

DRAFT

Landfills in the Sky Investigation into the waste PFI project in Cambridgeshire

15th March 2006

by James Greyson
Front of Pipe, Unit F, 34 Lents Way, Cambridge, CB4 1UA
<http://www.frontofpipe.net>

Draft: please return comments and corrections to report1@frontofpipe.net
Copyright 2006: may not be reproduced without prior written consent
Version 2

Remit of the investigation

This is the first report of an investigation into the conduct of the current waste PFI in Cambridgeshire. It is intended to assist DEFRA in commencing their own investigation, as promised by Dominic Jackson in his letter of 14th November 2005 (see appendix A). This report is written by James Greyson, a resident of Cambridge who attended one of Cambridgeshire County Council's 'waste strategy workshops' on 20th September 2005. My comments on possible technologies offered by bidders are not informed by knowledge of the bids.

Summary

Cambridgeshire County Council (Cambs) are currently setting up a Public Finance Initiative (PFI) to dispose of residual (unrecycled) wastes over the period 2007 to 2040. DEFRA have agreed £35million funding to be paid to a waste contractor over the 33 year period. Cambs' set-up cost for the contract is expected to be around £1.5 million, plus £6.4 million borrowing for land purchases. Due to the long-term commitment of large amounts of public money, there is a need for meaningful public involvement in the decision-making process. However, errors by Cambs and by DEFRA have led to the elimination of effective public involvement. The outcome being risked is that the people of Cambridgeshire are locked into inflexible and unsustainable solutions for waste management.

Failure to meet ministers' PFI criteria means that any contract signed for this project would be invalid and any transfer of funds to Cambs would not be legal and would remain liable to be repaid, together with contractor's claims for costs. Those responsible for this project face class-action compensation claims from individuals and health-care providers following commencement of RDF burning. Cambs should prepare to set aside funds against these and other risks identified in Appendix B.

If the errors by DEFRA are not corrected there can be little confidence in the entire national programme of waste PFIs. This is a test for two of our country's most basic values, democracy and sustainable development, and both are being failed. This report describes how an unacceptable situation can be cooperatively resolved and sustainable resource management funded and pursued both in Cambridgeshire and nationally. It is not too late to avoid incapacitating the nation with a scientifically illiterate switch from land-dumping to air-dumping. The problem is not reliance on landfill. The problem is reliance on dumping.

Contents

1. Introduction
 2. National policy impacts
 3. Ministers' PFI criteria
 4. Five minute guidance for Camb's PFI scheme
 5. Unexplored opportunities in Cambridgeshire
 6. Ways forward for Cambridgeshire County Council
 7. Ways forward for DEFRA
 8. Conclusion
- Appendix A: Commitment to investigate by DEFRA
Appendix B: PFI risks
Appendix C: Glossary

DRAFT

Landfills in the Sky

Investigation into the waste PFI in Cambridgeshire

15th March 2006

1. Introduction

1.1 Following two years of planning and negotiations with DEFRA, Cambridgeshire County Council (Cambs) are now at the stage of having received detailed bids from three of their short-listed potential waste contractors. The next stage, due this month, is to select best and final offer bidders. This Private Finance Initiative (PFI) is well advanced and proceeding on target. However there is a problem; the public have not been adequately involved or informed at any stage with the result that decisions on what to do with residual wastes are being led by corporate motives rather than the County's need for sustainable resource management.

1.2 DEFRA appeared to realise last year that some attempt at public involvement would be needed to justify Cambs' PFI decisions and appointed consultants SWAP to organise a limited 'public consultation'. This was scheduled to follow Cambs' invitation to short-listed bidders to submit detailed bids. Cambs were a year and a half overdue in revising their waste strategy so the opportunity was taken to combine the PFI 'consultation' with a waste strategy 'consultation'. I was among just 80 people throughout the County who were able to attend one of 7 workshops where aspects of local authority waste services were discussed and a presentation on the PFI was given.

1.3 This 'consultation workshop' omitted crucial information and options. No time was found for attempts to discuss other options. A written complaint was sent to SWAP and to Cambs the following day. Repeated attempts to locate those in DEFRA responsible for the SWAP appointment were unsuccessful and my emailed requests brought no help. The remaining 6 workshops proceeded with no discussion of improvements. My email to the responsible minister Ben Bradshaw MP was answered by Dominic Jackson of DEFRA who avoided responsibility for DEFRA's appointment of SWAP by claiming the matter was a local planning decision. "Neither Defra nor ministers intervene with local planning decisions, which must remain the responsibility of local communities."

1.4 On 1st November 2005 I returned to Ben Bradshaw with an assessment of ministers' criteria for waste PFI projects applied to Cambs. This assessment remains available to view at <http://www.sdinnovation.co.uk/cambsonhold.html>. Dominic Jackson replied again promising an investigation. The text of his letter is given in Appendix B below. Four months later there has been no further contact from DEFRA and no discussion leading to any investigation. Rather than burdening DEFRA with further requests to undertake an investigation which they are struggling to do properly or at all, I wrote this report for them.

2. National policy impacts

2.1 As a County with one of the country's highest recycling rates (currently around 45%) Cambridgeshire is in prime position to demonstrate what happens at the psychological barrier of 50% recycling. Do we continue to increase recycling at similar rates of improvement (as has been done repeatedly in other countries)? Do we explore the extent to which smarter public participation and stronger visions of sustainable resource management can deliver measurable reductions in waste generation? Or do we admit defeat without even trying and turn much of the approx 50% residual stream into Refuse Derived Fuel (RDF) for burning? There are already plenty of local authorities demonstrating versions of waste-burning. Instead, the country urgently needs working examples of 60%+ recycling and ambitious waste prevention.

2.2 The most basic and critical strategic decision regarding sustainable development has yet to be made. Is our collective future just a balance between environmental impacts and rush-rush business as usual? An even split between recycling and disposal to land and air in the interests of economic growth? Or is the conversion of yesterday's resources into tomorrow's waste and pollution in reality a drain on economic health, an obsolete bad habit which should itself be discarded. The moment the people of Cambridgeshire learn that much of their rubbish will be burnt they will understand that sustainable development is nothing more than green spin on business as usual. It doesn't matter whether they recycle because the waste-burning machinery continues regardless.

2.3 Cambridgeshire's experience questions the suitability of PFI as a mechanism for moving the management of waste up the waste hierarchy away from disposal. Since PFI is suitable only for large capital projects it can deliver only capital-intensive solutions. With the exception of gasification on the genuinely unrecyclable carbon-based fraction of household wastes (around 10%), all available technologies overwhelmingly provide disposal to air and land. The effect is to build over-capacity for disposal which takes away both scarce funds and motivation for labour-intensive recycling-based solutions. Capital and sloppy planning are used in place of labour and smart planning. Materials which could be recycled with improved waste strategies are dragged towards disposal for decades. PFI is prohibitively expensive to set up; in Cambs creating a borrowing burden of £6.4 million for land purchases, removing £1.5m from perilously overstretched budgets plus further large sums of public money for DEFRA PFI administration, all before any guarantee of a signed contract.

2.4 Before HM Treasury approval of any further waste PFI funding rounds there should be a review of how product end-of-life management may be more efficiently funded, bearing in mind the long-term imperative to shift responsibility from waste collectors to waste producers. So long as local authorities must scrape around for funds to recycle, sustainable resource management will remain a distant dream. There is however an efficient instrument by which the cost of avoiding waste may be built into the price of products. An insurance-based instrument can overcome the traditional drawbacks of using taxes for this purpose, whilst freeing producers from tick-box regulation. A paper on this approach is available from James Greyson, to be published in the Journal of Cleaner Production.

2.5 Democracy is our nation's proudest value, held up as a beacon to the world. Yet the British public are increasingly alienated from political processes and distrust of public authorities blocks progress with many problems. Today's problems will inevitably grow into tomorrow's crises without genuine widespread public engagement in decisions which affect us all. Unenforced criteria, token consultations, non-existent options, misleading information and unresponsive councillors are not symbols of hope for the future.

3. Ministers' PFI criteria

3.1 This discussion considers sample aspects of Cambs' effort towards ministers' criteria, sufficient to show that the criteria have not been met and cannot be met without restarting the project. The full list of criteria is available on <http://www.defra.gov.uk/environment/waste/localauth/funding/pfi/criteria.htm>

Criterion 4: Proposals should make clear how schemes would cut waste as required under Best Value.

3.2 Cambs' waste strategy 2002 http://www.cambridge.gov.uk/ccm/cms-service/download/asset/?asset_id=4040233 and waste local plan 2003 have no Best Value targets for cutting waste generation. County targets for reducing waste to landfill involve a shift from one form of disposal to another (land to air), and are seriously undermined by the absence of waste prevention targets. Disposal is being lavishly funded decades ahead but small struggling prevention initiatives, such as a nappy scheme, can apply for grants a year at a time. The County's waste strategy has no waste prevention strategy, no waste prevention policy, no prevention analysis of waste streams, no prevention targets for key streams and no hazardous-waste prevention policy or initiatives. Despite the existence of under-funded small-scale initiatives within Cambridgeshire there is no public dialogue about waste prevention, no dedicated staff to coordinate waste prevention, no forum for discussing waste prevention opportunities and no mechanism for improvement in waste prevention policy or initiatives. This starkly conflicts with The East of England Regional Waste Strategy which provides for no increases at all in waste generation from 2010 (page 52, <http://www.eera.gov.uk/Text.asp?cat=128&id=SX11AE-A77F8F87>). Cambridgeshire County Council appear unprepared to cut waste generation.

3.3 Given the County's slender preparedness for cutting waste, their plans to allow a PFI contractor to "manage waste minimisation activities and engagement with the public" (Invitation to Negotiate Volume 1, 6.2.2.10) is nothing less than handing hen-management to the fox. Despite waste minimisation and public engagement being the starting point for any possible sustainable waste scenario, these aspects are given the lowest weighting in the County's proposed evaluation of bids (ITN Vol 1 7.3.2).

3.4 Government guidance on preparing PFI bids suggests that "soft market testing" can involve industry and other external partners such as NGOs. See page 10 of <http://www.defra.gov.uk/environment/waste/localauth/practice-guidance/pdf/infosheet12.pdf> Cambs chose not to involve environmental NGOs or recycling/reuse NGOs who may have offered ideas on how to cut waste. As one of the country's few waste prevention policy NGOs, Front of Pipe was not consulted despite being known to Cambs waste management staff for over 15 years. Cambs chose to restrict their "soft market testing" to waste companies and a cement company, who together are not known for their interest in waste prevention. A discussion with the waste companies in early 2003 is outlined on page 156 of the Dec 2004 Outline Business Case (OBC - the bid to DEFRA for funding) and curiously does not describe their preferences for which technology to pursue. However page 10 of the OBC explains the choice of reference case (preferred technology) was based upon "encouraging discussions with the cement industry. The early signs are encouraging and the Council is hopeful that co-firing cement works with RDF will be a realistic prospect." It is hard to avoid the conclusion that the PFI was shaped not by the County's need for sustainable resource cycles, but by the needs of a profit-led cement company hoping to gain planning permission for a new kiln in Cambridgeshire. These profits may of course lead Cemex to build in other countries with even lesser awareness of pollution, waste and CO2 issues. Cemex may prove not to be the reliable business partner that all tiers of government may hope for.

3.5 In addition to this PFI's obstruction of measures to cut waste generation, there is the question of whether can it succeed merely as a disposal option by reducing the amount of waste? According to a 48 page mass balance study for Biffa in 2003 (see page 19 http://www.biffa.co.uk/files/pdfs/MassBalance_Thermowaste.pdf) one tonne of RDF creates 1.91 tonnes of waste, including ash, CO₂, CO, NO_x and contaminated water vapour (which is both a pollutant and a greenhouse gas). This figure does not include process water waste so the effect of burning RDF is to approximately double the total mass of waste whilst significantly widening the toxicological pathways for damage to health, climate, low level atmospheric quality (ozone and particulates), ecosystems, livestock, crops, surface water and ground water. Although waste burning is promoted as a disposal option in actuality this 'solution' doubles the problem of waste disposal whilst adding possibly incalculable costs from health care, loss of productivity and climatic instability.

Criterion 5: The use of residual waste treatment options involving recovery should be considered and their use justified in line with the waste hierarchy and should demonstrate that there is no future barrier to reduction, reuse and recycling efforts.

3.6 There are two problems with this criterion. The problem caused by DEFRA is that, instead of alerting bidders to the fact that residual wastes can be largely managed via the non-disposal routes available in the waste hierarchy, they direct bidders to the route of disposal to air. Solving residual wastes is less about shifting rubbish than about shifting minds. The second problem with this criterion is caused by the Cambs PFI bid which comprises a series of barriers to future reduction, reuse and recycling. Following DEFRA's lead, Cambs omitted the primary strategic option for managing residual wastes, to assess solutions higher in the waste hierarchy, which can allow almost all materials to avoid ever reaching the stage of disposal. This strategic option allows the volume of residual waste to fall and for improved technological solutions to emerge, thus permitting choice from a wider range of proven technologies. In Cambs' case this missing option has caused a costly rush to adopt treatment which works only with mixed wastes and is not compatible with future 70%+ recycling and source separation of carbon and non-carbon based residuals for Advanced Thermal Treatment (ATT).

3.7 Production of RDF is a barrier to reduction, reuse and recycling since the core challenge is to get it to burn, by maintaining the highest possible calorific value. Cambs anticipate producing RDF with a calorific value of 13 or 14 MJ/kg. The Environment Agency's study on more combustible RDF at 15MJ/kg shows that 55kg of added natural gas is needed per tonne of RDF for adequate combustion. See <http://www.environment-agency.gov.uk/wtd/679004/679021/679047/946096/946174/> The PFI waste contractor, who would be responsible for "managing waste minimisation and engagement with the public", is unlikely to be foolish enough to take any action to reduce the supply of burnable green wastes, paper, cardboard, wood or plastics. Any reduction in burnable input would risk loss of RDF income and increases in costs for disposal of higher proportions of ash. The proposed RDF would contain 68% biodegradable material (page 93 option 4 OBC), all of which would be unavailable for recycling or composting. Cambs Invitation to Negotiate (to bidders) of July 2005 vol 2 schedule 2 page 8, reassures contractors that they may bid to control all waste including recyclable and that only small amounts can held back by reuse, composting or recycling efforts by local charities. This scenario may contribute to the decline of community recycling and reuse in the County when a massive expansion is possible.

3.8 Cambs' PFI bid is financially incompatible with future reduction, reuse and recycling efforts. The payment of PFI funds to Cambs would exclude them from other Waste Implementation Programme funds supporting sustainable alternatives. This is one of the major reasons for the withdrawal of Peterborough from a previous joint bid with Cambs. The capital intensive route chosen by Cambs is also land intensive and may cost the County £6.4 million for land purchases which is then unavailable for other spending including reduction, reuse and recycling efforts. Also on page 8 ITN vol 2 schedule 2, contractors may

bid to handle just residual wastes, with any change to the composition, volume or methodology of recycling collections resulting in extra fees for the PFI contractor and extra costs to recycle more or recycle differently. Payments to contractors would follow tonnage bands so that if Cambs succeed with waste minimisation, higher fees would be paid per tonne, directly increasing the costs and decreasing the likelihood of prevention initiatives. Contractors have no financial incentive to run effective minimisation activities since the OBC shows on page 72 that payment is made for waste minimisation activities irrespective of their quality or effect. Page 71 shows that contractors may be further deterred from reduction, reuse and recycling by payment of an "energy recovery bonus". Since the contract is written without the benefit of awareness of the vast extent of waste-cutting opportunities, there will be inevitable large and continuing unexpected fees for changes to the service specification, which remove funds from other options in the waste hierarchy. The experience of unexpected costs and poor delivery of PFI is well established in the UK. See "hidden costs and extra charges" http://news.bbc.co.uk/1/hi/uk_politics/2121071.stm

3.9 In common with all disposal-dependent solutions, this PFI sends absolutely the wrong signal to the public about waste reduction, reuse and recycling. "We are ready for huge amounts of unrecycled mixed waste - bring it on!" Burning of wastes is uncompromisingly unpopular with the public and could seriously harm the high levels of public engagement and participation which are essential.

Criterion 6: Proposals should demonstrate that other relevant authorities, the public, and interested parties have been consulted.

3.10 Up to mid-March 2006 there has been no meaningful public participation in the PFI decision-making process. This PFI was being delivered behind the backs of those intended to benefit from it and those ultimately paying for it. There is no Statement of Community Involvement for this project because the community were not intended to take part until Cambs was so deeply committed that nobody could imagine any change. Despite four months of email dialogue, not even a key County Councillor on both the development control and the environment committees could imagine any change, "The waste PFI project is steaming on ahead regardless. The County has adopted its waste strategy and is choosing its PFI contractor based on their bids. If they all choose the same process there doesn't seem to be much we can do?"

3.11 The County ran a public consultation in 2001 for their 2002 waste strategy. This strategy made four relevant undertakings:

1. A regular public waste forum would be set up, able to bring in new ideas from interested parties (section 2.4).
2. A "small group of officers" would examine the area of waste minimisation and alternatives to the "end of pipe solutions" contained in the strategy (section 2.1.3).
3. Future decisions on residual waste would be in line with a list of agreed preferences, which considered anaerobic digestion and "technically feasible" gasification/pyrolysis first and MBT or burning as a "last resort" (section 2.6).
4. Cambs would procure a contract for residual waste management over just 20 years (4.8).

3.12 Cambs OBC contains on page 139 a "summary of the joint municipal waste management strategy". This summary does not mention the public waste forum nor the exploration of non-disposal approaches, since neither initiative was enacted. The least preferred options of MBT and burning were promoted without explanation to become the "preferred way to dispose of waste that cannot be recycled", now endorsed as "integrated solutions that employ a range of thermal and biological treatments". The summary strategy (OBC page 147) commits Cambs to a review of the strategy in March 2004, at the time of Invitations to Submit Outline Proposals by bidders. However the draft revision of the strategy is now not due to start being written until April 2006 after Best And Final Offers have been invited. There has yet to be any meaningful consultation regarding this PFI.

Since the life of the PFI will exceed the life of the waste strategy, and the PFI will curtail any significant improvement in waste strategy there may no longer be any point proceeding with the now redundant strategy. In summary Cambs did not gain public consent for MBT or burning in 2001 but have proceeded as if they did.

3.13 Stakeholder Commitment and Support is described on page 13 of the OBC, outlining apparent agreement between a group of Council officers and a group of Council members. However there is not even a mention of any other stakeholders, such as the public, environmental groups, community groups and local reuse/recycling organisations. These wider stakeholders had to wait until after the PFI bid reference case (preferred technology) had been chosen and after short-listed contractors were invited to submit bids, before having a slim chance of being asked along to an unadvertised invitation-only "waste strategy consultation workshop" held in Sept/Oct 2005. The meeting I attended involved just 10 people from Cambridge, including Council staff in role as public stakeholders. A portion of this workshop involved asking our opinion of the options for residual waste, after being given a total of just one option to consider (Mechanical and Biological Treatment, MBT). When I enquired "what if we didn't like this option?", we were told by the chair of the event, from DEFRA-appointed consultancy SWAP, that there was plenty of time before the PFI process was completed and that people could also object at the site planning stage. There was no indication that the key decisions had already been made far in advance of this 'consultation'. There was no mention of the leap in PFI contract time-scale from the 20 years shown in the waste strategy (4.8) to the likely 33 years given in the ITN 2.4.9. Participants were not informed about the County's "encouraging discussions with the cement industry to identify a potential outlet for RDF" OBC page 10. In essence this event offered no plausible opportunity for stakeholders to contribute to shaping the PFI. Although no meaningful or valid consultation on the PFI or on waste strategy can be said to have occurred, the event otherwise served as an example of a small public waste forum meeting.

3.14 Following the 'consultation' workshops Cambs produced a consultation leaflet for distribution to up to 100000 households. On 13th October 2005 I sent Cambs a detailed critique of major flaws with the draft leaflet, noting "If it was used it would mislead readers and serve as an serious obstacle to public involvement in decision-making." I received no reply and the leaflet was distributed uncorrected in mid-November. The most serious flaws may be summarised:

- No distinction between unrecycled waste (around 55%) and unrecyclable waste (17% or less).
- Options for residual waste besides disposal (to land or air) were omitted.
- Options which are unavailable (gasification and anaerobic digestion) due to previous PFI decisions were included. This is the opposite problem of being offered just one option at the 'consultation' workshop, but equally unacceptable.
- A claim that waste reduction was already being maximised, despite minimal strategy, policy, targets, analysis, discussion and initiatives.
- No mention of opportunities for dialogue with the public.

3.15 In effect neither the 'consultation' workshops nor the leaflets provided valid public involvement in the PFI decision-making process, primarily because all the major decisions had been taken before the public learnt anything. Very few members of the public still know anything about it. Both 'consultation' efforts undermined public knowledge and participation on waste issues, which will need to be undone in future. This disposal-fixated PFI may be heard as a call from Cambs for new thinking on waste which can be answered only with meaningful and continuous involvement of the public.

3.16 In mid-Feb 2006 the waste management team met with a member of the public about the PFI for the first time, so far as I know. In early-March, after requests dating back to Sept 2005, a copy of Cambs Outline Business Case was released under Freedom of Information. Cambs have not yet placed the OBC or ITN on their website as apparently required by UK law. Cambs have a legal duty regarding the "active and systematic

dissemination to the public by electronic means of the facts and analyses of facts which the public authority considers relevant and important in framing major environmental policy proposals." See part 2 para 4 of the Environmental Information Obligations. <http://www.informationcommissioner.gov.uk/cms/DocumentUploads/EIR%20text.pdf>

3.17 It should be noted that consultation with the public on waste strategy and PFI is not only a helpful tactic to avoid needless conflict and to improve the quality of decisions, it is also a statutory legal duty for Cambs. If this duty was somehow missed during reading of ministers' PFI criteria it should have come to light when reading the first page of the first information sheet of DEFRA's basic guidance to local authorities in waste management. <http://www.defra.gov.uk/environment/waste/localauth/practice%2Dguidance/pdf/infosheet01.pdf> "The EU Directive 2003/35/EC Providing for Public Participation in Development of Plans and Programmes requires meaningful and 'continuous' community engagement on issues such as developing or revising municipal waste management strategies (MWMSs)." Public participation is not optional.

4. Five minute guidance for Camb's PFI scheme

4.1 The following brief hypothetical discussion outlines how simply Cambs could have been guided through their PFI decision-making process. DEFRA should have provided the role of the guide.

4.1a County: "We need to cut biodegradable wastes to meet tough EU targets. Recycling more isn't easy so new technology is needed for the residual wastes left over after recycling. We're planning to make Refuse Derived Fuel which we hope will be burnt locally to make heat for a proposed new cement works. "

4.2 Guide: "OK, have you done an energy assessment to make sure that the net energy generated, after combustion efficiency losses, RDF production process energy requirements and transport is at least a positive number?"

4.2a County: "No, we don't know if our solution would make any net energy at all."

4.3 Guide: "Would the end-product RDF have a market value?"

4.3a County: "No, we expect it to cost around £20 per tonne to get rid of, via a cement works or other outlet. It may also cost a lot more than that due to the expected oversupply of RDF. "

4.4 Guide: "Would the waste heat after burning at least be used to make electricity or provide district heating?"

4.4a County: "Not that we know."

4.5 Guide: "Have you assessed the production and effects of PM2.5s (fine particulates) which are formed in incinerators in the presence of heavy metals and organic toxins, adsorbing these pollutants and carrying them into the blood stream and into the cells of the body." (The most thorough report available studied 257 references, at http://www.ecomed.org.uk/pub_waste.php)

4.5a County: "We have no knowledge of PM2.5s."

4.6 Guide: "Will a waste burning solution result in compostable and recyclable carbon-based materials accumulating in the air as waste CO2? What would be the CO2

emissions compared to the composting and recycling route?"

4.6a County: Yes carbon from the soil would be transferred to the air as accumulating CO₂. But we haven't done CO₂ calculations. There has also been no discussion about the potential for carbon capture.

4.7 Guide: "Can you be sure that this project will support the County's vision regarding safe and healthy communities and a sustainable environment?"

4.7a County: No, we cannot be sure, based on what we know so far. It's really just a way of getting someone else to deal with all this rubbish until around 2040."

4.8 Guide: "Is it true that since Cemex are not one of the bidders for the PFI contract, you are not actually using the Barrington Cement Works for the County's waste?"

4.8a County: "That's right, the Barrington works may be used for RDF from a waste contractor, not directly for the County's waste. This means that we can tell the public that the cement works are nothing to do with the waste PFI, even though the whole deal is based on burning waste."

4.9 Guide: "Have you analysed the residual waste stream to identify preventable, reusable, recyclable, compostable and hazardous fractions and the specific opportunities for each stream?"

4.9a County: "Not yet, we're planning to though when we get a free morning."

4.10 Guide: "Why the rush to invest in capital solutions when at least 33% of residual waste is already recyclable and more is becoming recyclable as European producer responsibility rules expand. "

4.10a County: "It's hard to find funding for non-disposal solutions and we might not get this PFI grant if we don't use a solution favoured by the waste contractors and government."

4.11 Guide: "Have you considered putting the PFI process on hold whilst you build a dialogue with the public and implement a fuller range of non-disposal options in the waste hierarchy?"

4.11a County: "Well it's true that we are already set to meet our 2010 targets for biodegradable wastes and we could also meet our 2012 targets with slight improvements, as they expect to do in Peterborough."

4.12 Guide: "The rate of change in the waste industry is accelerating. Could treatments that are not considered technically feasible or viable today become attractive in a year or so's time?"

4.12a County: "Yes, this fact is written into our planning but we're pushing ahead with waste burning anyhow."

4.13 Guide: "Your PFI decision-making process involved a cement company, waste companies, the government and local authorities. Are there any reasons why the public should have been involved as well?"

4.13a County: "So far there are 625 000 reasons. Soon there may be 8 million reasons." (£625000 spent so far, £875000 costs up to signing the contract, £6.4m to purchase land which the contractor may wish to use.)

5. Unexplored opportunities in Cambridgeshire

5.1 These few sample opportunities may be multiplied over and over when the other half million or so people in Cambridgeshire are invited to make suggestions. A steady stream of worthwhile ideas may also be gained from other local authorities and other countries. Differing circumstances is no excuse to discard ideas not invented here.

Shifting minds

5.2 Waste management without a realistic vision is a journey without a map. The word "vision", or any equivalent, does not appear in Cambs waste strategy 2002. The default vision "Diversion of waste away from landfill...", which means implementing the waste hierarchy backwards, has evidently been taken from the national waste strategy 2000 in which an almost imperceptible vision follows a strident chapter about diversion from landfill. This County needs a vision which takes an ambitious step away from long-term dependence on all forms of dumping, whether to land, air or water. Every tiny fraction of the waste stream is a new resource waiting to be claimed for the benefit of this County.

5.3 Ambition, fresh thinking and a habit of challenging obsolete assumptions are all victims of dependence on dumping. No institution can be expected to deliver any more than rhetorical innovation without a shift from seeing waste to seeing lost resources. How many products cannot be designed to end up as new resources? Which hazardous materials may be deterred from the market using economic measures? Why should any item be wasted just because one person no longer wants it?

Shifting information

5.4 Cambs struggles with public participation, in common with other local authorities. Although national waste education programmes now spend more, there has been no shift in the "we know best, just recycle more" megaphone method of communication with the public. The national opportunity to "rethink rubbish" was never taken and the potential for a productive regular local dialogue with the public has yet to be explored in Cambridgeshire. The Cambs waste strategy 2002 promise of "regular public waste and recycling forums" (section 2.4) remains undelivered.

5.5 There are a wide range of possibilities for dialogue with the public and with interested organisations. There is currently a network in the County for recycling and reuse but no networks which include research, policy or prevention of waste. There is no regular organised dialogue with the public on waste issues in any form. Options include a sustainable resource forum, a new electronic forum, Cambs participation in existing electronic fora (such as cam.misc), a community stakeholders scrutiny panel, a waste ideas and problem-solving network, strategy and plans panel.

5.6 Waste prevention/minimisation/reduction is about shifting information rather than materials, and cannot proceed without a half-decent vision. This may explain why waste prevention has yet to commence in Cambs, apart from a valiant poorly-funded campaign on reusable nappies. The Cambs waste strategy 2002 does not help, "the general public are not necessarily the right target for the waste reduction message" (2.3.1) and "the scope for minimisation of household waste is limited" (2.3.3) Initiatives focusing on recycling and composting are regularly cited as examples of waste minimisation, which also doesn't help. Wheeling out the same dusty list of waste reduction advice decade after decade doesn't help. Apart from the policy work discussed in section 3 above there is a need to capture information about the widespread and continuous waste prevention habits of residents. There are few people who do not take some action to prevent waste and by sharing

experiences is helpful. Yet how many people know that a lettuce will keep 3 times longer if wrapped in paper than plastic? Or how to reuse white spirit endlessly? There is scope for one or more enthusiasts networks, modelled on or incorporating the County composting network. The public can be engaged with competitions and press releases which uncover and spread worthwhile knowledge. Practical waste-prevention information such as running a non-toxic household, soldering an old electrical connection, using different glues or repairing furniture could be readily available on-line, in local evening classes and in regular drop-in events. As the most environmentally-sound and cost-effective waste management route, there is vast potential for prevention in Cambridgeshire.

Shifting materials

5.7 The first unexplored opportunity with materials links with the above dialogue and prevention initiatives. My limited experience of the region's local authorities suggests a preference to deal with the public either as a mass of individuals or as formally constituted community groups. The role and value of informal networks is generally not appreciated. (I disbanded a two year old network of local park enthusiasts last week after our district Council refused to work with us.) For waste issues neighbourhood level networking is absolutely essential for reaching new people, sharing skills and acting as a bridge to local authorities (to overcome distrust in both directions).

5.8 The easiest way to enable neighbourhood-level waste action is to provide an attractive range of products/services (such as shredding, wooden compost bin making events, under-sink compost box fitting, large canvas reusable shopping bags, repair advice, wormeries, compost-doctor advice, access to surplus/salvaged Council building materials, unclaimed and unsold found bicycles and parts, bulky waste collection, tree/bushes/flowers for planting, autumn leaf delivery and neighbourhood display boards - for events/adverts/giveaways). These could be made available free or discounted to individuals who take part in any of the County waste networks and to groups of neighbours who initiate waste-cutting action. Taking into account the high proportion of voluntary action, the efficient use of everyone's time for building critical masses of enthusiasm and the diverse long-term benefits, this initiative would be highly cost-effective.

5.9 Local authorities tend to focus on putting materials on trucks. A massive unexplored opportunity is to challenge the habit of discarding items when one person no longer needs them and at the same time avoid the costs, impacts and storage problems from road transport. The obvious solution is neighbourhood level giveaways where a sign at the front advertises items that others may have a use for. This might be done with an A4 poster in a window or with wheelie bins painted to accept writing with chalk. An alternative for streets with few passers-by is a neighbourhood notice-board. Cambs' 'swap and sell' initiative has largely been taken over by commercial sellers of tat and detailed suggestions I sent to the site organisers were never even acknowledged. Cambridge's 'freecycle' newsgroup consistently handles more than 10 times the volume of offers, provides privacy of contact details and costs nothing to run. It is however not promoted by Cambs besides gaining a listing on www.recap.co.uk as one of many 'environmental groups'.

5.10 Cambridge's neighbourhood recycling bring-sites still collect the same materials even though their function was replaced years ago by kerbside recycling. There seems little point duplicating the kerbside service when the sites could be refocused on other materials and items. Clothing, shoes and books are collected at some sites. Other possibilities include corks, CDs, mobile phones, ink cartridges, toner cartridges, plastic bags, slate tiles, tools, hardware, stamps, stationery/pens and medicines. There should be an open invitation to collect almost anything the public or others can find a use for regularly. CDs and DVDs are an obvious candidate, with a wide range of possible reuses. Self-serve venues where hard-to-recycle materials, such as expanded polystyrene, may be dropped off or collected are possible. Note that the proposed PFI contract appears to restrict and/or charge for any

changes to the collection "methodology" which remove new materials from the waste stream or allow new groups to recycle more (ITN July 2005 vol 2 sched 2 page 8).

5.11 Cambs' 'master composter' network of volunteers is a valuable initiative for anyone who can spare 2 days for training and commit further regular time as a compost volunteer. However its effect is limited in a modern world where everyone is busy. My friend who has attended the master composter training is asked at least 10 times per year to volunteer but has not once had the free time. An opportunity for Cambs is thus to redesign compost networking/engagement to suit busy lifestyles. An ideal solution may be to subsidise master composters' time when they act as "compost doctors" to solve householders' compost difficulties. The cost would be small and once-only whilst the reduction in biodegradable waste would be permanent. A home-visit service would also suit busy householders who want to do the right thing but haven't time to become experts themselves.

5.12 Cambs should also widen the range of composting options for householders, to suit a wider range of needs. The predominant ugly plastic "digesters" suffer from lack of air flow thus making less compost and more methane and uncollected liquid leachate. Opportunities include traditional wooden aerobic boxes, split and hinged aerobic boxes designed to aid turning, DIY instructions and kits for making boxes (from salvaged timber or pallets), wormeries (including designs fitted into garden benches), anaerobic weed-eater designs made from reused plastic barrels, neighbourhood shredding /chipping services, allotment/ neighbourhood/park composting in reclaimed white landscape materials bags, delivery of such bags to allotments/householders filled with autumn leaves for making leaf mulch. (Bulk landscape bags have proven to be excellent compost containers on my allotment for over 10 years. Over this period I have also used a salvaged plastic drum for anaerobic digestion of weedy material, collecting the leachate as liquid plant food. It has needed emptying only once.)

5.13 I understand that wood collected in Cambs HWRCs is chipped for animal bedding. In 2003 I sent Cambs a 16 page report into further opportunities and markets for solid wood, wood chip, wood pulp, wood waste prevention, streaming/sorting of wood according to value, advanced thermal treatment and related economic measures. I did not receive a word of feedback and have no idea if any use was made of the work. The opportunities for smart use of this valuable resource appear to be almost entirely untouched, with massive implications for waste, biodiversity conservation and climate. I have recovered approx 1m³ hardwoods from skips in the past year (enough to install oak fixtures throughout our house) - County waste sites might each collect and chip this much every few days. There is no organised method by which wood can be redistributed. Hundreds of commercial sites in the region routinely discard pallets with mixed waste; sufficient wood to fuel a cement kiln!

5.14 Cambs civic amenity sites (HWRCs) are still struggling to break from their old role as local tips. My experience is only with one HWRC, but illustrates massive untapped opportunities for improvement:

- Some hazardous wastes are mishandled. I was directed to place used brake fluid into a mixed waste skip (banned from landfill since July 2002).
- Staff are at best intermittently helpful. Staff do not reliably notice people in need of help, including elderly and heavily pregnant visitors.
- Rescued items are offered for sale in a small area for short periods and then discarded. There is no protection from the rain for delicate/electrical items despite availability of all the materials and manpower needed to construct a shelter.
- Prices demanded for some items are above the new cost. Sales are all in cash, giving little assurance that the proceeds will even benefit the community through taxes. Public participation and even staff morale could be higher if the proceeds went to charity or to fund waste prevention work.
- Facilities for testing, demonstrating, repairing and even pricing of goods are unavailable.
- No provision for display or refurbishment of large items such as furniture - all currently discarded.

- No separation of tempered glass, windows and window frames which would be good for making cloches, garden sheds and garden workshops).
- No system to take requests for items or spares needed by members of the public, despite this being a source of income for the operators. Discarded equipment can often be the only possible source of parts for old machines. Broken equipment is still 99% working.

The opportunities for household hazardous wastes amount to the commencement of detailed analysis, policy, prevention initiatives, collection services and reuse (such as "repaint" schemes), none of which appear to be mentioned in Cambs waste strategy 2002.

5.15 The opportunity for the unrecyclable carbon-based fraction of residual waste is to enact source separation, collection and conversion into a fuel via forms of Advanced Thermal Treatment (ATT). This can handle wastes such as dog mess, carpet, disposable nappies, chipboard, MDF, thermosetting plastic, messy plastic wrapping and the small fraction of biodegradable wastes from people immune to cooperation with recycling schemes. The critical benefit of ATT is that a liquid or gas fuel is produced which can be processed to any desired degree to remove contaminants. With incineration and RDF burning the fuel includes many materials (such as lead, mercury, cadmium and PVC) which are inherently unsuitable for burning since they cannot be reliably removed and once burnt they add to the existing ecological and health burden of particulates, dioxins and heavy metals. Plasma gasification is a promising technology with an impressive emissions profile but has not been used in the UK. If the Cambs PFI proceeds as planned it will eliminate the use of forthcoming treatments for residual wastes which are compatible with sustainable development.

Setting an example

5.16 I once wrote a leaflet for Cambs showing how to run a waste-free Christmas party, which I understand was distributed through the County. When I suggested they consider using the information for their own Christmas party I learnt that was not likely to be appreciated. Hence the opportunity is for a new level of waste awareness to take hold within all local authority organisations. Success here would provide tangible leadership to residents and businesses. I would suggest two simple measures:

- (i) A light-hearted competition between householders and municipal buildings for the highest recycling rate. If the public win there is to be a Council-funded waste-free celebration in every district.
- (ii) A LED scrolling sign on the outside of every building showing the building's current recycling rate and annual disposal costs. (There should be an additional sign showing energy costs and savings compared to the previous year - much needed since many buildings have open windows all winter.)

5.17 The County run numerous contracts for work on buildings and roads. One of these, the repaving of part of Burleigh Street in Cambridge (organised together with the Grafton Center) provided all the paving bricks and much of the sand and hardcore needed for a drive at the front of our house. I estimate the disposal of the remaining unsalvaged paving cost approx £5000 using grabber lorries. This waste of money, materials and landfill space could have been avoided by simply giving away the materials. Thousands of passing shoppers would have seen recycling in action and perhaps started to think what else they could recycle. This simple money-saving measure could be included in all Council construction/demolition contracts as well as in guidance for all developers in Cambridgeshire (who routinely discard even brand new materials).

6. Ways forward for Cambridgeshire County Council

6.1 DEFRA and Cambs have been made aware since October 2005 that this PFI does not meet minister's criteria, without which no funds may legally be paid and the project remains an expensive academic exercise. There is no prospect for this PFI to be adjusted to meet the criteria since all the key decisions have been made already without meaningful public knowledge or participation. Since it is not credible for Cambs to proceed with closed eyes and crossed fingers, there appear to be just two ways forward:

- (i) Elected members may choose to lobby for a halt and review of the PFI.
- (ii) Cambs may wait until an external authority intervenes.

6.2 A scrutiny committee meeting regarding this PFI will be held on March 15th 2006 which has explicitly chosen not to include any expert speaker to represent the most glaring option so far ignored by Cambs, to wait for better technologies whilst improving public participation, prevention, reuse, composting and recycling. (This is the option chosen by Peterborough when they pulled out of this PFI project.) My proposals for an expert from Flintshire, to represent this omitted option, alongside the two waste-burning perspectives from local authorities, were declined. If the Cambs scrutiny process is unable to examine options besides those already contained in the PFI it may be necessary for other members to act. It seems in the best interests of preserving the good reputation of Cambs if the initiative to halt and review the PFI process is taken voluntarily within Cambs, rather than forced upon it. This should also allow Cambs to maximise their chances of retaining their £35m bid funding until it is needed for a more suitable technology for the genuinely unrecyclable waste stream.

6.3 Cambs has been aware all along that it was choosing a controversial path. Had a sustainable solution been pursued then the process might have involved not secrecy and misinformation but the full fanfare of widespread public involvement. Those organising the PFI must have known they were taking the risk that details of the project might be uncovered before the contract became inescapable. These same people now have the opportunity to save up to £875 000 of avoidable procurement costs and up to £6.4 million of avoidable land costs which would be of great benefit to the County.

6.4 Once a halt to the PFI process has been agreed it will be possible for Cambs to begin a constructive dialogue with the public and other interested parties on capturing the vast opportunities for shrinking residual waste volumes in preparation for viable and sustainable treatment technologies becoming available in the coming years. This appears to be the route chosen by Peterborough and is even supported on page 147 of the Cambs OBC, "The rate of change in the waste industry is accelerating and treatments that are not considered technically feasible or viable today may become attractive in a year or so's time." The County Council's website PFI information claims that Cambs is open-minded and has the objectives of maximising recycling and composting, and of protecting health and the environment. I have no interest in criticism and feel sure that everyone's time would be better spent on collaborative projects compatible with sustainable development and public support.

7. Ways forward for DEFRA

7.1 DEFRA bear special responsibility in helping Cambs to now shift towards genuinely viable and sustainable resource management. Without the weak vision and emphasis on "energy recovery" within DEFRA-led national waste policy Cambs might not be in its current predicament. Without a PFI team obsessed with project delivery above all else Cambs might have found more suitable funding. Without DEFRA-funded consultants who argued against waste prevention and ambitious recycling rates Cambs might have been encouraged to think further and try harder.

7.2 The first priority for DEFRA is to assist Cambs to make a smooth transition to a process of active public participation in achieving sustainable management of residual waste, by applying first the non-disposal options of the waste hierarchy and later, when suitable technology is available, to source separate carbon-based residual waste for Advanced Thermal Treatment. DEFRA have a clear moral duty to ring-fence the previously agreed funding of £35m for both stages of the process for Cambs.

7.3 In order to gain from the experience, further action is required by DEFRA:

- (i) Separate the roles of funding and scrutiny in the waste PFI team, since the conflict of interest between the two has led to apparent abandonment of effective scrutiny.
- (ii) Join up the delivery of funding for capital (disposal options with a possible PFI component) and operations (prevention, reuse, recycling, composting) so that Councils are not forced to choose one route or the other, nor to rush into disposal solutions before other routes are exhausted.
- (iii) Reverse the current funding profile so that funds are provided according to ranking in the waste hierarchy. Thus waste prevention work would receive highest support and disposal options the least.
- (iii) Write a national waste strategy based upon the waste hierarchy and "circular economics" as is being done in China. Without these last two actions there can be no breakage of the link between growth and waste, and the UK risks being left behind internationally, stewing in its residues.
- (iv) Write an Innovation and Evidence (research) strategy for waste which prioritises, rather than ignores, the need for new strategic thinking, new perspectives on the waste hierarchy, new approaches and language for public engagement and new forms of economic instrument which ensure that the market operates to prevent the waste of all types of products, including fuels.
- (v) Join up the work of DEFRA's forward-thinking Sustainable Consumption and Production group with the Waste group in order to think across the whole product life-cycle, not just up to the point of purchase.
- (vi) Respectfully invite the cement industry to grow their own resources rather than convert those of the nation into air pollution and climatic instability.

8. Conclusion

There is now an opportunity for a shift in focus of Cambridgeshire County Council's waste plans that will not just benefit the people of Cambridgeshire. Due to previous high achievement, recycling rates of 70%+ are within reach. Cambridgeshire is in a position that other Councils can only envy, and with brave but simple measures our region can become an example to the nation and a spur to a powerful new era of resource efficiency which finds economic, social and environmental sustainability in what used to look like rubbish.

Appendix A: Commitment to investigate by DEFRA

14th November 2005: letter received from Dominic Jackson (Waste) "Thank you for your further email of 1 November to the Minister. You have raised a number of specific concerns over meetings and publicity material provided by Cambridgeshire County Council relating to waste management decisions in the County.

I am writing to inform you that I have asked Mr Ron Bates, Head of Funding and Scrutiny in DEFRA's Waste Implementation Programme to investigate the matters which you raise in order to respond fully, and appreciate your patience whilst this is in progress."

To date: no further contact from DEFRA, including to confirm my information before starting an investigation.

Appendix B: PFI risks

- 1 Cemex choose to build their new kiln elsewhere, despite Cambs offering cement-friendly waste strategy and PFI which pays them for supplying fuel.
- 2 Cemex close existing cement kiln in Barrington, Cambridgeshire with loss of only local market for RDF. The plant is 78 years old and no longer economic to operate.
- 3 Public backlash against waste solutions involving burning. Loss of trust and reputation of the County Council for the duration of the PFI (likely to be 33 years).
- 4 PFI contracts written with today's low awareness of waste opportunities. Inflexibility and extra contractor fees block tomorrow's attempts to improve resource management.
- 5 Record CO2 levels and weather-related damage. National response to climate change brings unexpected new charges for CO2 emissions, equivalent to a landfill tax on air disposal.
- 6 Failure of planning permission for Cemex due to conflict of interest over mishandling County waste strategy.
- 7 Landfill Allocation Trading System costs mount as unpopular RDF facilities are blocked at planning. PFI contractor fees remain payable despite non-delivery of service.
- 8 National oversupply of RDF as government encourages production and the public slow down burning facilities. Gate fee not £13/tonne as estimated but £46/t, priced to marginally undercut landfill cost.
- 9 New technologies for ATT become proven and viable in the short-term. Opportunity for sustainability-compatible solution missed.
- 10 Cambridgeshire becomes test case for UK and EU enforcement of Aarhus Convention, which requires meaningful and "continuous" community engagement on issues such as developing or revising municipal waste management strategies.
- 11 Research showing that health costs from RDF burning exceed waste disposal costs per tonne. Primary Care Trusts lobby to close down RDF production and all waste burning.
- 12 County and contractor's insurance policies insufficient to cover third party joint-liability class action claims from air pollution health damage.
- 13 County and contractor's insurance policies insufficient to cover liabilities for

environmental impairment due to RDF being converted into CO₂ and making a measurable contribution to worsening weather-related damage.

14 Groundwater contamination from Barrington hazardous waste site forces closure of cement works during a decade-long legal battle with the water company.

15 Renewable Obligation Certificates permanently exclude subsidy of RDF burning.

16 Climate Change Levy rebate removed from cement kilns burning recyclable or compostable material. Only biofuels to receive the rebate.

17 Ethical investment market moves against energy from waste projects, raising cost of finance for waste PFI. PFI investment market tainted.

18 UK government notices that burnt materials and products need to be replaced, with the full range of environmental impacts. Waste burning actively discouraged.

19 UK government reads any of the Life Cycle Analysis studies from the past 10 years comparing waste burning with waste recycling and discovers that recycling is many times more productive with energy. Burning actively discouraged for recyclable wastes.

20 UK government discovers the Law of Conservation of Matter (known to science since 1808 - John Dalton), noting that since the total matter on Earth is fixed it might not make sense to systematically and permanently convert much of it into wastes. Disposal of waste to land, air and water actively discouraged.

21 UK government discovers the climate change problem, suggesting that compostable wastes should be returned to the soil rather than burnt and converted into yet more CO₂. Municipal waste burning actively discouraged.

22 UK government discovers the Precautionary Principle, which suggests that just because humankind have burnt wastes since the days of cavemen, there is no certainty that any amount of anything may always be burnt without serious or irreversible consequences. Mixed waste burning actively discouraged.

23 UK government implements sustainable development. Waste hierarchy implemented, waste burning taxed rather than subsidised.

24 UK government discovers the Aarhus Convention (ratified by the UK in Feb 2005). Environmental decisions democratised, public pressure to stop municipal waste burning.

25 Government requires collection of more than the current 3 streams of household waste, when PFI bids are locked into 3 streams only. Extra costs to Cambs.

26 Despite the PFI, recycling increases above 60% over coming years, leaving insufficient calorific value to produce RDF. Contract penalties for failing to deliver to Cemex.

27 EU forces tougher controls on PM_{2.5} particulate emissions which are the main size emitted from RDF burning. UK forced to upgrade all equipment at massive cost.

28 EU producer responsibility rules for new product groups further cut the unrecyclable fraction of household wastes, making the burning solution even less suitable and viable.

29 EU challenges UK reliance on incineration where recycling rates are low. Tougher controls and higher costs for waste burning.

30 Low public engagement makes Cambs unable to meet targets for removal of

hazardous wastes from household waste stream. Environment Agency ban burning and composting the contaminated streams.

31 Economic penalties on hazardous waste disposal makes dumping of ash from RDF burning unaffordable. RDF production stopped, major costs to reconfigure MBT.

32 Health studies on waste ash in cement cause public outcry. Cement production becomes less lucrative as waste ash is banned from cement.

33 Cement industry contracts as nation moves to timber-framed housing. Remaining cement industry fueled sustainably on timber waste and biofuels. Cement industry invests globally in forest ecosystem protection and new planting.

34 Inclusion of end-of-life costs within product prices finally provides sufficient funding for reuse/recycling and ends RDF 'market'.

35 Regulatory system overhauled and burdensome end-of-pipe emissions controls largely replaced by inclusion of waste risks and preparedness within product prices. Market mechanisms succeed where government had failed.

36 New visions for sustainable waste management challenge the throw-away society. UK becomes sustainable. Mixed waste burning ends.

Appendix C: Glossary

ATT	Advanced Thermal Treatment; gasification or pyrolysis, produces a gas or liquid fuel rather than direct heat. Contaminants can be removed from the fuel.
Cambs	Cambridgeshire County Council.
Cemex	A cement company.
DEFRA	Department for Environment, Fisheries and Rural Affairs of the UK government.
EU	European Union.
HWRC	Household Waste Recycling Centre.
ITN	Invitation To Negotiate; an invitation to bidders.
MBT	Mechanical and Biological Treatment; chopping, composting and drying.
NGO	Non-Governmental Organisation.
OBC	Outline Business Case; the bid for funding to DEFRA.
PFI	Private Finance Initiative; a company builds something, the public pay for its services.
PM2.5	Pollution particles with a diameter less than 2.5 millionths of a metre (2.5 microns).
RDF	Refuse Derived Fuel; made from household wastes.
SWAP	A waste consultancy.

Waste hierarchy; the first principle of waste management. Obligatory but largely ignored ever since the EU Waste Framework Directive 1975. First priority is to cut waste via prevention, reuse, recycling and composting. Waste which cannot be managed by those routes must then be disposed to air, land or water. The waste hierarchy appears to have been 'reinterpreted' over the years in response to lobbying but not in response to research on the hierarchy, as little or none has been commissioned. I would be glad to learn of any research that does exist as a paper is being planned to describe a range of sustainable applications of the waste hierarchy, for policy, price correction, local initiatives and public engagement.