PROSPECTS AND PROBLEMS OF SUSTAINABLE SOLID WASTE MANAGEMENT IN BULGARIA

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Abstract
The problem of solid waste management (SWM) in Bulgaria, which continues to be a legacy of the former Socialist government's disdain for all things environmental, has been deteriorating ever since that country's democratisation despite determined efforts by the Government to alleviate it. This is mainly because while on the one hand the amounts of production, post-consumption and hazardous wastes being generated have been growing relentlessly, on the other available facilities (currently almost exclusively unregulated landfills) and management systems for their safe disposal are woefully meagre. A sense of urgency attaching to this state of affairs is Bulgaria's ambition for accession to the European Union (EU) which is contingent upon, among other things, adopting and implementing EU environmental legislation and convergence to EU environmental norms and standards.

Against this background this paper discusses evolving waste management strategies along with some of the key issues including legislation. It is argued that achievement of even a modest degree of sustainable SWM is contingent upon: (i) instilling genuinely environment-respecting moral values in the young; (ii) raising public awareness; (iii) changing the mind-set of municipalities to think and act regionally rather than locally as at present; (iv) giving greater emphasis to public private partnerships; and (v) developing an effective low-cost alternative to high-cost EU-standard landfill option.

Introduction

Status of SWM in Bulgaria before democratisation

It is no exaggeration to say that Bulgaria's erstwhile Socialist regime was profoundly disdainful of all matters environmental, and SWM was no exception. Emphasis was firmly on industrial development, especially metallurgical, chemical and energy industries, with little thought given to the environmental consequences of such development. Legal norms and requirements for SWM were dispersed in different acts and documents in a piece-meal fashion (1). As for environmental protection, the most important law was the "Law for the Protection of air, Water and Soil from Contamination" that came into force in 1963 (amended 1968, 1975, 1977, 1978, 1991 and 1992) but was seldom strictly applied.

According to the National Statistical Institute of Bulgaria, in the 1980s waste production in the country had increased substantially. In 1981 an industrial waste reporting system was established which, curiously, did not distinguish between industrial and hazardous wastes and gathered information only on the quantities of waste generated and recycled (2). Land disposal of industrial waste was common practice, and there was no procedure in place for waste monitoring or control. Industrial wastes were usually disposed to landfills operated by the enterprises themselves, and most of them did not distinguish between industrial and other types of waste. Even so, huge amounts of industrial waste had also to be disposed to municipal landfills along with domestic and hazardous wastes.

As competent authorities, municipalities were responsible for issuing permits authorizing suitable sites for landfills. Curiously, however, there was no regulatory requirement for their planning, construction or operation. From the beginning of 1951 a fee was levied on municipal waste to cover collection and disposal costs, while the collection of such waste was organised by the municipalities themselves (2).

These facilities cannot, however, be characterised as "landfills" in the true sense of the word, for in reality they have been, and about 90 percent of them still are open, unregulated, unsanitary and mostly illegal "holes in the ground" that do not comply with any norms or standards in terms of their construction or operation. Neither was there any administrative tool, such as permits, for proper SWM.

Haphazard dumping of all kinds of waste into such unsanitary and potentially dangerous facilities continues even today as the preferred, if not the only SWM option. Furthermore, landfills for industrial wastes had been built in the 1970s and 1980s to comply with regulations of that time (2). They do not comply with current and evolving regulations that are more stringent.

In the 1970s SWM began to be taken more seriously in Bulgaria, as evidenced by the five-year plans of the time that instructed both enterprises and local authorities to invest in environmental projects. As a result, during 1975-78 expenditure on environmental protection projects rose faster than national income in real terms. However, the goals of those projects had seldom been realised mainly because of poor management and lack of attention to depreciation of equipment (2).

A brief account of the evolution of SWM in Bulgaria since democratisation

And so it was that in 1990 the government of newly democratised Bulgaria inherited a dismal environmental legacy it was ill-equipped to cope with, due in the main to severe financial constraints and lack of know-how. So, foreign assistance had to be sought mainly for capacity-building in essential skills and for financial support. During that time the non-governmental organisations of Bulgaria did much to unravel the hitherto unspoken and appalling state of SWM in the country.

In the early Nineties productive industries in Bulgaria had been performing well below capacity, and many of the facilities had ceased production altogether, especially in the early to mid-Nineties. However, due to outdated machinery, processes, and poor quality of raw materials used in production, this did not lead to a commensurate reduction in the amounts of waste generated (2).

Even in the Socialist era it was recognised that a significant proportion of waste could be gainfully recycled or reused instead of disposing to unregulated landfills. Indeed, until 1991 a state company had been responsible for all recycling and reuse activities under an ordinance/decree. However, after 1991 it was split into 30 smaller, local companies responsible for collecting waste metals, textiles, paper, plastics and glasses for recycling (2). Even so, separation at source and collection still remained major problems especially for plastics (3). Recently some of the municipalities (notably *Welingrad* and *Vratza*) have undertaken pilot projects for waste separation at source by the house-holders themselves.

In 1992 the Ministry of Environment and Waters (MOEW), Bulgaria, developed a new environmental strategy in collaboration with the World Bank and the US government which prioritised reforms in environmental policies and activities. That strategy was formally adopted in 1994.

The year 1993 was an important milestone, because in that year for the first time in Bulgaria a monitoring system was introduced for hazardous wastes. The purpose was to monitor and report on their collection, toxicity, amount generated, management and treatment. This, together with coming into force in 1997 of the “Reduction of Harmful Impacts of Wastes on the Environment” Act, focused attention on the problems of waste management. And this accelerated the development of necessary legislation. A national database of domestic and construction wastes was also established in 1997.

During 1999-2001 an inventory was prepared within the framework of the project entitled “National Programme for Reducing Risk from Landfills and Old Waste Contamination” to assess the risk posed by 59 large municipal landfills, each serving an area with more than 20,000 inhabitants. The results of this work were used to prepare the “Register of Landfills and Old Waste Contaminations” within the framework of what is called the “National System for Ecological Monitoring” (4).

In Bulgaria collection, transportation and disposal of domestic waste is the sole responsibility of municipalities, and this arrangement has been creating difficulties in the planning of regional facilities (e.g. landfills, and incineration and composting plants) for waste disposal. A major difficulty is that current level of fees and charges do not cover the costs of higher technical standards of collection, transportation and disposal.

Major problems of SWM in Bulgaria today

At present the major problems are these: (a) the NIMBY (Not In My Back Yard) syndrome that is making the location of new facilities for waste treatment, storage or disposal increasingly difficult; (b) lack of up-to-date technical facilities for the safe disposal of hazardous wastes that is making it lucrative for criminal elements to illegally dispose of such wastes; (c) with some exceptions, existing landfills and

disposal facilities do not comply with current legal requirements or technical standards that are more stringent than before. Continued operation of outdated and often unsafe equipment is also a cause for concern; (d) purchase of new equipment for collection, transportation and disposal of wastes requires large short-term investment that is proving difficult to attract; (e) strict enforcement of current higher technical standards will make waste disposal more costly for the enterprises, so forcing them to seek illegal options; (f) due mainly to financial constraints it is becoming increasingly difficult for the smaller enterprises to build their own treatment or pre-treatment facilities; and (g) mounting difficulty in attracting private investment for SWM.

Current SWM trends in Bulgaria
Despite the long list of problems, it is gratifying to report that within a relatively short time Bulgaria has made significant progress in SWM, especially in legislation. The following illustrate the trend well: (a) increase in both expenditure and investment in waste treatment, reuse and disposal as a result of implementing more stringent legislation and higher technical standards; (b) greater use of local equipment for domestic waste disposal; (c) increasing incineration of waste as fuel in the cement industry; (d) increasing use of new equipment, and reconstruction of existing equipment, for waste recycling; (e) implementation of new technologies for waste disposal (e.g. physical and/or chemical treatment, composting); and (f) closure of existing illegal and unsanitary landfills (4).

Current status of SWM in Bulgaria
Ever since democratisation Bulgaria has aspired to join the European Union. Accordingly, where appropriate or necessary, all national legislation and public policies have been, and are being driven by the need to converge to those of the EU as far as possible prior to accession, so that at least a modest degree of sustainability could be achieved within a reasonable time-frame.

Disposal to landfills
However, as in a number of EU member states, there is an obstacle to the pursuit of sustainable SWM. It is this: disposal to landfills is and has been by far the commonest and traditional method of solid waste disposal in Bulgaria (5). According to a reliable estimate by the Regional Inspectorate of Environment and Water (RIOEW), at present there are 2439 landfills for domestic waste, 46 for construction waste, 86 for industrial waste, and 40 for hazardous waste. Only 121 of the landfills for domestic waste are controlled, and of these a meagre 22 are in convergence with the normative requirements, or can become compliant soon (5). All kinds of waste — domestic (municipal), Industrial, construction and hazardous — are disposed to landfills. It is estimated that in 2000 in Bulgaria 2884.8 kt of domestic waste, 1577.8 kt of industrial waste, and 478 kt of hazardous waste had been disposed to landfills (5).

On the other hand, according to the EU hierarchy of SWM options, given in Directive 75/442/EEC and listed below, landfills are least desirable for waste disposal (6).

- Prevention of waste (most desirable).
- Recycling and reuse of materials.
- Safe disposal of waste by:
  - Combustion as fuel.
  - Incineration without energy recovery.
  - Landfilling (least desirable).

According to this Directive landfills are certainly not a sustainable option like waste prevention (or waste minimisation). And so, Bulgarian policy-makers appear to have taken the pragmatic view that, given the economic realities, it is necessary to continue with the unsustainable landfill option in the medium-term, and at the same time gradually to adapt the national mind-set to the modalities of waste prevention and waste minimisation. In other words, the overall strategy for achieving even a modest degree of sustainability should be one of gradual transition from the landfill option to those of waste prevention and minimisation, recycling and reuse.

Disposal by incineration
Disposal of hazardous waste by incineration is not well developed in Bulgaria, as evidenced by the fact that to date no market-based incineration facility has been built in the country. A considerable part of the hazardous waste generated, mostly liquid waste of high calorific value, is still incinerated by the enterprises themselves, often illegally.

Some of the major problems thwarting the development of waste incineration in Bulgaria are these: (a) inadequate financial resources available for waste incineration; (b) high capital cost of building waste incineration plants; (c) limited success to date in attracting investment for waste incineration; and (d) growing public resistance to the siting of such plants, thanks to the NIMBY syndrome.

Composting
A number of economic and environmental benefits accrue from composting organic waste, the following in particular: (a) composting reduces the amount of waste to be disposed to landfills; (b) disposal of organic waste to unregulated and unauthorised landfills can cause environmental damage that can be costly to repair or mitigate. Composting alleviates this problem; (c) composting can significantly reduce both load on municipal landfills and the quantity of waste to be transported to landfills. The latter cuts waste transportation costs; (d) in some parts of Bulgaria manure with high nutrient content constitutes 70 percent of the total waste generated, and at present it is disposed to landfills. Composting of such waste can increase both value and crop yield of marginal agricultural soils (7).

In Bulgaria, as elsewhere, it is traditional for many of the individual households to compost organic waste on a small-scale for use in horticulture. However, at present there is no significant large-scale operation to produce compost from organic waste commercially.

SWM legislation in Bulgaria
Current and evolving legislation
Driven by the need to converge to EU norms and standards, existing waste legislation that came into force during 1997-2002 transposed almost the entire relevant EU legislation. In Bulgaria waste management is regulated by the "Reduction of Harmful Impacts of Wastes on the Environment" (RHIWE) Act that came into force in 1997 and was last amended in 2000. It established the legal framework for waste regulation and brought Bulgarian legislation to substantial compliance with EU regulation. By fulfilling the requirements of the Act, a national programme of waste management was established during 1998 and 2002 along with necessary regulations and ordinances.

Not surprisingly, waste classification in Bulgaria, stipulated in Order RD 323/1998, is based on EU classification, while documentation and reporting on waste management is regulated by Regulation 10/1998. Along with the Regulation a system was also introduced for regular annual reporting of domestic, construction, industrial and hazardous waste management. Other notable waste regulations currently in force are these: (a) Regulation on the Conditions and Requirements for the Construction and Operation of Municipal Waste Disposal Facilities and Installations (1998); (b) Regulation on the Treatment and Transportation of Industrial and Hazardous Waste (1999); (c) Regulation on the Requirements which Must be Met by Waste Treatment Facilities and Sites (1998); (d) Regulation on the Conditions and Requirements Towards the Construction and Operation of Waste Landfill Sites (1998); and (e) Regulation on the Requirements for Soil Protection when Using Sludge Originating from Waste Water Treatment Plants for the Purposes of Agriculture (2000).

Full convergence to EU legislation is expected to be achieved by improving existing legislation and by issuing new regulations and decrees. The process of transposing EU legislation into Bulgarian legislation will be finalised in 2003. To that end the following are to be issued during 2003 and 2004: (a) a new waste management act; (b) a new waste classification based on the last EU decision on waste classification; (c) revised regulation on construction and operation of landfills; (d) regulation on packaging and packaging waste (transposed Directive 94/62/EC); (e) regulation on PCB/PCT (transposed Directive 96/59/EC); (f) regulation on the treatment of electrical household devices (the EU Directive is not yet ready); and (g) regulation on the requirements for disposal of waste generated by titanium dioxide production (transposed Directives 78/176/EC and 82/883/EC).

At the national level waste is managed under the "National Programme for Waste Management" that is annually updated and approved by the Council of Ministers. This programme identifies the targets, sets priorities, and recommends policies for waste management in line with national priorities. Based on this programme every municipality prepares its own waste management programme for municipal (domestic) waste. As for industrial and hazardous waste, management comes under a separate programme targeted at enterprises or operators that generate 100 kg/day (or 0.1 m^3/day) or more of such waste. A new National Waste Management Programme for 2003-2006 is currently under preparation.

The "Permit System"
A permit system to regulate waste treatment, transport and disposal has been established under existing legislation (8). A major part of the system is concerned with the construction and operation of landfills. The Ministry of Environment and Water (MOEW) is the competent authority for issuing permits for the construction and operation of equipment and installations for the disposal of hazardous waste with capacity of more than 750 kg/hour, as well as for issuing permits for the collection, storage and transportation of industrial and hazardous wastes, if waste treatment activities take place over an area larger than that for which a single Regional Inspectorate of Environment and Water (RIOEW) is the competent authority. The MOEW controls the process of issuing permits and it methodically controls the activities of the RIOEWs in the permitting process, too. The MOEW is also the competent authority for issuing permits for transboundary transportation of wastes and for ensuring that the obligations of the Basle Convention are fulfilled.

Each RIOEW is the competent authority for issuing permits for the collection, storage and transport of industrial and hazardous waste on its own territory, as well as for issuing permits for the construction and operation of waste disposal installations for domestic, industrial and hazardous waste with capacity of less than 750 kg/hour. Each municipality is the competent authority to issue permits for the collection, transport, storage and disposal of domestic and construction waste generated within its jurisdiction, and empowered to allow operators to transport such waste to authorised disposal sites.

The new environmental law, which came into force on 01 January 2003, introduced a new permit system. Called the "Integrated Permit System", it is targeted at enterprises operating under the IPPC Directive. These permits will replace the old permits issued by the MOEW and the RIOEWs.

Shortcomings of the permit system
Major shortcomings are these: (a) sometimes the competent authority may issue a permit without taking necessary measures to protect the environment as required under existing legislation, or without checking the information provided by the enterprise; (b) a permit system is only as good as the inspection regime is robust and incorruptible. It may be too optimistic to presume that all inspection regimes are so, especially in economically underdeveloped or under-performing countries; and (c) in reality a permit gives polluters permission to pollute, and so it is hard to see how a permit system under current arrangements could meaningfully contribute to the achievement of sustainability. The following illustrates this well. Consider the tradable emissions permits in the USA, for which policymakers first determine the total amount of a given pollutant that will be permitted in the environment. It is called the "emissions ceiling" (9). For sustainability, this ceiling (or the standard set for the pollutant) must not be greater than the quantity of the pollutant which the re-generative capacity of natural systems can cope with. If it is, the excess will accumulate over time to cause adverse externalities that may be irreversible (10). Global warming provides a typical example of this. It is happening because nature's Carbon Cycle cannot cope with the huge amounts of CO_2 being emitted to the atmosphere. However, this balance is not considered in calculating the ceiling or in setting environmental standards. Instead, what is normally considered first and foremost is the supply and demand of the product(s) to be manufactured by the polluting facility in question, along with other economic benefits likely to accrue from it.

Prospects of achieving sustainable SWM in Bulgaria
"Ecology" versus "economy"
Arguably, the *laissez-faire* economic system, which is almost universal in its scope today, is primarily to blame for the lack of progress to date towards global environmental sustainability, which, according to the "local to global" paradigm of Agenda 21, cannot be achieved without first achieving local (or national) sustainability. Indeed, the main issue discussed at the World Summit on Sustainable Development (WSSD), held in Johannesburg in 2002, was why in spite of all the efforts and rhetoric the world in 2002 was actually less sustainable than at the time of the Rio Summit of 1992?

The answer lies in the fundamental conflict that exists between the *modus operandi* of this economic system and the core requirements of sustainable development. It is this: the *laissez-faire* economic system works only when there is uninterrupted growth of production and consumption to satisfy humankind's open-ended demand for goods and services, much of it fuelled by avarice, greed and gluttony. Otherwise recession may occur, or even economic collapse. But relentlessly growing production and consumption mean ever greater consumption of energy and raw materials (notwithstanding recycling and reuse), mounting quantities of production and post-consumption wastes to be

disposed of, and the environmental consequences and resource implications of all these (10). On the other hand, achievement of sustainability is contingent upon human societies adopting less consumptive and less polluting life-styles (11). It is hard to see how this fundamental conflict between "ecology" and "economy" could ever be resolved. It is an illusion to think that it could be resolved by enforcing command-and-control policies (10,12). And so the prospects of achieving environmental sustainability within a reasonable time-frame, even in a rich country like Germany, would appear to be bleak (13).

Can Bulgaria afford sustainable SWM?
Bulgaria, like other transition economies and developing nations, appears to be wholeheartedly adopting the rampant consumerism characteristic of the rich, industrialised nations — consumerism that is proving to be the nemesis of sustainable SWM and indeed of sustainable development itself. Whereas the rich nations have the financial, technical and skilled manpower resources to cope with some of the environmental consequences of such polluting and consumptive life-styles, economically poor nations like Bulgaria do not. Furthermore, thanks to the multinationals, the rich countries have been relocating their dirty production facilities in poor countries whose environments are being further degraded as a result (10,14).

It is also a fact of environmental economics that for any production facility or installation the marginal abatement cost (MAC) of pollution reduction rises, sometimes exponentially, as emission standards become more and more stringent (9). Given the above and the state of Bulgarian economy, it is hard to see how the country could afford EU standards for its landfills. Yet, it is legislating for those standards. What is really needed, certainly for the short- and medium-term, is a low-cost alternative to high-cost landfills of EU standard (7).

The above, and what we have said elsewhere in this paper, does not augur well for achieving even a modest degree of sustainable SWM in Bulgaria within a reasonable time-frame.

Key pre-requisites of sustainable SWM in Bulgaria
Based on experience and observation, the following are advanced as key pre-requisites for achieving even a modest degree of sustainable SWM in Bulgaria: (a) instilling genuinely environment-respecting moral values in the young through formal school curricula at all levels aiming at waste minimisation and prudent use of resources (15); (b) raising public awareness of the need to reduce the amount of waste generated in the interests of both intergenerational and intragenerational equity; (c) persuading municipalities to think regionally with regard to waste management, rather than locally as at present focusing exclusively on their respective jurisdictions (7); (d) giving greater emphasis to effective public private partnerships (PPP) than hitherto; and (e) developing an effective low-cost alternative to the high-cost and high EU-standard landfill option for the short- and medium-term (7).

Concluding remarks
Bulgaria, along with more than 178 other nations that adopted Rio's Agenda 21 which was strongly reaffirmed at the World Summit on Sustainable Development held in Johannesburg in 2002, needs to play its full part in global sustainable development following the "local to global" paradigm set out in Agenda 21. And sustainable waste management is an important and integral part of that exercise.

However, as we have pointed out, a host of problems stand in the way of Bulgaria's progress towards sustainable SWM. Due to the pervasive global culture of ever greater production and consumption of goods and services, the amount of waste generated is increasing relentlessly while the resources and facilities available for safe waste disposal remain woefully meagre. Of necessity, therefore, Bulgaria has no choice other than to persist with the unsustainable landfill option at least for both short and medium terms, and we have suggested ways in which this option could be made more effective and efficient. This bleak scenario is not unique to Bulgaria. It is all too common to all poor countries as well as many of the rich, developed countries of the world.

The fundamental problem seems to be unrelenting rise in production and consumption of goods and services to satisfy society's open-ended demands, much of it fuelled by greed, avarice and gluttony, and it is hard to see how Bulgaria, or any other country for that matter, could ever achieve even a modest degree of sustainable SWM or sustainable development without meaningfully reducing production and consumption. Demonstrably the problem stems from the pervasive exploitative attitude to nature and the environment that is quintessentially Western. And so, if we are at all serious about achieving even a modest degree of sustainable SWM in Bulgaria, or anywhere else for that matter,

this grossly exploitative attitude must change to one of *genuine* respect for the natural environment whose bountiful benediction makes life on earth possible. Education in moral philosophy is needed for this. It is hard to see how science or technology, however clever, could be helpful in this matter.

In order to utilise limited resources with greatest efficiency, we suggest that genuinely environment-respecting moral education should be focused on the young as an integral part of formal school curricula, and that research should be undertaken to determine the most effective mechanisms for the delivery of such education. However, given the rising tide of consumerism world-wide in pursuit of the perceived "good life" that demands instant sense gratification, we have no illusions about the difficulties of this task. Many would probably consider it too idealistic to be achievable, or even surreal. But, then, what is the alternative? Is there one, other than the flawed *status quo*? It would be useful to know. It is certain, however, that future generations are unlikely to forgive us if we do not even try.

Disclaimer

The views expressed in this paper are those of the authors and not necessarily those of the Executive Environment Agency, Sofia, Bulgaria.

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Explanation acronyms used in text

EEA: Executive Environment Agency (Sofia); EU: European Union, The; IPPC: Integrated Pollution Prevention and Control; MOEW: Ministry of Environment and Water, the (Government of Bulgaria); NIMBY: Not in My Backyard (syndrome); RIOEW: Regional Inspectorate of Environment and Water; SWM: Solid Waste Management; WCED: World Commission on Environment and Development.