

Sub ⑥



CEWEP Ireland Response
to
**Pre-treatment & Residuals Management: EPA
Technical Guidance Document**



10 October 2008

1.0 Summary

Urgent action is required to ensure that Ireland meets its Landfill Directive targets. If effectively and immediately implemented, the Guidance Document could provide the most significant opportunity to date for meeting this goal. While the landfill pre-treatment conditions will have a significant impact on the waste sector, it is submitted that temporary waste storage would be a viable solution until adequate pre-treatment capacity is developed. This activity is carried out in many best practice waste management regions in Europe as a means of ensuring that Landfill Directive targets are met.

A number of minor amendments have been proposed for the Guidance Document in this submission which include clarification on:

- the need for mechanical pre-treatment
- the options for regions with no source separation
- what constitutes an "urban" area
- the requirement for energy recovery
- how to avoid exceeding targets where the extent of pre-treatment is based on a fraction rather than an absolute figure

CEWEP Ireland is confident that with these modifications the Guidance Document would be clear, robust and effective at achieving its goals.

2.0 CEWEP Ireland

CEWEP Ireland is part of the Confederation of European Waste to Energy Plants (CEWEP), which represents over 340 waste-to-energy plants treating approximately 52 million tonnes of waste per year.

CEWEP Ireland supports European and Irish waste policy and promotes an integrated approach to managing waste. This involves supporting the development of sustainable waste-to-energy facilities in Ireland, and banning the landfill of combustible waste. CEWEP Ireland therefore welcomes and thoroughly supports the provisions of the technical guidance document which will contribute towards achieving its goals in Ireland.

3.0 Landfill Pre-treatment

3.1 Interpretation of Provisions

It is understood from the Guidance Document that under the Landfill Directive, landfill operators will be obliged from the 16th July 2009 to demonstrate that all waste accepted at a landfill has been subject to treatment.

Until now, "sorting" or source separation has been considered adequate treatment, in line with the Directive which states:

"treatment means the physical, thermal, chemical or biological processes, including sorting, that change the characteristics of waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery"

However, as shown in Figure 3 of the Guidance Document, this and other measures have not led to a reduction in biodegradable municipal waste (BMW) being sent to landfill and Ireland is more than likely to miss its Landfill Diversion targets.

The Guidance Document proposes to make more stringent these "treatment" requirements. CEWEP Ireland understands that the new treatment obligations for waste accepted at landfill consist of:

- At minimum, source separation via a two-bin system or equivalent AND treatment (including diversion) of the biodegradable component of MSW to the extent necessary to achieve the Landfill Diversion obligations, meaning:
 - source separation via a three-bin system and (where this alone does not meet the diversion target) thermal or biological treatment of the biological component of MSW

OR

- source separation via a two-bin system and thermal or biological treatment of the biological component of MSW
- In urban areas, source separation via a two-bin system AND mechanical treatment of "black bin" AND treatment (including diversion) of the biodegradable component of MSW to the extent necessary to achieve the Landfill Diversion obligations, meaning:
 - source separation via a three-bin system and (where this alone does not meet the diversion target)
 - mechanical and biological treatment of black bin waste

OR

- thermal treatment with the mechanical treatment of residues

OR

- source separation via a two-bin system and
 - mechanical and biological treatment of black bin waste

OR

- thermal treatment with mechanical treatment of residues

However, if this interpretation is correct, further clarification may be required in Figures 5 and 6 to articulate this more clearly as discussed below.

3.1.1. Mechanical treatment requirements

Figure 5 indicates that mechanical treatment is not required where thermal treatment (i.e. treatment in a dedicated waste-to-energy plant) is used. However, it could be interpreted from Figure 6 that mechanical treatment of black bin waste is required prior (i.e. as a pre-treatment) to thermal treatment.

Since the purpose of this mechanical treatment is to extract metals and SRF (a fuel), it would have the equivalent effect on black bin waste as thermal treatment (i.e. using waste as a fuel) followed by extraction of metals from residues¹. It is noted that waste-to-energy plants can produce higher value metals for recycling than mechanical treatment since impurities (i.e. labels, caps, organic matter) are effectively removed. Therefore, clarification on mechanical treatment requirements is required in Figure 6 to avoid the duplication of effort. Suggested wording is provided in Appendix A.

¹ As set out in the pre-treatment requirements for waste-to-energy plants

Since the residues from the treatment of SRF should not contain any metals unless co-fired with MSW (as metals would be removed through mechanical pre-treatment), there should be no requirement for the mechanical treatment of such residues. It is submitted therefore that "thermal treatment" could be more clearly defined, differentiating "dedicated waste-to-energy plant" from "co-firing" of SRF. Suggested wording is provided in Appendix A and B.

3.1.2 Mechanical Biological Treatment

From Figure 5 it appears that a two-bin system is required anywhere that mechanical and subsequently biological treatment (MBT) is employed. This would be consistent with the Waste Framework Directive, which requires that Member States take "measures to promote high quality recycling" and the EPA² assertion that:

"MBT treatment of municipal waste affords the opportunity to recover materials (e.g. wood, metals), however, due to soiling and contamination with a one-bin system there are few reuse/recycle opportunities".

As further noted by Juniper³ some recovered materials from MBT facilities have to be landfilled due to the level of contamination. Prioritising source separation by requiring a two-bin system in combination with any form of mechanical biological or thermal treatment effectively ensures that high quality recycling is facilitated.

CEWEP Ireland supports this approach, since it prioritises source separation and recognises that both thermal treatment and MBT are designed to treat residual waste only to recover energy and achieve stabilisation of materials going to landfill.

Further clarification may be required for areas that lack a two-bin collection system. It is submitted that in such regions, waste should be baled for storage as outlined below or treated directly in MBT or thermal treatment facilities where possible. Suggested wording is provided in Appendix A.

It is also noted that since a third bin for the diversion of mixed organics is not obligatory, it would be important to ensure that diversion of this material remains a higher priority than the treatment of mixed BMW. The recently issued Circular WPPR 17/08 seeks to accelerate the roll-out of the 'brown bin' source-segregated collection systems for organic waste. Synergies between this circular and the EPA Technical Guidance Document should be assessed.

3.1.3 Energy recovery

As outlined in the Guidance Document, the primary intent of waste acceptance and pre-treatment conditions is, amongst other things:

"the promotion of waste pre-treatment to ensure extraction from the waste disposal stream of recyclable/recoverable resources, including energy."

An emphasis on energy recovery is of strategic importance to Ireland, which currently imports around 87% of its energy requirements. This makes Ireland vulnerable to rising energy prices and supply line issues. For these reasons, Irish waste and energy policy recognises the need to optimise energy recovery from local and renewable energy resources.

² EPA, *Hitting the Targets for Biodegradable Municipal Waste: Ten Options for Change*, 2008, available at <http://www.epa.ie>

³ Juniper, *Mechanical Biological Treatment: A Guide for Decision Makers – Processes, Policies, Markets*, 2005, available at <http://www.juniper.co.uk>

Specifically, the *Bioenergy Action Plan* emphasises the importance of energy recovery over the landfill of residues, by referring to the *National Strategy on Biodegradable Waste* intent to:

"... maximise the recovery of useful materials and energy from residual waste, and accordingly suggests thermal treatment with energy recovery as the preferred option followed by mechanical biological treatment with energy recovery and with mechanical biological treatment of fully stabilised residue to landfill as a last resort".

The importance of energy recovery is also acknowledged by MBT experts Juniper, who state that the role of combined heat and power production and energy production from MBT derived fuels *"can be far more beneficial in climate change terms than the MBT-to-land or MBT-to-landfill systems that are favoured by many environmentalists"*.

The pre-treatment obligations outlined in Figure 6 support this policy, by requiring the recovery of a Solid Recovered Fuel (SRF) from mechanical pre-treatment. According to Juniper⁴, pre-treatment facilities producing SRF are typically of the bio-drying nature where the bulk of treated residual waste is passed in the SRF product.

This seems to imply that MBT facilities should be configured as biodrying plants for the production of SRF in "urban" areas (see Section 3.1.4) as a pre-treatment to landfill. Outside these areas, configurations of MBT with either biodrying (for SRF production) or biostabilization / CLO / digestate production (i.e. with the majority of stabilized residues going to landfill) would be accepted as pre-treatment options.

CEWEP Ireland supports this approach in principle since it encourages energy recovery in line with waste and energy policy. However, the requirement for energy recovery does not extend to all areas. Given the importance of energy recovery as reflected in policy, this could represent an important wasted opportunity.

CEWEP Ireland understands that in some of the more remote regions (see Section 3.1.4), it may not be financially viable to develop thermal treatment opportunities for such residue. However, acknowledging the rising price of fuel and considering that refuse derived fuel (RDF) from an existing MBT facility in Ireland is currently shipped to Scandinavia for energy recovery, it is likely that energy recovery will be a viable and indeed valuable option in many areas.

Energy recovery should therefore be encouraged insofar as practicable, with the requirement being assessed on a site/regional basis, factoring in for example viable transport distances to energy recovery facilities and the overall energy balance of such exercises. Suggested wording and clarification is provided in Appendix A and B.

Clarification may also be required in Figure 6 regarding SRF, since its inclusion as a "required material recovery" does not guarantee that it will be subsequently sent for energy recovery. Suggested wording is provided in Appendix A.

Finally, it is noted that biodrying is effectively a mechanical and biological process, and that the separation of mechanical and biological functions as per Figure 5 could be confusing. An alternative schematic for this process is suggested in Appendix B.

3.1.4 Urban / Rural Divide

As noted above, allocation of minimum and maximum pre-treatment conditions in the Guidance Document is based on the difference between urban and rural areas, with more stringent requirements for urban areas. In the recently issued Circular WPPR

⁴ Juniper, *The Challenge Ahead: Finding Outlets for MBT Outputs in Ireland*, Commissioned by CEWEP Ireland, 2008

17/08, "urban" is defined as "agglomerations of greater than 1,500 persons" which should capture 61% of the population in Ireland according to the Census of Population 2006 report.

However, waste collection routes and waste pre-treatment facilities (i.e. with capacities of over 100,000 tpa) are generally designed to cater for both rural and urban areas, to achieve economies of scale and in line with Regional Waste Management Plans. Furthermore, some energy recovery facilities (such as the Meath waste-to-energy plant and Ireland's numerous cement kilns) are already located in rural areas. Where energy recovery is only sought for urban areas, therefore, important opportunities could be missed.

It is submitted that the differentiation between urban and rural areas should be dropped, but that the appropriate level of pre-treatment (beyond the minimum conditions) should be based on a site/region specific assessment. Suggested wording for Figure 6 is provided in Appendix A.

4.2 Impacts and Enforcement

4.2.1 Impacts

The impact of the proposed pre-treatment conditions, if applied from 16th July 2009, would be significant. It is widely recognised⁵ that Ireland has not yet developed the necessary waste infrastructure for the diversion of waste away from landfill in line with Landfill Directive targets. If the ban is implemented in 2009 on untreated waste from going to landfill, there will be few options for the pre-treatment since:

- it is understood there are few large scale MBT facilities well advanced in the planning system, and any projects may take up to 5 years to develop from conceptual to operational stage
- operating standards and a definition of stabilisation (as proposed in the Guidance Document) have not been finalised and markets have not yet been established for MBT residues.
- the earliest anticipated operating date for any of the proposed waste-to-energy facilities is January 2011 (Meath waste-to-energy plant)

Therefore, it is likely that the only option following the implementation and enforcement of the conditions would be the storage of waste until such time as alternative treatment capacity comes online. It is unlikely that the export of untreated waste from Ireland would be acceptable to receiving Member States.

Any relaxation or delays to the pre-treatment conditions (i.e. to wait until capacity comes online) would only increase regulatory risk into the waste market and could have unintended impacts. Therefore, although storage may seem an unattractive option, it could also be the only option in the short term if Ireland is to meet its Landfill Directive targets.

Waste storage has been practiced in other Member States in response to landfill bans. When a comprehensive ban was introduced in Germany in 2005, there was also a lack of treatment capacity. This is because the ban was announced 12 years before it was implemented, and in the meantime landfill operators sought to fill capacity as quickly as possible. As a result, landfill gate fees dropped, causing thermal treatment to become unviable and deterring investors from developing alternative capacity. When the ban was finally implemented, a considerable amount

⁵ In numerous reports by Forfas, the EPA, the DoEHLG, ESRI, the Comptroller and Auditor General and others

of waste was either exported to neighbouring countries for energy recovery or temporarily stored (up to 2 million tonnes waste) for thermal treatment at a later date. Some of this waste was stored for as long as three years until the necessary treatment capacity was found. The waste sector has now recovered in Germany and most of the waste is treated within the country in an environmentally sound way. These experiences are outlined in detail in Appendix C.

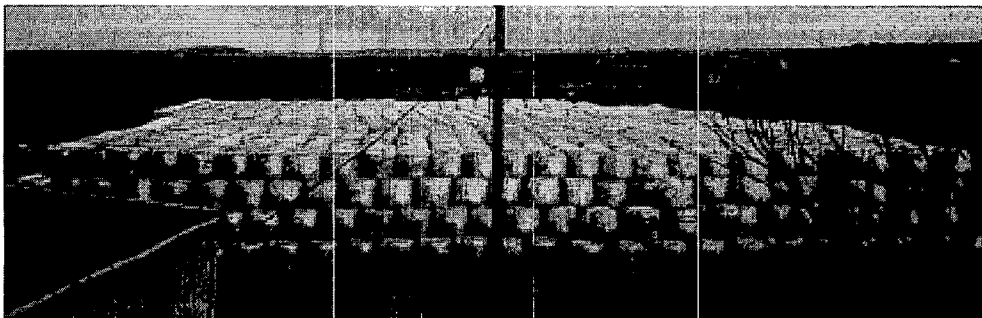
This demonstrates that a landfill ban can be rigorously applied even where there is a lack of alternative treatment capacity, provided that waste storage can fill the gap. It also demonstrates the importance of short lead-in times and enforcement to avoid the wrong signals being sent to the waste market (i.e. a driver to fill landfill capacity as quickly as possible).

Although one of CEWEP Ireland's long term goals is to achieve a ban on combustible waste going to landfill, to date the organisation has primarily advocated an increase in landfill levy as the most effective means of providing this market confidence. This is because systematic increases to the levy can provide confidence in the long term financial viability of alternatives while avoiding any immediate disruption in the waste market. However, implementing the pre-treatment conditions would also increase the cost of landfill and may therefore have the same impact as a levy.

4.2.2 Options

As noted above, it is likely that waste storage will be the most viable option for meeting the Landfill Directive targets (and EPA pre-treatment conditions) in Ireland. Baling waste is common practice throughout Europe. In Denmark, waste is baled for storage over a period of up to 8 years. It is noted that both Germany and Denmark, where waste storage is practiced, have met their long term Landfill Directive targets and are widely referred to as leaders of waste management in Europe. To ensure that baling of waste does not become in essence another form of landfill, a time limit is recommended. For example, in Sweden a time limit of three years is set for storage of the baled waste, it must come out of storage at the end of this period or else the material is deemed to have been landfilled.

An example of waste storage is provided in Figure C below.



SOURCE: Flexus Balasystem AB

Figure C: Baled waste stored in a landfill

The waste is baled and wrapped in plastic to reduce odour, delay decomposition and facilitate recovery for pre-treatment at a later date. Reference case studies provided for example on the website www.bala.se indicate that odour is not a problem from stored waste even under high temperatures.

Since there is already excess landfill capacity in Ireland⁶, there would be ample capacity available for the storage of baled waste until such time as the required pre-treatment capacity is developed. The effective cost of storage may be high due to the added cost of baling, wrapping and handling. However, this increased cost would provide the necessary financial driver, not unlike an increased landfill levy, to make alternatives to landfill more viable. CEWEP Ireland therefore supports in principle the immediate and effective implementation of the pre-treatment conditions.

4.2.3 Enforcement

Clear and effective enforcement of the proposed pre-treatment conditions will be critical in order to ensure the obligations are met and to provide market certainty. As noted, any loopholes, delays or lax enforcement could distort the market and deter investors in alternative capacity.

Enforcement would involve:

1. Measurement of extent of pre-treatment e.g. evaluating the quantity of waste going to each landfill as per the AERs⁷ and comparing this with the extent of pre-treatment required in line with the Landfill Directive (i.e. 50% by 2010)
2. Validation of treatment effort (i.e. ensuring that waste is stabilised in line with the definition provided for stabilised biowaste)

These are discussed in more detail below.

1. Extent of Pre-treatment

It is understood that the extent of the pre-treatment obligations are based on current national waste growth trends. The forecast "gap" to the targets, based on waste growth and composition (compared with 1995 waste sent to landfill) has been used to determine the level of pre-treatment required nationally. To close the gap to target:

- by 1st January 2010, 50% of all BMW accepted landfills will have to be pre-treated
- by 1st January 2013, 70% of all BMW accepted landfills will have to be pre-treated
- by 1st January 2016, 90% of all BMW accepted landfills will have to be pre-treated

According to the Guidance Note, this national target is to be shared between all landfills (or companies) handling MSW. CEWEP Ireland supports this approach since it does not rely on historical landfill operation (i.e. whether or not a landfill was open in 1995), or on setting local or regional targets (which can be extremely complicated as seen in the UK), but places the responsibility of meeting the targets on individual landfill operators. This will be more effective and easier to monitor through existing reporting systems.

It may be necessary to consider specifying a cap on the tonnage of untreated waste acceptable at a facility, rather than just giving the fraction of waste that must be pre-treated. This would ensure that any gap between forecast waste arising and the total licensed capacity is not filled and that as a consequence, Landfill Directive targets are not inadvertently exceeded. It would effectively prevent landfill operators from attempting to fill void before more stringent pre-treatment levels are applied.

⁶ CEWEP, *Ireland's Reliance on Landfill: CEWEP Briefing Paper*, 2008, available at <http://www.cewepireland.com>

⁷ Annual Environmental Reports

2. Validation of treatment effort

The standard suggested for stabilized biowaste is in line with the criteria suggested in the (sidelined) 2nd Draft of the EU Biowaste Directive including:

- a respirometric activity after 4 days (AT₄) of <10mg O₂/kg dry matter (DM), or
- a dynamic respiration index (DRI) of <1g O₂/kg volatile solids per hour

It is noted that standards in Germany and Austria, often referred to as leading countries in MBT development, are more demanding than this, requiring a respirometric activity after 4 days (AT₄) of <5mgO₂/kg DM (Germany) and <7mg O₂/kg DM (Austria). These are designed to ensure an improvement of the landfill behaviour regarding landfill gas and leachate of more than 90%⁸. The estimated treatment time to meet these various targets is indicated in Table 1 below.

Table 1: Treatment time to meet stabilization targets^{9,10}

	Respiration activity < 5mg O ₂ /kg DM	Respiration activity < 10mg O ₂ /kg DM
Composting	8 – 16 weeks	5 – 8 weeks
AD + composting	2 – 3 weeks AD 4 – 10 weeks composting	2 – 3 weeks AD 2 – 5 weeks composting

Clearly, the biostabilisation standard applied significantly impacts on the economic viability of MBT facilities (which is linked to retention times). However, since these standards also determine the ultimate environmental impact of stabilized residue in landfill and the overall carbon balance of MBT, it would be important to:

- monitor the effectiveness of the test methods for determining this standard, and
- monitor the overall impact of residues stabilized to this level when sent to landfill

on an ongoing basis. This would be aimed at ensuring that the proposed level of stabilization (which is lower than that applied in Germany and Austria) is adequate, and can achieve the Landfill Directive as well as wider environmental goals.

5.0 Pre-treatment for Waste-to-Energy

CEWEP Ireland supports the source separation of valuable materials for recycling, followed by thermal treatment of residuals and therefore welcomes the pre-treatment requirements for waste-to-energy facilities. As noted above, CEWEP Ireland also supports the requirement for a two-bin system to be in place for all residual waste treatment technologies, including both mechanical and biological treatment of mixed "black bin" waste and thermal treatment. This is consistent with the requirement to recover clean and high value recyclable materials.

The Guidance Document states that:

⁸ Muller, W., *Capability of MBT to Meet Treatment Targets in Different EC States*, Proceedings from the International Symposium MBT 2007, Wasteconsult International, 2007.

⁹ An estimate for achieving a DRI of <1g O₂/kg volatile solids per hour is not given in the reference document

¹⁰ Muller, W., *Capability of MBT to Meet Treatment Targets in Different EC States*, Proceedings from the International Symposium MBT 2007, Wasteconsult International, 2007.

“Pre-incineration biological treatment of residual waste is not mandatory and would be decided on a case-by-case basis having regard to the environmental and economic efficiency of the proposal.”

Given the lack of certainty about the environmental impacts, greenhouse and energy balances of MBT facilities, which depend heavily on plant configuration¹¹, this condition would appear reasonable and supports the EPA's previous concern¹² that:

“If most of the outputs of MBT are incinerated (e.g. stabilized biowaste and refuse derived fuel) is the preliminary treatment by MBT superfluous and does it add unnecessary costs to the price of waste services?”

CEWEP Ireland further submits that any requirement for pre-incineration biological treatment should also have regard to Regional Waste Management Plans, which set out preferred treatment technologies and future capacity requirements. This will ensure that any such obligations are in line with the region's integrated waste management solution.

6.0 Conclusion

CEWEP Ireland welcomes the Guidance Document as an important instrument for achieving Ireland's Landfill Directive targets. This submission outlines a number of areas where the Document could be amended for clarity.

Firstly, Figure 6 should be amended to avoid any suggestion that mechanical treatment should take place prior to thermal treatment, since it is already included as a treatment condition for thermal treatment residue. The different types of thermal treatment should also be clarified to avoid confusion over the mechanical treatment of residues. On the other hand, the separation of mechanical and biological functions should be avoided since this can lead to confusion.

It is submitted that energy recovery should be encouraged insofar as practicable for all MBT residue, regardless of location, in line with energy policy. Furthermore, the differentiation between urban and rural areas should be dropped, and the appropriate level of pre-treatment (beyond the minimum conditions) should be based on a site/region specific assessment instead.

Care must be taken to ensure that the wording of Figure 6 ensures that SRF is sent for energy recovery and not to landfill. Clarification is also required on the procedure for areas that lack a two-bin collection system.

To avoid landfill operators seeking to fill landfill void prior to the rigorous implementation of the pre-treatment conditions, it may be necessary to apply a cap on the tonnage of untreated waste acceptable at a landfill facility. Lessons from Germany also imply that the conditions should be applied to immediate effect to minimise any lead-in time.

Finally, it is submitted that although the ban will have a significant impact on the waste sector, there is a simple solution to the short term pre-treatment capacity deficit. The storage of waste, widely practiced in other Member States, will facilitate diversion from landfill while alternative capacity is being developed. CEWEP Ireland submits that this is a necessary and viable option to ensure that Ireland meets the imminent Landfill Directive targets.

¹¹ See CEWEP Submission to the RIA Waste Facilities Levy, available at <http://www.cewepireland.com>

¹² EPA, *Hitting the Targets for Biodegradable Municipal Waste: Ten Options for Change*, 2008, available at <http://www.epa.ie>

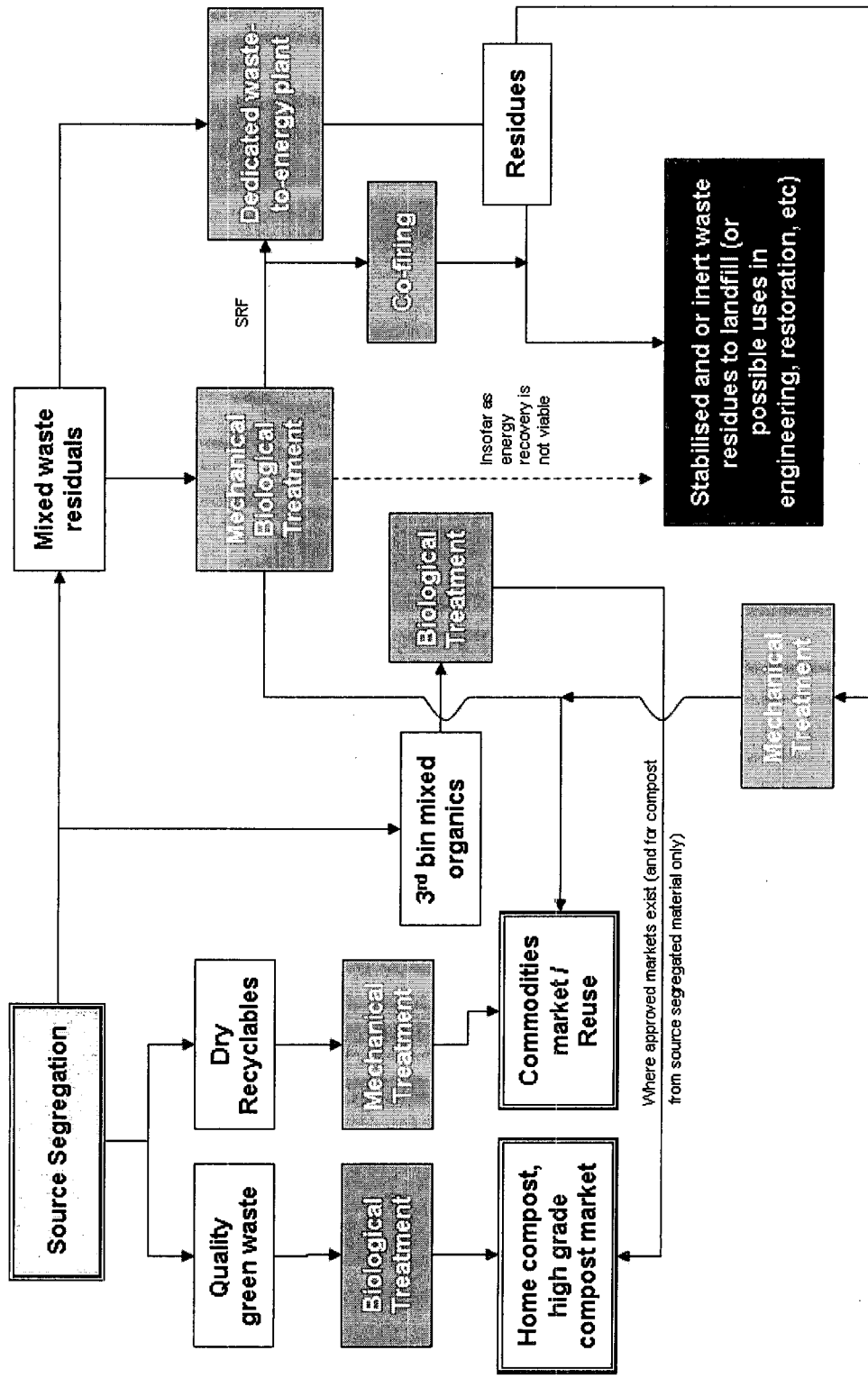
Principal Disposal Route	Minimum Pre-Treatment Required	Required Material / Energy Recovery	Date
Landfill	1. 2 bin collection system ¹	Dry Recyclables	16-7-09 for a landfill existing on 16-7-2001
	2. Mechanical treatment of black bin ² except for waste treated in dedicated WtE plant (see below).	Metals SRF ³ for energy recovery	16-7-2001 for all other landfills (including major extensions)
	3a. Diversion of biowaste from disposal stream, and/or 3b. Treatment of the biological element of 'black bin' pre landfilling	Biodegradables Energy insofar as practicable	2010, 2013 & 2016 for all landfills accepting MSW to the extent necessary to achieve the diversion obligations. Viz, - by 1 st January 2010 a minimum of 50% of all BMW accepted at the facility shall be biologically treated (including diversion) - by 1 st January 2013 a minimum of 70% of all BMW accepted at the facility shall be biologically pre-treated (including diversion) - by 1 st January 2016 a minimum of 90% of all BMW accepted at the facility shall be biologically pre-treated (including diversion)
Dedicated Waste-to-energy facility	1. 2 Bin collection system	Dry Recyclables	Prior to commencement of any MSW waste-to-energy plant
	2. Mechanical treatment of bottom ash from waste-to-energy plants	Metals Other marketable recyclables	

Note 1: Where no two-bin system is in place, waste should be subject to pre-treatment as per 3b (e.g. on condition that a two-bin system is to be implemented in the future)

Note 2: The requirement for this level of pre-treatment will depend on a site/region specific assessment.

Note 3: Solid Recovered Fuel whereby this is produced as the main output from facility

Appendix B: Suggested Modifications to Figure 5



Appendix C: Experience of the Landfill Ban in Germany

Firing on all Cylinders

Responding to a Lack of a Waste Treatment Capacity in Germany

Kyra Dreher

Solid waste requires pre-treatment. This has been the position in Germany since 1993, when the TAsi regulations on municipal solid waste (MSW) came into effect. Straight disposal, e.g. into landfill, is no longer an option. The law itself provided a long transition period of 12 years. This period ended on the 31 May 2005.

On 1 June 2005, the German waste-to-energy (WtE) industry found itself in a complex position. It had the potential for handling large quantities of diverted waste, but fulfilling this potential was not a straight-forward task. In addition to a lack of treatment capacity, accurate data on waste quantities were not always available.

Lack of clarity

Prior to the landfill ban, it was impossible to state with accuracy how much industrial waste was on the market. (Industrial MSW is similar to household waste, but originates from a different source. Often it contains more plastics than household waste and so has a higher calorific value.) Estimates ranged from 3-7 million tonnes per year. Furthermore, the amount being co-incinerated was significantly less than official figures. This was due to several factors:

- Waste prepared for co-incineration exhibits varying characteristics and many power plants and cement kilns are reluctant to use MSW as a fuel due to problems such as corrosion.
- Co-incineration is not only authorised to treat MSW but also waste from other sources
- The infrastructure needed for waste co-incineration was not complete by 1 June 2005

Interim Disposal

In response to a lack of treatment capacity, 'interim storage sites' were considered with increasing frequency as the 1 June deadline approached.

The current position on interim waste storage in Germany is as follows: whereas waste for disposal can not be interim stored for more than 1 year, waste for recovery can be interim stored for up to 3 years.

Today nobody really knows the exact number of such interim storage sites or the total amount of waste lying there. The official figure at the end of 2005 was 22 interim storage sites. But, presumably there are many more sites owned by waste delivery companies. The current best estimate for the total amount of waste stored in interim sites in Germany is approximately 1.5 million tonnes (spring 2006). Most single sites do not contain more than 20,000 tonnes, though there are a few very large sites with capacities of more than 100,000 tonnes.

According to calculations by market researcher Prognos, German Waste to Energy plants will require at least an additional 2 million tonnes of treatment capacity in 2006 (the early deconstruction of interim landfill sites would require even more treatment capacity). Prognos

also estimates that the total capacity/volume of interim storage sites (effectively interim landfill sites) will increase to 16 million tonnes over the coming years and that it will take until 2020 to retrieve all the temporarily stored waste.

ITAD's view on the conditions for the interim storage of waste

In spring 2005, ITAD (the Confederation of all German Waste to Energy Plants) asked for strict conditions for the interim storage of waste:

1. It must be guaranteed that the stored waste will in fact finally be treated properly, so that the interim storage solution does not turn into a final landfill.
2. The precise disposal route must be clear before the waste is authorized to be interim stored.
3. The actual disposal / treatment must to be proved by a contract that includes a delivery commitment to a specific plant.
4. If such a contract cannot be proved, then security (bail) must be provided with a public agency. The rate for this security must include the costs for transport, pre-treatment and treatment.

Furthermore, it is necessary to control the final treatment of waste after its interim storage has been authorized. Only with effective control can further capital investments be initiated.

Examining short term solutions

WtE plants currently shoulder the treatment of nearly two thirds of all MSW in Germany; however, there is insufficient capacity to handle industrial waste being diverted from landfill. This represents the most pressing issue in treatment capacity. For some WtE plants the amount of industrial waste being received has quintupled. How can this situation be mitigated?

Lowering the calorific value?

A waste-to-energy plant is designed with a specific treatment capacity and calorific value in mind. Since the landfill ban WtE plants have needed to treat more waste - in particular more industrial waste. This raises the calorific value as mentioned earlier. In these circumstances total treatment capacity could be expanded by lowering the average calorific value of the waste. However, this approach has two negative side effects:

- There would be insufficient capacity to treat the diverted high calorific waste fractions
- The high calorific waste fractions contain relatively high chlorine. Secondary recovered fuel containing high chlorine is hard to sell on the waste market.

Therefore, this option should not be considered.

Shipping the waste abroad?

It has been suggested that the present tense situation on the waste market could be solved in part by simply exporting parts of industrial waste. This is not a reasonable proposal for various reasons:

- the waste would be exported to facilities mostly to the east of Germany to countries with predominantly lower environmental standards.
- it would be hard to control how much waste is actually exported and where it is treated.

- once abroad, it is unlikely that the waste would ever come back into its country of origin. This would not only be against the proximity principle, it would also undermine the effective operation (at expanded capacity) of WtE plants in Germany.

Mid-term solutions

Better ways to solve the present capacity problem include the following:

- improve the sorting of waste fractions,
- enhance separation to boost material recycling
- expand thermal treatment capacity.

It is possible to construct new WtE-capacity in a relatively short period of time (circa 2 years) by extending the size of existing plants. This strategy would cover most of the MSW and industrial waste generated in Germany each year, leading to a thermal treatment capacity of approximately 20.5 million tonnes by the end of 2009.

Political will and the need for investment

German politicians and public authorities have already become aware of the considerable contribution of WtE to climate protection. Accordingly the fact that WtE does recover energy should politically gain in importance.

Clear acceptance of WtE as an appropriate technology for energy recovery and its legal anchorage in the European Waste Framework Directive would initiate the needed impulse for further investment in this sector. Investment risk would be further minimized by extending existing plant capacity. This approach would also attract less controversy in terms of political and public support when it comes to authorizations.

The EC's proposal to define energy recovery in the new Waste Framework Directive is in principle a move in the right direction, though the threshold set for energy recovery operations of 60% is too ambitious and cannot be reached by many plants. Financial incentives are needed to support increased investment in WtE plants and improve their energy efficiency.

Conclusion

Almost one year after the landfill ban in Germany and before the revised Waste Framework Directive is implemented, it can be summarised that:

- Germany's waste treatment system is not facing collapse
- Most of the waste generated in Germany is treated within the country in an environmentally-sound way
- An improved legal framework, legal certainty and security for further investments are needed to overcome the remaining obstacles.

Kyra Dreher, Managing Director
ITAD, The Confederation of German Waste to Energy Plants, Germany