DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING

POSITION PAPER ON ORGANIC WASTE MANAGEMENT

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CONTENT

1. INTRODUCTION

This position paper presents a motivation for the setting of diversion targets for organic waste from waste disposal facilities (WDFs) in the Western Cape, and the reviewing of regulatory requirements that may act as an obstacle to waste management and diversion practices. Support is given to technological and minimisation methods which include beneficiation endeavours, collaboration where appropriate, the streamlining and regionalisation of the management of organic waste in the province, and the expansion of the role of the Department of Environmental Affairs and Development Planning (DEA&DP) towards one that is more enabling and supportive.

2. BACKGROUND

Organic waste generally refers to garden waste, food waste (including animal carcasses from the abattoir industry), wood waste (including offcuts from sawmills), biomass from alien clearing programmes, kelp, and biodegradable waste from agriculture. Sludge from Wastewater Treatment Works (WWTW) is generally also included (although its high metal content is problematic for certain beneficiation methods such as composting). Paper pulp residue is another organic waste stream that can be included.

Organic waste is recognised as a problematic waste stream nationally and in the Western Cape. For instance, in the National Organic Waste Composting Strategy: Final Status Quo Report (Department of Environmental Affairs, 2012) it was estimated that 20 793 600 tonnes of organic waste were produced in South Africa in 2011. This equates to about 40% of the total General Waste generated in South Africa (the total being approximately 49 995 029 tonnes). "Consider[ing] that approximately 13% of general waste generated in South Africa is municipal organic waste (Department of Environmental Affairs, 2012), collected predominantly by municipalities, and an additional 61% industrial and agricultural biomass waste, it is surprising that biological treatment (e.g., composting, anaerobic digestion) is not utilised more extensively in South Africa" (Department of Science and Technology, 2014). Furthermore, the World Bank estimates that globally the organic fraction of Municipal Solid Waste is 46% by mass (2009).

In the Western Cape at least 37% of the waste generated is organic waste. Furthermore, the GreenCape Western Cape Waste-to-Energy Position Paper (2014) indicates that there are potentially 2 992 641 tonnes of organic waste available per year in the Western Cape.

3. NEGATIVE IMPACTS OF LANDFILLING

Landfilling continues to be the main 'default' method of managing organic waste in the Western Cape. At the current rates of disposal to WDFs, organic waste causes a variety of significant negative financial, social, and environmental impacts. For instance, the high volume of organic waste occupies increasingly scarce landfill airspace, and it produces leachate which requires expensive containment barriers to mitigate against surface and groundwater contamination (diverting funds that could be used for other needed infrastructure, and social projects and programmes). It results in high logistics costs, particularly because the health risks, including odour and vectors, require frequent trips for collection and disposal. It is a significant contributor to greenhouse gases resulting from the production of methane gas during the decomposition process[1]. The fact that many existing WDFs in the Western Cape do not meet regulated operational requirements exacerbates the negative environmental impacts.

4. BENEFITS OF DIVERSION

Given the high proportion of organics in the waste stream, the diversion of organics from WDFs, and therefore the reduction in volumes being disposed of at WDFs, would significantly extend the lifespan of existing and future WDFs. Financial savings would also be made through the possibility of downscaling the design of containment barriers (without organic waste there would be reduced leachate, therefore reduced risk of contaminants and organic compounds polluting surface and groundwater). The resulting reduction in methane generation would assist with meeting South Africa's national greenhouse gas reduction targets and obligations. In addition, converting organic waste into beneficial products could, among other benefits, contribute to the Green Economy by promoting industry and job creation. An example is Reliance Compost, which employs almost 200 people and has helped establish six new independent businesses at CCT drop-offs. Organic waste can be processed to produce beneficial soil amendments (such as composts and biochar as an alternative to chemical fertilizers) and for the bioremediation of contaminated soils. This would improve soil profiles, reducing erosion and reducing water use for growing crops, thereby positively contributing to agriculture and food security. Certain recovery technologies provide alternative options that also allow for the generation of electricity, production of heat for industrial purposes and the generation of other fuels for secondary energy production. The significant reduction in waste disposed of to WDFs would also result in reduced transportation costs for municipalities. Even if green waste is only chipped, volume is already reduced by 35%.

[1] According to the National Organic Waste Composting Strategy: Final Status Quo Report, DEA, 2012, the organic content in waste is the biggest contributor to the generation of methane (CH4) on landfill sites.

Municipalities and communities "realising the potential value in separating organic waste from general waste and the creation of a space to harness the value from the organic waste' will also 'realise the potential in upcycling to a viable economic resource" (DEA&DP, 2015).

5. PROPOSED MECHANISMS TO PROMOTE DIVERSION OF ORGANICS FROM LANDFILL

5.1 It is proposed that aspects of the current and proposed policy, regulatory and legislative framework are reviewed and streamlined to facilitate organic waste management, without compromising the environment. This includes the following:

- Setting targets for organic waste diversion from landfill: The publication of GN. R. No. 636, 23 August 2013: National Norms and Standards for the Disposal of Waste to Landfill focuses specifically on the banning of garden waste, but not organic waste, from landfill.
  These norms and standards for garden waste call for 25% diversion, from baseline, of separated garden waste within the next 5 years, and 50% within next 10 years, from the date of promulgation (i.e., by 2018 and 2023, respectively).

  A total ban on organics to landfill in the Western Cape is proposed. The time for this to take place should, however, be phased to allow for the development of the necessary infrastructure and the time and resources required for the development of appropriate technologies. The following diversion rates and timeframes are proposed:

  - 50% organic waste diversion by 2022
  - 100% organic waste diversion by 2027

- Reducing permitting and other legislative requirements:
  The development of infrastructure and technologies for waste management generally require several costly and time-consuming licences and/or authorisations, which municipalities and smaller industry players often cannot afford. These may include air emissions licences, waste management licences (WMLs) and environmental authorisations. These requirements may be so stringent that they act as barriers to innovation.

  It is suggested that certain thresholds could be raised. For instance, the threshold for the triggering of the listed activities requiring an Environmental Impact Assessment (EIA) in terms of the National Environmental Waste Act, 2007 (NEMWA) for composting facilities could be raised higher, or in some circumstances, where the risk of environmental damage is minimal, the activity could be delisted altogether.

  Although norms and standards may be considered as preferable alternatives to licences and/or authorisation for many waste-related technologies and infrastructure requirements,

extreme care must be taken that these are not unnecessarily onerous so that they act as further barriers to innovation and beneficial diversion options. For example, the Draft National Norms and Standards for Organic Waste Composting (NOWC), GN No. 68 of 2014, which aims to prevent or minimise potential negative impacts on the bio-physical and socio-economic environment during the composting process, demand what are excessive and impractical requirements in many circumstances. The unintended consequences of unnecessarily high and stringent standards are likely to be that the costs of infrastructure required to meet these standards (such as additional liners for composting windrows) will escalate to such a degree that it will be financially unaffordable for smaller industry players and municipalities and will deter efforts for minimisation and diversion from landfill. An example of this is given below.

Composting of more than 10 tonnes a day currently requires a WML. The draft norms and standards are intended to alleviate the need for the WML for such compost facilities, subject to compliance with specific requirements. For example, the required floor surface would need to be a composite liner overlain by concrete. Since trucks and other heavy equipment will drive over the surface, the concrete layer should be at least 200mm in thickness, and a composite liner is a compacted clay liner (CCL) plus a geomembrane. This (draft) requirement will result in a composting facility of 10 or more tonnes per day being unaffordable - for example, a 9 tonne per day composting facility would cost approximately R4 million compared to R24 million for an 11 tonne per day facility (Department of Environmental Affairs and Development Planning, 2016). This significant cost increase is likely to result in owners of composting facilities keeping a facility below the 10-tonne threshold, and therefore losing economies of scale – or not composting organic waste at all, as the 'rule of thumb' for a viable composting facility is 350 tonnes per month[4].

- It is therefore proposed that in certain situations, consideration should be given to delisting activities that would cause minimal or no negative environmental impacts. Together with the various relevant stakeholders, the development of alternative tools such as risk-based norms and standards that maintain realistic environmental standards while promoting beneficial diversion options should be considered. The environmental, social, and economic impacts of the status quo (landfilling of organic waste at present rates) versus those of technologies and methods to achieve diversion, always needs to be evaluated.
- Municipal by-laws should include requirements for organic waste diversion. These municipal requirements could possibly replace environmental authorisations and permits in certain circumstances, thereby reducing duplication in licence applications.
- WML conditions for waste facilities can include timeframes for landfill bans for organic waste.

5.2 Economies of scale, regionalisation, synergies, partnerships, and collaborations (between and among municipalities, government and other agencies, and the private sector) need to be encouraged and supported. This would include collection, transport, funding, and information sharing.

5.3 The planning and development of increased infrastructure for diversion and best practice low-tech and/or innovative technologies should be encouraged and supported:

The vision of the National Development Plan 2030 (2012) for waste management is investment in recycling infrastructure and waste-to-energy projects, amongst others (Department of Environmental Affairs and Development Planning, 2017).

Types of diversion and alternative technologies that may be considered as sustainable options for diverting organics from landfill include value-added industries, composting, mulching, chipping, aerobic and anaerobic digestion, and waste–to-energy. Organics are also generally required to co-mingle with other components of the waste stream for waste-to-energy technologies, for example to provide sufficient liquid content.

Composting techniques range from basic composting such as transforming leaves and grass to humus-rich compost (United States Composting Council, undated) to anaerobic digestion, to high temperature thermal destruction, e.g., incineration. Another use for organic waste is the generation of Biochar which can be made through a simple open fire or through a complex modern bio-refinery through the breaking down of organic material by heat known as pyrolysis (Biochar, 2017). A by-product generated during the production of grape seed oil is a renewable energy product called Eco Fire and braai logs. This is another example of beneficiation of organic material[2]. Other uses for organic materials such as fruit pips of peaches, chipped wood and chipped wood pallets are good for mulch.

Waste to energy (W2E), the conversion of waste to energy for the potential use in households of businesses is another alternative. Thermal treatments such as incineration, pyrolysis and gasification include the use of greens and organics. However, W2E is generally a costly process, often demanding a complex legal process, and needs large volumes (Department of Environmental Affairs and Development Planning, 2015).

Following the principles of the Waste Hierarchy, diversion at source is considered the most desirable option, with products such as composting and mulching generally preferred to converting organic waste to energy. In addition, a Value Pyramid for biomass has been

[2] http://www.ecofireandbraai.com/

developed where added value is the highest at the top of the pyramid and the lowest at the bottom, and on the contrary, the volume of biomass needed for the applications is the lowest at the top and the highest at the bottom of the pyramid (Figure 1).

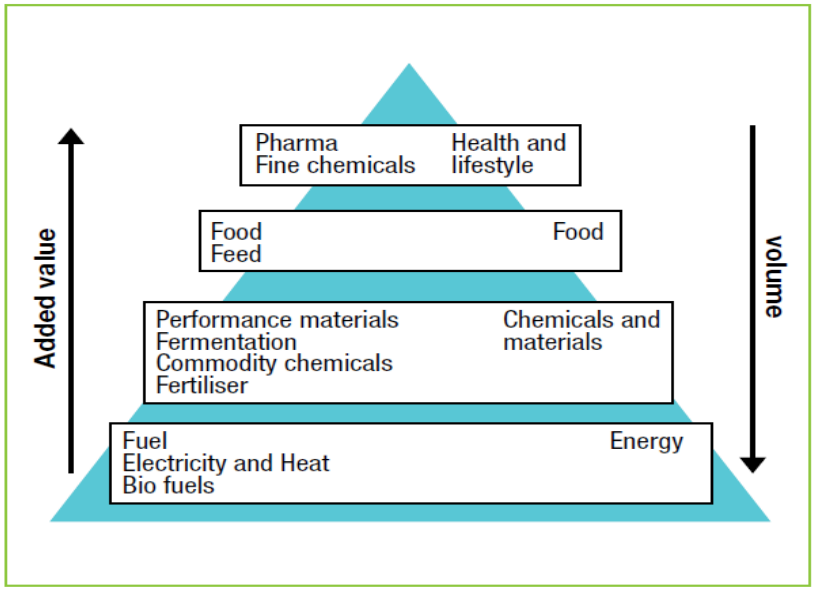

Figure 1: The Value Pyramid (Source: Biobased Economy, undated)

The Value Pyramid indicates that if biomass can be used for the higher value applications, it should ideally not go directly to the lower applications, such as burning for energy recovery.

5.4 The development of guidelines focusing on best practice for the management of various organic waste types e.g., green waste and sewage sludge.

6. ISSUES AND CHALLENGES

6.1 There is insufficient knowledge thus far of the cost to benefit ratio and feasibility of many of the technologies mentioned above.

6.2 Data for organic waste streams is often incomplete and unreliable.

6.3 Legislative and regulatory obstacles have already been mentioned. The Regulations Regarding Fertilizers, 2012 (GN No. R. 731) may also need to be interrogated, as requirements for the composition of compost and other soil conditioners for sale also act as an obstacle for markets. Legislative and regulatory requirements can also conflict with one another, for example, options for the management of abattoir waste according to the Meat Safety Act, 2000 (Act No. 40 of 2000) includes burial through trenching methods, while the Waste Classification and Management Regulations, 2013 (GN No. R.

634) and the National Norms and Standards for the Disposal of Waste to Landfill, 2013 (GN. No. R. 636) prohibit this.

6.4 There is no 'one-size-fits-all' solution. It is vital that solutions are guided by what makes local and economic sense, based on, amongst others, the quantities and types of organic waste generated and available, distances and cost of transport, the local cost of technology solutions, the value of waste streams to local markets, available skills, the local policy environment, and the local climate for business and investment. For example, although regionalisation is offered as a solution, the cost of transport for small quantities over large distances may make this inefficient.

6.5 The organic industry tends to be fragmented, without a strong united body that can lobby for its best interests (for example, lobby against proposed regulatory requirements).

7. CONCLUSION

It is argued that realistic and achievable targets for the diversion of organic waste from landfill should be set. Efforts should be made to reconsider and reduce unnecessary regulatory obstacles and to consider alternative mechanisms such as practical and feasible risk-based norms and standards. Infrastructure and technologies for diversion and beneficiation should be supported. Regionalisation and collaborative approaches should be taken with regards to organic waste minimisation in the Western Cape – particularly considering that organics are often required together with other waste streams for certain technologies – and for economies of scale, while at the same time recognising that in some situations local and small-scale initiatives will be more realistic. The Department should expand its role, with more emphasis being placed on its enabling and supportive role.

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Appendix D