

## **THE SCIENCE**

There have been numerous independent scientific studies across the globe that have proven that food waste disposers (FWDs) play an important role in solving the food waste management challenge.

This page gives a summary of 15 years of findings...

### **United Kingdom 2012 – STRONG BODY OF EVIDENCE**

Recent report by Local Government Association (LGA) reviewed 147 pieces of literature available on food waste disposers (FWDs) in preparation for their forthcoming pilot study that will investigate the effects of domestic FWD usage in newly built homes. Out of 95 pieces of relevant research they found 60 that reported a positive impact from the use of FWDs. There were 23 pieces of primary research that concluded FWDs have a positive impact on the environment and do not have a negative impact on the sewers or waste water treatment plants. Key findings relating to the sewer network were: most studies found there to be no clogging; evidence on sewage settlement indicated sewage with ground solids may 'settle better'; anaerobic evidence pointed to increase in biogas production and enhancement of biological nutrient removal; and data on residual waste saw a fall in volume of the general refuse stream.

#### **Source:**

Roberts, P. and Davies, N. Low and Behold Ltd (October 2012) *The potential of food waste disposal units to reduce costs – A literature review.*

### **Denmark 2011 – POSITIVE OPERATIONAL IMPACTS**

Desk study by a leading Danish engineering consultancy for members of the Danish Water and Wastewater Association and Danish municipalities. It contained previously

undocumented operational experience from municipalities and made various positive conclusions. As a result of the study, Odense, Denmark's third largest city, announced that it will permit FWD installations. Report concluded FWDs do not increase sedimentation and blockages and will not change the amount of fat in the sewer system. The extra water consumption is marginal and will not affect the hydraulic capacity of sewers or treatment plants. It also reported the amount of refuse is reduced by 20-30% with fewer odour problems, better hygiene for collection workers and possibility of less frequent collection.

**Source:**

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

**Surahammar, Sweden, 1997- 2009 – COST BENEFITS & CLEAR SEWERS**

This piece of research found that FWDs contribute to increased production of sustainable energy, had no impact on the sewer system. To reduce waste sent to landfill the town of Surahammar offered its citizens differential charges for waste collection. This included home composting, kerbside collection and an 8-year contract to lease a food waste disposer (FWD) from Surahammar's KommunalTeknik AB (SKT). Over the 10 years 50% of households chose the FWD option and it offered a unique chance to conduct a controlled study over a decade. This concluded there was no increase in water usage, sewer blockages, nor accumulation of solids, fat oil and grease, hydrogen sulphide or corrosion. There also was no change in wastewater treatment cost but on the contrary FWD usage increased biogas production by 46%.

**Source:**

vans, T.D.: Andersson, P.: Wievegg, A.: Carlsson, I. (2010) Surahammar – a case study of the impacts of installing food waste disposers in fifty percent of households. *Water Environ. J.* 241 309-319

**Stockholm, Sweden, 2008 – WATER BOARD ENDORSEMENT**

After completing a comprehensive study on the impacts and benefits of food waste disposers, in September, 2008, the Stockholm Water Board voted to allow the

installation of FWDs in all areas of their jurisdiction without prior approval, and also eliminated previously required surcharges. FWDs in Stockholm now play a major part in the national strategy to divert 35% of household food waste from incineration to biological recycling by 2010 (through biogas recapture in water plants).

**Source:**

Minutes from Stockholm Water meeting on FWD decision.2008-09-04

**Worcestershire and Herefordshire, UK, 2005 – COST EFFICIENCY**

These UK counties have been subsidising the purchase of FWDs by residents since 2005, after studying the issue and concluding that using disposers was a cost-effective, convenient and hygienic means of diverting kitchen food waste from landfills. According to their analysis, using in-sink disposers for food waste costs less and has a better carbon footprint than other waste disposal options. The counties estimated that lower solid waste disposal costs would pay for the cost of subsidies in about three years.

**Source:**

Evans, T. D. (2007) Environmental impact study of food waste disposers for the County Surveyors' Society & Herefordshire Council and Worcestershire County Council

**Italy, 2007 – BENEFICIAL IMPACT ON WASTE & WASTEWATER MANAGEMENT**

In a field trial that installed FWD in homes and a school for 67% of the 250 population of a mountain village in Italy the researchers found no problems in sewers, a benefit to wastewater treatment and a payback to the community of only 4-5 years.

**Source:**

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

**Netherlands, 2004 – NEGLIBLE IMPACT ON SEWERS**

Study performed at request of Dutch government to analyse the effects on the Dutch sewer system from use of FWDs. Delft University of Technology conducted the study which was completed in July 2004. Conclusions were that the organic loading emanating

from FWDs present negligible impacts to the sewer system or wastewater treatment facility.

**Source:**

de Koning, Dr.ir. J. Delft University of Technology. July 2004. *Environmental Aspects of Food Waste Disposers*.

**Hokkaido, Japan, 2000-2003 – POSITIVE IMPACT ON COMMUNITY & ENVIRONMENT**

Comprehensive four year study on the impact of disposers carried out in the town of Utanobori in Hokkaido. A technical report on the study found the installation of disposers did not result in any changes in the amount of system water usage; no large changes were evident in the amount of foreign material and deposits discharged at pump facilities; the frequency of cleaning did not change and no effects were observed to the quality of treated water. The popularisation of disposers would cause no changes to the environmental burden and an overall cost benefit analysis found that the convenience benefits and the cost of purchasing and installing a disposer to be an excellent value when compared to the changes in administrative costs and disposal operation costs.

**Source:**

Water Quality Control Dept., Sewage and Wastewater Management Dept, City and regional Development Bureau, Ministry of Land, Infrastructure and Transport, Japan Parks and Sewage Division, Department of Construction, Hokkaido Government, Town of Utanobori *Report on Social Experiment of Garbage Grinder Introduction*.

**Karlsruhe, Germany, 2001 – GREEN LIFECYCLE**

Research at the University of Karlsruhe in the department of Professor Herman H. Hahn, who for 11 years was the president of the German Water and Wastewater Association, demonstrates that the output of FWDs is transported through sewers easily. The study found that 40-50% of the output of a FWD was less than 0.5 mm and 98% was less than 2 mm by sieve analysis. All of the output passed a 5 mm sieve. Of the food waste sent down the FWD, between 15-36% of the output was dissolved. The output of the FWD was very finely divided and very biodegradable. They measured the density and settling velocities of bio-waste particles to be very much less than the mineral particles

commonly found in sewer sediments. The study also found that FWD produces about 10 times more electricity (from the biogas) than the FWD uses.

**Source:**

Kegebein, Jorg, Erhard Hoffmann, and Prof. Hermann H. Hahn. Institute for Municipal Water Treatment, University of Karlsruhe. *Co- Transport and Co-Reuse – An Alternative to Separate Bio-Waste Collection?* Wasser-Abwasser GWF 142 (2001) Nr. 6 429-434

**Sydney, Australia, 2000 – GOOD ENVIRONMENTAL OPTION**

In 2000 a comparative study of FWDs against other food waste solutions was carried out for Sydney apartment buildings,. The impacts of FWDs in each area were compared (on the basis of the scientific literature) to the impacts of the current practice of collecting food waste with municipal waste and sending it to landfill, centralised composting of food and garden waste, and home composting. The report concluded the disposal of food with municipal waste to landfill was the least satisfactory of all options; individual composting was environmentally ideal but impractical for multi-unit dwellings. Using a food waste disposer was environmentally acceptable for energy consumption, global warming potential and acidification.

**Source:**

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

**Wisconsin, USA, 1998 – EFFECTIVE SOURCE OF SUSTAINABLE ENERGY**

In 1998 The National Association of Heating, Plumbing, and Cooling Contractors commissioned a life-cycle comparison, at University of Wisconsin, of five engineered systems for managing food waste. The four-year research project concluded a FWD has the lowest cost to the municipality, the least air emissions, especially greenhouse gases and converts the food waste to a resource which may be recycled, making it the most environmentally friendly option for recycling biowaste.

**Source:**

Diggelmann, Dr. Carol and Dr. Robert K. Ham. Department of Civil and Environmental Engineering – University of Wisconsin. January 1998. *Life-Cycle Comparison of Five*

### **New York City, USA, 1995 – MINIMAL IMPACT ON SEWERS AND WATER SYSTEM**

In 1997 New York City rescinded its 18 year opposition to domestic FWDs, concluding that the opposition had no objective basis after a 21-month pilot proved their benefits exceeded any negligible impact on the sewer system and water quality. Among the issues examined were the impact of grease and food solids on sewers, the impact on water consumption and the impact of possible increased pollutant loading on receiving waters. The study concluded that the impact of food waste disposers in any of these areas was “de minimus.” The measure rescinding the ban was signed into law by Mayor Giuliani in 1997.

**Source:**

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

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