

Cynulliad Cenedlaethol Cymru Pwyllgor Amgylchedd a Chynaliadwyedd	National Assembly for Wales Environment and Sustainability Committee
Egwyddorion cyffredinol Bil yr Amgylchedd (Cymru)	General principals of the Environment (Wales) Bill
Ymateb gan The Association of Manufacturers of Domestic Appliances (AMDEA)	Response from The Association of Manufacturers of Domestic Appliances (AMEDA)
EB 14	EB 14





*The Association of Manufacturers
of Domestic Appliances*

Mr Alun Davidson
Committee Clerk
Environment and Sustainability Committee
National Assembly for Wales
Cardiff Bay, CF99 1NA.

By email: SeneddEnv@Assembly.Wales

12 June 2015

Dear Sir

Consultation on the Environment (Wales) Bill

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). We write to raise the concerns of AMDEA's FWD Group that the proposed Welsh regulation on food waste is based on assumptions and misconceptions that lack scientific rigour and denigrate the environmental reputation of their technology.

Members of our FWD Group include the world's leading producer, InSinkErator, a company that has manufactured food waste disposers for over 70 years and markets these appliances in over 80 countries world-wide. InSinkErator's parent company Emerson Electric Co. also has strong investment interests in mid-Wales, where in Powys, the Emerson electrical engineering business, Control Techniques, employs over 600 at its worldwide headquarters.

As food waste and sewer management are core issues for AMDEA's FWD Group, we have accumulated and are continually developing a vast evidence base of peer-reviewed scientific research conducted by recognised experts and academics worldwide, including countries that lead environmental best practice such as Denmark, the Netherlands and Sweden.

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To summarise our concerns:

- The Welsh Assembly Bill is proposing a ban on the commercial disposal of food waste to sewer on the basis of a report and impact assessment which reflect prejudices relating to food waste disposers that contradict a vast and growing body of robust, peer-reviewed, scientific evidence, in favour of using disposers to recover value from food waste.
- These serious misapprehensions, unsupported by the science, reflected in the Eunomia Impact Assessment, the Explanatory Memorandum and the Bill, threaten to flaw Welsh environmental policy and limit its future ambitions.
- No experts from our industry were consulted on, or quoted in, the previous report “Additional Policy Options” prepared by Eunomia in May 2013, nor the updated Impact Assessment, dated January 2015. Neither report includes a literature review or bibliography.
- The Impact Assessment lacks explanation regarding sources, assumptions and methodology for the modelling. This renders the conclusions inscrutable. Our members are concerned that this failure to clearly present the economic evaluation behind the policy decision to ban commercial disposers may be construed to signify a bias.
- It is possible to identify various critical questions in the assessment regarding the cost-savings projected of some £9.9 million. They are poorly explained, but appear to be based largely on misguided speculation that food waste disposers block the sewers. This directly contradicts the worldwide evidence, a sample of which we present later in this letter.
- Furthermore, in Table 8 of the report the £5.9 million attributed to sewer blockages is assumed to be saved by the policy of banning commercial disposers. Although unexplained this figure is likely to represent total expenditure on sewer blockages in Wales. It is generally acknowledged by sewerage experts that sewer blockages are primarily caused by “disposables” such as wet wipes and sanitary products and fats, oils and greases (FOG). None of these causes will be eliminated by banning disposers.
- It is not apparent how many commercial disposers are assumed to be installed, although industry sources advise AMDEA the number is likely to be relatively small, which calls into question many of the figures quoted, such as energy and water use, CAPEX and OPEX. And it is acknowledged in the report that no data is available on the number of businesses that would be affected by the ban. To this unknown number of affected private sector stakeholders the Impact Assessment may appear to present a determination to ban disposers rather than a commitment to evidence-based policy.
- Reliance on a single solution of separate collection for transport to anaerobic digestion (AD) is high risk and will prove a block on technological innovation in food waste management in Wales. Even countries that have long experience of separate collections and have established treatment infrastructure reach a plateau and are experiencing barriers to further achievement.

- Wales is failing to acknowledge the rapid evolution of the environmental agenda. The recovery of phosphorus from sewage sludge is rising fast on the European Commission's Circular Economy agenda. Environmental policies in Germany, Sweden and Denmark¹ now position waste water treatment as a key focus for resource recovery.

To compensate for the apparent lack of qualified consultation, last year our members requested a technical review of the Eunomia study by a specialist FWD/sewer engineer (Annex 1). This review concluded that any position that the Welsh Government might 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. The current Impact Assessment appears to represent a further extrapolation from this unreliable source.

Key Food Waste Disposer Facts and Supporting Evidence

- 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 Germany².
- Easy to use and hygienic FWDs provide efficient capture of food waste in problematic densely populated urban areas, flats, or where terraced properties open directly on to the street. For transient populations in cities, the elderly, infirm, or flatted properties that lack space, storage and carrying out to the street requires a level of commitment not found in the entire population. These considerations have prompted towns and cities such as Stockholm³, New York⁴, Sydney⁵ and Odense⁶ to adopt FWDs as an additional recycling strategy to capture more food waste.
- Food waste disposers consume minimal amounts of water and electricity⁷, yet 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. While in Amsterdam

¹ <http://www.food-waste-disposer.org.uk/the-environment/phosphorus-fertiliser>

² 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

³ Tendaj, M.; Snith, Å; von Scherling, M.; Hellström, M.; Mossakowska, A. and Millers-Dalsjö, D. (2008) Kitchen Disposal Units (KDU) in Stockholm. Stockholm Water's pre-study on the preconditions, options and consequences of introducing KDU in households in Stockholm. Stockholm Water

⁴ New York City Department of Environmental Protection (June 1997). The Impact of Food Waste Disposers in Combined Sewer Areas of New York City.

⁵ Wainberg, R.; Nielsen, J.; Lundie, S.; Peters, G.; Ashbolt, N.; Russell, D.; and Jankelson, C. (2000) Assessment of food disposal options in multi-unit dwellings in Sydney. CRC for Waste Management and Pollution Control Limited. Report 2883R.

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

⁷ Market Transformation Programme for Defra (2008) BNXS43: Food Waste Disposers – an overview

Waternet (the local water company⁸) is mounting a retrofit trial of FWDs in 200 apartments to explore improved recovery of critical resources such as phosphates and nitrates at their waste water treatment/sewage plants.

- Food waste disposers can also 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 fractions⁹.
- FWD do not increase the risk of sewer blockage, as confirmed most recently in Sweden¹⁰. Ground food waste is 70% water, with a specific gravity similar to faecal waste which the sewers are designed to transport. Over decades the evidence from numerous field studies is that FWD do not impact adversely on the sewers, to cite a few:
 - USA, Atwater (1947) reviewed a decade of FWDs in 300 municipalities and found the apprehensions of sewerage engineers unfounded.
 - Sweden, Nilsson et al.(1990) conducted video inspection of sewers from 100 apartments pre and post FWD installation and found no fouling of pipes. They also conducted a laboratory simulation of 15 years usage and found no fouling.
 - Netherlands, De Koning and Graaf (1996) found no clogging of pipes even at the shallow gradients at which sewers are laid in the Netherlands.
 - Sweden, Karlberg and Norin(1999) video inspected sewers from apartments with and without FWDs and found no effect.
 - New York City Dept. of Environmental Protection (1999) video inspected sewers from 1049 households in four locations in the city and found no fouling or deposits.
 - Germany, Kegebein et al (2001), conducted particulate size analysis and settling velocities of FWD output and found it would be carried more easily than faecal matter, in conventionally designed sewers.
 - Italy, Bolzanella et al (2003) found FWD do not block sewers.
 - Japan, NILIM (2005) found no deposits in sewers
 - Italy, Battistoni et al (2007) found FWD improved wastewater treatment and had no adverse effect on the sewers.
- 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 in FOGc samples¹¹. This has been corroborated by samples from sewers in the

⁸ <https://www.waternet.nl/projecten/projecten-afvalwater/>

⁹ 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

¹⁰ Mattsson, J. and Hedström, A. (2011) The incompatibility of food waste disposers with an aging sewer – Fact or Fiction? 12th Nordic Wastewater Conference, Helsinki

¹¹ 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.

UK¹². 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.

- FWDs do capture many typical food waste contaminants that have proved damaging to AD plants such as plastic wrappings and bags. These cannot leave an FWD grind chamber.

Anaerobic digestion (AD) 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.

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. In contrast FWD leave physical contaminants in the kitchen and just deliver clean food waste to the sewer.

AMDEA urges the Committee to consider the evidence supporting a well proven technology in the context of the current environmental agenda, where recovery of critical resources from the sewers, such as phosphorus, is becoming ever more urgent. Wales should not limit its ability to respond to the rapid evolution of technology and contemporary thinking and we would ask the Committee to use its powers to instigate appropriate amendments to the proposed legislation.

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 at the end.

Douglas Herbison
Chief Executive

¹² 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

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?

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

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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.