

**WR1403: Business Waste Prevention
Evidence Review
L2m4-7 – Waste Minimisation Clubs**



A report for
Defra

November 2011

This report has been prepared by: Vanessa Fandrich

Checked as a final copy by: Katie Deegan

Reviewed by: Jayne Cox

Date: 22 October 2011

Contact: jayne.cox@brooklyndhurst.co.uk

File reference number: WR1403-L2-m4-7 Waste-Minimisation-Clubs.docx

Oakdene Hollins provides clients with these services:

- Modelling and impact assessment
- Programme management and evaluation
- Project management
- Ecolabelling advice
- Carbon footprinting
- Critical review of life cycle assessment
- Policy and strategy development
- Lean manufacturing
- Economic analysis
- Market appraisal.

For more information visit www.oakdenehollins.co.uk

Oakdene Hollins is registered to ISO 9001:2008



The original reports referenced in this document are permanently and freely available through our infinifile® service. Visit www.infinifile.org.uk and use Project ID 246 and the document id appended to the bibliographic reference to retrieve. Conditions apply.



We print our reports on Ecolabel / recycled paper

Context of Project WR1403

Waste prevention is at the top of the waste hierarchy. A major priority of the coalition government is to move towards a zero waste economy, and an important element of this will be to encourage and increase waste prevention. This review aims to map and collate the available evidence on business waste prevention. It will help inform the preparation of England's National Waste Prevention Programme as required under the revised EU Waste Framework Directive (2008).

The focus is on aspects of waste prevention that are influenced directly or indirectly by businesses - it complements a previous evidence review, WR1204, which focused on household waste prevention. The definition of the term 'waste prevention' used here is that in the revised Waste Framework Directive:

'Prevention' means measures taken before a substance, material or product has become waste, that reduce:

- a) the quantity of waste, including through the re-use of products or the extension of the life span of products;*
- a) the adverse impacts of the generated waste on the environment and human health; or*
- b) the content of harmful substances in materials and products.*

Recycling activities or their promotion are outside the scope of this review.

Context of this module

This module is one of a number of Level 2 modules that contain analyses of Approaches, Interventions, Sector Issues and other aspects of the review. This module deals specifically with the aspect of waste prevention using the Intervention mechanism of Waste Minimisation Clubs.

A full map of the modular reporting structure can be found within **L1m2: Report Index**.

(Empty page)

Contents

1	Waste Minimisation Clubs and How they Address Waste Prevention	1
2	The Nature of the Evidence	3
3	Evidence of Waste Prevention	4
3.1	Introduction	4
3.2	Mixed Approaches	4
3.3	Summary of Key Findings	10
4	Behavioural Aspects	11
4.1	Drivers and Motivators	11
4.2	Barriers to the Effectiveness of Clubs	12
4.3	Factors Influencing the Success of Waste Minimisation Clubs	13
4.4	Summary of Key Findings	18
5	Conclusions	20
5.1	Learning	20
5.2	Insights	20
5.3	Research Gaps	21
6	Bibliography	22
7	Annexe L2m4-7-A: Waste Minimisation Clubs	24

Glossary

betre	business excellence through resource efficiency	NREP	Northamptonshire Resource Efficiency Programme
BREW	Business Resource Efficiency and Waste	REC	Resource Efficiency Club
CWN	Corby Waste Not	SME	small/medium-sized enterprise (EU definition)
KARE	Kettering Action on Resource Efficiency	WMC	waste minimisation club
		WREP	Wellingborough Resource Efficiency Project

Units Conventional SI units and prefixes used throughout: {k, kilo, 1,000} {M, mega, 1,000,000} {G, giga, 10⁹} {kg, kilogramme, unit mass} {t, metric tonne, 1,000 kg}

Language used in this report

This report has used a framework for evaluating both the actions a business takes to prevent waste (the Approaches), and the mechanisms that have catalysed the actions (the Interventions). The detailed description of Approaches and Interventions may be found within the respective modules **L2m2: Approaches** and **L2m4-0: Interventions Introduction**, but a brief reference outline to the Approaches is given here:

Positioning of approaches in response to business drivers including waste

	Process ← "supply side" ←	FOCUS Drivers	→ Product Performance → "demand side"
Incremental ← CHANGE → Radical	Clean Operations: More radical restructuring of processes "new, green, clean", often cooperating with others in the supply chain.		Product-Service Innovation: Fundamental redesign of the product and service combination of a business or its suppliers to reduce life-cycle impacts.
	Waste Minimisation: Traditional in-process housekeeping, including Lean, to improve conversion of input to outputs within current production system.		Green Products: Redesign, eco-design, light-weighting of products to reduce impact in manufacture, distribution, use or end-of-life by businesses or consumers.

Source: Oakdene Hollins/Brook Lyndhurst

1 Waste Minimisation Clubs and How they Address Waste Prevention

Waste minimisation clubs (WMCs) consist of a group of businesses within the same sector or a given geographical area that work together to achieve savings in waste minimisation. In addition to providing varying levels of training and consultancy support to participating companies, waste minimisation clubs provide members with the opportunity to share knowledge and experience through club meetings and events.

The first waste minimisation clubs were set up in the UK in the mid 1990s and, according to Mattsson *et al.* (1), were based on experience from mainland Europe (2)^a. The European model was then the basis for waste minimisation clubs set up in other countries such as Canada, Australia and South Africa (see below).

Whilst there is no formal definition of waste minimisation clubs, they usually follow the same basic framework (3) (4):

- **Recruitment phase:** launch and recruitment of participating companies.
- **Implementation phase:** workshop / seminars to train staff in waste minimisation techniques, identification of measures and support in implementation of measures.
- **Evaluation and dissemination phase:** further implementation, evaluation, dissemination and replication.

The lifetime of each of the phases of the project is set out at the beginning, with projects generally running somewhere between one and three years, depending on number of companies involved and the level of funding available. Some authors argue that two years seems to be the minimum time to turn potential savings into actual savings (5) (1), while others say that it takes at least three years to turn more than 90% of potential into actual savings (Coskeran and Phillips in (1)). It is not possible to say with any degree of certainty what the most effective lifetime of clubs is based on the evidence reviewed.

Three different models of UK clubs are identified by Paul Phillips *et al.* (1) (2) (6) which relate to the scope and financing of the clubs:

- **Demonstration clubs:** These were highly subsidised projects, involving significant amounts of public funding and support from private consultancies, business support organisations, or universities (e.g. Aire and Calder, Catalyst) (1). They recruited a small number of companies in a limited range of manufacturing sectors that were high-waste producing and therefore offered significant potential for waste and financial savings (1). The aim of these clubs was to demonstrate how significant financial cost savings could be made by implementing waste prevention and resource efficiency 'best practice' (7). In showing how savings could be made it was hoped that other companies would be encouraged to adopt similar initiatives. Heavy involvement by private consultants meant that the expertise would generally be lost once projects ended and the consultants moved on. Clubs in the early to mid 90s generally followed this model.
- **Facilitated self-help clubs:** These rely on limited external funding to provide some external expertise, but then rely on training champions within participating companies to build organisational capacity in waste prevention. The literature distinguishes between two types of facilitated self-help clubs, depending on the level of external funding: around £100,000 for "second generation self-help clubs" and around £40,000 for "third generation self-help clubs". In addition they may draw on 'in

^a See L2m8 Historic Review for evidence sources on waste minimisation clubs prior to 1995

kind' contributions from partners (e.g. Kettering (7)). These types have been the preferred model for the majority of clubs from the late 90s onwards.

- **Sectoral clubs:** These are based on single industrial sectors (e.g. East Anglian Waste Minimisation Business Club). They can be either based on the demonstration or facilitated-help club model above.

Clubs are typically initiated and run by a partnership of interested organisations (which may include local authorities, utility companies, central government, private consultancies, business support organisations, Regional Development Agencies, government offices, industry, regulators and universities) with expertise in specific areas of relevance to members of the business group (3). Waste minimisation clubs were a central feature of UK strategy over the past 20 years and often linked with regional or local strategies. The evidence reviewed suggests that they were rarely initiated voluntarily nor exclusively funded by companies (1).

Whilst clubs have traditionally relied on a number of funding sources, the Landfill Tax Credits Scheme was a key source of funding for a number of clubs during the late 1990s and early 2000s. Government funding has also been channelled through significant involvement of Envirowise and the Environment Agency in waste minimisation clubs. Between 2005 and 2008, 70 clubs were exclusively funded by central government through the Business Resource Efficiency and Waste Programme (BREW), via Envirowise (1).

'Waste minimisation' was defined very broadly by clubs, reflecting different meanings to different groups. As such it often included activities to reduce landfill disposal and off-site recycling. In addition, most clubs link waste prevention with wider resource efficiency objectives (6), including energy management, water efficiency, legislative compliance and reduction of greenhouse gas emissions. Financial saving and other impact data will therefore need to be treated with caution, as discussed in Section 2.

2 The Nature of the Evidence

The club approach is well documented in academic literature based on a number of waste minimisation clubs that have operated in the UK, mainland Europe and internationally since the early 1990s. However, different definitions of waste minimisation as well as club structures and models mean comparison is not straightforward. Activities undertaken by members of the clubs cover all of the approaches as defined in this review, but the impacts of those activities are rarely reported on separately within the published evidence. The nature of the evidence therefore means that it is difficult to distil a clear picture of the waste prevention impact of clubs, and evidence on wider resource efficiency impacts is therefore included.

A large proportion of the evidence on waste minimisation clubs is from peer-reviewed journals and meta-analyses of club programmes. About half of the evidence from the UK has been conducted with some level of input from Professor Paul Phillips, an academic from the University of Northampton who has researched waste clubs since the late 1990s. The evidence includes three international examples of a waste minimisation club. The key sources used within this research to assess the impacts of waste minimisation clubs and their limitations are given in Table 1.

Table 1: Advantages and limitations of different evidence sources

Source	Advantage	Limitations
Evaluation reports	Comprehensive information on the success and failure of specific waste minimisation clubs	Difficult to assess waste prevention impacts, as often include recycling, energy or water efficiency Few studies available
Academic papers	Comprehensive information on the success and failure of waste minimisation clubs, adding further information on the wider context Peer reviewed	Difficult to assess waste prevention impacts, as often include recycling, energy or water efficiency Difficult to disaggregate company specific impacts Heavy involvement of one academic in UK papers

A number of caveats about the evidence therefore need to be borne in mind when considering the impacts of waste minimisation clubs:

- Firstly, the principal issue is whether the data are being reported on a like-for-like basis in different studies. For example, impacts are often aggregated for a wide basket of resource efficiency outcomes and rarely refer to the prevention of solid waste alone. Similarly, some studies provide data on company specific impacts, while others aggregate experiences across the whole club or across a programme of clubs. It is also not always clear in the reported data whether the costs and savings are for equivalent time periods, and whether they are annual or for the whole-life of the club.
- Secondly, whilst being a key component of the club model, the impact of co-operation, knowledge exchange and shared experience during the lifetime of clubs is not well researched. Similarly, impacts on long-term behaviour change within participant companies following the cessation of club membership are under researched, with evaluations generally focusing on immediate savings only.
- Finally, more than 200 clubs have been set up and run in the UK over the past 20 years. The majority of clubs, including some very recent or still ongoing ones, are not well - or not at all - documented in the literature and therefore have not been included within the scope and time of this research project. We primarily summarise key points from clubs with the most complete evidence on impacts and effectiveness and further research (desk and field) may be required.

3 Evidence of Waste Prevention

3.1 Introduction

Based on data from Envirowise, it has been estimated that 150 waste minimisation clubs operated across the UK from 1992 to 2004, working with 5,222 companies (1). This figure has to be treated with caution as it only includes those within Envirowise's data base (2). In 2001 Envirowise concluded that 138 clubs and projects had generated savings of £45 million (8). Between 2005 and 2008 a further 70 resource efficiency clubs were set up by Envirowise covering an additional 1,330 companies, leading to additional £25 million of savings over three years (see Section 3.2). Mattson *et al.* (1) estimate that about 30 clubs are still operating in the UK; however, no detail is given on the scope or location of these clubs.

The nature of the evidence means that it is difficult to distil a clear picture of the impact of clubs specifically on waste prevention. Activities undertaken by members of the clubs cover all of the approaches as defined in this review but the impacts of those activities are rarely reported separately in the published evidence. Not all clubs have presented end of project reports detailing action taken by members. Those clubs that do report waste savings data generally do so in terms of solid waste reduced, which is likely to include measures to divert waste from landfill through off-site recycling. In addition, cost savings may include savings made from energy, water, and greenhouse gas emissions.

It is therefore impossible to map impacts of clubs against the different approaches due to the nature of the evidence. 'Waste minimisation clubs', for the purpose of this paper should therefore be taken to cover all of the approaches as defined in this research project, which is captured under the heading "mixed approaches" below.

The following section sets out the most useful examples identified from the evidence in terms waste and economic impacts achieved by a range of waste minimisation clubs. Section 4 draws on the evidence to draw out the factors that influence the success or failure of waste minimisation clubs.

3.2 Mixed Approaches

The following reviews a range of waste minimization clubs, highlighting key features, methods and outcomes. A summary of the high-level findings can be found in Table 2 at the end of this section, while a more detailed table of cost and outcomes is provided in **Annexe L2m4-7-A: Waste Minimisation Clubs**.

Demonstration clubs

Early demonstration clubs relied heavily on the use of private consultants to deliver the specialist expertise to participating companies and as a consequence were expensive to run.

Examples of typical demonstration projects include:

- **The Aire and Calder Project (1992-1994):** This club worked with 11 companies to identify and implement waste minimisation opportunities. £3,350,000 of savings per annum were achieved, half of which were from raw material savings, while solid waste reductions equalled 4,800 tonnes. Despite the high cost of the club, the saving to cost ratio of 8.4 (i.e. it has achieved £8.40 savings for each £1 invested) can be explained by the project focusing on a small number of manufacturing companies with significant waste saving opportunities. 10% of the measures were cost-neutral and a further 60% had a pay back of less than one year (9).

- **Project Catalyst (1993-1995):** 14 member companies, contributing 50% of the project funding, achieved solid waste savings of 12,000 tonnes, with further significant savings in reduction of liquid waste (1,800,000m³) and water demand (1,900,000m³). Total savings after one year equalled £2.3 million. The club was very expensive to set up and run requiring £1 million, which led to a low saving to cost ratio of 2.3. That said, 30% of the measures were cost-neutral, with a further 30% having had a pay back of less than one year.

Facilitated self-help

The main difference of facilitated self-help clubs is that they focus on providing staff training and raising awareness of waste prevention issues to build organisational capacity in resource efficiency. Examples of facilitated self-help clubs that are well evidenced in terms of design, structure and impacts include:

- **Northamptonshire Resource Efficiency Programme (NREP) (1997-1999):** The club was delivered by a partnership between the local Business Link, University College Northampton, the County Council, Agenda 21 and Enviros March Consulting Group. Of the original 22 companies that joined the club, 19 companies completed the whole programme. The overall cost of the club was £135,000, with member companies contributing £11,000, or £500 each. A similar amount was provided through 'in kind contributions' by partners. By the end of the two year project companies had made total savings of £1,894,274. 70% of participants came from the manufacturing sector, which might partly explain the favourable saving to cost ratio of 14.1. Another key success factor was the involvement of a university to provide low cost advice to businesses. The largest savings (£500,966) came from process changes, i.e. streamlining and optimising existing working practices for resource efficiency, water and energy. Solid waste savings made up £288,906, while hazardous waste savings contributed £3,200 (10). Further key success factors for NREP were the extensive dissemination of the project in the local area to share best practice and the development of an extensive exit strategy "to leave a support network for waste issues" which led to a number of follow up projects in the area (10 p. 219) (see below).
- **Corby Waste Not (CWN) (1999-2000):** Corby Waste Not, a follow up to NREP, was targeted at the whole community within Corby Borough, Northamptonshire. To achieve this, a large number of public and voluntary organisations collaborated to provide information and support to businesses and householders. Key partners included the Environment Agency, Northamptonshire County Council, The Government Office, University College Northampton, Envirowise and Agenda 21. Overall external funding for the project was £148,380, with a similar amount provided through 'in kind contributions' of key partners. The commercial and industrial waste club was financed through £35,000 and 25 companies, primarily SMEs from a variety of sectors participated. The business club achieved savings of £250,000, including 12,000 tonnes of solid waste reductions. One company, a small manufacturer of foam products, experienced a 50% reduction of waste to landfill, per month, saving the company £10,000 per annum (11 p. 27). A key success factor was considered to be the development of local and regional partnerships allowing the project team to draw on a wide skills base and wide ranging communications and media campaigns that targeting the whole community (11).
- **KARE and WREP (2000-2001):** Two further NREPs successors were Kettering Action on Resource Efficiency (KARE) and Wellingborough Resource Efficiency Project (WREP). The emphasis of both clubs was on local partnerships and achieving objectives with very small inputs of external funding (which was achieved in part through no use of external consultants and the use of 'in kind' funding from local partners) (7). Schools and the voluntary sector were also involved with the aim of permeating waste prevention through the wider community. To increase participation from SMEs the club was free to all members; although it was found that this did not have a marked impact on SME participation compared to earlier clubs, suggesting that funding was not necessarily a barrier to participation. 14 companies participating in KARE achieved solid waste savings of £86,528 at a cost of £13,000, while 17 member companies participating in WREP achieved solid waste savings of

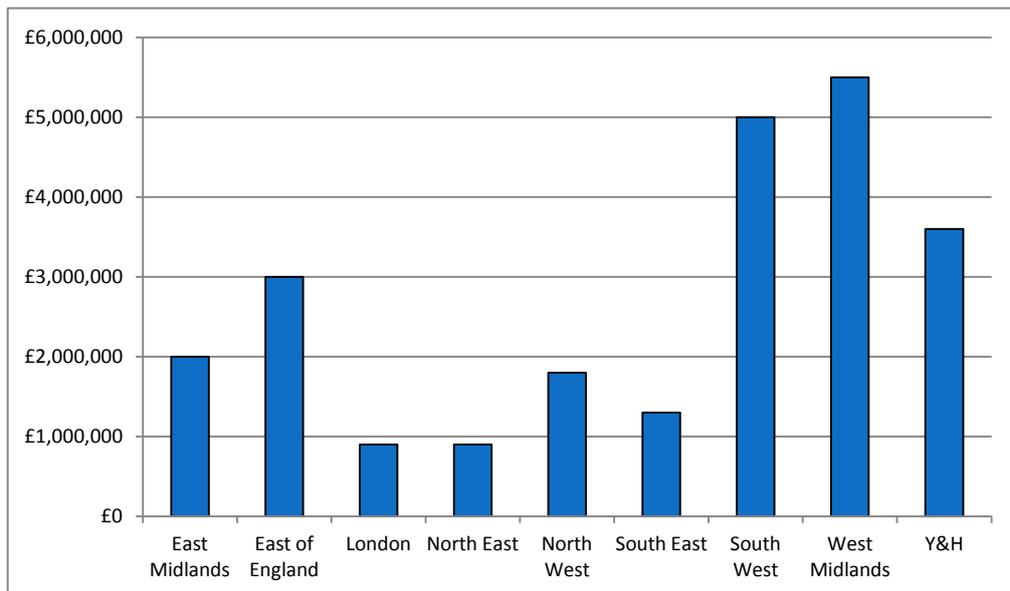
£148,459 at a similar cost. Other significant savings came from packaging, process changes and business rationalisation.

- business excellence through resource efficiency (betre):** Following a small pilot project involving 21 local companies in the South West of England, betre aimed to recruit 70 SMEs. 308 companies eventually participated, 64 of which implemented resource saving opportunities leading to £215,000 of savings. Around 32% of savings (£66,000) came from solid waste reduction, 28% from energy efficiency and 20% from water savings. Results from pre- and post-surveys of participants indicate that betre had promoted a cultural shift for companies, with responses to the second wave of the survey suggesting that environmental considerations had become more important following completion of the club^a. Overall, the project was considered a success in terms of company recruitment, creating a strong brand image to underpin future projects and creating strategic partnerships within the county. Saving to cost ratio was low at 0.8. A key conclusion from the research was that more time should have been devoted to direct business support rather than training seminars, to maximise saving opportunities.

We found two published evaluations of larger club programmes - one from the UK and one from Canada:

- Resource Efficiency Club (REC) Programme (2005-2008):** The programme was funded through £5 million of Defra money, administered through Envirowise. 70 clubs were set up, 53 of which provided useful data. 30% of the clubs were sectoral, with the remaining cross-sectoral (12). The total number of companies involved in the clubs was 1,330, of which 1,000 provided useful data. Each company in a club received resource efficiency advice via club meetings, events, networking opportunities and on a one-to-one basis with the club leader. Overall the clubs achieved £25 million of actual savings, ranging from just under £1 million in London and the North East to over £5 million in the South West and the West Midlands (Figure 1).

Figure 1: Actual savings achieved by RECs by region (£)



Source: (12)

^a No detail on survey design or sample size is given.

In total, 27% of the overall savings came from solid waste, 20% from raw material reduction and 1% from hazardous waste. The remainder was achieved through energy efficiency (48%) and water savings (4%).

The actual saving to cost ratio showed that on average RECs provided a return of £5.80 for each £1 invested, although achievements by club varied greatly (Table 2). While some clubs under-achieved significantly, a total of 24 clubs realised actual savings to grant ratios greater than 5. Nine of those clubs realised a ratio greater than 10.

Table 2: Saving to cost ratio for RECs (based on 53 clubs)

R = total savings/cost	Number of clubs
R < 1	13
R between 1 and 2	8
R between 2 and 5	8
R between 5 and 10	15
R > 10	9

Source: (1)

- **The Canadian Enviroclub Initiative (2000):** This initiative of seven clubs was developed to assist SMEs in Canada's Quebec region. Each club consisted of 10-15 SMEs, who committed themselves (by contract) to carry out one profitable on-site project and then attended four workshops within a six month period. Projects implemented in seven clubs brought annual savings of C\$5.1 million (£3.2 million at November 2010 exchange rates) averaging C\$91,000 (£57,000) per company. Resource savings included 11,300m³ of wood, 708 tonnes of hazardous waste and 53 tonnes of toxic substances. One participant, a manufacturer of wooden kitchen cabinets, decreased its hazardous waste by 49% by changing operational practice in the paint shop. The combination of workshops, knowledge exchange and support for hands-on experience was considered a key success factor in engaging SMEs in waste prevention. Initial recruitment based on strategic marketing tools and clear messages was also considered crucial in determining the success of the club (13).

More details about the Quebec initiative are provided in the case study of Box 1.

Box 1: The Enviroclub Initiative

The Enviroclub Initiative involved seven waste minimisation clubs developed in 2000 to assist SMEs in Canada's Quebec region. Each club consisted of 10 to 15 businesses who committed themselves, by contract, to conduct one profitable on-site project and attend four workshops within six months. Interventions included material substitution and changes in operational practice. For instance, one SME started using glass rather than steel shot as a polishing agent not only lowering hazardous arisings by 132 tonnes per annum but also producing less dust.

Business Benefits

- Total resource savings realised by Enviroclub included 11,300m³ of wood, 708 tonnes of hazardous waste and 53 tonnes of toxic substances. Across the seven clubs, annual savings of CAD\$5.1m (£3.2m at November 2010 exchange rates) were achieved, although the longer term and wider community impacts of the club are unknown.

Drivers

- The opportunity for companies to save costs, increase competitiveness were thought to be important drivers, and language used in marketing material during recruitment to Enviroclub reflected this. 'Win-win' was a common phrase.

Key Elements for Success

- As with other waste minimisation clubs, interactive workshops, knowledge exchange and support for hands-on experience was key to engaging SMEs in the Enviroclub initiative, as were strategic marketing tools and clear messaging.
- The Enviroclub engaged and fostered a 'champion' who attended training events and workshops and returned to oversee the training of colleagues. The club also made the most of personal contacts with expertise in the relevant industries to reach those companies in most need of support.
- By contracting members to attend at least one workshop, Enviroclub ensured continued engagement.

Sources: (13)

Sectoral clubs

We found one, extensively researched, example of a UK sectoral club. We also include two international sectoral clubs established under the United Nations Cleaner Production Centre - one in Australia and one in South Africa:

- **The East Anglian Business Club (1997-1999):** The East Anglian Waste Minimisation Club for the food and drink industry was initiated as a partnership between ten organisations from the public and private sector. 13 companies received training and technical support which was specifically designed to address a broad range of issues from mass balance and material loss calculations to project management skills. Overall £1.1 million of savings were achieved per annum, representing annual savings of 0.4% of member company turnover. Solid waste production was reduced by 1,400 tonnes annually (14) (15) (3). The reduction of raw material use carried the greatest potential for financial savings. Procedural changes (input changes, product modification, and good housekeeping) represented £350,000 of the total annual savings, with an average payback of less than one month. Evaluation of the training programme found that it had been successful in building knowledge and capacity for waste minimisation in member companies and also provided collective benefits associated with teamwork such as cross-fertilisation of ideas, stimulation of innovation, motivation and knowledge transfer (3).

More information about the East Anglian initiative is provided in the case study of Box 2.

Box 2: The East Anglian Business Club

Running between 1997 and 1999, the East Anglian Waste Minimisation in the Food and Drink Industry Project was a partnership between ten public and private sector organisations. The aim was to help 13 independent food and drink manufacturers to prevent waste in their operations by support in the form of a prescribed training programme with distinct learning outcomes. Topics ranged from mass balance and material loss calculations through project management skills. Members contributed to the programme design and were supported in workshops and training on specific technologies.

Business Benefits

- Solid waste production was reduced by 1,370 tonnes per year.
- The East Anglian Project achieved net annual savings from waste, water and energy efficiencies of £1.1m from a total capital investment of £726,000. These savings represented an average of 0.4% of company turnover.

Drivers

- Food and drink companies were motivated to participate in the East Anglian Project by potential to save money.
- The opportunity to receive collaboratively funded training and consultancy support was another driver.
- Regulations apparently did little to stimulate producers, suppliers and consumers to act on their collective supply chain responsibilities.

Key Elements for Success

- Reduction in the use of raw materials use through simple procedural changes such as input changes, product modification, and good housekeeping were very important, representing £350,000 of total annual savings, with an average payback of less than one month. However, these measures required intensive staff and management time to change current practice.
- While investment in new technology yielded the greatest financial savings, such measures were among the most costly. However, payback on these investments was typically less than 8 months.
- Participants found that the progress-sharing/workshop approach was especially valuable.
- The East Anglian Project engaged and fostered a champion in each company; the same person who attended training events was then responsible for training colleagues.

Sources: (14) (19) (15) (3)

- **Dry-Cleaning Industry Cleaner Production Club (Australia, 2000-2001):** Six dry-cleaning companies (<10 employees) received regular benchmarking support on key eco-efficiency indicators (amount of garments cleaned per waste generated, waste costs per garment etc), provision of information on sector-specific cleaner production practices, and industry specific training. The training comprised of attendance at five workshops and assistance in developing action plans. On average participants saved A\$6,000 per annum.^a In addition, 17 companies received information only. While overall, participants reduced hazardous waste generation by 48% and chemical consumption by 30% and improved their energy efficiency by 9%, a comparative analysis of the outcome of the two groups of companies (i.e. those that received information only and those that received training and support) showed no significant difference in the rate of improvements between them (16).
- **Metal Finishing Waste Minimisation Club (South Africa, 1998):** The Metal Finishing Club was the first waste minimisation club established in 1998 in South Africa. 29 companies participated; 15 of these implemented waste minimisation programmes on site, with the remaining members attending meetings from time to time. Members achieved financial savings of more than \$200,000 per year, with the majority of savings achieved through reduced chemicals and metals use, water savings and effluent reduction, and energy savings.^b

^a http://www.unep.fr/shared/publications/other/WEBx0072xPA/manual_cdrom/CPLinks/pdfs/cpinwa.pdf

^b <http://www.ncpc.co.za/wmc/journals.html>

3.3 Summary of Key Findings

A summary of the high-level findings on impacts and outcomes can be found in Table 3.

Table 3: Summary of high-level findings on impacts and outcomes

Key findings	
Cost	<ul style="list-style-type: none"> Waste minimisation clubs have worked under a number of different cost structures. Early demonstration clubs were very expensive to run, with costs ranging from £400,000 to £1,000,000 per club. The mean value of clubs for the REC Programme was £45,000 (at 2008 costs). Landfill tax and 'in kind contributions' from strategic partners have been key sources of funding for clubs with no evidence found on clubs having been initiated or fully financed by businesses themselves. Over the years, the cost of running clubs has significantly reduced by focusing less on the use of private consultancies to implement waste minimisation opportunities in companies, to facilitating training and organisational development in companies. Cost to members was reduced in later clubs through free membership or only limited registration fees.
Savings	<ul style="list-style-type: none"> Well managed clubs achieve cost savings in excess of initial investment (> £10 for each £1 invested), however is not always transparent what is included in the costs of the club (i.e. 'in kind' contributions, including time and resources from businesses). Similarly, clubs have shown they can achieve significant waste savings, although it is difficult to disaggregate true waste prevention savings from other waste and resource efficiency savings based on the evidence. Impacts depend on the size, sectors and duration of the club activity, with limited evidence on how individual companies have benefited from the approach.
Other	<ul style="list-style-type: none"> Evaluations generally focus on immediate savings in terms of tonnage and £s with little attention to measuring social benefits (e.g. improved working conditions or business image in the community). While some papers indicate positive impacts in terms of changed attitudes and behaviours in response to club participation, long-term impacts on behaviour change appear not well researched.

4 Behavioural Aspects

Section 3 presented key findings in relation to waste minimization clubs' ability to achieve cost and waste savings. This section looks at the factors that influence the effectiveness of waste minimization clubs. This includes a discussion of the motivations and barriers for business engagement in the club approach as well as the success factors for effective clubs. Motivations and barriers for businesses undertaking waste prevention activities in general are discussed in more detail in **L2m3: Attitudes & Behaviours**.

4.1 Drivers and Motivators

The key influences on business behaviour to engage in waste minimisation clubs include:

- cost saving opportunities
- positive attitudes towards waste prevention opportunities
- opportunities for free or subsidized business support
- opportunities for networking and peer support.

Cost saving

Cost saving opportunities can be a key motivating factor for companies to engage in waste prevention clubs. According to Hyde *et al.* (3), the companies that joined the East Anglian club indicated that their decision was based on the potential financial benefits arising from waste prevention as well as the potential benefits from receiving collaboratively funded training and consultancy support. This supports Johnston and Stokes (9) who found that 43% of participants in 10 demonstration projects joined because of the perceived cost reduction opportunities. The opportunity for cost savings was also identified as the key motivating factor for companies participating in *betre*. When asked to rate reasons for involvement in *betre*, the majority (42%) of respondents chose "to reduce costs"^a (17).

Attitudes

A few papers suggest that existing positive attitudes to engaging in waste prevention play a key role in the success of clubs, although the issue has not been researched in detail. For example Hyde *et al.* (3) argued that some of the success of recruiting businesses to the East Anglian Club may have been due to existing positive attitudes or motivations towards tackling waste (3). Similarly, businesses that are already managed in a way that seek out even small opportunities may respond better to the services offered through waste minimizations clubs (2) (16).

Subsidies

Financial benefits from subsidized training and consultancy support was mentioned as a key motivator for business engagement in the East Anglian Business Club (3).

Networking

A number of papers suggest that opportunities for networking and peer support can act as a key influencing factor for businesses. 15% of respondents to the *betre* survey stated "to network with other businesses and share ideas" as their reason for joining the club. This supports the review of participants in 10 waste prevention clubs by Johnston and Stokes (9) who identified the following benefits of waste prevention clubs for members: inspiration stimulated by the progress of other members; reassurance

^a Note no details on sample size and survey design is provided.

other members had similar problems; experience of different methodologies and best practice; and a sense of community. The experience from the East Anglian food and drink waste clubs, Canadian Enviroclub and betre supports this with progress sharing and interactive workshop approaches having been found of most value by participants (13; 17; 3).

4.2 *Barriers to the Effectiveness of Clubs*

The following barriers to business participation in waste minimization clubs have been identified in the literature:

- lack of awareness of waste minimisation clubs
- lack of resources
- negative attitudes, including scepticism over the benefits of waste prevention
- reluctance to share information or collaborate with competitors.

Lack of awareness

Lack of awareness of clubs can be an obvious barrier. A survey of 19,000 SMEs in 2006 (18) found that only 1% of respondents were aware of waste prevention clubs. A similar story can be found when looking at potential deliverers of clubs. 70% of the 110 respondents to an Envirowise-commissioned survey of business support organisations in England^a said that they were not familiar with Resource Efficiency Clubs. Most of those that were familiar with RECs (30%) were directly involved in clubs in their area and hence had direct experience. This suggests that clubs may need to be marketed better.

Lack of resources

Lack of staff time and other resources is commonly cited as a key barrier to company engagement in waste prevention clubs, in particular for SMEs (17) (1) (3). This relates to time required for attending workshops, implementing solutions and collecting data. Business pressures (e.g. end of financial year / busy season for the member / last minute crises / mergers and acquisition) can also hinder initial or ongoing engagement by diverting resources away from waste prevention (17) (1).

Negative attitudes

The issue of negative attitudes regarding the cost savings opportunities and resources required to achieve these was mentioned repeatedly. The evidence from the UK and overseas suggests that where companies chose not to participate in waste minimisation clubs this was often due to:

- attitudes or 'inertia' towards waste, i.e. it not being a problem and not an area that needed further attention (3) (5) (16)
- scepticism over the potential benefits of participating in waste prevention clubs (3) (5) (17). This is particular true for SMEs (17) (16)
- perception that implementing waste prevention costs money (3).^b

Reluctance to collaborate

Waste prevention clubs, in particular sectoral ones, may bring together companies that are potential or existing business rivals and companies may be reluctant to share information (3). This can cause conflicts leading to a less open approach during meetings (9) (3). For example, in the East Anglian club some companies refused to participate in a joint benchmarking exercise during the evaluation and

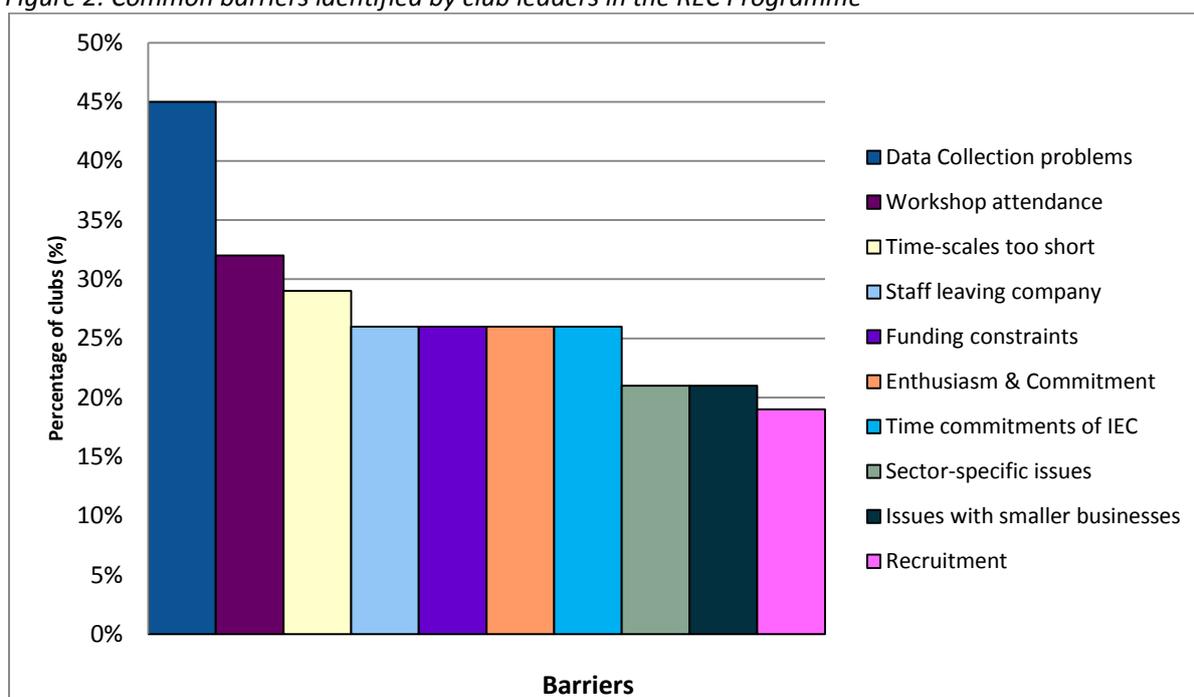
^a Survey respondents included Business Links, Chambers of Commerce, the Manufacturing Advisory Service (MAS), North Yorkshire Environmental Forum, Universities, Environment Agency and other organisations involved in supporting businesses

^b <http://www.ncpc.co.za/wmc/casestudies/Pub5.pdf>

dissemination phase. The “secretive nature” of the manufacturing industry was also mentioned as a key issue during the running of sectoral clubs in the REC Programme. No evaluation data on the potential prevalence of this barrier could be found within the time and scope of this project.

Evidence from organisations involved in running Resource Efficiency Clubs support the above. Figure 2 shows that data collecting, maintaining member attendance at workshops, and lack of commitment and buy-in from participants caused the biggest problems during the lifetime of clubs (12).

Figure 2: Common barriers identified by club leaders in the REC Programme



Source: (1); N=53

4.3 Factors Influencing the Success of Waste Minimisation Clubs

Based on the evidence on outcomes, as well as motivations and barriers mentioned above, the evidence suggests a number of success factors for effective waste minimisation clubs. These factors include:

- strategic partnerships and good relationships
- clear messages and effective communication channels
- tailored information and support
- funding
- the importance of follow up.

Strategic partnerships and good relationships

Before considering setting up a club, the development of strategic partnerships involving a range of local and regional organisation were highlighted as important to the success of clubs by a number of authors (4) (10) (7) (3) (17). Hyde *et al.* (3) also found that the trust of member and partner organisations was essential to the success of club operations. As such the involvement of ‘not for profit’ organisations were considered positive, while regulators or utility companies may potentially hinder the open sharing of sensitive data. An analysis of the delivery organisations involved in the 70 RECs is shown in Table 4.

Table 4: Breakdown of lead organisations of the REC Programme (1)

Delivery body/Lead organization	%
Government body/Chamber of Commerce/Council	20
Private consultancies	21
Business Link	15
Environment Agency	2
Not for profit	23
University	8
Charity/trust	3
Support group/forum	8

NB: this does not include Envirowise as they operated as the overall coordinator

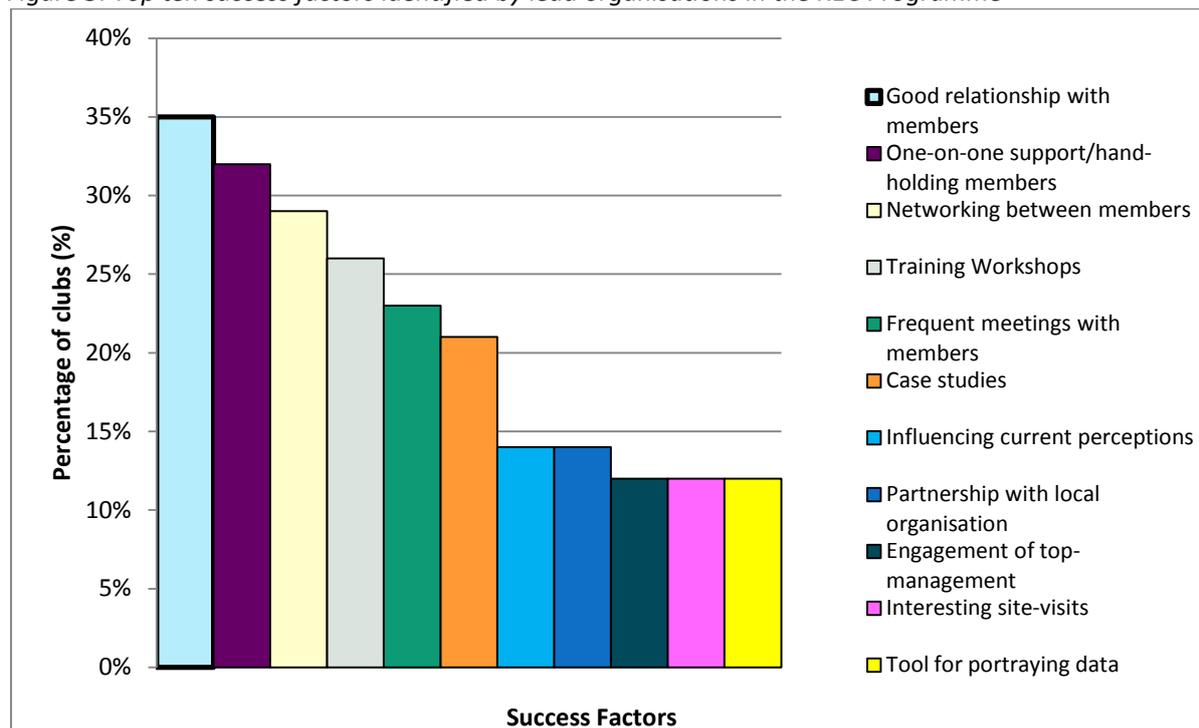
According to Mattson *et al.* (1) the quality of the lead organisation is often the main cause of success, which supports the model applied under the REC Programme where the prospective lead organisation had to prove it had the skills and knowledge to run a club when applying for funding. However there were several clubs that significantly under-delivered in terms of saving to cost ratios (see Section 3.2) and a closer investigation of the competencies and capabilities of these organisations may provide important lessons for future club design.

Once clubs are established, a good relationship with member companies was the most important success factor mentioned by REC leaders (35%) (Figure 3). Respondents found that regular communication was not only essential in terms of ‘handholding’ members through the ‘difficult bits’, but also in terms of encouraging networking and facilitating knowledge exchange between member companies. This brings up the question of how many companies are most effectively engaged in a club. The evidence with regards to maximum number of participants is patchy:

- Based on the experience of betre, the biggest UK resource efficiency club with over 300 members, Ackroyd *et al.* (17) suggest 50-60 companies as the maximum number of companies engaged. However, it should be noted that a key conclusion was that training should be reduced, while more efforts should be put into direct business support which will have an impact on the overall cost of the programme.
- Based on the experience of the REC Programme, Mattson *et al.* (1) support a mean number of 19 businesses.
- International examples from Canada and Australia (16) support club memberships of 10-15 companies.

Considering that the evidence strongly suggests that networking and sharing best practice is a key success factor for clubs (9) (17) (14) (3), this could suggest that too-large numbers will make it more difficult for this to happen. However, further work would need to be undertaken to ascertain whether there was an optimal number of companies per club.

Figure 3: Top ten success factors identified by lead organisations in the REC Programme



Source: (1); N= 53

Clear messages and effective communication channels

As highlighted in Section 4.2, persuading companies to participate in a waste prevention club can be a challenge, and the recruitment process is therefore critical for the success of the club (13) (17). For a detailed discussion on the effectiveness of waste prevention messages and channels see also module **L2m4-5: Communications**.

Some clubs found that those companies responding to marketing are often those are already ‘warm’ to the project (i.e. they have heard of it and are interested to find out more) (17) or those that are in least need of assistance (i.e. they already have the structures and capabilities in house to undertake waste prevention) (2) (5). The evidence therefore suggests that a range of messages, tools and channels need to be applied as part of a strategic marketing strategy to engage a wide range of businesses in waste prevention clubs.

The **messaging** used to attract recruits was found to be important in engaging businesses in waste prevention clubs, with a number of clubs noting that putting messages of cost savings or ‘win-win’ opportunities at the forefront in marketing material was key to the success of recruiting companies (19) (13) (11).

In terms of **tools** and **channels**, the need to use direct marketing tools and personal contacts was highlighted:

- In the betre example it was found that the most effective method of attracting businesses was a combination of presentations at business events, followed up by direct mailings and personal calls to attendants (average response rate 23%, 46 members recruited). Despite a fairly low response rate (3%), direct mailing to businesses in the region plus follow up calls accounted for the largest number of companies recruited (total 210). Personal contacts, mainly through referral from local authorities, the Environment Agency and EcoSys, was another successful method of recruitment leading to 43 new members. The least effective tools were presentations only and press releases (17).

- In the Canadian Enviroclub example a range of marketing tools was trialled and dismissed and in the end recruitment relied on personal contacts, plant visits and the demonstration of proven past successes by individuals highly experienced with industrial processes.

It is important to note that marketing can be very resource intensive and take longer than initially expected (3) (17). In the betre example recruitment overran the allocated staff budget by 15% (17).

Targeted information and support

Training in waste minimization is essential for the success of the project and should involve all employees (3). To ensure ongoing participation and engagement by club members, it is therefore important that the material delivered through workshops and training events is presented in a manner that meets the need of the particular audiences. This includes industry/sector-specific information as well as information targeted at different functions within organisations (i.e. managers and operators).

With regard to the first point, evaluation of the REC Programme found that many clubs identified issues that were specific to particular sector, suggesting the need to tailor club activities towards members' sectors and to ensure that the support given was tailored towards sector specific issues (12). Similarly, experience in South Africa in Barclay and Buckley (20) found that sector-specific clubs seemed to be more successful for smaller companies, while larger organizations prefer to be in a regional club. We found nothing in the UK evidence base to support this. Mattson *et al.* (1) also stress the need for regional and local knowledge with regards to perceived resource issues in companies to be used before design and recruitment commences.

In relation to the second point, some authors suggest that in order to maintain ongoing engagement by companies - and hence avoid drop out - key individuals within organisations should be targeted at the outset. The Canadian Enviroclub and East Anglian club both took the approach of engaging and fostering a 'champion', which meant that the same person was attending training events (13) (3). That said, in the REC Programme having only one contact within companies was found to be a barrier to the effectiveness of clubs (Figure 2). Regardless of the number of contacts, involving individuals with the authority to drive change was considered important (12) (17) (5). A different model was applied by the Enviroclub in Canada. Whilst most UK clubs are based on the notion of voluntary action when it comes to implementing identified solutions, the Canadian Enviroclub (13) ensured continued engagement by contracting members to complete at least one on-site project during the running of the club.

In terms of topics, waste and energy appeared to be of most interest to members across the RECs (1), and also reflected the greatest savings for betre (17). Involving participants early in the planning and delivery of training sessions increased satisfaction and ensured the content and language matched their needs and information exchange between companies was taking place (3) (1). Services differ between different clubs but those of particular value to members of club appear to be:

- networking and knowledge exchange with peers (3; 7; 13)
- case studies (3; 1; 17)
- site visits (1)
- one-to-one support / 'handholding' (1; 17).

Ackroyd *et al.* (17) found that auditing and direct support were more effective in achieving savings for betre, while Hyde *et al.* (15) also stressed the value of training and capacity building in achieving savings in the East Anglian Business Club. The available evidence is not robust enough to evaluate the relative merits (or cost and benefits) of running workshops versus providing direct one-to-one support services. However, it should be noted here again that in the betre example a large number of SMEs were given access to training, which potentially could have diminished the potential benefits of small group learning. Given the higher costs of 'one-to-one' over 'one-to-many' support, this is an area that may benefit from further research.

Some authors stress the need for flexibility in the delivery of services. The evidence from the Dry-Cleaning Cleaner Production Club suggests that different levels of services may need to be linked to the existing knowledge as well as the management structures of participants (16). That is: companies with a limited history of waste minimization and poor environmental management practice may benefit more from information on simple housekeeping measures, while more advanced and well managed companies may benefit more from technical advice and support. Finally, services need to reflect seasonal variations in business activities (13). *betre*, for example, initially failed to match the timings of training sessions to the distinctive seasonal patterns of work activity in SMEs (e.g. holiday periods) (17). *Mattsson et al.* (1) add that clubs will need to be highly responsive to changing needs and may need to radically alter services in response to changing drivers, such as increases in raw material prices or new legislation.

Funding

As shown in Section 3, the costs of setting up and running waste minimisation clubs can be high. Despite member contributions and significant cost reductions achieved over the years, overall clubs relied heavily on public funding sources, in particular from Landfill Tax.

Funding was identified by 25% of RECs as a barrier to the successful operation of clubs (Figure 2). When asked if club leaders were planning to continue running their REC without Envirowise funding^a, 85% (17) said that they were planning to do so. 90% said they were investigating other sources of funding, but only 20% (i.e. 4) had been successful (1). Roughly three quarters of the respondents were considering other public funding sources, namely “regional business support organisations” (e.g. RDAs, Business Links, local authorities, etc) or European funding, while a quarter of clubs were planning to continue through self-funding (12).

18 out of 23 club leaders said they were exploring alternative funding sources, including self-funding and Trade [Associations], but only 4 had been successful. When asked whether they believed that their REC could function as a self-funding support service to businesses, about half (9) of the respondents felt that it was unlikely to provide a long-term financial sustainability (1). For example, one club leader suggested that it may be possible to ask members to pay for a membership fee (around £500 per year) but that this would only help to match-fund the cost of the club. Another leader argued that while a few large companies may be willing to pay, most SMEs would not (1). The data should be treated with caution given its low sample size, and further analysis may be required to ascertain the viability of self-funding as a successful model for clubs.

Given the need for investment by companies to turn potential opportunities into real solutions, coupled with resource constraint barriers, especially for SMEs, pay back periods are of interest to companies (2). *Phillips et al.* (2) found that an assessment of 10 WMCs between 1995 and 2000 showed that out of 2,696 opportunities, “75% had a payback period of less than 1 year and 35% did not incur capital costs”. The evidence does not allow breaking down pay-back by specific actions and it may be that low pay-back may reflect simple low-cost changes that may not be available to all. Pay-back data from more recent clubs have not been found in the published evidence, and this may be an area that could be explored through further research to help businesses make the business case for waste prevention.

Follow up

Once projects are completed the importance of a clear exit strategy and follow up activity was highlighted (10) (7) (8) (11) (13). This ensures that best practice is disseminated to the wider community and lessons learned during the running of the club are used to design follow up activities in the region, but there is little evidence on long-term impacts within the wider community. *Mattson et al.* (1) suggest

^a It should be noted here that the survey is based on a small sample (23) of REC leaders. Moreover not all questions were answered and some responses were categories under more than one heading. The figures should therefore be treated with caution.

that outputs from clubs can be used to drive pro-environmental change by linking it with regional awareness raising campaigns for both municipal and commercial waste.

Activity in Northamptonshire has led to a number of follow up projects which were possible because of the infrastructure being already in place; however, based on the evidence we have reviewed, it is not possible to ascertain whether clubs have led to long-term behaviour change within specific companies or wider communities. An in-depth analysis of historical performance within specific locations may help to identify key success factor over a longer time-frame.

In addition, a few authors have highlighted the potential for further informal information exchange following the successful completion of clubs. For example, Huppe *et al.* (13) found that former participants from the Canadian Enviroclub were interested in maintaining relationships they had built with other members during implementation and conclude that clubs should be followed by activities that reinforce change; but no evidence of this having happened has been found within this review. Similarly, Ackroyd *et al.* (17) and Hyde *et al.* (3) suggest that once companies are committed, they could promote waste prevention and resource efficiency to their suppliers ensuring that a wider audience is reached. Again, no evidence to support this could be found within the time and scope of this review. The fact that most clubs are evaluated only once, and often before all opportunities had been realised, therefore points to the need to introduce longer-term monitoring and evaluation strategies as part of club set-up.

4.4 Summary of Key Findings

Key findings in relation to motivations, barriers and success factors for waste minimization clubs are summarised in Table 5 (next page).

Table 5: Summary of key motivations, barriers and success factors for waste minimisation clubs

Category	
Motivations	<p>The opportunity to save costs through waste prevention is a key influencing factor for businesses to engage in waste clubs.</p> <p>Companies exhibiting positive attitudes and a corporate culture towards waste prevention will be easier to engage as they actively seek for opportunities and welcome advice.</p> <p>Opportunities to learn from other businesses that have similar problems can motivate companies to engage in waste clubs (but see below potential problems within sector groups).</p>
Barriers	<p>Lack of awareness of waste minimisation clubs can provide a barrier to engaging businesses, suggesting that further work may be needed to communicate the benefits of waste minimization clubs.</p> <p>Barriers related lack of resources (time, money and staff) and willingness to engage in waste prevention are major barriers, particularly when trying to engage SMEs.</p> <p>Companies may be reluctant to share information with potential or existing competitors.</p>
Success factors	<p>Strong partnerships and collaboration between different delivery organizations as well as between member companies will increase the efficiency and cost-effectiveness of clubs.</p> <p>Clear messages and strategic marketing tools are needed to engage companies in waste minimization clubs. Messages should focus on 'win win' scenarios be delivered by industry experts where possible.</p> <p>The information and support needs to be flexible to changing business pressures and be tailored to the specific audience, covering wider waste prevention issues as well as industry-specific topics.</p> <p>Members should be able to influence the topics and running of workshops to encourage 'ownership' and engagement by key decision-makers. Services that include an interactive element (i.e. workshops, site visits, one-to-one contact) are valued the most by participants.</p> <p>There is some evidence that clubs could function as a self-funding business support service, however further research is required to evaluate its economic viability in the long-run.</p> <p>A clear exit strategy and follow up activity will reinforce change in members. Short time frames and limited funding have meant that some of the benefits of clubs may be lost following club completion and this needs strategic attention at the outset.</p>

5 Conclusions

5.1 Learning

- **Since the early 1990s the waste minimisation club approach has operated under a number of different cost and engagement structures.** Despite the name, most clubs have focused on issues wider than pure waste prevention covering landfill diversion as well other resource efficiency objectives. (Indeed the renaming of such as resource efficiency clubs has latterly reflected the change in emphasis.)
- **Well managed clubs have the potential to provide significant cost savings - in excess of £10 saved for each £1 invested.** Waste savings per club can range from a few thousand to hundreds of thousands of tonnes annually, depending on the number and type of business involved and the duration of the club activity. There is some evidence that suggests that a maximum number of 20 participants and a life-time of at least two to three years may achieve the best outcomes however further research would be needed to ascertain the most successful model for waste clubs in terms of scale and size.
- **Overall, clubs appear to work particularly well when:**
 - delivered by a lead organization with the necessary skills and expertise to facilitate running the club, and supported by a range of strategic partners, working together to provide financial and other support (1) (7) (10) (2) (11) (6)
 - recruitment is underpinned by a strategic marketing strategy that uses a range of tools and channels, puts message of cost savings at the forefront and reflects industry specific interests (14) (13) (17)
 - frequent communication and close relationships between the lead organization and its members, as well as amongst members is taking place (1)
 - services are tailored to the audience – sector or multi-sector – and provide a combination of one to one/handholding support, training and interaction to encourage peer learning (12) (3) (17) (1).
- **Public funding has played a significant role in the running of clubs** although there is some limited evidence that suggests they could work as self-funded projects, for example, through membership fees and charged-for services. However further work may be needed to ascertain the acceptability by businesses – especially SMEs – as well as the commercial viability of self-funded clubs.
- **Businesses are primarily motivated to participate in waste minimization clubs due to the potential to reduce costs and increase profitability** but also by additional benefits of collaborative working, a sense of community and free or subsidised training and consultancy support. The main barriers experienced were primarily around lack of time, resources and commitment from participants, in particular in SMEs.

5.2 Insights

On the basis of the evidence available in this review, we were not able to disaggregate impacts at company level for a number of clubs. It may be that some companies benefit more than others from the advice and support provided through the club approach, and further case studies and the collection of waste and attitudinal and behaviour change data could be useful in the evaluation of future clubs.

There is some evidence that waste minimisation clubs appear to have been more effective in terms of high tonnages and cost savings by engaging those with the highest potential for waste savings - for example, medium and large companies in the manufacturing sector, or those that are already 'warm' to the concept of waste prevention.^a This means that a substantial part of the SME population may currently not benefit from the waste minimisation club approach and there may be significant barriers to engaging their interest in such clubs (see module **L2m3: Attitudes & Behaviours** for more detailed information on SME barriers).

5.3 Research Gaps

- Out of the 200 plus waste minimisation clubs that have been set up and run in the UK **only a very small fraction has been publicly evaluated in terms of their impacts and effectiveness on waste prevention**. This includes a number of recently finished or ongoing clubs operating in different parts of the UK. Analysis of these clubs would allow further lessons to be learned in terms of their potential in achieving significant cost and waste savings.
- **Evaluations of clubs tend to focus on quantitative cost and waste savings**, which is essential information, **but tend not to provide deep insights on why businesses took part** or the internal factors that enabled the club model to work effectively for their business.
- Evaluations of the East Anglian Business Club (3), betre (17) and Canadian Enviroclub (13) show that waste minimization clubs can have a positive impact on changing attitudes and behaviours, but results are indicative at best. This is an area that might benefit from **further research to better understand the social dimension of what motivates businesses to engage in waste prevention clubs**, what are the key success factors within member businesses that influence how knowledge gained in the clubs is applied, and the benefits it brings in terms of catalysing wider behaviour change. This could include pre and post action research with participants of current waste clubs to evaluate motivations and barriers in more depth.
- While the evidence is strong on the potential benefits of the club approach on long-term behaviour change, evaluations generally focus on immediate impacts during the lifetime of clubs. **More needs to be known about the long term legacy of waste clubs, both for participating companies** and in terms of wider diffusion of waste prevention activity in sectors or regions.

^a Critical review addendum: In the literature of Phillips et al. (various papers) there are numerous tables that report the cost to savings ratio and then discuss the mean and median. A typical club may have a cost to savings of 1:10. According to Envirowise 1:5 is sustainable. However this may mask the number of companies that have achieved high values and those that are very low indeed. In the Hereford and Worcester club of mid 1990 some 3 companies provided the vast majority of the significant savings out of total >15, so consideration of the distribution is vital. Even in very well managed clubs there are clear cases of both best practice and of poor practice. We are uncertain, however, whether the data can be adequately segmented along the sectoral and other dimensions of interest to this review for the purposes of creating a tool of generic predictive capability.

6 Bibliography

1. *A critical review of the largest Resource Efficiency Club Programme in England (2005–2008): Key issues for designing and delivering cost effective policy instruments in the light of Defra’s Delivery Landscape Review.* **Mattsson, L.T., Read, A.D. and Phillips, P.S.** 2010, Resources, Conservation and Recycling, Vol. 55, pp. 1–10. id 837.
2. *A radical new proposal for delivering and financing waste minimisation clubs in England, due to the loss of landfill tax credit scheme funding.* **Phillips, P.S., et al.** 2004, Resources, Conservation and Recycling, Vol. 43, pp. 35–50. id 461.
3. *Minimising waste in the food and drink sector: using the business club approach to facilitate training and organisational development.* **Hyde, K., et al.** 2003, Journal of Environmental Management, Vol. 67, pp. 327–338. id 417.
4. *The role and success of UK waste minimisation clubs in the correction of market and information failures.* **Pratt, R.M. and Phillips, P.S.** 2000, Resources, Conservation and Recycling, Vol. 30, pp. 201–219. id 591.
5. **Oakdene Hollins Ltd.** *Milton Keynes Waste Reduction in Industry.* s.l. : EB Milton Keynes, 2002. id 66.
6. *UK waste minimisation clubs: a contribution to sustainable waste management.* **Phillips, P.S., et al.** 1999, Resources, Conservation and Recycling, Vol. 27, pp. 217–247. id 416.
7. *Third generation waste minimisation clubs: a case study of low cost clubs from Northamptonshire, UK.* **Clarkson, P.A., Adams, J.C. and Phillips, P.S.** 2002, Resources, Conservation and Recycling, Vol. 36, pp. 107–134. id 604.
8. **Oakdene Hollins Ltd.** *Aylesbury Vale Waste Reduction in Industry-Final Report.* Milton Keynes : EB Bucks Ltd. id 61.
9. **Johnston, Dr Neil and Stokes, Dr Antony.** *Waste Minimisation and Cleaner Technology-An assessment of motivation.* London : Centre for Exploitation of Science and Technology, 1995. id 760.
10. *The Northamptonshire Resource Efficiency Project: the exit strategy.* **Cheeseman, K. and Phillips, P.S.** 2001, Resources, Conservation and Recycling, Vol. 32, pp. 203–226. id 404.
11. *Corby Waste Not: an appraisal of the UK’s largest holistic waste minimisation project.* **Phillips, P.S., et al.** 2002, Resources, Conservation and Recycling, Vol. 36, pp. 1–31. id 439.
12. **Envirowise.** *Unpublished internal evaluation of the Envirowise Resource Efficiency Clubs Programme April 2005 – March 2008, provided by WRAP.* id 808.
13. *Fostering pollution prevention in small businesses: the Enviroclub initiative.* **Huppe, F., et al.** 2006, Journal of Cleaner Production, Vol. 14, pp. 563-571. id 324.

14. *The value of resource efficiency in the food industry: a waste minimisation project in East Anglia, UK.* **Henningsson, S., et al.** 2004, *Journal of Cleaner Production*, Vol. 12, pp. 505–512. id 410.
15. *The challenge of waste minimisation in the food and drink 28 industry: a demonstration project in East Anglia, UK.* **Hyde, K., et al.** 2001, *Journal of Cleaner Production*, Vol. 9, pp. 57–64. id 596.
16. *Benchmarking to trigger cleaner production in small businesses: drycleaning case study.* **Altham, W.** 2007, *Journal of Cleaner Production*, Vol. 15, pp. 798-813. id 465.
17. *Business excellence through resource efficiency (betre): An evaluation of the UKs highest recruiting, facilitated self-help waste minimisation project.* **Ackroyd, J., et al.** 2003, *Resources, Conservation and Recycling*, Vol. 38, pp. 271-299. id 319.
18. **Carter, S., Mason, C. and Tagg, S.** *Lifting the Barriers to Growth in UK Small Businesses.* London : Federation of Small Businesses, 2006. id 43.
19. **Poonprasit, M., et al.** *The Application of Waste Minimisation to Business Management to Improve Environmental Performance in The Food and Drink Industry.* 2005. id 65.
20. *Promoting sustainable industry through waste minimisation clubs.* **Barclay, S.J. and Buckley, C.A.** 9 (pp79-86), London : Water, Science & Technology, 2002, Vol. 46. id 959.

Note: The id numbers at the end of the bibliographic references refer to the source file id number stored at www.infinifile.org.uk. You can access these sources for free, using project id 246 in conjunction with the file id when prompted. Requires registration. The adjacent QR code will take you to the site if you have the smart-phone QR reader app (many are free).



7 Annexe L2m4-7-A: Waste Minimisation Clubs

Category	Description	Outcomes	Ref ID
Demonstration	Aire and Calder (1992-1994): The first waste minimisation club in the UK, launched in 1992 and completing in 1994. The club was funded through £400,000 from the Centre for Exploitation of Science and Technology, the BOC Foundation for the Environment, Her Majesty's Inspectorate of Pollution and Yorkshire Water Services Ltd. A private consultancy was appointed to carry out site visits at the 11 member companies. The project initially focused on the reduction of liquid effluent emissions, however much of its impact arose from the reduction of process usage of water, energy and raw materials	£3.35m /y ^a of which £1,565,000 from raw material reduction. Solid waste reduction of 4.8kt achieved. Savings to cost ratio :8.4	(4) (9)
	Project Catalyst (1993-1995): A demonstration project sponsored through £1m from the Department of Trade and Industry and the BOC Foundation for the Environment. 14 companies were supported by a consortium of private consultants. Following Aire and Calder the focus was broadened to address all types of waste - solid, liquid and gaseous (9).	Cost savings = £2.3m /y. Waste savings = 12kt liquid effluent = 1.8m m ³ water = 1.9m m ³ CO ₂ = 990t. Saving to cost ratio: 2.3	(4) (9)
	Leicestershire Waste Minimisation Imitative (LWMI) (1995-1996). A small working group was set up and funded through £200,000 under the umbrella of the East Midlands Advisory Group on the Environment, including Leicestershire County Council, The Leicestershire Training and Enterprise Council, The Department of Trade and Industry, the National Rivers Authority, the BOC Foundation for the Environment and Severn Trent Water. Members included 10 mainly small to medium-sized, from the engineering, building materials, textiles, food and brewing sectors. Companies contributed 25% of the club funding.	Cost savings = £1.3m; Waste savings = 13.7kt Effluent reduction = 114,200 m ³ and CO ₂ emissions reductions = 600t. Saving to cost ratio: 6.5	(4) (6) (9)
Facilitated-Help Clubs	Northamptonshire Resource Efficiency Club (NREP) (1997- 1999). Funded through £135, 000 from partners (Local Council, Environment Agency). Envirowise (then the ETBPP) and the Environment Agency also played a major role in providing substantial 'in kind' funding, while companies contributed £500 each to the running of the club. NREP was also the first club to introduce a close relationship with a Higher Education organisation (University College Northampton) that provided help and support to businesses at a lower cost than private consultants. At the end of the project an exit strategy was devised which lead to the development of a Centre for Waste Minimisation at the University and a number of follow up clubs in the region.	£1,890,000 £288,906 solid waste £3,200 hazardous waste £277,433 raw materials Saving to cost ratio: 14.1	(7) (10) (10)

^a £1,565 from raw materials

Category	Description	Outcomes	Ref ID
	Corby Waste Not's industrial waste minimization club (1999- 2000) was part of a wider programme of activity targeting different parts of the community, including businesses, householders, students and the voluntary sector. At a cost of £35,000 the industrial club focused on training key employees in a range of SMEs about waste minimisation methods. Best practice and success stories were disseminated widely throughout the community.	£250k 12kt of solid waste Saving to cost ratio: 7.1	(11)
	The business excellence through resource efficiency (betre). £125,000 of funding was provided through landfill tax and project partners included the Environment Agency, West Sussex County Council, all seven Local Authorities and EcoSys Environmental Management and Education. Following a small pilot project involving 21 local companies, betre aimed to recruit 70 companies. 308 companies participated in some form (e.g. attending events, using auditing services) with 64 implementing waste prevention measures.	Annual savings: £215k; solid waste reductions of 1,437t, representing £66,480 (32% of the financial savings) Saving to cost: 1.7	(17)
	The Enviroclub Canada was a programme of seven clubs developed by three federal agencies and delivered by not-for-profit organisations. Set up and running costs were estimated at C\$220k per club. Part of this is covered by a registration fee (C\$2.5k) participants pay and for which they received 4 days of workshops and subsequently, 90 hours of professional services to help them to identify and carry out pollution prevention projects.	Annual savings: C\$5.1; annual reductions in hazardous wastes (708t); toxic substances (53t); water (536,000 m ³); petroleum products (225,000 L); wood (11,300 m ³); green house gases (17,100 tCO ₂ e),	(13)
	The Resource Efficiency Club Programme (2005-2008). Funded through £5m of Defra money, this Programme of clubs lead to the development of 70 clubs across all 9 regions. The mean number of participants per club was 19. Envirowise co-ordinated the Programme, while organizations from a wider range of backgrounds were invited to lead individual clubs. Membership was free and each member received resource efficiency advice via club meetings, events, networking opportunities and one to one contact with the club leader or a technical advisor.	£25m of savings. 27% of from solid waste, 20% from raw materials, 1% from hazardous waste. Also energy efficiency (48%) and water savings (4%) Saving to cost ratio: 5.8 (mean)	(1)
	Two of NREPs successors, Kettering Action on Resource Efficiency (KARE) and Wellingborough Resource Efficiency Project (WREP) took a slightly different approach by putting emphasis on local partnerships and achieving objectives with very small inputs of funding. Participation was free and focus was on building capacity in member companies with the aim to ensure action would continue after help was provided.	KARE: Solid waste savings £86,528, energy £2,996, water £1,443. Saving to cost ratio: 7 WREP: Waste = £148,459; energy = £3,460; water =£1710. Saving to cost ratio: 11.9	(7) (7)

Category	Description	Outcomes	Ref ID
Sectoral Club	The East Anglia Business Club for the food and drink industry (1997-1999). At a cost of £412,000, 13 companies from the food and drink sector were assisted throughout this club. The club met through a prescribed training programme with distinct learning outcomes. Training focused on a broad type of measures from mass balance and material loss calculations to project management skills. Members could contribute to the design of the programme and were then supported through taught workshop sessions, progress sharing sessions and in-depth training on specific technologies.	Cost savings = £1.1m; waste savings = 1,370t	(15) (3) (14)
	Dry-Cleaning Industry Cleaner Production Club (Australia, 2000-2001): Six dry-cleaning companies (<10 employees) received regular benchmarking support on key eco-efficiency indicators (amount of garments cleaned per waste generated, waste costs per garment etc), provision of information on sector-specific cleaner production practices, and industry specific training.	On average participants saved A\$6k /y	(16) ^a
	Metal Finishing Waste Minimisation Club (South Africa, 1998): 29 companies participated. 15 of these implemented waste minimisation programmes on site, with the remaining members attending meetings from time to time. Members achieved financial savings of more than \$200,000 per year, with the majority of savings achieved through reduced chemicals and metals use, water savings and effluent reduction, and energy savings.	\$200k for total club	^b

^a http://www.unep.fr/shared/publications/other/WEBx0072xPA/manual_cdrom/CPlinks/pdfs/cpinwa.pdf

^b <http://www.ncpc.co.za/wmc/journals.html>

Disclaimer:

Oakdene Hollins Ltd and Brook Lyndhurst Ltd believe the content of this report to be correct as at the date of writing. The opinions contained in this report, except where specifically attributed, are those of Oakdene Hollins Ltd and Brook Lyndhurst Ltd. They are based upon the information that was available to us at the time of writing. We are always pleased to receive updated information and opposing opinions about any of the contents.

The listing or featuring of a particular product or company does not constitute an endorsement by Oakdene Hollins or Brook Lyndhurst, and we cannot guarantee the performance of individual products or materials. This report must not be used to endorse, or suggest Oakdene Hollins' or Brook Lyndhurst's endorsement of, a commercial product or service.

All statements in this report (other than statements of historical facts) that address future market developments, government actions and events, may be deemed "forward-looking statements". Although Oakdene Hollins and Brook Lyndhurst believe the outcomes expressed in such forward-looking statements are based on reasonable assumptions, such statements are not guarantees of future performance: actual results or developments may differ materially. Factors that could cause such material differences include emergence of new technologies and applications, changes to regulations, and unforeseen general economic, market or business conditions.

We have prepared this report with all reasonable skill, care and diligence within the terms of the contract with the client. Although we have made every reasonable effort to ensure the accuracy of information presented in this report, neither Oakdene Hollins nor Brook Lyndhurst can expressly guarantee the accuracy and reliability of the estimates, forecasts and conclusions herein. Factors such as prices and regulatory requirements are subject to change, and users of the report should check the current situation. In addition, care should be taken in using any of the cost information provided as it is based upon specific assumptions (such as scale, location, context, etc.). Clients should satisfy themselves beforehand as to the adequacy of the information in this report before making any decisions based on it.

Oakdene Hollins Ltd
Pembroke Court
22-28 Cambridge Street
Aylesbury
Buckinghamshire
HP20 1RS

T: +44(0)1296 423915
E: admin@oakdenehollins.co.uk
www.oakdenehollins.co.uk
www.remanufacturing.org.uk

Registered in England No. 2937129