Identification and development of waste management alternatives for Strategic Environmental Assessment (SEA)

Margaret Desmond *

Department of Geography, University College, Ireland

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ABSTRACT

The European Union Strategic Environmental Assessment (SEA) Directive (2001/42/EC) requires the assessment of likely significant effects on the environment of implementing plans or programmes and reasonable alternatives. While SEA regulations and guidelines emphasize rigour and objectivity in the assessment of alternatives they have little to say on their actual identification. Therefore, criteria should be developed which would aid decision makers in the identification of alternatives appropriate to the tier of decision-making and which meet the objectives of SEA.

A methodology is set out in this paper for identifying SEA alternatives for a proposed waste management plan/programme. Specifically, the methodology describes a set of alternatives identification criteria, which will meet the requirements and objectives of SEA and waste management legislation. The outputs from the methodology will help focus on the identification of more sustainable alternatives for waste management planning in Ireland.

1. Introduction

Strategic Environmental Assessment (SEA) is an important tool for integrating the environment into decision-making (Sadler and Verheem, 1996; Sheate et al., 2003) and as such offers a promising approach towards achieving the goal of sustainable development (Therivel and Partidario, 1996). Specifically, SEA seeks to inform the decision-maker of the degree of uncertainty over impacts, the level of consistency in objectives (plan and environmental), the sensitivity of the baseline and the range of plan or programme alternatives available.

Alternatives are options, choices, or courses of action; they are means to accomplish particular goals (Steinemann, 2001). Specifically, they are the means of achieving the central aims of SEA, which is to provide for a high level of environmental protection and to integrate environmental considerations into the decision making process.

In order to determine if the central aims of SEA are being met, it is possible to intervene and evaluate alternatives to certain plans and programmes on the environment in all European Union member states (EC, 2001). The SEA Directive is intended to help protect the environment and promote sustainable development by integrating the environment into decision-making. Regarded as the ‘big brother’ of Environmental Impact Assessment (EIA) (Fischer, 2003), SEA seeks to inform the decision-maker of the degree of uncertainty over impacts, the level of consistency in objectives (plan and environmental), the sensitivity of the baseline and the range of plan or programme alternatives available.

2. Strategic Environmental Assessment (SEA)

Since 21 July 2004, Strategic Environmental Assessment (SEA) is required under Directive 2001/42/EC for the assessment of the effects of certain plans and programmes on the environment in all European Union member states (EC, 2001). The SEA Directive is intended to help protect the environment and promote sustainable development by integrating the environment into decision-making. Regarded as the ‘big brother’ of Environmental Impact Assessment (EIA) (Fischer, 2003), SEA seeks to inform the decision-maker of the degree of uncertainty over impacts, the level of consistency in objectives (plan and environmental), the sensitivity of the baseline and the range of plan or programme alternatives available.

2.1. Sea and alternatives

One of the original reasons for the development of the SEA process was to enable the consideration of alternatives at the strategic level (Sadler, 1996). If a vision or set of goals exist for a policy, plan or programme, it is possible to intervene and evaluate alternatives to select the appropriate direction that will most likely reach the desired vision (Noble, 2000). As SEA considers the longer term and larger scale plans, it can give proper consideration to different or alternative ways of achieving certain plan or programme aims (Jones et al., 2005) and...
the central aims of SEA. While the development of alternatives is a legal requirement under the SEA Directive, Noble (2000) further argues that the formulation of alternatives is a core activity in the achievement of sustainable development.

The promotion of sustainable development through the identification of alternatives requires the inclusion of socio-economic and biophysical elements and their interrelations and interdependency in both the long and short term (Gibson, 2006). To determine which alternatives are most likely to facilitate progress towards sustainability, it is necessary to think through the rationale for decision making and the criteria upon which decisions are made. In making explicit the criteria upon which decisions are made the interests of accountability, process credibility and learning are served (Gibson et al., 2005). In this way a very real argument can be made for the identification of alternatives decision criteria tailored for the SEA process.

Within SEA the consideration of alternatives broadly follows a three-step process: 1) the identification/development of alternatives; 2) the assessment of the environmental effects of the chosen alternatives and; 3) documentation of how the preferred alternative was chosen with a view to supporting transparent and inclusive decision making (Therivel, 2004). In this paper the emphasis is on the establishment of SEA specific decision criteria for the identification of alternatives, which will be applied to waste management planning in Ireland.

2.2. Sea in Ireland

The SEA Directive was transposed directly into Irish law in 2004 to ensure that all substantive and procedural requirements of the Directive were met. Under Irish regulations the types of plans and programmes subject to SEA include: agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications and tourism and those which set the framework for future development consent of projects listed in Annexes 1 and 2 of the Environmental Impact Assessment Directive, and land use planning.

Since July 2004 approximately fifty-eight Strategic Environmental Assessments have been completed or partially completed in Ireland at a number of planning tiers and across a variety of sectors (mainly land use planning) by a number of local authorities (Desmond, 2007a). While no waste management planning SEA have been completed to date (a non statutory pilot SEA of the Midlands Waste Management Plan was conducted in 2005), the National Hazardous Waste Management Plan is currently the subject of an SEA. In the near future all of the country’s Regional Waste Management Strategies will be subject to review and SEA. In advance of this process, criteria for the development of alternatives, which will meet the requirements of SEA, must be set out for practitioners with a view to assisting waste management planning in Ireland to meet its increased environmental obligations.

3. Overview of waste management planning in Ireland

The generation of waste in Ireland is considered to be high by international standards (OECD, 2005; Eurostat, 2005). While this reflects improved national data collection and reporting in terms of availability and the accuracy of the information provided (Forfas, 2006; Eunomia, 2007), actual increases have occurred in line with the emergence of the so-called ‘Celtic Tiger’ economy (Clinch et al., 2002; Taylor, 2001). However, an adequate waste infrastructure has not developed in tandem (EPA, 2004; Forfas, 2003; EEA, 2005; Eunomia, 2007). The pressures generated by increased waste and lack of infrastructure has had a number of undesirable impacts such as the export of waste, illegal dumping, fly tipping and backyard burning. For example, significant quantities of recyclable waste materials are exported for recovery and recycling as an indigenous recycling industry is almost non-existent (EPA, 2006). Such pressures have placed an enormous burden on local authorities to effectively manage municipal solid waste (Desmond, 2006).

Increasingly, the governance of waste in Ireland is spread across a number of private operators and local authorities. Recently, there have been rapid changes due to the continued development and consolidation of the private sector, the changing role of local authorities as service providers and competitors within the industry, and the movement towards full cost recovery for waste services (DoEHLG, 2006a). In this context there would seem to be “limited control over waste by any organisation” (Eunomia, 2007: 46). This has major implications for the provision of large scale infrastructure such as incinerators which must be guaranteed a constant supply of waste to be economically viable. Thus, the nature of waste governance has an important role to play in the development of alternatives and options.


National waste policy is firmly focused on the development of an ‘integrated waste management’ approach underpinned by the European Union ‘waste hierarchy’ (EC, 1975). The waste hierarchy of policy alternatives places greatest emphasis on waste prevention, minimisation, re-use, recycling, energy recovery and the environmentally sustainable disposal of residual waste (DoELG, 1998, 2002). The integrated approach to waste management suggests a mix of policy alternatives. More recently the EU’s Sixth Action Programme (COM 31 final, 2001) addressed the need to decouple economic activity and environmental degradation. In addition the Programme also advocated enhanced public participation in waste management planning (Morrisey and Phillips, 2007).

One of the main objectives of national policy is to drive waste up the hierarchy and away from landfill in favour of a range of treatment options. Key national targets are contained in the policy documents Changing Our Ways and the National Biodiversity Strategy (Table 1). However, progress towards the achievement of these targets has been mixed.

The implementation of national policy has been based on the formulation of waste management strategies and plans at regional (known as Regional Waste Management Plans (RWMPs)) and local levels. Seven regions (involving 31 local authorities) ratified waste plans, while the three remaining authorities have prepared individual plans (Boyle, 2001), which are subject to review on a five yearly basis.

<table>
<thead>
<tr>
<th>Waste targets to be achieved by 2013</th>
<th>Progress to targets by 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversion of 50% of household waste from landfill</td>
<td>22.7%</td>
</tr>
<tr>
<td>Minimum 65% reduction in biodegradable wastes consigned to landfill</td>
<td>34.3%</td>
</tr>
<tr>
<td>Recycling of 35% of municipal waste</td>
<td>34.6%</td>
</tr>
<tr>
<td>Recycling of 85% of construction and demolition waste (C&amp;D)</td>
<td>86.9%*</td>
</tr>
</tbody>
</table>

*This figure is based on C&D waste collected as reported by local authorities (source: DoELG, 1998, EPA, 2006). However, the EPA (2006) argues there are discrepancies between the figures reported by local authorities and those recovered by waste operators.
However, many authorities have experienced difficulties in the roll out of their plans for a number of economic reasons and because “waste treatment options are often controversial and proposals for significant scale waste infrastructure have generated strong opposition” (DoELG, 2004). In spite of this insight the follow up review plans are being developed in exactly the same way as before (Morrissey and Phillips, 2007) with little apparent analysis of what happened in the intervening period (Eunomia, 2007).

Central to the preparation of the RWMPs has been the development and assessment of ‘waste scenarios’ to determine the Best Practicable Environmental Option (BPEO) and economic options. The waste scenarios are based on a mix of alternatives and represent a combination of different waste management technology options (Table 2). However, the waste scenarios unlike those suggested by Bartlett and Brunstad (2006) and described by Verheem (1996) do not deal with factors outside the control of the strategic action such as high or low waste generation. As such the waste scenarios described in (Table 2). However, the waste scenarios unlike those suggested by Bartlett and Brunstad (2006) and described by Verheem (1996) do not deal with factors outside the control of the strategic action such as high or low waste generation. As such the waste scenarios described in the Irish context are more akin to options, that is, “mix and match combinations of individual components of a strategic action” (Therivel, 2004: 119).

Based on a sample of three sets of RWMPs: the Midlands Waste Strategy 2005–2010; the Cork Regional Strategy 1995–2020; and the South East Regional Strategy 2002–2021, the waste scenarios discussed above are outlined in Table 2. The three sets were chosen because they represent a geographic spread of both urban and rural areas and have been undertaken by different consultancies (most of the Regional Plans were undertaken by one or other of these companies).

Based on the above description of the sample waste scenarios a number of points are worth making. First, the range of alternatives considered has been confined to the lower levels of the waste hierarchy (incineration, landfill and recycling) with no consideration of the top layers of waste prevention, minimisation and reuse (Eunomia, 2007). As Coakley and Cunningham (2004) argue, while the plans acknowledge that prevention of waste is the priority, there is a lack of detail relating to specific measures that will be taken to ensure that progress is attained in stabilising and reversing the trend of waste growth.

Second, each of the plans is remarkably similar with little variation between them, particularly in relation to thermal treatment (Davies, 2003). Yet in reality the geographic areas, population densities and distributions varies quite substantially between the Plans. For example the Cork Regional Strategy represents both a city and county while the Midlands Regional Strategy represents a predominately rural area. Thus it is questionable if the strategies have been tailored to meet the requirements and needs of specific areas.

Third, in each of the three plans the main emphasis has been on the discussion of options in relation to the treatment and disposal of residual waste. Emphasis has generally been on the two options of landfill and incineration, however there has been little or not debate in relation to any other options such as materials recovery which, includes recycling, composting and mechanical biological treatment (MBT). As a recent EEA (2007) report argues there are three clearly discernable routes to disposal based around combinations of landfill, incineration and materials recovery currently being practiced across the Member States. Thus, “to ignore other alternatives clearly has the potential to generate sub-optimal outcomes” (Eunomia, 2007: 50).

In light of the current situation it seems necessary to tease out the criteria used to guide waste management decision making in Ireland with a view to understanding the scenarios/alternatives developed and determining if they are adequate to meet the demands of SEA.

3.1. Identification and characterisation of waste management alternatives

The determination of national waste management alternatives across the European Union is broadly based on the existing waste management facilities, infrastructure and governance structures (EEA, 2007). In Ireland the development of waste management alternatives are further driven by:

- national policy
- waste arising (quantity and character)
- requirement to meet national waste targets
- waste management methods

Under Irish waste management legislation (Government of Ireland, 1997) the identification of waste alternatives must adhere to the principles of self-sufficiency, Best Available Techniques (BAT), proximity, precaution, producer responsibility, polluter pays. Decision criteria for the identification of alternatives include: the technical strengths and weaknesses of the technology or systems chosen, capital and operating costs, resource recovery potential (material or energy), interface with current practices, current and future regulatory context, land use and siting considerations, energy consumption, transport infrastructure, groundwater usage and vulnerability (FAS, 2003).

While the decision criteria have been devised to meet the objectives of waste management planning, it’s not altogether clear if they meet the requirements of SEA at different tiers of decision making. The imposition of SEA into waste management planning brings with it new considerations. Such considerations are driven by the achievement of the main objectives of SEA and include enhanced environmental protection and the integration of the environment into the higher levels of the decision making process. Thus, the convergences and divergences between the two systems must be established.

4. Waste management planning and SEA

From the outset it would seem that the waste management planning process and the SEA process have a lot in common. Both by their nature are concerned with environmental protection and the

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Overview of RWMPs waste scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td>Policy alternatives</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Midlands waste management strategy</td>
<td>Recycling, thermal treatment, landfill</td>
</tr>
<tr>
<td>Cork regional strategy</td>
<td>Recycling, thermal treatment, landfill</td>
</tr>
<tr>
<td>South east regional strategy</td>
<td>Recycling, thermal treatment, landfill</td>
</tr>
</tbody>
</table>

Source: author.
achievement of sustainability. As Scannell (2006) argues, waste management planning in Ireland is already subject to a form of SEA. In theory both processes follow a similar stepwise procedure of context description, baseline description, alternatives development and assessment and follow up measures. However, there are procedural and substantive differences, which need to be considered if SEA is to be effectively applied to waste management planning in Ireland with a view to achieving sustainable development (Table 3).

There are many similarities between the waste management planning and SEA approaches such as the description of the geographic area and plan objectives, however, there are also a number of differences that need to be explored. The main differences between the two sets of process can be seen in relation to the setting of broad environmental protection objectives, consultation, detailed description of the current and future state of the environment as a result of implementing the plan or programme, likely significant environmental issues and monitoring. These elements need to be brought forward in the development of waste management plans if they are to meet the SEA goals.

4.1. Alternatives development for sea: decision making criteria

Based on the specific goals of SEA to integrate the environment into decision-making with a view to promoting sustainable develop-

Table 3
Relationship between WMP and SEA: the differences between approaches

<table>
<thead>
<tr>
<th>Waste management planning</th>
<th>SEA</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish waste management policy context and objectives of the plan</td>
<td>Set the context and identify broad environmental protection objectives for the SEA</td>
<td>Identification of broad environmental protection objectives of relevance to the P/P</td>
</tr>
<tr>
<td>Waste baseline description including: general description of area, relevant land use considerations, ground water usage and vulnerability, size and distribution of population, economic activity, transport infrastructure</td>
<td>Determine of current state of environment and its evolution without implementation of the plan, determine the environmental characteristics of areas likely to be significantly affected, detail any existing environmental problems of relevance to the plan</td>
<td>Determination of current state of environment and its evolution without implementation of the plan, likely significant effects on the environment including topics set out in Annex 1 of SEA Directive.</td>
</tr>
<tr>
<td>Quantify waste risings (including characterisation) and determine future disposal requirements</td>
<td>Detail likely significant effects on topics set out in Annex 1 of the SEA Directive.</td>
<td></td>
</tr>
<tr>
<td>Assess waste management options and identify facilities required</td>
<td>Identify reasonable alternatives and impacts of alternatives</td>
<td>Identification and evaluation of more sustainable alternatives</td>
</tr>
<tr>
<td>Prepare plan and develop implementation of programme</td>
<td>Mitigate impacts of chosen alternatives</td>
<td>Impact mitigation, monitoring and follow up</td>
</tr>
<tr>
<td></td>
<td>Monitor impacts of chosen action</td>
<td></td>
</tr>
</tbody>
</table>

Source: author.

Table 4
Criteria for the development of alternatives for use in SEA

<table>
<thead>
<tr>
<th>SEA alternatives development criteria</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographic scope of P/P</td>
<td>Tier of decision making</td>
</tr>
<tr>
<td>P/P objectives</td>
<td>Path dependency</td>
</tr>
<tr>
<td>Socially acceptable</td>
<td>Hierarchy of options</td>
</tr>
<tr>
<td>Legal (meet statutory requirements)</td>
<td>SEA/environmental objectives</td>
</tr>
<tr>
<td>Reasonable/reallstic</td>
<td>Existing environmental issues</td>
</tr>
<tr>
<td>Technically feasible</td>
<td>Potential environmental issues</td>
</tr>
<tr>
<td>Economically feasible</td>
<td>Consultation</td>
</tr>
<tr>
<td>Sustainable</td>
<td>Timing</td>
</tr>
</tbody>
</table>

(Desmond, 2007b).

ment. Desmond (2007b) identified the following generic criteria for the development of alternatives (Table 4).

A set of alternatives development criteria might include some or all of the above depending on the sector, plan making procedures, level of decision-making and purpose of the alternatives (whether to achieve a future vision, and/or respond to existing issues). For example, at the higher levels of decision making where the objective is to achieve a policy direction or vision appropriate criteria would include hierarchy of options, SEA/environmental objectives, social acceptability, sustainability and consultation. At lower tiers such as programme making the more appropriate criteria might include technical, economic and legal feasibility, path dependency, existing and potential environmental issues, consultation and timing.

When the generic set in integrated with the existing waste management planning alternatives development criteria, the full list might resemble those set out in Table 5.

Some criteria are quite specific to waste management planning such as the waste hierarchy, waste streams and volumes; others are generic such as plan issues, legal, technical and economic feasibility (Desmond, 2007b). Some overlap seems to exist in relation to the consideration of the geographic scope of the plan/programme (referred to as functional area of plan in waste management planning) and inclusion of the plan objectives, however with the inclusion of SEA these criterion are modified. For example, the geographic scope of the Plan is expanded as a result of the SEA process due to the requirement for transboundary consultation. The process recognises that most environmental processes do not respect neat political and administrative boundaries and can impinge on other jurisdictions. As a result other member states likely to be impacted upon by a proposed plan or programme must now be consulted in transboundary situations such as waste management. For example, in the context of Ireland’s National Hazardous Waste Management Plan (NHWMP) countries receiving hazardous waste from Ireland were notified and

Table 5
Waste management planning and SEA alternatives development criteria

<table>
<thead>
<tr>
<th>Existing waste alternatives development criteria</th>
<th>SEA alternatives development criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographic scope of P/P</td>
<td>Tier of decision making</td>
</tr>
<tr>
<td>Objectives of P/P (including international/EU waste objectives)</td>
<td>Path dependency</td>
</tr>
<tr>
<td>Waste hierarchy</td>
<td>Hierarchy of options</td>
</tr>
<tr>
<td>Plan issues (e.g. existing infrastructure, implementation of policies/objectives)</td>
<td>SEA/environmental objectives</td>
</tr>
<tr>
<td>Waste streams and volumes (current and predicted)</td>
<td>Existing environmental issues</td>
</tr>
<tr>
<td>Legal (statutory requirements current and anticipated) feasibility</td>
<td>Potential environmental issues</td>
</tr>
<tr>
<td>Technically feasible (current and anticipated technologies, approaches)</td>
<td>Sustainability</td>
</tr>
<tr>
<td>Economic feasibility (capital and operating costs)</td>
<td>Consultation</td>
</tr>
<tr>
<td>National waste policy objectives and targets</td>
<td>Timing</td>
</tr>
</tbody>
</table>

Source: author.
The addition of SEA specific criteria to the development of alternatives brings new demands, however it is the contention of the author that their inclusion should assist practitioners meet the goals of SEA. Each of the additional SEA criteria (Table 5) is considered in relation to waste management planning in Ireland in the remainder of this section.

4.2. Tier of decision-making

In theory a tiered hierarchy for environmental decision-making exists which differentiates between policies, plans, programmes and projects (Wood and Djeddour, 1992). While the reality may be different (Therivel, 2004), practitioners are likely to be able to identify alternatives specific to the administrative level and systematic tier SEA is applied to (Fischer, 2007). While the notion of tiering within decision-making is not without its challenges (Noble, 2000; Scrase and Sheate, 2002; Arts et al., 2005), as a criterion it provides a very useful structure for the development of alternatives specific to differing decision-making levels.

In waste management planning in Ireland a clear hierarchy of planning exists which policy can flow from the uppermost levels of nation policy, to Regional Waste Management Plans, Local Plans, and Waste Management Projects (Fig. 1).

However, within each of these layers of decision making a blurring between policies and plans exists. For example, RWMPs will contain policies, plans and programmes for strategic actions such as waste disposal, while local plans will also contain policies and plans specific to their immediate area. In spite of the apparent confusion the notion of tiering is important to consider when setting alternatives for individual policies, plans or programmes in that it allows practitioners to place their strategic action within a recognised hierarchy and identify the policies/objectives and targets which must be carried through into their own plan making from higher levels and which will subsequently be carried down to lower levels. For example, it is possible to identify the cascade of national waste policy from higher level policy down to regional level plans such as those set out in the NHWMP (EPA, 2007). 

4.3. Path dependency

Path dependency within a tiered decision-making hierarchy refers to the way in which policy decisions create a context for subsequent decisions, and thereby create a certain path dependency, reinforcing the likelihood of similar decisions in the future (Scrase and Sheate, 2002). In order to understand the notion of path dependency in relation to alternatives, they must be considered in the context of an historical policy trajectory that has set out the future orientation or vision. In this understanding “the focus is on paths, not places” (Noble, 2002:4). Based on this, options within the chosen pathway can begin to be formulated. However, some alternatives may have been foreclosed by higher-level plans (which also may not have undergone SEA) (Sheate and Bennett, 2007), which has serious implications for the development of subsequent sub alternatives.

In waste management planning in Ireland a path dependency based on the waste hierarchy exists, which sets out a clear policy direction and attendant broad suite of alternatives (prevention, reuse, recycling, energy recovery and final disposal). However, it is worth noting that in a recent study (Eunomia, 2007) it was argued that a policy path has been set for incineration in such a way to exclude all other reasonable waste disposal options. In the context of a technology that is time consuming to implement and has traditionally shown the greatest potential to generate public discontent the notion of path dependency comes into stark relief while demonstrating the need for SEA at higher levels of decision making.

Based on the notion of tiering and path dependency broad alternatives should be assessed at the level of national strategies, while their attendant options should be developed and assessed at the lower level of regional waste management planning. Thus it can be argued that different layers of decision-making give rise to different types of alternatives which must accounted for within SEA.

4.4. Hierarchy of options

Different types of alternatives exist at different tiers of decision making (Therivel, 2004). At the top level (programme or policy) various approaches and alternatives are open for consideration, at the planning level alternative locations and capacities are open to consideration and at the project level design and mitigation options are available (Therivel and Partidario, 1996). As a way of conceptualising these the ODPM (2005) suggests that a hierarchy of alternatives may be considered for key plan or programme issues, which can be combined with the policy hierarchy to represent the broad types of alternatives available (Fig. 2).

Within waste management at the level of policy the alternatives available focus on achieving the objectives and targets set out under EU waste policy and the Landfill Directive (1999/31/EC) in particular. At this level the focus is on setting directions or visions for lower level plan, programmes and projects through the broad brush stroke of the waste hierarchy of policy alternatives. At the level of regional plan making the orientation is towards the implementation of national policy. At this level the alternatives available can be understood as options or sub-alternatives of those generated from the higher tiers of decision making and focus on getting things done through various methods and technologies. At local level the focus is generally on spatial alternatives (Fischer, 2003), that is, deciding where infrastructure will be located, networks and densities. At the lowest level of programmes the concern is with both location and timing, for example the location of Bring Banks and the timings of waste collections (Table 6). Perhaps, uniquely within environmental decision making, the use of the hierarchy of policy alternatives (within each

submitations requested from England, Scotland, Wales, Denmark, Belgium, Holland and Norway (EPA, 2007).

Fig. 1. Irelands waste management planning hierarchy (source: author).

Fig. 2. Waste policy hierarchy and alternatives hierarchy (source: author).
policy alternative there are a number of technical, location and timing sub-options) within waste management sets out potential courses of action for decision makers which must be followed down through the different tiers of decision making (national policy, regional planning, local planning, programmes and projects) (Table 6). However, it is worth noting that the Hierarchy itself has not been without controversy, particularly in relation to the classification of incinerators as energy recovery or disposal options and their attendant rung on the hierarchy of alternatives (Dijkgraaf and Vollebergh, 2005; Eunomia, 2007).

4.5. Environmental policy context review: setting environmental objectives

The SEA Directive requires information on: the relationship of the plan or programme with ‘other relevant plans and programmes’; the environmental protection objectives, established at international, [European] Community or [national] level, which are relevant to the plan or programme, and the way those objectives and any environmental considerations have been taken into account (Annex I, SEA Directive). These are important considerations in the development of alternatives since they must be able to demonstrate their ability to account for other environmental policies and objectives over and above those of the immediate plan and in particular the sole concerns of teatche and landfill gas management.

For waste management planning the list of relevant policies, plans and programmes and their objectives might include: air, climate, water, soil, landscape, population and human health and sustainable development. While some of these topics are already being included in waste management planning in Ireland, such as emissions to air and water and impacts on climate change, land use and soils they will now have to be considered in a different manner due to the influence of SEA. Specifically, policy objectives and their associated targets now have the opportunity to be integrated into waste management planning through the SEA process and not simply some vague aspirations as has been the situation to date. For example, waste in Ireland accounts for 2.5% of total Green House Gas (GHG) emissions (DoEHLG, 2007). The objectives and targets of the National Climate Change Strategy (DoEHLG, 2007) can be directly integrated into the SEA of waste management planning with a view to achieving our international obligations. Similarly, many other pressing environmental obligations can also be progressed in this way, including those listed in Table 7.

The setting of environmental objectives of relevance to the plan and its alternatives are not only influenced by the policy context within which the plan or programme sits, but are also strongly influenced by the nature of the environmental data emerging from the baseline assessment element of the SEA.

4.6. Identification of existing and potential environmental issues; evidence from the baseline

The baseline environment is the current environment and the likely future environment in the absence of the proposed plan or programme (Therivel, 2004). Baseline information provides the basis for predicting and monitoring environmental effects and helps to identify environmental problems and alternative ways of dealing with them (ODPM, 2005).

In waste management planning baseline studies the emphasis to date has been on a description of the environment in relation to air and climate, geology, economic activity, transport infrastructure, ground water and landscape. However, with the addition of SEA the existing environment must now be considered in relation to the topics set out in Annex 1 of the Directive: biodiversity (flora and fauna), population, human health, soil, water, air, climatic factors, material assets, cultural heritage (including architectural and archaeological

<table>
<thead>
<tr>
<th>Table 6</th>
<th>Potential waste management alternatives available at different tiers of decision-making</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier: national policy/strategy</td>
<td>Tier: regional planning</td>
</tr>
<tr>
<td>Policy alternatives (waste hierarchy)</td>
<td>Waste management options</td>
</tr>
<tr>
<td>Waste minimisation</td>
<td>Prevention</td>
</tr>
<tr>
<td>Re-use</td>
<td>Extend product life</td>
</tr>
<tr>
<td>Recovery, recycling</td>
<td>Landfill treated wastes</td>
</tr>
</tbody>
</table>

Source: author.

<table>
<thead>
<tr>
<th>Table 7</th>
<th>Some environmental policies and objectives of relevance to Irish waste management SEAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic</td>
<td>Policy/plan/programme</td>
</tr>
<tr>
<td></td>
<td>EU Habitats Directive (92/43/EEC)</td>
</tr>
<tr>
<td></td>
<td>Local Biodiversity Action Plans (various)</td>
</tr>
<tr>
<td></td>
<td>River Basin District Management Plans (various in preparation)</td>
</tr>
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<td></td>
<td>National Climate Change Strategy (2007)</td>
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<td>Human health and population</td>
<td>The EU Environment and Health Strategy 2004–2010 (first period)</td>
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<td>EU Major Accident (Seveso) Directive (96/82/EC) 1996</td>
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<td>Cultural heritage</td>
<td>European Landscape Convention (2000)</td>
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<td>National Heritage Plan (2002)</td>
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<td>National Sustainable Development Strategy (1997)</td>
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Source: author.
heritage), landscape the inter-relationship between these factors. While not all of these topics might be relevant at all levels of decision making, reasons should be given as to why they are not being considered at the level of the plan under consideration. For example in the NHWMP the most relevant environmental issues considered were: water, air, climate, soil, human health, material assets (including transport, energy and land take) biodiversity, flora and fauna, while cultural heritage (architecture, archaeology and landscape) were scoped out.

The baseline assessment in the context of waste is important as it allows practitioners to determine the current state of the environment and in particular how it is being impacted upon by ongoing waste management infrastructure and practices such as landfill, incineration, recycling facilities, emissions and transport. In addition the assessment also allows for the identification of any significant environmental effects and existing resources that need to be addressed as a matter of priority in the waste strategy.

The consideration of the baseline environmental issues (existing and potential) must also form part of the criteria by which alternatives are developed. By including environmental issues at the outset existing pressures on the environment can be identified. If these issues can potentially be exacerbated by the proposed waste strategy or new issues generated, opportunities now exist to factor this information into the development of alternatives. In this way the alternatives developed are sensitive to existing and potential environmental issues, which might result from the implementation of the strategy and can in certain circumstances be used to mitigate exiting or potential impacts.

The identification of existing and potential environmental issues as a result of the waste strategy should allow practitioners to begin to identify alternatives which are more sustainable in the longer term.

4.7. Sustainability

For some commentators SEA is recognised as a means of incorporating/integrating environmental issues into policy, plan and programme decision-making processes and thereby contributing to sustainability (Noble, 2002; Dalal-Clayton and Sadler, 2005). Specifically, this includes the design of environmentally sustainable policies and plans and the identification of more long term, sustainable alternatives (Partidario, 2000; Therivel, 2004). To progress the goal of sustainable alternatives specific sustainability decision criteria should be included in their development (Gibson et al., 2005). By including such criteria all policy and development objectives are considered together and trade-offs are addressed directly such that best options and not just acceptable options are achieved (Gibson, 2006).

The notion of sustainability within waste management has come to mean different things to different stakeholders with different environmental, economic and societal considerations given greater or lesser prominence (Bruce, 1998; Furedy, 1990; Tammemagi, 1999; Petts, 2000; OECD, 2002).

In Ireland national waste policy is underpinned by a notion of sustainability, which advocates an integrated approach to waste management. However, as discussed in Section 3, the RWMPs waste scenarios have tended to focus on the lower tiers of the waste hierarchy and predominately on alternatives for the final disposal of waste. If a more sustainable approach to waste management is to be pursued, the full range of alternatives as set out in the waste hierarchy must be addressed. In this respect SEA now has a substantial role to play in the development of more sustainable alternatives by including the full range of options available from all the tiers of the waste hierarchy. SEA will allow for different options to be included in the discussion around waste management in view of the prevailing environmental and social context. On a more encouraging note the NHWMP, has been developed along sustainability lines with emphasis on pursuing principles of self sufficiency, proximity principle and the polluter pays.

4.8. Consultation

The requirements for consultation under the SEA Directive are specific and set who should be consulted and when. At a minimum, statutory authorities (in Ireland these are the Department of the Environment, Heritage and Local Government, the Department of the Marine and Natural Resources and the Environmental Protection Agency) and the public should be given an early and effective opportunity within appropriate time frames to express their opinions. Opportunities for consultation exist during scoping, release of the draft plan and in transboundary situations. The results of consultation must be taken into account during the preparation of the plan and before its adoption.

Consultation in relation to waste management planning has been restricted to date. Under the Waste Management Acts the public are allowed to make representations within a three month period and before the adoption of a Plan. However, to date public consultation in relation to waste management has been ineffective and passive (Davies, 2003). The development of RWMPs has been on traditional lines with communities being included after the plans have been constructed (Morrissey, 2004).

The more robust consultation requirements of the SEA process will be a challenge for waste management planning in Ireland. Not only has the process to include more and transboundary stakeholders but their views and opinion must be accounted for. At a very minimum, this will allow opposing and diverse views to be articulated through the SEA process.

4.9. Timing

Under the Directive there is a requirement that SEA “shall be carried out during the preparation of a plan or programme and before its adoption” (Article 4.1). To be fully effective the SEA must be timed to run in parallel with the plan making process, which will allow for interventions to be made in an effective manner. The logic behind conducting the SEA and the plan making processes in tandem allows for the proper consideration of environmental data and the rigorous consideration of plan alternatives. A post-hoc SEA for a plan does not allow it to influence key decisions, which defies the central objectives of the Directive. As Therivel and Walsh (2006) argue the consideration of alternatives is the one aspect of SEA that cannot be effectively ‘retrofitted’.

The ‘early and effective’ consideration of alternatives within waste management planning will be a challenge for waste management planning in Ireland. There is a possibility that the waste scenarios developed in the original RWMPs will be inherited by subsequent plan reviews and will be subject to post hoc assessment through tools such as LCA. For example, in the review of the Midlands Waste Management Plan (2005–2010), the original waste scenarios were not changed, because it was argued that European and National waste policy hadn’t changed significantly in the intervening period and the scenarios were modelled on a 15-year life span (1998–2013).

5. Conclusion

The purpose behind proposing a set of alternatives identification criteria in this research paper was to establish a means of developing alternatives that would be of a sufficiently high, yet of practical standard to meet the objectives of the SEA Directive and Irish waste management legislation.

The development of alternatives in waste management planning in Ireland has traditionally been driven by waste quantities and qualities, ability to meet waste policy objectives and targets, environmental protection, existing facilities, infrastructure and governance structures. However, it is proposed here that these criteria alone are insufficient to meet the goals of SEA, which is to integrate the environment into the decision making process with a view to achieving sustainable development.
Developed within an Irish environmental planning context, a set of alternatives development criteria was proposed, which it was argued would be sufficiently robust to meet the main SEA objectives. The criteria were then applied to waste management planning with a view to testing their validity.

The suggested criteria include: tier of decision-making; path dependency; hierarchy of options; environmental policy context review; setting environmental objectives; identification of existing and potential environmental issues; evidence from the baseline; sustainability; consultation and timing. In recognizing that different types of alternatives may be available in specific situations it was further argued that different combinations of the criterion may be appropriate to different tiers of decision making. For example, at higher levels of decision making where the objective could be to achieve a policy direction or vision appropriate criteria would include hierarchy of options, SEA/environmental objectives, social acceptability, sustainability and consultation.

The potential list should not be seen as exhaustive and may need to be updated over time as familiarity and confidence in the SEA process grows. The alternatives decision criteria provide a simple and logical method for identifying reasonable alternatives for use in SEA. Since the identification, description and evaluation of reasonable alternatives is a central but highly challenging SEA exercise, it is useful to establish a methodology for their development, which can be drawn upon by practitioners. In providing a short, comprehensive and recognisable set of criteria, practitioners should not experience any major difficulties in their utilisation. Indeed it can be argued that in many circumstances the criteria already form part of the practitioners environmental decision making toolkit, even if undocumented and tacit.

In conclusion, it is recommended that such a methodology could be used when alternatives are being developed in practice in any number of environmental sectors (e.g. land use planning, waste management, transport, energy). Not only will the criteria assist in the practicalities of developing alternatives, but they will also go some way towards illuminating the reasoning behind how decisions are made and why particular conclusions are arrived at and by whom. At a practical level the criteria can be used as a simple audit trail to illustrate the decision making process, while at a deeper level they can be used as a starting point for practitioners to think through the socio-environmental context within which they develop policy and plan alternatives and ultimately make environmental decisions. In this way the methodology opens up the environmental decision making process to scrutiny. In addition, in the utilisation of a generic set of criteria, practitioners should not experience any major difficulties in their utilisation. Indeed it can be argued that in many circumstances the criteria already form part of the practitioners environmental decision making toolkit, even if undocumented and tacit.

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References


