage versus abstraction.

Interestingly, when the Lower Shannon flooded in early December 2015, many media commentators and ‘talk back’ radio participants suggested that the Shannon flood waters should be pumped to Dublin. Public opinion can change quickly depending on local circumstances and media agendas.

3.3.9 Social Acceptance of Nuclear Energy

As concerns about climate change and security of supply issues continue, and the awareness that renewable energy alone will not be enough to replace fossil fuels, views on nuclear energy may be shifting towards a ‘reluctant acceptance’.

The latest Eurobarometer on Radioactive Waste (2010) indicates that before the Fukushima incident in March 2011, there were almost as many citizens in Europe in favour of nuclear power (44%) as against it (45%), and that the greater the level of knowledge and experience of nuclear energy, the more favourable citizens’ opinions were¹⁵². There is a marked increase in acceptance of nuclear energy with proximity to nuclear power plants, for example in countries such as France, where support for nuclear power is strong and

¹⁴⁹ <http://www.water.ie/about-us/project-and-plans/projects/>

¹⁵⁰ <http://www.limerickleader.ie/news/business/business-news/shannon-water-extraction-a-concern-for-limerick-councillors-1-6891520>

¹⁵¹ www.shannonprotectionalliance.com

¹⁵² European Atomic Forum, 2014. *What people really think about Nuclear Energy.* http://www.foratom.org/jsmallfib_top/Publications/Opinion_Poll.pdf

nearly every citizen lives near a nuclear power plant. In these countries, the public feel better informed and therefore less resistant to nuclear energy, and trust the authorities with controlling and ensuring the safe operation of reactors.

However, there still appears to be a lack of knowledge about nuclear power, with only 1 in 5 European citizens wanting to be directly consulted in the decision making process regarding nuclear power, due to the fact that many people do not feel well informed and therefore not competent enough to decide on issues.

Despite the perceived lack of information, polls suggest that most people do not trust the nuclear industry as a source of information, even in countries where nuclear power is strong. Scientists are considered to be the most 'credible sources', with nuclear safety authorities in second place; journalists do not have a particularly high credibility rating, even though the mass media is the main source of information on nuclear power for European citizens (see Figure 3.9). In West Cumbria, UK, locals from the area surrounding the Sellafield nuclear power plant considered Greenpeace to be an effective 'regulator' of BNFL¹⁵³, reflecting the public's general lack of trust in 'official' regulatory authorities – as mentioned previously in relation to CCS.

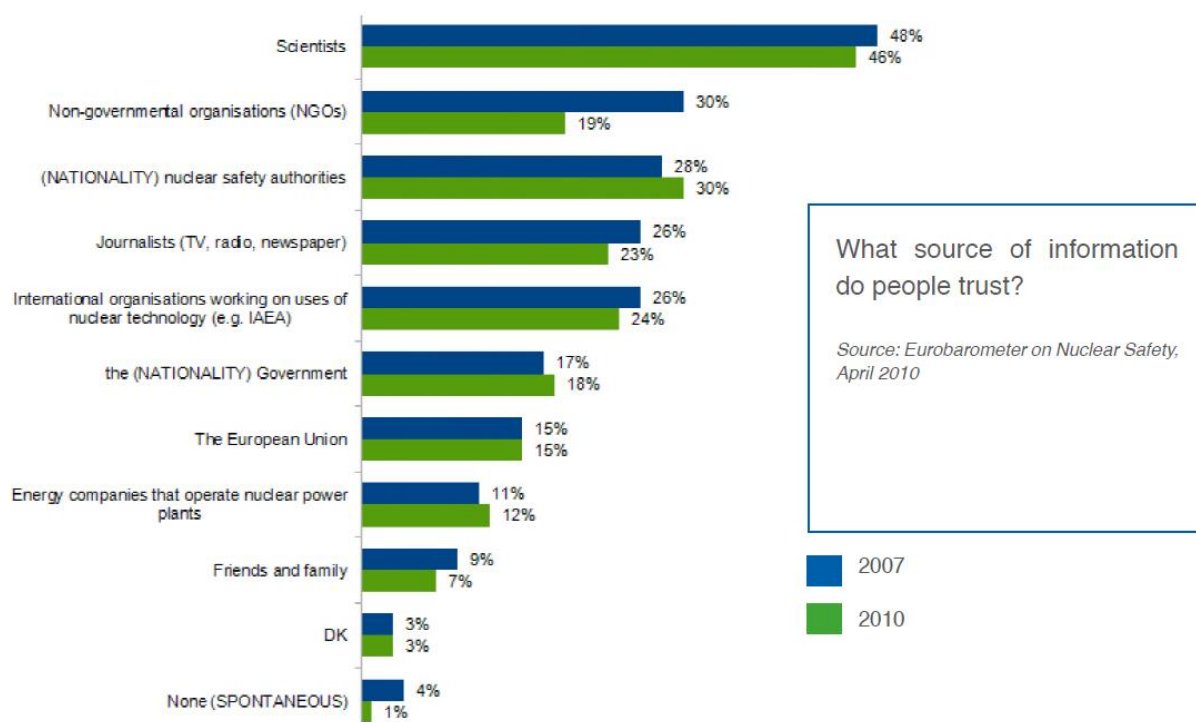


Figure 3.9 Credibility of Sources of Information, from European Atomic Forum, 2014.

Before the Fukushima incident, radioactive waste management appeared to be the main concern regarding the use of nuclear power (Eurobarometer on Radioactive Waste, 2008); polls found that if this issue was resolved, alongside the development of other renewable energies, the majority of European citizens would have been in favour of nuclear power. However, following the Fukushima incident and the subsequent increase in safety concerns

¹⁵³ Wynne, B., Waterton, C., and Grove-White, R., 2007. *Public perceptions and the nuclear industry in West Cumbria*. Centre for the Study of Environmental Change, Lancaster University.
[http://www.research.lancs.ac.uk/portal/en/publications/public-perceptions-and-the-nuclear-industry-in-west-cumbria--report-to-cumbria-county-council\(72a56702-7e48-4ab0-83b5-a1afbc541d27\)/export.html](http://www.research.lancs.ac.uk/portal/en/publications/public-perceptions-and-the-nuclear-industry-in-west-cumbria--report-to-cumbria-county-council(72a56702-7e48-4ab0-83b5-a1afbc541d27)/export.html)

related to nuclear power, some countries have decided not to build new nuclear power plants and/or phase them out; in May 2011 the German government adopted the decision to phase out nuclear by 2020.

Nevertheless, although the accident at Fukushima will contribute (and has already) to a reduction in existing plants and the construction of new ones, at this time effects appear to be quite limited on a global scale¹⁵⁴, as evidenced by the Ipsos MORI poll (January 2012) in the UK¹⁵⁵ (Figure 3.10) and the Harris Interactive poll across France, Germany, Britain, Spain, and the US¹⁵⁶ (Figure 3.11).

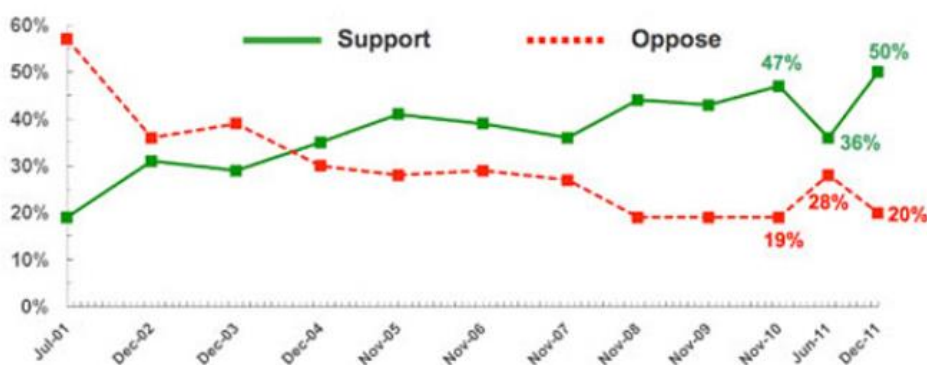


Figure 3.10 Nuclear Support and Opposition in the UK, Ipsos MORI 2012

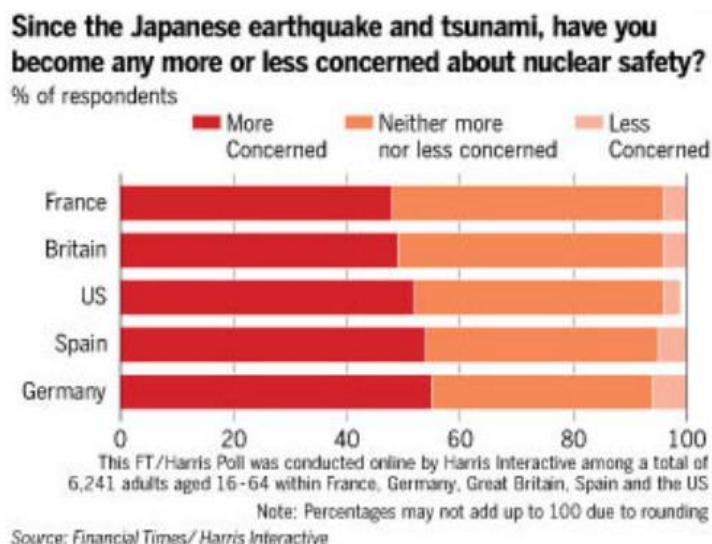


Figure 3.11 Nuclear Safety Concern, Harris Interactive, May 2011

¹⁵⁴ Joskow, P.L., and Parsons, J.E., 2012. *The Future of Nuclear Power After Fukushima*. MIT.
<http://web.mit.edu/ceepr/www/publications/workingpapers/2012-001.pdf>

¹⁵⁵ Ipsos MORI, January 2012. *Nuclear Energy Update Poll*.

¹⁵⁶ Harris Interactive poll, May 2011. *Since the Japanese earthquake and tsunami, have you become any more or less concerned about nuclear safety?* <http://www.ft.com/cms/s/0/a378cf98-759c-11e0-80d5-00144feabdc0.html#axzz3twAiBAFu>

3.4 Communications & Public Perceptions of Risk

The resources industry has not been strong on the positive communications of either risks or benefits of the industry. However, *“risk perception and scientific risk assessment ...must be part of any informed decision making process”*¹⁵⁷.

The International Risk Governance Council (IRGC) assert that risks, including technical, social or environmental, “may be complicated or amplified by untimely, incomplete, misleading or absent communication”¹⁵⁸. Effective communication requires a two-way flow of not just ‘top-down’ messaging by government, policy makers or scientists to lay people, but also bottom-up messaging from the concerned public.

Opinions about the mining and metals industry are not formed by one dominant influencer¹⁵⁹. All organisations and individuals have almost equal amount of influence in shaping views about the mining industry, as there are numerous influence flows amongst stakeholders. The ICMM found evidence of a communication barrier between the industry and media stakeholders, as the mining industry employees and associations struggle with little success to shape views of the industry amongst media stakeholders. Currently NGOs are more influential in shaping government stakeholders’ views about the mining industry and its risks than are mining industry associations, employees and management.

What is risk?

Batel et al. (op cit) provide an interesting reflection on the distinction between ‘risk’ and ‘danger’: *Luhmann proposed that ‘risk’ and ‘danger’ are conceptually different, namely while risk is the result of a decision/ agency, and thus internally-driven, danger is the result of something external and does not involve a decision.... Recently, Boholm (2011) put Luhmann's argument to the test, namely analysing if such a distinction would also be made in ordinary language use. The results from his analysis of a 100-million word corpus of natural language use (newspapers, books...), actually show that ‘risk’ and ‘danger’ are used differently and according with Luhmann's proposal. These results reveal then that “the choice of word [risk or danger] influences the content of what is being communicated, and knowledge of what words refer to is arguably crucial in effectively communicating information conveying an intended content”.*

With a few rare exceptions, such as the Tellus research in Ireland (Section 3.3.1), there are not many examples of good public communications of geoscience activity or risk. The American Geosciences Institute (www.americangeosciences.org) is strong on the need for communication, policy and advocacy, and provides a focus for education, outreach and public engagement¹⁶⁰. The AGI have established a **Centre for Geoscience and Society** which has a dedicated ‘critical issues’ portal for researchers and policy makers. The current list of critical issues focuses on Climate, Energy, Hazards, Mineral Resources and Water. As yet, social acceptance of resource developments is not defined as a ‘critical’ issue.

Interesting research was conducted on attitudes to mining in Kentucky, USA (Hoffman 2013)¹⁶¹. The work focused on two main objectives to (i) determine attitudes towards mining and knowledge about mining by surveying distinct populations in three counties in

¹⁵⁷ Dowd, A-M., Boughen, N., Ashworth, P. and Carr-Cornish, S. (2011). *Geothermal Technology in Australia: investigating social acceptance*. Energy Policy, V.39, no. 10, p. 6301-6307.

¹⁵⁸ IRGC (2010). *The Emergence of Risks: Contributing Factors*. Geneva.

¹⁵⁹ ICMM 2014. Stakeholder perceptions survey: tracking progress. <http://www.icmm.com/document/8615>

¹⁶⁰ <http://www.americangeosciences.org/education>

¹⁶¹ Thanks to Josh Hoffman, who forwarded links to his work: Hoffman, Joshua M., "A framework for understanding the public's perspectives of mining applied to the Kentucky coal industry" (2013). *Theses and Dissertations--Mining Engineering*. Paper 4. http://uknowledge.uky.edu/mng_etds/4/

Kentucky, including coal mining and non-mining districts, and (ii) to apply theoretical foundations to educational and community engagement efforts. The study examined communications from the industry to the public and identified key attitudes and misconceptions about mining. Relationships between knowledge and attitudes were explored, as well as relationships between demographic information and knowledge, and attitudes.

It was clear that those communities who lived close to and had employment in Kentucky's coal mines were significantly more knowledgeable and positive towards mining, while the converse equally applied. The research made recommendations for improved communications through education and of targeted messages. Critically, it also identified that the only information that the mainstream film and popular media communicate about mining is negative, with outmoded concepts of working conditions and 'canaries in the mine' images. It was concluded that how the mining industry communicates with the public needs to be significantly improved to counter-balance negative popular imagery.

Conversely, opponents of resource developments are masters in the art of communications. In Ireland, access to advanced education continues to exceed European norms¹⁶², and the average citizen is informed and unafraid to challenge authority where s/he perceives risks to the social fabric or environment are at stake. At the same time, access to information has increased exponentially through the internet, while the ease of communications has been facilitated greatly through the use of social media.

The inter-connectivity through websites, Facebook, blogs and Twitter of what were heretofore isolated community lobby groups, has heralded a new form of civic lobbying power against resource developments e.g. wind www.windawareireland.ie; grid infrastructure, the Pylon Alternative Alliance <http://www.pylonalternativesalliance.ie/local-groups>, and hydraulic fracturing for unconventional gas, 'fracking' www.loveleitrin.org.

The use of film and documentary media by lobby groups and NGOs can influence public opinion very strongly. Risteard O'Domhnaill's 2010 documentary film '*The Pipe*'¹⁶³ which charted the course of the Corrib Gas controversy with an intentional bias towards the community activists, provided the Irish public with the story "*of the small Irish village that stood up to Big Oil.*" Conversely, the iCrag screened the film '*The Switch*' in central Dublin in November 2015¹⁶⁴ as part of *Science Expressions* to stimulate a constructive public debate on energy supply and demand, and the role of each individual in the energy choices we make. This too, however, can be perceived by community activists as validating fossil fuel industries over low carbon energy sources. Recent print media reports and radio advertisements by Shell Corrib, 10 years on from the jailing of the *Rossport Five*, are promoting the socio-economic benefits of the Corrib Gas project in developing local enterprises, skills and job creation.

Using social media, international movements can mobilise and link community-based activism. Recent online discussions on climate change in the shadow of the COP21 Paris talks are moving from a focus on control of emissions to control of production. Hence, the '*Keep It In The Ground*' (KIITG) lobby has formed to support a move from fossil fuel production, with the imprimatur of a range of prominent people and promoted by one of the most respected international media outlets¹⁶⁵.

¹⁶² OECD Economic Surveys: Ireland 2015, OECD, Paris. http://dx.doi.org/10.1787/eco_surveys-irl-2015-en

¹⁶³ https://www.youtube.com/watch?v=VhZlbe_JdhI

¹⁶⁴ <http://icrag-centre.org/switch-energy-project-at-science-expressions-film-festival/>

¹⁶⁵ <http://www.theguardian.com/environment/keep-it-in-the-ground-blog/2015/mar/25/keep-it-in-the-ground-campaign-six-things-weve-learned>

The KIITG has not made suggestions as to what society will do in the transitional term if we stop extracting resources from the ground, while many KIITG supporters in Ireland (e.g. An Taisce; see Figure 3.12 below) appear to be opposed to development of renewable wind energy based on serial objections to such planning applications. However, activists also advocate strongly for hydro power, geothermal and biomass energy options.

NGO lobby groups are strong, articulate and forceful entities at local, national and international levels. While they provide positive benefits in a democratic society through citizen engagement, there can also be negative attributes where e.g. selective use of non-peer reviewed 'science' and misinformation can be easily accessed and spread.



Figure 3.12 *Keep it In the Ground* protest at Cliffs of Moher (photo: *Irish Times*, 15/11/15)

Clearly, there is a need to improve communications to inform the public discussion on exploration, exploitation and utilisation of resources and to rebalance the debate. There may be a need to create a social forum in which a respectful public discourse may be held.

The IRGC identify twelve 'fertile ground' contributing factors to emerging risks which are complex, interdependent elements. However, the IRGC perceive that "*communication has a particularly key role in managing risk, as it can influence all other factors*". Thus the IRGC places communication as its centrepiece in its Risk Governance Framework¹⁶⁶ (Figure 3.13).

¹⁶⁶ IRGC (2005). *White Paper #1: Risk Governance Towards an Integrative Approach*, Geneva. www.irgc.org/IMG/pdf

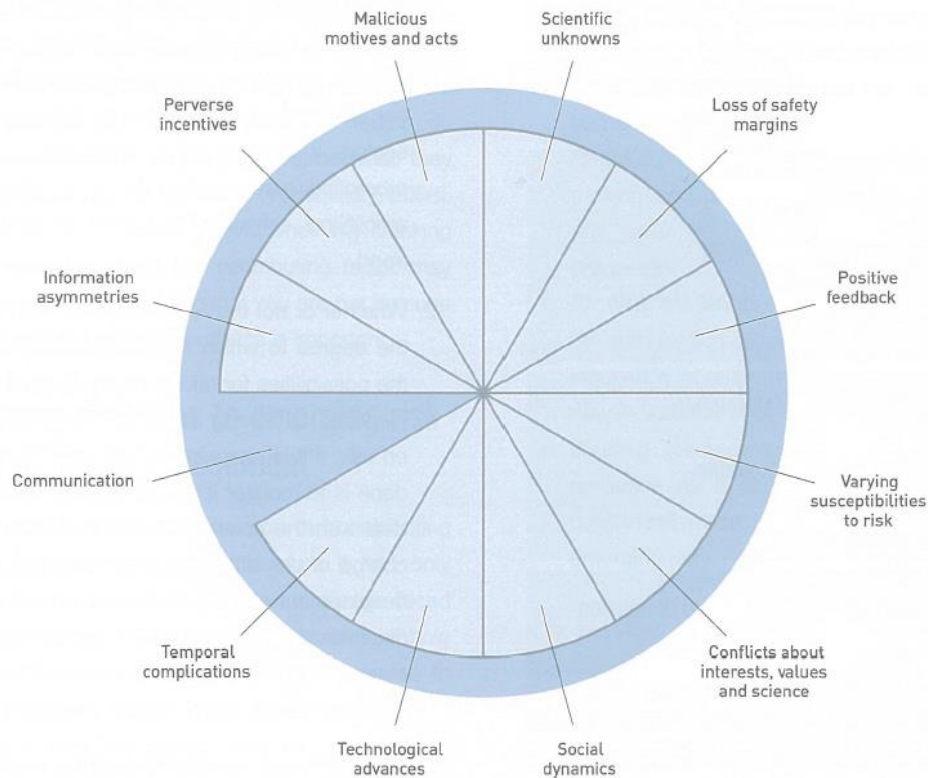


Figure 3.13 IGRC: Contributing Factors to Emerging Risks

There is a need to move from a traditional top-down¹⁶⁷, developer-led, techno-legalistic DAD (Decide-Announce-Defend) communication and decision making approach to a more evolved and participative MUM (Meet-Understand-Modify)¹⁶⁸ or DDI (Dialogue-Design-Implement) approach to engender social acceptance. In the latter models, all stakeholders work to scope options and modify the optimal design for a given resource development. This allows the parties to mutually define and measure the likely positive and negative impacts of the proposal, and develop a plan to mitigate, measure and manage impacts where possible.

There is a truism that technocrats and scientists are uniquely poor at communicating their activities to the general public, which tends to be overly technical and inaccessible to the layperson. Such an approach does not enhance public understanding or social acceptance as recently evidenced by the overwhelming 34,000+ responses to the EirGrid public consultation process in 2014 in the wake of the Grid 25 overhead pylons controversy¹⁶⁹.

It is recommended that the style of outputs for future engagement with community stakeholders on earth resources and geoscience activity should move away from *Non-Technical Summary* models to be in accessible formats, through a mix of methods, including presentations, leaflets, local radio, web and increasingly, through social media¹⁷⁰.

¹⁶⁷ Cowell, R. and Owens, S. (2006). *Governing Space: planning reform and the politics of sustainability*. Environment and Planning C – Government and Policy.

¹⁶⁸ [https://www.iaia.org/IAIA%202015%20Social%20Impact%20Assessment%20guidance%](https://www.iaia.org/IAIA%202015%20Social%20Impact%20Assessment%20guidance%20document.pdf)

¹⁶⁹ *Reviewing and Improving our Public Consultation Process*. EirGrid (December 2014).

¹⁷⁰ Becker, Henk (2001). *European Journal of Operational Research*, 311-321.

4.0 CONCLUSIONS

The key conclusions of the systematic review of existing international and national literature related to geoscience activity and earth resources are:

- There is a significant body of research on social acceptance and public attitudes to renewable energies, particularly wind, both internationally and in Ireland. Similar research has been conducted in relation to mining and minerals in resource rich jurisdictions such as Canada and Australia.
- The review indicates that similar issues influence social acceptance of resources and wind farm projects and therefore the research is relevant to geoscience activities in Ireland.
- There is almost a complete lack of research on ‘social acceptance’ of geoscience activity and development of earth resources in Ireland. However, there are a number of case study subjects with significant associated source data for research purposes.
- Political leadership is required at national and regional socio-political levels to deliver policy commitments and balanced spatial planning in the search for indigenous resources.
- At local levels, where ‘social acceptance’ in the current consideration resides, public engagement on geoscience activity is critical, particularly in the research, exploration for and exploitation of resources, to earn the social licence to operate.
- The Government White Paper (December 2016) on Energy Policy adopts the concept of an ‘Energy Citizen’. While Ireland has a well-established regulatory process and highly regarded policy investment climate for minerals development, the current mineral policy does not address engagement with the citizens for development of major resource projects. The concept of a ‘Resource Citizen’ could be considered by policy makers, to inform national and regional spatial planning for resource developments, through proactive engagement with citizens.
- For resource projects to be socially acceptable, consideration of local values, transparency, procedural and distributional justice is required.
- Trust in the developer is crucial and may be determined more by perceptual factors rather than the technical information provided. Such trust is underpinned by faith in the regulatory/ governance systems to defend the public interest. Unfortunately, the legacy of acrimonious opposition to resource projects, coupled with economic collapse in Ireland, may have undermined public trust in the regulatory system.

The research indicates that the key issues to achieve social acceptance of geoscience activity and ultimately the ‘social licence to operate’ in Ireland are likely to be:

- ✚ Early and effective engagement with impacted communities (of locality and interest);
- ✚ The need for understanding of place attachment; shared values and issues of concern; understanding of local power relations;
 - *Impacts on Place* may include place, health and environmental impacts including visual intrusion, noise, traffic, biodiversity, identity and local well-being
- ✚ Procedural fairness, with transparent, equitable decision making by developers and policy makers.
- ✚ Distributional justice to ensure host communities gain socio-economically.
- ✚ Trust building among all parties – open, honest and transparency in all dealings.

These factors combine in complex ways and can be partly determined by previous community experience of major proposals, or cumulative impacts of other resource developments in the locality. The reactions to a local project can be strongly influenced by the wider regulatory context and broader societal values.

Public communications of geoscience activity are weak and should be focused on building balanced scientific understanding and awareness of the need, benefits and risks of geoscience activity through public outreach. The effective use of the web and social media to counteract negative and frequently misinformed opinion is absolutely requisite.

5.0 EMERGING TOPICS FOR FURTHER RESEARCH

The research has to date identified the issues which are required to gain social acceptance for geoscience activity and natural resource projects. Although the Phase 2 consultations have not been completed and may identify other issues suitable for research, a number of possible research topics are emerging:

- ✚ The need for large scale baseline research on public attitudes to minerals, mining and hydrocarbon resources by a national body, akin to studies undertaken on attitudes to wind energy by SEAI, is required as a matter of urgency. Such research could be used to determine the public perceptions of risk and key areas for further research to inform policy making, particularly for mineral resources.
- ✚ Current minerals policy in Ireland could be further developed to support balanced spatial planning and to enhance social acceptance, while balancing economic, environmental and social expectations, as well as security of supply. This concept could be explored by examining how such issues are managed elsewhere and devising a policy suited to the Irish socio-political context. The Energy White Paper offers some innovative policy options which could be explored in the minerals field. Linked to this is the need for a participative 'Resources Citizen', akin to the 'Energy Citizen' concept adopted in recent Irish energy policy, underpinned by the provisions of the Aarhus Convention.
- ✚ The issue of place attachment in Ireland is central to social acceptance of projects, as evidenced by Corrib, Leitrim 'fracking' and more recently by wind energy protests in the Midlands. The complex socio-psychological issues at play, related to procedural and distributional justice issues, need to be researched through the psychology/ geography/ sociology disciplines.
- ✚ The framework for implementing minerals policy, the interaction between Government and industry in raw materials development and the role of the concerned citizen in the process needs to be explored. The research could include the communications process employed; the perceptions of unfairness in both procedural and distributional justice; and the level of transparency in decision making.
- ✚ The management of the business process in many resource developments is still very much driven by top-down (DAD) style techno-legalistic approaches. There is a need to develop new participative and meaningful decision making models, suited to the particularly 'local' nature of Irish politics and relationships. This research could be constructed through a combination of business schools/ management institutes and some of the major resource players in Ireland.
- ✚ Finally, the public communications of geoscience activity needs to be explored: what is best practice? The means to promote everyday uses of resources; positively overcoming negative images and use of effective messages and channels of communication need to be explored. There requirements for scientific education, particularly at primary and secondary levels, to promote basic understanding of geoscience concepts through innovative educational tools and use of digital technology, also requires research.

6.0 CLOSURE

This report has been prepared by SLR Consulting (Ireland) with all reasonable skill, care and diligence, and taking account of the human and budget resources devoted to it by agreement with the client. Research data reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Geological Survey of Ireland; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

Appendix A - Bibliography

The following provides an extensive bibliography pertaining to the topic of social acceptance, public participation in decision making, and public attitudes to resource development.

BIBLIOGRAPHY

Sorted by Sector/ Type in Alphabetical Order

Community Consultation / Stakeholder Engagement / Public Participation

- A Brief Guide to the Aarhus Convention – Your Right to a Healthy Environment.
- Aarhus Convention and Access to Justice in Ireland: Where are We Now? Ewing, M..
- Aarhus Convention Implementation Report, 2011.
- Aarhus Convention: Public Participation. Kearney, P., 2013.
- Aarhus Ireland: Statutory Instruments: European Communities (Public Participation) Regulations, 2010.
- Aarhus: United Nations Economic and Social Council, 2014. *Maarstricht Recommendations on Promoting Effective Public Participation in Decision-making in Environmental Matters*. Economic Commission for Europe, Fifth section.
- AccountAbility, 2011. *AA1000 Stakeholder Engagement Standard*.
- Adomokai, R., and Sheate, W.R., 2004. *Community participation and environmental decision-making in the Niger Delta*. Environmental Impact Assessment Review.
- An Bord Pleanála: *A Guide to Public Participation in Strategic Infrastructure Development*.
<http://www.pleanala.ie/sid/sidpp.htm>
- Audit Commission, 1999. *Listen Up! Effective Community Consultation*, referenced in CIGRE TB 548 (WG C3.04) 2013.
- Burmingham, J., Barnett, J., and Thrush, D., 2006. *The Limitations of the Nimby Concept for understanding public engagement with Renewable Energy Technologies*. Beyond Nimbyism, Working Paper 3; School of Environment and Development, Univ. Manchester.
www.sed.manchester.ac.uk/research/beyond_nimbyism
- CSR21 Transparency Index, 2014. Available at: www.csr21.org
- Davis, R. and Franks, D.M., 2014. *"Costs of Company-Community Conflict in the Extractive Sector."* Corporate Social Responsibility Initiative Report No. 66. Cambridge, MA: Harvard Kennedy School.
- Department of Environment, 2015. *Development Management Practice Note: Pre-Application Community Consultation (And Pre-Application Discussions)*.
- Devine-Wright, P., 2011. *Public engagement with large-scale renewable energy: breaking the NIMBY cycle*. Wiley Interdisciplinary Reviews: Climate Change, 2:1, 19-26.
- EirGrid, 2015. *Reviewing and Improving our Public Consultation Process*.
- Environmental Protection Agency, 2015. *Public Engagement on Water Quality Issues*.
- European Commission, 1999. *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions -*

European Commission, 2004. *A Guide to Successful Communications*. Brussels: Office for Official Publications of the European Union.

Global CCS Institute. *Social Site Characterisation and Stakeholder Engagement*.

Gross, C., 2007. *Community perspectives of wind energy in Australia: The application of a justice and community fairness framework to increase social acceptance*. Energy Policy, 35, 5, 2727-2736.
<http://www.sciencedirect.com/science/article/pii/S0301421506004861>

Hanley, N., Nevin, C., 1999. *Appraising renewable energy developments in remote communities: the case of the North Assynt Estate, Scotland*. Energy Policy, 27, 527-547.

Humphreys, D., 2000. *A Business Perspective on Community Relations in Mining*. Resources Policy, 26:3, 127-131.

International Council on Mining and Metals, 2005. *Community Development Toolkit*.

International Council on Mining and Metals, 2005. *Leading by Example: Making a Difference through Partnership – Annual Review 2005* [<http://www.icmm.com/publications/2005>], (accessed May 2006).

International Council on Mining and Metals, 2010. *Community Development Toolkit*.

International Council on Mining and Metals, 2014. *Good Practice Guide: Indigenous Peoples and Mining*.

International Council on Mining and Metals, 2014. *International Indigenous Peoples Workshop, from: Good Practice Guidance to Good Practice on the Ground*.

International Risk Governance Council, 2012. *Social Media for Crisis Communication*.

Irish Wind Energy Association, 2013. *Best Practice Principles in Community Engagement and Community Commitment*.

Kooroshy, J., 2013. *Revisiting Approaches to Community Relations in Extractive Industries: Old Problems, New Avenues?* Energy, Environment and Resources Summary, Chatham House, London. Monaghan Community Forum, 2005. *The Monaghan Model - Best Practice Community Consultations*. Castleblaney: Castle Printing (Castelblaney) Ltd..

Monaghan Community Forum, 2005. *The Monaghan Model - Best Practice Community Consultations*. Castleblaney: Castle Printing (Castelblaney) Ltd..

National Economic and Social Council, 2014. *Wind Energy in Ireland: Building Community Engagement and Social Support*. NESC Publications, No. 139.

National Grid, 2012. *North West Coast Connections Project: Stage 1 Consultation Feedback Report*.

National Grid, 2014. *North West Coast Connections: Public Consultation 2014 – Information Booklet*.

O'Keefe, A., and Haggett, C., 2012. *An investigation into the potential barriers facing the development of offshore wind energy in Scotland: Case study – Firth of Forth offshore wind farm*. Renewable and Sustainable Energy Reviews, 16, 3711-3721.

Reed, M.S., 2008. *Stakeholder participation for environmental management: A literature review*. Biological Conservation, 141, 2417-2431.

Renewable Energy UK, 2012. *RenewableUK: Community engagement workshop (Bristol)*.

Report of the Working Group on Citizen Engagement with Local Government, 2013.

The Heritage Council, 2012. *Toolkit: Community-Led Village Design Statements in Ireland*.

Working Group Report on Citizen Engagement with Local Government, 2014.

Community Acceptance / Wind Energy

Aitken, M., 2010. *Wind power and community benefits: Challenges and opportunities*. Energy Policy, 38, 6066-6075.

Bristow, G., Cowell, R., and Munday, M., 2012. *Windfalls for whom? The evolving notion of 'community' in community benefit provisions from wind farms*. Geoforum, 43:6, 1108-1120.

Cowell, R., Bristow, G., and Munday, M., 2011. *Acceptance, acceptability, and environmental justice: the role of community benefits in wind energy development*. Journal of Environmental Planning and Management, 54:4, 539-557.

Devine-Wright, P. and Howes, Y., 2010. *Disruption to place attachment and the protection of restorative environments: a wind energy case study*. Journal of Environmental Psychology, 30:3, 271-280.

Ellis, G., Barry, J., and Robinson, C., 2007. *'Many ways to say 'no', different ways to say 'yes': Applying Q-Methodology to understand public acceptance of wind farm proposals'*. Journal of Environmental Planning and Management, 50:4, 517 – 551.

Ellis, G., and Welstead, J., 2012. *A review of the context for enhancing community acceptance of wind energy in Ireland*. SQW Pty Ltd. and Queen's University Belfast, Belfast.

Eltham, D.C., Harrison, G.P., and Allen, S.J., 2008. *Change in public attitudes towards a Cornish wind farm: Implications for Planning*. Energy Policy, 36, 23-33.

Glasgow Caledonian University, Moffat Centre and CogentSi, 2008. *The economic impacts of wind farms on Scottish tourism.. A report for the Scottish Government*.
<http://www.gov.scot/resource/doc/214910/0057316.pdf>

Haggett, C., 2008. *Over the Sea and Far Away? A Consideration of the Planning, Politics and Public Perception of Offshore Wind Farms*, Journal of Environmental Policy and Planning, 10:3, 289-306, DOI: 10.1080/15239080802242787. Available on: <http://dx.doi.org/10.1080/15239080802242787>

Hoen, B., Brown, J.P., Jackson, T., Wiser, R., Thayer, M., and Cappers, P., 2013. *A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States*. Ernest Orlando Lawrence, Berkeley National Laboratory, Environmental Energy Technologies Division.
<http://emp.lbl.gov/sites/all/files/lbnl-6362e.pdf>

Irish Wind Energy Association, 2011. *International Energy Agency Report on Energy Policy for Ireland*.
<http://www.iwea.com/index.cfm/page/iweapolicydocuments>

Irish Wind Energy Association, 2012. *Best Practice Guidelines for Wind Farm Development*. www.iwea.org

Irish Wind Energy Association, 2012. *Best Practice Guidelines for the Irish Wind Energy Industry*.
<http://www.iwea.com/index.cfm/page/iweabestpracticeguidelines>

Jones, C.R., and Eiser, J.R., 2010. *Understanding 'local' opposition to wind development in the UK: How big is a backyard?* Energy Policy, 38, 3106-3117.

Jones, C.R., Orr, B.J., and Eiser, J.R., 2011. *When is enough, enough? Identifying predictors of capacity estimates for onshore wind power development in a region of the UK*. Energy Policy, 39, 4563-4577.

Kraus, W., 2010. *The 'Dingpolitik' of Wind Energy in Northern German Landscapes: An Ethnographic Case Study*. Landscape Research, 35:2, 195-208.

- Ladenburg, J., 2008. 'Attitudes towards on-land and offshore wind power development in Denmark; choice of development strategy'. *Renewable Energy* 33:1, 111–118.
- Maruyama, Y., Nishikido, M., and Idida, T., 2007. *The rise of community wind power in Japan: Enhanced acceptance through social innovation*. *Energy Policy*, 35:5, 2761-2769.
https://www.researchgate.net/publication/223055053_The_Rise_of_Community_Wind_Power_in_Japan_Enhanced_Acceptance_through_Social_Innovation
- Munday, M., Bristow, G., and Cowell, R., 2011. 'Wind farms in rural areas: How far do community benefits from wind farms represent a local economic development opportunity?' *Journal of Rural Studies*, 27, 1-12.
- Roberts, J., and Escobar, O., 2015. *Involving communities in deliberation: A study of three citizen's juries on onshore windfarms in Scotland*. University of Edinburgh, ClimateXChange.
http://www.climateexchange.org.uk/files/5614/3213/1663/Citizens_Juries_-_Full_Report.pdf
- Sustainable Energy Authority of Ireland, 2012. *Best Practice Methodology for the Acceptance of Wind Energy*.
- Sustainable Energy Authority of Ireland, 2004. *To Catch the Wind: The Potential for Community Ownership of Wind Farms in Ireland*. Report prepared by CSA Group and BBB Umwelttechnik GmbH on behalf of Renewable Energy Partnership and SEAI.
- Sustainable Minerals Institute, 2010. *Cumulative Impacts: A Good Practice Guide for the Coal Mining Industry*.
- Toke, D., 2005. *Explaining wind power planning outcomes: Some findings from a study in England and Wales*. *Energy Policy*, 33, 1527-1539.
- Walsh, B., 2010. *Promoting the social sustainability of wind energy development through enhanced participatory processes*. Thesis submitted for the Degree of Ph.D. Department of Geography, School of Geography and Archaeology, College of Arts, Social Sciences and Celtic Studies, National University of Ireland, Galway.
- Warren, C.R., Lumsden, C., O'Dowd, S., and Birnie, R.V., 2011. 'Green on Green': *Public perceptions of wind power in Scotland and Ireland*. *Journal of Environmental Planning and Management*, 48:6, 853-875.
- Wolinsk, M., and Breukers, S., 2010. *Contrasting the core beliefs regarding the effective implementation of wind power. An international study of stakeholder perspectives*. *Journal of Environmental Planning and Management*, 53:5, 535-558.

Complexity of Systems: Wicked Problems

- Baranger, M., 2000. *Chaos, Complexity, and Entropy: A physics talk for non-physicists*. New England Complex Systems Institute, Cambridge.
- Jacobson, M.J., and Wilensky, U., 2006. *Complex Systems in Education: Scientific and Educational Importance and Implications for the Learning Sciences*. Lawrence Erlbaum Associates, Ltd., *The Journal of the Learning Sciences*, 15:1, 11-34.
- Ramalingam, B., and Jones, H., 2008. *Exploring the science of complexity: Ideas and implications for development and humanitarian efforts*. 2nd ed. Overseas Development Institute, Working Paper 285.
- Rittel, H.W.J., and Webber, M.M., 1973. *Dilemmas in a General Theory of Planning*. *Policy Sciences*, 4, 155-169.
- Weber, M., 1991. *The Nature of Social Action*. Runciman, W.G. 'Weber: Selections in Translation', Cambridge University Press.

Environmental and Social Impact Assessment

- Barrow, C.J., 1997. *Environmental and Social Impact Assessment: An Introduction*. Centre for Development Studies, University of Wales Swansea. Chapter 7 *Impact Assessment in Developing Countries*. Arnold Hodder Headline.
- Becker, Henk, 2001. *Social Impact Assessment*. European Journal of Operational Research, 128:2, 311-321.
- Bureau of Minerals and Petroleum, Greenland, 2009. *Guidelines for Social Impact Assessment for Mining Projects in Greenland*.
- Eirgrid, 2014. *Reviewing and Improving our Public Consultation Process*. <http://www.eirgridgroup.com/site-files/library/EirGrid/Reviewing-and-Improving-Our-Public-Consultation-Process.pdf>
- Franks, D., Fidler, C., Brereton, D., Vanclay, F., and Clark, P., 2009. *Leading Practice Strategies for Addressing the Social Impacts of Resource Developments*. Centre for Social Responsibility in Mining, Sustainable Minerals Institute, University of Queensland.
- Fujiwara and Campbell, 2011. *Valuation Techniques for Social Cost Benefit Analysis: Stated Preference Revealed Preference and Subjective Well-Being*. SROI Network International Conference, Univ. Potsdam, Germany.
- Gomez, A.A., Donovan, J.D., and Bedggood, R.E., 2013. *Developing a 'best practice' SIA process: Exploring the integration of technical and participatory approaches*. 'IAIA13 Conference Proceedings, Impact Assessment the Next Generation, 33rd Annual Meeting of the International Association for Impact Assessment, Calgary, Alberta, Canada.
- International Association of Impact Assessors, May 2003. *Social Impact Assessment: International Principles. Analysing, Monitoring and Managing the Social Consequences of Development*. <http://www.iaia.org/publicdocuments/SP2.pdf>
- Misra, V., 2004. *Social Impact Assessment Methodology*. Centre for Good Governance.
- Montgomery, G., 2014/15. *An assessment of social impact reporting in contemporary EIA*. MSc dissertation, Sustainability and Environmental Studies, University of Strathclyde.
- Queensland Government, July 2013. *Social Impact Assessment Guideline*, prepared by Queensland's Department State Development, Infrastructure and Planning.
- Rogers, J.C., Simmons, E.A., Convery, I., and Weatherall, A., 2012. *Social impacts of community renewable energy projects: findings from a wood fuel case study*. Energy Policy, 4, 239-247.
- Society of Environmental Toxicology and Chemistry, 2011. *SETAC's History in Sustainability and Path Forward*.
- Stahl C., C.A., 2002. *A New Approach to Environmental Decision Analysis: Multi-Criteria Integrated Resource Assessment (MIRA)*. Bulletin of Science, Technology and Society, 22:6, 443-459.
- The Evaluation Partnership, 2010. *Study on Social Impact Assessment as a tool for mainstreaming social inclusion and social protection concerns in public policy in EU Member States*.
- Vanclay, F. Bronstein, D.A., 1995. *Environmental and Social Impact Assessment*. John Wiley and Sons.
- Vanclay, F., 2003. *International Principles for Social Impact Assessment*. International Association for Impact Assessment (IAIA), Impact Assessment and Project Appraisal, 21, 5-11.
- Vanclay, F., Esteves, A.M., Aucamp, I., and Franks, D.M., 2015. *Social Impact Assessment: Guide for Assessing and Managing the Social Impacts of Projects*. International Association for Impact Assessment (IAIA).

Walker L.J. and Johnston J., 1999. *Guidelines for the Assessment of Indirect and Cumulative Impacts, as well as Impact Interactions*. EC DG XI. Environment, Nuclear Safety and Civil Protection, Luxemburg. NE803828/D1/3

EU Publications

European Environment Agency, and Ecotech Research and Consulting Ltd., 2001. *Renewable energies: success stories*.

European Union, Georange, 2011. *The Georange guidelines for stakeholder consultation and disclosure*.

Industrial Minerals Association, 2001. *EU Non-Energy Extractive Industry Sustainable Development Indicators Report for 2001*.

Intelligent Energy Europe, 2011. *Green Electricity – Power of the Community*.

IFC Sustainability Guidelines

International Finance Corporation, 2003. *Good Practice Note 3: Addressing the Social Dimensions of Private Sector Projects*.

International Finance Corporation, 2011. *Annex A: Summary of Key Changes in the Sustainability Policy and Performance Standards*.

International Finance Corporation, 2012. *IFC's Sustainability Framework: From Policy Update to Implementation*.

International Finance Corporation, 2012. *IMPACT, Annual Report 2012*.

International Finance Corporation, 2012. *International Finance Corporation's Policy on Environmental and Social Sustainability*.

International Finance Corporation, ICMC and Brunswick, October 2013. *Changing the Game, Communications and Sustainability in the Mining Industry*.

International Finance Corporation, 2013. *Good Practice Note: Cumulative Impact Assessment and Management – Guidance for the Private Sector in Emerging Markets*.

International Finance Corporation. *Understanding IFC's Environmental and Social Due Diligence Process*.

International Finance Council, 2004. *Building Sustainable Business*.

International Finance Council, 2013. *Good Practice Note - Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets*.

International Finance Council Guidelines: Social Dimension of Public Sector Projects.

ISO Social Responsibility-Guidance

ISO 14001. *Benchmarking Tool for ISO 14001: 2004*.

ISO 14001. *Summary of Requirements for ISO 14001: 2004*.

ISO 26000: *Guidance on Social Responsibility for Developers* (2010).

Mining and Hydrocarbons: Sustainability Issues

Azapagic, A., 2004. *Developing a framework for sustainable development indicators for the mining and minerals industry*. *Journal of Cleaner Production*, 12:6, 639-662.

Boutilier, R.G., and Black, L., 2013. *Legitimizing industry and multi-sectoral regulation of cumulative impacts: A comparison of mining and energy development in Athabasca, Canada and the Hunter Valley, Australia*. *Resources Policy*, 38:4, 696-703.

Campbell, B., 2011. *Corporate Social Responsibility and development in Africa: Redefining the roles and responsibilities of public and private actors in the mining industry*. *Resources Policy*, 37, 138-143.

Centre for Public Enquiry, 2005. *The Great Corrib Gas Controversy*.

Cheshire, L., 2009. *A corporate responsibility? The constitution of fly-in, fly-out mining companies as governance partners in remote, mine-affected localities*. *Journal of Rural Studies*, 26, 12-20.

Ernst and Young, 2011-2012. *Business risks facing mining and metals*.

Ernst and Young, 2014-2015. *Business risks facing mining and metals*.

Evangelinos, K., and Oku, M., 2006. *Corporate environmental management and regulation of mining operations in the Cyclades, Greece*. *Journal of Cleaner Production*, 14, 262-270.

Farrell, L.A., Hamann, R., and Mackres, E., 2011. *A clash of cultures (and lawyers): Anglo Platinum and mine-affected communities in Limpopo Province, South Africa*. *Resources Policy*, 37, 194-204.

Franks, D., Bereton, D., and Moran, C., 2008. *Coal Mining: Managing the cumulative impacts of multiple mines on regional communities and environments in Australia*. *Impact Assessment and Project Appraisal*, 28:4, 299-312. <http://dx.doi.org/10.3152/146155110X12838715793129>

Franks, D.M., Bereton, D., and Moran, C.J., Sarker, T., and Cohen, T., 2010. *Cumulative impacts – A good practice guide for the Australian coal mining industry*. Centre for Social Responsibility in Mining & Centre for Water in the Minerals Industry, Sustainable Minerals Institute, The University of Queensland, Australian Coal Association Research Program, Brisbane.

Freeman, L.W., and Highsmith, R.P., 2014. *Supplying Society with Natural Resources: The Future of Mining – From Agricola to Rachel Carson and Beyond*. In *Spring Emerging Issues in Earth Resources Engineering: The Bridge Linking Engineering and Society, Spring 2014*. National Academy of Engineering.

Gardner, J.S., 2014. *Changing Perceptions about the Oil and Gas Industry in America – Lessons Learned from the Coal and Mining Industry*. 2014 Eastern Unconventional Oil & Gas Symposium.

Gilmartin, M., 2009. *Border thinking: Rosspoint, Shell and the political geographies of a gas pipeline*. *Political Geography*, 28, 274.

Giurco, D., and Cooper, C., 2012. *Mining and sustainability: asking the right questions*. *Minerals Engineering*, 29, 3-12.

Gunningham, N., and Sinclair, D., 2002. *Voluntary Approaches to Environmental Protection: Lessons from the Mining and Forestry Sectors*. OECD Global Forum on International Investment, Conference on Foreign Direct Investment and the Environment, Lessons to Be Learned from the Mining Sector.

- Hajkowicz, S.A., Heyenga, S., and Moffat, K., 2010. *The relationship between mining and socio-economic well being in Australia's regions*. Resources Policy, 36:1, 30-38.
- Helmholtz Allianz ENERGY-TRANS, 2015. *Public perception of new energy technologies: Survey on public acceptance of fracking as energy alternative in Germany*.
- Hoffman, J.M., 2013. *A framework for understanding the public's perspectives of mining applied to the Kentucky Coal Industry*. University of Kentucky UKnowledge, Thesis and Dissertations Mining Engineering.
- Hu, D., and Xu, S., 2013. *Opportunity, challenges and policy choices for China on the development of shale gas*. Energy Policy, 60, 21-26.
- Idemudia, U., 2009. *Assessing corporate-community involvement strategies in the Nigerian oil industry: An empirical analysis*. Resources Policy, 34:3, 133-141.
- Institute for Environment and Development and the World Business Council for Sustainable Development, 2002: *Breaking New Ground: Mining, Minerals, and Sustainable Development*, United Kingdom and United States of America: Earthscan Publications Ltd.
- Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development, 2010. *Mining and Sustainable Development – managing one advance to another*. A Mining Policy Framework.
- International Institute for Environment and Development, 2012. *MMSD+10: Reflecting on a decade of mining and sustainable development*, by Buxton, A..
- Jaspal, R., and Nerlich, B., 2014. *Fracking in the UK press: Threat dynamics in an unfolding debate*. Public Understanding of Science, 23:3, 348-363. <http://pus.sagepub.com/content/23/3/348.abstract>
- Jenkins, H., and Yakovleva, N., 2006. *Corporate social responsibility in the mining industry: Exploring trends in social and environmental disclosure*. Journal of Cleaner Production, 14, 271-284.
- Laurence, D., 2010. *Establishing a sustainable mining operation: an overview*. Journal of Cleaner Production, 19:2-3, 278-284.
- Maybee, B.M., 2011. *Mining, Society and a Sustainable World*, Richards, J.P., ed.. Springer, Heidelberg, 506.
- McDonald, S., and Young, S., 2012. *Cross-section collaboration sharing Corporate Social Responsibility best practice within the mining industry*. Journal of Cleaner Production, 10:2, 331-347.
- Moran, C.J., and Brereton, D., 2013. *The use of aggregates complaint data as an indicator of cumulative social impacts of mining: A case study from the Hunter Valley, NSW, Australia*. Resources Policy, 38:4, 704-712.
- Murguía, D.I., and Böhling, K., 2013. *Sustainability reporting on large-scale mining conflicts: the case of Bajo de la Alumbrera, Argentina*. Journal of Cleaner Production, 41, 202-209.
- Mutti, D., Yakovleva, N., Vazquez-Brust, D., and Di Marco, M.H., 2011. *Corporate social responsibility in the mining industry: Perspectives from stakeholder groups in Argentina*. Resources Policy, 37, 212-222.
- OECD Global Forum on International Investment, 2002. *Foreign Direct Investment and the Environment: Lessons from the Mining Sector*.
- OECD Guidelines for Multinational Enterprises, 2008.
- Owen, J.R., and Kemp, D., 2013. *Social License and Mining: A Critical Perspective*. Resources Policy, 38, 29-35.
- Pelligrino, C., and Lodhia, S., 2012. *Climate change accounting and the Australian mining industry: exploring the links between corporate disclosure and the generation of legitimacy*. Journal of Cleaner Production, 36, 68-82.

- Prno, J., and Slocombe, D.S., 2012. *Exploring the origins of 'social license to operate' in the mining sector: Perspectives from governance and sustainability theories*. Resources Policy, 37, 346-357.
- Science Wise, 2014. *Public engagement with shale gas and oil. A report on findings from public dialogue workshops*. Available at: <https://www.gov.uk/government/publications/public-engagement-with-shale-gas-and-oil>
- Vintro, C., Fortuny, J., Sanmiquel, L., Freijo, M., and Edo, J., 2011. *Is corporate social responsibility possible in the mining sector? Evidence from Catalan companies*. Resources Policy, 37, 118-125.
- Waarnars, X.S., 2011. *Why be poor when we can be rich? Constructing responsible mining in El Pangui, Ecuador*. Resources Policy, 37, 223-232.
- Whitfield, S., 2015. *Public Perception is Vital to Success of Oil and Gas Industry Operations*. Culture Matters.
- Whitmarsh, L., Nash, N., Lloyd, A., and Upham, P., 2014. *UK Public Perceptions of Shale Gas, Carbon Capture & Storage and Other Energy Sources & Technologies: Summary Findings of a Deliberative Interview Study and Experimental Survey*. Understanding Risk Research Group Working Paper 14-02, Cardiff University. <http://psych.cf.ac.uk/understandingrisk/reports/>
- Whitmarsh, L., Nash, N., Upham, P., Lloyd, A., Verdon, J.P., and Kendall, J.-M., 2015. *UK public perceptions of shale gas hydraulic fracturing: The role of audience, message and contextual factors on risk perceptions and policy support*. Applied Energy, 160, 419-430.
- Williams, L., Macnaghten, P., Davies, R., and Curtis, S., 2015. *Framing 'fracking': Exploring public perceptions of hydraulic fracturing in the United Kingdom*. Public Understanding of Science [Epub ahead of print].

PDAC Community Guides

- Prospectors and Developers Association of Canada, 2007. *Sustainable Development and Corporate Social Responsibility: Tools, codes, and standards for the mineral exploration industry*. Special Publication.
- Prospectors and Developers Association of Canada, 2009. *Excellence in Social Responsibility e-toolkit (ESR)*. e3Plus: A Framework for Responsible Exploration.
- Prospectors and Developers Association of Canada, 2012. *Preventing Conflict in Exploration: A Toolkit for Explorers and Developers*.

Policy / Good Practice

- Equator Principles. Available at: www.equator-principles.com
- Government for National Recovery, 2011-2016.
- Council of Europe. *Code of Good Practice for Civil Participation in the Decision-Making Process*.
- Cowell, R., and Owens, S., 2006. *Governing space: planning reform and the politics of sustainability*. Environment and Planning C – Government and Policy, 24, 403-421.
- Department of Communications, Energy and Natural Resources, 2006. *Environmental Safeguards, The Irish Way*. Minerals Ireland: Exploration and Mining Division.
- Department of Communications, Energy and Natural Resources, 2006. *Land of Mineral Opportunities*. Minerals Ireland: Exploration and Mining Division.

- Department of Communications, Energy and Natural Resources, 2006. *Wind Energy Development (Planning) Guidelines*. Available at: <http://www.environ.ie/en/Publications/DevelopmentandHousing/Planning/FileDownload,1633,en.pdf>
- Department of Communications, Energy and Natural Resources, 2010. *National Renewable Energy Action Plan Ireland*. Available at: <http://www.dcenr.gov.ie/NR/ronlyres/C71495BB-DB3C-4FE9-A725-0C094FE19BCA/0/2010NREAP.pdf>
- Department of Communications, Energy and Natural Resources, 2012. *Guidelines for Good Environmental Practice in Mineral Exploration*. Minerals Ireland: Exploration and Mining Division.
- Department of Communications, Energy and Natural Resources, 2012. *Strategy for Renewable Energy: 2012-2020*. Available at: http://www.dcenr.gov.ie/NR/ronlyres/9472D68A-40F4-41B8-B8FD-F5F788D4207A/0/RenewableEnergyStrategy2012_2020.pdf
- Department of Communications, Energy and Natural Resources, May 2014. *Green Paper on Energy Policy in Ireland*.
- Department of Environment, Community and Local Government, 2002. *National Spatial Strategy for Ireland: 2002-2020*.
- Department of Environment, Community and Local Government, 2011. *A Framework for Sustainable Development for Ireland: A Draft for Public Consultation*. The Stationary Office, Dublin.
- Department of Environment, Community and Local Government, 2012. *A Guide To: Putting People First. Action Programme for Effective Local Government*.
- Department of Jobs, Enterprise and Innovation, 2013. *Public Consultation: A National Entrepreneurship Policy Statement for Ireland*.
- Department of the Taoiseach, 2007. *National Development Plan 2007-2013*.
- Environment, Community, and Local Government, 2012. *Our Sustainable Future: A Framework for Sustainable Development in Ireland*.
- Environment, Community, and Local Government, 2012. *Development Contributions: Draft Guidelines for Planning Authorities*.
- Environmental Protection Agency, 2007-2013. *Ireland's Sustainable Development Model*. Report Series No.47.
- European Bank for Reconstruction and Development, 2014. *Environment and Social Policy: Performance Requirements*.
- Fitzgerald, J., 2011. *A review of Irish energy policy*. The Economic and Social Research Institute, Research Series Number 21. <https://www.esri.ie/news/a-review-of-irish-energy-policy/>
- HM Treasury, 2011. *The Green Book: Appraisal and Evaluation in Central Government*. London: TSO.
- National Economic and Social Council, 2012. *Draft Framework for Sustainable Development for Ireland: NESC Response*. NESC, No. 126.
- National Economic and Social Council, 2012. *Ireland's Climate Change Challenge: Connecting 'How Much' with 'How To'*. Social and Behavioural Aspects of Climate Change, Background Paper No. 3.
- NUI Maynooth, University College Dublin, and Teagasc, 2005. *Rural Ireland 2025: Foresight Perspectives*.
- Renewable Grid Initiative, 2013. *European Grid Report: Beyond Public Opposition, Lessons Learned*. 2nd ed.

Royal Irish Academy and the Geological Survey of Ireland, 2007. *Putting Our Knowledge Of The Earth To Work For Ireland*. National Geoscience Programme (2007-2013).

SPAN Research Publications, 2008. *Planning and Participation in the Republic of Ireland. Review of Public Participation in the Dún Laoghaire-Rathdown County Development Plan 2004-2010*.

Social Acceptance-Perception of Natural Resources

Aitken, M., 2009. *Why we still don't understand the social aspects of wind power: A critique of key assumptions within the literature*. Energy Policy, 38, 1834-1841.

Arlt, D., and Wolling, J., 2015. *Fukushima effects in Germany? Changes in media coverage and public opinion on nuclear power*. Public Understanding of Science.
<http://pus.sagepub.com/content/early/2015/06/08/0963662515589276.abstract>

Ashworth, P., Pisarski, A., and Thambimuthu, K., 2009. *Public acceptance of carbon dioxide capture and storage in a proposed demonstration area*. Journal of Power and Energy, 223:3, 299-304.
<http://pia.sagepub.com/content/223/3/299.short>

Barry, J., Ellis, G., and Robinson, C., 2008. *Cool Rationalities and Hot Air: A Rhetorical Approach to Understanding Debates on Renewable Energy*. MIT Press, Global Environmental Politics, 8:2, 67-98.

Beland Lindahl, K., Baker, S., and Waldenström, C., 2013. *Place Perceptions and Controversies over Forest Management: Exploring a Swedish Example*. Journal of Environmental Policy & Planning.
[Http://dx.DOI:10.1080/1523908X.2012.753316](http://dx.DOI:10.1080/1523908X.2012.753316)

Boyd, A., and Paveglio, T.B., 2014. *Front page or 'buried' beneath the fold? Media coverage of carbon capture and storage*. Public Understanding of Science, 23:4, 411-427.
<http://pus.sagepub.com/content/early/2012/07/25/0963662512450990>

Brown, M., 2015. *Science in Ireland Barometer*. Science Foundation Ireland.

Darnall, N., Seol, I., Sarkis, J., 2009. *Perceived stakeholder influences and organizations' use of environmental audits*. Accounting, Organisation, and Society, 34, 170-187.

Devine-Wright, P., 2005. *Local aspects of UK renewable energy development: Exploring public beliefs and policy implications*. Local Environment, 10:1, 57-69.

Devine-Wright, P., 2007. *Reconsidering public attitudes and public acceptance of renewable energy technologies: a critical review*. Research Councils Energy Programme, Economic and Social Research Council, Working paper, University of Manchester.

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., 2011. *Place attachment and public acceptance of renewable energy: a tidal energy case study*. Journal of Environmental Psychology, 31:4, 336-343.

Devine-Wright, P., 2012. *Explaining 'NIMBY' objections to a power line: The role of personal, place attachment and project-related factors*. Environment and Behaviour, 45:6, 761-781.

Dolnicar, S., Hurlimann, A., and Grun, B., 2011. *What affects public acceptance of recycled and desalinated water?* University of Wollongong, Faculty of Commerce – Papers (Archive).

Dowd, A-M., Boughen, N., Ashworth, P. and Carr-Cornish, S., 2011. *Geothermal Technology in Australia: investigating social acceptance*. Energy Policy, 39:10, 6301-6307.

- Ellis, G., 2014. *Planning and Community Acceptance for Renewable Energy Projects*. Presentation to the Irish Renewable Energy Summit 2014, Dublin, Ireland.
- Ellis, G., and Welstead, J., 2012. *A review of the context for enhancing community acceptance of wind energy in Ireland*. SQW Pty Ltd. and Queen's University Belfast, Belfast.
- European Atomic Forum, 2014. *What people really think about nuclear energy*.
- Fang, X., 2014. *Local people's understanding of risk from civil nuclear power in the Chinese context*. Public Understanding of Science, 23:3, 283-298. <http://pus.sagepub.com/content/23/3/283.abstract>
- Geothermal Communities, 2013. *Study on public perception of geothermal energy*.
- GEOELEC, 2013. *Public acceptance of geothermal electricity production*. Deliverable no. 4.4, Report on public acceptance.
- Hagget, C., Creamer, E., Harnmeijer, J., Parsons, M., and Bomberg, E., 2013. *Community Energy in Scotland: the Social Factors for Success*. ClimateXChange, Scotland.
- Hall, N., Ashwork, P., and Devine-Wright, P., 2013. *Societal acceptance of wind farms: Analysis of four common themes across Australian case studies*. Energy Policy, 58, 200-208.
- Harris Interactive poll, May 2011. *Since the Japanese earthquake and tsunami, have you become any more or less concerned about nuclear safety?* <http://www.ft.com/cms/s/0/a378cf98-759c-11e0-80d5-00144feabdc0.html#axzz3twAiBAFu>
- Horlick-Jones, T., Prades, A., and Espluga, J., 2012. *Investigating the degree of "stigma" associated with nuclear energy technologies: A cross-cultural examination of the case of fusion power*. Public Understanding of Science, 21:5, 514-533. <http://pus.sagepub.com/content/21/5/514.abstract>
- Huijts, N.C., Midden, A., and Meijnders, A., 2007. *Public acceptance of carbon dioxide storage*. Energy Policy, 35, 2780-2789.
- International Energy Agency, 2009. *Social Acceptance of Wind Energy Projects: Winning Hearts and Minds*.
- International Renewable Energy Agency, 2012. *Social Acceptance of Wind Energy Projects – Winning Hearts and Minds*. <http://www.irena.org/REmaps/countryprofiles/Europe/Denmark.pdf>
- Ipsos MORI, January 2012. *Nuclear Energy Update Poll*.
- Jobert, A., Laborgne, P., and Mimler, S., 2007. *Local acceptance of wind energy: Factors of success identified in French and German case studies*. Energy Policy, 35, 2751-2760.
- Josklow, P.L., and Parsons, J.E., 2012. *The Future of Nuclear Power After Fukushima*. MIT, 1:2.
- Kępińska, B., and Kasztelewicz, A., 2015. *Public Perception of Geothermal Energy in Selected European Countries*. Proceedings World Geothermal Congress, 2015.
- Kim, H., 2014. *Reconstructing the public in old and new governance: A Korean case study of nuclear energy policy*. Public Understanding of Science, 23:3, 268-282. <http://pus.sagepub.com/content/23/3/268.abstract>
- Li, L.W., Birmele, J., Schaich, H., and Kernold, W., 2013. *Transition to community-owned renewable energy: Lessons from Germany*. Procedia Environmental Sciences, 17, 719-728.
- Malo, M., Moutenet, J-P., Bédard, K., and Raymond, J., 2015. *Public Awareness and opinion on Deep Geothermal Energy in the Context of Shale Gas Exploration in the Province of Québec, Canada*. Proceedings World Geothermal Congress, 2015.

- Mankad, A., and Walton, A., 2015. *Accepting managed aquifer recharge of urban stormwater reuse: The role of policy-related factors*. Water Resources Research, 51:12, 9696-9707.
<http://onlinelibrary.wiley.com/doi/10.1002/2015WR017633/full>
- Mankad, A., Walton, A., and Alexander, K., 2015. *Key dimensions of public acceptance for managed aquifer recharge of urban stormwater*. Journal of Cleaner Production, 89, 214-223.
<http://www.sciencedirect.com/science/article/pii/S0959652614012086>
- Marquis, C., Glynn, M.A., and Davis, G.F., 2007. *Community isomorphism and corporate social action*. Academy of management Review, 32:3, 925-945.
- Musall, F.D., and Kuik, O., 2011. *Local acceptance of renewable energy-A case study from southeast Germany*. Energy Policy, 39, 3252-3260.
- Nadaï, A., and van der Horst, D., 2009. *Wind power planning, landscapes, and publics*. Land Use Policy, 27:2, 181-184.
- O'Hara, S., Humphrey, M., Jaspal, R., Nerlich, B., and Poberezhskaya, M., 2013. *Public perception of shale gas extraction in the UK: How people's views are changing*. Research report for external body. Nottingham: University of Nottingham. http://ground-gassolutions.co.uk/wp-content/uploads/2013/03/Nottm_PublicPerceptionsShaleGasUK_Mar2013.pdf
- O'Hara, S., Humphrey, M., Jaspal, R., Nerlich, B., and Poberezhskaya, M., 2013. *Public perception of shale gas extraction in the UK: The impact of the Balcombe Protests in July-August 2013*. University of Nottingham. <http://nottspolitics.org/wp-content/uploads/2013/10/public-perceptions-of-shale-gas-in-the-UK-september-2013-1-2.pdf>
- Olson, M., 2002. *The Logic of Collective Action: Public Goods and the Theory of Groups*. Harvard University Press, USA.
- Parkill, K., 2007. *Tensions between Scottish National Policies for Onshore Wind Energy and Local Dissatisfaction – Insights from Regulation Theory*. European Environment, 17, 307-320.
- Parkhill, K.A., Demski, C., Butler, C., Spence, A. and Pidgeon, N., 2013. *Transforming the UK Energy System: Public Values, Attitudes and Acceptability – Synthesis Report*. UKERC: London.
- Pidgeon, N., 2015. *Public perceptions of climate change in Britain following the Winter 2013/14 flooding*. Research led by the Understanding Risk Research Group, Cardiff University, ClimateXChange Seminar.
- Popovski, K., 2003. *Political and public acceptance of geothermal energy*. The United Nations University, Geothermal Training Programme, Short Course September 2003.
- Poumadère, M., Bertoldo, R., and Samadi, J., 2011. *Public perceptions and governance of controversial technologies to tackle climate change: nuclear power, carbon capture and storage, wind, and geoengineering*. Wiley Interdisciplinary Reviews: Climate Change, 2:5, 712-727.
<http://onlinelibrary.wiley.com/doi/10.1002/wcc.134/abstract?userIsAuthenticated=false&deniedAccessCustomisedMessage=>
- Sandström, C., Carlsson-Kanyama, A., Beland Lindahl, K., Mossberg Sonnek, K., Mossing, A., Nordin, A., Nordström, E-M., and Rätty, R., 2016. *Understanding consistencies and gaps between desired forest futures: An analysis of visions from stakeholder groups in Sweden*. The Royal Swedish Academy of Sciences: Ambio, 45(Suppl. 2), S100-S108.
- Sarkis, J., Gonzalez-Torre, P., and Adenso-Diaz, B., 2010. *Stakeholder pressure and the adoption of environmental practices: The mediating effect of training*. Elsevier B.V., Journal of Operations Management, 28, 163-176.

- Stenekes, N., Colebatch, H.K., Waite, T.D., and Ashbolt, N.J., 2006. *Risk and governance in water recycling: Public acceptance revisited*. Science, Technology, and Human Values, 31:2, 107-134.
<http://sth.sagepub.com/content/31/2/107.short>
- Storey, A., 2009. *The Corrib Gas Dispute – Background and Current Status*. Afri Publications.
- Terwel, B.W., Harinck, F., Ellemers, N., Daamen, D.D.L., 2011. *Going beyond the properties of CO2 capture and storage (CCS) technology: How trust in stakeholders affects public acceptance of CCS*. International Journal of Greenhouse Gas Control, 5:2, 181-188. <http://www.sciencedirect.com/science/article/pii/S1750583610001507>
- Turcanu, C., and Perko, T., 2013. *Public participation processes related to nuclear research installations: What are the driving factors behind participation intention?* Public Understanding of Science, 23:3, 331-347.
<http://pus.sagepub.com/content/23/3/331.abstract>
- University of Cambridge, 2008. *How to change attitudes and behaviours in the context of energy*.
- Wolsink, M., 2006. *Invalid theory impedes our understanding: a critique on the persistence of the language of NIMBY*. Transactions of the Institute of British Geographers, 31:1, 85-91.
- Wolsink, M., 2007. *Planning of renewables schemes: Deliberative and fair decision-making on landscape issues instead of reproachful accusations of non-cooperation*. Energy Policy, 35, 2692–2704.
- Wüstenhagen, R., and Bilharz, M., 2006. *Green energy market development in Germany: effective public policy and emerging customer demand*. Energy Policy, 34, 1681-1696.
- Wüstenhagen, R., Wolsink, M., and Bürer, M.J., 2007. *Social acceptance of renewable energy innovation: An introduction to the concept*. Energy Policy, 35, 2683-2691.
- Wynne, B., 1992. *Misunderstood misunderstanding: social identities and public uptake of science*. Public understanding of Science, 1:3, 281-304. <http://pus.sagepub.com/content/1/3/281.short>
- Wynne, B., Waterton, C., and Grove-White, R., 2007. *Public perceptions and the nuclear industry in West Cumbria*. Centre for the Study of Environmental Change, Lancaster University.
- Zoellner, J., Schweiser-Ries, P., and Wemheuer, C., 2008. *Public acceptance of renewable energies: Results from case studies in Germany*. Energy Policy, 36, 4136-4141.
- Zyglidopoulos, S.C., Georgiadis, A.P., Carroll, C.E., and Siegel, D.S., 2012. *Does media attention drive corporate social responsibility?* Journal of Business Research, 65, 1622-1627.

Social Licence to Operate

- Colton, J., 2014. *Developing a Social Licence: Tidal Energy Development in Nova Scotia*. Acadia Tidal Energy Institute, Acadia University, Nova Scotia. *Presentation to International Conference on Ocean Energy, 2014*.
www.icoe2014Canada.org
- Corscadden, K., Wile, A., Yiridoe, E., 2012. *Social license and consultation criteria for community wind projects*. Renewable Energy, 44, 392-397.
- Franks, D.M., and Cohen, T., 2012. *Social Licence in Design: Constructive technology assessment within a mineral research and development institution*. Technological Forecasting and Social Change, 79, 1229-1240.
- Gunningham, N., Kagan, R.A., and Thornton, D., 2002. *Social Licence and Environmental Protection: why businesses go beyond compliance*. Centre for Analysis of Risk and Regulation, London School of Economic and Political Science, London.

- Gunningham, N., Kagan, R. and Thornton, D., 2004. *Social License and Environmental Protection: Why Businesses go Beyond Compliance*. Law and Social Inquiry, 29, 307–41.
- Howard-Grenville, J., Nash, J., and Coglianese, C., 2008. *Constructing the licence to operate: Internal factors and their influence on corporate environmental decisions*. Law and Policy, 30:1, 73-107.
- Moffat, K., and Zhang, A., 2014. *The paths to social license to operate: An integrative model explaining community acceptance of mining*. Resources Policy, 39, 61-70.
- Pike, R., 2012. *Social License to Operate (research paper). The relevance of social license to operate for mining companies*. Schroders.
- Thompson, I., and Boutilier, R.G., 2011. *Modelling and Measuring the Social License to Operate: Fruits of a Dialogue between Theory and Practice*.
- Thompson, I., and Boutilier, R.G., 2011. *The Social License to Operate*. In Darling, P.; *SME Engineering Handbook*, ch.17.2, p. 1779-1796. Society of Mining Metallurgy and Exploration, Littleton, Colorado.
- Social Licence Task Group, 2009. *Earning a Social Licence to Operate: Lessons from selected industry sectors*. Final report. Submitted to the Energy and Mines Ministers Conference, Canada, Sept. 2009.
- Wiig, A., Kolstad, I., 2010. *Multinational corporations and host country institutions: A case study of CSR activities in Angola*. International Business Review, 19, 178-190.
- Wilburn, K.M., and Wilburn, R., 2011. *Achieving Social License to Operate Using Stakeholder Theory*. Journal of International Business Ethics, 4:2 3-15.

Sustainable Development

- Beland Lindahl, K., Baker, S., Rist, L., and Zachrisson, A., 2015. *Theorising pathways to sustainability*. International Journal of Sustainable Development & World Ecology.
<http://dx.doi.org/10.1080/13504509.2015.1128492>
- COMHAR: The National Sustainable Development Partnership. *Principles for Sustainable Development*.
- Davis, R. and Franks, D.M., 2014. *"Costs of Company-Community Conflict in the Extractive Sector."* Corporate Social Responsibility Initiative Report No. 66. Cambridge, MA: Harvard Kennedy School.
- Drexhage, J., and Murphy, D., 2010. *Sustainable Development: From Brundtland to Rio 2012*. International Institute for Sustainable Development, United Nations.
- Gibson, R.B., 2006. *Sustainability assessment and conflict resolution: Reaching agreement to proceed with the Voisey's Bay nickel mine*. Journal of Cleaner Production, 14, 334-348.
- Global Reporting Initiative, 2013. *G4: Sustainability Reporting Guidelines*. Implementation Manual.
- Global Reporting Initiative, 2013. *The external assurance of sustainability reporting*. Research and Development Series.
- Global Reporting Initiative. *GRI G4 Guidelines and ISO 26000:2010: How to Use the GRI G4 Guidelines and ISO 26000 in Conjunction*.
- International Risk Governance Council, 2006. *Managing and Reducing Social Vulnerabilities from Coupled Critical Infrastructure*.
- Irwin, A., 1995. *Citizen Science: A Study of People, Expertise and Sustainable Development*. London: Routledge.

KPMG, Centre for Corporate Governance in Africa, Global Reporting Initiative, and United Nations Environment Programme, 2010. *Carrots and Sticks – Promoting Transparency and Sustainability. An update on trends in Voluntary and Mandatory Approaches to Sustainability Reporting.*

KPMG, Centre for Corporate Governance in Africa, Global Reporting Initiative, and United Nations Environment Programme, 2013. *Carrots and Sticks: Sustainability reporting policies worldwide – today's best practice, tomorrow's best trends.*

McAllister and Fitzpatrick, 2010. *Canadian Mineral Resource Development: a sustainable enterprise?* In: Mitchell, B., ed.. *Resource and Environmental Management in Canada: Addressing conflict and uncertainty*, 4th ed. Oxford Univ. Press, Toronto, Ontario, 356-381.

Slack, K., 2012. *Mission impossible?: Adopting a CSR-based business model for extractive industries in developing countries.* Resources Policy, 37, 179-184.

UN Publications

United Nations Environment Programme, 2000. *Mining and sustainable development II: Challenges and perspectives.* Industry and Environment, 23, Special Issue 2000.

United Nations Environment Programme, 2011. *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers.* www.unep.org/greeneconomy

United Nations Economic Commission for Europe at Aarhus, Denmark, 199., Convention on Access to Information, Public Participation in Decision- Making and Access to Justice in Environmental Matters – the *Aarhus Convention (ratified 2012, Ireland)*; and Maastricht recommendations on promotion of effective public participation in decision making.

Work Bank Publications

World Bank Group, 2002. *Social Impacts Assessment Tools and Methods.*

World Bank Group and Extractive Industries, 2003. *Volume 1: Striking a Better Balance.* The final report of the Extractive Industries Review.

World Bank Group Support for Extractive Industries in Africa, 2003. *Poverty Reduction or Poverty Exacerbation?*

Useful Websites

Aarhus Convention Implementation Guide (2013): <http://www.unece.org/environmental-policy/treaties/public-participation/publications/public-participation/2013/aarhus-convention-implementation-guide-second-edition-text-only-version.html>

Agile Advice www.agileadvice.com

American Geosciences Institute: Education and Outreach Programs <http://www.americangeosciences.org/education>

Attitudes to WE in Ireland
http://www.seai.ie/Renewables/Wind_Energy/Attitudes_towards_Wind_Energy_in_Ireland/

Bingham, Nancy – Caterpillar: ‘Ground Rules: Mining for a Sustainable Future’ – Educational Film and DVD.
<https://mining.cat.com/groundrules>

Campus Engage Ireland <http://www.campusengage.ie>

Department of Communications, Energy and Natural Resources, 2006. *Wind Energy Development (Planning) Guidelines*. DoECLG, Dublin
<http://www.environ.ie/en/Publications/DevelopmentandHousing/Planning/FileDownload,1633,en.pdf>
[Accessed 1 Aug 2013]

Department of Communications, Energy and Natural Resources, 2012. *Strategy for Renewable Energy: 2012 – 2020*. DoCENR, Dublin http://www.dcenr.gov.ie/NR/rdonlyres/9472D68A-40F4-41B8-B8FD-F5F788D4207A/0/RenewableEnergyStrategy2012_2020.pdf [Accessed 1 Aug 2013]

Department of Communications, Energy and Natural Resources, 2010. *National Renewable Energy Action Plan Ireland*. DoCENR, Dublin <http://www.dcenr.gov.ie/NR/rdonlyres/C71495BB-DB3C-4FE9-A725-0C094FE19BCA/0/2010NREAP.pdf> [Accessed 1 Aug 2013]

Dessureault, Sean – University of Arizona. Particularly focussed on social media metrics.
<http://devmge.engr.arizona.edu/sean-dessureault>

The Dow Jones Sustainability Index <http://www.djindexes.com/sustainability/>

Earth Observatory, NASA <http://earthobservatory.nasa.gov/?eocn=topnav&eoci=logo>

The Economic and Social Research Institute: Behavioural Economics <https://www.esri.ie/research/behavioural-economics/>

The Equator Principles: <http://www.equator-principles.com/>

European Industrial Minerals Association (EIMA) - <http://www.ima-europe.eu/commitments/sustainable-development>

German WE Association ‘Community Wind Power’ – local energy for local people www.wind-energie.de/en

Global Reporting Initiative (GRI) (<https://www.globalreporting.org/Pages/default.aspx>)

Grupo Antofagasta (Chile) sustainability reports <http://www.aminerals.cl/mineria-sustentabilidad/reportes-de-sustentabilidad/>

Inform IT www.informit.com

Institute of Environmental Management and Assessment (IEMA). *Corporate Social Responsibility: A Guide to Good Practice* (Best Practice Series Vol.9, Aug. 2007) www.iema.net

International Association for Impact Assessment www.iaia.org

International Council for Mining & Metals www.icmm.org

International Council for Mining & Metals, 2013. *Changing the Game: Communications in the Mining Industry*
www.icmm.com

International Finance Corporation www.ifc.org : see Performance Standards
http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/performance+standards/environmental+and+social+performance+standards+and+guidance+notes

International Finance Corporation (IFC) *Policy on Environmental and Social Sustainability* www.ifc.org

Interorganizational Committee on Guidelines and Principles for Social Impact assessment (1994)
www.nmfs.noaa.gov/sfa/social_impact_guide.htm

Irish Wind Energy Association, 2011. *International Energy Agency Report on Energy Policy for Ireland*.
<http://www.iwea.com/index.cfm/page/iweapolicydocuments> [Accessed 1 Aug 2013]

Irish Wind Energy Association, 2012. *Best Practice Guidelines for the Irish Wind Energy Industry*.
<http://www.iwea.com/index.cfm/page/iweabestpracticeguidelines> [Accessed 1 Aug 2013]

ISO 14001 www.iso.org/iso/iso14000 *Environmental Management*

ISO 26000 www.iso.org/iso/home/standards/iso26000.htm *Social Responsibility*

Love Leitrim <http://www.loveleitrim.org/>

Mining Facts <http://www.miningfacts.org/Communities/What-is-the-social-licence-to-operate/>

National Geographic <http://www.nationalgeographic.com/magazine/>

NESC Wind Energy: Building Community Engagement and Social Support, NESC No. 139, July 2014
<http://www.nesc.ie/en/publications/publications/nesc-reports/wind-energy-in-ireland-building-community-engagement-and-social-support/>

OECD *Guidelines for Multinational Enterprises* www.oecd.org

OECD, 2011 <http://www.oecd.org/statistics/OECD-ICW-Framework-Chapter2.pdf>

Post-Carbon Ireland www.postcarbonireland.org

Prospectors and Developers Association of Canada, e3Plus 'Excellence in Social Responsibility'
<http://www.pdac.ca/programs/e3-plus/toolkits/social-responsibility>

Public Understanding of Science – journal: <http://pus.sagepub.com/search>

The SIA Hub www.socialimpactassessment.com

SocialLicense, 2014. *Social License to Operate*. <http://sociallicense.com/index.html>

Stamford M. (2004). *Community Ownership: UK Wind Power*. MSc. Dissertation.
www.uea.ac.uk/env/all/teaching/eiaams/pdf_dissertations/2004/Stamford_Mike.pdf

Sustainable Aggregates – Communities: <http://www.sustainableaggregates.com/overview/communities.htm>

7th Schedule Strategic Infrastructure Developments – Guidelines for Planning Authorities
<http://www.pleanala.ie/sid/sidpa.htm> and <http://www.pleanala.ie/sid/sidapp.htm>

Strategic Infrastructure Development: A Guide to Public Participation <http://www.pleanala.ie/sid/sidpp.htm>

University of Exeter, Beyond Nimbyism: A multidisciplinary investigation of public engagement with renewable energy technologies http://geography.exeter.ac.uk/beyond_nimbyism/

Social Data Management/ Planning Tools

<http://www.socialplanningtool.net.au/sharing/guides.asp>

<https://www.ihs.com/products.html>

<http://fdean-consult.limehouse.co.uk/portal>

<http://www.objective.co.uk/>

<http://www.smartwind.co.uk/socio-economic-development.aspx>