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Action Plan

How to participate in the closed loop economy through waste exchange

This action plan is for use by Operations Directors and senior level decision makers in grocery manufacturing and retail organisations.
Key opportunities:

- Reduce waste costs and obtain further income from waste and by-products
- Close the loop on material consumption

Overview

All businesses produce unavoidable waste that cannot be further reduced, re-used or recycled. For grocery manufacturers, distributors and retailers, 5 million tonnes of food- related waste (excluding packaging) is sent to landfill each year (WRAP, 2010).

The costs of waste disposal have risen by 14.2% over the last year (WRAP, 2012). Coupled with increases in waste transport and storage costs, it is increasingly important to review the value of grocery product waste. The sale and use of second-hand food equipment, refrigeration units and packaging machines is a well established practice within the grocery sector because it makes good business sense. **Applying this philosophy to grocery product waste can cut waste disposal, storage and transport costs, generate new revenue streams and reduce material input costs**. Within WRAP's current business plan (2011-15) the National Industrial Symbiosis Programme (NISP) has already helped businesses in England reduce waste to landfill by 277k tonnes and cut the use of virgin materials by 547k tonnes, saving £6 million in costs and generating £8.5 million in sales by reviewing how wastes could be reused by other businesses.

Waste Exchange (sometimes called industrial symbiosis) is an approach that develops mutually beneficial arrangements between organisations to reduce waste, material and processing costs and impacts.

Opportunities

The largest benefit to organisations producing waste is to identify approaches to eliminating it as a priority to avoid disposal costs. Where waste cannot be eliminated or reduced, waste exchange, including food redistribution, can bring benefits to producers of waste and other organisations and individuals. Waste exchange can apply to all business operations and re-useable resources and materials; including product and process waste, Information Technology (IT) and office equipment and manufacturing equipment. This action plan presents the opportunity for retailers, wholesalers and manufacturers to benefit from waste exchange activities by getting involved in food redistribution projects, supplying food waste and by-product materials for recycling or equipment and material reuse schemes.

The table below summarises some of the opportunities by waste type and benefits of exchange:

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	Local community relationships	Cost savings	Environmental benefits	Revenue and business opportunities
Grocery products	**Food redistribution,** reducing waste to landfill and disposal costs and providing social benefits to local communities			
Food waste, by-products and process materials		**Recycling** in anaerobic digestion or composting facilities or **process materials replacement** in other organisations, such as pet food producers, reducing waste to landfill and disposal costs and potentially providing new revenue streams		
Equipment and reusable items	**Donation or sale of items** for reuse or refurbishment by other organisations or individuals, reducing waste to landfill and disposal costs, supporting community activities and potentially providing new business opportunities			
Packaging		As ingredients come into the manufacturing process in packaging that is often disposed of with other waste, this could be **sold for re-use** or **recycled** if kept separately. Wastages in the packaging process also can have a high value if segregated		

Implementation Process

Aim: To develop mutually beneficial arrangements between organisations to reduce waste, material and processing costs and impacts.

	Step 1	Step 2	Step 3	Step 4	Step 5
	Determining value	**Developing business case**	**Identifying partners**	**Trialling and monitoring**	**Embedding and review**
Waste producer	Quantify outputs and value	Assess benefit to business, investment requirements and possible risks	Determine organisations that may require materials	Trial with selected recipients	Implement new contracts, operational procedures and training and establish review programme
Waste recipient	Quantify material needs and suitability		Determine organisations that may be source of materials	Undertake testing and trials with one organisation	

Step 1 – Determining the value of wastes

If you are a waste producer, then start by quantifying the volume and characteristics of any waste materials, energy, water or by-products. If you are a potential waste recipient, define the material needs, including volume and characteristics, of your operations. Use waste exchange and food redistribution websites (see contacts list at the end of this document) to obtain information on the nature of materials currently being sought and exchanged, how you can access appropriate networks, and the possibility of selling goods and materials through online auction sites. To assess the value of the waste stream, it is useful to compare with published prices for common materials such as metals, card, plastic, etc.

When reviewing the value of waste and by-products take account of guidance from the regulators on the classification of waste and when material ceases to be classed as waste (DEFRA, 2012, SEPA 2006, 2007).

Step 2 – Develop the business case

Involve operational and management staff in developing the business case to ensure that the benefits and risks identified and quantified are relevant and realistic, and that any operational changes can be implemented.

When assessing the risks and benefits of waste exchange activities for your business take account of the following factors:

• Regulatory	• Material quality	• Impact of variations (delivery, quality, quantity)
• Logistical	• Material volume	• Economic
• Business practices	• Training and skills	• Technology
• Markets	• Sustainability of supply	• Standards and quality of items

Step 3 – Identify partners

In some cases a producer or recipient may have existing relationships with other businesses with which there is scope for waste exchange. Where relationships do not exist, and knowledge of the needs of other types of organisation is limited, you may need to contact third party organisations. Talking with your existing waste contractor other waste management companies, and your local council can help you identify local organisations who may want your food waste and grocery products. Existing waste exchange networks, charitable organisations and industry bodies, such as the Food and Drink Federation (FDF) and the Organics Recycling Group (ORG), can also provide information on how to identify suitable partners.

Food waste and by-products	Grocery products	Equipment/ items for reuse
Pay particular attention to the amounts, quality and consistency of supply of materials to suitable exchange organisations. High volume, low value wastes are better matched with more local companies while low volume, high value wastes could be supplied to a larger geographical area.	When donating unsold grocery products for food redistribution through charitable or other intermediary organisations make sure you comply with best before and use by labelling requirements. Guidance on labelling is available from WRAP (WRAP, 2012b).	When donating equipment and other items for reuse it is your responsibility for making sure you comply with your waste responsibilities, such as the Waste Electrical and Electronic Equipment Regulations (EA, 2013).

Step 4 – Trialling and monitoring

Initiate a small scale trial with one type of waste with one organisation. The trial should include all the steps in a full operational programme. Use the key findings from this trial to feed into the future scaling up of the operation. This checklist can be used when assessing the success of the pilot.

Success factor	Not met	Partly	Fully met
The quantity of materials exchanged are within agreed ranges and will be able to be supplied in the future in appropriate timescales			
The materials available and supplied meet agreed performance criteria and will be able to be provided consistently			
Changes to storage facilities and transport costs are adequate			
Regulatory requirements have been taken into account and are likely to be approved for a full scale programme			
The materials exchanged, methods of exchange and logistical arrangements pose no significant health and safety risk and training requirements or mitigation measures can be addressed			

Step 5 – Embedding waste exchange process and review

Taking part in waste exchange will require a change in the way you do business in your organisation. Buy-in from a wide range of individuals and teams may be required from technical, operational and financial senior management to operational and shop floor staff. By using a workforce partnership approach you can introduce new initiatives such as waste exchange more effectively. Obtain a free step by step guide on building workforce partnerships from WRAP (Workforce Partnerships for Resource Efficiency). Establish a programme of review to allow the impacts on waste exchange activities of wider changes in organisation operations to be identified and procedures or contracts to be changed appropriately.

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Benefits

Savings		Actor	
Environment	**Cost**	**Producer**	**Recipient**
• Reduced use of virgin materials • Reduced carbon emissions from extracting and processing virgin materials • Reduced waste to landfill	• Reduction in material costs for the recipient • Additional income stream and /or reduced waste disposal costs for the producer • Protection from market fluctuations in material costs for the recipient • Immunity from rising waste disposal costs for the producer	• Reduced regulatory burdens • Potential for brand enhancement • Network and relationship building • Diversifying outlets for by-products or wastes • New business opportunities • Scope for innovation in processing • Enhanced CSR reporting	• Diversifying materials suppliers • Improve material security • Scope for innovation • Attract investment in recycling and reprocessing • Create and safeguard jobs

Barriers

Barrier	Description	Mitigation	
		Producer	Recipient
Waste, material and equipment costs are part of everyday business	Lack of understanding and awareness of the value of materials, cost of waste or the availability of materials and equipment suitable for reuse and the benefits that can be realised	Carry out waste review and future scenario evaluation to understand business cost and benefits	Review suppliers, materials and equipment market to understand market opportunities
		Contact intermediary organisation	
Consistency of quality and quantity	Assurances will need to be in place from a producer to ensure materials provided do not detrimentally affect a recipient's activities and a recipient needs to provide assurances on ability to receive quantity available at the agreed quality	Provide appropriate test results of materials and products to provide assurances	Work to minimum quantity and quality requirements to maintain degree of flexibility
		Carry out small scale trial	
Logistics of storing, transporting and receiving materials	There is the perception that businesses need to be in close proximity for waste exchange. Such issues are dependent upon the volume and value of the material being exchanged and the benefits to be realised to each organisation	For low value, high volume materials or products restrict arrangements to local partners.	
Behaviour/process change needed	Changes to how waste maybe stored / processed for the exchange may require staff to change their working habits, or modifications to production processes.	Producer should provide clear instructions to staff and engage to mitigate any concerns. Some additional staff engagement / training may also be helpful.	

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Case Study – Thornton Budgens

Thornton Budgens is an independently owned retail store in Crouch End, London. Since October 2011, the store has used fresh ingredients approaching their sell-by dates to produce meals for a new in-store hot food counter. In addition, edible food surplus that cannot be sold is donated to a local charity, FoodCycle, to create affordable meals for local communities (feeding5k, 2013).

Case Study – Brakes Group

Brakes are often left with food that has passed their exacting minimum shelf life and cannot be distributed, even though it is still 'in date'. This food has historically gone to landfill costing the company thousands of pounds per annum in disposal costs. In March 2010 Brakes entered a partnership with FareShare, and estimates it donated one million meals by 2011. This initiative not only helps relieve food poverty, it also reduces food waste and cuts the associated greenhouse gas emissions that result from sending unwanted food to landfill (Brakes Group, 2011).

Case Study – John Baarda Ltd

John Baarda Ltd cultivates 300,000 tomato plants at its 38 acre greenhouse in Billingham. Through the National Industrial Symbiosis Programme relationships have been established with Terra Nitrogen UK Ltd, producer of nitrogen products and methanol, and A&E Thompson, local farmer and composting company.

John Baarda uses CO_2 and steam from the nearby Terra Nitrogen UK ltd plant to heat the greenhouses and enhance plant growth and A&E Thompson composts the tomatoes and vine waste from the greenhouses for use on its own farmland.

Key annualised synergy benefits (NISP):

- 12,500 tonnes CO_2 reduced
- 250 tonnes green waste diverted from landfill
- Cost savings for John Baarda of £5,000 per annum
- Additional product sales of £500 for A & E Thompson

Case Study – Ribblesdale Cheese Company

The Ribblesdale Cheese Company is a small artisan cheese producer based in Yorkshire. It has established a relationship with brewery company TR Theakstons through regional waste exchange - 'Why Waste' .

Theakstons brewery uses the age old process of Cooperage to produce wooden casks on site which results in the production of oak shavings. Why Waste identified the potential for the shavings to be used in traditional food smoking processes. The oak shavings from Theakstons are now used as a bed for fine oak chippings that are used in Ribblesdale Cheese Company smoker.

Case Study – Sainsbury's

Sainsbury's has achieved zero food waste to landfill throughout all their operations. This has been achieved by a number of mechanisms. In 2012 Sainsbury's donated 3,947 tonnes of surplus food worth over £2.1m to FareShare for food redistribution. All bread and bakery waste is returned daily to the depots' Resource Recovery Units (RRU) to be sent to feed processors where it's turned into animal feed to support the farming

industry. 800,000 litres of waste cooking oil is collected from stores annually and recycled into bio fuel and any surplus food not fit for human consumption, and not donated for animal feed, is sent for anaerobic digestion. Sainsbury's is the UK's largest retail user of Anaerobic Digestion (AD). The waste goes to plants in England and Scotland creating enough energy to power 2,500 homes annually.

Resources

1. WRAP, 2010. Waste arisings in the supply of food and drink to households in the UK
2. WRAP 2012, Gate fees report 2012, Comparing the cost of alternative waste treatment options
3. WRAP, 2012b. How to apply date labels to help prevent food waste
4. DEFRA, 2012. Guidance on the legal definition of waste and its application - a practical guide for businesses and other organisations, August 2012
5. SEPA, 2006 Is It Waste - Understanding the definition of waste
6. SEPA, 2007 Supplementary guidance to Is it Waste?
7. EA, 2013 A guide to when electrical and electronic equipment is considered waste and the controls that apply
8. NISP 2009. The pathway to a low carbon sustainable economy
9. Feeding5k 2013. http://www.feeding5k.org/businesses+casestudies.php
10. NISP. http://www.wrap.org.uk/sites/files/wrap/Tomato_Compost_NE.pdf
11. WRAP, WPRE. Workforce partnerships for resource efficiency
12. NISP. http://www.wrap.org.uk/sites/files/wrap/Tomatoes%20New.pdf
13. Why Waste. http://www.whywaste.org.uk/case_studies.asp?CaseID=18
14. Brakes Group http://www.brakesgroup.com/cser/case-studies/fareshare/
15. Sainsbury's fact sheets http://www.j-sainsbury.co.uk/responsibility/factsheets/
16. FDF, Supporting food redistribution throughout the grocery supply chain http://www.fdf.org.uk/environment/zero_waste.aspx
17. ORG, Directory of organics recycling organisations http://www.organics-recycling.org.uk/memberslist.php

You may also be interested in these related Action Plan/Topic Guide(s):

- How to use digestate as a fertiliser substitute
- Harmonising smart planning (manufacturers) and demand forecasting (retailers)

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Appendix: How to calculate the financial business case

Waste exchange projects can involve a variety of materials in widely varying amounts, and the business case will therefore vary in each case. The example given below considers the factors that would generally need to be taken into account to produce a financial business case to support a waste exchange project. The case applies equally to a waste producer and waste recipient. The financial costs and incomes can be classed under the following headings:

1) Costs of establishing the exchange
2) Recurring annual costs and incomes
3) Risk of intermittent breakdown of the exchange

Establishment costs

The costs of establishing the exchange can be treated in the business case as a one-off cost in the first year of the scheme. The costs of establishment can vary widely from very small amounts for the intermittent exchange of low amounts of materials, to a significant cost for large, regular exchanges of waste that are business critical to both the waste producer and waste recipient.

Recurring annual costs

As a waste producer you should calculate the recurring costs of running your existing waste disposal system. This process is important for identifying what the current costs are to the business and for projecting the potential savings through waste exchange. As a waste recipient you should determine the costs you would incur from purchasing the items new and the operational costs of your current material handling operations.

	Cost Area	Description
Supplier		
Waste fees		A waste gate fee will be charged by the waste contractor if the waste is currently disposed to landfill or sent for use in energy recovery at an energy from waste (EfW) plant. These costs would be incurred year after year.
Taxes	Landfill tax	The landfill tax is charged by the weight of the waste disposed to landfill. This cost is often included in the waste gate fee by waste contractors. Calculation should include the planned changes in landfill tax over the period considered.
Transport		Transport of wastes off site will usually be included in the waste contractor's gate fee so may not need to be included separately in the calculation. However, it should not be forgotten that you are paying for transport of your wastes, even though that cost is hidden.
Operating Costs	Salaries and management	Salary and management costs for the internal operation of the waste management system.

Recipient		
Material costs		The costs of purchasing the materials that will be replaced by the waste materials to be exchanged needs to be included in a baseline calculation.
Operating Costs	Salaries and management	Salary and management costs for the internal operation of the current materials handling system, including quality and other internal system checks.

A similar cost analysis should be applied to the situation with the waste exchange in place. In this case the major costs of waste disposal and landfill tax for the supplier will be eliminated and potentially replaced with an income stream. Any changes in staff and management costs or transport costs with the waste exchange in place will also need to be included. In the case of the recipient, the new (reduced) costs of the materials will need to be included, together with changes in staff and management costs and also transport costs if that is part of the agreement.

The outputs of your financial business case analysis should be presented in the context of your business. A key attribute of any presentation is the assessment of **payback periods** for investing in a new system. By dividing investment costs by the estimated savings you will calculate the number of years needed to run your new system before the investment costs result in real savings for the business.

System Failure

You may wish to consider including in the analysis the potential costs of breakdown of the waste exchange scheme. Costs may be incurred by both the supplier of materials (having to find an alternative outlet or pay disposal costs for the materials) and the recipient (having to find an alternative source of materials). The costs will vary from scheme to scheme and will depend on whether other sources of materials are readily available and if the failure is business critical. This cost can be estimated by assessing the potential cost to each business and combining this with an estimate of the probability of it occurring.

Template

A cost/benefit template spreadsheet can be downloaded from the PSF Knowledge Base, designed to be used for calculating the business case, and tailored using the considerations mentioned above.