



*The Association of Manufacturers
of Domestic Appliances*

The Environment Bill Team
Climate Change and Natural Resource Policy Division
Welsh Government
Cathays Park
Cardiff CF10 3NQ
By email: NaturalResourceManagement@wales.gsi.gov.uk

15 January 2014

Dear Sir or Madam

Towards the Sustainable Management of Wales' Natural Resources
Consultation on proposals for an Environment Bill, October 2013

AMDEA is the UK trade association for large and small domestic appliances: heating; water heating; floor care and ventilation. We represent manufacturers at UK, European and International level; with government and EU political institutions; in standards and approvals; with non-governmental organisations; with consumers and in the media. AMDEA protects and promotes its members' interests in all these spheres.

All of our members are fully committed to waste prevention, opposed to landfilling of unavoidable waste and support the recovery of value from waste. However we have some member companies with a particular interest in sustainable and effective food waste management, as they manufacture domestic food waste disposers (FWDs).

Members of our FWD Group include the world's leading producer that has manufactured food waste disposers for over 70 years and markets these appliances in over 80 countries. As food waste and sewer management are core issues for this group, we have accumulated a substantial evidence base of peer-reviewed scientific research conducted by recognised experts and academics worldwide.

In our drive to promote evidence based policy AMDEA's FWD Group also facilitates the exchange of information between the industry, scientists, engineers and environmental policy makers. To this end we recently held the first of an intended series of AMDEA FWD Group round tables at the Royal Society in London, which included expert presentations from countries such as Sweden and Denmark, considered leaders in environmental best practice.

It is particularly regrettable that no representative of the Welsh Government policy team was able to attend this event at a time when the Welsh Assembly Government White Paper is proposing a ban on the disposal of food waste to sewer on the basis of a report "Additional Policy Options Analysis for Welsh Government: Costs and Benefits of Extending Waste Framework Directive requirements, Waste Treatment Restrictions, Requirement to Sort and a Ban on the Disposal of

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Food Waste to Sewer”, Eunomia, May 2013, which reflects prejudices relating to food waste disposers which are unsupported by the worldwide evidence.

We are deeply concerned that statements repeated in both the study and the White Paper relating to food waste disposers contradict robust, peer-reviewed, scientific evidence. These serious misapprehensions threaten to flaw gravely Welsh environmental policy and limit its future ambitions.

The environmental agenda is constantly evolving and the danger of a single solution approach to managing food waste is to block technological innovation. Even countries that have long-term experience in separate collections are experiencing barriers to further achievement.

Despite a highly disciplined and environmentally aware population there is a significant proportion of the German population who cannot or does not effectively separate their food waste. According to a very recent German report, “Ecologically Sustainable Recovery of Biowaste,” published in July 2013 by the German Federal Environment Ministry, only 67.5 million of the German population have separate collection services and of these 56% do not use the facility. This means 44 million, or half, of the German population do not have or use a separate food waste collection facility. Germany aspires to separate collection of food waste for treatment at AD centres and is committed “in principle” to establish closed loop recycling by 2015. However it is much further from achieving this target than might be supposed.

Regrettably the statements published in the White Paper reflect a position which the Environment Agency retracted in November 2010, on consideration of the substantive body of evidence which we would also like to make available to Resource Wales, Eunomia and Dŵr Cymru Welsh Water.

Since 2010 the evidence has continued to grow with recent studies published from countries at the forefront of sound environmental management, such as Denmark and Sweden. In England, in November 2012 the Local Government Association embarked on a programme of pilot studies installing food waste disposers in new-build properties, to deepen the proven knowledge base¹. The Republic of Ireland has recently reversed a ban on domestic food waste disposers.

As no experts from our industry were consulted on, or quoted in, the report by Eunomia and it includes neither a literature review nor a bibliography, our members are concerned that these oversights may contribute to misconceptions, or may even be construed as bias.

To compensate for the apparent lack of qualified consultation our members requested a technical review of the study by a specialist FWD/sewer engineer which we submit for your consideration (Annex 1). This review concludes that any position that the Welsh Government may take relating to food waste disposers on the basis of the recommendations of this study will be flawed; carrying a high risk of departure from evidence based policy making.

Accordingly we have confined our responses to those questions relating to Chapter 4 of the White Paper which rely on misconceptions apparently drawn from this report.

¹ http://www.local.gov.uk/web/guest/productivity/-/journal_content/56/10171/3510540/ARTICLE-TEMPLATE

Key Points

- Food waste disposers provide a sustainable means of effectively diverting food waste from landfill and extracting both renewable energy and soil nutrients. Both Denmark and Sweden are monitoring the benefits of encouraging FWD usage to increase biogas production.
- Food waste disposers can improve the recovery of other waste fractions. Food waste is a significant contaminant of dry recyclables and research in Japan has found that removing food waste at source, using an FWD, unlocks the potential for recycling other fractions².
- Food waste disposers grind practically all food waste to minute particles (98% are less than 2mm) that are easily carried in the wastewater collection system, as established in Germany³.
- FWD do not increase the risk of sewer blockage⁴. Ground food waste is 70% water, with a specific gravity similar to faecal waste which the sewers are designed to transport. A study from the New York City Department of Environmental Protection concluded that the impact of FWDs on the sewer system was insignificant⁵.
- Food waste disposers deter rodents and vermin as food waste is not stored for street collection. Without leaving the kitchen, finely ground waste goes directly to the sewer. As concluded most recently by a Danish study⁶ "...finely ground kitchen waste will have little impact on the sewer rats' general health and will not result in a significant increase in their population."
- The suggestion that ground food waste increases the risk of odours in the sewers is spurious and unproven. It is certainly not the experience of Surahammar in Sweden where domestic FWD use increased from 0% of households to more than 50% of households in a period of about 10 years⁷. Odours are a far greater risk, along with proliferation of bacteria and pathogens, where food waste is stored for kerbside collection.

² Yang, X.; Okashiro, T.; Kuniyasu, K. and Ohmori, H. (2010) Impact of food waste disposers on the generation rate and characteristics of municipal solid waste. *J. Mater. Cycles Waste Manag.* 12:17-24

³ Kegebein, J.; Hoffman, E. and Herman H. Hahn (2001) Co-Transport and Co-Reuse. An Alternative to Separate Bio-Waste Collection? *Wasser-Abwasser GWF* 142 (2001) Nr. 6 429-434

⁴ Mattsson, J. and Hedström, A. (2011) The incompatibility of food waste disposers with an aging sewer – Fact or Fiction? 12th Nordic Wastewater Conference, Helsinki

⁵ New York City, DEP (1997), The impact of food waste disposers in combined sewer areas of New York City. cit.op.

⁶ Clauson-Kaas, J. and Kirkeby J. COWI (August 2011) Food waste disposers: energy, environmental and operational consequences of household residential use

⁷ Per Andersson, Surahammars KommunalTeknik AB, personal communication 2013

- FWDs do capture many typical food waste contaminants that have proved damaging to AD plants such as plastic wrappings and bags. These remain in the FWD grind chamber.
- Ground food waste aids biological nutrient removal both at the WwTW⁸ and by in-sewer bio-transformations⁹ as it has a much higher ratio of carbon to nutrients.
- Fats oils and greases (FOG) are serious problems for sewers but they are not linked to FWD usage. A Water Environment Research Foundation (WERF) study of FOG examined samples from all around the USA. It is the largest study of FOG to date. The WERF researchers say they did not see (by microscope examination) evidence of FWD output in FOGc samples¹⁰. This has been corroborated with samples from sewers in UK¹¹. Authors of the WERF study have gone on to elucidate the mechanism of FOGc formation, which points to grease recovery units being superior to static grease traps.

Response to relevant questions:

18. Do you agree with the proposals in Chapter 4 and approach of combining the 5 measures together, in relation to regulation of waste segregation? Are there any other materials or waste streams which should be included in the requirements to sort and separately collect? If yes, what are they, and why should they be chosen?

The cost of establishing adequate new anaerobic digestion infrastructure drives a need to adopt a rigid single policy approach mandating kerb side collection. This lack of flexibility carries a high risk:

- Anaerobic digestion is a technology that is already demonstrating vulnerabilities in both safety and systemic failures. In presenting Evidence to the House of Lords in December 2014, the Environment Agency pointed out areas of difficulty which have been encountered with significant incidents at AD sites in England.
- Demanding rigid sort of waste to avoid the contaminants that have proved a barrier (cling film etc.) places a reliance on human efficiency that has proved misplaced in the UK, and other countries such as Denmark.

⁸ Battistoni, P.; Fatone, F.; Passacantando, D.; Bolzonella, D. (2007) Application of food waste disposers and alternate cycles process in small-decentralized towns: A case study. *Water Research* **41** 893 – 903

⁹ Evans, T.D.; Sandell, M. Andersson, P. and Wievegg Å. (2013) Field-based quantification of the power of in-sewer treatment. 7th International Conference on Sewer Processes & Networks, 28 - 30 August 2013, Sheffield

¹⁰ Ducoste, J.J.; Keener, K. M.; Groninger, J. W. and Holt, L. M. (2008) Fats, roots, oils, and grease (FROG) in centralized and decentralized systems. Water Environment Research Foundation. IWA Publishing, London.

¹¹ J.B. Williams, J.B.; Clarkson C.; Mant C.; Drinkwater, A. and May E. (2012) Fat, oil and grease deposits in sewers: Characterisation of deposits and formation mechanisms. *Water Research* **46** 6319-6328

- New technologies and new paradigms for environmental achievement are constantly evolving. Rigid regulation is a barrier to achievement in both areas.

19. Do you agree that the level of segregation asked of individuals/businesses is acceptable? If no, please state why and an alternative.

No. In the most disciplined nations evidence is demonstrating that allowances must be made for the fact that enthusiasm peaks and human error compromises efficacy. Suitable flexibility must be built into regulation to allow a sustainable alternative for those businesses or individuals who cannot comply with a rigid requirement for source separation for street collection, on practical or economic grounds; otherwise the cost of enforcement will outweigh the environmental benefit. The Waste Framework Directive requires that TEEP must be permitted to prevail and regulatory space or sufficient flexibility must be created to enable this. Food waste disposers are just one currently proven technology that could provide an additional sustainable solution and if permitted others will emerge.

20. Are there any particular types or sizes of businesses where it would not be technically, environmentally or economically practicable to keep the 7 waste streams separate at source? If yes, please identify them and explain why.

Small businesses and households will find the separation and storage of 7 waste impracticable. Small bed and breakfast businesses, cafes and sandwich bars, or flatted properties will be unable to comply. Although other on site solutions such as food waste disposers could permit compliance in these space-restricted environments.

21. Do you agree with the materials that we propose to ban from landfill or energy from waste facilities? Are there any other materials which should be banned from landfill or energy from waste facilities? If yes, what are they, and why?

We support banning food waste from landfill, providing that the regulation adequately permits a range of alternative methods of achieving this.

22. Do you agree that developing guidance for acceptable levels of contamination in residual waste for landfill / incinerator operators and the regulator is a workable approach? If no, what other approach could we adopt?

No comment

23. Do you agree that there should be a prohibition on the disposal of food waste to sewer? If yes, should this apply to: i) households, ii) businesses and public sector or iii) both?

No. Where food waste cannot be prevented, food waste disposers (FWDs) aid recycling and recovery, efficiently using existing infrastructure (with no detrimental effect), improve kitchen and street hygiene and reduce the need for collection vehicle emissions.

In seeking to impose a ban on food waste disposers, Wales is regulating against proven technology and restricting policy success to a single solution. Anaerobic digestion is a good solution for food waste and for sewage sludge but physical contaminants (mainly plastic film) are a major operational problem for AD of separately collected food waste. As yet there is no clear winner in the search for a technology to remove physical contaminants. In contrast FWD leave physical contaminants in the kitchen and just deliver clean food waste to the sewer.

24. Do you have any comments about how such a prohibition should be enforced with i) businesses and public sector and ii) households?

As we find this prohibition unsubstantiated and ill-advised we have no comment on enforcement.

25. Do you agree that lead in times for the proposals are reasonable? If no, what alternative lead in time would you suggest?

The lead times fail to recognise that the active life of an FWD is approximately 10 years. Forcing disposal and recycling of an appliance which is still has an active life and against which there have be no evidence based environmental objections represents the adoption of economically and environmentally impracticable policy.

26. Do you agree that NRW are the best placed organisation to regulate the duty to source segregated wastes? If no, please give the reason and propose an alternative regulatory body.

NRW is an organisation ideally placed to encourage new technologies and continuous innovation. Policing a single proscriptive policy may not represent best use of this potential positive contribution.

27. In your opinion, who is the most appropriate body to regulate the bans on disposal of food waste to sewer for businesses and the public sector: i) NRW ii) Local Authorities iii) sewerage undertaker or iv) other. If 'Other' please propose an alternative regulatory body and state reasons.

Banning ground food waste to sewer is misguided and non-evidence based policy. Seeking the "most appropriate body" to regulate unsubstantiated policy is a misnomer. Efforts would be better spent developing a more flexible regime that permits the use of existing and appropriate infrastructure, that is the sewer system, to transport finely ground food waste to waste water treatment and anaerobic digestion.

28. Do you have any comments on the impact of these proposals (for example, impacts on your organisation)?

The impact of banning finely ground food waste to sewer on the flimsy basis of unsubstantiated misapprehension will deprive Wales of an easy and efficient means of eliminating this waste stream from landfill, recovering biogas and valuable soil nutrients including phosphates.

On the basis of years of operational experience and of published research, administrations in many advanced countries are adding FWD to the toolbox of options for diverting food waste from landfill, and encouraging their use.

AMDEA urges Wales to consider the evidence, to keep abreast of current international environmental thinking and not to ban FWDs.

Yours faithfully

A handwritten signature in black ink that reads "Douglas Herbison". The signature is written in a cursive style with a long horizontal stroke extending to the right.

Douglas Herbison
Chief Executive

Encls: Annex 1 Review of Eonomia Report MK 090114

Comments on: “Additional Policy Options Analysis for Welsh Government: Costs and Benefits of Extending Waste Framework Directive requirements, Waste Treatment Restrictions, Requirement to Sort and a Ban on the Disposal of Food Waste to Sewer, Report for Welsh Government (Eunomia Report)

Michael Keleman 1/9/14

Following a review of “Additional Policy Options Analysis for Welsh Government: Costs and Benefits of Extending Waste Framework Directive requirements, Waste Treatment Restrictions, Requirement to Sort and a Ban on the Disposal of Food Waste to Sewer, Report for Welsh Government,” hereafter referred to as the Eunomia Report, I offer the following detailed review.

I serve in a technical support role as the Manager of Environmental Engineering at InSinkErator, the world’s leading manufacturer of food waste disposers, referred to in the Eunomia report as macerators. My primary function is to oversee research and communicate on the impacts of food waste disposers, and after nearly twenty years in the wastewater treatment profession, I am ardent about the benefits of disposers, because they are increasingly being viewed as a part of the global solution to organics management. Disposers facilitate both landfill diversion and resource recovery, so the recommendation by Eunomia supporting a ban on commercial disposers solely on an economic evaluation contradicts contemporary research and trends.

The authors of the Eunomia Report (Ann Ballinger, Peter Jones and James Fulford) are all residents of the UK, and apparently have extensive background and education in the waste industry in the UK (according to their LinkedIn profiles). Unfortunately, even with their experience in waste management, including life cycle assessment, composting and anaerobic digestion (Ann Ballinger), they did not consult with any literature outside the UK and Europe for their evaluation. In fact, the report contains no formal literature review or bibliography. Without a thorough investigation of existing literature on the subject of food waste disposers, the recommendation to prohibit commercial food waste disposers is biased and flawed. Furthermore, it is unfortunate and shortsighted that the authors of the Eunomia Report neglected to include any outside experts familiar with the environmental impacts of food waste disposers before writing their report. (Although the report references WRc, no industry experts were consulted for their evaluations.)

As communities around the world consider alternatives to landfills for effective management of organics, they should consider reviewing “Life Cycle Assessment of Systems for the Management and Disposal of Food Waste.”ⁱ This evaluation concluded that food waste disposers used in conjunction with any of eight types of wastewater treatment plants results in lower greenhouse gas emissions than landfilling. In addition, if the plant utilizes anaerobic digestion and cogeneration, the impacts of primary energy demand and greenhouse gas emissions are both lower than even composting.

The Eunomia report mentions on page five the goal of Wales to “...improve rates of recycling” yet a ban on disposers contradicts this goal. The report ignores the global megatrend for [The Water Resources Utility of the Future](#) to transform wastewater treatment plants into Water Resource Recovery Facilities (WRRF) – producers of clean water, energy and fertilizer.ⁱⁱ Resource recovery is the ultimate form of recycling, and can be accomplished via disposers. Food waste on average, is at least 70% water, and is basically the same specific gravity as human waste, and so by conveying finely ground material processed in a disposer to the local wastewater treatment plant, municipalities can reclaim the imbedded water as a resource. Also, where anaerobic digestion is utilized, there is a net energy gain on the process as recently modeled by world renowned wastewater treatment academic and author George Tchobanoglous.ⁱⁱⁱ This paper also demonstrated the benefits of disposers on nutrient removal at WRRFs.

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As the trend continues to reduce the negative impacts of eutrophication, municipalities should consider that because sewage is carbon deficient and food waste has a high carbon to nitrogen ratio, when there are sufficient food waste disposers, the better carbon to nutrient ratio can help municipalities meet strict regulatory effluent compliance limits, and in a less energy intensive manner. This paper was recently shared at the European Wastewater Management Conference in Manchester. The Eunomia Report is void of any mention of the benefits of adding supplemental carbon to wastewater for reducing nutrients in the treated effluent.

Contemporary research on food waste disposers resulted in a claim from the latest edition of Wastewater Engineering which states,

“The challenge in the future is how to extract the energy in wastewater most effectively. For example, food waste could be ground up in kitchen grinders and transported to the wastewater treatment facilities in the collection system.^{iv}”

With any engineering report, assumptions are necessary in order to quantify both environmental and economic impacts. Unfortunately, the Eunomia Report bases much of its economic impact of commercial disposers on current residential disposer levels of 3% yielding 6,000 tonnes per year. Arguably, the amount of food waste processed in disposers is difficult to measure and highly variable, but to extrapolate any data for commercial disposers based on an exaggerated residential number is more of a guess than an estimate, and renders any further economic evaluation useless. Furthermore, why is the cost of the disposer mentioned in Section 4.1 on page 42? The cost of purchase is irrelevant to the Wales government because it is covered by the user. With regard to economics, the report contradicts a recent report titled “Sustainable Food Waste Evaluation,” which determined that wastewater treatment of food waste via disposers is the least expensive option based on a comparison of five different systems, including composting.^v The exclusion of the cost benefit of sending ground food scraps to AD in Table 4-1 on page 51 explains why the Eunomia report exaggerates the costs of disposers.

In Section 4.1.1.1 on page 43, if commercial food waste is 3.5 times (21,000 tonnes) that of residential waste (6,000 tonnes), then why is the CAPEX and OPEX FWD (Table 4-1 on page 50) for business approximately 9 times that of household?

In Section 4.1.1.2 on page 44, using the assumption of 0.001 £s/liter and the 300,000 L/month cited in notation 25 would equal 300 £s/month or 3,600 £s per year I water costs. This is only 14% of the value of 25,000 £s/year quoted (from an article from notation 23).

In section 4.1.1.3 on page 46, the report lists 1,300,000 households x 3% penetration x 1% blockages = 390 blockages per year expected due to FWD usage. So what is the actual number of blockages recorded in Wales? If disposers are already negatively impacting sewer networks, it is important to consider the current level of disposer use in Wales. Our best estimates show that on average, less than 5% of residences currently own a disposer, which agrees with the Eunomia estimate of 3%. If the sewers are in poor condition, and the sewer manager is concerned about solids build up during the dry weather, does that mean they are currently relying on wet weather inflow and infiltration to keep the sewers clean?

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Additional flow from disposers will not exacerbate existing problems given food waste is the same specific gravity of human waste. More importantly, food waste discharged from disposers meets very fine particle size requirements of the American Society of Sanitary Engineering (ASSE) - 94% of the material must pass a 6 mm sieve, and so concerns of sedimentation expressed by water authorities in sewers should not be rationale for prohibiting sewers. Potential sedimentation has been studied thoroughly, largely because officials repeatedly mention “concerns of sedimentation,” yet no research has substantiated these claims, and none of the studies were referenced in the Eunomia report.

It is highly unlikely the current level of disposer installation results in negative impacts on sewers, especially given the widespread acceptance and use in the US where some areas have as high as 90% adoption rates. Cities like Philadelphia, Tacoma and Milwaukee are actually encouraging the use of disposers to accomplish organics diversion and resource recovery.

Acknowledgement of issues of fats, oils and greases in Welsh sewers within the Eunomia report to support a ban on disposers is interesting given the current low penetration of disposers. In fact, this supports our ongoing research on the phenomena of calcium soaps forming in sewers as a result of free fatty acids (from various sources including bar soap, poorly maintained grease interceptors, and feces) reacting with ubiquitous Calcium. In other words, disposers are not the source of problematic calcium soaps.



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ⁱ PE Americas. 2011. “Life Cycle Assessment of Systems for the Management and Disposal of Food Waste.” InSinkErator.

ⁱⁱ The Water Resources Utility of the Future. 2013. National Association of Clean Water Agencies, Water Environment Research Foundation, and Water Environment Federation.

ⁱⁱⁱ Harold Leverenz and George Tchobanoglous. 2013. “Energy Balance and Nutrient Removal Impacts of Food Waste Disposers on Wastewater Treatment. Unpublished Report. InSinkErator.

^{iv} Tchobanoglous, George, H. David Stensel, Ryujiro Tsuchihashi, and Franklin Burton. 2014. Wastewater Engineering: Treatment and Resource Recovery. 5th Edition. Metcalf & Eddy/AECOM. McGraw Hill-Education. p. 1869.

^v David Parry. 2012. “Sustainable Food Waste Evaluation.” Water Environment Research Foundation.