Why don't you recycle mixed plastics?

Mixed Plastics - Briefing Note, Forest of Dean District Council

Background

In recent months interest in the recycling of plastics has risen greatly following programmes such as BBC's Blue Planet 2 - which showed the damaging effects of plastic litter on wildlife - the Government's introduction of a ban on plastic microbeads in toiletries and cosmetics to reduce the harm these do to marine life - and news stories regarding all manner of other 'problem' plastics (from straws and plastic coated coffee cups to cotton buds and wet wipes).

What are 'mixed plastics'?

'Mixed plastics' is a term used to refer to all non-bottle plastics and will include rigid plastics (predominantly trays, pots, punnets or tubs) and plastic films. While these materials can be recycled - and it is broadly speaking in the interests of protecting the environment to reduce, reuse and recycle as much as possible - it is not always economic or practical to do so and there are a number of factors that need to be considered. These are set out within this briefing note.

Current situation in the Forest of Dean

Each district or borough is different in terms of the size of its area, the number of households it has to service, the general make-up of the area, the budget available, proximity to disposal/tipping sites and processing facilities and the methods it employs to collect waste and recycling dependent, in part, on the vehicles. All of these factors need to be carefully considered in terms of what service can be offered to residents locally in terms of waste and recycling provision.

Currently only plastic bottles are collected by the Forest of Dean District Council for recycling. These are collected either at the kerbside or through the network of recycling banks. The Household Recycling Centre (HRC) at Oak Quarry which is operated by Gloucestershire County Council, also only accepts plastic bottles for recycling. (Note: that the district council and the HRC only accept household waste. Commercial waste is not accepted).

FODDC Collection Service

The Forest of Dean district's kerbside recycling vehicles are specifically designed with a range of compartments so that the recyclable materials can be collected separately. Note: This is different from the vehicles which collect mixed or "commingled" recycling (where all recyclables are collected in a wheeled bin) where the recycling will be tipped onto a standard 'refuse-type' collection vehicle.

Collecting materials separately helps ensure that the recyclate is of good quality and is free of contamination.

In the Forest of Dean, the collection vehicles need to be narrow-bodied to allow access to the many lanes in what is predominantly a rural district. This limits the vehicle capacity and means that more vehicles are required to service the number of households compared to an urban area.

Due to capacity on the vehicles, some materials currently collected from the kerbside are loaded part-mixed on to the vehicles (for example plastic bottles and tins/cans are emptied into a compartment together to be sorted at a later stage) while other materials are kept completely separate (such as glass and textiles which requires no further sorting).

Ideally all materials would have their own compartment, but due to the large range of materials now collected for recycling, this is not practical.

If mixed plastics were introduced, they would currently need to be added to the compartment used for plastic bottles and tins/cans. There is some capacity on the collection vehicles in the 'plastic and can' compartment but the council needs to determine if there is enough capacity to add these materials without the need for vehicles to tip more frequently or the need for an additional vehicle and collection round, as both scenarios would increase the costs of collection.

The council has carried out a review of the amount of plastics collected by local authorities that do collect mixed plastics but the results have been wide ranging and as such we do not feel that we can rely on this data alone to determine the fleet requirements.

The council is carrying out a four season waste sort that involves sampling the black bin waste to determine what type and amounts of materials are in the waste stream. The results will provide a better estimate of the amount of mixed plastics in the waste stream to be made, so that the costs of adding these to the recycling collection service can be determined.

Local Infrastructure

When one or more of the compartments on the recycling collection vehicles is full, the vehicles tip at the Biffa depot in Cinderford. The food waste compartment is removed from the vehicle by a fork lift truck and then emptied into a sealed container. The other materials are tipped in separate bays for glass, paper and cardboard, cans and plastic bottles.

The different material streams are then collected by hauliers on a daily basis and sent directly to reprocessors - (glass, paper and cardboard, textiles) to be recycled. Food waste is recycled at an Anaerobic Digestion plant near Bishops Cleeve, Gloucestershire.

The plastics bottles and cans collected mixed at the kerbside are transported from the Cinderford depot to a Materials Recycling Facility to be separated into the different materials streams: aluminium, steel, PET bottles clear, HDPE and Mixed Plastic Bottles. They are then bailed and sent on to reprocessors to be recycled.

As there are currently no local Materials Recovery Facilities or Sorting Facilities, the plastic bottles and cans have to be transported loose to a MRF, to which there is an environmental and financial cost. There is also a cost to the Council for the materials to be sorted at the MRF.

The ideal solution would be to sort the cans and plastics at the depot and then bale them before sending on to reprocessors. However the current depot is too small for this type of operation. This results in high haulage costs as only a limited tonnage can be loaded on to vehicles.

If plastic pots, tubs and trays were added to the service then haulage costs would increase further (as more material would require extra collections) and there would be increased sorting costs.

The limited storage space at the Cinderford depot is a barrier to adding additional materials to the recycling service. Currently one to two articulated lorry loads of plastic bottles and cans leave the depot each day and if a vehicle fails to collect there is a risk that collections would have to cease as there is no capacity at the depot for stock piling materials. Adding tubs, pots and trays would exasperate this situation.

If space was available at the depot or a site was found near to the depot, the council could invest in equipment to sort and bale materials locally. This would allow materials to be sent direct to reprocessors rather than via a Materials Recovery Facility. This should decrease haulage costs - as materials would be compacted and baled first - and increase income. However, this decision would need to be balanced

against significant capital investment for a site and equipment as well as the ongoing revenue costs for repair and maintenance of equipment and additional staffing costs to operate the new site.

To avoid stock piling materials and to mitigate risk, plastic bottles and tins/cans are currently sent to two Material Recovery Facilities (at Avonmouth and Bishops Cleeve). If materials were sent to only one facility and they no longer wanted it due to the current market fluctuations and fragility of some markets, the council could find itself in a position where it would have to stop collecting the materials at the kerbside as there is no space to store them.

Not all plastics are the same

In total there are over 50 different families of plastic. To enable them to be recycled effectively they must first be sorted back into their individual family at a Material Recovery Facility (MRF). MRF's process large volumes of municipal and commercial waste a produce a range of high quality recyclable outputs. A combination of mechanical sorting techniques and manual quality controls is used to separate the materials so they can be sent on to reprocessors.

Plastic Bottles

Plastic bottles are made from one of only three polymer types and are very easily identified, both by members of the public and those sorting the collected bottles. The three polymer types used are PET (e.g. fizzy drink bottles and squash bottles), HDPE (e.g. milk bottles and detergent bottles) and PVC (e.g. large squash bottles), although the use of PVC in such applications is in decline. Once sorted into the different streams these materials can be baled and sent on to plastic reprocessors to be processed and sold back into the manufacturing chain. This is 'closed loop' recycling as the materials are deemed to be high quality so they can directly substitute virgin materials.

Mixed Plastics (Pots, Tubs and Trays, PTT)

Mixed plastics (PTT) such as margarine tubs and rigid food containers are made from a very wide range of polymer e.g. PS, PP, PET, PVC and LDPE, many of which are blends. These are much more difficult to identify and separate efficiently and it is more difficult to secure an outlet for the material as mixed plastics are not in high demand by plastic reprocessors. This is because:

PTT made from the same polymer as bottles (i.e. PET and HDPE) are not of the same quality as plastic bottles and as such in collecting them they could lower the overall grade of the material being collected.

PTT may be contaminated with food which reduces the quality of the materials.

Some pots such as yogurt pots are made from polystyrene or more than one type of plastic i.e. the rigid top and softer body which cannot be separated.

Black Plastic Trays

Black plastic trays are particularly troublesome for Material Recovery Facilities (MRFs) as the plastics are sorted using optical readers which rely on the reflection of light to identify the polymer or colour type. Since black is unable to reflect light, any black plastic will not be identified by the optical sorting units and may stay within the residual waste stream (unless sorted at a later stage in the process by the MRF).

On a positive note, some food producers are looking at alternatives. Back in 2014 Marks & Spencer invested in trials to find a way to coat their food trays to allow them to be 'recognised' while others are starting to move away from black in their packaging to avoid this problem.

Link: http://corporate.marksandspencer.com/blog/stories/tackling-a-recycling-challenge

Plastic Film

Items such as plastic film also cause problems as these are likely to jam and become wound around the conveyor belts and other machinery used in MRFs.

End markets

End markets for any material collected for recycling need to be robust to ensure continuity of service delivery.

While some councils do collect mixed plastics the end markets for these are very limited. In the past, the majority of UK mixed plastics were exported to China for recycling. However, due to increased quality controls and a desire to stop taking low-grade materials and to reduce pollution, China is now heavily restricting or banning some materials it historically accepted from overseas:

Links to recent BBC news articles on the Chinese restrictions can be found here:

http://www.bbc.co.uk/news/business-42455378
http://www.bbc.co.uk/news/business-42456584

The Chinese restrictions, which came into force in January 2018, have affected the whole recycling market as the supply of materials is now greater than demand. The demand for low-grade mixed plastics is one which is particularly limited and, finding an outlet for it at present would be difficult (even if the council were in a position to introduce this service to householders).

While this change is hopefully leading the wider recycling community to work more closely with industry to investigate how the quality of materials can be improved so that recycling markets remain available, this solution will not be available overnight given the UK's current position.

Current UK infrastructure is such, that, according to a recent report by Green Alliance, only 9% of all available plastics is recycled domestically so waste collection authorities and their contractors are still reliant on non-domestic end markets and reprocessors for the materials they collect.

However, the report suggests that the UK could fulfil over two-thirds of domestic demand if extra actions and incentives were pushed through by Central Government. Such requirements could include mandatory recycled content in all plastic products and packaging and short-term support to help boost the UK's plastics recycling industry.

Demand for all plastics for recycling, is also driven by the price for oil. When prices are lower, there is less incentive for manufacturers to buy recycled stock, opting for virgin sourced material instead. Another possible incentive could be higher taxes on items made from virgin rather than recycled sources.

One of the main reason for the Forest of Dean District Council only collecting type 1 (PET) and type 2 (HDPE) plastic bottles from the kerbside (and banks), is that these two types are easily traded on as there remains a demand for this type of plastic from reprocessors. This means that the council can be confident that it is contributing to a closed loop recycling process.

If the Council were to add a low-grade plastic (such as rigid mixed plastic) to the collection scheme the Council would need to ensure there is a viable and sustainable end market and at present this cannot be guaranteed.

Operational Considerations

There are also operational aspects to consider. Collection crews are required to make a decision as to whether the materials presented at the kerbside by a household are acceptable or not. Given that the majority of punnets are not made from PET (although some are) crews do not have the time to check every item presented by a householder for recycling.

Communications from the district council to its residents have to be clear and not open to misinterpretation so trying to give this level of detail is problematic. Giving a clear: 'yes please we would like your plastic bottles' or a: 'no thanks we do not collect punnets and trays' is easily understood by all.

While it is encouraging to see how many residents are very interested in recycling and will make the effort to follow more complex requests, there are those that will not sort materials to the degree required to maintain the quality of each material stream.

Financial Constraints

Over recent years local authorities have had to contend with reduced budgets from central government. Only 11% of the council tax goes to the Forest of Dean District Council to deliver a range of services.

The Forest of Dean District Council is committed to reducing residual waste and increasing recycling but has to consider the financial impacts of expanding the kerbside collection to include mixed plastics.

The expansion of the service will require investment in infrastructure and may require additional vehicles and crews and at present an increase in the amount of money to dispose of its plastics recycling. In addition introducing mixed plastics could have a knock on effect on the amount of kerbside containers required by householders which would need to be purchased as plastics – whether bottles or otherwise – are voluminous so can quickly fill a kerbside box.

This investment may not be worthwhile if secure recycling markets cannot be found for the materials.

Summary

We acknowledge that in trying to answer the question "Why don't you recycle mixed plastics?" a long and comprehensive answer has been provided. This reflects the complexity and cost of the recycling process in a rapidly changing market. We hope this helps you to understand a little better why the Forest of Dean District Council's recycling service does not collect mixed plastics at the moment, but that it is no less cost-effective and value for money in reducing waste and its wider environmental impact in its ambitions.