

Waste Management in Ireland:

Benchmarking Analysis and Policy Requirements

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Executive Summary

Background

Maintaining economic progress in Ireland is contingent on a good environment and the availability of modern waste management facilities. Over recent years, Forfás has highlighted the growing concerns of the development agencies and the enterprise base in relation to the lack of adequate waste infrastructure and services in Ireland to meet the demands from industrial, commercial and household waste generation. The availability of waste management services and facilities and the associated costs continue to be a key competitiveness issue for enterprise in Ireland.

This report, which includes an assessment of Ireland's comparative performance across key indicators, focuses on the policy issues that need to be addressed to enable Ireland meet the waste management needs of the enterprise sector.¹

Key Findings

Ireland has made significant progress in the area of waste recycling in recent years. The target to recycle 35 percent of municipal waste by 2013 was achieved in 2005, eight years ahead of schedule. Municipal waste generation per capita in Ireland declined from 777 kg in 2004 to 717kg in 2005.

From an enterprise perspective, Ireland continues to perform poorly relative to a selection of competitor countries in meeting the waste management needs of enterprise. The enterprise sector requires a choice of competitively priced and secure waste management options along the waste hierarchy, from prevention and minimisation through to reuse, recycling and disposal. Ireland is currently falling short in a number of areas with relatively higher costs and a heavy reliance on landfill.

In terms of waste treatment costs, while landfill gate fees are levelling off, Ireland is the second most expensive country for landfill among the benchmark countries. Ireland remains the most expensive of the benchmark countries for biological waste treatment gate fees and, following cost increases from €80 per tonne in 2005 to €90 in 2006, is now significantly above the benchmark countries.

Ireland's continues to have a relatively high reliance on landfill for waste treatment and Irish companies continue to have a limited choice of waste treatment solutions compared to their competitors. In 2005, Ireland disposed of 65 percent of its municipal waste in landfill, the second highest rate among the benchmark countries.²

¹ It was not possible to update all of the indicators for all of the benchmarking countries as waste data tends to be updated on a cyclical basis.

² Under the EU Landfill Directive, Ireland will be restricted to landfilling 75 percent of the municipal biodegradable waste produced (by weight) in 1995 by 2010. This means Ireland must reduce its 2004 biodegradable waste levels by almost 340,000 tonnes. The *National Strategy on Biodegradable Waste*, published in April 2006, sets out measures to progressively divert biodegradable municipal waste from landfill in accordance with the agreed targets under the Landfill Directive.

Latest data for industrial waste treatment shows that Ireland also disposed of 65 percent of its industrial waste in landfill in 2004.

Conclusions and Recommendations

There have been a number of important developments during the last year that will play a key role in improving Ireland's ability to meet the waste management needs of the enterprise base. These include the allocation of funding for waste management infrastructure under the NDP (2007-2013), the enactment of the Strategic Infrastructure Act 2006, the Department of the Environment, Heritage and Local Government's (DEHLG) consultation on the regulation of the waste management sector and the publication of the Government's Bioenergy Action Plan. Notwithstanding, the benchmarking analysis has highlighted a number of pressing policy issues that need to be addressed to improve Ireland's comparative performance in meeting the waste management needs of the enterprise base. These are set out below.

Addressing Infrastructure Deficits

While significant progress has been made in recent years to increase the percentage of waste being recycled, from 13 percent in 2001 to 35 percent in 2005, Ireland's dependence on landfill remains high relative to the benchmark countries. This is mainly due to the limited progress that has been made in delivering hard waste infrastructure (e.g. thermal treatment).

In the previous NDP (2000-2006), €825 million was allocated to waste management infrastructure, of which €571 million was to be sourced from private investment. Limited information is available on the actual total investment in waste infrastructure under the previous NDP but Forfás estimates that less than half of the amount allocated has been spent. Although it was expected that many projects would proceed through PPP arrangements under NDP 2000-2006, only a small number proceeded in this way with full private funding being the principal model. The NDP 2007-2013 expects this trend to continue.

In the context of the NDP 2007-2013, specific infrastructures that need to be developed include:

- thermal treatment capacity to recover energy from municipal and industrial waste;
- thermal treatment or landfill capacity for hazardous waste;
- biological treatment (composting, anaerobic digestion) throughout Ireland; and
- reprocessing capacity for recovered materials (e.g. paper, glass, plastic, metal recycled materials).

The DEHLG established the Market Development Group (MDG) in 2004 to promote the development of markets for recycled materials on the island of Ireland. The three waste streams focused on are paper, plastics and organics. However, the lack of a full-time team of personnel dedicated to the market development agenda has proved a barrier to implementing the MDG objectives to date. A multi-annual work programme for the MDG has now been drawn up and is to be launched shortly. It is imperative that the required resources be made available, as identified in the MDG work

programme, so that work on delivering the various elements of the work programme can commence.

Removing Barriers to Infrastructure Delivery

There are a number of impediments to accelerating the delivery of waste infrastructure nationally. These include uncertainty as to the regulatory framework and emerging structure of the market, the lack of coordinated regional waste plans and delays in the planning process.

- *Market Reform to Promote Competition:* The increasing involvement of the private sector in waste collection and infrastructure provision in recent years has given rise to much debate about the competitive structure of the market, and, in particular, the market uncertainty arising from the potentially conflicting role of the local authorities as service or infrastructure provider and as regulator of the sector. Given that Ireland has the second highest landfill gate fees of the benchmark countries, the existing market structure needs to be reformed to encourage greater competition between and within waste treatment options. Providing a level playing field for private and public service and infrastructure providers is essential to give Irish businesses a choice of competitively priced waste management solutions.
- *Coordination of Regional Waste Plans:* Decisions on the roll-out of infrastructure are primarily made at regional or county level rather than being based on national criteria. This means that Ireland is not fully exploiting the economies of scale that can exist in the delivery of waste infrastructure. It may also limit competition for the supply and treatment of waste. Coordination of regional waste plans would also allow national targets to be put in place for the diversion of waste to different treatment options from landfill to thermal treatment to recycling, which would improve Ireland's environmental sustainability performance.
- *Improving the Planning Process:* Lengthy delays in the planning process have also had a huge impact on the timely delivery of key waste management infrastructure. For example, a waste management company received planning permission for a waste-to-energy facility in Cork in January 2004. A judicial review of An Bord Pleanála's planning decision was sought and granted in January 2005. The High Court hearing has yet to be held. Long delays in the planning process add to costs and risk for investors and is a major barrier to market entry, which ultimately reduces the provision of services, choice and competition in the market. The enactment of the Strategic Infrastructure Act 2006 and the proposed legal reforms are positive developments, but it needs to be used in a way that accelerates the delivery of important new infrastructure such as thermal and biological treatment facilities.

Specific actions required include:

- reviewing the relative roles and responsibilities of the State in the regulation and management of the waste sector at national, regional, and local level to address the issues affecting infrastructure provision and to ensure that the Irish market remains attractive to private infrastructure providers. Furthermore, the terms of reference for any new waste management authority or entity to deliver the multi-disciplinary public policy objectives which arise in the waste sector need to be carefully assessed against the potential for existing agencies to fulfil these roles;

- effectively coordinating regional waste management plans to ensure that Ireland is benefiting from the economies of scale that can exist in the delivery of national waste infrastructure; and
- maximising the impact of the Strategic Infrastructure Act and the proposed legal reforms on the speed of delivery of important new infrastructure to ensure the expected benefits are being realised.

Waste Minimisation and Prevention

Ireland also needs to ensure it is not falling behind its competitor countries in implementing alternatives to waste treatment, namely waste prevention, minimisation and re-use. Investing resources in waste prevention and minimisation offers potential long-term benefits for the competitiveness of enterprises of all types. It is imperative for Ireland's future competitiveness and environmental sustainability that the necessary resources and commitment to realise the objectives of Ireland's *National Waste Prevention Programme 2004-2008* are provided.

A range of waste/pollution prevention or resource conservation initiatives are being undertaken by different organisations such as the IDA Ireland, Enterprise Ireland, IBEC and the Environmental Protection Agency (EPA). In order to build on these existing initiatives, it is important that all relevant lessons learned on waste prevention are widely disseminated. In particular, the aforementioned organisations need to continue to enhance their efforts to ensure that businesses are fully aware of the benefits of waste prevention and how best to exploit them.

Summary of Main Actions Required

1. The development of specific waste management infrastructures, particularly thermal treatment, biological treatment and reprocessing facilities must be accelerated (*Action: DEHLG, public and private infrastructure providers*);
2. The required resources to progress the development of markets for recycled materials, as identified in the Market Development Group work programme, need to be put in place without further delay so that work on delivering the various elements of the work programme can commence (*Action: DEHLG, Market Development Group*);
3. The relative roles and responsibilities of the State in the regulation and management of the waste sector at national, regional, and local level need to be reviewed to address the issues affecting infrastructure provision and to ensure that the Irish market remains attractive to private infrastructure providers. Furthermore, the terms of reference for any new waste management authority or entity to deliver the multi-disciplinary public policy objectives which arise in the waste sector need to be carefully assessed against the potential for existing agencies to fulfil these roles (*Action: DEHLG*);
4. Regional waste management plans need to be effectively coordinated to ensure that Ireland is benefiting from the economies of scale that can exist in the delivery of national waste infrastructure (*Action: DEHLG*);
5. The impact of the Strategic Infrastructure Act 2006 and the proposed legal reforms on the speed of delivery of important new infrastructure need to be maximised to ensure the expected benefits are being realised (*Action: DEHLG*); and
6. Continued and enhanced efforts are required to ensure that businesses are fully aware of the benefits of waste prevention and how best to exploit waste management reduction processes and technologies (*Action: Development agencies, IBEC, EPA*).

1. Introduction

Maintaining economic progress in Ireland is contingent on a good environment and the availability of modern waste management facilities. Since 2001, Forfás has monitored the adequacy of waste infrastructure and services in Ireland to meet the demands from industrial, commercial and household waste generation. The availability of waste management services and facilities and the associated costs continue to be a key competitiveness issue for enterprise in Ireland.

Earlier Forfás reports, *Key Waste Management Issues in Ireland* (2001) and *Key Waste Management Issues in Ireland - Update Report* (2003), highlighted the growing concerns from industry over the lack of adequate waste infrastructure and capacity to cope with the demands from industrial, commercial and household production. However, progress on delivering competitively priced waste management services has been limited.

The *Waste Management Benchmarking Study - A Baseline Assessment*, published in June 2006, benchmarked Ireland's performance against ten other countries and regions across key performance indicators.³ Although the rate of municipal waste recycling in Ireland has improved significantly in recent years, increasing from 13 percent in 2001 to 35 percent in 2005, the baseline analysis highlighted higher waste management costs, shortfalls in waste treatment capacity and limited choice of waste treatment solutions compared to the benchmark countries. The report outlined a number of policy issues that needed to be addressed in order to improve Ireland's comparative performance. There has been limited progress in addressing these issues.

This report, which includes an assessment of Ireland's comparative performance across key indicators, focuses on the policy issues that need to be addressed to enable Ireland meet the waste management needs of the enterprise sector.

2. Waste Management in Ireland

The Republic of Ireland produced over 85 million tonnes of waste in 2004.⁴ Agricultural waste (e.g. animal manure, soiled water, silage effluent) comprised over 70 percent of the total figure.⁵ Construction and demolition waste (e.g. soil, rubble, concrete and timber waste) accounted for 12 percent of the total, while industrial waste and municipal waste contributed 11 and four percent respectively.⁶

Industrial waste includes both hazardous and non-hazardous waste. Examples include waste metals, chemicals and mining waste. Municipal waste can also include both hazardous and non-hazardous waste. In Ireland, municipal waste is defined as household waste and commercial waste, which

³ Available online at <http://www.forfas.ie/publications/show/pub234.html>

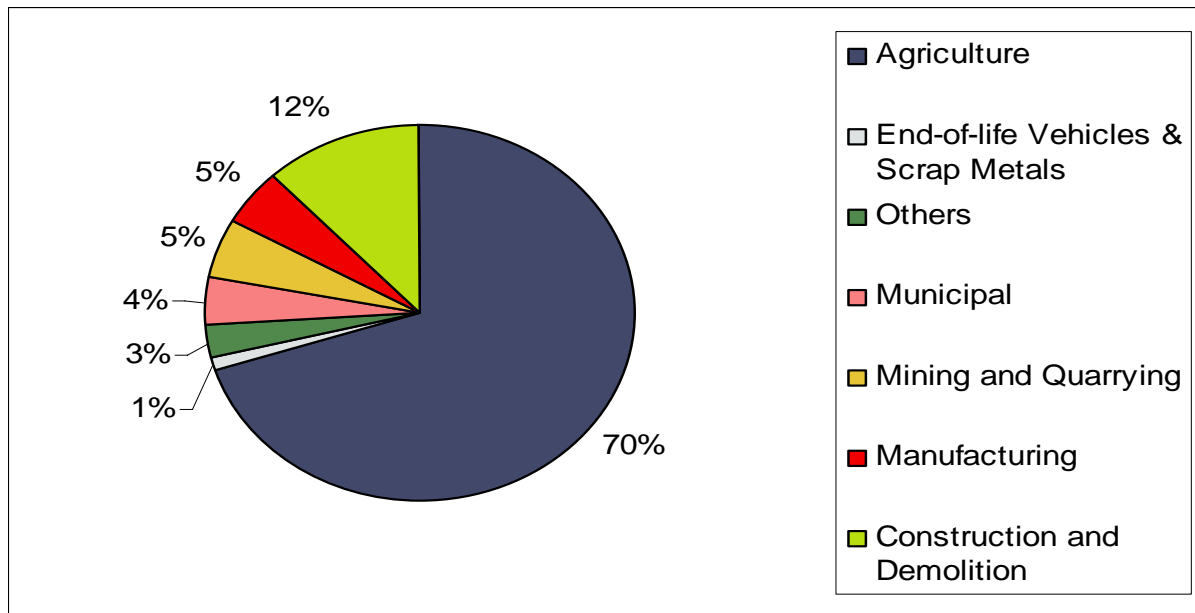
⁴ National Waste Report, Environmental Protection Agency, 2004.

⁵ Almost 70 percent of the total agricultural waste could be categorised as being animal manure. Animal manure spread on land as fertiliser may be considered not to be waste if certain specific criteria are met.

⁶ Industrial waste includes manufacturing waste and mining and quarrying waste.

because of its composition is similar to household waste. Examples include paper, cardboard and food waste.

Figure 1: National Waste Profile of Waste Generated, 2004



Source: EPA.

Ireland's approach to dealing with waste is based on the internationally adopted waste management hierarchy, which states that the most preferred option for waste management is prevention and minimisation, followed by re-use and recycling, energy recovery and, least favoured of all, disposal (Figure 2).^{7 8}

'Prevention and minimisation', the most favoured waste management option, aims to reduce waste at source, thus eliminating the need to handle, transport, treat and dispose of waste. 'Re-use or recycling' methods, also known as recovery, include the re-use of plastic bags, the re-processing of materials like glass into new products and biological treatment.^{9 10} 'Energy recovery', or waste to energy (WTE) refers to any waste treatment process that creates energy in the form of electricity or heat from a waste source that would have otherwise been disposed of in landfill. The most

⁷ The waste hierarchy, generally embraced by the European Union since 1989 as the cornerstone of its waste management policy, has been adopted in Ireland as the basis of our waste policy via the Waste Management Acts, 1996-2001 and the 1998 Government policy statement, *Changing Our Ways* and the 2004 paper, *Taking Stock and Moving Forward*.

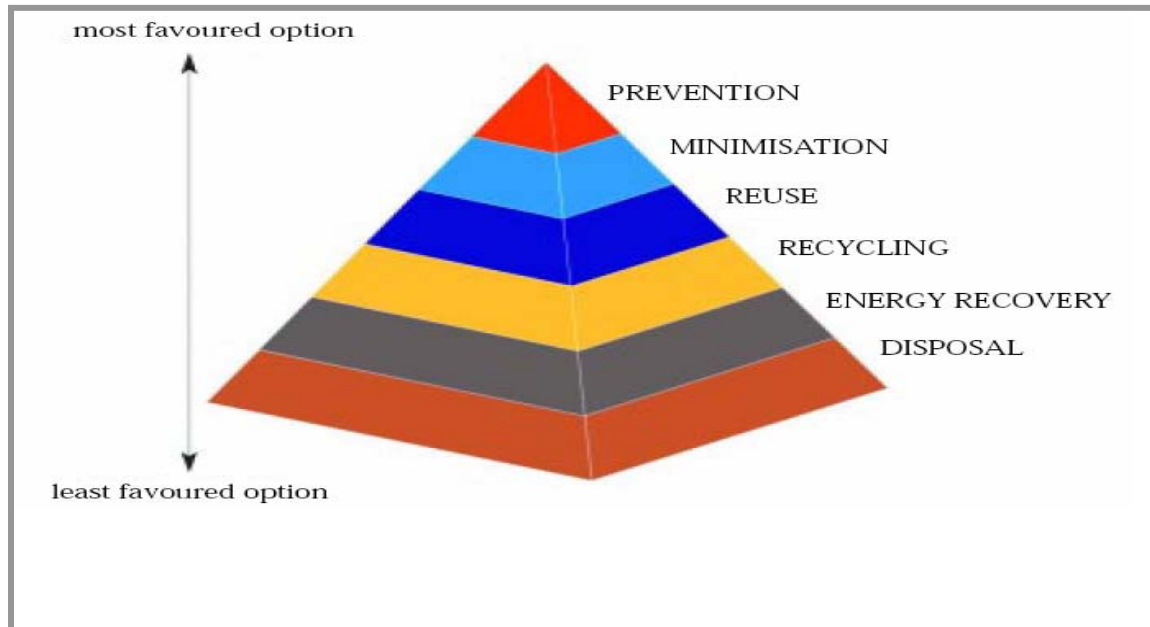
⁸ The EU Commission recently voted in favour of introducing a five-stage hierarchy of priority for EU waste management policy. The hierarchy is similar to one outlined in Figure 2, giving priority to prevention, recycling and reuse over landfill and incineration. The system is an attempt to push industry to use more environmentally-friendly materials, with the aim of cutting the amount of waste ending up in landfill. The system would require industry to pay for impact studies justifying their use of particular types of packaging if they do not fall into line with the hierarchy. The European Council are expected to vote on the issue in 2007.

⁹ Re-use is also considered to be waste prevention, especially where the item is used for the same original purpose. Recycling involves a complete re-transformation of a recovered material usually in an industrial scale process.

¹⁰ Biological treatment in this report refers primarily to composting, which can be defined as the process of producing compost through decomposition of biodegradable organics matter. Other forms of biological treatment include anaerobic digestion, where unlike composting, sewage and animal waste can be broken down to produce soil improver, and in some cases a biogas that can be used to produce electricity.

commonly used method of WTE is thermal treatment. The least favoured treatment option of all is the disposal of untreated waste in landfill facilities.

Figure 2: Waste Management Hierarchy



Source: Changing Our Ways, Department of the Environment, Heritage and Local Government, 1998.

3. Methodology

In 2005, Forfás commissioned RPS Consulting Engineers to undertake a baseline benchmarking analysis of the Irish waste management sector. This paper updates that analysis. Forfás also established a Steering Group to oversee this project, comprising representatives from the Department of Enterprise, Trade and Employment (DETE), the Department of Environment, Heritage and Local Government (DEHLG), Enterprise Ireland, the Environmental Protection Agency (EPA) and IDA Ireland.

Internationally, waste data can often be of variable quality and tends to be updated on a three or five year cycle.¹¹ This has led to a dearth of up to date, comparable international data. As a result, one of the major challenges of the benchmarking exercise was to develop robust indicators.

This study focuses on the priority waste streams of most relevance from an enterprise development perspective, namely municipal, industrial and hazardous waste.¹² Reported data for municipal and

¹¹ Ireland's waste statistics compare well with all ten countries selected, both in terms of availability and the accuracy of the information available.

¹² The other priority waste streams are packaging waste, construction & demolition waste, waste from end-of-life vehicles and waste oil.

hazardous waste is generally reliable and was found to be consistent for most of the selected countries. Reporting on industrial waste was limited because of data availability and comparability issues.

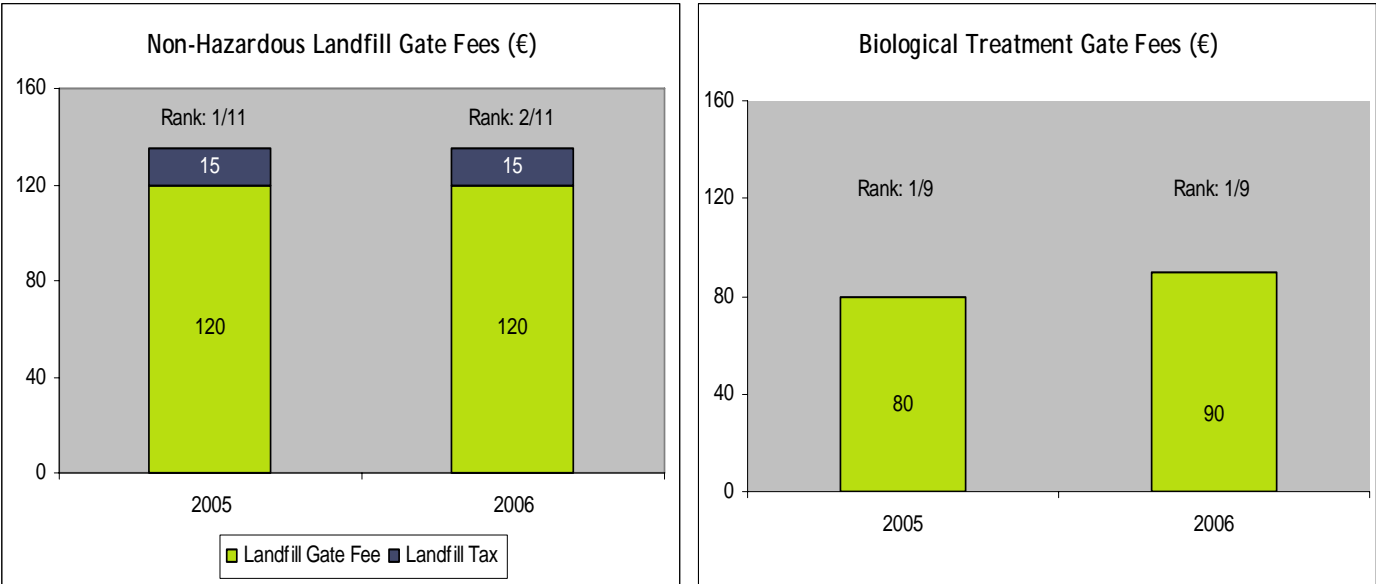
4. Main Findings of Benchmarking Analysis

Ireland has made significant progress in the area of waste recycling in recent years. The target to recycle 35 percent of municipal waste by 2013 was achieved in 2005, eight years ahead of schedule. Municipal waste generation per capita in Ireland declined from 777 kg in 2004 to 717kg in 2005.

From an enterprise perspective, Ireland continues to perform poorly relative to a selection of competitor countries in meeting the waste management needs of enterprise. The enterprise sector requires a choice of competitively priced and secure waste management options along the waste hierarchy, from prevention and minimisation through to reuse, recycling and disposal. Ireland is currently falling short in a number of areas with relatively higher costs and a heavy reliance on landfill.

In terms of waste treatment costs, while landfill gate fees are levelling off, Ireland is the second most expensive country for non-hazardous landfill among the benchmark countries. Ireland remains the most expensive of the benchmark countries for biological waste treatment gate fees and, following cost increases from €80 per tonne in 2005 to €90 in 2006, is now significantly above the benchmark countries (Figure 3).

Figure 3: Waste Management Treatment Costs, 2005 vs. 2006



Source: RPS.

Some additional waste treatment capacity, mainly biological waste treatment facilities did come on stream during 2006. Nonetheless, Ireland's relatively high reliance on landfill persists and Irish companies continue to have a limited choice of waste treatment solutions compared to their competitors.

Although the rate of municipal waste recycling in Ireland has improved significantly in recent years, from 13 percent in 2001 to 35 percent in 2005, Ireland continues to have a heavy reliance on landfill to treat its municipal and industrial waste. In 2005, Ireland disposed of 65 percent of its municipal waste in landfill, the second highest rate among the benchmark countries. When municipal waste is broken down between commercial and household waste, significant differences emerge in terms of the volume of waste recycled. Almost half of commercial waste is recycled compared to just 23 percent of household waste.¹³

Latest data for industrial waste treatment is for 2004 and shows that Ireland also disposed of 65 percent of its industrial waste in landfill. Ireland does not have any commercial thermal treatment facilities.

5. Important Recent Developments

There have been a number of important developments in the past year that will have implications for Ireland's ability to meet the waste management needs of the enterprise base. These are set out below.

5.1. National Development Plan (NDP) 2007-2013

NDP 2007-2013 was published in January 2007. Environmental sustainability is one of four horizontal principles underpinning the new NDP (2007-2013). Waste management is one of the main environmental challenges highlighted for attention.

Another horizontal principle is all-island cooperation. An overview of Northern Ireland's performance across a number of key areas such as waste generated and treatment options is presented in Appendix II.

In the previous NDP (2000-2006), €825 million was allocated to waste management infrastructure, with €571 million to be sourced from the private investment. Although it was expected that many projects would proceed through PPP arrangements, only a small number proceeded in this way with full private funding being the principal model. Limited information is available on the actual total investment in waste infrastructure under the previous NDP but Forfás estimates that less than half

¹³ Under the EU Landfill Directive, Ireland will be restricted to landfilling 75 percent of the municipal biodegradable waste produced (by weight) in 1995 by 2010. This means Ireland must reduce its 2004 biodegradable waste levels by almost 340,000 tonnes. The *National Strategy on Biodegradable Waste*, published in April 2006, sets out measures to progressively divert biodegradable municipal waste from landfill in accordance with the agreed targets under the Landfill Directive.

of the amount indicated has been spent. Much of the progress under NDP 2000-2006 has been in recycling facilities, which has contributed to the significant rise in recycling rates in recent years.¹⁴ However, performance in delivering hard infrastructure, e.g. thermal treatment, has been much slower due to public opposition to these facilities and delays in the planning process.

NDP 2007-2013 proposes to invest €753 million of public funding under the waste management sub-programme and has prioritised three areas for investment:

- Legacy landfills - funding the rehabilitation of certain local authority landfills
- Recycling and recovery - to roll out recycling centres to increase and enhance the availability of high-quality biological treatment facilities; and
- Thermal treatment - thermal treatment with energy recovery will be the preferred option for dealing with residual waste.

5.2. Consultation on the Waste Regulator

Regulation of the waste management sector has become the subject of much debate in recent years in light of the increasing role played by the private sector in waste management services and infrastructure provision. Of particular concern is the dual role of the local authorities as regulator and service provider. The public consultation by the DEHLG on the regulation of the waste management sector during the second half of 2006 was therefore a welcome development.¹⁵ The Department consulted on the most appropriate model of regulation for the waste sector, as well as the remit and functions of a waste regulator. DEHLG is currently reviewing the responses received and the Minister for the Environment, Heritage and Local Government is expected to bring recommendations to Government shortly.

Following extensive enquiries into household waste collection in 2005, the Competition Authority found that the market for household waste collection in Ireland is not working well for consumers. It concluded that competitive tendering, for the right to serve the market rather than price regulation, would be the best method to ensure that household waste collection providers deliver good services at competitive prices.¹⁶ This position was reiterated in its submission to DEHLG's consultation on the regulation of the waste sector in October 2006.

The development agencies (Forfás, IDA, and Enterprise Ireland) made a joint submission to DEHLG's consultation last year. The submission highlighted international evidence that "competition for the market" as opposed to "competition in the market" delivers greater cost efficiencies in the municipal waste collection services in many OECD countries. The submission recommended that DEHLG reform the existing regulatory framework for the waste sector and introduce competitive tendering to deliver competitively priced, high quality waste management solutions.

¹⁴ The recycling target for municipal waste is 35 percent by 2013. This target was reached in 2005, eight years ahead of schedule.

¹⁵ [http://www.environ.ie/DOEI/DOEIPol.nsf/0/c8f71c4e05251d8280256f0f003bc802/\\$FILE/WasteRegulatorAug06.pdf](http://www.environ.ie/DOEI/DOEIPol.nsf/0/c8f71c4e05251d8280256f0f003bc802/$FILE/WasteRegulatorAug06.pdf)

¹⁶ Enforcement Decision: Alleged excessive pricing by Greenstar Recycling Holdings Limited in the provision of household waste collection services in northeast Wicklow, The Competition Authority, August 2005.

5.3. Strategic Infrastructure Act 2006

The Strategic Infrastructure Act 2006, which came into effect on 31 January 2007, has put in place a streamlined planning process for certain strategic infrastructural projects, including waste, while ensuring that all statutory requirements are observed. The Act provides for the establishment of a Strategic Infrastructure Division within An Bord Pleanála, which will be the sole planning consent authority for almost all major infrastructure development.¹⁷ The legislation is expected to speed up the delivery timeframe for projects which are subject to it.

The Strategic Infrastructure Act is a positive development. It has also been recognised that many of the most protracted delays in recent years have been due to legal challenges to planning decisions for major infrastructural projects. Arrangements were put in place in the High Court during 2006 for the case management of judicial review applications relating to such projects. A set of Rules of Court designed to formalise these arrangements has been drawn up and it is expected that they will shortly come into effect.

In addition, the Government decided in December 2006 to increase the number of judges on the High Court bench by two, with a view (among other things) to fast-tracking judicial review cases, particularly review cases arising from major infrastructural projects, thus curbing the growth of judicial review as a delaying tactic. The legislation to give effect to the decision to increase the number of High Court Judges was published in February 2007.¹⁸

5.4. Bioenergy Action Plan

The Bioenergy Action Plan, published on 4th March 2007, sets out an integrated strategy for collective delivery of the potential benefits of bioenergy resources across the agriculture, enterprise, transport, environment and energy sectors. Bioenergy includes biomass, landfill gas, biogases and biofuels. Biomass is defined as the biodegradable fraction of products, waste and residues from agriculture (including vegetal and animal substances), forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste.

One of the main actions highlighted in the Bioenergy Action Plan is to expand the REFIT mechanism to assist the development of waste to energy projects by supporting hybrid projects.¹⁹ This would allow mixed renewable and non-renewable generation waste to energy projects to obtain support for the renewable portion of the output. This type of hybrid support mechanism is common in other EU Member States. It also supports the objectives of the *National Strategy on Biodegradable Waste* to maximise the recovery of useful materials and energy from residual waste.

¹⁷ Waste disposal infrastructure coming under the provisions of the Act includes: facilities >100,000 tonnes p.a. for the incineration and chemical treatment of hazardous and non-hazardous waste; and facilities >100,000 tonnes p.a. for the disposal, treatment or recovery of waste.

¹⁸ Courts and Court Officers (Amendment) Bill 2007.

¹⁹ REFIT = Renewable Energy Feed-In Tariff. This programme guarantees fixed prices for all registered renewable power generators. Tariffs range from 5.7 eurocent/KWh for large wind farm electricity to 7.2 eurocent/KWh for biomass energy.

5.5. EU Policy Developments

In June 2006, the European Commission published the *Renewed EU Sustainable Development Strategy*.²⁰ One of the main objectives of European sustainable development policy is to promote sustainable consumption and production. Good waste management practice is central to delivering on that objective. Member States are required to review their national sustainable development policies and the DEHLG has commenced the Irish review.

The EU Commission also introduced two initiatives in 2005 to replace the existing 1975 Waste Framework with the aim of reducing the amount of waste that ends up in landfill. The first, the EU Waste Directive, aims to set binding targets for waste for the first time. The second initiative, the Thematic Strategy on the Prevention and Recycling of Waste, focuses on long-term EU waste strategy.

In February 2007, the European Parliament voted on these initiatives and the main elements of its decision include the introduction of:

- a five-step waste 'hierarchy' that gives priority to prevention, reuse and recycling over incineration and landfill.²¹;
- EU waste-prevention targets to stabilise waste production by 2012 to the levels produced in 2008, and for waste production to start declining from 2020. Member States will also be required to draw up national waste prevention programmes within 18 months of the Directive coming into effect²²; and
- EU targets for reuse and recycling - by 2020, 50 percent of municipal solid waste and 70 percent of waste from industry (including manufacturing) and construction and demolition, must be re-used or recycled.

These ambitious goals, approved overwhelmingly by the European Parliament, are expected to be agreed by the European Council in June 2007.

6. Conclusions and Recommendations

The enterprise sector requires the availability of a choice of competitively priced and secure waste treatment options along the waste hierarchy. Ireland is currently falling short on a number of areas with comparatively higher costs and a heavy reliance on landfill. The benchmarking analysis has highlighted a number of issues that need to be addressed to improve Ireland's comparative performance in meeting the waste management needs of the enterprise base. Some of these issues were also raised in the recently published NDP 2007-2013.

²⁰ Sustainable development was included as an overarching objective of EU policies in the Treaty of Amsterdam in 1997. The first EU Sustainable Development Strategy was published in 2001. Further details are available at <http://ec.europa.eu/environment/eussd/>. Ireland's national sustainable development policy is available at <http://www.environ.ie/DOEI/DOEIPol.nsf/wvNavView/Sustainable+Development:+A+Strategy+for+Ireland?OpenDocument&Lang=#11>.

²¹ The Commission's original proposal had called for a three-step hierarchy that did not prioritise between reuse, recycling and recovery.

²² Ireland is well ahead on this front as our national waste prevention programme was launched in 2004. See Section 6.3 for further details. The Commission's proposal to reclassify incineration from 'disposal' to 'recovery' for energy production was rejected.

The most immediate issue is the need to accelerate the development of waste infrastructures particularly thermal treatment, biological treatment and recycling/reprocessing facilities. This will require actions to address potential barriers to infrastructure rollout such as concerns over the structure of the market, the lack of coordination of regional waste plans and the lengthy delays in the planning process. Ireland also needs to ensure it is not falling behind its competitor countries in implementing alternatives to waste treatment, namely waste prevention, minimisation and re-use.

6.1. Addressing Infrastructure Deficits

While significant progress has been made in recent years to increase the percentage of waste being recycled, from 13 percent in 2001 to 35 percent in 2005, Ireland's dependence on landfill remains high relative to other countries. This is mainly due to the limited progress that has been made in delivering waste infrastructure in preferred waste treatment options such as thermal and biological treatment. Ireland also continues to export most of its recycled materials for reprocessing.

(1) Specific Infrastructure Deficits

Ireland's comparatively poor performance on key benchmarking indicators such as costs and capacity can be traced back to the failure to deliver key waste management infrastructure in recent years. Specific infrastructures that need to be developed include:

- thermal treatment capacity to recover energy from municipal and industrial waste;
- thermal treatment or landfill capacity for hazardous waste;
- biological treatment (composting, anaerobic digestion) throughout Ireland; and
- reprocessing capacity for recovered materials (e.g. paper, glass, plastic, metal recycled materials).

That said, new waste treatment facilities have to be economically viable. Accordingly, in certain cases, the export option will remain the most practical and cost effective solution, as long as export of waste is permitted and other countries are willing to accept it.²³

(2) Provision of Thermal Treatment Facilities

The prioritisation of the rollout of thermal treatment capacity under the new NDP (2007-2013) is to be welcomed. As set out in the waste hierarchy, thermal treatment is the preferred treatment option for residual waste. The availability of thermal treatment capacity will also be central to Ireland meeting the targets for the diversion of biodegradable municipal waste under the EU Landfill Directive. Ireland will be restricted to landfilling 75 percent of the municipal biodegradable

²³ For example, in 2004, a quantity of municipal waste from Ireland underwent energy recovery operations in Germany but this ceased in 2005 as a result of Germany's implementation of the EU Landfill Directive - German incineration capacity was reduced as waste was diverted from landfill.

waste produced (by weight) in 1995 by 2010. In 2004 the amount of biodegradable municipal waste land-filled in Ireland was 101 percent of the 1995 baseline figure.

NDP 2007-2013 proposes that the thermal treatment facilities will be provided either entirely by private sector investment or by way of PPP as is the case in the Dublin region. The significant under-spend in the last NDP suggests that the market, as it stands, is not conducive to private sector investment and the delivery of long overdue waste infrastructure, such as thermal treatment. It is critical that the issues outlined in Section 6.2 are addressed to ensure that Ireland remains attractive to private infrastructure providers and to facilitate competition between and within waste treatment options.

(3) Developing Markets for Recycled Materials

The 2002 policy statement, *Preventing and Recycling Waste: Delivering Change*, identified the lack of stable and economically attractive markets and outlets for recyclable materials as one of the main barriers to improved and sustainable recycling performance in Ireland. DEHLG established the Market Development Group (MDG) in 2004 to promote the development of markets for recycled materials. The three waste streams focused on are paper, plastics and organics.

In 2006, the MDG engaged consultants to draw up a comprehensive multi-annual programme to deliver on its objectives.²⁴ Delivery of the MDG programme can play a significant role in providing waste producers with alternative waste treatment solutions and infrastructure. It will need to be managed in an efficient manner to ensure that the overall goal of the programme is achieved, and that all the work elements are delivered according to objectives, budgets and timeframes.²⁵

The lack of a full-time team of personnel dedicated to the market development agenda has proved a barrier to implementing the MDG objectives to date. It is imperative that the required resources be made available, as identified in the MDG work programme, so that work on delivering the various elements of the work programme can commence.

Another potential bottleneck to developing domestic reprocessing facilities for recycled materials, that requires attention, is the limited number of segregation facilities in Ireland currently. Addressing this issue is essential to improve the supply and quality of recycled materials, particularly paper and plastics, that are available for reprocessing.

²⁴ The programme sets out a five-year blueprint for investment in recycling markets, including material specific projects, programme communications, and research and development. The MDG will also provide seed funding for specific projects, new recycling concepts, and will encourage innovation and partnership among the stakeholders. Green procurement will form part of the strategy. Expenditure (approx. €8 million over the period 2007 - 2011) will be spread across the various technical and market development activities, and will include incentives for R&D, feasibility studies, and demonstration trials.

²⁵ The MDG programme is due to be launched during the first quarter of 2007.

6.2. Removing Barriers to Infrastructure Delivery

There are a number of impediments to accelerating the delivery of waste infrastructure nationally. These include uncertainty as to the regulatory framework and emerging structure of the market, the lack of coordinated regional waste plans and delays in the planning process.

(1) Market Reform to Promote Competition

The increasing involvement of the private sector in waste collection and infrastructure provision in recent years has given rise to much debate about the competitive structure of the market. Private waste service providers offer integrated waste management solutions to industrial and commercial waste producers while infrastructure provision and municipal waste collection is undertaken by both local authorities and private operators. This complexity needs to be recognised when determining the appropriate regulatory framework for the waste sector.

As outlined in Section 5.2, DEHLG consulted on the most appropriate model of regulation for the waste sector, as well as the remit and functions of a waste regulator during 2006. DEHLG is currently reviewing the responses received and the Minister for the Environment, Heritage and Local Government is expected to bring recommendations to Government shortly.

One of the main factors contributing to concerns over the existing structure of the market arises from the potentially conflicting role of the local authorities as service or infrastructure provider and as regulator of the sector. Providing a level playing field for private and public service and infrastructure providers is essential to facilitate competition between and within waste treatment options and to give Irish businesses a choice of competitively priced waste management solutions. The main areas of concern were outlined in the DEHLG consultation paper and include:

- Unlike the private sector, local authorities do not require collection permits in order to collect waste;
- Local authorities are required to undergo a less onerous registration process for certain waste activities than the permitting process required of private sector operators for the same activities;
- The planning system operates differently for private sector and public sector projects with a longer timescale needed for private sector projects. For example, it takes longer to obtain planning permission for private sector projects than it does to obtain permission for local authority projects²⁶; and
- Local authority waste infrastructure projects are part-funded by the Environment Fund but there is no funding for private sector waste projects.

While there is broad consensus among stakeholders on the need for regulatory reform to ensure a level playing field between private and local authority waste service and infrastructure providers,

²⁶ The enactment of the Strategic Infrastructure Act goes some way towards addressing this issue. However, differences still exist. There is a mandatory pre-application consultation with Bord Pleanála under the Act for private sector projects but not for local authority ones.

the complexity of the issues involved makes it difficult to determine the changes in institutional arrangements required to achieve it. These complexities notwithstanding, it is important that DEHLG concludes this process in a timely fashion because there will be continued market uncertainty until such time as the new regulatory framework is put in place. Providing market certainty for investors is critical if the Irish market is to remain attractive to private infrastructure providers as envisaged in NDP 2007-2013.

With regard to the potentially conflicting roles of the local authorities in the area of municipal waste collection, as outlined in our submission to DEHLG, the development agencies support the creation of “competition for” the municipal waste collection market as opposed to “competition in” the market. This will address the waste collection issues outlined above regarding permits and registration. DEHLG has expressed reservations about the appropriateness of competitive tendering for all local authorities such as those where a private service provider is already operating. In light of the benefits that have accrued in other markets, it is imperative that the implications of introducing competitive tendering in the Irish market are fully investigated and that due consideration is given to exploring solutions to concerns about existing private service providers and the direct employees of the local authorities engaged in waste collection.

More broadly, if Ireland is to achieve the objective of providing competitively priced waste management services to business and the consumer, while meeting its environmental obligations, the relative roles and responsibilities of the State in the regulation and management of the waste sector at national, regional, and local level need to be elaborated. In particular, the local authorities’ role in carrying out the following regulatory functions must be addressed:

- Drawing up and reviewing of regional waste plans;
- Granting of collection and facilities permits;
- Setting landfill gate fees; and
- Directing waste to particular treatment facilities.

The terms of reference for any new waste management authority or entity to deliver the multi-disciplinary public policy objectives which arise in the waste sector, and which were set out in DEHLG’s consultation document, need to be carefully assessed against the potential for existing agencies to fulfil these roles. With regard to the proposal in DEHLG’s consultation paper to establish a waste regulator, due consideration must be given to the fact that all regulation is costly and can have a significant impact on enterprise and in particular on small businesses. Moreover, there is no evidence to suggest that price regulation in the waste sector is appropriate.

(2) Coordination of Regional Plans

Most local authorities have adopted a regional approach in the development of their waste management plans. With the exception of Wicklow, Kildare and Donegal County Councils, who have decided to proceed with county plans, all local authorities in the country are now involved in regional waste management plans.

Decisions on the roll-out of infrastructure are primarily made at regional or county level rather than being based on national criteria such as industry economies of scale, the development of critical mass and the existence of transport corridors. There also appears to be a lack of urgency at a local level in the implementation of the waste plans. This has implications for Ireland's international competitiveness in the provision of competitively priced and high quality waste management solutions for businesses operating here and those considering establishing a presence in Ireland.

While Government has made it clear that it does not support the setting up of a National Waste Management Agency as previously recommended, the regional waste management plans need to be effectively coordinated to ensure that Ireland is benefiting from the economies of scale that can exist in the delivery of waste infrastructure. Coordination of the regional waste plans would also allow national targets to be put in place for the diversion of waste to different treatment options from landfill to thermal treatment to recycling, which would improve Ireland's environmental sustainability performance.

These issues should be considered in the context of the reform of regulatory environment discussed in the previous section.

(3) Development of the Planning Process

Lengthy delays in the planning process have had a negative impact on the timely delivery of key waste management infrastructure. For example, a waste management company received planning permission for a waste-to-energy facility in Cork in January 2004. A judicial review of An Bord Pleanála's planning decision was sought and granted in January 2005. However, as of March 2006, the High Court hearing has yet to be held.

The enactment of the Strategic Infrastructure Act 2006 and associated proposed legal reforms are positive developments and should help accelerate the delivery of important new infrastructure such as thermal and biological treatment facilities. The impact of these developments in practice on infrastructure delivery need to be maximised to ensure the expected benefits are realised.

(4) Greater Use of Community Gain

One of the main barriers to timely delivery of waste infrastructure is public opposition. A frequent concern raised by receiving communities of waste management facilities is that, by hosting such essential facilities, they experience a degree of dis-amenity on behalf of the wider population, yet they are not offered anything in return for this. Community gain has been used successfully in other countries to create and enhance community support for the development of new waste management facilities.

National planning legislation is also supportive of the concepts embodied in community gain, and such approaches have already been accommodated within Ireland's existing legislative and policy framework. It is recommended that community incentives, in the form of infrastructure or other facilities benefiting the affected local community should be provided, where appropriate, for waste projects. Criteria for the provision of such incentives should be developed.

6.3. Waste Minimisation and Prevention

Along the waste management hierarchy, prevention and minimisation are the preferred waste management solutions. In addition to the obvious environmental benefits, investing resources in waste prevention and minimisation offers potential long-term benefits for the competitiveness of enterprises of all types. When a company analyses and identifies wasteful practices it often becomes aware of other inefficiencies in its operations - for example, poor management or storage of raw materials, inefficient machinery or poorly trained staff.

The main objectives of Ireland's *National Waste Prevention Programme 2004-2008*, which was launched in 2004, are to reverse current trends in waste production, decouple waste generation from economic growth and minimise the environmental impact of waste. It is imperative for Ireland's future competitiveness and environmental sustainability that the necessary resources and commitment to realise these objectives are provided.

While the National Waste Prevention Programme is progressing the waste prevention agenda at local authority/community level, there is a need for business as well as consumers to buy in to cleaner, greener behaviour relating to our use of all resources. A range of waste/pollution prevention or resource conservation initiatives is being undertaken by different organisations. These include those by Enterprise Ireland (e.g. the www.envirocentre.ie website, plus support for Environmentally Superior Products and Environmental Management Systems), Repak and IBEC (annual environmental awards) and the EPA (Cleaner Greener Production Programme, IPPC licensing and waste prevention publications).²⁷

In order to maximise the value from, and build on, these existing initiatives, it is important that all relevant lessons learned on waste prevention are widely disseminated. A research programme has commenced to identify, develop and publish useful prevention case studies for wider dissemination. Organisations such as IDA Ireland, Enterprise Ireland, IBEC and the EPA need to continue to enhance their efforts to ensure that businesses are fully aware of the benefits of waste prevention and how best to exploit waste management reduction processes and technologies.²⁸

²⁷ The National Waste Prevention Programme - Second Annual Report 2005/06, EPA, September 2006. http://www.epa.ie/OurEnvironment/Waste/NationalWastePreventionProgramme/AnnualReports/pdfsforNWPPAnnualReports/FileUpload_10897_en.pdf.

²⁸ Details of waste prevention programmes in other benchmark countries was included in the 2006 baseline waste management benchmarking study. See Section 4, pages 22-26.

APPENDIX I - KEY PERFORMANCE INDICATORS

The 2006 *Waste Management Benchmarking - Baseline Assessment* presented a set of key performance indicators for Ireland and the selected benchmark countries to assess Ireland's relative performance in meeting the waste management requirements of the enterprise sector. As waste data tends to be updated on a three or five year cycle, it was not possible to update all of the indicators for each benchmark country this time. Where new data was not available, this is indicated in the notes under each chart.

This appendix assesses Ireland's performance under the key performance indicators, which measure: waste generation; waste treatment options; waste costs; capacity and infrastructure; and, ownership. The sources of data for each indicator are presented in Appendix III.

A.1. Waste Generation

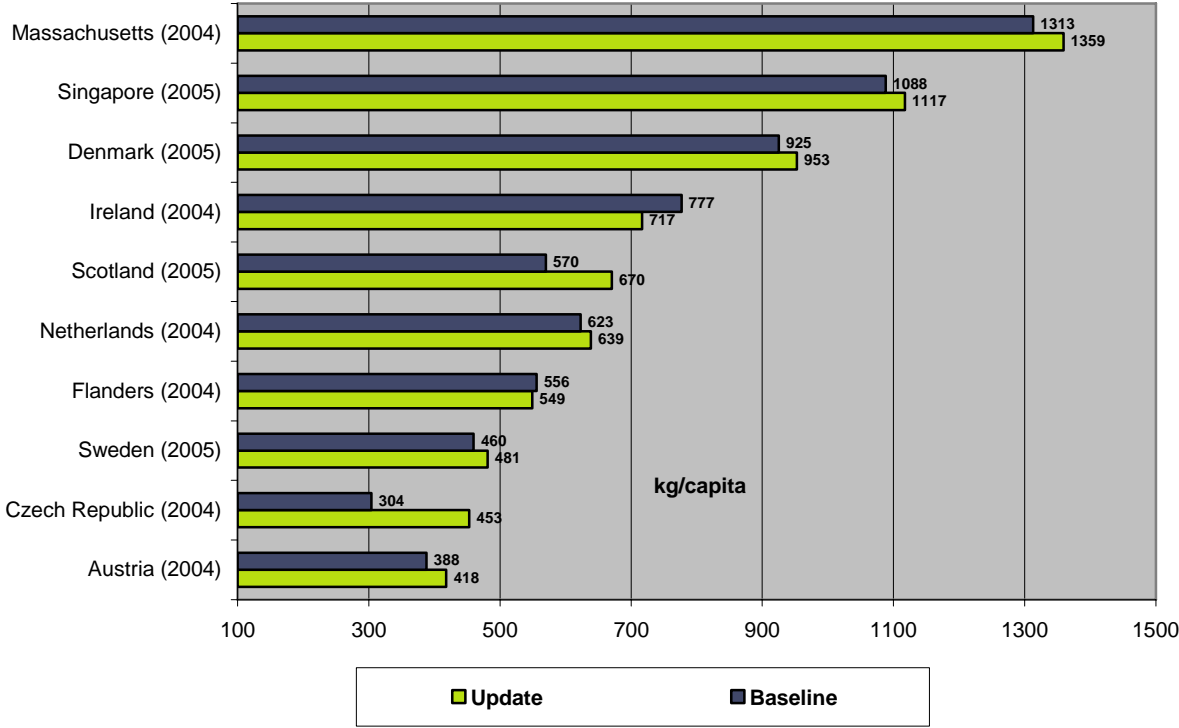
These indicators highlight how much municipal, industrial and hazardous waste each benchmarked country produces on a 'per capita' or 'per employee' basis. The data in this section also provides an indication of waste efficiencies and the success of waste prevention policies.

Municipal Waste Generation

Municipal waste in Ireland includes both household and commercial waste. While this definition is used by most of the selected countries, there is still need for caution when comparing municipal waste generation in Ireland with other countries due to differences in definition.²⁹

²⁹ In particular, the extent to which commercial waste is included can vary.

Figure 1: Municipal Waste Generation per Capita



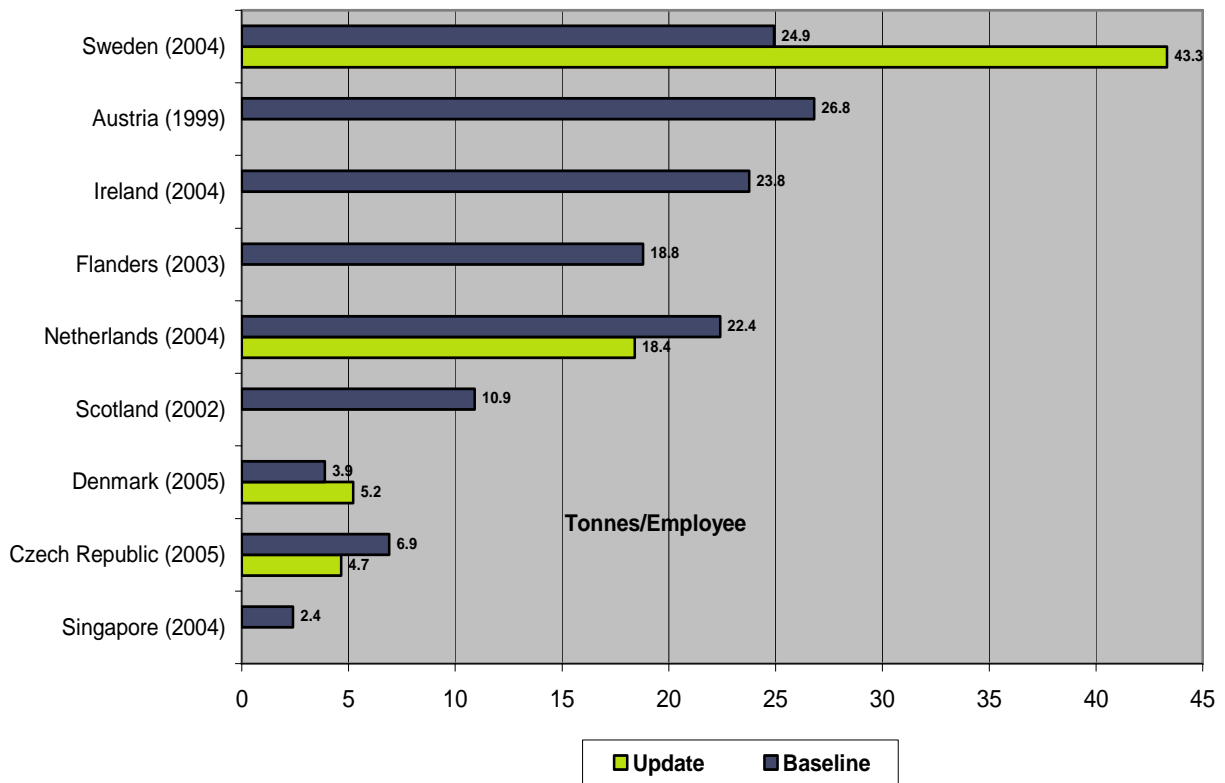
Note: A broader definition of waste of municipal waste was used for Denmark, Singapore and Massachusetts and the baseline data has been revised accordingly. In the baseline report, Ireland’s municipal waste generation per capita was higher than Denmark, Singapore and Massachusetts.

- Municipal waste generation per capita in Ireland has declined from 777 kg in 2004 to 717kg in 2005. Ireland has the fourth highest level of municipal waste generation of the benchmark countries.

Industrial Waste Generation

As the definition of industrial waste varies internationally, data on manufacturing waste was used.³⁰

Figure 2: Manufacturing Waste per Manufacturing Employee



Notes:

1. New data only available for Sweden, the Netherlands, Denmark and the Czech Republic.
2. The significant change in Sweden is mainly due to an additional 9.5 million tonnes of waste generated by the wood manufacturing industry in 2004.
3. Caution should be exercised when interpreting the figures for Singapore and Austria. The quality of the data from Singapore was generally poor, while the data for Austria dates from 1999 and as a result may not provide an accurate reflection of manufacturing waste generation.

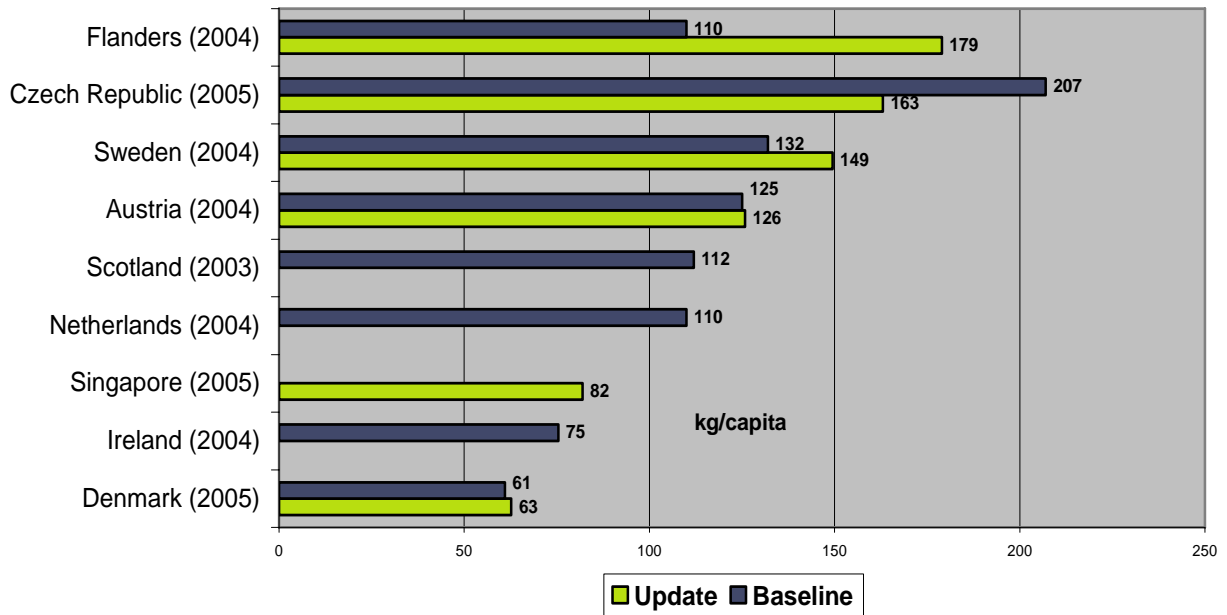
- Ireland is ranked third highest of the benchmark countries, producing 23.8 tonnes of manufacturing waste per employee. Ireland's ranking is unchanged from last year's.

³⁰ Manufacturing waste includes both hazardous and non-hazardous waste. Examples of manufacturing waste include waste metals, chemicals, wood products, textiles and food.

Hazardous Waste Generation

Hazardous waste is generated by all sectors of society, including households, industry, agriculture, construction and healthcare. Most hazardous waste in Ireland is generated by industry, particularly the pharmaceutical and chemical sectors that produce organic solvents.

Figure 3: Hazardous Waste Generation Per Capita



Notes:

1. New data was not available for Ireland, Scotland or the Netherlands, while data for Singapore was included for the first time.
2. A revision to the classification of hazardous wastes in Sweden has expanded the definition and includes other waste streams such as End of Life Vehicles and incineration residues.
3. The data for Ireland, in contrast to the baseline report, excludes unreported and contaminated soil. The figure is 83kg per capita if this is included.

- Of the nine countries benchmarked, Ireland has the second lowest hazardous waste generation per capita, generating 75 kg per capita, an increase of 4 kg per capita on last year's figure. Ireland's low levels of hazardous waste generation can be attributed to the profile of the industrial base in Ireland and the absence of heavy industrial activity.

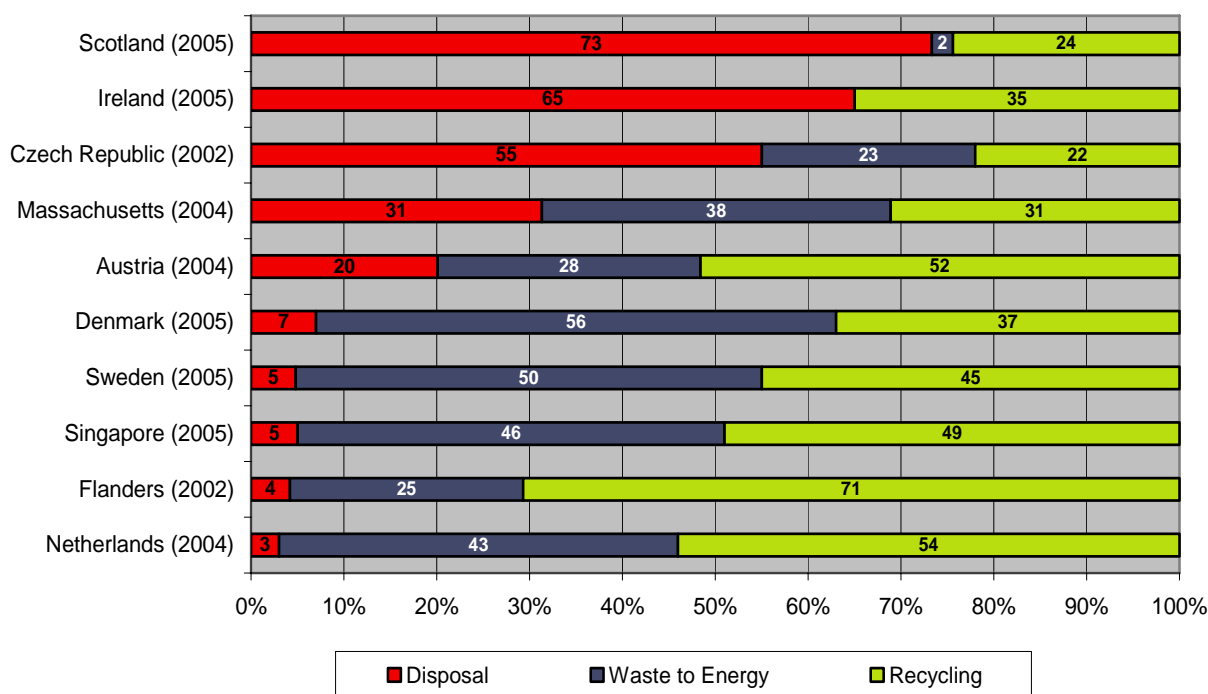
A.2. Waste Treatment Options

The waste management hierarchy indicates that the most preferred waste management option is prevention and minimisation, followed by re-use and recycling, energy recovery and, least favoured of all, disposal. This section outlines what treatment options are being used by each of the benchmark countries to process their municipal (household and commercial) and industrial waste.

Municipal Waste Treatment

This indicator ranks the benchmark countries based on the level of waste that is disposed of in landfill.

Figure 4: Municipal Waste Treatment Options



Note: No new data was available for the Czech Republic.

- Ireland is still highly dependent on landfill to treat municipal waste, although the rate of municipal waste recycling in Ireland has improved significantly in recent years.³¹ In 2005, Ireland disposed of 65 percent of its municipal waste in landfill, the second highest rate of all the benchmark countries. While this represents a slight improvement on the 2004 baseline figure of 66 percent, Ireland's performance on this measure, remains poor compared to the benchmark countries.
- In contrast, the top five ranking countries/ regions on this measure treated, on average, just over five percent of their municipal waste in landfill. The Netherlands, Flanders and Singapore

³¹ The municipal recycling rate was 9 per cent in 1998.

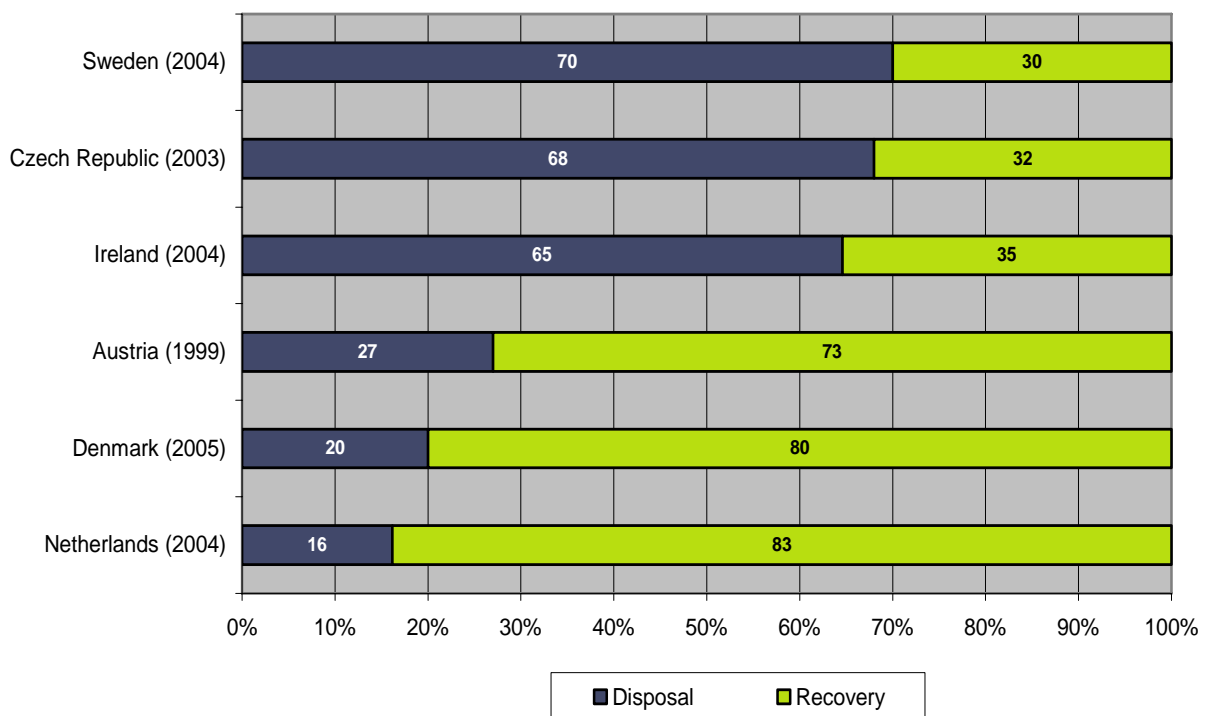
process the bulk of their waste using waste to energy (WTE) and recycling treatment options. Ireland is the only country benchmarked where WTE plays no role in treating municipal waste.

- When municipal waste is broken down between commercial and household waste, significant differences emerge in terms of the volume of waste recycled. Almost half of commercial waste is recycled compared to just 23 percent of household waste.
- Under the EU Landfill Directive, Ireland will be restricted to landfilling 75 percent of the municipal biodegradable waste produced (by weight) in 1995 by 2010. This means Ireland must reduce its 2004 biodegradable waste levels by almost 340,000 tonnes. The *National Strategy on Biodegradable Waste*, published in April 2006, sets out measures to progressively divert biodegradable municipal waste from landfill in accordance with the agreed targets under the Landfill Directive.

Industrial Waste Treatment

Similar to Figure 4, this chart ranks the benchmark countries based on the level of waste that is disposed of in landfill, as this is the least preferable waste treatment solution.³²

Figure 5: Industrial Waste Treatment Options



Note:

1. New data was not available for either Ireland or Austria.
2. Sweden's figure includes large amounts of mining waste which explains the high level of disposal.

³² Due to the lack of information available, the treatment options have been simplified and are reported in terms of disposal and recovery.

- Figure 5 again emphasises Ireland's dependence on landfill as a waste treatment option. In 2004, Ireland disposed of 65 percent of its industrial waste in landfill. Ireland's performance has improved in recent years; in 2001, 75 percent of industrial waste was being landfilled.³³

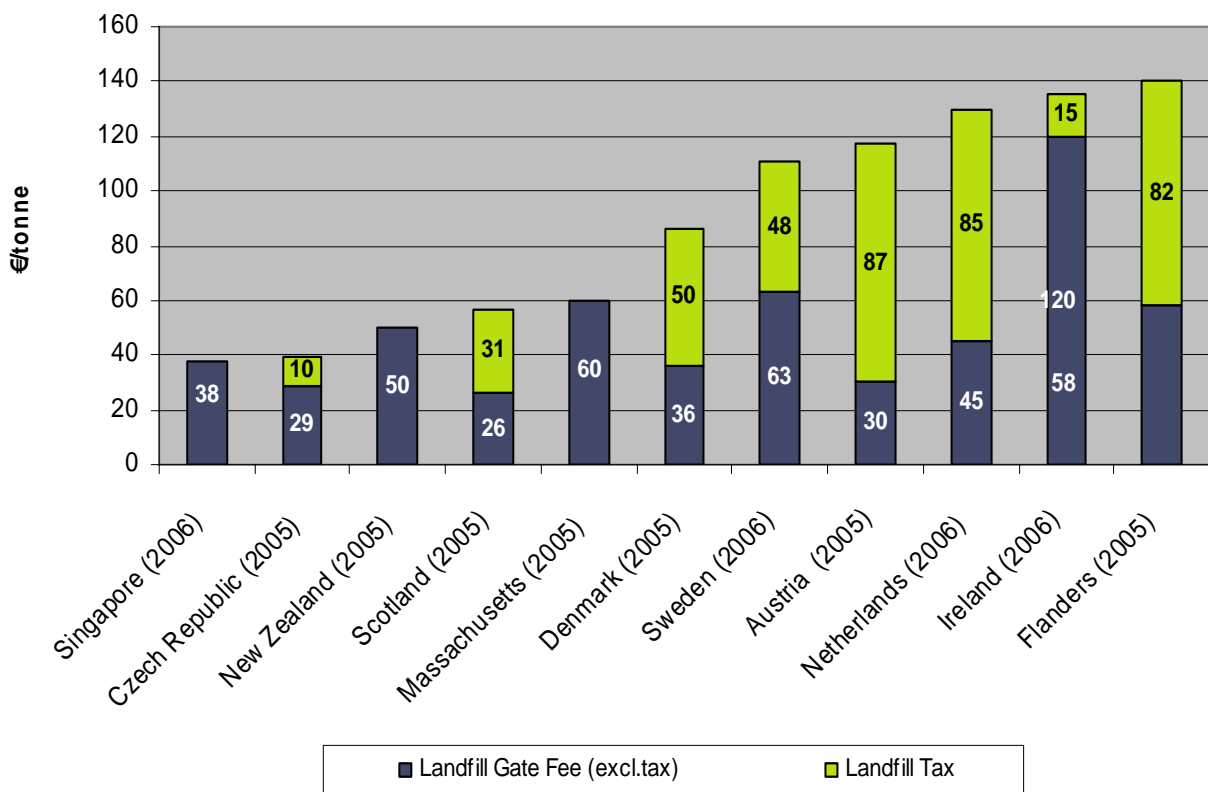
A.3. Costs

In recent years, there have been growing business concerns over the cost of waste management solutions. This section provides an assessment of Irish landfill gate fees, thermal treatment gate fees and biological treatment gate fees.

Landfill Gate Fees for Non-Hazardous Waste

Landfill disposal is in operation in all of the benchmark countries. For Ireland and Scotland, it remains the primary waste treatment solution (Figures 4 and 5).

Figure 6: Non-Hazardous Landfill Gate Fees incl. Landfill Tax 2006



Note: No new data was available for Massachusetts.

- In Ireland, the average landfill gate fee for non-hazardous waste plus tax is €135 per tonne, the second highest of the benchmark countries. The average cost of landfill disposal per tonne has

³³ Repak is currently developing, in conjunction with the EPA and with the support of the DEHLG, a programme of measures to promote prevention and minimisation of waste within industry. The programme will be launched in March and will highlight best practice with a view to helping industry to prevent and minimise packaging waste and save money.

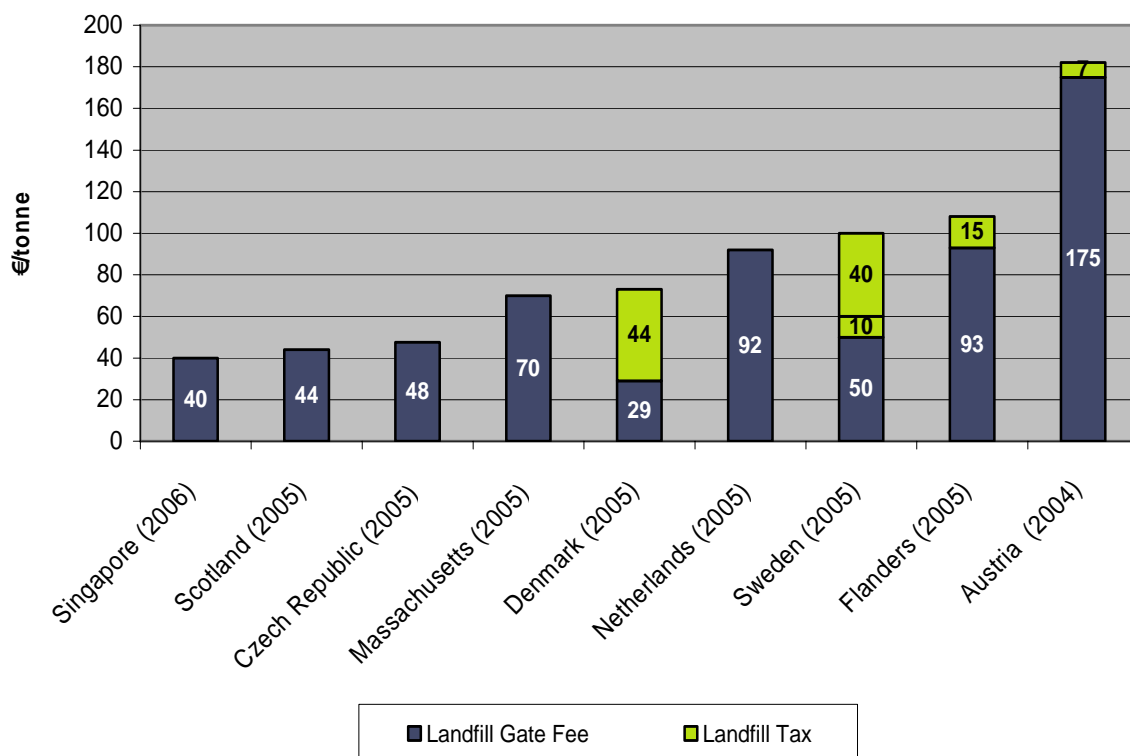
not increased since the baseline report, which supports anecdotal evidence that there has been a levelling off in landfill gate fees in Ireland. The lack of alternative treatment options means that many companies are directly affected by the high landfill costs.

- Many countries are using significant landfill taxes to keep landfill costs artificially high to incentivise the use of preferred treatment solutions such as recycling and WTE.
- Although Ireland has the second highest landfill charge, it has one of the lowest tax surcharge rates for landfill. Consideration therefore needs to be given to the use of the landfill tax as an effective tool in rendering alternative, more environmentally friendly solutions more attractive commercially. The extent to which economic instruments are used to incentivise the use of preferred waste treatment options will need to take into account the availability of other waste management facilities as well as the implications for providing competitively priced waste management solutions to Irish companies. In addition, further research is required to understand why Ireland's landfill gate fees are so high even with a low landfill tax.

Thermal Treatment Gate Fees

The data presented represents the current (average) cost of treatment for non-hazardous and industrial type waste. Thermal treatment taxes are included where applicable.

Figure 7: Non-Hazardous Thermal Gate Fees Including Tax, 2006



Note:

1. New data was not available for either Massachusetts or Scotland.
2. No commercial thermal treatment facilities are currently available in either Ireland or New Zealand.

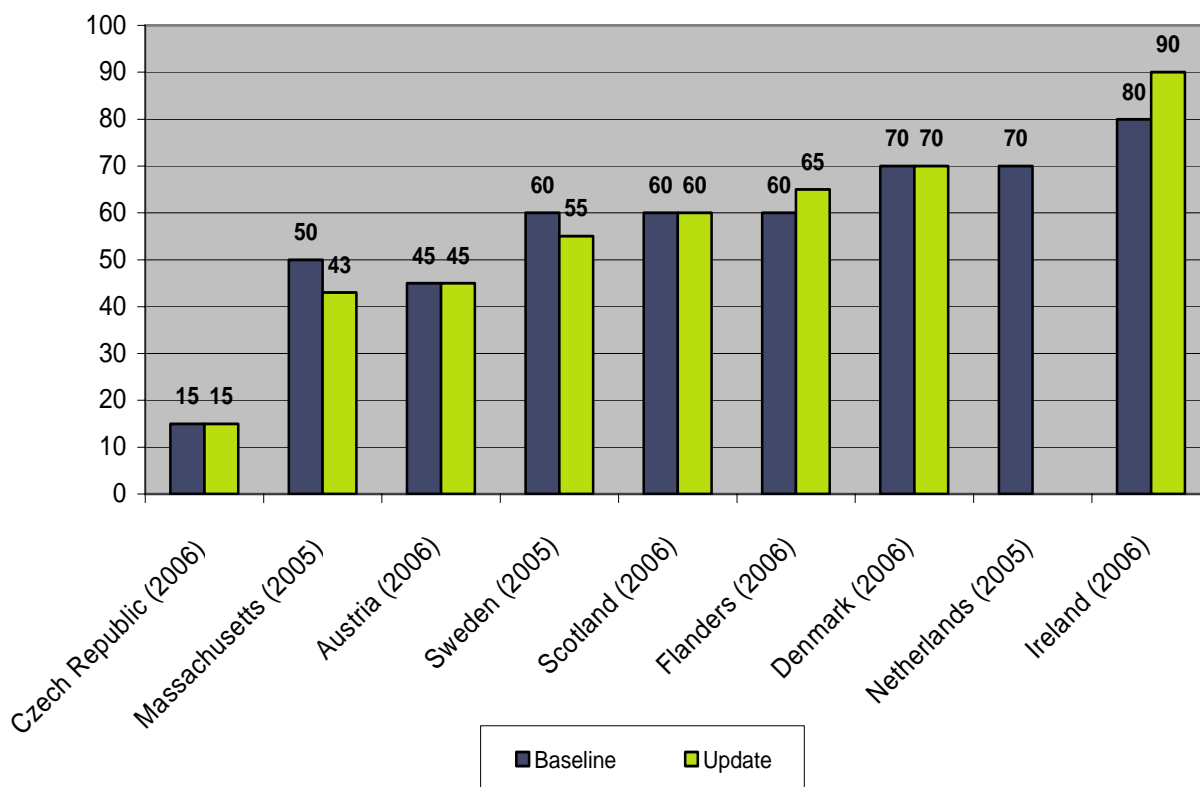
- Singapore continues to have the lowest thermal treatment gate fee of the benchmark countries while Austria still has the highest.

- A thermal treatment tax has been introduced in Sweden which increases its total gate fee to as high as €100 depending on the nature of the facility. The scale of the new tax is dependent on the heat and electricity recovered at the plant and ranges between €10 and €50. The tax encourages operators to be as environmentally efficient as possible.

Biological Treatment Gate Fees

Biological treatment facilities are in operation in all 11 benchmark countries. Biological treatment is a preferred waste hierarchy treatment solution and these facilities can contribute significantly to diverting material from landfills and achieving recycling targets. The costs given represent the current costs for the treatment of municipal and industrial bio-waste.

Figure 8: Biological Gate Fees



Note: No new data was available for the Netherlands.

- To encourage the greater use of biological treatment solutions, biological gate fees are not taxed. The costs given represent the current costs for the treatment of municipal and industrial bio-waste.
- Ireland continues to have the highest biological treatment gate fees of all the benchmark countries at €90 per tonne in 2006. Biological gate fees in Ireland increased by €10 per tonne between 2005 and 2006 which represents an increase of 12.5 percent. This means that biological gate fees in Ireland are now significantly higher than the benchmark countries.

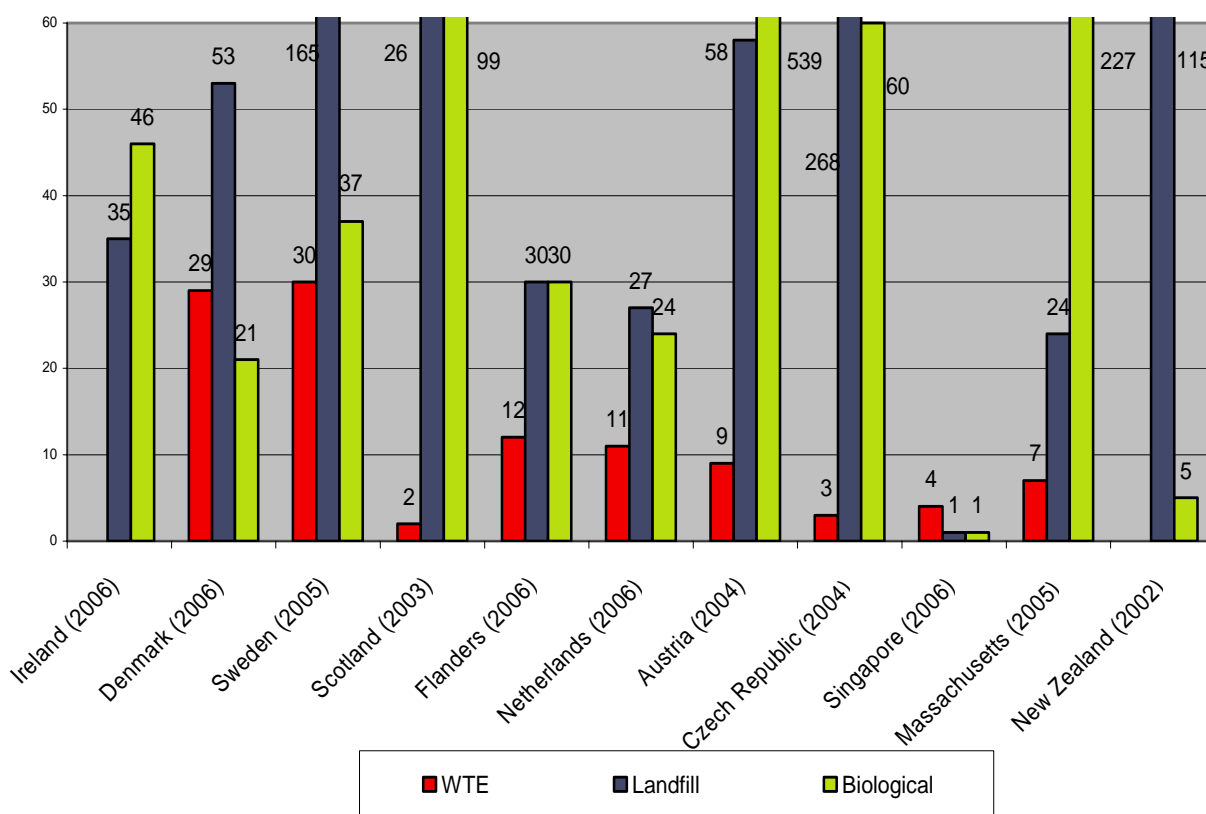
A.4. Capacity and Infrastructure

Ireland needs to develop adequate national capacity to treat all types of waste to meet the needs of a growing economy. Spare capacity can encourage competition and drive down prices, whereas a lack of capacity tends to result in higher prices. This section compares the availability of waste treatment facilities and recycling/reprocessing facilities across the benchmark countries.

Waste Treatment Facilities

An indication of the range of treatment facilities available (i.e. WTE, landfill and biological) across the benchmark countries is provided in Figure 9.

Figure 9: Number of Waste Treatment Facilities in Operation



Note: No new data was available for New Zealand, Scotland or Massachusetts.

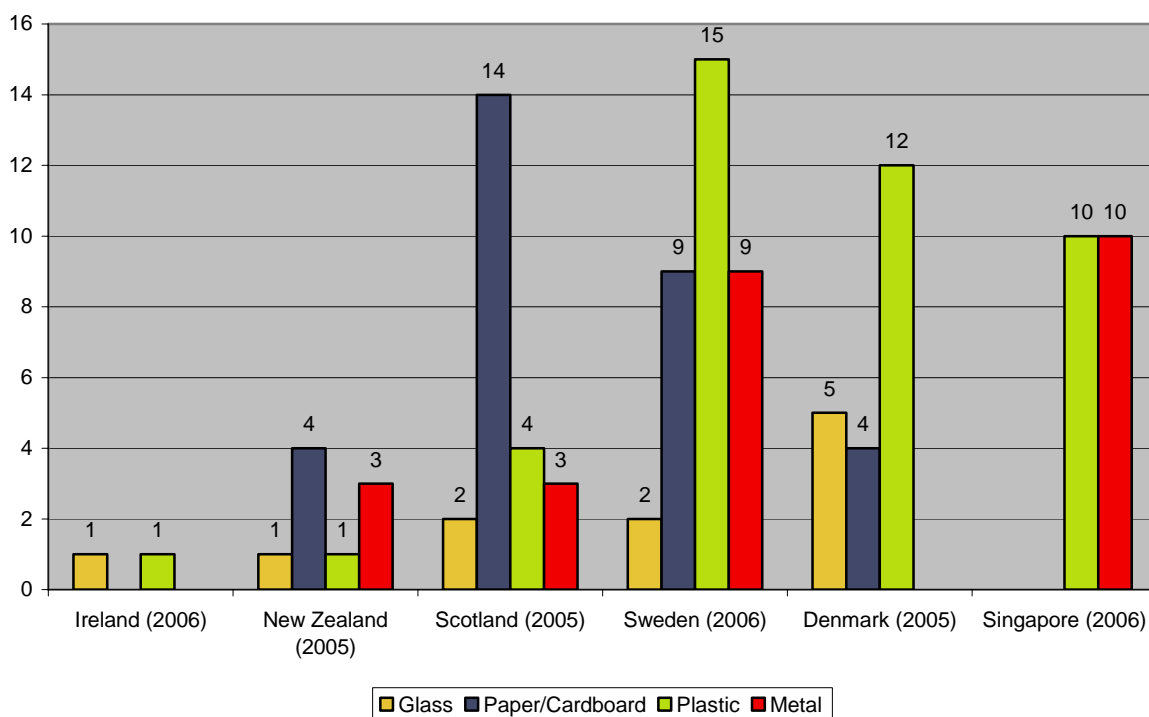
- A comparison of the baseline and update data indicates that there has been an increase in the number of biological treatment plants operating in Ireland (from 35 to 46), although many of these facilities are relatively small in capacity terms.

- The number of landfill sites in Ireland is unchanged at 35. There are no public WTE facilities operating in Ireland, although two facilities in Ireland have been granted planning permission and an EPA licence (in Meath and Cork). Both projects are subject to a court appeal.³⁴

Recycling/Reprocessing Facilities

Figure 10 illustrates the number of recycling or reprocessing facilities in operation in each of the benchmark countries. Three types of recycling/reprocessing facilities are benchmarked; glass refineries, paper/cardboard mills and plastic reprocessing facilities.

Figure 10: Number of Major Recycling/Reprocessing Facilities in Operation



Note: Sourcing data for Austria, the Czech Republic, Flanders, Massachusetts and Netherlands again proved difficult, while no new updated data was available for New Zealand or Scotland.

- Figure 10 highlights the lack of facilities for treating recyclable materials in Ireland compared to the benchmark countries.
- Due to the lack of facilities, the majority of Ireland's recyclable materials are exported for further treatment. Transport costs can add €25 to €50 per tonne to the cost of waste treatment, depending on the material.

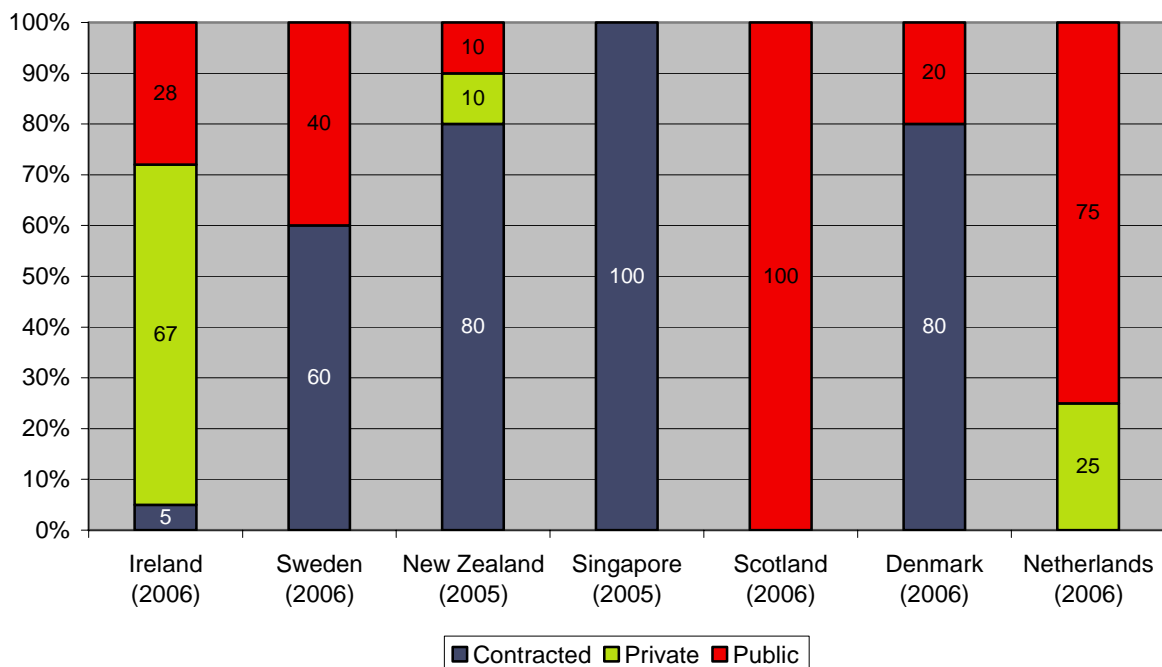
³⁴ Indaver received planning permission and an EPA waste licence for a 150,000 tonnes per annum waste-to-energy facility in Carranstown, Co. Meath. This project was subject to an appeal to the Supreme Court, a final judgment was not made. In the meantime, Indaver re-applied to Meath County Council for the expansion of the proposed facility to allow an annual capacity of 150,000 - 200,000 tonnes per annum. Regarding the Cork plant, it too received planning permission and an EPA waste licence but a judicial review of An Bord Pleanála's planning decision was sought and granted in January 2005. The High Court hearing has yet to be held.

- The volume of recycled materials from municipal waste reprocessed in Ireland in 2005 decreased by 25 percent compared to 2004 as Ireland becomes increasingly dependent on foreign recycling infrastructure with 83 percent of municipal recyclable materials exported.³⁵

A.5. Ownership - Municipal Collection

The final indicator benchmarks the degree to which municipal waste collection services are provided by the public and private sector across the benchmark countries. Three categories are identified; public collection ('public'), publicly controlled but employing a private contractor under contract ('contracted') and private collection ('private'). Collection and treatment of waste tends to be operated to varying degrees by the public and private sector across the benchmark countries.³⁶

Figure 11: Municipal Collection Ownership




Note: No new data was available for either New Zealand or Singapore.

- Ireland is unusual among the benchmark countries in having private companies directly involved in the collection of waste without any municipal involvement in establishing the contract and determining what happens to the waste.
- While the collection of municipal waste was evenly split between the public and private sector in 2005, it is estimated that the extent of private waste collection has increased from 48 to 67

³⁵ National Waste Report 2005, EPA, January 2007.

³⁶ Direct collection of waste by municipalities is common in most of the EU countries benchmarked. This comprises mainly household waste but in some cases some commercial waste is also included. Ownership data was also collected for industrial waste and hazardous waste for a selection of benchmark countries. The private sector is primarily responsible for collecting these waste streams.



percent in 2006, with nearly all commercial waste and approximately half of household waste now collected by private operators.

APPENDIX II: NORTHERN IRELAND

One of the four horizontal principles underpinning NDP 2007-2013 is all-island cooperation. The NDP proposes to realise the opportunities offered by strengthening North/South cooperation across a wide range of areas including infrastructure provision and spatial planning.

Cooperation in developing infrastructure will help ensure more efficient planning and joined-up delivery of key infrastructure projects, resulting in better value for money, economies of scale in public investment and better deals from financial markets. It is therefore timely to provide an overview of Northern Ireland's performance across a number of key areas such as waste generated and treatment options.

The definitions for waste categories used in the North differ from those used in the South. Municipal waste is made up of almost 90 percent household waste in the North compared to approximately 60 percent in the South. Industrial and commercial waste are categorised together in the North.

The most recent municipal waste data for the North is for 2005/2006 and was published in December 2006. The key findings are:

- Total municipal waste generated in the North in 2005/06 was 1,063,510 tonnes, an increase of 1.2 percent on 2004/05 levels. This represents 617 kg per capita³⁷; and
- Almost three quarters of the North's municipal waste is disposed of in landfill. In 2005/06, 23 percent of municipal waste was recycled, up from 18 percent in 2004/05;

Industrial and commercial waste data is due to be updated shortly but at the time of publication, the most recent data available was for 2002. The key metrics are:

- The most common waste management option in the North was landfill, which accounted for 40 percent of waste generated by industry and commerce while one third was recycled. Around a fifth of industrial and commercial waste was incinerated in 2002; and
- Industrial and commercial waste generated per employee in 2002 was 1.07 tonnes. Using manufacturing waste only, the waste generated per employee is just marginally higher at 1.09 tonnes per employee. This is significantly lower than the manufacturing waste per employee of the benchmark countries and is a reflection of the industrial profile of the North's economy.

It is proposed that the next update of the waste management benchmarking analysis will look at the all-island market in more detail.

³⁷ This is not directly comparable with the municipal waste generated per capita for the South as the definitions vary. The South's definition also includes commercial waste.

APPENDIX III: DATA SOURCES

Figure A.1: Municipal Waste Per Capita	
Ireland	EPA, National Waste Report 2005
Denmark	Danish Ministry for the Environment EPA, Waste Statistics 2005
Sweden	The Swedish Association of Waste Management
Scotland	SEPA, Rolling Year Data, April 2005 - March 2006.
Flanders	OVAM
Netherlands	SenterNovem
Austria	Austrian Federal Ministry of Agricultural Environment and Water Management, Federal Waste Management Plan, 2006
Czech Republic	CEWEP, Country Report: Czech Republic, 2006
Singapore	National Environment Agency Website: http://app.nea.gov.sg/psi
Massachusetts	Department of Environmental Protection, Solid Waste Master Plan: 2006 Revision.

Figure A.2: Manufacturing Waste Generation	
Ireland	EPA, National Waste Report 2004, January 2006
Denmark	Danish Ministry for the Environment EPA, Waste Statistics 2005
Sweden	The Swedish EPA, National Waste Report, 2004
Scotland	SEPA, Waste Data Digest 5, 2003 and 2003/2004 data
Flanders	OVAM
Netherlands	Central Bureau voor de Statistiek, 2004
Austria	Austrian Federal Ministry of Agricultural Environment and Water Management, Federal Waste Management Plan, 2001
Czech Republic	Czech Statistical Office, 2005
Singapore	National Environment Agency Website: http://app.nea.gov.sg/psi

Figure A.3: Hazardous Waste Per Capita	
Ireland	EPA, National Waste Report 2004
Denmark	Danish Ministry for the Environment EPA, Waste Statistics 2005
Sweden	The Swedish EPA, National Waste Report, 2004
Scotland	SEPA, Waste Data Digest 5, 2003 and 2003/2004 data.
Flanders	OVAM
Netherlands	Waste Management Council, The Future of Incineration of Specific Hazardous Waste, 2004
Austria	Austrian Federal Ministry of Agricultural Environment and Water Management, Federal Waste Management Plan, 2006
Czech Republic	CEWEP, Country Report: Czech Republic, 2006
Singapore	National Environment Agency Website: http://app.nea.gov.sg/psi

Figure A.4: Municipal Waste Treatment Options	
Ireland	EPA, National Waste Report 2004
Denmark	Danish Ministry for the Environment EPA, Waste Statistics 2005
Sweden	The Swedish Association of Waste Management
Scotland	SEPA, Rolling Year Data, April 2005 - March 2006.
Flanders	OVAM
Netherlands	SenterNovem
Austria	Austrian Federal Ministry of Agricultural Environment and Water Management, Federal Waste Management Plan, 2006
Czech Republic	Ministry of the Environment of the Czech Republic, Waste Management Plan of the Czech Republic, 2003
Singapore	National Environment Agency Website: http://app.nea.gov.sg/psi
Massachusetts	Department of Environmental Protection, Solid Waste Master Plan: 2005 Revision, Public Hearing Draft, September 2005

Figure A.5: Industrial Waste Treatment Options	
Ireland	EPA, National Waste Report 2004
Denmark	Danish Ministry for the Environment EPA, Waste Statistics 2005
Sweden	The Swedish EPA, National Waste Report, 2004
Netherlands	SenterNovem
Austria	Austrian Federal Ministry of Agricultural Environment and Water Management, Federal Waste Management Plan, 2001
Czech Republic	Ministry of the Environment of the Czech Republic, Waste Management Plan of the Czech Republic, 2003

Figure A.6: Non-Hazardous Landfill Gate Fee	
Ireland	RPS Ireland Data
Denmark	COWI (Denmark) Data
Sweden	The Swedish Association of Waste Management
Scotland	RPS Scotland Data
Flanders	OVAM
Netherlands	SenterNovem
Austria	CEWEP, Country Report: Austria, 2006
Czech Republic	CEWEP, Country Report: Czech Republic, 2006
Singapore	National Environment Agency Website: http://app.nea.gov.sg/psi
Massachusetts	Massachusetts Department of Environmental Protection
New Zealand	Ministry for the Environment

Figure A.7: Non-Hazardous Thermal Treatment Gate Fee	
Denmark	RenoSam, Benchmarking 2006
Sweden	The Swedish Association of Waste Management
Scotland	RPS Scotland
Flanders	CWEP, Country Report: Belgium, 2006
Netherlands	SenterNovem
Austria	CEWEP, Country Report: Austria, 2006
Czech Republic	CEWEP, Country Report: Czech Republic, 2006
Singapore	National Environment Agency Website: http://app.nea.gov.sg/psi
Massachusetts	Massachusetts Department of Environmental Protection

Figure A.8: Biological Treatment Gate Fee	
Ireland	RPS Ireland Data
Denmark	RenoSam, Benchmarking 2006
Sweden	The Swedish Association of Waste Management
Scotland	RPS Scotland Data
Flanders	VLACO Flanders Composting Association
Netherlands	Brance Verenigen Organische Reststoffen (Dutch Composting Association for Green Waste)
Austria	Kompost - Entwicklung & Beratung Composting Consultancy
Czech Republic	Czech Association for Biomass
Massachusetts	Department of Environmental Protection

Figure A.9: No. of Waste Treatment Facilities	
Ireland	EPA
Denmark	Danish Ministry for the Environment EPA, Waste Statistics 2005
Sweden	COWI Data
Scotland	SEPA, National Waste Strategy, 2003
Flanders	OVAM
Netherlands	SenterNovem
Austria	Austrian Federal Ministry of Agricultural Environment and Water Management, Federal Waste Management Plan, 2006
Czech Republic	Statistical Environmental Yearbook of the Czech Rep, 2005
Singapore	National Environment Agency Website: http://app.nea.gov.sg/psi
Massachusetts	Department of Environmental Protection (DEP) , Active MSW Combustion Facilities in Massachusetts, 2004 DEP, Active Solid Waste Landfills in Massachusetts, 2005 DEP, Active Composting Sites, 2005
New Zealand	Ministry for the Environment

Figure A. 10: No of Recycling/Reprocessing Facilities	
Ireland	RPS Ireland Data
Denmark	COWI Data
Sweden	COWI Data
Scotland	RPS Scotland Data
Singapore	National Environment Agency Website: http://app.nea.gov.sg/psi
New Zealand	Ministry for the Environment

Figure A. 11: Municipal Collection Ownership	
Ireland	RPS Ireland Data
Denmark	COWI (Denmark) Data
Sweden	The Swedish Association of Waste Management
Scotland	RPS Scotland Data
Netherlands	SenterNovem
Singapore	Ministry of the Environment and Water Resources, The Singapore Green Plan 2012, 2002
New Zealand	Ministry for the Environment

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