MARKET REPORT ON
ANAEROBIC

May 2009

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- Market and Industry Information: Inter*Trade*Ireland has extensive market and industry information available through the Business Monitor and the Trade Statistics Webpage. This data will help companies to take informed decisions and develop sound strategies.

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Some figures are quoted in pounds to euros; this reflects the source of the data as being from Northern Ireland or from Ireland.

EXECUTIVE SUMMARY

This report examines the current economic conditions of the Composting and Anaerobic Digestion Market on the island of Ireland. The report looks at the key factors influencing the market for organic waste as well as new initiatives and the environmental benefits from processing organic waste in composting and anaerobic digestion facilities.

This report is set in the context of the EU Landfill Directive which requires member states to divert biodegradable municipal waste (BMW) from landfill, of which organic waste is a significant component.

The current issues concerning the organic waste sector are:

- Over reliance on landfills for disposal of organic waste. Significant amounts of organic waste needs to be diverted from landfills under the EU landfill directive to avoid financial penalties from the European Commission.

- Compost producers are aware of the need to respond and provide processing infrastructure and have indicated that – subject to the right economic conditions – they could add sufficient new capacity in the short term.

- Funding is needed to support the rapid development of food waste reprocessing facilities across the island of Ireland. This will help to stimulate a greener economy by creating skilled jobs in construction, collection, reprocessing marketing and distribution - and bring significant environmental benefits.

- New end markets for compost are emerging in the peat and tillage industries.

- Anaerobic digestion is emerging as a technology to process food waste, due in part for its potential as a source of renewable energy.

Northern Ireland:

- Landfill levy is at £40/tonne (From April 2009) and will increase by £8 per year up to 2013.

- Food waste collections have grown rapidly and are expected to continue to do so as higher landfill levy rates make alternative disposal routes for food waste more financially attractive.

- The Northern Ireland Landfill Allowance Scheme (NILAS)[1] places limits on local authorities to landfill up to an allocated tonnes of BMW to landfill. A fixed penalty of £150/tonne will be incurred if a local authority breaches its landfill allowances target in the scheme year. This has created a good incentive to divert organic waste from landfills.

Ireland:

- New initiatives are needed to create the right economic climate to divert organic waste from landfills.

    - Landfill levy is at €20/tonne and needs to be increased in an escalator effect to the limits like in Northern Ireland.

    - Statutory instrument making the commercial brown bin[2] mandatory (this is being drafted in food waste regulations).

    - Local authorities putting conditions for the roll out of brown bins in waste collection permits.

1 The Landfill Allowance Scheme (NI) Regulations 2004 (NILAS) came into operation on 1st April 2005.
2 'Brown bin' is source separated collection scheme for food waste/garden & park waste.

- Landfill gate fees have to be high, to create a disincentive. This will make source separation of organic waste more financially attractive. Recent and projected increases in landfill levy rates are pushing disposal costs towards this point in Northern Ireland. Ireland needs to increase the landfill levy to the same level. When combined with the prospect of potential fines under the NILAS, this provides local authorities in Northern Ireland with a strong financial driver towards the diversion and treatment of food waste.

- In Ireland there will be restrictions on the amount of allowed organic waste to be landfilled in the EPA's *Guidance on Municipal Solid Waste – Pre-treatment & Residuals Management* to be published in June 2009.

- The national legislation making the commercial brown bin mandatory will create a driver for the diversion of organic waste from landfills.

Set against this, the compost producers have indicated that once the right economic conditions are created, additional processing infrastructure will be provided and will require a capital investment of the order of £225-450 million.

The sectors have the potential to create approximately 1,500 directly employed and 10,000 indirectly employed linked or work on occasion in the sectors.

Potential Capacity Required	Number of Jobs Potentially Created	Capital Investment Required
1.5 to 2 million tonnes capacity	Directly employed - 1,500 Indirectly employed – 10,000	£225-450 million

Demonstration on application of compost.

1. INDUSTRY OVERVIEW

Composting involves the rapid decomposition of organic materials, accompanied by self-heating which sanitises the material, followed by a cooler, slower decay of the woodier plant organic matter. The whole process takes three to six months and produces a crumbly, soil-like product that is a good source of organic matter and nutrients and can be beneficially applied to most soil types. When the composting process is complete, the compost is graded to achieve a suitable particle size for different applications.

Windrow composting:
Garden/park wastes can be composted in the open air in elongated piles called windrows. The windrows are monitored throughout the composting process to ensure that the optimum temperature, oxygen concentration and moisture content are maintained. The windrows are turned periodically to introduce fresh air and watered to maintain the ideal conditions for composting.

In-vessel composting (IVC):
Household food wastes and other meat-containing food wastes need to be composted under controlled conditions to comply with Animal By-Products Regulations. This is to ensure that any pathogens are killed and also that there is no access to wild animals. In-vessel composting is similar to the open-air windrow composting, but is carried out in an enclosed vessel, usually followed by an outdoor maturation stage. This allows a greater degree of control of the process temperature, oxygen and moisture.

Anaerobic digestion (AD):
Unlike composting, AD is carried out in an oxygen free (anaerobic) environment. The feedstocks are placed in a warmed sealed airless container, where they ferment (digested by bacteria) to produce a biogas which can be used as a fuel, and liquid and solid 'digestates' which can be used as fertilisers and soil conditioners. AD has the ability to treat wetter waste streams, so it is particularly suited to industrial feedstocks and municipal food wastes.

At present, AD accounts for a small fraction of organic waste treatment, but this proportion is expected to grow rapidly over the next few years.

Appendix A includes a list of the market leaders in the operation of composting and anaerobic digestion facilities.

1.1 Market size and segmentation

Provisional results from an Cré[3] research study showed that based on a number of European case studies from advanced source separation schemes, the collectable potential of food, garden/park organic materials from householders and similar institutions in Ireland is estimated to be 654,000 tonnes of organic fraction (food and garden waste) of BMW. In addition, the collectable portion of commercial organic BMW (approximately 331,691 t) and industrial organic waste (597,816 t) sources may be added to the materials requiring processing by composting/anaerobic digestion. This results in a total potential of 1,447,194 tonnes in Ireland.

There are landfill diversion targets of organic waste to be met. However the composting and anaerobic digestion industry aims to go above and beyond those targets and process as much organic waste as suitable to manufacture quality assured compost products.

In Northern Ireland, under the NILAS (Landfill Allowance Scheme NI regulations) the permitted amount of BMW to be sent to landfill in 2006/07 was 655,547 tonnes. There was 535,716 tonnes of BMW sent to landfill. This amount utilised 81.7% of the landfill allowances available for the 2006/07 scheme year, 119,831 tonnes less than the permitted maximum. Composting is the most common recovery route with 106,208 tonnes collected for composting in 2006/07[5].

If the estimated organic waste arising is 1.5-2 million tonnes in North and South were composted/digested, the estimated turnover could be in the region of €195-260 million[6].

[3] An international team of consultants conducted this study for Cré and examined the waste industry in Ireland and produced these figures for the Republic of Ireland. This report will be published shortly.
[4] Data from EPA Annual Environmental Reports.
[5] Municipal Waste Management Northern Ireland For the year ended 31 March 2007. Environment and Heritage Service.
[6] This figure could change if higher proportion of compost was sold in higher value markets. The Cré compost quality assurance scheme in the Republic will increase the value of compost as people.

1.2 Export market of compost

The island of Ireland has a very unique market of peat dilution for compost compared to other member states in the European Union. According to the Central Statistics Office in 2006 631,692 tonnes of peat was exported from Ireland. A major use of this was for horticultural use in the UK. There are many peat producing companies (e.g. Bord na Mona, Westland, Erin Horticulture) in Ireland who are diluting peat with compost. Bord na Mona alone produced 1.889 million cubic metres of horticultural peat products and sold these products for €56.1 million in 07/08. 90% of their horticultural peat products were exported[7]. Bord Na Mona has outlined that they are part of the Growing Media Initiative (GMI). The GMI endeavours to reach 90% dilution of peat within the retail sector. They have also outlined that they will source green waste compost from other composting companies in Ireland to dilute peat products.

The prices of chemical-based fertilisers increased sharply in 2007/2008. Since then the prices have decreased but still remaining higher than pre 2007/08 prices. Compost has the opportunity to offset imports of artificial fertilisers an alternative source of nutrients in particular phosphorus. The use of compost also at the same time provides a good source of organic matter which builds up the natural productivity of soil overtime.

1.3 Prices

Northern Ireland Gate fees

Local authorities and waste management companies pay disposal charges or 'gate fees' for treatment of organic waste at composting facilities. Gate fees for windrow composting are broadly similar to those payable for landfill in Northern Ireland. But because no landfill levy is incurred, composting garden waste is substantially cheaper than disposing of it via landfill (Graph 1), notwithstanding the higher costs associated with segregated collections. Over the past five years, garden waste gate fees have risen faster than the rate of inflation in Northern Ireland. However, landfill costs have increased at a faster pace still, primarily because of the escalator on landfill levy.

Gate fees for food waste (or mixed food and garden waste) are higher than those for garden waste because of the higher capital and operating costs associated with in-vessel composting (IVC) and anaerobic digestion (AD) facilities. While landfill disposal costs are broadly in line with gate fees for food waste processing facilities in Northern Ireland, the rising cost of landfill will mean that food waste processing will become an increasingly attractive option (Graph 1).

Northern Ireland is making good progress to meet its Landfill Diversion targets as the cost of landfill disposal increases. In this sense, it was announced recently that the levy in Northern Ireland and the rest of the UK will increase £8 per year and by 2013 the levy will be £72 per tonne.

Graph 1:
Organic Waste Gate Fees in Northern Ireland and UK

Sources: LetsRecycle.com and MRW
Forecast for landfill incorporates changes in landfill tax only.

[7] Bord na Mona Annual Report 2007/2008.

Ireland Gate Fees[8]

The situation in Ireland is quite different from Northern Ireland. Graph 2 shows that when the levy was introduced in 2002 (€15) in the South and there was limited capacity of landfills which resulted in high landfill gate fees. As a result, the cheaper treatment of organic waste in composting facilities grew in a short period. However, in 2006 onwards, an over supply of landfill capacity resulted in increased competition in the landfill market to reduce prices and no increases in the landfill levy resulted in a significant decrease in landfill gate fees. This had a negative result in that it became increasing commercially unviable for composting site to compete with landfills gates fees. This situation needs to be reversed immediately by a significant increase in the landfill levy to the same level as in Northern Ireland.

Graph 2.
Landfill Gate Fees and the Number of New Compost Site Opened Each Year (Source: Cré)

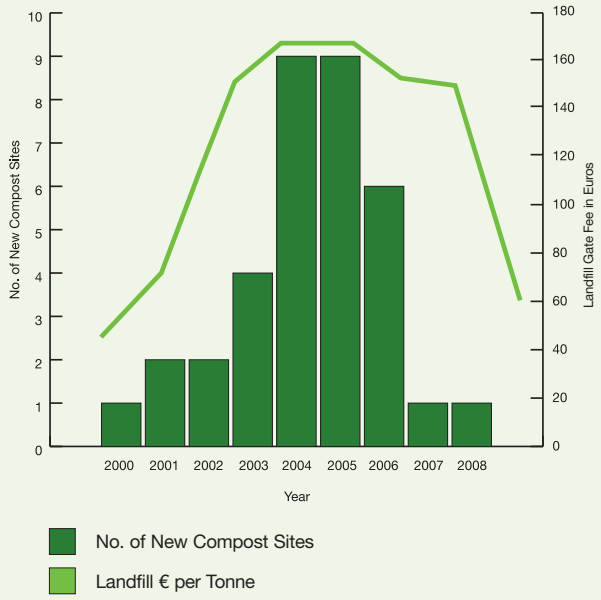


Table 1. Gate Fees at Composting Sites in Ireland

Year	Garden/Park Waste	Biowaste brown bin
	€/tonne	
2005	50*	80[9]
2006	40*	90[10]
2009	30*	70-80*

**Cré survey of compost sites*

Compost Prices[11]

For those products that are sold, prices vary according to the grade of compost. Ex-works prices for loose compost typically range from around £3 per m^3 for 0-40 mm grade composts to £12 per m^3 for finely graded (0-5mm) composts. The average bulk density of compost is around 500kg/m^3, which implies a price range of £6 to over £20 per tonne.

The evidence on trends in compost prices is mixed. Some data sources suggest that prices have risen over the past three years, while others suggest falling prices. Both the demand for and supply of compost appear to have grown, but it is not clear which of these effects is dominating. On the one hand, the supply of compost from source segregated wastes has increased dramatically over the past few years, possibly putting downward pressure on prices. On the other, demand for organic composts is also growing, in part reflecting the increased retail demand for organic food and peat-free composts[12].

The value of compost as a replacement for inorganic fertiliser is estimated to be around £5 per tonne, although this is offset by the costs of spreading, which are in the order of £1-£3 per tonne. The value of compost as a replacement for inorganic fertiliser is estimated to be approximately €30 per tonne in the current situation in Ireland[13].

The prices of chemical-based fertilisers increased sharply in 2007/2008. Since then the prices have decreased but still remaining higher than pre 2007/08 prices.

[8] 2000-2006 gate fees are an unweighted average based on data collected by the Irish Waste Management Association and include the environment levy. It is acknowledged that the actual costs varied considerably around the country. The 2008 and 2009 data are from a survey of some Cré members of the fees landfill operators charged.
[9] Forfas (2007) Waste Management in Ireland: Benchmarking Analysis and Policy Requirements.
[10] Forfas (2007) Waste Management in Ireland: Benchmarking Analysis and Policy Requirements.
[11] WRAP (2008) Market Situation Report – Realising the value of organic waste.
[12] Source: Horticultural Trades Association. Garden Industry Monitor.
[13] CSO figures.

Against this backdrop, higher usage of compost in agricultural applications as an alternative source of nitrogen and phosphorus has the potential to offer cost savings to farmers.

Topsoil prices vary according to the end market, specification and the volume required, but typical delivered price ranges are £11- £18 per tonne for the landscaping sector and £15-£30 per tonne for sports and leisure applications.

The retail market for composting products is highly differentiated into dozens of niche products (e.g. seed/ potting compost, container/basket compost etc). Bagged retail composts range in price from around £50 per tonne for multipurpose compost to over £1,000 per tonne for speciality blends (although the market for and yield of these products is small).

1.4 End markets for composts

Organic waste and manufactured composts are bulky, so transport and distribution costs limit the distances over which it is feasible to move both feedstock and final products. As a result, treatment facilities tend to be located close to feedstock supplies, the end-markets tend to be local, and the products and end users vary by region. Products targeted at sectors such as horticulture, landscaping and sports turf do offer higher values, which is reflected in increased regional and national distribution of these products.

The main market for compost in Northern Ireland[14] is agriculture (about 80%) followed by landscaping (20%).

In Ireland in 2006, the 36 sites composted approximately 162,606 tonnes of biodegradable materials and from this, produced 79,783 tonnes of finished compost[15]. The main markets (based on the 79,783 tonnes) for this compost were application to agricultural land (33%); use in peat dilution (21%), landscaping (16%), and horticulture (14%); as landfill cover (11%); and for other uses (5%).

New markets for compost:

Tillage: The Irish Farmer's Journal (April 09) reported that monitoring of soil Organic Matter (OM) is to become compulsory on land in Ireland that has been cultivated for more than six years. Where the soil OM level falls below 3.4%, growers will be obliged to put in place suitable remedial action. The terms and conditions for the 2009 Single Farm Payment (SFP) specify that farmers must "maintain soil organic (OM) matter levels through appropriate practices[16]". This new requirement is mainly of relevance to land in tillage, where soil OM levels fall over time through cultivation. This opens a new potential market for compost in tillage land, as compost is high in organic matter.

Peat Dilution: Bord na Mona is the largest producer of peat free growing media and peat free decorative horticultural products in Ireland and the UK. Bord na Mona is actively working with Enterprise Ireland, WRAP and the Growing Media Association in the UK to help comply with the Growing Media Initiative (GMI). The GMI endeavours to reach 90% dilution of peat within the retail sector. Bord na Mona would happily dilute all of its retail growing media brands in Ireland and the UK with composted green waste, if the necessary materials were readily available. It would be willing to source composted green waste from others within the industry if the material was of adequate standard.

Organic Sector: Cré recently visited a few certified organic gardening organisations. According to K. Laitenberger, organic gardener, there is no certified organic compost in Ireland. In some case certified organic compost is imported from the UK and Germany. This sector offers a huge potential for some Irish composting sites to produced certified organic compost.

[14] WRAP (2008) Market Situation Report – Realising the value of organic waste.
[15] Prasad, M and P Foster (2009) To Develop an Industry Led Quality Standard for Source-Separated Biodegradable Material Derived Compost. Environmental Protection Agency, Wexford.
[16] Farmer's Journal Newspaper, April 2009.

1.5 Quality Standards and Quality Assurance Schemes

- Specification for compost materials (BSI PAS 100): In Northern Ireland a successfully compost quality assurance scheme has being operating for a number of years.

- Quality Protocol: WRAP (Waste & Resources Action Programme) is working on a Quality Protocol for anaerobic digestate to be launched in 2009.

- EPA (Environmental Protection Agency, Ireland) waste licenses: EPA awards licenses for the composting and anaerobic digestion facilities in the waste sector. Included in these licences are compost quality standards. In addition, in May 2009, EPA funded the research project "Development of an Industry-Led Quality Standard for Source-Separated Biodegradable Material Derived Compost".

- Cré Compost Quality Assurance Scheme: Certification Europe will manage this Scheme and will provide third party assessment and conformity with the quality standard developed in the EPA funded research project "*Development of an Industry-Led Quality Standard for Source-Separated Biodegradable Material Derived Compost*". With this scheme composts certified by Certification Europe will be traceable, safe and reliable.

1.6 Capital costs of composting[17]

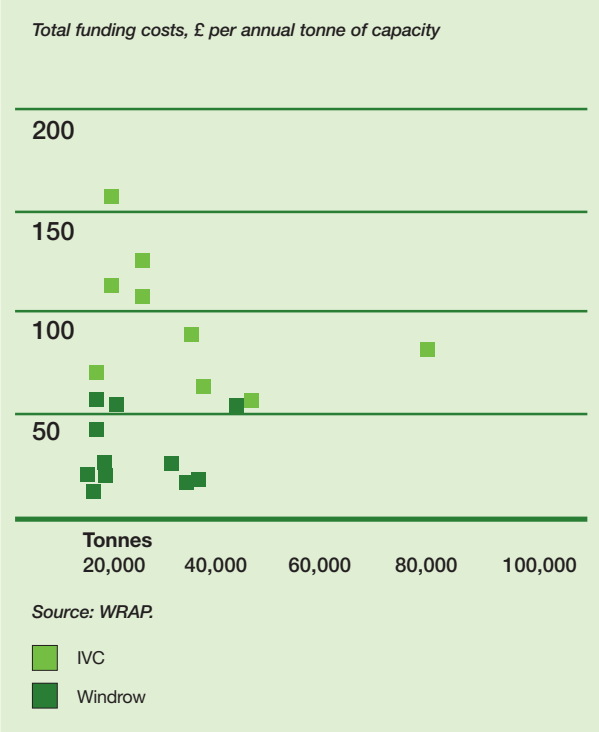
2008 data for the UK situation suggest that capital costs for windrow average about £35 per tonne of annual capacity (Graph 3), although there is a wide variation around this. Because of the greater degree of control required, food waste processing capacity is significantly more capital intensive than garden waste capacity.

The average cost of IVC facilities is around £90 per annual tonne, while indicative costs for AD facilities are in the region of £150-£300 per annual tonne.

There appear to be substantial economies of scale in the capital costs of composting facilities; more so for IVC than for windrow. These economies of scale arise largely because of the fixed infrastructure costs associated with putting new sites in place. Larger facilities enable these costs to be spread across higher tonnages. However, set against these possible savings are increases in transport costs – for both feedstocks and products – if the catchment area is widened to collect greater volumes.

The build/capital costs in Ireland vary. The cost per tonne of annual treatment capacity can vary from €20-25 for windrow composting, €90-160 for IVC and €140-300 for AD.

Graph 3.
Economies of scale in UK composting facilities



[17] WRAP (2008) Market Situation Report – Realising the value of organic waste.

1.7 Anaerobic Digestion - Markets for the Products

A large source of revenue to an anaerobic digestion plant is from sales (or avoided costs) of electricity and heat generation. Gate fees for organic waste are another large source of revenue too. However, in order for an anaerobic digestion plant to be commercially viable, markets also need to be found for the solid and liquid digestates. The biogas produced by an anaerobic digestion plant is predominantly composed of methane (60%) and CO2 (40%), with traces of other gases. Each tonne of food waste generates 100-150m^3 of biogas, which in turn has the potential to generate a net 300kWh of electricity. Given recent prices for renewable energy of around £100 per MWh[18] in Northern Ireland, this suggests revenues in the order of £30 per tonne of input material. If anaerobic digestion becomes eligible for double Renewable Obligation Certificates (ROCs), as is proposed, this could increase the value of the biogas fraction by a further £15 per tonne.

In Ireland the feed in tariff is 12c per kwh or €120 per MWh for electrical energy generated by anaerobic digestion. Each tonne of food waste is estimated to produce around 0.83 tonnes of digestate, which can be separated out into liquid and solid fractions. The liquid digestate is a fine slurry containing nutrients from the decomposition process which can be used as a fertiliser.

The solid digestate typically comprises organic fibres which can be either used without further treatment as a soil improver or can be further processed to yield compost that can be used in growing media. If the solid fraction is composted, this leads to a further reduction in the dry weight of about 20 per cent.

There are a number of potential markets for digestate including agriculture, regeneration of contaminated land or organically depleted soils, or as landfill cover. The primary market is likely to be agriculture, although not all agricultural land is suitable, for example, because of specific site circumstances or limitations on the use of fertilisers in nitrate vulnerable zones.

There is little information about prices for anaerobic digestates although recent estimates for digestate delivered to an agricultural end market – whether in whole, solid or liquid form – range from -£5 per tonne to a few pence per tonne.

Bagging compost.

[18] Source: NFPA, This includes the value of the ROCs.

1.8 Employment

Job creation potential from green activities extends well beyond the renewable energy sector. Selecting composting and anaerobic digestion over disposal or incineration will allow to generate renewable energy and to avoid methane generation. Furthermore, source separating organic waste using the brown bin and recovering this resource in composting and anaerobic digestion, has a positive impact on the environment and on the local economy.

A survey was conducted by Cré on the number of people employed in the compost and anaerobic digestion sector. These broad figures are presented in Table 2. All those surveyed were asked to indicate the number of employees within their organisation, total directly working within the sector and total that are indirectly liked or work on occasion in the sector.

Reducing the compost down to fine grades.

Table 2:
Employment numbers in the composting & anaerobic digestion sector

Description	Employment Numbers
Directly employed	363
Indirectly employed	2,573

The employment figures in table 2 are related to the approximately processing capacity of 508,560 tonnes. Table 3 shows the employment that could be generated when the compost processing reach its capacity.

Table 3:
Potential Employment numbers in the composting & anaerobic digestion sector

Potential Capacity	Description	Employment Numbers
1.5 to 2 million tonnes capacity	Directly employed	1,089-1,452
	Indirectly employeed	7,719-10,292

These figures exclude people involved in the construction of facilities and people involved in maintenance (electricians etc).The potential numbers directly employed are similar to the Austrian composting and anaerobic digestion industries where one job is created for every 800 tonnes of organic waste processed. It is important to note that these figures are indicative figures.

2. INDUSTRY TRENDS

2.1 Competitive landscape

2.1.1 Labour market

The labour market employed in this sector has a very diverse range of expertise. The skilled people employed in the sector are:

- Construction
- Equipment – engineers
- Compost marketing – marketing expert, horticulturalists
- Consultants (environmental scientists/engineering)
- General operators
- Landscapers
- Farmers

2.1.2 Regulations

EU Landfill Directive
European legislation requires a major diversion from landfill sites. The landfill directive requires the volume of waste being sent to landfill to be reduced to 75 percent of the 1995 level in 2010; to 50 percent by 2013; and 35 percent by 2020.

http://ec.europa.eu/environment/waste/landfill_index.htm

Transfrontier Shipment Regulations
Regulating the movement of waste between EU Member States and between the EU and other countries is a large and complex business. It is referred to as "transfrontier shipment", or TFS. Movement of waste between member states is subject to Regulation (EC) No. 1013/2006 of the European Parliament and of the Council of 14th June, 2006 on shipments of waste.

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32006R1013:EN:NOT

EU Animal By-Product Regulation (No 1774/2002)
Animal pathogens such as Foot & Mouth, Swine Fever, and others have become very high profile over the last few years in Europe, due to recent outbreaks in the UK and NI. The European Commission adopted the Animal By-Product Regulation (No 1774/2002) to ensure that all meat and other products of animal origin, which are processed by composting, meet specific treatment standards for destroying potential pathogens so that the treated compost may be safely applied to land.

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32002R1774:EN:HTML

This scheme outlines the targets which have been set by the Department of the Environment (DOE) for each Council. These allowances incorporate the step change reductions in the amount of biodegradable municipal waste (BMW) permitted to be landfilled by each council in 2010, 2013 and 2020 (the EC Landfill Directive (LFD) target years).

http://www.ni-environment.gov.uk/waste-home/regulations_legs.htm

2.1.3 Infrastructure

Cré has recently completed a survey of the sectors concerning operating facilities available. The survey covered processing of brown bin and garden/park waste. The results provide an estimate of the processing capacity. It is important to note the need of additional capacity for the treatment of sewage sludge, agricultural slurries and industrial wastes.

Table 3: Cré Survey on Capacities for Brown Bin and Garden/Park Waste on the Island of Ireland

	Tonnes
Brown Bin Material	
Operating Facilities for Processing Brown Bin Material	
1. EPA/EHS Waste Licenced/Local Authority Permitted Capacity not Built	718,260*
2. Of Point 1 the EPA/EHS Waste Licensed/Local Authority Permitted Capacity not Built	405,700
3. Of Point 1 the Capacity Which is Actually Built Today & Operating	312,560
4. Of Point 3 the Spare Capacity at the Operating Facilities	134,700
5. Of Point 3 -If There Was a Lot of Waste Available What Extra Capacity Would be Build at These Facilities	203,500
New Facilities by End of 2009/Early 2010, Planning & Licensed Approved but Not Built & Sites in the Planning Process	
6. New Facilities that Could be Built by the End of 2009/Early 2010 if the Right Economic Climate was Created	234,500
7. Facilities with Planning Permission, But Have Not Been Built	222,000
8. Facilities in the Planning Process	258,000
9. Planning to Build But Have Not Submitted to the Planning Authority	205,000
Green Waste (Park & Garden)	
Operating Facilities for Processing Green Waste (Park & Garden) Material	
10. EPA/EHS Waste Licensed/Local Authority Permitted Capacity	226,500
11. Of Point 10 the EPA/EHS Waste Licensed/Local Authority Permitted Capacity not Built	30,500
12. Of Point 10 the Capacity is Actually Built Today & Operating	196,000
13. Of Point 12 the Spare Capacity at the Operating Facilities	104,800
14. Of Point 13 - If There Was a Lot of Waste Available what Extra Capacity which Would Build at These Facilities	52,000
New Facilities by End of 2009/Early 2010, Planning & Licensed Approved but Not Built & Sites in the Planning Process	
15. New Facilities that Could be Built by the End of 2009/Early 2010 if the Right Economic Climate was Created	0
16. Facilities with Planning Permission, But Have Not Been Built	30,500
17. Facilities in the Planning Process	5,000
18. Planning to Build But Have Not Submitted to the Planning Authority	50,000

**some 100,000 to 120,000 of this capacity at these facilities may also be used instead for Mechanical Biological Treatment, depending on market conditions. Sewage sludge composting sites (not in figures) may also take in garden/park waste.*

The estimated organic waste arising is 1.5-2 million tonnes in Northern Ireland and Ireland, based on the WRAP figures it can be estimated that it would required a capital investment of £225-450 million. WRAP stated[19] that in the UK 1 million tonnes capacity for food waste processing would require capital investment of £150-300 million.

[19] WRAP (2008) Market Situation Report – Realising the value of organic waste.

2.2 Key players

2.2.1 Market leaders

Most of companies operating within the sector are specialist composting companies. Waste management companies, local authorities, landscaper companies and agricultural companies each have a share of the sector too. There are many leaders in the composting and anaerobic digestion (See Appendix A).

2.2.2 Government bodies and agencies

IRELAND

Environmental Protection Agency (EPA)
The EPA is an independent body with a wide range of environmental functions, in the area of waste, the agency is responsible for licensing major waste facilities and for the enforcement of the terms of licences granted.

http://www.epa.ie/

Department of Environment, Heritage and Local Government (DoEHLG)
Its mission is to promote sustainable development and improve the quality of life through protection of the environment and heritage, infrastructure provision, balanced regional development and good local government.

http://www.environ.ie/en/

Department of Agriculture, Fisheries and Food
The Department is the regulator of the animal By Product Regulations in Ireland.

http://www.agriculture.gov.ie/

Sustainable Energy Ireland
Sustainable Energy Ireland (SEI), formerly the Irish Energy Centre was set up by the government in 2002 as Ireland's national energy agency. Its mission is to promote and assist the development of sustainable energy.

http://www.sei.ie/

TFS (TransFrontier Shipments) Office
All transfrontier shipments of waste originating in any local authority area in the State after the 12 July 2007, that are subject to the prior written notification procedures must be notified to and through Dublin City Council at the National TFS Office established to implement and enforce the Regulations.

http://www.dublincity.ie/WaterWasteEnvironment/Waste/WasteCollectors/National_TFS_Office/Pages/NationalTFSOffice.aspx

Market Development Group
The Department of Environment, Heritage and Local Government established the Market Development Group (MDG), comprised of range of different stakeholders, to develop and implement a new Market Development Programme. The aim of this group is to progress the development of new markets for recyclables - organic, paper and plastic. Over the next five years, this team will play a pivotal role in the development of markets for compost and digesate in Ireland.

http://www.mdg.ie/

NORTHERN IRELAND

Northern Ireland Environment Agency (NIEA)
NIEA is the largest agency within the Department of Environment. It advises on and implements he Government's environmental policy and strategy in Northern Ireland.

www.ni-environment.gov.uk

Department of Agriculture and Rural Development (DARD)
The Department is the regulator of the Animal By Product Regulations in Ireland.

http://www.dardni.gov.uk

Waste & Resources Action Programme (WRAP)
WRAP helps individuals, businesses and local authorities to reduce waste and recycle more, making better use of resources and helping to tackle climate change. A not-for-profit company limited by guarantee, WRAP is supported by government funding from the Northern Ireland Executive, the Department for Environment, Food and Rural Affairs, the Scottish Government and the Welsh Assembly Government.

http://www.wrap.org.uk/

Northern Ireland - NetRegs
NetRegs provides free environmental guidance for small and medium-sized businesses in the UK. NetRegs will help you to understand what you need to do to comply with environmental law and protect the environment.

www.netregs.gov.uk

2.2.3 Industry networks and organisations

Cré – The Composting Association of Ireland
Cré – The Composting Association of Ireland is a non-profit organisation established in 2001. Cré is the Irish word for 'Earth' and its mission statement is:

- To promote composting and compost utilisation across the Island of Ireland
- The Association's function is to infuse best practices into the development of the industry.
- Promote public awareness
- Promote research
- Develop an information storehouse on composting and compost utilisation.

Cré's aim is to help develop a sustainable composting industry which is important for driving resource efficiency and tackling climate change. Cré wants to help organisations take advantage of opportunities which they have for making composting sustainable both economically and environmentally.

More recently a large segment of its membership stated they would like Cré to embrace Anaerobic Digestion (AD) within its remit. As a result, the Cré Board of Administration has agreed that Cré should conduct an "Exploratory Period of Investigation on AD". At the end of this exploratory period members will be consulted to determine if Cré should/should not formally embrace AD within its remit.

Cré – Composting Association of Ireland, Business Innovation Centre, Institute of Technology Campus, Ballinode, Sligo. t. 086 812 9260 f. 071 914 4500
e. info@cre.ie

www.cre.ie

Northern Ireland Environmental Services Association (NIESA)
NIESA was launched in 2001 in order to provide technical direction and support to the waste management industry and authorities in Northern Ireland as they strive to fulfil the Northern Ireland Waste Management Strategy.

http://www.esauk.org/ireland/

Irish Bioenergy Association
The Irish Bioenergy Association (IrBEA) was founded in May 1999. It has been formed to promote the bioenergy industry and to develop this important sector in the Republic of Ireland and Northern Ireland.

http://www.irbea.org

2.3 Trends

2.3.1 Current Policy Issues

Landfill Gate Fee
The cost of land filling has decreased significantly across the island. This does not create an adequate incentive for producers of waste and service providers to prevent and minimise waste. Nor does it promote recycling and recovery of biodegradable waste.

Landfill Levy
In Ireland the proceeds from the landfill levy are used to support public sector composting projects. In contrast, in Northern Ireland WRAP provide a 30% capital grant (on a competition basis) to both the public and private sectors if they produce PAS 100 certified compost from source separated waste.

Lack of Brown Bin Collection Schemes
At the moment a brown bin service has not been provided to all householders and businesses. The collection infrastructure on the island needs to be developed and/or improved.

EU Landfill Diversion Requirements
Diverting food waste from landfill is currently the main waste management priority. In Ireland the recycling of BMW decreased by 2.7% in 2007 and its disposal at landfill increased by 5.2%. In this sense, Ms Laura Burke, director at the Environmental Protection Agency, has commented "Although significant progress has been made in managing waste in Ireland, the report clearly shows that Ireland is in danger of missing a key EU target for diverting biodegradable municipal waste from landfill. Urgent and short-term actions are required in 2009 to tackle the generation and recycling of food waste from households and businesses if we are to meet the 2010 target for diverting an additional half a million tonnes of this waste from landfill[20]."

Food Waste Management
The policy drivers have now turned to food waste, where collections and processing capacity have grown rapidly over the past few years, albeit from a low base. The costs of residual waste disposal will increase further over coming years, making food waste recovery look more commercially attractive. However, there needs to be commensurate growth in capacity and in the markets for the end products.

2.3.2 Challenges

There are a number of challenges outlined below for the composting and anaerobic digestion industry on the island.

- Creation of an adequate industry capacity, as the sector develops.
- Attracting investment to generate growth and development in the sectors.
- Promote organic waste separation (particularly food) in households and commercial premises as well as putting in place the adequate collection services.
- Delivering advanced waste management policies to allow for accelerated investment programmes which are necessary to avoid landfill practices.
- Ensuring adequate infrastructure to treat the very large amounts of organic (particularly food) waste that must be collected separately and diverted from landfill.

[20] EPA Press release (Jan 2009) for the 2007 National Waste Report.

- The Department of Agriculture, Fisheries and Food (Ireland) recently published new condition documents for the operation of composting and anaerobic digestion facilities. The challenge for the industry is to comply with the new conditions.

2.3.3 Opportunities

The source separation of organic waste and composting entail economic and environmental opportunities such as:

Business development opportunities
The waste management sector and in particular the composting and anaerobic digestion sub-sectors, are currently an unsaturated industry that needs to be further explored. Areas of particular interest are develop and commercialisation of the technologies and equipment necessaries for the collection and processing of food waste. In addition, expert consultancy services need to be developed.

Economic opportunities
If food waste is processed in an anaerobic digestion facility, the decomposition is controlled and all of the biogas can be captured and used to generate heat and electricity. Each tonne of food waste produces biogas sufficient to generate about 300kWh of electricity.

The sale of compost products offers great economic opportunities, in particular in topsoil manufacture and growing media markets. Furthermore, compost is a valuable source of organic matter and a source of slow-release nutrients, improving yields and cutting the need for traditional fertilisers. The use of compost will therefore make more efficient agriculture activities.

In addition, when the wet organic waste is removed from waste by separating it at source, it leaves the other recyclables drier, cleaner and will be of higher quality for recycling.

Environmental benefits
When compared with disposal via landfill, each tonne of food waste processed via anaerobic digestion is estimated to save about one tonne of CO_2 equivalent emissions[21].

When food and garden wastes are composted they produce water and CO_2. Some of the carbon is sequestered into the compost – and hence in the soil if the compost is applied to land – leading to a reduction in GHG emissions. Set against this, however, are increased transport and process emissions. Nevertheless, each tonne of garden waste composted, rather than disposed of via landfill, and used in an agricultural application leads to a reduction of between 90kg and 230kg of CO_2 equivalent emissions .

2.3.4 Latest developments

UK Budget on Landfill Levy Escalator
UK's 2009 budget has provided clarity over plans to steadily increase the rate of levy on waste going to landfill for the next four years. Chancellor Alistair Darling confirmed that the standard rate of landfill tax would increase by £8 per year up to 2013. Previously there had been no official line on what would happen beyond 2010. In Northern Ireland, Scotland, Wales and England, the levy will be increased every year by £8/per tonne up to 2013. April 2009 = £40, April 2010 = £48, April 2011 = £56, April 2012 = £64, April 2013 = £72.

The Northern Ireland Waste Management Strategy 2006 - 2020
This strategy puts greater emphasis on the importance of waste prevention and of breaking the link between waste production and economic growth. It renews recycling targets and focuses on awareness campaigns and introduction of incentive schemes.

[21] The GHG benefits of various options for managing biodegradable wastes are the subject of a current Defra study. In the absence of definitive data, the figures cited are based on a range of sources.

Ireland's Landfill Levy

Currently the landfill levy is €20 per tonne and is one of the lowest in Europe. For example Sweden is €40, Denmark is €50, Flanders is €55, Netherlands is €65[22] and Northern Ireland, Scotland, Wales and England is €44 and this will increase to €76 in 2013. In 2008 the Department of Environment, Heritage and Local Government issued a Regulatory Impact Assessment on proposed increases in the landfill levy. Changes to the landfill levy have not been announced. Minister John Gormley in a press release in January 2009 said "primary legislation would be brought forward to allow for significant increases to the landfill levy which will make sustainable alternatives such as composting more economically attractive".

Irish Draft Food Waste Regulations 2009

The regulations centre on the requirement that all major sources of food waste segregate them from other wastes and store them separately prior to their collection. Alternatively, these materials can be composted on the premises of production under specified conditions. The duty to segregate these waste types is compulsory for all nine separate classes of premises listed in the Schedule to the Regulation. This list is intended to cover all of the major sources of food waste, with the exception of food manufacturers and agriculture. It includes state buildings where food is prepared, restaurants and cafés, hot food outlets, canteens, hotels and larger guest houses, supermarkets, and other food retailers. It is considered that, by making segregation mandatory, the legislation will cause a significant diversion of waste from these sources away from landfill sites. It will also offer regulatory certainty, as well as a significant amount of new feedstock, to the fledgling food waste recycling industry. In order to avoid any potential for cross-media waste/pollutant transfer, the Regulation prohibits affected businesses from disposing of food waste into the sewerage infrastructure by the use of macerators.

EPA Municipal Solid Waste –Pre-treatment & Residuals Management

When published this guidance document will set the definition of minimum acceptable pre-treatment for Municipal Solid Waste accepted for landfilling or incineration at EPA licensed waste activities. On foot of the publication the EPA will commence an exercise of reviewing conditions in existing EPA licences for waste activities. The purpose of this review will be to update and reinforce these licences to the extent necessary to ensure that the regulatory system in place is positioned to contribute effectively to Ireland's efforts in meeting its obligations under EU waste policy.

EPA Funded Research Report "Development of an Industry-Led Quality Standard for Source-Separated Biodegradable Material Derived Compost"

The purpose of this industry standard research project is to offer a quality standard for compost derived from source-separated biodegradable materials in order to promote the development of markets for compost based products on the island of Ireland as well as to protect human, plant, soil and animal health. Other EU countries with an established composting infrastructure show that successful biowaste treatment must include meeting quality standards in order to control the use and guarantee the environmental safety of compost application within agricultural, horticultural and landscaping industries, by home gardeners and local authorities. The establishment of an industry-based compost standard supports the long-term growth of the industry and ensures product satisfaction to maintain consumer confidence.

Cré Compost Quality Assurance Scheme

Cré has funded the development of a compost quality assurance scheme and this will be launched in 2009. When the Cré QAS is launched and implemented at compost sites in Ireland and in the future when you're looking for compost– when you see the Cré QAS certification logo, you can be assured that the compost you are buying is produced to the highest standard. The Cré QAS will mean that the composts certified by

[22] Environmental Protection Agency (EPA) published in January 2008 a discussion paper "Hitting the Targets for Biodegradable Municipal Waste: Ten Options for Change".

Certification Europe are quality assured, traceable, safe and reliable. Certification Europe Ltd is going to manage the Cré Compost Quality Assurance Scheme and will provide third party assessment and conformity with the quality standard developed in the research report *"Development of an Industry-Led Quality Standard for Source-Separated Biodegradable Material Derived"*.

Waste Collection Permits by Some Local Authorities Mandating the Roll Out of the Domestic and Commercial Brown Bin

Some local authorities have imposed conditions for the brown bin collection service in waste collection permits to waste contractors. Below is an example of conditions in one region.

Table 4: Schedule for Segregated Organic Waste Collection for Households in Limerick, Clare and Kerry

Date	Target
1 May 2009	Roll out four month Awareness Campaign
1 September 2009	20% of Households must have segregated organic collection
31 December 2010	40% of Households must have a segregated organic collection

Table 5: Schedule for Segregated Organic Waste Collection for Commercial Collections in Limerick, Clare and Kerry

Date	Target
1 January 2009	50% Diversion of Commercial Organic Waste from Landfill
1 January 2010	100% Diversion of Commercial Organic Waste from Landfill

European Commission Green Paper on Biowaste

On December 3, 2008 the Commission launched a *Green Paper*[23] on biowaste[24]. This is considered a first step in a whole range of activities aiming at a comprehensive assessment of an appropriate strategy and legal provision for biowaste on European level. The green paper was published for public consultation and considers arguments for and against the range of possible treatment options for biodegradable organic waste as there is prevention at source, source separation or mixed waste collection followed by composting or anaerobic digestion, incineration and landfilling.

Minister Gormley Issued Detailed Circular (WPPR 17/08) to Local Authorities on the Implementation of Segregated Brown Bin Collection for Biowaste and Home Composting

John Gormley, TD, Minister for the Environment Heritage and Local Government, issued a detailed and lengthy circular to City and County Managers in August 2008. The circular states that Ireland has to meet challenging targets for the diversion of biodegradable municipal waste from landfill in-line with the general targets set down in the EU *Landfill Directive*. In order to achieve those targets Local Authorities will have to increase proportions of biodegradable waste recycled and this must be diverted to composting or, in the case of paper, either recycling or composting.

The Minister has requested that Local Authorities accelerate the implementation of the *National Strategy on Biodegradable Waste* and in particular the rolling out of the Brown Bin. The Brown Bin is a source-segregated collection system for organic waste and it is hoped that this will drive the diversion of biodegradable municipal waste from landfill, through the following:

- Consultation with the collectors
- Direct provision of such services
- Educational awareness campaigns
- Imposition of conditions on waste collection permits across each region

[23] Green Papers are documents published by the European Commission to stimulate discussion on given topics at European level. They invite the relevant parties (bodies or individuals) to participate in a consultation process and debate on the basis of the proposals they put forward. Green Papers may give rise to legislative developments which are then outlined in White Papers.

[24] COM(2008) 811 final: Green paper on the management of bio-waste in the European Union. SEC(2008)2936; http://ec.europa.eu/environment/waste/compost/

- Provision of home composting units to householders at reduced prices
- Introduction and modification of local bye-laws
- Provision of composting/biogas infrastructure

BSI PAS 110 Specification for AD
Quality protocol for the use of anaerobic digestion digesate is currently being approved and it will be supported by a specification, PAS 110 published by BSI.

Garden & Park Waste Proposal for EU Regulations on Transfrontier Shipment of Waste
At the moment 'Garden & Park Waste' is not a listed material under the EU Regulation on Transfrontier Shipment of Waste. This issue is particular relevant to facilities on both sides of the border between Ireland/ Northern Ireland. Recently the DoEHLG submitted a proposal to the EU for garden and park waste to be become a green listed material. If this is approved it will make it simpler to trade garden and park waste across the border for treatment.

2.3.5 Outlook

It is expected that the industry will continue to grow and develop over the next years. The following points outline some prospects for the industry.

- The creation of the right economic climate in which disposal of organic waste is less financially attractive will increase the composting and anaerobic digestion activities.
- The development of an adequate network of composting and anaerobic digestion sites that meet the needs of the locality will help in dealing with future demand for treatment capacity for source-segregated organic wastes.
- Companies involved in composting and anaerobic digestion will increase. These companies should be more encouraged to adopt quality standards such as the PAS 100 QAS and the future Cré QAS, in order to ensure the production of quality compost.
- There are possibilities of development of an all island brown bin network of waste collectors. This network would train collectors on how to set up a brown bin scheme and provide an opportunity to share experiences.
- Forecasts suggest that there is significant potential waste arising which could be source separated and processed in composting and anaerobic digestion facilities to produce quality assured products.
- In order to comply with the EU Landfill Directive, it is expected considerable capital investments (multi-million Euro/Pound investments) by the private and local activities in biological treatment facilities and waste management infrastructures and services.
- If the estimated organic waste arising is 1.5-2 million tonnes in Northern and the Republic of Ireland was composted/digested, the estimated turnover could be in the region of €195-260 million[25].

[25] This figure could change if higher proportion of compost was sold in higher value markets. The Cré compost quality assurance scheme in the Republic will increase the value of compost as people will have greater confidence in compost products and will be willing to pay more for compost.

3. Cross-Border Insight

3.1 Cross-Border Trading

There is currently cross-border trading in source separated waste, quality compost and technologies.

Waste
One example of the shipment of source separated waste is Fermanagh County Council sends the garden and park waste collected at its recycling centres across the border to Envirogrind Ltd for the production of quality compost. In the future it is expected that there will be increased trading of brown bin waste among the border counties.

Compost Sales
Various compost facilities sell compost across the border.

- Envirogrind in Donegal manufactures topsoil.
- Terralift in Monaghan manufactures specialised slow release nutrients compost for golf course which is not alone traded across the border, but across many other European countries.
- Bord na Mona, Co. Kildare dilutes down its various peat based products with compost and this is primarily shipped to DIY stores in the UK and Northern Ireland.
- Natural World Product's (Armagh) Rosey Lee Organic Compost is currently stocked in over forty garden centres across Ireland. It is also widely sold to golf courses across Ireland as far as Co. Cork.
- De Brun Iasc, Dingle manufactures specialises slow release nutrients compost from fish waste and this is sold across Ireland and Europe.
- Enrich Environmental Ltd, Kilcock, Co. Meath manufactures roof top garden substrates with compost and exports these products to the UK.

Technologies
There are many technology suppliers based in Ireland which sell their technology across Ireland and Europe examples are Active Difference, BioPower, Celtic Composting Ltd, FLI Group, KEDCO Plc, Mac Machinery, PresecoIreland, TEG Group Plc, Thorn and VCU.

North/South Ministerial Council - Environment Sectoral Format
The North/South Ministerial Council (NSMC) established on December 1999 aiming to foster consultation, co-operation and action within the island of Ireland. The NSMC, comprises Ministers of the Northern Ireland Administration and the Irish Government, working together to take forward co-operation between both parts of the island to mutual benefit.

During the eighth meeting of the North/South Ministerial Council in Environment (March 2009), issues such as cross-border movement of waste and the development of markets for recycled products were addressed.

3.2 Best practice

Cré and WRAP
Cré and WRAP Northern Ireland have worked closely together over the past number of years in providing assistance to each other in training of operators, promoting the sector and working to develop all island solutions to markets for compost. More recently they jointly funded a *Compost Top Dressing Demonstration Trials at the K Club Golf Course, County Kildare*.

The trials were carried out during from July to November 2008 to investigate the use of high quality composted materials in the maintenance of golf fairways. Prior to completion of the trial an open day was held at the K-Club's Smurfit Club House for all the Golf Superintendents in Ireland.

This project was a good example on how the industry should work together to develop all island markets for compost. This project brought together key golf superintendents and educated them about the use of compost. The Golf Course Superintendent Association of Ireland will be publishing the results of this demonstration trial. This could lead to compost sales in golf courses at composting sites on the island of Ireland.

Appendix A - Market Leaders

Animal By Product Approved/In Validation Facilities for Brown Bin Material

- Acorn Recycling
- Envirogrind Ltd
- Galway City Council (In validation)
- Johnstown Recycling Ltd (In validation)
- Magaherfelt District Council
- Natural World Products Ltd
- O'Toole Composting Ltd
- PresecoIreland Ltd (In validation)
- Thornton's Recycling Ltd
- Waterford City Council
- Waddock Composting Ltd

Garden & Park Waste Facilities

- Bord na Móna
- Clare County Council
- Cork County Council
- Cork City Council
- CTO Environmental Solutions Ltd.
- Down District Council
- Enrich Environmental Ltd
- Green King Composting Ltd
- Limerick County Council
- Pat Cleary & Sons Ltd
- Sligo County Council
- V&W Recycling Ltd

Sludge Composting

- McGill
- Cremin's Farm Compost Ltd
- OD Recycling Ltd

Other Types of Composting (Fish waste etc)

- Marine Harvest Ireland Ltd
- Organic Gold (Marketing) Ltd
- Terralift Ireland Ltd
- Custom Compost Ltd

On Farm Composting/Anaerobic Digestion

- Kildangan Stud
- Methagen, Co. Waterford
- Camphill, Co. Kilkenny
- Ballyshannon Farm, Co. Wexford
- Southwest College, Omagh

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