



Working with communities

Geological Disposal - Literature Review

Department of Energy and Climate Change

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Literature Review - Geological Disposal

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Executive Summary

This document provides an informative literature review on the issue of working with communities in the context of the UK's efforts to site a geological disposal facility (GDF) for the disposal of high level radioactive waste.

The review is divided into four chapters, addressing different stages of facility siting in relation to potential host communities, and draws from a wide body of literature on the subject including peer-reviewed academic journals, books, government, NGO and industry reports. Also included is an appendix summarising voluntarist approaches to the siting of radioactive waste disposal facilities around the world.

Siting of the Geological Disposal Facility (GDF) is a complex process. The goal is to find a site that is both geologically suitable and socially acceptable and experience around the world has shown that this is not simple. The challenge has been described as "an archetypal example of a *messy problem* with numerous parties involved; uncertainties that may not be fully resolvable; conflicts over what values are important and what trade-offs should be made.

Early attempts at siting nuclear waste repositories focussed solely on the technical suitability of potential sites while overlooking the social reaction to plans, leading to siting problems that currently remain unresolved. In line with a growing understanding of the need to address the social implications of repository siting, policy emphasis switched from purely technical considerations to include social considerations such as community acceptance. It has been found that increasing community participation and empowerment in siting processes builds trust between community stakeholders and siting authorities, and can improve siting outcomes. Different approaches to nuclear waste disposal facility siting have been adopted around the world with varying degrees of success; however, the global trend has been towards a greater degree of sophistication and complexity in siting processes as the reasons for earlier policy failure are elucidated.

Recent research has highlighted the importance of greater participatory democracy and community empowerment in siting processes. These studies identify the benefits of strategies that deliver balanced and unbiased education on the implications of hosting sites, accounting for emotional perceptions of risk, highlighting the benefits of hosting a repository, and empowering local communities in decision-making processes, thus establishing a level of consensus within the community for hosting a GDF.

Defining host communities

The government's strategy for siting of the UK GDF aims to address partnering between the developer and potential host communities, which can be hard to define. With regards to the GDF project, a number of dimensions need to be considered when defining the host community. The broadest categories that can be applied for this purpose are geographical communities and communities of interest, which are made up of networks of individuals and can transcend geographical areas.

For practical purposes, it is likely that a geographical definition of community will be utilised, although the suitability of pre-existing, arbitrary boundaries (such as those of local authorities) would need to be taken into account. It is also necessary to consider organisational structures which may operate in these communities, including those involved in governance (county, regional, and local or parish councils), the third sector, such as local environmental or conservation groups, and local businesses. These organisations would be major stakeholders in the GDF project, and may provide pre-existing structures around which support or opposition to the project may be built.

Participation and governance

Aside from the complexities associated with developing a practical definition of the host community, the government's commitment to a voluntary, informed siting process warrants consideration of project governance, and the participatory mechanisms that allow genuine public input into decision-making in the siting process.

Good project governance builds trust between potential host communities and siting authorities, and demands that from the outset the siting process is transparent, especially given the negative preconceptions that are likely to exist when discussing high level nuclear waste. It is essential that the concerns of stakeholders are taken into consideration, and that stakeholders have a demonstrable and significant impact on planning and development processes.

Participatory mechanisms utilised in the siting process should also aim to cultivate dialogue between the community and the developer, rather than older models which relied simply on communicating intentions to the affected populace, or allowing the population a voice through consultation exercises: in both cases, information is transferred in one direction: from developers to the public in the case of communication; or from the public to developers in the case of consultation. True participatory mechanisms aim to build consensus about best courses of action between developers

and the public. This allows development frameworks and rules to be negotiated, and for mutually acceptable trade-offs to be made.

Participation must be open to all stakeholders involved in the siting process. One risk in developing participatory mechanisms is that one group is empowered over another, for example due to disparities in funding of engagement activities or greater access to resources for communications campaigns. In order to avoid this issue, any public funds allocated for citizen engagement and participation in decision-making processes must be made equally available to groups which support and oppose the project. This maintains balance in the engagement process, and gives equal opportunities for groups to express their opinions.

Good governance, public engagement and public participation have resulted in improved siting outcomes in other parts of the world, with notable examples including Eurajoki, Finland, the WIPP in Carlsbad, New Mexico, and Gyeongju, South Korea.

Community benefits

Funding packages for host communities, as well as the wider benefits associated with hosting such a project, form a central part of the siting strategy. When determining the direct benefits received from the developer in the form of investment, participatory mechanisms should also be employed: rather than the developer setting out their approach to a benefits package: dialogue between the developer and local stakeholders allows the design of a benefits package that is specifically tailored to meeting the needs of the host community.

Engagement when determining the benefits package should be as broad as possible, and should take into account the views of both those in support of and opposition to the wider process of GDF siting. This approach has previously been outlined in best practice guidance issued by DECC in relation to wind farm siting, which can be adapted to the GDF project.

Wider benefits associated with the project include local and regional economic stimulation, job creation, and the development of new industries in the area based around the operation of the GDF. Further benefits that can be taken into account include the significant investment in regional infrastructure that are a prerequisite to GDF construction and operation, including renewing, improving or adding to existing infrastructure. In order to maximise these benefits, local businesses and workers should be favoured where possible when procuring goods or services for the GDF and its associated infrastructure projects.

Siting outcomes

The final stage of the siting process is to test public support for the project following a significant period of public engagement. At this stage in the process, the public should be well-informed about the benefits, potential drawbacks and risks of hosting the GDF, allowing a balanced decision to be made on the best course of action. This test could take a number of forms, including public consultation, surveys, and a referendum.

1. Consultation can provide a great deal of detailed feedback for the developer to make a decision; the main drawback of consultation is the high degree of self-selection of participants, reducing representation in the wider population;
2. Surveys can reach a much broader and more representative segment of the population; however, they may fail to sufficiently empower the community in determining the outcome of the siting process;
3. A referendum significantly empowers the community, as it gives a great deal of leverage in negotiation throughout the process and the siting decision ultimately rests in the hands of the host community. However, referendums also entail a great deal of risk for the developer, as the outcome in the context of the GDF is likely to be binding, and reduces the possibility of continued dialogue between the developer, and prospective host community. Recent experiences of the EU referendum only serve to highlight this danger.

Given the desire expressed by the government for transparency and a fair outcome, public support should be monitored during the siting process, with consultations and surveys conducted throughout the participation and engagement processes, with the possibility of holding a referendum at the end of the process if there is still an appetite in the UK for any further use of referendums as a tool of direct democracy.

Chapter 1

Community Definition

1.0 Introduction

Siting of the Geological Disposal Facility (GDF) is a complex process. The goal is to find a site that is both geologically suitable and socially acceptable and experience around the world has shown that this is not simple. The challenge was recently described by the US Nuclear Waste Technical Review Board as “an archetypical example of a *messy problem*”¹, with numerous parties involved; uncertainties that may not be fully resolvable; conflicts over what values are important and what trade-offs should be made; and ill-defined decision-making processes that are ever changing, and opaque (NWTRB, 2015a). To this might be added the long duration of the project, which brings with it its own set of difficulties (see InSOTEC 2014a).

1.1 Scope of Literature Review

This review is selective in its treatment of the literature reviewed, seeking to provide a methodical research synthesis, but not a systematic review to cover all of the available literature.

The brief is to consider the wider literature, beyond purely academic sources, and the review is therefore based on a variety of sources including refereed journals, conference papers and books, through to government, NGO and industry reports.

1.2 Defining Community

Defining the word community is one of the challenges relating to the creation of a strategy for public engagement, representation and investment in the process of siting a GDF.

A brief look at the ‘outpourings’ of British policy makers will quickly show that the idea of community is one that covers a multiplicity of meanings (Hoggett, 1997). As long ago as 1955, Hillery identified 94 different definitions in the literature, across several disciplines, and in 1969, Stacey concluded that “it is doubtful whether the concept ‘community’ refers to a useful abstraction even though the idea has become ubiquitous in contemporary public and social policy (Stacey, 1969). There are numerous and often conflicting interpretations of what a community is (Plant, 1978) but for our purposes there is no need to embark on an ontological search for a definition.

¹ Messy problems were explored by Russell Ackoff (1974) but see Metlay and Sarewitz (2012) for an up-to-date discussion. Messy problems also have much in common with the concept of wicked problems which were famously characterised by Rittel and Weber (1973).

According to Gusfield (1975), "...two major usages of 'community' should be distinguished at the outset." The first is the *geographical community* which can be defined in terms of the location or territory in which organisations, groups or individuals are based, such as a street, village, town, county or city. The second is the relational usage "which points to the character of human relationships without reference to location"². This might cover a group of individuals with shared interests, family ties or professional interest.

The relational community envisaged by Gusfield (1975) is not a geographical community. It can be seen as a *community of interests* and in practice these two usages overlap: there is often a geographical connection in a community of interests (see Hinshelwood and McCallum, 2001).

1.3 Geographical Communities

The most obvious way to define a geographical community is in relation to the local government administrative area within which the GDF is sited, but this view of local community is too simple. Given the arbitrary, limited and changeable nature of community boundaries (Wong, 2004), it is almost certain to be transcended (Lesbirel, 2011), especially given the complexity and timescales of radioactive waste disposal (Kraft & Clary, 1991). The dynamic nature of communities should also be noted, with communities existing in a state of flux "as new relationships are formed and old ones break" (Walker, 2011).

With regards to the geographical definition of community, it has long been the aim of government that "local authority areas should be based on communities" (DOE, 1991) but the definition of community is not synonymous with local government administrative boundaries. Nor can it be assumed that the local population identifies with the institutions of local government. Wood (1995) observes that "the present structures of local government do not win universal favour with local people who have their own ideas about what sort of structure would best reflect local loyalties and communities". The problem is that "communities are not homogeneous, harmonious bodies of people" (Hinshelwood and McCallum, 2001) and a local authority area "need not cover only one community" (DOE, 1991).

Overlapping communities, when viewed from an administrative perspective, are a fact of life in the UK model of Local Government. As such, it is necessary to consider

² This can be seen as the classical distinction between *Gemeinschaft* (community) and *Gesellschaft* (society) that was first discussed by Ferdinand Tönnies in 1897.

the wider region, which could lead to the inclusion of multiple parish or community councils as well as higher tiers of local government such as district and county councils (vertical communities). This adds a layer of difficulty to the definition of community which must be considered for GDF siting (Lesbirel, 2011). The vertical hierarchy poses problems in determining the amount of influence each level of government should have in the siting process (Goodall, 1982), and the presence of overlapping geographical communities (horizontal communities) means that there is potential for multiple and possibly conflicting community interests which must be taken into account and ultimately reconciled.

The inherent difficulty in defining the nature of community has been extensively explored in the literature for infrastructure projects. For recent examples, see Venables *et al.*, (2012) for nuclear power stations, Walker (2011) for carbon governance, Usher (2013) for coal mining, or Rozema (2015) for rail infrastructure.

1.4 Communities of Interest

All communities can be “visualised as lots of overlapping clusters of groups” which can be geographical, based solely on shared interests or a combination of the two (Hinshelwood and McCallum, 2001). Considering communities of interest within a geographical area is a useful way of subdividing local communities into interconnected groups of individuals, and can facilitate better understanding of the boundaries within which people may group in a geographical community (Lamont & Molnar, 2002).

This can be helpful in understanding community dynamics, and is a contributory factor towards place attachment of residents, for example in the context of neighbourhoods (Hidalgo & Hernandez, 2001). Having a network of relationships is central to the concept of community cohesion and the resultant sense of community: the perception of living in a cohesive and positive community ³ (McMillan & Chavis, 1986).

McMillan & Chavis (1986) suggest using such factors to produce an empirical measure of the strength of sense of community in an area which Chavis & Wandersman (1990) see as useful in determining reasons for disparities in community participation between localities. Drawing on the McMillan and Chavis model, Wylie *et al.*, (2016) used a two-stage methodology in an attempt to define a

³ Living in a cohesive and positive community has been shown in Nordic studies to influence health positively (Hyyppa & Maki, 2003).

community more rigorously. The first stage was to identify the directly affected population (DAP) by conducting qualitative research into the perceptions of risk and disruption caused by siting of a facility. This was used to determine which stakeholders could legitimately be included in the local host community. The second stage of their analysis focuses on the experience of living in a community by measuring factors such as sense of community. The approach was applied to the siting of the low-level radioactive waste storage site in Dounreay, Scotland, and revealed interesting dynamics in the interplay between the DAP and the wider community. It was shown that the DAP experienced a level of pressure from the wider community who saw any opposition to the siting of the waste facility (by the DAP) as contrary to the economic benefits to be reaped by the wider community. This problem was exacerbated by the promised community benefits package for hosting the site.

This first stage test applied by Wylie, *et al.*, raises the prospect of tenuous stakeholder claims, and one idea, (not present in the community literature reviewed so far), might be to borrow from the legal principle of *locus standi*⁴, where anyone wishing to bring a legal case must show the court that they have sufficient standing. In most cases the position is clear, but for some more remote stakeholders this could be a useful informal test.

In another attempt at measurement, and recognising the difficulty of “pinning down the idea of community”, the government asked the Local Government Commission for England to develop a Community Index which would include a range of indices including history, topography, mobility, industrial character, transport, demography and sporting, leisure and cultural affiliations. (DOE, 1993). This proposal never came to fruition and was “virtually abandoned at a distressingly early stage of its life” (Game, 1995, quoted in Bennett & Chandler, 1997).

Another important element of the community which may influence the siting process is second home owners. Here we see a community of interest with a geographical connection. One study found that second home owners can make more significant contributions than locals to opposing planned developments, perhaps due to greater financial resources, as well as the fact that their opposition may transcend local boundaries (Mottiar & Quinn, 2003). A recent study from Finland concluded that second home owners could play significant roles in influencing

⁴ Oxford dictionary definition of *Locus Standi*: The right or capacity to bring an action or to appear in a court.

planning decisions, although there were also barriers to public participation in terms of being accepted by locals as a member of the community (Rinne *et al.*, 2015).

Differences in social capital may also be a factor (see for example Holman & Rydin, 2013)⁵.

1.5 Communities at different levels

Communities of interest consist of actors from geographically unrelated areas, for example those with shared interests (Voydanoff, 2001), or via social media (Kietzmann *et al.*, 2011) but these are not considered in detail in this document.

It should also be recognised that communities of interest can transcend local geographical boundaries, for example in relation to environmental concern (Usher, 2013). Both types of community are important but the geographically determined community - that is the host community - is immediately relevant for the definition of communities envisaged in the 2014 White Paper (DECC, 2014). It is the “communities at local level that will be affected most and who could benefit more from potential spin-offs” according to Hinshelwood and McCallum, writing for the DOE in the context of renewable energy, (2001).

The question of community definition was addressed in the 2008 White Paper (DEFRA, 2008 paras 6.6 – 6.9). Three types of community were defined, the *Host Community*, the *Decision Making Body* and *Wider Local Interests*. The Government at that time accepted that these tiers were not rigid and aimed to “retain flexibility to account for local circumstances and allow communities to have a degree of self-definition”. It was also recognised that “individual local circumstances differ and, to a degree, a tailored approach to any discussions [with communities] will need to be taken” (DEFRA, 2008).

This approach is repeated in the 2014 White Paper and the evidence of voluntarist siting for similar facilities strongly supports this approach to the problem (see for example NWTRB, 2015a, 2015b, OECD/NEA, 2010, MODERN, 2011).

As can be seen from the literature, a simple geographical definition of community is insufficient for an engagement strategy with such wide-ranging consequences as a GDF. Likewise, a community definition that aligns precisely with the local

⁵ A related strand of the literature covers NIMBYISM and this is explored in more detail as another topic in the literature review.

government boundaries is equally unlikely to adequately meet the needs and grouping of individuals and organisations in any potential area.

1.6 Who are the Stakeholders?

Another approach to understand community definition is to examine the siting decision from the perspective of stakeholders. The Nuclear Energy Authority uses the term “stakeholder” as a label for any “actor institution, group or individual with an interest or a role to play in the societal decision-making process around radioactive waste management. Different stakeholders may have different interests. Engagement strategies should thus be adjusted to context: differing needs, programme phases, formal requirements, as well as national process and national and local culture.” (OECD/NEA, 2015)

When considering the stakeholders, it is necessary to consider the multi-faceted impact that a project of this nature has (Lesbirel, 2011). First and foremost, is the host community: defined to cover those living and working in areas directly affected by the siting of a GDF, for example through the possibility of changing land values (Smolen, Moore & Conway, 1992); or who would be affected by construction work in the close vicinity of their property (Olander & Lanadin, 2005). Another dimension to be considered would be stakeholders affected by aspects such as increased traffic on the local road network, and this has the potential to significantly broaden the spatial dimensions of the community under consideration, for example by including individuals who regularly commute along roads which may be prone to increasing traffic flows (Gilchrist & Allouche, 2005).

1.7 Parish & Local Councils

Parish or local councils (Community Councils in Scotland and Wales) are the lowest unit of local government in the UK ⁶ and as such they “are the tier... that is closest to the electorate...” (Sandford, 2015). Higher tiers, that is county, district and unitary authorities in England are now referred to in legislation and government guidance as ‘principal authorities’.⁷ This terminology is a useful reminder of the primacy of

⁶ Elected parish councils were created by the Parish Councils Act 1894, which removed all non-ecclesiastical functions from church parish councils and passed them to newly-established local elected bodies, which became known as ‘parish councils’.

⁷ The terminology ‘principal authority’ was introduced in s1 of the Local Government and Public Involvement in Health Act 2007 and where there are two tiers of local government represented by principal authorities, this will result in overlapping jurisdiction.

these tiers over local and parish councils, but it is still important to explore the role of the lower tier because of its proximity to the local community.

Unlike a nation, the local community is a natural association of people formed by the act of local association⁸ and on this view, local and parish councils might be seen as the most legitimate representatives of the local community. Engagement with this lower tier of local government is seen as important: they have been described by DGLC (2006) as “an established and valued form of neighbourhood democracy” and Redcliffe-Maud (1969) saw them “as a vital element to democratic local government”. Since 2007 any area can have a parish council (or its equivalent)⁹.

Local government in the UK has a history of reorganisation with the trajectory of change moving towards “the creation of a smaller network of larger administrative units” (Barnett and Chandler, 1997). The last major reorganisation took place in the 1990s, the latest in a long series of changes dating back to 1888¹⁰, with a major change in the early 1970s following the Redcliffe-Maud Report (1969). This introduced the present system of unitary authorities which was criticised at the time as stifling local democracy¹¹.

Only in the last two decades have we seen the beginning of a trend towards more local government, through devolution, localism and a focus on local communities (see for example NALC, 2010). This has included the optional reintroduction of the parish (or local) councils to all areas of England, reversing, at least in part, the tendency to larger units of administration.

Participation can be seen to be a diminishing function of scale (Dahl, 1967). Smaller administrative units are better placed for engagement but for Sharpe “the key question is participation in the government of what?” Even if a parish council is

⁸ Alexis de Tocqueville, writing in 1835 comments that “man makes Kingdoms and creates republics; the township seems to issue directly from the hand of god”. National definition was explored in depth more recently by Benedict Anderson in *Imagined Communities* (2006).

⁹ The Local Government and Public Involvement in Health Act 2007 gave every community the opportunity to have its own local council, but the legal foundation is the Local Government Act 1972 which still governs much of the workings of parish and town councils today.

¹⁰ The Local Government Act 1888 is taken here as the start of the modern era of local government, but it was preceded by the Municipal Corporations Act 1835, and other miscellaneous legislation.

¹¹ The Royal Commission’s official report contained a substantial memorandum of dissent from Derek Senior, one of twelve members of the Commission, who did not accept the unitary authorities arguing that they “defy both the demands of local democracy and the facts of social geography” (see Thomas, 1969, who gives a short summary of the three volume report).

democratic due to its proximity to the citizens it represents, it “may be incapable of doing anything of any importance” (Sharpe, 1970).

Sharpe was referring to the scope of parish council authority but a related question arises on the subject of competency. The low calibre of men and women who become parish councillors was for JS Mill, “the great imperfection of these local institutions” (Mill, 1861). Much has changed in the last 150 years: local councillors are more professional and are supported by the National Association of Local Councils. Nevertheless, “it is not unusual for elections to parish councils to be uncontested, and for members to be co-opted where the number of candidates is fewer than the number of seats available” (Sandford, 2015), and this raises questions about the representative nature of the parish council. Newton (1979) examines the role of local political elites and finds them (at that time) to be barely representative of the local demographic, with local councillors’ social and economic backgrounds differing markedly from the population norms ¹².

Nor is the parish council the only mechanism for representation at the very local level. There are several other groups operating who may claim to have equal standing with the parish council. These include:-

- Parish Meetings;
- Area committees;
- Neighbourhood management arrangements;
- Area/community forums;
- Residents’ and tenants’ associations;
- Community associations;
- Chambers of Commerce and other business associations.

1.8 Business Communities

Businesses and organisations representing businesses can claim to have a legitimate role in their community and they should be included in the operational definition of community. Larger groupings of businesses are known as Chambers of Commerce, while smaller business associations have traditionally been known as Chambers of Trade but many former chambers of trade may have dropped the ‘chamber’ title and

¹² It should be noted that this difference is less stark for urban councils and labour movements (e.g. political parties, unions and co-operative societies) are part of the explanation for this difference (Newton, 1979).

used ‘business association’ (Bennett, 2011, who gives full coverage of the subject of local business voice).

Local Enterprise Partnerships (LEPs) also need to be considered. They were established in 2011¹³, and work with Chambers of Commerce and local business associations based on the premise that “localities themselves are best placed to understand the drivers and barriers to local growth and prosperity (BIS, 2010). LEPs (and the other organisations that arise from this initiative) should be treated as part of the community for the purposes of GDF siting.

1.9 The role of the third sector and NGOs

Another group of stakeholders that must be considered in the GDF siting process are voluntary organisations, otherwise known as third sector organisations and sometimes collectively termed *civil society*. These include non-governmental organisations (NGOs) such as charities, non-profit organisations (NPOs) as well as less formal community organisations: the third sector is characterised by civil and social sector organisations which cannot be categorised as governmental or private sector organisations (Salamon & Anheier, 1997, pp.1-3).

Third sector actors can draw information and funding from a variety of sources, including partnerships with government, private organisations, and the community itself (Rathi, Given & Forcier, 2014). The term NGO is extremely broad, and organisations with a range of interests and supporter bases may be seen as NGOs; nevertheless, in terms of their function, one view is that NGOs provide “venues for dialogue on social transformation and for influencing forums that are traditionally dominated by state actors” (Fernando and Heston, 1997, pp. 8-12).

The relationship between governments¹⁴ and third sector organisations is complex, with a number of factors coming into play, including the “government’s resistance or acceptance of institutional pluralism, the relative balance of power in the relationship, and the degree of formality and – by extension – the level of government linkage” (Coston, 1998). In cases where a degree of resistance is evident from government, Coston breaks down the forms of interaction into repression, rivalry, and competition; in cases of acceptance, relationships can be viewed as

¹³ LEPs replaced Regional Development Associations and might be seen as another strand in the slow trend towards more effective local engagement with communities, although the narrative in the White Paper is contradictory, with the definition of scale focused on the city-region which is hardly local (BIS, 2010).

¹⁴ Government here is referring to all tiers of government.

contracting, third party government, cooperation, complementarity, and collaboration (Coston, 1998).

In the context of GDF siting in the UK, the government's attitudes towards third sector organisations may be influenced by whether these organisations are viewed as conducive to positive outcomes, however, given the voluntary and participatory nature of GDF siting policy, relationships should remain positive given that these organisations can provide forums for citizens to express their views, empower their communities, and maintain community cohesion (Frumkin, 2009). This is also an important consideration in any project involving the government and a private contractor as major stakeholders, because third sector organisations may be seen as being more trustworthy than businesses in service delivery (Strickland and Vaughn, 2008), thus providing a balance to power (Coston, 1998) and improving participation in the siting process.

A crucial aspect of the relationship between the government and third sector organisations is trust between the state sector and the third sector. Over recent years, this trust has diminished as the government has been pushing for a trade-off between third sector autonomy and accountability; this has reduced the availability of public funding for third sector organisations (Coote, 2011), a move justified as devolving power to communities to arrange and manage their own services in tandem with increasing responsibilities for the private sector (Milbourne and Cushman, 2012).

Evidence can be found in the literature of third sector organisations having major impacts on planning decisions, for example in the case of an open-pit coalmine planned for the Leeds greenbelt, which was blocked by a coalition of local and national opponents (Usher, 2013). In this instance, a number of local opposition groups formed around a variety of discourses and concerns, and initially provided disjointed opposition to the plans; however, as local opposition groups united in order to defend the local RSPB nature reserve, a new emergent discourse was formed around opposition to global climate change, rather than preservation of local scenery, allowing them to tap into the better organised and efficient resources of organisations such as Leeds Friends of the Earth. This case demonstrates the power of third sector community groups, and their ability to mobilise considerable resources by transcending local boundaries and engaging with national third sector organisations (Usher, 2013). The formation of third sector organisations in this manner also provides a basis for sustaining opposition, for example to construction projects (Teo and Loosemore, 2011). In terms of GDF siting, the interests of third sector groups can even come into conflict, as seen in a nuclear waste repository siting dispute in Östhammar, Sweden, in 1997. Local residents formed competing

groups, one supporting the hosting of the facility, with the other opposing it (OECD, 2010). This is an essential part of the voluntarist approach that has been adopted by the government.

1.10 Summary

Community is a multi-dimensional term and the operational definition of community will need to take a down-to-earth rather than a sophisticated approach. This will not be technical definition of community, but an inclusive common sense definition. It is clear that any definition of community must include a geographical dimension, closely linked to the local host community, but there are other wider communities and non-geographical stakeholders that include communities of interest, perhaps extending even to the virtual world.

The unknown location of the volunteer communities for GDF siting creates an added difficulty. Even when a community does come forward, it will not be easy to identify the mosaic of affected geographic communities, the overlapping communities of interest and the wider stakeholders that need to be represented. This difficulty is exacerbated by the uncertainty of the precise GDF siting within a community and the protracted timescales that apply to the GDF siting process.

For any volunteer community, there will be some easily recognisable stakeholders. Local government units at all levels will be simple to identify¹⁵. Even though it has been shown that the definition of community is not synonymous with local government administrative boundaries, it is nevertheless expected that the unit of local government administration will be one of the chief interfaces with local communities.

Any community is a dynamic, rather than a static structure and membership of the community changes over time. There are expected to be multiple overlapping communities. Some of these communities will be defined by law and practice, others will be self-defined, and still others will only emerge as the process of site selection progresses. Ultimately there is no prescription - flexibility is required both in how a community or stakeholder is defined and also how they are engage in the process and the siting process should be designed to reflect this need.

¹⁵ The local government units that might be affected can be identified early on in the volunteering process, but the final local councils that are affected may not be clear until the precise site location and extent is settled, much later in the siting process.

Chapter 2

Participation & Governance

2.0 Introduction

This document outlines the methods for project governance, community engagement, and community participation mechanisms relating to the siting of a geological disposal facility (GDF), for the storage of high level radioactive waste. The aim of this work is to collate, present, and critically analyse historical approaches to radioactive waste repository siting processes, looking at some of the barriers and hurdles that have been faced by organisations and governments around the world looking to site a GDF or similar facility. This work also identifies both successful and unsuccessful approaches to this issue, and presents research that seeks to understand what factors contribute to a robust, successful, and, crucially, democratic siting process.

2.1 Increased Participation

Since the late 1950s, policies for long-term management of radioactive waste have been driven by technical experts but this has changed and Stirling (2008) observes that "...deference in the governance of science and technology is rebalancing from expert analysis toward participatory deliberation." This has led to a "proliferating variety of new institutions, processes, and tools."

Noting the controversial nature of infrastructure siting, Cotton and Devine-Wright (2012) observe that the practice of engaging with the public and stakeholders "has arisen primarily as a means to ameliorate the public scepticism, cynicism, and mistrust that has undermined technology development plans". This is characterised as a "crisis of confidence" in 2000 by the House of Lords Select Committee on Science and Technology, and this report (HL, 2000) in can be seen as a turning point, identifying the need to address the crisis through a three pronged approach:-

- through activities that improve the "public understanding of science";
- by "improved communication of uncertainty and risk";
- by "changing the culture of policy-making...to bring the public into dialogue about new developments at an early stage".

All three can be seen to have specific application to the problem of radioactive waste management and this represents "a move away from top-down, techno-centric decision-making" towards participative processes and cultural changes in the institutions responsible for making and implementing policy (Irwin, 2001).

However, the technical case for geological disposal was “determined long before any participatory turn” and we should “acknowledge that the existence of this prior framing” which represents a commitment in terms of research, expertise and policy frameworks. This prior commitment “limits the scope for formal citizen participation to influence the resulting sociotechnical configuration” (Bergmans, et al., 2015) and effectively “closes down” the problem from the perspective of full consultation (Stirling 2005).

2.2 Community Engagement

The siting of the geological disposal facility is controversial and the “need for a fair process is simply stated: people feel threatened by radioactive waste; and they deserve to be taken seriously in the decision making process” (BRWM, 1990). That the siting decision “poses social and ethical questions...” is well understood and the “debate becomes most critical when it is focussed within the community... that may host the repository”.

While “technical arguments were once dominant, the question of implementation is now being approached from the viewpoints of sustainable development, financial considerations and social acceptability”¹ and “there is an absolute need for those leading the process to demonstrate integrity” (OECD/NEA, 2009).

Democracy privileges the short run over the long run with time itself being tied to the political cycle (Palonen, 2008). Many problems cannot be solved in the short time frame of a single political administration and maintaining the GDF process over long timescales is challenging. The process must “continue through relatively short term political changes, working in the longer-term interests of the public and affected communities” (OECD/NEA, 2009).

The main ethical issues relating to safety have been explored by the RWM community in the past (see for example SKN, 1988, BRWM, 1990, or IAEA, 1992). They were summarised by the Swedish Consultative Committee on Radioactive Waste Management, in the following terms: First, that “coming generations will not be obliged to take measures to protect themselves or their environment” and that they “can repair any mistakes we may have made in disposing of the waste.” And

¹ The deficit model of science communication was used in the early days of nuclear industry, but “studies have consistently shown that people’s perception and acceptance of technology and science are not straightforwardly attributable to their level of knowledge about them” (Pidgeon & Demski, 2012. See also Sturgis & Allum (2004).

secondly, “that the repository is designed in such a way as to allow future generations to control it” the reason being that coming generations may have the capacity to deal with nuclear waste more safely or may be able to utilise “the energy resources latent in the waste.” (SKN, 1988).

The problem of long duration touches many aspects of the project, not just the safety case and the engineering approach. One of these is the long-term governance, explored by the EU Communities and Waste Management project (COWAM), which looked in depth at long term governance, concentrating on “the nontechnical issues” and how to “build sustainable decisions including ethical and social aspects”. The final COWAM report identifies participation as one of the key long term goals discussing “how to organize the participation of citizens in the long term consultations and decisions concerning the management of radioactive waste?”² (COWAM, 2006a).

But participation is needed at every stage of the process, in the immediate short term, the medium term and the long term in order to cement a sense of community involvement in and ownership of the project (Sturup, 2016). Having rejected a ‘decide-announce-defend’ (DAD) model in favour of a voluntarist approach, it is important to both consult and engage with the local community, and to build trust. Voluntarism is now in vogue, but as we have seen, timescales in the nuclear world are long, and it is twenty years since it was first proposed and over that time we have seen the transformation of “a contentious issue into a largely consensual one” (Metlay, 2013).

There is still a need for careful consultation and engagement thorough *public participation*. Rowe and Frewer (2005) observe that this term is imprecisely defined which has “militated against the implementation of good participation practices”. Defining the range of participation processes, practices, instruments and techniques as “participation mechanisms” Rowe & Frewer elaborate a typology of public engagement mechanisms with *mechanisms* that can be applied in different defined *circumstances*, with the important question being “What participation mechanism is most effective in what circumstances?” According to Rowe and Frewer there are three broad classes to define mechanisms for public engagement, depending on directions of information flow.

² The final COWAM report does not make a convincing case about the long term ethics, presenting an unfocussed and muddled discussion.

1. **Public communication:** transfer of information from sponsors to participants;
2. **Public consultation:** transfer of information from participants to sponsors;
3. **Public participation:** gathering of information from both participants and sponsors, integration of the information into an accurate composite, and redistribution of composed information to participants and sponsors.

As these classes highlight, truly participative forms of engagement require dialogue between all groups involved in the GDF project, including the local population (participants) and sponsors (the government and developers). Simple public communication of information at the stage of planning and decision-making has been shown to be ineffective in previous siting policies, which relied on the failed principle of ‘decide-announce-defend’, resulting in widespread public opposition to siting (Morton, Arioldi & Phillips, 2009). Under this policy, participation was only initiated after key decisions had been made, resulting in a non-participatory siting strategy in which host communities are disempowered (Arnstein, 1969) and a lack of community ownership of the project (Sturup, 2016).

On the other hand, public consultation mechanisms in this context would be the final stage of a much broader participatory strategy in which information has also been transferred from sponsors to participants, and would therefore not be used as a standalone engagement mechanism. Another consideration worth noting is that certain forms of engagement mechanism favour self-selection of participants (Rowe and Frewer, 2005); there is a risk that such a self-selected population has strong, pre-formed opinions as was seen in the public and town meetings in the 2003 GM Nation? debate, which was considered by Pidgeon, et al. (2005). However, the authors observe that

“in terms of participatory (rather than representative) democracy, engaged people with clear views on an issue do have a legitimate contribution to make in any significant public policy debate... In policy terms it may sometimes be just as important to recognise what will motivate a significant sector of the population to action, as it is to reflect upon the views and wishes of a broader cross-section of the public.” Pidgeon et al (2005, at p. 477).

A list of different engagement mechanisms can be found in table 2.1 below. This table gives a range of different mechanisms of public engagement divided into classifications. For a more detailed analysis of each engagement strategy, see Rowe and Frewer, 2005, as well as OECD/NEA, 2015, pp. 38-40.

Table 2.1: Mechanisms of Public Engagement

Public Communication	Public Consultation	Public Participation
Cable TV	Citizens' panels	Action planning workshops
Drop-in centres	Consultation documents	Citizen juries
Hotlines	Electronic consultation	Consensus conferences
Information broadcasts	Focus groups	Deliberative opinion polls
Internet information	Open space	Negotiated rule-making
Public hearings/inquiries	Opinion polls	Planning cells
Public meetings	Referendums	Task forces
	Study circles	Town meetings
	Surveys	
	Telepolling/televoting	

Source: Based on Rowe and Frewer, (2005).

Gaining trust and reaching agreement has become easier as “over the past decades researchers have scrutinized the public process surrounding nuclear power and radioactive waste... and there is more understanding of siting, perceived risk, and trust” (Pidgeon and Demski, 2012). DECC in the UK³ has carried a Public Attitudes Tracking Survey since 2012 and this has asked

³ The Department of Energy and Climate change is now part of the newly created Department of Business, Energy and Industrial Strategy (BEIS) and the survey is now part of the BEIS's Energy and Climate Change Public Attitudes Tracking Survey.

participants about their knowledge of the of radioactive waste disposal but “only 3% said they knew a lot about GDF” (DECC PAT, 2016 at p.8).

Van Dijck, speaking of the Belgian experience is of the view that “when members of the public have sufficient opportunity to obtain information... then they are willing to engage and fully capable of contributing positively to a project” (quoted in OECD/NEA, 2009).

The OECD Handbook on Information, Consultation and Public Participation recommends the use of a “mix of tools matching objectives, publics and resources” and it goes on to define resources to include financial capacity and human capability (OECD, 2001). Choosing tools that are beyond the execution capability is one problem but participation requires an ability on the part of the prospective host community to engage with the technical subject matter ⁴, although it must be conceded that the capacity for adult community members to gain levels of technical knowledge on a par with experts in the field may be lacking (Tuler & Webler, 2016). This reinforces the need to develop skills among young people in the local community, especially given the long term nature of the project.

Evaluation is important, and needs to be part of the mechanisms that are being deployed, not just afterwards, but during the process. Effective evaluation should be used “to measure success, to demonstrate it, to enable learning from experience and support awareness across the organisation...” (OECD, 2001).

In Germany, the AkEnd committee discussed forms of participation, suggesting a citizen forum for local engagement which is supported by a panel of experts. A round table on regional development is suggested for wider consultation (AkEnd, 2002).

2.3 Project Governance & Partnership

Project governance (i.e. the way a project is managed and controlled) must take the views of the local and wider community into account in order to build trust and confidence within the host community (Olander & Landin, 2005; Chung, Kim & Rho, 2008; Yang & Pandey, 2011). This is especially true of projects such as GDF siting,

⁴ The need for technical training and understanding was highlighted in the siting of a Hungarian LILW repository in Bataapáti, where local residents received training to ensure that they were capable of assisting in safety monitoring at the facility. Not only does this strategy improve participation, but it can also serve to empower the local community (OECD/NEA, 2010).

construction, and operation which may have strong negative connotations and high degrees of perceived risk associated with them (Kraft & Clary, 1991).

One aspect of governance that is central to the siting process is ensuring that from the outset, stakeholders are aware of the impact that they can have on the siting process and that this impact is significant: one factor that has been shown to lead to apathy towards public engagement and participation is the perception that members of the community have little influence over decision-making or policy (Arnstein, 1969). According to Arnstein (1969), there are different levels of public participation that can be observed in decision-making, which can be broadly categorised as non-participation; token participation; and full citizen control. This governance concept is further developed by Rowe & Frewer (2000), who analysed different methods of public participation, taking into consideration the representativeness and level of control that different methods imparted on the public.

2.4 NIMBYism

Siting of controversial developments has long drawn opposition from potential host communities, which has given rise to the term NIMBY (not-in-my-backyard) Syndrome or NIMBYism. In the past, siting authorities have used the term pejoratively to brand communities as simply being uncooperative, at the risk of overlooking legitimate community concerns. NIMBYism may arise in response to projects which are perceived to have a high environmental impact, or to impact on the quality of life of local residents. Overcoming NIMBYism is one of the significant issues that will be faced by the government in siting a GDF (Rozema, 2015).

Siting hazardous waste facilities has long been a problem, partially because of the implication that it is the “redistribution of the risk, costs, and benefits of hazardous waste disposal among the affected population by concentrating the risks and non-financial costs on a small segment of the population” (Matheny & Williams, 1985). Concerns amongst the local population are justified and according to Llurdes, Sauri & Cerdan (2003) can be broadly classified into three main areas: environmental and health risks, such as public health impacts of groundwater contamination (Tarlock, 1981); stigma effects, like lower land and property values (Smolen, Moore & Conway, 1992) and equity issues, such as a redistribution of costs and risk (Matheny & Williams, 1985).

Further attempts to discourage NIMBY opposition stemmed from accusations that NIMBY responses were poorly informed and highly emotional, with communities downplaying benefits and exaggerating risks of a development,

however, this has since been shown not to be the case, with opposition groups being well-informed enough to engage in reasoned discussion of siting proposals (Kraft & Clary, 1991). Furthermore, it is extremely risky for a developer to treat public opinion and participation with contempt, as attempts to ignore local public opinion may be unsuccessful and can ultimately lead to project failure (Upreti & van der Horst, 2004).

A further argument used to deter NIMBY opposition is the negative perception of NIMBY syndrome as a selfish and unethical attitude that undermines the greater public good, making the term pejorative (Hermansson, 2008). However, all of these attempts to quash or demonise opposition groups ignore the fundamental facts of local opposition: it can derail siting processes for important infrastructure developments such as nuclear waste repositories (Kearney & Smith, 1994); the concerns of local people are often legitimate (Llurdes, Sauri & Cerdan, 2003); and public participation in projects may improve decision-making processes (Irvin & Stansbury, 2004).

In the case of nuclear waste disposal, it has been shown that local knowledge can inform the siting decision (Blowers & Sundqvist, 2010) and there is evidence from around the world that participation and inclusion of host communities in decision-making processes can improve siting outcomes⁵ (OECD/NEA, 2010).

For McClymont & O'Hare (2008), the literature on the negative impact of NIMBYism presents an interesting conundrum: while the government's view of a sustainable community is one in which citizens participate freely and openly in planning and development processes in the community, this participation is viewed as undesirable should it prevent a 'positive' project outcome which has been pre-determined by the government or a developer.

In dealing with issues of local opposition, one strategy that has been applied is the economic model of cost-benefit: in return for hosting the facility in question, the local community is offered some form of compensation in order to balance the perceived negative impact of the facility on the community (Wolsink & Devilee, 2009). Such packages vary in their degree of sophistication. They range from simple monetary compensation, community investment guarantees, to offers of infrastructure such as a highway connection, which may be necessary in order to construct a facility in the first place (Wolsink & Devilee, 2009). Another approach is

⁵ For specific examples in which community participation has greatly facilitated siting outcomes, see examples from Canada, Hungary, South Korea, and WIPP in the United States.

an auction designed to determine which of a number of potential communities will host a site either in terms of most public support or at the lowest cost to the developer (Chung, Kim & Rho, 2008). Such approaches may create issues of equity: affluent communities which do not perceive any issues with maintaining the status quo are less likely to be motivated by economic gains and may have more to lose by bearing the costs of hosting a hazardous waste facility, meaning that such facilities may be more likely to be hosted by poorer communities in need of economic stimulus (Gregory et al., 1991).

According to Wolsink and Devilee (2009), and many other researchers in this field, much of the literature on NIMBYism is inherently flawed as it assumes that all local opposition stems from local self-interest. This view has been shown to be counter-productive in the siting of energy infrastructure such as wind farms, where oversimplification of local opposition stifles public participation and community engagement, essentially encouraging further opposition (Petrova, 2016). This view is supported by the results of a survey conducted in Wales, which found that 88% of local residents thought that development should occur in partnership with local residents (Devine-Wright, 2005)⁶. The flaws of NIMBYISM are discussed in Pidgeon and Demski (2012), or Bell et al (2005).

A *Good Practice* note was prepared by the UN which identified panels “on the local level specifically engaging local stakeholders” and which identifies the contribution made by these stakeholders. Apart from “the opportunity to simply be heard, the major incentive for stakeholders to participate is the opportunity to positively affect decisions which impact their constituency”. The authors observe that stakeholders “give their time and energy and risk peer criticism” in the process. This points to the need for an assurance that the Board will engage with them and will properly reflect on the contributions of the panel when formulating its activities. (UN, 2010).

2.5 Risk Perception and Nuclear Facilities

Despite the attempts to portray nuclear power as a constructive technology, concerns have been raised through the years about the hazards of waste generation. Nuclear accidents, including Three Mile Island (1979), Chernobyl, (1986) and more recently Fukushima-Daiichi (2011) and the publicity they

⁶ This was in relation to wind farm siting, and 52% of residents felt that wind farms should be owned by local communities.

have attracted have done little to ease public concerns. Given this backdrop, nuclear technologies are perceived by many as carrying unacceptable risks, and communities which are unfamiliar with nuclear technologies are, understandably, reluctant to host new nuclear facilities (Cutter, 1993, Ch. 7).

During the 80s and 90s there were highly negative connotations attached to nuclear power and the nuclear industry due to high perceived risks and concerns over the management approaches taken to nuclear waste, with a large literature now existing on this topic⁷. Historically, many factors have come into play in shaping these perceptions of radioactive waste and nuclear power. Concerns about catastrophic accidents (and associations with atomic weapons), the invisible and long-term nature of radiation, the involuntariness of exposure, and strong negative affective associations all play a part. Hence, Slovic et al (1991) found that the five most common images related to an underground nuclear waste repository were 'dangerous', 'death/sickness', 'negative', 'pollution' and 'war'. Regulation and management of nuclear facilities is also distrusted by many people, in part because of visible failures (e.g. Three Mile Island, Chernobyl) in the face of past reassurances of safety, but also because of a historical legacy of secrecy within the industry (e.g. Flynn, 2003; Wynne, Waterton and Grove-White, 2007). Distrust is in turn directly related to people's high risk perceptions and lack of acceptability. Accordingly, openness and transparency in risk management and its communication are now recommended as prerequisites for re-building trust and confidence (Pidgeon & Demski, 2012).

In more recent times, but pre-Fukushima, opinion polling indicated a significant reduction in levels of opposition to nuclear power amongst the public in Britain (Knight, 2009; Corner et al, 2011), a trend also evident in the USA (Greenberg, 2009). This in part reflected arguments being advanced regarding nuclear power's possible contribution to combating climate change and to delivery of future energy security, but also the fading collective memory of Chernobyl. However, a closer look at the national polling data shows a more complex picture with a large proportion of recent support remaining conditional - a 'reluctant acceptance' at best. While many more in Britain have indeed come to support nuclear power over the past decade they do so while viewing it only as a 'devil's bargain', a choice of last resort in the face of the threat of climate change and energy security concerns (see Bickerstaff et al, 2008; Pidgeon et al, 2008).

⁷ See Arup, 2016, for an excellent summary of this area (at section 5.6).

We also know that there is a clear gender gap in attitudes to local environmental pollution from both nuclear power and radioactive waste (see e.g. Davidson and Freudenburg, 1996) with men in aggregate reporting somewhat lower risk perceptions than women in surveys⁸. It should be stressed that this statistical phenomenon has been shown not to be a function of level of education or knowledge of the technology, but rather arises for more complex reasons: in particular, because there exists a sub-group of men within any survey sample who express very high confidence in the control of technologies such as nuclear, while the wider gender roles across society also tend to constrain how both women and men, in rather different ways, express their uncertainties and fears about associated risks (see Henwood and Pidgeon, 2015). That all being said, given the choice a large proportion of individuals show very clear preferences for renewable electricity generation over nuclear technology in many countries (Greenberg, 2009; Demski et al, 2015).

Views become more complex at existing nuclear locations. Here the response in such communities does not always mirror those obtained from national samples. A common assumption is that people living in these locations will be overwhelmingly positive about nuclear power, because of long-standing experience with the local station and local economic benefits (see discussion of 'The Donut Effect', below). In-depth interview research across two UK nuclear sites, Oldbury and Bradwell, found that nearby residents expressed confidence in local site activities, but based primarily upon people seeing their existing local facility as both a familiar and unremarkable feature of the locality, and also expressing confidence and trust in those who managed the plants built up over many years of incident-free operation. However, almost everybody interviewed for the study could also recount instances (news of the Chernobyl disaster, the London terrorist bombings, a friend being diagnosed with cancer) where the 'extraordinary' risks of nuclear power, and with this very real personal anxieties, had been brought home to them in a powerful way (Parkhill et al, 2010).

Given the above, one might have expected that the major accident at Fukushima would have drastically changed attitudes to nuclear technologies in the UK, as it did in other countries. However, survey evidence shows clearly that while the Japanese public lost trust in nuclear safety and have become far less accepting of nuclear power since 2011, in the UK attitudes to nuclear power have remained relatively stable following the accident (Poortinga, Ayogi and Pidgeon, 2013). One explanation

⁸ See also DECC PAT, 2016.

would be the belief that the particular circumstances surround in the accident could not happen in the UK.

The lesson one can draw from over four decades of research on attitudes to nuclear power and radioactive waste is that, even in so-called 'nuclear communities', public attitudes are nuanced and multi-layered, and that the public engagement process for repository siting needs to take full account of this fact.

2.6 The Doughnut Effect

Siting processes in the US have identified a phenomenon that has been termed 'The Doughnut Effect' when attempting to site waste repositories in communities which either already host nuclear facilities, or which have a history of interaction with the Department of Energy (DoE), which is responsible for the siting process. The Doughnut Effect is the observation that in such communities, including the area around Yucca Mountain, Nevada the centre of an ongoing HLW repository siting process; Hanford, Washington State; and Oak Ridge, Tennessee, local levels of support for waste disposal facilities has been demonstrably higher than in more distant communities. With sufficient distance, opposition to siting declines, which creates a hollow-centred ring (or 'doughnut') of opposition around the proposed site.

The explanation of this effect is that the immediate host community stands to gain the most from hosting a facility, but at the same time bears the highest risk. Further investigations found that in other areas, the doughnut effect was absent, with opposition to siting directly correlating with distance from the proposed repository, thus highlighting that confidence in the DoE through previous association, or lower risk perception due to familiarity with the reality of hosting a nuclear facility considerably reduces opposition to hosting a nuclear waste repository (Easterling & Kunreuther, 1995).

The Doughnut Effect is not limited to the US, although it may be limited to nuclear risk perception rather than risk perception in general. Attempts to site a LLW repository in Dounreay, Scotland, proved unsuccessful, with opposition among the local community being high. In this circumstance, residents living in the immediate vicinity of an experimental nuclear reactor were found to have lower perceptions of nuclear risk than more distant populations; however, opposition was centred on the fear of disruption associated with repository construction, as well as the fact that the plans for the repository would have extended the limit of the nuclear site. Members of the wider local community, who stood to gain from the economic benefits associated with the repository but were less likely to face disruption, strongly supported repository siting and placed significant pressure on the directly affected community (Wylie, Haraldsen & Howe, 2016).

This example shows that nuclear risk perception is not the only, and perhaps not the most significant factor facing directly affected communities participating in repository siting processes if these communities already host nuclear facilities.

2.7 Decision Making Process

Stern & Fineberg (1996) describe a broadly based analytic-deliberative process – that is a decision making model that integrates both analytic processes and deliberative processes. They note that this may “require organizations that characterise risks to engage in new and unfamiliar activities” and it is probable that RWM need to expand their inherently technical-engineering outlook to accommodate the socio-technical dimension of the GDF siting process. To be successful, the analytic-deliberative process needs to be matched to the needs of the decision. This requires a clear understanding of the *decision milieu*. There is no standard procedure for this but, “organisations can benefit by asking a series of diagnostic questions when they plan the process and by keeping their diagnoses flexible and responsive to information that emerges during the process”. Capacity building by the delivery organisation(s) is as important as capacity building within the host and other communities, if all are to engage with the process successfully (Stern & Fineberg, 1996). Hunt and Wynne (2000) writing on behalf of Nirex⁹, identify seventeen different ways in which “dialogue and consultation with stakeholders and the public (*sic*) can contribute...” and these include “generating relationships and building trust, developing institutional capacity, developing and building institutional credibility and authority”.

2.8 Summary

Following the failure of technocratic approaches to GDF siting, such as the ‘decide-announce-defend’ model, greater emphasis has been placed on the previously overlooked aspect of public involvement in siting decisions. One of the main problems encountered in the past was the refusal of communities to accept the siting decisions for nuclear waste repositories, a stance that was frequently seen by siting

⁹ There is an important strand of the literature that comprises the outputs of Nirex, which is not pursued here in detail. See for example Nirex (2012).

authorities as 'NIMBYism' resulting in the blocking of important infrastructure development. This idea is largely outdated, as it has become clear that host communities have genuine concerns, especially given recognition of the emotional basis of risk perception. It has been found that increasing community engagement and participation may be useful in improving siting outcomes.

The community needs to be engaged in the siting process, and this can be done through a variety of mechanisms, broadly categorised as communication, consultation, and participation. A successful engagement strategy should emphasise productive dialogue between the developer and the host community, allowing the host community to play a major role in the framing and shaping of the project. Participation has a number of aspects that must be incorporated, including the dissemination of information to citizens and the opportunity for citizens to provide feedback to the government and developer. In order to avoid a token participatory process, the citizenry must also be empowered by participating, meaning that their contribution has a real impact on decisions arising from the process.

Chapter 3

Community Investment

3.0 Introduction

Community investment refers to the disbursement of funds from Government to the prospective host community, as set out in the 2014 White Paper. These funds can be broadly divided into two headings, *community empowerment* to facilitate capacity building to allow the community to engage with this complex issue and *community investment* which is for investment within the community.

The discussion here relates to community investment that takes place prior to a firm decision on site location. There is no consideration of subsequent community investments beyond the siting decision.

There are a number of contexts where investments¹ are made. In the 2008 White Paper community empowerment funding was envisaged as part of a community engagement package and this set out a number of headings which were eligible for funding, specifically “commissioning specialist advice”.

This is not the same as community engagement per se.

Community empowerment measures “are aimed at enabling communities to participate in the decision-making process and influence its outcome”

3.1 EU Competition

Depending on the purpose and amount of any community investment, these payments could be treated as state aid under the EC competition regulations. These regulations govern the grant of state aid and subsidies by members (TFEU, s107, s108)². A State Aid Modernisation programme was completed in 2012 which is designed to “support flagship initiatives of the Europe 2020 strategy for smart, sustainable and inclusive growth”. It also aimed to simplify the rules, increase

¹ Community investment has a very specific meaning in this paper, but there are many other contexts where this term is used, including the case where the community makes and investment in the infrastructure and has a financial stake, increasingly common in renewable energy projects (see for example DECC, 2014b).

² There are two chief types of EU regulations relating to funding of this type, state aid Regulations and those relating to subsidy. The EU defines a subsidy as "a financial contribution made by (or on behalf of) a government or public body which confers a benefit to the recipient". The EU may impose countervailing duties to neutralise the benefit of such a subsidy if it is limited to a specific firm, industry or group of firms or industries. A subsidy which is broadly available – like training aid or aid to small businesses – is not normally considered specific.

flexibility and extend the categories of state aid that are covered by the general block exemption regulation (EC, 2012). The block exemption regulations allow the grant of state aid in certain conditions without the need for prior approval from the European Commission (EC, 2014a).

In the past, the UK Government has chosen to provide regional aid only under the block exemption measures (EC, 2014b) and if this is desirable then the community investment will need to comply with the block exemption regulations in force at the time. The current regulations (in place since July 2014) set out the detailed exemptions which cover twelve categories, including local infrastructure, training, regional aid and aid to SMEs (EC, 2014c).

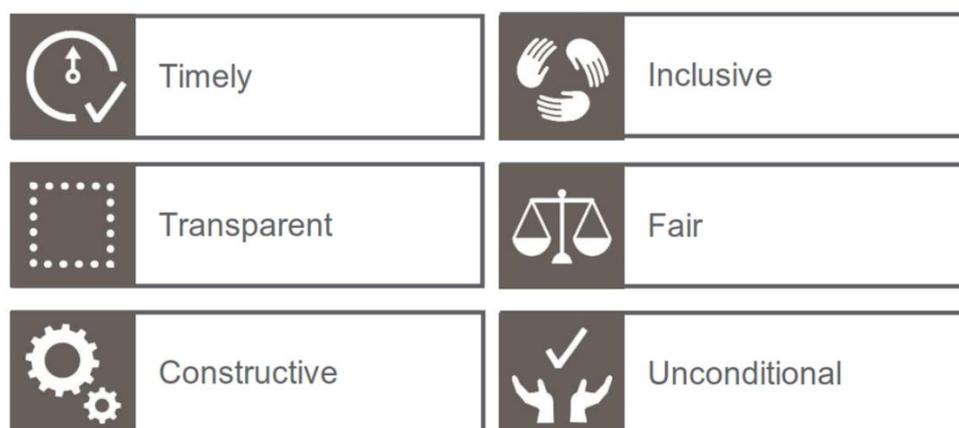
There is an exception for general infrastructure [in EU competition law].

3.2 Community Benefits

There are a number of benefits that flow from the decision to build a GDF in a particular community that are associated with the presence of the project itself. These are not considered here, nor are the benefits that may flow from community investment in the wider sense, going beyond the construction of an important national infrastructure project.

The term 'community benefit' is widely used but "it remains relatively poorly defined" (Butler & Docherty, 2012). We have already seen the difficulty in defining community itself.

Community investment cannot be discussed in isolation from community benefits. There is body of literature that relates to community benefits, although like the literature on community investment itself, it is mostly relating to the period after the decision to build the infrastructure has been taken. DECC themselves discuss this in the context of Onshore Wind development. Noting that community benefits "can bring tangible rewards to communities which host wind projects, over and above the wider economic, energy security and environmental benefits that arise from those developments" (DECC, 2014b). For onshore wind, DECC identify six "fundamental principles of best practice in establishing community benefit.



According to these principles, discussions around community benefits packages should be conducted in a timely fashion, ideally as the proposals for a development are made public. This allows communities to decide whether or not they wish to engage, with a reasonable amount of time to consider the benefits of hosting a facility. DECC also states that the developer should state their approach to community benefits. However, literature around the decision-making processes involved in infrastructure contraindicate this approach (Sturup, 2016; Arnstein, 1969): it may be better that developers work with communities to determine the approach to community benefits to be adopted, creating a fairer, more participatory approach to community investment.

It is essential that transparency and integrity are maintained throughout the process of creating and implementing the benefits package, which applies equally for the developer, administrators, and community representatives. This package will be included on the English Community Benefits Register once it becomes available.

Trust is important for a constructive relationship between the developer and the community. This means that in terms of creating the benefits package, participants should contribute in a positive manner regardless of their support or opposition to the scheme. This can ensure that the legacy arising from the scheme genuinely benefits the host community.

Inclusivity ensures that the widest range of local stakeholders as possible are given the opportunity to shape the community benefits package. This means that an engagement strategy needs to be designed around the benefits scheme, and that this approach should be consistent across all groups. In the context of wind power schemes, DECC recommends that the engagement scheme follow issued Best Practice Guidance, a model which could be adapted for use in the GDF project.

The benefits scheme should be fair, and incorporate good governance principles. To an extent, fairness is a function of inclusivity, transparency, and removal of conditionality from contributing to the design of the scheme.

Finally, an unconditional approach to participation in the benefits package must be taken. This means that all members of the affected community should have the right to participate in deciding the shape of the benefits package, whether or not an individual supports the scheme. Individuals who contribute to the formation of the package must not be precluded from expressing a view on the development as a result of participation.

A community benefit fund offers “a rare opportunity for the local community to access resources, including long-term, reliable and flexible funding to directly enhance their local economy, society and environment.” (DECC 2014b).

This approach is thought to align well with the annual mode of payment being proposed for the GDF siting, and there is no obvious reason why the fund should have an annual fixed income. It could be a fund that has a variable income, subject to the annual maximum contribution, paid subject to approved projects that go through a due diligence process (OECD/NEA, 2010), although it is expected that the community will determine what the money in the fund can be used for (DECC, 2014b).

Unlike the GDF siting decision, the funding of community benefits for wind development is paid for by the onshore wind developer. This is typically in the form of an annual contribution, and it results in a community benefit fund.

The view from the United States is that Community Benefit Agreement is a documented set of “commitments that a private developer has made to win political support from the residents of a development area and others claiming a stake in its future”. This appears to closely align with the purposes of the community investment envisaged in the 2014 White Paper.

In the lengthy period leading up to the siting decision, there are other community benefits that could be funded from the community investment, some of these were identified in the 2008 White Paper, including, improved local training and skills development, improved public services, infrastructure or recreational facilities.

3.3 Other Examples of Community Investment Funds

Perhaps the oldest example of a community benefit fund in the UK is the Shetland Charitable Trust that was established in 1976 when the Sullem Voe Terminal opened and “money was paid by the Oil Industry to Shetland as a way of compensating the people for the inconvenience of having the terminal based in Shetland” (SCT, 2016).

3.4 Copeland Community Fund

This fund was established in October 2010 to recognise the role of the community in hosting the Drigg Low Level Waste Repository and since then over 195 projects in Copeland have been sponsored (CCF, 2015). The Operational Strategy of the fund is to “build capacity with local groups and community based projects” under a range of headings, including: Arts, Culture & Sports; Improvements to the Built Environment; Open Spaces; Training, Employment & Social Enterprise (CCF, 2016a).

An Evaluation of Copeland Community Fund Grants Programme was carried out by Rocket Science and Rose Regeneration (RS, 2013) and at that time “the balance of grants awarded... had a social focus. The Energy Act 2004, requires the Nuclear Decommissioning Authority (NDA) to giving “encouragement and other support to activities that benefit the social or economic life of communities living near designated installations” (s 7).

Rocket Science reported that 245 applications for grants were received by the fund to March 2013, with 128 grants being approved, having a median value of £25,000 and a total value of £7,933,744. 117 applications were declined.

3.5 Summary

Communities which host a GDF can expect to receive substantial community benefits arising from the project, including the indirect benefits associated with such a large infrastructure project, such as regeneration and job creation, as well as the more direct benefits package of investment that will be attached to the scheme. There are existing examples of community benefits packages in relation to other infrastructure projects, and DECC has issued Best Practice Guidance on the creation and governance of community benefits packages (*for onshore wind projects*).

The benefits package should be subject to principles of good governance, with the allocation of funds from the package being determined in a democratic, community-led manner. This will require a transparent, fair and inclusive process in which

members can shape the package, accepting constructive input from all members of the community. The ability to contribute to the formation of the benefits package should not be dependent on any factor other than membership of the host community, and the benefits package should be defined in a timely manner to allow for proper community input into the scheme.

Chapter 4

Test of Public Support

4.0 Introduction

The 2014 White Paper makes it clear that “the final decision to apply for development consent and regulatory approvals for a GDF will not be taken until, and unless, there is a positive test of public support for a GDF at the site in question.

We are dealing here with the mechanism of consent, and language of the 2014 White Paper – test of public support - is not found in the general literature. It is abbreviated here to TPS.

4.1 Public Participation and Testing Public Support

Public participation is vital to the success of a project and the speed at which it is implemented. One factor that may have a significant effect on public support is the fact that consultation processes often follow core decision-making processes, which can prevent the feeling of community ownership of a project. The argument goes that following identification of a problem, a solution is presented and the problem is then redesigned around the solution; as a result, public participation is limited by the failure to include the public in determining the solution to a problem (Sturup, 2016). In the most extreme cases, this can lead to the possibility that projects solve a problem that was promoted or invented to justify the project (Priemus *et al.*, 2008, Chapter 6).

In the case of the GDF, there is clearly a problem that requires a solution, and extensive contributions have been made by experts in order to determine that best solution. However, in further stages of the project, it is necessary to give the public considerable input from the beginning in order to allow the community to further shape the solution and thus take ownership of it. This is an essential component of the development process, as it has been postulated that NIMBYism may arise from an inadequate consultation process that fails to engage the public (Woodcock *et al.*, 2011 in Sturup, 2016).

There are a number of participatory mechanisms which may be involved in the GDF siting process, and these reflect different levels of empowerment for citizens on the participatory process. One of the first widely known analyses on citizen participation viewed different tiers of engagement, ranging from nonparticipation (i.e. manipulation of citizenry to achieve desired goals) to full citizen control of a decision-making process (Arnstein, 1969). The three methods of participation which can be used to produce a test of public support are consultation, surveys, and referendums.

4.2 Consultation

Consultation is a participatory method that allows citizens to input their views into a decision-making process, although ultimately it may be viewed as a token participatory procedure as it does not empower those who choose to participate as they do not actually actively have control over decision-making (Arnstein, 1969).

Consultative structures take a number of forms, ranging from open consultations such as public hearings and submission of written comments and opinions in which all citizens have the ability to participate to various manifestations of a 'community panel' structure, in which representatives for the community are chosen, and can input views into the decision-making process (Reddel & Woolcock, 2004).

Consultation in the form of public hearings, reviews, and written comment procedures has received a great deal of criticism as a participatory procedure as it is not viewed as being representative of the citizenry (Rowe & Frewer, 2000) and may not satisfy the public that their input is taken into consideration (Innes & Booher, 2004).

Another source of criticism in open consultation is the assumption that the public will actively participate in the process given the opportunity (Shiple, 2002), and thus consultation needs to be underpinned by a more cohesive public engagement strategy in order to be effective, and needs to be retrospectively analysed to judge the efficacy of the consultation process (Shiple & Utz, 2012). This point is especially pertinent given that the sample of the public that is represented in current consultation practices is essentially either self-selected in cases where individuals choose to submit responses to an open consultation, or self-selected and subsequently appointed under systems in which individuals choose to put themselves forward for panel membership, and of these a number are selected to participate (Fishkin, 2009); it is possible that the self-selection process may play a role in skewing public representation.

4.3 Surveys

Surveys are another method for testing levels of public engagement, participation, and support regarding planning or legislation. They may take the form of fairly rudimentary opinion polls consisting of closed questions which require little of a participant's time, to more detailed, open-ended surveys which require more substantial input from the participant.

Surveys can be an attractive proposition for measuring public opinion due to the possibility of being highly representative of the target audience, and the relative ease of determining response rates and thus the level of participation (Rowe & Frewer, 2000). This being said, representativeness can be determined by the manner in which surveys are disseminated: for example, in the public debate on the use of GM crops in Britain, surveys completed by debate attendees produced a negatively skewed perception of GM technologies as the debates tended to attract individuals with a strong opposition to GM (Pidgeon *et al.*, 2005). An additional benefit to surveying a population is the fact that survey questions can be piloted and pretested to evaluate their appropriacy (Presser *et al.*, 2004).

One problem with the use of surveys as a participatory mechanism comes back to the fact that surveys do not constitute dialogue: closed-ended questionnaires do not actually give participants any input into the planning or decision making processes, while there is no guarantee that feedback from open-ended surveys will be taken into account. However, as a test of public support for a project, surveys do allow public mood to be gauged, especially when measures are taken to ensure higher response rates are achieved (Kaplowitz, Hadlock & Levine, 2004). Surveys can also be conducted across a range of media, including telephone, mail, and online responses (Baruch & Holtom, 2008), allowing a wide range of local stakeholders to be included. One further issue that needs to be considered is the response rate to surveys. This has been found to be dependent on the length of the survey, the time required to complete it, and a range of societal- and respondent-specific factors (Fan & Yan, 2010).

4.4 Referendums

For the GDF, a referendum is one of the possible mechanisms that could be chosen for the test of public support although it not clear that this method of testing of public support will serve the siting process well. The use of a referendum has the advantage of being visible and decisive (Björklund, 2007).

The UK does not have a history of using referendums for public decision making. There have only been two national referendums in the UK, the first referendum in 1975 on the UK's continued membership of the European Union (at that time called the European Community) and the second in May 2011 on whether to change the voting system for electing MPs to the House of Commons. There have been nine significant regional referendums, mostly on the subject of devolution, the most

recent in September 2014, when the Scottish referendum was held on whether Scotland should be an independent country. (UK Parliament, 2016)¹.

Referendums are widely described in the literature as direct democracy and Butler and Ranney (1978) discuss why referendums are held², and Leduc (2002) sets out a framework that classifies referendums explaining the most common cases including the 'specific issue referendum' of the type envisaged for the GDF siting.

Tonsgaard (1992) identifies the extent to which the basic values and beliefs of the participants are linked to a referendum issue and this provides "a key starting point for understanding the empirical reality of referendum voting behaviour" (Leduc, 2002). John Zaller (1992) develops this further, with a model of how public opinion is formed, which Leduc sees as being "particularly well suited to the study of... voting behaviour in referendums." For Zaller, the process of opinion formation results from the interaction of information and predisposition and "people rarely have fixed attitudes on specific issues" constructing 'preference statements' based on the use of ideas that are "the most immediately salient to them". This serves to underline the importance of the preliminary process of education and familiarisation and the need for it to be as wide as possible both in terms of geographic and demographic coverage (discussed in Chapter 2).

The specific issue being decided "may be entirely new and unfamiliar to many voters". This can result "in a 'cue-taking' process specific to the campaign itself" (Leduc, 2006). Cue taking is open to the influence of interests on either side of the referendum question, and this means that "voting behaviour in referendums often exhibits greater volatility than is found in elections". The whole process can be seen as a learning process with different actors "adopting different methods of controlling and neutralising referendum challenges" (Uleri, 2002). Campaign learning is explored more recently by Whiteley, *et al.* (2011) who develop four alternative models designated as the 'cost-benefit', 'cognitive engagement', 'heuristics' and 'mobilisation' models. This is thought to be worthy of further examination when constructing an engagement strategy.

This strand of the literature refers to referendum campaigns, where the referendum itself is usually on a short timescale, but the run up to any TPS for the GDF will be

¹ Contrast this with Italy where 53 issues were put before the electorate between 1970 and 2000 (Uleri, 2002). Switzerland might be the only county that regularly has national referendums.

² A referendum is usually held "because the constitution demands a referendum... or because a certain number of voters have a constitutional right to demand a referendum" as is the case in Switzerland and California (Butler and Ranney (1978).

the outcome of several years' preparation, which is unusually long³ and does give the opportunity to build solid support for the GDF. The challenge will be how to engage with the defined communities, developing their knowledge in a broad and comprehensive way.

A referendum will typically have some qualifying rules, for example a quorum representing the minimum number of voters required for validity, often known as a turn-out requirement, in some cases laid down in the national constitution. The turn-out requirement must be used with care⁴, because opponents to a particular referendum have often found it easier to canvass for abstention – effectively demobilising voters – rather than to worry about the vote itself (Uleri, 2002). This will depend on the framing of the referendum question and the outcome if the referendum is not quorate. Framing of the referendum question is key, but it is not considered in this short review.

The most volatile referendum campaigns will be those in which there is little “partisan...or ideological basis on which voters might tend to form an opinion easily” and in this case, the “decision becomes highly unpredictable” (Leduc, 2002). Suiter and Reidy (2015) make an analysis of referendums where the outcome is seen as volatile, demonstrating that “voters relied significantly on... shortcuts emanating from the campaign and to a lesser extent on either media campaigns or rational knowledge”. This might be seen to be the case for GDF siting, and one of the main risks is that a referendum may act as “a lightning rod for dissent” (Björklund, 2007).

This will be a local referendum, which in itself leads to another problem that will apply to any TPS that is considered. This is the difficulty of community definition considered before, described in political philosophy as the ‘boundary’ or ‘demos’ problem, that is “the question of ‘who’ constitutes the polity and is hence legitimately entitled to decide” (Mendez & Germann, 2016).

In the UK there is now considerable experience of local referendums, held under the neighbourhood planning provisions of the Localism Act 2011. Neighbourhood development plans under the Act “do not take effect unless there is a majority of support in a referendum of the neighbourhood” (DCLG, 2016) and over 100 local referendums have been held (Locality, 2015).

³ This ignores the long gestation period before a referendum is agreed which, in the case of sovereignty referendums, can be decades.

⁴ This requirement was absent from the September 2014 Scottish referendum which gave rise to some criticism and analysis (see for example Tierney, 2013).

The regulations for holding a referendum under the Localism act have evolved to reflect experience, and since April 2013 now include a provision for Businesses to be included in the referendum process: this once again brings us back to the problem of defining the community⁵ (PAS, 2015). This pool of experience needs further investigation and analysis if a referendum is to be considered as the mechanism for the TPS.

A non-binding referendum raises echoes of the past, where doubts were expressed by the local community about exercise of the right of withdrawal. The Right of Withdrawal (RoW) set out in the 2014 White Paper was also present in the 2008 White Paper. The Cumbria Partnership that was formed to explore siting of the GDF considered the right of withdrawal which proved to be one of the more contentious issues with two key problems identified. The first was the problem that the RoW was not given legal status, but was simply a Government policy commitment. The RoW was established as Government *policy* in the 2008 *White Paper* up until when “construction is due to start.” The right was not codified in law. This gave rise to a concern that the RoW might not actually be exercisable as the siting decision progressed, and especially once deep boreholes were started. The Cumbria Partnership pursued this matter and received a letter of assurance from DECC’s Minister of State (DECC, 2011).

This led to a second closely related problem, a lack of trust, which was discussed at some length in the final report. The Cumbria Partnership recognised that “trust cannot be built through written words alone, but by demonstration, reciprocal action and mutual respect across a significant period of time”. (WCMWRSP, 2012). There is a history of policy change through the world, thought to be inevitable when the timescales and the complexity of the problem are taken into account, but it makes the job of gaining consent harder. When Eurajoki, the current site for the Finish repository was chosen for a nuclear power station in 1973, the local community accepted the reactor “on the condition that SNF would not be buried in the nearby bedrock” (NWTRB, 2015a)⁶.

⁵ For example, under the Neighbourhood Planning (Referendums) Regulations 2012, as amended, there is provision for an independent examiner to be appointed to consider whether the area for any referendum should extend beyond the immediate neighbourhood.

⁶ In Sweden a non-binding national referendum was held in 1980, with the decision being made that all nuclear power would be phased out by 2010. Two reversals of this referendum decision have taken place since then, the first in 1997, to extend the date beyond 2010, and in 2010 when a parliamentary decision was taken allowing nuclear new build, with the replacement of nuclear power stations on existing sites (NWTRB, 2015a).

This problem is described as “withholding consent but to no avail” by the US Nuclear Waste Technical Review Board (NWTRB, 2015a).

It can be seen that referendums are perhaps the most democratic way to test public support, as they are open to the vast majority of respondents of voting age, are conducted at a single point in time, and, assuming that the outcome is honoured, directly empower members of the public who choose to participate (Arnstein, 1969; Rowe & Frewer, 2000). The decision reached by referendum is generally final, although the referendum may be repeated again further in the future.

In terms of nuclear waste disposal facilities, one discussion based around the use of a referendum as the test of public support for siting a facility was conducted in Germany by the AkEnd committee (AkEnd, 2002). In this scenario, the public took part in a referendum, the result of which was submitted to local councils as a recommendation for their approval (or disapproval) in participation in the siting process. Other concerns highlighted were the potential for a siting process to be derailed by irrelevant arguments put forward by opponents to the process swaying public opinion, and the scenario where communities veto development following the investment of billions of euros in suitability tests in underground laboratories.

Referendums have previously been used as a method of gauging public opinion in the siting of nuclear waste repositories in several countries. The results of these referendums are outlined in the table below.

Table 4.1: Referendums held to test public support for nuclear waste disposal

Municipality, Country	Result	Voter Turnout	% Supported Decision
Beauraing, Belgium	Refused	Unknown	95%
Bátaapáti, Hungary	Approved	75%	95%
Storuman, Sweden	Refused	Unknown	71%
Mala, Sweden	Refused	Unknown	54%
Gyeongju, South Korea ⁷	Approved	71%	89.5%
Gunsan, South Korea ¹	Approved	Unknown, >33%	84.4%
Yeongdeok, South Korea ¹	Approved	Unknown, >33%	79.3%
Pohang, South Korea ¹	Approved	Unknown, >33%	67.5%

Table 4.1: Compiled from OECD/NEA, (2010).

⁷ Of the four South Korean municipalities, only Gyeongju actually hosted a waste repository due to the fact that all four municipalities were participating in the same siting process, with the final selection being based on the site with the greatest level of public support.

Table 4.1 shows the outcomes of various referendums held to approve or refuse a nuclear waste disposal facility in the municipality.

As can be seen from the table above, previous referendums on hosting nuclear waste disposal facilities tend to be decisive, with only Mala, Sweden, producing less than a two-thirds majority. The siting process in South Korea presents an interesting case study as all four municipalities were competing with one another to host the repository. This had the effect of mobilising high levels of support very rapidly and arguably improved the democratic accountability of the process as opposition to siting influenced the final outcome of the decision even in the case of majority support due to the fact that the government was using the volume of support to choose a site (OECD, 2010).

4.5 York Potash

York Potash is a good example of a project which has received high levels of public support following extensive community engagement in the early phases of the project. In light of the original intention to submit a planning application in 2013, the company began their engagement process in 2011. Despite the withdrawal of the 2013 planning application, the company continued the engagement process throughout 2014 (NYMPA, 2014). A variety of methods were used, primarily based around meetings with various stakeholder groups, as well as regular updates for local parish and town councils in order to disseminate information to the local communities. Further engagement methods included hosting public exhibitions, as well as helping to set up programmes with local schools to promote the skills required by the project and to promote future employment opportunities associated with the project (York Potash Ltd., 2015).

The community benefits associated with York Potash operations have played a central role in project development. At a local level, the company has stated that it expects to create over 2,000 jobs, and declared the intention that at least 80% of these should recruit from local communities (NYMPA, 2015). In addition, as part of the engagement strategy, the company is working in partnership with local schools in order to ensure that the appropriate skillsets are promoted in order to ensure that it is possible to recruit locally. In terms of monetary compensation, York Potash intends to set up a charitable fund which will receive 0.5% of income generated by the project. This is predicted to be as much as £6million per year under planned production targets (NYMPA, 2014).

The test of public support for the project was carried out by consultation which received 919 third party responses, as well as a survey which received 1,741 responses. Public support to the consultation in the local area was overwhelmingly positive: 92.1% of responses favoured development, with only 7.5% objecting and 0.4% remaining neutral (NYMPA, 2015). Interestingly, much of the opposition to the project was received from third sector organisations, such as the Campaign for National Parks, the Campaign to Protect Rural England, and the Yorkshire Wildlife Trust (NYMPA, 2014).

4.6 Summary

The government is committed to a voluntarist approach throughout the siting process, and this will include testing public support before finalising plans to develop a GDF in a community. This test will come at the end of a significant public engagement and participation exercise, and therefore extends beyond the public engagement definition of consultative processes outlined in chapter 2. The three main methods by which the public show of support can be conducted are consultations, such as holding public hearings, written input, and reviews; surveys; and referendums.

Consultations have been criticised as not being truly representative of public opinion due to the fact that participation may prompt a high degree of self-selection, although they do deliver a strong mechanism for enabling dialogue. Surveys may gain a much better insight into the mood of the public at large, but must not be relied on as a main participatory mechanism due to the fact that they do not constitute an acceptable level of dialogue and thus may fail to empower citizens if their opportunity for discussion or response is limited. Finally, a referendum may be conducted at the end of a longer and deeper public engagement and participation strategy. Referendums offer the opportunity to genuinely empower the community and provide significant leverage to the community as a whole in discussions with siting authorities. One issue with referendums is that once a referendum has been held, the outcome is permanent and binding, thus entailing a level of risk for the siting authorities.

Appendix

Voluntarist approaches around the world

A1. Introduction

This Appendix summarises the approach to voluntarism in other countries. It draws on a number of sources, but it begins from the work of the OECD (2010) and summarises the more up-to-date analysis from the UK (NDA, 2013) and the US Nuclear Waste Technical Review Board (NWTRB, 2015).

The focus is on the process of voluntarism in site selection and the nature of any community investments and benefits. Countries are listed here in alphabetical order. The term GDF is used to refer to any deep-mined sub-surface storage facility. High level waste is used to refer to all types of higher activity waste, including spent nuclear fuel (SNF).

Three countries have selected a site for the storage of high level waste (HLW), Finland, Sweden and France. In Finland there is a multi-step process and regulatory approval was given in 2015 for the first step in the construction of a repository in Olkiluoto. France is seeking a licence from the regulator to build a repository in Bure, and Sweden has submitted an application for regulatory approval to build a repository in Östhammar.

Nine countries are actively engaged the process of site selection for a GDF that will store high level radioactive waste: Canada, China, Czech Republic, Germany, India, Japan, Russia, Switzerland and the United States.

A further six countries have decided to build a GDF as the preferred solution for waste management but have not commenced the siting process: Mexico, Netherlands, Italy, Ukraine, Korea and Brazil ¹. Another six countries have made no decision: Australia, Argentina, Belgium, Spain, Pakistan and South Africa.

The detailed discussion below does not cover every country, and includes countries where a voluntarist approach has been taken to the siting of radioactive storage facilities, including low level waste facilities. Whilst not facing the same level of difficulty, low level waste facilities are seen as a close analogue and worthy of consideration.

¹ Some of these countries have attempted to select a site and have been unsuccessful.

A2. Belgium

Belgium has made no official decision about the storage of high level waste, but has been actively engaged in siting for a low-level and short-lived intermediate level radioactive waste (LILW) repository since 1994. A final decision on the host community was made in June 2006.

The Belgian plan is a good example of a process which evolved over time in order to enhance citizen participation in both the siting process and the associated socio-economic investment package.

The initial plan devised by the Belgian radioactive waste management organisation was based around an objective siting process based on technical suitability in order to identify sites from a list of potential candidates. This approach proved unsuccessful due to the major problems caused within potential host communities, lending further credence to the notion that citizen involvement is not just desirable, but rather central to the process.

In Belgium, a small number of municipalities expressed interest in discussing the possibility of hosting a LILW, and all of these already hosted some form of nuclear activity. An early attempt by the municipality of Beauraing to bid for the facility was unsuccessful following a local referendum which saw 95% of voters oppose the siting, leading to early withdrawal from the process. This is perhaps a reflection of an attempt to rapidly gain agreement rather than a more concerted and informed campaign to make the case for hosting a facility: offering a project of unknown consequences to the public may be perceived as a risk of unknown magnitude, and therefore less desirable than maintaining the status quo (Gregory *et al.*, 1991).

Of the 589 municipalities in Belgium, all of which were invited to participate in the siting process, four responded positively to the government's invitation. This resulted in the formation of three partnerships, in which members of the public, local organisations, local businesses, and local elected officials were provided with a platform for input into the technical elements of the project, and in community benefits. Throughout this process, municipal councils reserved the right to support development of the repository, or to reject it. One significant aspect in this right to veto was that there was no legal basis for a council to veto the project unilaterally; rather it represented a good degree of trust between the council and the waste management organisation. This structured and participatory community partnership and trusting relationship between the host communities and the developer appears to have been effective: all three partnerships recommended

development of a LILW repository, with three out of the four municipal councils involved supporting the proposals.

Following these successes, the national government eventually chose the municipality of Dessel for siting, although given the close proximity (and therefore likely impact) of a rejected municipality (Mol), it was decided that the Mol partnership (named STORA) would continue to play an active role in the development process. Although no direct benefits package had been received by the municipality by 2010 (this needs updating), the partnership process adopted in Belgium provides a clear model of a working process which empowered the local community, the local government, and gave real input into the siting process, as well as the site development process.

A3. Canada

Canada currently has two siting processes underway: one relating to low level waste (LLW) generated from uranium processing, with the other being a LILW facility for waste generated from power plant operation.

In 2010 the Canadian Nuclear Waste Management Organisation (NWMO) initiated a site selection process for Canada's GDF in an "informed and willing host community". This invited expressions of interest and the site selection process was open to all communities interested in learning more about Canada's plans. Twenty-one communities came forward and "actively engaged" in the process and in September 2012, the NWMO suspended new expressions of interest in order to "focus its efforts on conducting the detailed studies required in communities that formally expressed an interest" (NWMO, 2012). Out of the 21 communities, by the end of 2014, ten were dropped from further study and ten continued to be evaluated and the outcome for one had yet to be decided (NWTRB, 2015a)

The low-level waste process in Canada highlights again the effectiveness of local communities in developing solutions to problems associated with repository siting, and the role that local interests can play in shaping repository development.

Following the failure of an earlier siting process and the lack of a long-term solution to the issue of LLW, the three municipalities, Port Hope, The Township of Hope, and Clarington (in 2001, Port Hope and the Township of Hope amalgamated to form the municipality of Port Hope) currently hosting LLW came forward with their own proposals to develop local waste repositories. In these cases, the municipal councils again hold significant power over the development process of the waste repository, reserving the right at any time to veto (and thus derail) the development process;

however, unlike in Belgium, the Canadian municipal councils held the legal right to exercise their power of veto.

The next stage in the development process was to conduct appropriate environmental assessments for the long-term storage plans developed by the municipalities, which would then allow the national government to either approve or reject the proposals put forward. In March 2007, following a satisfactory environmental assessment, the national government approved the plans to develop the Port Hope facility, with the municipal council waiving its right to veto (and thus allowing development to commence) in April 2007.

In the LLW development process, each municipality formed local citizens' committees, which were funded by the government, in order to develop local solutions to provide long-term LLW storage. Following the development of plans by the committees, which were informed by consultants chosen by the committees and evaluated according to their beliefs about community needs, the preferred plan of each committee was endorsed by the municipal council. Giving the community representation group the power and freedom to hire a consultant (rather than simply being assigned a developer with whom to work), and entrusting the group with making the decision about the waste management solution to be deployed, gives an insight into a sophisticated and pragmatic approach. It allowed communities to reach the best solution according to their own perception of the problem, thus giving scope to reduce the problems inherent in complex siting processes by conferring ownership of the project to the host community. In tandem with this strategy, the low-level radioactive waste management office (LLRWMO), which oversees the LLW projects, provides regular publications in host communities to maintain the flow of information for citizenry in host communities, including quarterly bulletins and a newspaper column, as well as having provided information sessions and workshops in order to allow the public a platform for discussion and input into the development process. LLRWMO also meets with municipal councils every 6 weeks to maintain open communication with local government.

The LILW repository is a project being developed in Kincardine, which came forward in 2001 as a potential site for the long-term storage of LILW arising from Ontario Power Generation's (OPG) nuclear operations. Again, a contributory factor in the expression of interest in hosting a repository stems from the fact that Kincardine is currently the site of interim waste storage, which conforms to the view that familiarity with the nature of the risk involved in nuclear waste storage can alleviate some of the concerns associated with hosting a repository (see for example Kari, Kojo, and Litmanen, 2010 or Pidgeon and Demski, 2012). This process led to the Kincardine

Council officially endorsing development of a deep geological repository in April 2004, and a subsequent hosting agreement signed between OPG in Kincardine municipal council in October 2004. As part of this agreement, a community consultation and demonstration of support was given a deadline for February 2005: the participation rate in a telephone poll used to demonstrate support among all citizens aged 18 and over was 72%, with 60% of respondents supporting the development of the facility, compared to only 22% opposing development, with the remaining 18% being unsure or neutral. The facility still requires further regulatory approvals. The community package associated with the LILW repository is extensive, with CAN\$35 million set to be received over the next 30 years.

A4. Czech Republic

The Czech Republic aims to begin operation of a geological disposal facility by 2065 to accommodate waste drawn from two nuclear power plants. The approach adopted by the Czech government with regards to GDF siting has been dogged by issues which have arisen through a poor community participation strategy, with plans for GDF siting meeting resistance in all 6 areas where the geology was deemed to be suitable for the site. Communities situated in the 6 areas identified have demanded stronger input into the siting process and, following referendums in some communities to demonstrably oppose GDF siting, have lobbied elected representatives to oppose further exploration of potential sites via any legal means available. These communities are extremely resistant to opening dialogue with the government due to the fact that they view the referendums as clear, democratic evidence of opposition to GDF siting in their respective areas. This has forced the government to adopt a stance which will seek the consent of municipalities in which a GDF may be sited, although the municipal counties will not have the right to veto a development.

The Czech communication campaign is based mainly around informing communities of what a GDF would mean for their area. In several villages, the radioactive waste authority has assisted in renovating and reopening libraries and providing Internet access, although this method has fallen out of favour as a result of other government initiatives. Another strategy is to inform influential community members (such as teachers and elected officials) about the implications of becoming a host community, with site visits arranged to existing LLW facilities and interim storage facilities in Czech Republic, as well as visiting host communities and receiving technical tours of radioactive waste repositories in other European countries.

A5. Finland

Finland is currently the only country to have licensed and approved the construction of a GDF in Olkiluoto. The construction licence was granted in November 2015 and construction is due to start in 2016 with a view to begin operating by 2023.

Finland amended its nuclear energy act to prevent the import or export of nuclear waste, meaning that two nuclear operators in Finland had no choice but to establish a company named Posiva, specifically for the purpose of disposing of nuclear waste. The process for repository siting began as early as 1983, when a list of 101 potential sites was drawn up, resulting in 5 volunteer sites being identified by 1985, upon which more detailed investigations were carried out with interim site reports being produced in 1996. The Finnish process also highlights another example of a community named Loviisa, in which waste was already stored, voluntarily entering the siting process.

In Finland, an approval system known as the Decision in Principle (DiP) process is used, in which the municipal council and regulator first have to approve the safety case presented by the developer before the national government can make any siting decisions. The municipal councils in Finland had the right to withdraw from the siting process at any point by vetoing development of a local repository. The Eurajoki region (in which Olkiluoto is sited) reached a DiP in 2000, with this being approved by the government and ratified by parliament in 2001.

Part of the information and awareness raising process in Finland consisted of forming working groups, including members of Posiva and of the municipal and regional officials in which the repository could be sited. These groups also included an environmental impact assessment contact who was appointed independently of the two major stakeholder parties.

The GDF siting process in Finland did not include any direct incentives or compensation from the government. Rather, the facility developer must pay local property tax at the maximum rate of 2.5%, which goes directly to the municipality. While this has the benefit of removing any kind of restrictions on use of the money, it also means that one group of stakeholders has total control over the way that money arising from facility siting is spent. Another benefit received in Olkiluoto was a loan given by Posiva for the construction of a new old people's home, with the original home being restored using money provided by Posiva, the municipality and the EU. Part of the original building is currently being used by Posiva as offices, with the remainder being a public resource. Posiva has agreed to rent the building for 40 years, and to cover the whole rent for the first 20.

A6. France

France has a great deal of experience with the selection of voluntary industrial sites, including nuclear power plants and radioactive waste facilities. The body currently responsible for radioactive waste management is called ANDRA. While France has yet to finalise plans for a HLW repository, it is currently conducting tests in underground laboratories to inform its disposal strategy.

A low level and short-lived intermediate level radioactive near-surface repository was built at Centre de l'Aube following a selection process involving five potential sites. The rapidity of this siting process is somewhat impressive in comparison to the drawn-out processes conducted in other countries: the search for a site began in 1985, with the facility at Centre de l'Aube becoming operational in 1992.

High level waste and long-lived intermediate level waste has posed a more significant challenge. Following the failure of an initial programme to select a site based mainly on geological suitability, the passage of the Waste Act in 1991 reinvigorated investigation into deep site storage. The policy shows a cautious yet pragmatic approach is being adopted: following the creation of a number of underground research laboratories (URLs) in a R&D programme lasting 15 years, the French parliament was due to select one of the URLs as the site for a GDF. The Waste Act also mandated a parallel R&D programme in order to investigate long-term surface storage techniques. The law also mandated consultation of the public and of local officials at the sites under investigation for a URL, followed by a vote from local (or regional) government in order to gain approval for URL development. This process led to 30 administrative areas volunteering for hosting a URL, of which 3 were ultimately chosen based on societal feasibility, determined using a measure of "sustainable consensus" among local governance structures.

Following the 15 year R&D programme, the French government revisited the issue of radioactive waste in 2006. The next stage of the law provided for the continuation of the research project, including the reversible storage of HLW in deep geological formations at the existing URLs in order to prepare for an application for GDF siting by 2015. The site, upon approval, would be operational by 2025. There is provision for the construction of further interim storage capacity to meet national needs by 2015.

In terms of wider engagement, a local information and oversight committee (CLIS) was set up in Bure in the Champagne-Ardenne region of eastern France, one of the URL sites under investigation. The CLIS has over 90 members, including individuals, all tiers of government, local businesses, environmental groups,

ANDRA, and other stakeholder groups. The CLIS meets 3-4 times a year, with a 16 member board meeting monthly. CLIS must be consulted on all operations-related matters which may affect the environment or the region, and has the power to commission independent experts. CLIS receives substantial funding of about €300,000 per year. An application for a deep geological repository construction licence was submitted in 2015.

In terms of community benefits, money is raised from the nuclear facilities through an economic development tax and a technology diffusion tax. This money is used to fund public interest groups (GIPs), which spend the money to improve the local economy and employment. The GIPs received about €9 million per year between 1999 and 2006. This money cannot be spent freely and is subject to a number of pieces of legislation, including those from the EC rules on state aid, and the Amsterdam Treaty which covers the injection of public money into private firms. In addition, the GIP can only allocate 80% of a project's budget, with the remaining 20% coming from a higher level of state: this also poses barriers to the way in which money arising from hosting a URL can be spent. In 2006, legislation came in allocating €20 million of the tax revenue (14% of that generated) to communities within 10km of a URL to spend without restriction. In the period from 2007 to 2015, each GIP received €20 million while the government determined the most suitable URL for conversion into a GDF.

A7. Hungary

The majority of radioactive waste from Hungary is produced by the Paks nuclear power plant, although further waste is contributed from 2,000 research facilities, and two research and training reactors. Early Hungarian attempts to find a long-term disposal site for LILW beginning in the late 1980s were unsuccessful as a result of a technical approach used for siting the facility. Any proposed sites were vehemently contested by local communities, and by 1993 the project was abandoned in favour of a new approach to facility siting which took into account the level of acceptance by local communities. Added to this strategy were financial incentives and public information strategies. As a result, a LILW repository was sited in 2005 in the town of Bataapati. Also beginning in 1993 was the search for a site for long-term storage of HLW, although this is a great deal more complex, and is being conducted in a similar manner to the French process of URL construction.

The siting of the LILW repository in Bataapati began after community leaders contacted Paks power plant, offering the opportunity to explore the local geology provided that the municipality stood to gain from benefits such as employment and

tax revenue. By 2005, a referendum was held in Bábaapáti which approved the LILW repository, with high participation in the referendum (75%) and 95% of those approving siting. This decision was ratified by the Hungarian parliament, and development of the repository began. The council retained the right to veto the siting at any point through the process.

After work commenced on the Bábaapáti siting process, it became apparent that greater public engagement and participation was required to achieve a positive outcome: to this end the Social Control and Information Association (TETT) was founded, including the joint leadership of seven neighbouring communities in the area. The goal was to alleviate the sense of fear associated with the repository and the public opposition to the project. TETT ensured the formation of a committee of three independent scientists, assigned to the project by the Hungarian Academy of Sciences, to provide unbiased technical control of the project, alongside community leaders who were responsible for the economic policy associated with the project. In addition to this, an information strategy has been developed as a means to empower the local community. A monthly television broadcast called TETT News is delivered in these communities and a regional monthly bulletin is disseminated. Further success was seen due to the involvement of local residents in the exploration project, boosting confidence in safety and transparency. Further efforts have demonstrated the ability of the radioactive waste management authority (PURAM) and the local community to solve local problems together, for example the construction of a bypass for heavy vehicles.

Another empowerment strategy utilised in Bábaapáti was the provision of a year-long course that trained residents to scrutinise the safety of the repository. An interesting example of community involvement in the operation safety is that individuals from civil society form a control committee, with the power to randomly test the radiological activity of any waste drums arriving at the facility, providing further reassurance of the satisfactory operation of the facility. In the event of anomalous readings, the national radioactive waste management agency is able to verify the contents of a waste consignment.

Bábaapáti has received a range of benefits as a result of hosting the LILW repository. In terms of social benefits, PURAM has invested in a repository visitors' centre and is developing leisure activities in the surrounding area. The facility has also brought economic benefits to the area. TETT received €0.7 million in assistance in 2005, and €1.5 million in 2006. A legal amendment in 2005 also authorised the use of such assistance to contribute to local infrastructure, rather than simply public communications. Additionally, this amendment strengthened community

protection, stating that house prices must not decrease due to the facility, and that the local environment must not be compromised; in either case, the developer will have to compensate those affected. The facility is also seen as a major source of employment for future generations: TETT advocates skills development and qualifications for local young people in order to ensure that they will be able to work at the facility.

A8. Japan

The Japanese waste management organisation (NUMO) assumed responsibility for developing a GDF in 2000, and initially engaged in a voluntary process to select the site. The process followed is summarised below, but in 2013 the “Japanese Government abandoned the search for a volunteer community.” (NWTRB, 2015a). Under the present siting strategy the Japanese Government will play a “proactive role by nominating ‘scientifically favourable areas’ to assist in resolving the issue of high-level radioactive... in addition to helping the Japanese public as a whole, and regional populations, to understand the geological disposal program” (NWMO, 2015a).

The voluntary process was divided into three stages once a community volunteered, including a literature survey for preliminary selection (for example by ruling out areas with active faults or volcanoes); surface based investigations and drilling; and finally investigation from a URL and repository siting.

NUMO aimed to promote understanding among the Japanese public through a variety of methods. It provides interactive activities and tours of nuclear facilities for residents living in areas which have expressed interest in repository siting. They also utilise mass media in order to engage citizens, and circulate a magazine called NUMO-NOTE. As well as media usage, NUMO also invites residents, experts and opinion leaders to discussions about the importance of the project, as well as responding to all enquiries regarding safety, necessity of final disposal, and the potential for community development.

Once volunteer communities are identified, NUMO begins to take actions to build confidence and positive interaction with communities. These include hosting community events to enhance understanding of final disposal, planning community development to enhance local conditions, provision of information and further round-table discussions to improve awareness.

Hosting a facility brings great socio-economic benefits, predicted for the 60 years it would take to develop the facility: the benefits are predicted to be worth US\$17 billion and require 2,200 workers per year. In addition to this, communities engaging in the siting process can be awarded up to US \$66.7 million in government grants, which is paid out once the literature survey begins. The grants are intended for communication activities, examining regional development, improving local welfare, and promoting local industries. Further activities aimed to provide economic benefits to the region which hosts the GDF include relocating NUMO headquarters to the municipality, using local industries in the construction and operations of the site, as well as employing local workers, and by opening the repository up for visitors, stimulating local tertiary industry.

A9. Republic of Korea

The Republic of Korea has 23 operational nuclear power plants, with plans to build a further five (of which three are already under construction). The national waste management policy was formulated in 1998 and amended in 2004. Amongst the priorities in the policy are safety, direct government control, minimising generation of waste, the “polluter pays principle”, and transparency in the siting process. The policy is subdivided into two sections: an LILW repository and a spent fuel (SF) repository. Korea has a stated preference for a GDF but no siting process is in place, and this report will focus on the LILW site.

Initial plans for a LILW repository were laid down in 1986, and focused on technical considerations of siting a facility. The LILW management plans were widely perceived as a succession of policy failures as a result of the government’s inability to site a facility for almost 20 years, largely due to issues in public perception of radioactive waste, a lack of incentives for hosting a facility, and a lack of trust in the government’s siting process. However, the evolution of the siting policy eventually led to the siting of a facility in Gyeongju, one of four municipalities that volunteered to host the facility and approved siting with 90% support in a local referendum in which 71% of the electorate voted. This overwhelming support was perhaps achieved by a competitive auction between the four potential sites, with the government stating that the site which achieved the highest level of support would host the facility. It is worth noting that Gyeongju already hosts four nuclear power stations, and had been experiencing a steady period of economic decline relative to neighbouring regions. While the municipal councils did not have the right of veto *per se*, the local government bodies voluntarily initiated the siting process and the referendums allowed for full representation of public opinion, effectively giving the

public the right to veto the facility. Furthermore, in order to be deemed legitimate, the referendums required a voter turnout of greater than 33% with a majority in favour of hosting the facility.

The local community in Gyeongju has already influenced the design of the LILW repository. The government explored a number of designs for the facility, and eventually decided on a vault design as this was believed to be the most cost-effective. However, the local community considered a silo-type design to be safer and more secure, and thus pressured the government to adopt such a design, which in due course the government did.

Gyeongju has received significant community benefits as a result of hosting the facility. The community received an initial one-off payment of US \$300 million. This is further compounded by disposal fees, which are estimated to amount to US \$8.5 million per year and are expected to last for up to 50 years (i.e. the operational lifetime during which the facility receives waste). Support funds are to be used for community gain, including uses such as local development; tourism promotion; the expansion of cultural facilities; projects that enhance income, livelihood, environment and welfare; and any other projects for local development and the improvement of local living standards. The disposal fees are to be used to provide local subsidies for services including electricity; public communication; education; and environmental or safety management; and for the promotion of industries such as farming; fishery; and tourism. Further benefits expected for the host community include the preferential employment of local residents through the construction and operation of the facility, preferentially awarding contracts worth less than US \$2.7 million to local businesses, and an increased national subsidy for approved local projects.

A10. Spain

The radioactive waste management agency in Spain is known as ENRESA, and was established in 1984. It currently operates a LILW disposal facility in El Cabril, and is also responsible for decommissioning nuclear power plants, as well as siting a temporary SF waste storage facility (CSF). The siting of this facility is to be based on a voluntary approach, in which communities would hold a veto over the process. The point in the process at which the veto expires is currently undetermined. It is mandatory under Spanish law for both operational and decommissioning nuclear power plants to establish an information committee, and this principle is also envisaged for waste storage facilities.

A number of social benefits have been envisaged as a result of hosting a CSF, although these are not legally mandated. Firstly, ENRESA plan to make the CSF the centre of a broader strategy designed to invigorate research and business in the host community by making it an integral part of a technology and business park, and this technology and business centre would likely see €50 million invested in the region, with associated positive impacts for local businesses in a variety of fields, such as manufacturing and transport. This would be centred on generating intellectual property and resultant business in the field of radioactive waste management. The facility is expected to require €540 million of investment, of which 25% is likely to be spent on civil works, thus leading to improvement of local infrastructure.

On top of these indirect economic benefits arising from facility construction, municipalities would also see a direct economic package which is legally provided via the Fund for Nuclear Waste. The amount of money provided is variable, depending on factors such as the amount of waste handled, the distance from the facility, and the population of the municipality. While some of this money is required to be spent on community empowerment in decision-making concerning the waste facility, ENRESA has conducted research that shows that this funding also goes to improving the standard of local communities, being spent on projects such as educational and cultural facilities such as schools, music schools, nurseries, and sports facilities, as well as the provision of local services such as road surfacing, street lighting, urban development, and green zones. The effectiveness of spending can be increased as investment in such community infrastructure may be compounded by government subsidies.

A11. Sweden

At present there are two main bodies relevant to the Swedish nuclear waste management programme: the Swedish Nuclear Fuel and Waste Management Company (SKB) and the main regulatory body, the Swedish Radiation Safety Authority (SSM). The SSM was formed in 2008 when the two precursor organisations, the Swedish Nuclear Power Inspectorate (SKI); and the Swedish Radiation Protection Authority (SSI), were merged. The SKB is responsible for siting a GDF for SF using a voluntary siting process which began in the early 1990s. The process began with eight sites initially, from which two were selected for further investigations.

According to Swedish law, municipalities have the power to veto a development if it is considered environmentally unacceptable. However, in the case of siting nuclear waste storage facilities, this veto can be overridden by the national government,

except in the case that an alternative site is available in a different municipality which is more willing to accept the facility. Overriding a veto in this manner would require an appeal on the part of SKB to the national government, although SKB has stated that they would not do this as it is in contradiction to the voluntarist approach that has been adopted.

In October 1992, the 286 municipalities in Sweden were invited to approach the SKB to take part in feasibility studies in order to identify suitable areas for a waste repository. The invitation stressed that volunteering to take part in the studies was not tantamount to an obligation to host a repository, and it also informed the municipalities of their right to withdraw from the siting process. This represented a new approach to GDF siting, which had previously focused on geology as the overriding factor rather than voluntary participation.

The feasibility studies aimed to collate a wide variety of information, as opposed to conducting a great deal of new research, in order to identify suitable sites, and extended beyond the purely technical aspects of siting. Considerations included the feasibility of working partnerships between local communities and the SKB; the local environment; the availability and quality of local transport and infrastructure; the socio-economic status of the community; the type of local industries; and the local geology. In the event that it was established that a working local partnership was practical, a site investigation was offered. Unfortunately, the early approach was unsuccessful. There was little uptake by Swedish municipalities, and of those that did, no suitable candidates were identified. Feasibility studies were conducted in two municipalities (Storuman and Malå), however, upon completion of the studies both communities vetoed hosting a GDF in local referendums, with 71% and 54% of residents voting against continuation of the siting process respectively. Interestingly, in this early siting process, existing nuclear communities did not come forward as they did not believe that the call for a voluntary host community was directed towards them.

The failure of the first siting process led to a revised approach by SKB, which decided instead to focus on existing nuclear communities. Several communities agreed to take part in feasibility studies in the knowledge that participation did not put them under any obligation and that they were able to opt out of the process.

From the eight sites investigated as a result of this new approach, a site at Östhammar was selected in June 2009 and in 2011, SKB submitted an application to the Swedish regulator to construct a GDF in the Östhammar Municipality.

Between 1995 and 2000, the Consultative Group was established in Östhammar, drawing members from across the political parties on the municipal council. The group's mandate was to review the feasibility study and inform people about it in a transparent manner. To this end, the Consultative Group organised a series of seminars and public meetings, as well as distributing an information brochure to local homeowners, including summer residents. Simultaneously, a group of four civil servants was formed in order to represent the municipality and administrate its part of the feasibility study.

In 1997, an opposition group named Opinion for Safe Disposal was formed. They held public meetings of their own and were financed by the municipal council using money from the Nuclear Waste Fund. These activities led to another community interest group forming in favour of the feasibility studies, named Energy for Östhammar. Again, this group was able to draw on the Nuclear Waste Fund in order to fund its activities.

In 2002, more detailed site investigations began, leading to the establishment of the Nuclear Waste Repository Project, as well as further groups to engage in discussions about the repository. The project is administered by the nuclear waste repository group, which includes a number of environmental experts, as well as an expert in repository safety. Other groups include the planning group, responsible for issues based around planning and EIA; the working group, which focuses on information and safety issues; and the consultative group, which works under the working group and handles a range of public communications activities.

Communities received monetary compensation for taking part in the siting process. For taking part in feasibility studies, eight municipalities received 2 million SEK per year for the four years that it took to conduct the studies. This doubled to 4 million SEK per year for the two communities (Östhammar and Oskarhamn) that went on to take part in more detailed site investigations. As Oskarhamn is also being considered to host an encapsulation plant handling radioactive waste, it receives an additional 1.5 million SEK per year. In receipt of this money, the communities are subject to an annual audit in order to ensure that it is spent only on enabling debate about long-term waste management. As well as further compensation to cover the costs involved in siting the GDF for the municipal and county council, one of the main benefits envisaged is the economic stimulus and spin-off benefits that will be drawn from hosting a project of such magnitude in the area. A 2004 amendment to the rules governing the Nuclear Waste Fund enabled non-profit organisations to access the fund for the purposes of participating in the EIA consultation process and

to evaluate issues relating to radioactive waste disposal and its human and environmental health effects.

A12. Switzerland

In Switzerland, the siting process for a GDF is influenced by the need for approval across a range of governmental levels, the lowest being the host municipality, followed by the canton, the federal government, and the highest, in theory, being an optional national referendum of the Swiss people according to the principles of direct democracy. Previous siting attempts have been blocked at the cantonal level despite the support of the local community.

In the 1990s, the Swiss radioactive waste management agency (Nagra) was exploring the possibility of siting a short-lived radioactive waste facility in Wellenberg, Nidwalden canton. A local implementing organisation (GNW) was formed in 1994 and an agreement with the local community of Wolfenschiessen was signed with respect to the repository. Although the community supported the site, the project was blocked, first by a cantonal referendum in 1995, and again in 2002. Following this failure, the site was abandoned and a new process was begun for the storage of all waste types following the Nuclear Energy Act passed in March 2003.

The Act requires that all radioactive waste be stored in a deep geological disposal facility, which must be demonstrably and indefinitely safe without the need for further control. As a consequence, site selection is driven primarily by technical considerations, although land use planning and socio-economic aspects are also taken into account. The conceptual plan for a sectoral siting procedure was developed by the Swiss Federal Office of Energy (SFOE), which was approved by the Federal Council in 2008. This plan defines the siting process in three distinct stages. Public participation at all levels is conducted by principles of direct democracy, such as polls, referendums, initiatives and elections, as well as through the legal system via hearings, consultations, the right of objection and complaints.

Stage 1 of the sectoral plan process involves laying the groundwork for the project: a cantonal commission facilitates the coordination of government officials from affected cantons, as well as interaction between the cantons and the federal government, and where necessary, foreign governments. SFOE also considers the needs, values, and interests of stakeholders, and how these can be fairly represented in the participatory aspect applied in stage 2. In order for these two objectives to be met, affected communities are identified based on the geography of the potential siting area, taking into account location relative to the target geology. The range of

affected communities may be expanded by considering other aspects such as proximity to bodies of water which overlap the affected area, the flow of traffic caused by the facility through a neighbouring area, or close regional economic ties to the affected area.

In stage 2, affected communities take responsibility for the participatory process, representing regional interests while working together with federal authorities and waste producers. This stage allows affected regions to provide input into facility design, placing and access.

Stage 3 covers the proposal of measures and projects for implementing the regional development strategy and determining compensation measures. The siting region must also consider issues of knowledge preservation and information exchange with the public.

A number of working groups participate in the Swiss siting process. The Federal Department of the Environment, Transport, Energy and Communications (DETEC), with support from the Federal Nuclear Safety Commission, guides the overall siting process. DETEC is also required to set up a Waste Management Advisory Council, which, being an independent and national-level organisation, is designed to bring an objective perspective to the siting process. The SFOE is responsible for the sectoral plan procedure, the appointment of relevant working groups, and the coordination of the cantons and waste producers. It also produces a review of the participatory and consultation phase for Federal Council approval.

The cantons themselves also play a major role and are responsible for implementing the community participation phase of the process with the support of SFOE. The affected communities, cantons, and in some cases foreign governments, have the opportunity to express their viewpoints in formal hearings. Communities in the siting region also contribute to the regional participation phase. Finally, the Swiss electorate can express its views if the siting process triggers a national referendum, although a national referendum is optional.

There is no legal basis for compensation for hosting a GDF in Switzerland, however the Swiss authorities assume that compensation will be received by the host community. Compensation is open to negotiation at stage 3 of the sectoral plan, and would be paid by waste producers upon the award of a general licence to proceed with GDF development. Compensation may take the form of measures should planning, construction, or operation of a GDF have negative consequences for the host region. These would be developed by the siting region and canton, and financed by waste producers. These measures would consist of project proposals for

regional development and cover the monitoring of socio-economic and environmental impacts. Compensation measures would be developed in stage 3 of the sectoral plan.

In 2012, the Federal Government approved Nagra's choice of three siting regions for for the HLW GDF and the second stage of the Swiss Sectoral Plan was commenced.

A13. United States

The United States has had an operating long-lived ILW repository since 1999. This facility is known as the Waste Isolation Pilot Plant (WIPP) and is sited in Carlsbad, New Mexico. The plant was authorised by Congress in 1979 in response to lobbying from local residents and community leaders. In the siting process, the State of New Mexico did not have the right to veto the proposals; however an agreement for consultation and co-operation. The agreement covered numerous issues, guaranteeing that the Department of Energy (DOE) would address the state's concerns before constructing or delivering waste to the facility; allowing the State to initiate judicial reviews regarding activities at WIPP; provisioning of reports concerning the structural integrity of underground storage facilities at WIPP; allowing the state to conduct 3 separate reviews of WIPP; and giving the state the right to initiate legal proceedings to halt the project should it be unsatisfied with the measures taken under the agreement. The DOE commissioned a task force to investigate independently any concerns raised by the state, such as accident liability or post operation monitoring.

A variety of structures and measures were also implemented in order to empower the host community. WIPP is subject to independent oversight in order to ensure rigorous protection of public health and safety, as well as local environmental protection. The independent overseer, currently PECOS Management Services, Inc. is funded by the DOE. In 1981, the Cooperation and Consultation Agreement was reached between DOE and New Mexico in order to address some of the state's concerns, particularly those related to transportation such as emergency responses to accidents, highway infrastructure, transport monitoring, and accident liability. DOE and New Mexico reached an agreement regarding the funding in order to address the concerns raised by the state. This agreement was supplemented in 1982 in order to address the issues raised more specifically, for example by assisting the state to obtain technical support and emergency response equipment and funding through other federal agencies. Further empowerment measures include agreements reached with Native American tribes along transport routes, public hearings before any major changes to the WIPP permit or operations, recertification of the plant every 5

years by the Environmental Protection Agency, and elective specialist training for state emergency responders along the transportation route.

Carlsbad has enjoyed several social benefits as a result of hosting the facility, as the community has seen a large investment in local educational facilities, many of which relate to its role as the host community for the WIPP. The DOE funded a multi-million dollar campus for New Mexico State University located in Carlsbad, named the Carlsbad Environmental Monitoring and Research Centre. The Centre hosts a range of activities relating to the environmental implications of radioactive waste management. In addition to this, the DOE in large part funded the development of an Advanced Manufacturing and Innovation Training Centre, which serves for academic and technical education, as well as serving as a business incubator. Further facilities include a number of environmental or hazardous materials education and training programmes, as well as the establishment of the Centre for Hazardous Waste Management Excellence, and the Records Centre Project, which archives transuranic waste records across the US. Further investments which are less specific to Carlsbad's role as the WIPP host community include school equipment and curricula, grant writing courses for educational and not-for-profit organisations, and more than US\$ 4 million in donations to charitable and civic organisations based in Carlsbad.

Carlsbad has received a number of economic benefits from hosting the WIPP. Job creation was a significant impact, and WIPP directly employs around 1000 people on high salaries, while either directly or indirectly WIPP accounts for more than 25% of employment among the Carlsbad workforce. In addition, WIPP prioritises local procurement, spending US\$ 22 million (more than a third of its expenditure) on contracts with local suppliers and services in 2005. Nearly half of the procurement budget is spent in the State of New Mexico. In addition to this, the Land Withdrawal Act (1992) passed by the US Congress supplied almost US\$ 250 million to New Mexico, largely as economic impact funding, for hosting WIPP. Further benefits included business development projects in Carlsbad sponsored by Washington TRU Solutions and the DOE, and WIPP initiated a technology transfer programme, providing training materials, software and organisational tools over 300 organisations in 50 communities across the state.

The US has had little success with formulating a plan for a HLW GDF. In 1987, the Nuclear Waste Policy Act (NWPA) was amended in an attempt to find a long-term solution for HLW, however, no volunteer communities came forward. In light of the lack of volunteers, the Office of Civilian Radioactive Waste Management (OCRWM) began to consider a site at Yucca Mountain, Nevada, and established the Native American Interaction Programme in order to build relations with 17 tribes and

organisations in the Yucca Mountain area. While there were no provisions for a veto from the state governor or legislature, the NWPA did allow for a notice of disapproval, which was submitted to Congress in 2002; however, Congress overrode the notice, and in 2008, an application for the construction of a GDF at Yucca Mountain was accepted for review by the Nuclear Regulatory Commission (NRC). The plans were postponed under the Obama administration due to the deep unpopularity of the project amongst local communities, and the future of the site remains uncertain.

A 2003 study conducted by the University of Nevada, Las Vegas, concluded that the Yucca Mountain project contributed more than US\$ 200 million per year to the state economy. The project employed thousands of workers and offered significant opportunities through project procurement. In 2005, employees from the surrounding counties earned over US\$ 130 million as a result of the project, and the DOE estimates that since 1989 affected counties received over US\$ 500 million in funding.

The NWTRB published a long report entitled “Designing a Process for Selecting a Site for a Deep-Mined, Geologic Repository for High-Level Radioactive Waste and Spent Nuclear Fuel” and this sets out the current approach in detail. A summary is contained in NWTRB (2015b).

A14. Summary

As can be seen from the siting strategies analysed in this document, many countries have adopted a voluntarist approach to siting HLW disposal facilities. This has largely been a response to the failure of technocratic ‘decide-announce-defend’ policies used before the early 1990s, and has been an inherently iterative process as siting policies evolve in search for positive outcomes.

While there are political and cultural differences in the approaches towards siting GDFs, it seems that many siting processes can be found on broadly converging trajectories. There is a growing awareness in the role that governance and participation play in acceptance of such facilities, including aspects of free, informed consent for communities, the involvement of local government in siting processes, and the stakeholders’ right to veto. The elected representatives of the host municipality tend to take the lead role as local decision-makers in the siting process and community incentives are usually available for host communities.

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