

Research and Library Services



Northern Ireland Assembly

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POULTRY WASTE INCINERATION

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This paper deals with the best practices and legislation regarding incineration and the positive and negative impacts that poultry litter incineration would have in Northern Ireland.

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Background:

An energy plant at Glenavy, Co. Antrim has been proposed. The energy is to be derived from poultry litter by a high-technology incineration process. The proposed plant is a 30/25 MW power generating plant and has the capacity to utilise 300,000 tonnes of poultry litter per annum. It is estimated that the power plant can potentially supply energy to 30,000 homes. It is a proven technology and will make a significant contribution to Northern Ireland's renewable energy obligations.

1. Current Best Practice:

Examples of Best Practice:

Holland¹:

Due to the intensive nature of agriculture in Holland, new national legislation came into force for the disposal of poultry litter. Farmers had to sign contracts for the guaranteed and sound disposal of their litter. This resulted in increasing manure disposal costs and accelerated efforts to develop and implement alternatives for manure disposal. In response to this new need, a number of farm-scale gasifiers were soon in operation.

The economics of a farm-scale gasifier for poultry litter disposal can be positive due to the avoidance of disposal and transport on the one hand, and the production of heat, power and fly-ash on the other hand.

New Zealand:

In New Zealand poultry litter is incinerated using technology called a *Vertical Composting Unit*² (VCU). This is an enclosed aerobic composting system suited to processing biological waste in small to medium sized municipal and industrial applications.

The composting takes place inside modular chambers, 25 cubic metres in capacity. Processing is continuous with waste being loaded into the top of the chamber and stabilised product removed from the bottom every day. The continuous flow is computer operated. A VCU unit utilizes poultry egg waste along with local green waste and post peel to produce a nitrogen and calcium-rich compost.

Scotland and Northern Ireland³:

The introduction of *Integrated Pollution Prevention and Control*⁴ (IPPC) in the pig and poultry sectors highlights that there are problems associated with current methods of utilization or disposal of litter in Scotland and Northern Ireland.

¹ <http://www.btgworld.com/2005/pdf/services/pei/930-sum.pdf>

² http://www.hgleach.co.nz/Tirohia_compost_solutions.html

³ http://www.sniffer.org.uk/exe/download.asp?sniffer_outputs/UKPIR01_1.pdf

⁴ http://www.defra.gov.uk/environment/ppc/envagency/pubs/pdf/ippcguide_ed4.pdf

To prevent pollution and comply with the requirements of the IPPC Directive, limits on nutrients applied to land have been established.

Project UKPIR01 was commissioned by the *Scotland and Northern Ireland Forum for Environmental Research*⁵ (SNIFFER) and the *Environment and Heritage Service* (EHS) in Northern Ireland to identify methods for disposal or processing of waste streams from intensive livestock rearing farms in Scotland and Northern Ireland that are permitted under either the *Pollution Prevention Control Regulations (Northern Ireland) 2003*⁶ or the *Pollution Prevention and Control Regulations (Scotland) 2000*⁷.

Environmental Impacts of Current Disposal Practices: If land spreading were the only option, to comply with a Nitrate Directive Requirement of 170 kg N ha⁻¹ per annum, the minimum amount of suitable land for the pig and poultry sector would be as shown below:

Theoretical Minimum Land Requirement (170kg ha⁻¹ N limit) using traditional spreading methods:

	Land Area (ha) Required Per 1,000 Birds Places Per Annum	Minimum Suitable Land (ha), Northern Ireland
Broilers	1.5	19,200
Laying Hens	3.5	7,700
Breeders	4.5	11,250
Poultry Totals		38,150

Broilers:

The situation for broilers is quite different in Scotland due to the existence of a dedicated poultry litter combustion facility based in Fife producing renewable energy.

⁵ <http://www.sniffer.org.uk/>

⁶ <http://www.opsi.gov.uk/Sr/sr2003/20030046.htm>

⁷ <http://www.opsi.gov.uk/Sr/sr2003/20030046.htm>

This facility utilises almost all of the broiler litter produced in Scotland, and only an estimated 10% or less of broiler litter is spread on land.

Laying Hens:

The situation in both Northern Ireland and Scotland is similar. Virtually all laying hen manure is currently spread on land. This is because layer manure is wetter and is therefore less suitable for combustion. In Scotland, the concentration of laying farms in certain localities places significant demands on the land bank for spreading. In Northern Ireland there are approximately 60 large producers.

The UKPIR01 Report also Addresses the Environmental Aspects and Impacts of Litter/Manure Combustion as Biomass Fuel for Energy Generation (Positive and Negative):

Air Emissions:

Negative – Acid deposition, odour nuisance, potent greenhouse gases.

Positive – Impact of displacement of greenhouse gases from fossil fuel combustion.

Releases to Water:

Negative – Theoretical effluent leakage from storage areas; surface run-off from yards.

Positive – Impact of reduced risk of nutrient leaching/diffuse pollution.

Contamination of Land:

Negative – Potentially toxic elements (PTE's) and excess nutrients in soil from inappropriate ash fertilizer application.

Positive – Impact of ash fertilizer correctly applied to maintain soil nutrient status.

Use of Natural Resources:

Negative – Energy requirements for combustion process; potential layer manure drying; transport.

Positive – Impact of renewable energy generation.

Appraisal of Poultry Litter Combustion: In Northern Ireland, the current problems are particularly acute as there is not enough land of a nutrient status low enough to accommodate land spreading of manure, and difficulties are compounded by the geographic concentration of intensive pig and poultry units.

Broiler Litter: Broiler litter probably has the greatest potential for utilisation by alternatives to land spreading. Combustion for energy production is a tried and tested route and currently almost all broiler litter in Scotland is utilised by this means. The stringent controls on incinerator emissions and the fact that renewable energy is produced mean that using litter as a biomass fuel is an environmentally sound solution.

The UKPIR01 Report found that a large centralised plant such as the one proposed for Glenavy need not be the only route for biomass combustion. The report stresses merit in considering a limited number of intermediate sized combustion units delivering combined heat and power (CHP).

The study also recommends that centralised treatment options with a high capital cost must be economically stable. The results also stress the importance of a subsidised price is received for electricity produced and that there is a ready market available for the fertilizer ash by-product.

2. European Legislation⁸:

The most important European Legislation which impact on the siting of such incinerators is *Directive 2000/76/EC* of the European Parliament and of the Council of 4th December 2000 on the incineration of waste.

This legislation covers incineration of both hazardous and harmless wastes which may cause emissions of substances which pollute the air, water and soil and have harmful effects on human health.

It is intended to incorporate the technical progress made on monitoring incineration process emissions into existing legislation, and to ensure that the Community meets its international commitments to reduce pollution.

This Directive applies not only to facilities intended for waste incineration (“dedicated incineration plants”) but also “co-incineration” plants (facilities whose main purpose is to produce energy or material products and which use waste as regular or additional fuel, this waste being thermally treated for the purpose of disposal).

The Directive does not cover experimental plants for improving the incineration process and which treat less than 50 tonnes of waste per year. Nor does it cover plants treating only:

- Vegetable waste from agriculture and forestry, the food processing industry or the production of paper;
- Wood waste;
- Cork waste;
- Radioactive waste;
- Animal carcasses;
- Waste resulting from the exploitation of oil and gas and incinerated on-board offshore installations.

Avian Influenza H5N1 (Regulations)⁹:

In the UK, where cases of Avian Influenza have been identified, the *Department for Environment, Food and Rural Affairs* (Defra) adopts the practice of movement restrictions where poultry is to be isolated from wild birds.

An example of this is local authorities and ‘*Animal Health*¹⁰’, enforcing a 3km Protection Zone, a 10km Surveillance Zone and a wider Restricted Zone covering the

⁸ <http://europa.eu/scadplus/leg/en/lvb/l28072.htm>

⁹ <http://www.defra.gov.uk/news/latest/2007/animal-1112.htm>

¹⁰ <http://www.defra.gov.uk/animalh/index.htm>

whole of Suffolk and most of Norfolk around infected premises which have been identified.

3. Public Health Considerations:

In Northern Ireland, Planning Policy WM 1 '*Environmental Impact of a Waste Management Facility*¹¹' was published as part of *Planning Policy Statement 11*. It determines that proposals for the development of a waste management facility will be subject to a thorough examination of environmental effects and will only be permitted wherever it can demonstrate that all of the following criteria will be met:

- The proposal will not cause demonstrable harm to human health or result in an unacceptable adverse impact on the environment.
- The proposal is designed to be compatible with the character of the surrounding area and adjacent land uses.
- The visual impact of the waste management facility, including the final landform of landfilling, or land raising operations, is acceptable in the landscape and the development will not have an unacceptable visual impact on any area designated for its landscape quality.
- The access to the site and the nature and frequency of associated traffic movements will not prejudice the safety and convenience of road users or constitute a nuisance to neighbouring residents by virtue of noise, dirt and dust.
- The public road network can satisfactorily accommodate, or can be upgraded to accommodate, the traffic generated.
- Adequate arrangements shall be provided within the site for the parking, servicing and circulation of vehicles.
- Wherever practicable, the use of alternative transport modes, in particular, rail and water has been considered.
- The development will not have an unacceptable adverse impact on nature conservation or archaeological/built heritage interests.
- The types of waste to be deposited or treated and the proposed method of disposal or treatment will not pose a serious environmental risk to air, water or soil resources that cannot be prevented or appropriately controlled by mitigating measures.
- The proposed site is not at risk from flooding and the proposal will not cause or exacerbate flooding elsewhere.
- In the case of landfilling, the proposal includes suitable, detailed and practical restoration and aftercare proposals for the site.

¹¹ http://www.planningni.gov.uk/AreaPlans_Policy/PPS/pps11/PPS11.pdf