

# ELR

## NEWS & ANALYSIS

### Can You Really Kill Two Birds With One Stone?: The Future of the Waste-to-Energy Industry as an Energy and Environmental Policy Decision

by Eric A. Koester

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*Editors' Summary: The government has faced an ongoing dilemma in its quest to balance its policy decisions with the waste-to-energy industry. In this Article, Eric Koester examines what it will take for the industry to again become a significant solution in our energy and solid waste dilemmas. First, he looks at the impact of environmental regulations on the industry, including air emissions and waste ash products. He examines the impact changes in energy regulation have had and what the future of energy regulation and deregulation may yield for the waste-to-energy industry. He goes on to examine the impacts of Supreme Court rulings, project finance, and changes in tax programs on the waste-to-energy industry. Finally, he discusses what the future holds and determines if conditions have evolved over the past 30 years to again produce a scenario right for waste-to-energy development.*

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#### I. Introduction

We consume. Our society is based on a need for more—more products, more size, more power, more technology, and more food; basically, more of everything. We consume and we consume quickly. Sure, there have been critics harping on our habits of consumption; development cannot go on forever, markets will run out, fossil fuels are not endless, and trash does not disappear on its own. Usually these critics are just tuned out by the silent majority. So we continue consuming on our ongoing quest for more.

##### *A. A Brief History of the Waste-to-Energy Industry*

In the 1970s, those critics of the consumption machine struck a chord with the public, and most importantly, with politicians. The United States began to look around at the events of the decade with increasing uncertainty about this ongoing race for more consumption. Could the Arab oil embargos really be sending us a message about the future of energy? Were the landfill shortages facing growing American metropolises a harbinger of what was to come? Suddenly, our country and its leaders had pause to reflect and peer over to the economies in Asia and Europe. These problems plaguing America—rising energy prices and the growing “not-in-my-backyard” landfill syndrome—were just as prevalent in Europe and Japan. Yet, those economies had turned to a new strategy to battle each: waste incineration.

Incineration of waste became more technical and more advanced in the 20th century. No longer was this a backyard metal can full of trash lit with a match and gasoline. And while some forms of incineration technology had been around in the United States in a smaller capacity, the larger, more efficient waste management systems used abroad became more and more appealing. Waste-to-energy (WTE) grew rapidly in the 1980s and 1990s with the closing of old incineration systems and the building of new plants to operate WTE. These systems reduced solid waste by 90% or more and generated electricity by the same token. Meanwhile, the federal, state, and local governments were willing to offer tax incentives and look the other way at the potential environmental risk.

With the expansion of WTE, we could continue to consume without fear. Most assumed the rapid growth of the WTE industry was here to stay. By the late 1970s, the U.S. Environmental Protection Agency (EPA) had even included WTE as a part of its strategy for solid waste management and 30 plants had been opened as a part of this commitment. By 1980, 60 plants were either on-line, under construction, or in the planning stages. And by 1987, an EPA study stated that 110 WTE plants were in operation and nearly 220 were in the planning or construction stage. By 1990, an additional 56 major and 27 minor plants had opened.<sup>1</sup>

But the satisfaction with WTE and the perception of success was short-lived. The 1990s ushered in increased regu-

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1. H. Lanier Hickman Jr., *A Brief History of Solid Waste Management in the U.S. in the Last 50 Years*, MSW MANAGEMENT, Sept./Oct. 2001, [http://www.mswmanagement.com/mw\\_0111\\_history.html](http://www.mswmanagement.com/mw_0111_history.html).

latory pressured on the industry and the economics changed. It was no longer politically or socially popular to promote incineration and EPA began to express concerns over the pollutants in the air and in the ash from these plants. Now the industry was dealing with heightened standards for its waste products: air emissions and the waste ash. Industry was unable to take advantage of tax incentives to fund capital products. New landfills had opened and energy deregulation had cut into the profits of the energy generation. No longer was WTE the solution all had assumed it could be. Today, the total waste processed with WTE technology is actually less than it was in 1996.<sup>2</sup> We must now ask: Did WTE ever represent the stone that could kill two birds? And can it be again?

### B. The Current State of the Waste-to-Energy Solution

EPA has reported that waste-to-energy facilities (WTEF) themselves are a “clean, reliable, renewable source of energy” and these facilities produce electricity with “less environmental impact than almost any other source of electricity.”<sup>3</sup> The U.S. Department of Energy (DOE) has labeled WTE as a renewable energy source and includes WTE in DOE tracking of progress toward the federal government’s renewable energy goal established by Executive Order No. 13123.<sup>4</sup>

EPA has found that approximately 17% of the municipal solid waste (MSW) generated in the United States was processed by combustion or incineration resulting in energy recovery.<sup>5</sup> This rate is considerably lower than that of several countries. Denmark, for example, processes over 80% of its MSW in WTE plants, while Japan’s rate is over 60%.<sup>6</sup> In the United States, WTE facilities process 34 million tons of solid waste each year and generate 2,500 megawatts (MW) of renewable energy, which is equivalent to the energy needs of 2 million homes.<sup>7</sup> More than 36 million people in 27 states rely on the 89 WTE plants which currently operate nationwide.<sup>8</sup> Processing solid waste through WTE facilities typically achieves a 90% reduction in waste volume and a 75% reduction in waste weight.<sup>9</sup>

Despite the most recent federal and state agency support of WTE, why have so many concerns been levied against waste incineration? The reasons include questions about the ability to meet air quality requirements, worries about the disposal of ash and other potentially hazardous byproducts, conflicts with adjacent land uses, disturbances to biological resources, concerns about large water usage for cooling purposes (if wet cooling towers are used), aesthetic concerns about incineration facilities and waste management traffic, public opposition due to come over health, safety, odor, and

traffic impacts, perceived conflicts between using solid waste for electricity generation and programs that advocate recycling or other waste reduction, and concerns about site cleanup after facility closure.

The industry and the technology have frankly lost the public relations battle—leaving some to wonder if a cleaned-up industry is enough to change the industry’s course.

### C. Scope of This Article

This Article will attempt to illustrate the ongoing dilemma that the government has faced in its quest to balance its policy decisions with the WTE industry. What will it take for the industry to again become a significant solution in our energy and solid waste dilemmas? First, we will look at the impact of environmental regulations on the industry—including air emissions and waste ash products. Second, we will examine the impact changes in energy regulation have had and what the future of energy regulation and deregulation may yield for the WTE industry. Third, we will examine the impact of the 1994 Supreme Court rulings on the industry with respect to waste-flow regulations. Fourth, we will explore the impact of project finance on the industry, including changes in tax programs which had once encouraged development, but had suddenly dried up, forcing the industry to reevaluate its financial model. Finally, we will discuss what the future holds and determine if conditions have evolved over the past 30 years to again produce a scenario right for WTE development.

Many people still feel that WTE can be a valuable tool in U.S. energy and environmental strategy—and much can be learned from the successes and failures of our Asian and European counterparts. We will explore what has led an industry that expanded so rapidly to suddenly stall and what may be required for the future of WTE projects.

What we have learned from this industry is that a single stone may certainly kill two birds. But we have also learned that by killing those birds we did not get all the results we expected—other problems, issues, and obstacles arose. Can the WTE industry be an effective part of our energy and environmental policies in this country? Absolutely. But a one-time darling will need to change with the times to again find its place. Today, we have again seen rising oil prices and continued concern over landfill space. What will it take for that perfect storm to brew again for WTE?

### D. A Waste-to-Energy Case Study: Anytown, USA

What are the practical effects of the changes to the industry and the current issues facing a city debating the issues that surround WTE facilities? While addressing the regulatory, public policy, economic, and social issues regarding use of solid waste to generate electricity, we will also develop an understanding of the issues that face a community affected by waste and WTE policies.

The context for determining the changes that have faced the WTE industry over the past 30 years and the future for the industry will be Anytown, USA. Anytown is a medium-size city located in the state of Columbia that was found to be an ideal candidate for the implementation of a municipal waste incinerator in 1980. Its plant was initially located on the outskirts of town, but due to the strong growth

2. *Id.*

3. Letter from Marianne Horinko & Jeffrey Holmstead, U.S. EPA, to International Solid Waste Association (Feb. 14, 2003) (reprinted online at <http://www.wte.org/docs/epaletter.pdf>).

4. *Id.*

5. JEREMY K. O'BRIEN, COMPARISON OF AIR EMISSIONS FROM WASTE-TO-ENERGY FACILITIES TO FOSSIL FUEL POWER PLANTS (2005), available at [http://www.wte.org/docs/emissions\\_comparison.pdf](http://www.wte.org/docs/emissions_comparison.pdf).

6. Integrated Waste Services Association, *About Waste-to-Energy*, <http://www.wte.org/energy/> (last visited Nov. 3, 2006).

7. *Id.*

8. *Id.*

9. *Id.*

in the population of Anytown, the WTE facility has become engulfed by a city and its population.

The facility itself dealt with many of the struggles faced by other WTE facilities in the past 25 years—increased environmental standards, limits on waste flow, competition from new landfills, deregulated energy prices, and a losing public relations battle. Like many other WTE facilities, it was opened via public financing with bonds, but was run by a private entity. This gave the city of Anytown reason to initially support the venture given that its tax dollars helped to support the project and the ongoing tax treatment of the venture ensured that it provided a valuable service for the city. Because of this partnership approach, the city had passed legislation requiring that haulers use the Anytown WTE facility and pay the higher tipping fees (fees for depositing waste at a facility such as a landfill or a WTE facility) to finance the plant.

In 1999, after the prospect of massive undertakings to meet the new air emissions standards, the Anytown WTE facility was mothballed. After five years without activity, the city council was approached with a new opportunity to resurrect the WTE facility in Anytown. The new facility will employ new technology capable of meeting the EPA requirement and will serve as an alternative to landfilling. Many issues exist, including the fact that Columbia has passed a renewable energy statute.

This case study will look at WTE through the eyes of a town that was once home to a facility and now contemplates its revival. Is Anytown ready for the prospect of another incineration facility or is the time still not right?

## II. The Impact of Environmental Regulations on Waste Incineration

It is often difficult to point to a single turning point in any major change. However, in the case of the rapid change in public perception of the WTE industry, we need not look much further than the impact of EPA. At one time, WTE technology had represented a major piece of EPA's strategy for solid waste management, but soon the tides changed as EPA set its sight on the pollutants it saw spewing from the facilities stacks.

During the 1980s, EPA began to focus on the air emissions of the WTE facilities and the potential toxicity of the ash being generated. It expressed concerns about the high levels of dioxins and furans, carcinogenic pollutants released in high levels by WTE facilities. In a 1987 study, EPA estimated that nearly 65% of all dioxins released into the air in the United States came directly from WTE facilities.<sup>10</sup> Likewise, EPA began to grow wary of the toxic ash generated by the facilities and the disposal of this waste product. The potential impact on humans led to a drastic change of course.

This scrutiny ultimately led to the dramatic change in public perception of the WTE industry. Suddenly, environmental restrictions tightened and fiscal incentives were wiped away. This evolution in policy quickly quelled the rapid growth and development of WTE facilities. The following sections will examine the development of

the current regulatory oversight of both air emissions and ash generation.

### A. The Clean Air Act Amendments

EPA and various state regulatory agencies regulate the WTE industry through a number of environmental programs. Today, the WTE industry continues to abide by regulations in the Clean Air Act (CAA)—one of the most important environmental regulations for waste incineration facilities. In October 1995, EPA promulgated new standards based on CAA regulations for municipal waste combustors, including WTE plants. Such standards continue to govern many key aspects of the operations and design of waste-fueled incineration power plants.

This increased emphasis on emissions by WTE facilities ultimately led many of the older, smaller-scale projects to be shuttered due to the substantial capital investments required for compliance with federal regulations. Such regulations led WTE facilities to spend in excess of \$1 billion to come into compliance with EPA rules and regulations to meet cleaner air standards.<sup>11</sup>

#### 1. CAA Regulations and the Waste-to-Energy Industry

The WTE industry initially was only affected in a limited sense by environmental regulations for air quality. The industry had largely flown under the radar until an increase in air quality testing identified key pollutants being emitted by municipal waste combustors (MWCs)<sup>12</sup> in the 1980s. Flush with new data, EPA acted quickly to begin regulation of the WTE industry and has continued with a strict regulation policy of the industry until today.

In December 1989, the first set of new guidelines and standards for WTEFs was offered by EPA under the authority delineated in §111 of the CAA Amendments of 1977.<sup>13</sup> This industry regulation under these new standards relied on the use by WTE facilities of the best available control technology (BACT).<sup>14</sup> A year later, in November 1990, the U.S.

11. Danielle Jackson, *MACT Regulations Help Clean Up WTE*, WASTE AGE, Aug 1, 2002, [http://www.wasteage.com/mag/waste\\_mact\\_regulations\\_help/](http://www.wasteage.com/mag/waste_mact_regulations_help/).

12. Municipal waste combustors refer to all facilities that incineration municipal waste, not only those that use the incineration to generate electricity.

13. Pub. L. No. 95-95, §111(d) (2000):

(d)(1) The Administrator shall prescribe regulations which shall establish a procedure similar to that provided by section 110 of this title under which each State shall submit to the Administrator a plan which (A) establishes standards of performance for any existing source for any air pollutant (i) for which air quality criteria have not been issued or which is not included on a list published under section 108(a) [or 112(b)(1)(A)] but (ii) to which a standard of performance under this section would apply if such existing source were a new source, and (B) provides for the implementation and enforcement of such standards of performance. Regulations of the Administrator under this paragraph shall permit the State in applying a standard of performance to any particular source under a plan submitted under this paragraph to take into consideration, among other factors, the remaining useful life of the existing source to which such standard applies.

14. Letter from John Calcagni, Director, U.S. EPA Office of Air Quality Planning and Standards, TRANSMITTAL OF BACKGROUND STATEMENT ON "TOP-DOWN" BEST AVAILABLE CONTROL TECHNOLOGY (BACT) 8.51 (1989), available at [http://www.epa.gov/ttn/nsr/psd2/p8\\_51.html](http://www.epa.gov/ttn/nsr/psd2/p8_51.html).

10. U.S. EPA, *User's Manual for the Database of Sources of Environmental Releases of Dioxin-Like Compounds in the United States: Reference Years 1987 and 1995*, <http://cfpub.epa.gov/ncea/cfm/dioxindb.cfm?ActType=default> (last visited Nov. 3, 2006).

Congress enacted amendments to the CAA,<sup>15</sup> adding §129 to the CAA.<sup>16</sup> These amendments directed EPA to develop new emission guidelines for existing and new WTE facilities. In 1995, EPA published air emission guidelines for existing MWCs with the goal of reducing emissions by air pollution control systems, monitoring systems, training, and selected material separation prior to incineration. Limits were set for sulfur dioxide, hydrogen chloride, cadmium, lead, and mercury emissions. EPA set the most restrictive limitations on emissions of dioxins, furans, nitrogen oxides, fugitive fly, and bottom ash.<sup>17</sup>

EPA Administrator Carol Browner signed significant air pollution control standards called “Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Municipal Waste Combustors.”<sup>18</sup> The emission guidelines regulate existing operating facilities while the new source performance standards regulate facilities built after 1995. The emission guideline standards are intended to ensure that facilities use the maximum achievable control technology (MACT).<sup>19</sup> Facilities were required to follow MACT to achieve acceptable levels of air emissions. The regulations also called for facilities to use continuous emission monitoring (CEM) systems to report emissions of their facility. MACT includes scrubbers, baghouses, mercury control system, and nitrous oxide management systems. EPA has continued to issue refinements to its 1995 policies based on the MACT requirements.<sup>20</sup> These rulings by EPA banned the combustion of lead acid batteries and called for the separation of certain materials prior to combustion.

According to EPA’s Office of Air Quality Planning and Standards, the MACT rule has in fact reduced emissions of cadmium, lead, mercury, dioxin, sulfur dioxide, hydrogen chloride, nitrogen dioxide, and particulate matter by approximately 145,000 tons per year.<sup>21</sup> Based on emissions data collected by EPA, MACT will reduce dioxin emissions from WTEFs by 99% or more. The result is that WTE facilities will represent less than 1% of the known sources of dioxin. EPA also estimated that this has led to a 90% reduction in emissions of mercury from the facilities, based on 1990 levels.<sup>22</sup>

The regulations themselves were considered by some to be severe when they were first implemented. In fact, Davis County Solid Waste Management District, Waste Energy Partners, and the Cement Kiln Recycling Coalition brought suit against EPA in 1996, challenging the standards for existing facilities.<sup>23</sup> The standards were upheld and upgrades

and retrofits were complete by the year 2000.<sup>24</sup> However, the implementations did force some facilities to close and halted building of the next generation of WTE facilities. Since the 1995 rules were enacted, there have been no new facilities which have opened and some slated for construction were halted.<sup>25</sup>

## 2. Anytown Case Study: Impact of the Clean Air Standards

Hindsight tells us that the Anytime WTE facility was unable to comply with the increased air emission standards and therefore decided to close its doors. Such a decision was not without debate and discussion. The Anytown facility, being a medium-size city, was a small or medium sized facility. It was not financially sound beginning in the early 1990s—given that it had never operated at capacity (which will be discussed at a later point) and therefore had lower revenues from tipping fees and electricity due to lower production and prices for electricity. The prospect of these new regulations would force a significant investment.

EPA allowed Anytown the opportunity to meet the new standards after they were issued. Each state was required to communicate specifics about each facility to EPA. Columbia (the state where Anytown is located) was required to submit a state implementation plan (SIP) by December 31, 1996. The SIP was to include state-specific standards that were at least as stringent as those promulgated by EPA. Columbia issued final rules on air emissions in line with those promulgated by EPA. Such rules would require changes in the Columbia state facilities. A few of the facilities in Columbia could already meet Columbia’s emissions standards. Other facilities would need to add or retrofit their operations with new technology to enhance air pollution control equipment.

Meeting such standards would require a major investment in Anytown’s facility. A few of the major improvements<sup>26</sup> included:

- A “bag house” that works like a giant vacuum cleaner with hundreds of fabric filter bags which clean the air of soot, smoke, and metals
- A “scrubber” which sprays lime slurry into the hot exhaust (The lime neutralizes acid gases, just as a gardener uses lime to neutralize acidic soil. Scrubbing also can improve the capture of mercury in the exhaust.)
- “Selective noncatalytic reduction” (SNCR) that converts nitrogen oxides—a cause of urban smog—to harmless nitrogen by spraying ammonia or urea into the hot furnace
- “Carbon injection systems” that blow charcoal into the exhaust gas to absorb mercury (Carbon injection also controls organic emissions such as dioxins.)

While EPA recognized the costs associated with these improvements, they were not as concerned with the success or failure of the smaller facilities such as in Anytown. Many in EPA felt that these facilities were better off closed and would be unable to meet the requirements without outside

15. Clean Air Act Amendments of 1990, Pub. L. No. 101-549 (Nov. 15, 1990).

16. 42 U.S.C. §7429.

17. U.S. EPA, STRATEGY FOR HAZARDOUS WASTE MINIMIZATION AND COMBUSTION (1993), available at <http://www.epa.gov/epaoswer/hazwaste/combust/general/strat-2.txt>.

18. 40 C.F.R. pt. 60.

19. U.S. EPA, *supra* note 17.

20. See, e.g., Direct Final Rule Amendment for Standards of Performance (Subpart Eb) and Emissions Guidelines (Subpart Cb) for Large Municipal Waste Combustors (CO Malfunction Provision), 66 Fed. Reg. 357824 (Nov. 16, 2001).

21. Jackson, *supra* note 11.

22. *Id.*

23. Davis County Solid Waste Management & Energy Recovery Special Serv. Dist. v. EPA, 101 F.3d 1395, 27 ELR 20476 (D.C. Cir. 1996).

24. *Id.*

25. Hickman, *supra* note 1.

26. U.S. EPA, FINAL AIR REGULATION FOR MUNICIPAL WASTE COMBUSTORS: FACT SHEET (Oct. 31, 1995).

assistance. With the limited resources available and with the most significant environmental externalities, the large facilities were the focus.

After Columbia had adopted its final rule, the state set forth its compliance deadlines for facilities. The deadlines as mandated by EPA required that the large combustors (those that burned in excess of 250 tons of trash daily) had one year to comply with the regulations. Those that were unable to meet that requirement were given generous extensions if they could show progress—which some of the facilities in Columbia required. In those cases, these special facilities were given up to three years for compliance. Small combustors like Anytown's that burned less than 250 tons of trash per day were given a full three years to comply with the regulations.<sup>27</sup> It was assumed that as a small combustor, Anytown's facility would be able to comply within the three-year window.

This assumption proved to be more than Anytown's facility could manage. The town offered little assistance, as many hoped the facility would be shut down and redeveloped. The technology investment to meet the standards was significant, and given the small size, the significant investment, and the limited timeline, Anytown closed its facilities. In summary, these new regulations forced all facilities to meet stricter restrictions, which meant a significant investment in technology. In 1999, the facility was finally shut down. Almost overnight, the plant was shuttered and the facility sat idle.

#### *B. The Resource Conservation and Recovery Act: Municipal Solid Waste Combustor Ash*

After combustion of MSW in a WTE facility, the waste is reduced by 90% by volume and approximately 75% by weight. However, an ash residue does remain that traditionally has been disposed of in landfills or processed in other applications. This ash is referred to as MSW combustor ash or WTE ash. Some of that ash is used as landfill roadbed material, daily and final landfill cover, road aggregate, granular base, asphalt-mixture, and even in the construction of artificial reefs and cement blocks.<sup>28</sup> The remaining ash is traditionally disposed of in a landfill—and the WTE facility is responsible for its transportation and payment of the tipping fees.

The Resource Conservation and Recovery Act (RCRA)<sup>29</sup> of 1976 directs disposal of solid and hazardous

waste.<sup>30</sup> Included in the Act are the requirements for testing waste to determine key characteristics. RCRA exempts WTE facilities from these requirements by exempting household trash being burned in a facility from the testing.<sup>31</sup> It was assumed by many in the WTE industry that this exemption was likewise applied to waste ash.

In September 1992, EPA Administrator William Reilly announced that he would interpret RCRA §3001(i) to exempt from all Subtitle C requirements ash from WTE facilities incinerating household wastes and nonhazardous wastes.<sup>32</sup> However, on May 2, 1994, the Supreme Court issued an opinion interpreting RCRA §3001(i), 42 U.S.C. §6921(i).<sup>33</sup> The Court held that this provision does not exempt ash generated at WTE facilities burning household wastes and nonhazardous commercial wastes from the hazardous waste requirements of Subtitle C of RCRA. As a result, WTE facilities began to test ash for any hazardous or toxic characteristics with the Toxicity Characteristic Leaching Procedure (TCLP).<sup>34</sup> The TCLP subjects the WTE ash to acidic liquid, causing metals to leach from the material.

Following this ruling, EPA has issued directives to the states requiring that ash be tested before it leaves the facility.<sup>35</sup> The directives permit WTE facilities to mix fly and bottom ash before testing and disposal and provides guidance regarding the administration of the TCLP tests. Based on the result in *City of Chicago v. Environmental Defense Fund*<sup>36</sup> and EPA's directives, the WTE industry has raised few issues with respect to ash disposal.

WTE ash continues to be tested to ensure it is nonhazardous per federal law.<sup>37</sup> EPA relies on a measurement entitled the TCLP. This process applies an acidic liquid to the waste ash which causes metals to leach from the material.<sup>38</sup> The ash will be considered to be hazardous if metals leach in excess of a fraction of 1%. Traditionally, ash from the WTE facilities has proven safe to be disposed of and reused in various applications. Some question this test as it exaggerates the potential for metals to leach from ash into the environment. Measurements have shown metal levels in WTE ash leachate are close to the drinking water standards (which are much more stringent) and far below the TCLP toxicity criteria.<sup>39</sup>

27. *Id.*

28. W.C. Ormsby, Federal Highway Administration, *Paving With Municipal Incinerator Residue*, in PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE ON MUNICIPAL SOLID WASTE COMBUSTOR ASH UTILIZATION 49 (1988); C.N. Musselman et al., *Utilizing Waste-to-Energy Bottom Ash as an Aggregate Substitute in Asphalt Paving*, in PROCEEDINGS OF THE EIGHTH INTERNATIONAL CONFERENCE ON MUNICIPAL SOLID WASTE COMBUSTOR ASH UTILIZATION 59 (1995); C.M. Jones et al., UTILIZATION OF ASH FROM MUNICIPAL SOLID WASTE COMBUSTION, Final Report, Phase I, NREL Subcontract N XAR-3-1322, at 13 (1994); F.J. Roethal & V.T. Breslin, *Stony Brook's MSW Combustor Ash Demonstration Programs*, in PROCEEDINGS OF THE THIRD INTERNATIONAL CONFERENCE ON MUNICIPAL SOLID WASTE COMBUSTOR ASH UTILIZATION 237 (1990); J.V. Kiser, 2002 IWSA DIRECTORY OF WASTE-TO-ENERGY PLANTS (2002).

29. 42 U.S.C. §§6901-6992k, ELR STAT. RCRA §§1001-11011. RCRA requires all solid waste to be either "utilized for resource recovery" or "disposed of in sanitary landfills" in accordance with EPA Standards. 42 U.S.C. §6943(a)(2) (1988); 40 C.F.R. pt. 258 (1994).

30. 42 U.S.C. §82 (2002).

31. 40 C.F.R. §261.4(b)(1).

32. WORK ON WASTE USA, INC., THE 7TH CIRCUIT COURT OF APPEALS RULES, FOR THE SECOND TIME, THAT ASH FROM MUNICIPAL WASTE INCINERATORS IS A HAZARDOUS WASTE (1993), available at <http://www.americanhealthstudies.org/wastenot/wn223.htm>.

33. *City of Chicago v. Environmental Defense Fund*, 511 U.S. 328, 24 ELR 20810 (1994).

34. 40 C.F.R. §261.24.

35. *Id.*

36. 511 U.S. 328, 24 ELR 20810 (1994).

37. U.S. EPA & THE COALITION ON RESOURCE RECOVERY AND THE ENVIRONMENT, CHARACTERIZATION OF MUNICIPAL COMBUSTION ASH, ASH EXTRACTS, AND LEACHATES (1990).

38. C.A. Andrews, *Analysis of Laboratory and Field Leachate Test Data for Ash From Twelve Municipal Solid Waste Combustors*, in MUNICIPAL WASTE COMBUSTION: CONFERENCE PAPERS AND ABSTRACTS FOR THE SECOND ANNUAL INTERNATIONAL SPECIALTY CONFERENCE (1991).

39. *Id.*

### *C. Anytown Case Study: Compliance With Current Regulations*

The increase in regulations for both air emissions and ash disposal beginning in the mid-1990s ultimately increased the costs of operations for the Anytown WTE facility. By 1999, the facility was shuttered due to the significant costs of continuing operations and retrofitting the facility to comply with the standards promulgated by EPA. And while the facility was unable to function due to the significant investment required, the question now exists for the citizens of Anytown: If a new facility is opened, can this facility meet the new standards, or will it be forced to close in the future?

A WTE facility traditionally has a life of 25 to 40 years of operations, which means the plant that closed was likely at the end of its useful life when upgrades were required. This means that the closure was not entirely unexpected—it was likely close to the termination of its operations as it stood. Therefore, the question of the sustainability of any new facility should not be done in light of the prior closure.

Any new WTE facility—one that uses the existing land or is a new plot—will require the use of new technology and new operations. The new facility will be required to meet EPA standards for ash and air emissions. However, new technologies have been developed that not only allow a plant to meet these goals but drastically exceed them. New technologies burn hotter and consume a greater portion of the hazardous materials. New scrubbing and filtration techniques have even been able to produce zero emission (immeasurable quantities) systems called pyrolysis and gasification, currently used only in small scale operations currently with plants opening in 2006/2007 in Europe.<sup>40</sup> Technology now exists to ensure compliance with even more stringent standards.

What about other environmental goals? Columbia has set a goal for recycling in the state and some have questioned whether the addition of this facility will hurt its recycling efforts. The regulations promulgated by EPA also allow states to place sortation requirements into their state standards. This means that Columbia could require all facilities to sort recyclable materials from the stream. In fact, in locations that have WTE facilities, recycling rates are higher than in locations without WTE facilities (35% versus 30% nationwide).<sup>41</sup>

A new facility can be opened and can meet all current environmental regulations in the United States, in the state of Columbia, and in Anytown. What we have seen in the past 10 years as the industry has struggled to comply with the new standards is that little new development has begun. Much of this has occurred because investors are skittish about investing in old technology—technology that would need to be replaced as occurred with the first wave of WTE facilities. Therefore, new technologies have sprung up that can meet both today's and tomorrow's standards. And a comparison with current landfilling technologies and the environmental impact yields evidence that WTE technology is vastly superior with respect to its production of externalities. Given the new technology available, any new facil-

ity can meet the current environmental regulations and likely could meet them throughout its 25- to 40-year useful life.

Despite the fact that any facility with the newly emerging technologies could likely meet any and all environmental regulations, it is still unclear if the concept of incineration could pass a city council or a state legislature due to poor public perception. In particular, the terms “combustion” and “incineration” have been black-flagged by many environmental groups. The result is that any discussion to reinvigorate WTE processing in a locality will likely rely on new terms: “pyrolysis,” “gasification,” or others. The ability to meet standards represents only a small part of the battle for public perception of compliance with environmental standards. It will take leadership and a public relations effort for Anytown to overcome current perceptions—a risk many politicians are wary of undertaking.

### **III. Utility and Energy Regulations**

WTE facilities had benefited from the fact that the production of electricity produced significant revenues for their ventures. Due to the oil embargoes of 1973 and 1978, the Public Utility Regulatory Policies Act (PURPA) was passed by Congress in 1978.<sup>42</sup> PURPA essentially requires utilities to buy power from WTE projects, among other sources. In the 25 years since PURPA, the environment surrounding PURPA and WTE-produced electricity has changed. As a result, WTEFs no longer see the same preferable revenues from their electricity production capabilities.

While between 50% and 70% of WTE facilities revenue came from tipping fees, a significant portion came from electricity sales. For instance, at a WTE plant which would process MSW, each ton will generate a net of 500 to 600 kilowatt hours (kwh). This baseload electricity is then used by the local utility, which compensates the facility for its power supply. At the price of four cents per kwh, the revenue per ton of MSW would be \$20 to \$30.<sup>43</sup> This meant that a 1,000-ton-per-day facility could earn \$30,000 daily in electricity revenues, totaling nearly a million dollars a month. As such, the ultimate impact of price changes in electricity is significant and has been a powerful driver in the industry changes over the past 20 years.

#### *A. The Public Utility Regulatory Policies Act of 1978*

Congress entrusted responsibility to the Federal Energy Regulatory Commission (FERC) to oversee the implementation and operations of PURPA.<sup>44</sup> PURPA essentially requires that utility companies buy power from qualifying facilities (QF). These QFs include production from WTE facilities. Utilities are required to purchase energy produced by these QFs (which include WTE facilities) at a price which is “fair and reasonable” and nondiscriminatory, or the utility’s “avoided cost.”<sup>45</sup> Various states and their respective public utility commissions also passed legislation to assist

40. Integrated Waste Services Association, *Waste-to-Energy Worldwide*, <http://www.wte.org/worldwide/> (last visited Nov. 3, 2006).

41. John F. Williams, *WTE: 25 Years Later: Technology With a Past, Present, and Future*, MSW MANAGEMENT, Sept./Oct. 2004, [http://www.mswmanagement.com/mw\\_0409\\_wte.html](http://www.mswmanagement.com/mw_0409_wte.html).

42. 16 U.S.C. §2601, Pub. L. No. 95-617 (1978).

43. Integrated Waste Services Association, *Fact Sheet: Waste-to-Energy and the Production Tax Credit*, <http://www.wte.org/docs/FactSheetPTC.pdf> (last visited Dec. 1, 2006).

44. 16 U.S.C. §2601.

45. *Id.*

with the efforts of PURPA.<sup>46</sup> These regulations oftentimes would serve to set a specific rate or set a minimum purchase price. Ultimately, competitive bidding has replaced these calculations to best determine a fair and reasonable price.<sup>47</sup> The requirements of PURPA and the state commissions led to growth in the independent power production market which ultimately resulted in favorable pricing and revenues for WTE facilities.

### 1. Energy Policy Act of 1992

The favorable pricing for WTE electricity began to erode with the introduction of new federal regulations and key rulings by FERC. In 1992, the Energy Policy Act of 1992<sup>48</sup> established Exempt Wholesale Generators (EWGs) that would be exempt from the regulations under the Public Utility Holding Company Act (PUHCA) of 1938.<sup>49</sup>

Under the Energy Policy Act, WTE facilities and other generators could now only receive status as an EWG from FERC on a case-by-case basis. This led to greater competition in U.S. wholesale electricity generation markets by allowing for greater participation by the subsidiaries of electric utilities and other nonqualifying facilities.<sup>50</sup> Since the law no longer limited participation by generator size, fuel type, or technology, QFs such as the WTEFs no longer held a competitive advantage. States were now free to move toward programs such as all-source bidding, which allows competition for pricing, causing erosion of preferential electricity pricing for WTE-generated electricity.

### 2. Key Public Utility Regulatory Policies Act Rulings

During the late 1980s and early 1990s, several PURPA challenges were raised to FERC. In those challenges, the commission struck down some state laws that had required utilities to purchase electricity at prices which exceeded avoided cost. In response to a filing by Connecticut Light & Power, FERC held that PURPA did not allow a state to require a utility to purchase power from QFs at prices above the avoided cost.<sup>51</sup> Additionally, FERC ruled against several state initiatives which required regulated utilities to purchase specific quantities of renewable energy since this would likely lead to purchase prices that would be in excess of avoided cost.<sup>52</sup> In one decision, an order by the California Public Utility Commission was struck down by FERC because of its renewable source purchase requirement.

FERC also issued Orders 888<sup>53</sup> and 889<sup>54</sup> in 1996. The orders were issued in reference to open-access transmission and stranded costs, respectively. The open-access transmission rule functionally unbundled transmission from genera-

tion by requiring utilities to open their transmission systems to all wholesale transmission on a real-time, nondiscriminatory basis.<sup>55</sup> The impact has led to a continued process of deregulation of the industry and effectively limiting the financial pricing benefits for WTE producers.

The deregulation of the electricity grid has limited the initial effects of PURPA (encouraging investment and use of alternative energy production) and has affected most WTE facilities. While federal and state entities continue the process of deregulation, there has been some evidence to suggest that costs have remained lower as a result of the effort. It is uncertain what the effect of deregulation will be on WTE, but it is likely that competition will continue the process of lowering prices previously set aside for WTE electricity production.

### B. Energy Policy Act of 2005<sup>56</sup>

The Energy Policy Act of 2005 includes several provisions that will ultimately impact the present and future of the WTE producers. On July 27, the U.S. House of Representatives-U.S. Senate Conference Committee passed the Energy Policy Act, H.R. 6, which was approved by both Houses of Congress and signed by the president in early August.<sup>57</sup> The legislation included a key provision: the inclusion of tax credits for WTE. It appears that these provisions are the first step toward greater WTE fiscal and regulative incentives for expansion.

According to the Bill, WTE facilities will receive a two-year placed-in-service extension from January 1, 2006, to December 31, 2007. This window would have expired at the end of 2005, but is now extended for two years. In addition, the payout period was extended from five years to 10 years, which will permit more facilities to qualify for the tax credit and will double the payout term of the credit. The credit amount of 0.75 cents (0.9 cents inflation adjustment) per kwh remains the same.<sup>58</sup>

The Bill also clarified several WTE provisions. The new legislation states that new units at solid waste combustion facilities that increase the electricity output and are placed in service after October 22, 2004, are eligible for the tax credit. Other items of note are the creation of Clean Renewable Energy Bonds (CREB).<sup>59</sup> These bonds will provide tax exempt financing of capital expenditures for facilities such as WTE ventures that qualify for the \$45 tax credit. There is a national limit of \$800 million that can be allocated for these bonds.<sup>60</sup>

The federal government now includes WTE facilities in the portfolio of renewable energy sources.<sup>61</sup> According to

46. Eileen B. Berenyi, "The Impact of Federal Regulation on Capital Costs of Municipal Waste Combustion Facilities: 1980-1998," Governmental Advisory Associates, Inc., prepared for the Energy Information Administration, U.S. Department of Energy (DOE).

47. *Id.*

48. Pub. L. No. 102-486 (Oct. 24, 1992).

49. 15 U.S.C. §79.

50. Berenyi, *supra* note 46.

51. *Niagara Mohawk Power Corp. v. Federal Energy Regulatory Comm'n*, 117 F.3d 1485, 1488 (D.C. Cir. 1997).

52. Berenyi, *supra* note 46.

53. 18 C.F.R. pts. 35, 385.

54. 18 C.F.R. pt. 37.

55. Energy Information Administration, *Renewable Energy Annual 1995*, DOE/EIA-0603(95) (Dec. 1995); *Annual Energy Review 1995*, DOE/EIA-0384(95) (July 1996).

56. 42 U.S.C. §134 (2005).

57. The White House News & Policies, *President Signs Energy Policy Act*, Aug. 8, 2005, <http://www.whitehouse.gov/news/releases/2005/08/20050808-6.html> (last visited Dec. 1, 2006).

58. Press Release, SWANA Supported Provisions Included in Energy Bill; SWANA Advocacy Scores Another Legislative Victory (July 29, 2005), [http://www.swana.org/sections/communicate/pr\\_view\\_detail.aspx?pressId=149](http://www.swana.org/sections/communicate/pr_view_detail.aspx?pressId=149).

59. *Id.*

60. *Id.*

61. Integrated Waste Services Association, *IWSA Weekly Update, 10/22/2004*, <http://www.barlowprojects.com/industrynews.htm> (last visited Nov. 3, 2006).

the National Renewable Energy Laboratory of DOE, WTE energy is now a part of their renewable energy federal calculations. An Executive Order signed by President William J. Clinton<sup>62</sup> mandated that federal buildings and installations must purchase a percentage of power, or the credits associated with that power, from renewable sources.

### C. State Renewable Energy Policies and Standards

State policy is critical to the future of WTE expansions and development. Currently, many states have enacted Renewable Portfolio Standards (RPS) which require that a certain percentage of electricity sold in a state is generated from renewable energy sources. Many of these states have defined WTE as renewable. Additionally, while some states have not enacted RPS policies, other states have defined WTE as renewable energy for other purposes. Below are some state activities as listed by the Integrated Waste Services Association:

- **Arizona:** Established an RPS that requires .2% in 2001 rising to 1.1% in 2007 through 2012. Solar, landfill gas, wind and biomass are eligible technologies. There are no waste-to-energy facilities in the state.
- **California:** Established an RPS that requires 20% by 2017. Solar, wind, biomass, landfill gas, digester gas, geothermal and one waste-to-energy facility are eligible technologies.
- **Connecticut:** Established an RPS that requires 6% in 2005 and 7% in 2009. Renewable energy sources were placed in Class I or Class II categories according to the sources' commercialized potential. Class I: solar, wind, small hydro, sustainable biomass, landfill gas and fuel cells. Class II: hydro, waste-to-energy and other biomass.
- **Hawaii:** Established a voluntary RPS of 7% in 2003 rising to 9% in 2010. Solar, wind, geothermal, hydro, landfill gas, ocean thermal, wave, biomass including waste-to-energy, biofuels and savings from heat pumped water are eligible for the RPS.
- **Illinois:** Established a voluntary RPS of 5% in 2010 rising to 15% in 2020. Wind, solar, dedicated energy crops, organic waste biomass and existing small hydro are eligible technologies. There are no waste-to-energy facilities in the state.
- **Iowa:** Established an RPS that requires 2% from 1999. Solar, wind, methane recovery, biomass are eligible technologies. The existing waste-to-energy plant is also included.
- **Maine:** Established an RPS that requires 30% from 2000. Fuel cells, tidal, solar, wind, geothermal, hydro, biomass, waste-to-energy and cogen systems are eligible technologies.
- **Maryland:** Established an RPS that requires a percentage of the state's electricity supply is generated by renewable energy. Wind, solar, biomass, landfill gas and waste-to-energy are eligible technologies.
- **Massachusetts:** Established an RPS that requires 1% from new renewables in 2003, rising to

4% in 2009 and increasing 1% each year thereafter. Solar, wind, ocean thermal, wave, tidal, landfill gas, low-emission biomass are eligible as new renewables. Waste-to-energy and hydro qualify as existing.

- **Minnesota:** Established an RPS that required 425 MW of wind by 2002 with another 400 MW of wind by 2012. 125 MW of biomass that includes waste-to-energy are also required.
- **Nevada:** Established an RPS that requires 5% by 2003 rising to 15% in 2013. Wind, solar, geothermal and biomass (includes agricultural, wood, animal wastes, municipal wastes and aquatic plants) are eligible. There are no waste-to-energy plants in the state.
- **New Jersey:** Established an RPS of 2.5% for Class I and or Class II renewable energy sources. An additional RPS for Class I renewables increases to 4% by 2012. Class I includes solar, wind, fuel cells, geothermal, wave, tidal, landfill gas and sustainable biomass. Class II includes waste-to-energy and hydro that meets environmental standards.
- **New Mexico:** Established an RPS of 5% by 2006 rising to 10% in 2011. Wind, solar, geothermal, biomass, small hydro, landfill gas, and fuel cells are eligible. There are no waste-to-energy facilities in the state.
- **New York:** The Public Service Commission established an RPS in 2004 that calls for 25% renewable generation by 2013. Waste-to-energy is excluded from eligibility.
- **Pennsylvania:** Established RPS by legislation in 2004. Waste-to-energy is defined as a renewable and is an eligible technology.
- **Texas:** Established an RPS of 2.3% by 2009 and requires 2000 MW of new renewables be built in the state by 2009. Solar, wind, geothermal, hydro, wave, tidal, biomass, and landfill gas are eligible. Waste-to-energy is excluded.
- **Wisconsin:** Established an RPS of 2.2% by 2011. Wind, solar, biomass, geothermal, tidal and fuel cells are eligible. Waste-to-energy is excluded.<sup>63</sup>

### D. Anytown Case Study: Utility and Energy Regulation

Falling electricity revenues due to decreasing energy prices was just one of the mounting issues for the WTE industry that led to its struggles and its development plateau. In Anytown, the declining electricity revenues necessitated increases in tipping fees, which led some waste haulers to dispose of their solid wastes at landfills rather than at incineration facilities. This vicious cycle of declining revenues was part of the reason that internal investments in technology for emissions reductions were not possible. Ultimately, it is not possible to point to a single problem as the cause of Anytown's shutdown. But coupled with the other issues, it was nearly impossible for the plant to sustain itself.

What does such a structure mean for the potential development or redevelopment of a WTE venture in Anytown? It does provide a business limitation as electricity revenues

62. Energy Efficiency and Water Conservation at Federal Facilities, Exec. Order No. 12902, 59 FR 11463 (Mar. 8, 1994).

63. INTEGRATED WASTE SERVICES ASSOCIATION, WASTE-TO-ENERGY AND STATE RENEWABLE PORTFOLIO STANDARDS (RPS) (2004), available at <http://www.wte.org/docs/FactSheetRPS.pdf>.

may remain somewhat low. However, the fact that WTE-produced electricity is now part of most renewable energy portfolios represents a tremendous opportunity. The goals set by various states will require increases in production of renewable energies. What has already been seen in various states is that development of these energy sources is difficult, which is why many states have revised prior policies that had at one time excluded WTE-generated electricity. It has proven to be difficult to meet such goals and with the enhancements in emission control technologies, WTE is a viable alternative.

As various states begin to approach goals, it is likely that renewable energy sources may in fact be able to increase their rates in the competitive marketplace. Likewise, many states have set their baselines as of a certain date and require the production of new energies. Were Anytown to create a new WTE plant, Columbia might be willing to assist with project financing due to its goal of achieving renewable energy production. Therefore, the financial situation surrounding deregulation might cause a short-term decrease in energy prices. However, energy prices have continued to rise and the qualification of WTE-produced electricity as renewable may prove a valuable revenue source.

Additionally, it appears that the federal government has begun to do an about face again on its treatment of WTE facilities—particularly given EPA's treatment of the ventures following the retrofits and upgrades of 1999. This treatment by the federal government may be a valuable resource for plant development and operations financing.

While the changes in the energy market may have led to the demise of Anytown's first attempt at a WTE facility, new changes including RPS may encourage development for the future. Likewise, as these goals are approached and as the federal government, states, and localities find renewable energy sources elusive, it appears likely that incentives may again appear to encourage development and expansion of WTE projects.

#### IV. Halting the Flow: Supreme Court Decisions and Waste Incineration

Prior to the 1990s, the WTE industry saw minimal government regulation of its industry. Its emissions and waste ash began to face greater regulation in the 1990s. Two significant decisions were handed down by the Supreme Court in May 1994. The impact of these rulings altered the way waste management systems could then integrate WTE systems.<sup>64</sup>

##### A. Pre-1994 Status

Prior to 1994, the courts had traditionally held that local regulation could not discriminate against interstate commerce solely to advance local economic interests. Such a holding was applied to strike down flow-control ordinances between states but had not addressed interjurisdictional limits on flow control of wastes.

Garbage became a serious problem as landfill space in the metropolitan areas on the eastern seaboard began to shrink. In particular, New York City continued to grow rapidly and soon began to see limitations with respect to its solid waste

disposal, in particular with respect to landfills. The issue was brought to the Supreme Court in 1978. In the case of *Philadelphia v. New Jersey*,<sup>65</sup> the Supreme Court held that household garbage was commerce within the meaning of the Commerce Clause of the U.S. Constitution.

The Commerce Clause<sup>66</sup> prohibits state or local regulations which discriminate against out-of-state commerce in order to protect local economic interests.<sup>67</sup> The court held that New Jersey's attempt to preserve landfill capacity for in-state garbage was unconstitutional. Courts have interpreted this holding to mean that a state cannot prohibit a private landfill or waste disposal facility from accepting out-of-state garbage or imposing a tax or additional fee on such waste. The Supreme Court continues to be unable to find a rational basis for restricting or surcharging out-of-state wastes<sup>68</sup> and has now extended this holding to include hazardous waste under the Commerce Clause.<sup>69</sup>

##### B. *Carbone v. Town of Clarkstown*<sup>70</sup>

Prior to 1994, local governments had the option to mandate the flow of waste within the boundaries of their jurisdiction. Essentially, this meant that a locality could require that waste was transported to a given facility or location within its boundaries. The result was that waste transporters and haulers would be forced to pay the tipping fees at the mandated facility. These higher fees helped support the publicly financed WTE facilities in many locations—many of which were built at larger incineration capacities than possibly necessary, but built with the expectation of a guaranteed stream of waste for processing due to the flow-control ordinances. Even if a waste hauler was able to find a cheaper disposal option at an area landfill or facility in another jurisdiction, the location could mandate that waste be transported to its chosen facility or facilities. These decisions helped ensure that WTE facilities could remain economically viable and could continue to operate and service the areas in which they were located.

This arrangement soon came crashing down around the localities and the WTE facilities. In *Carbone v. Town of Clarkstown*, the Supreme Court held that mandatory solid waste flow-control ordinances constituted an impermissible restraint on interstate commerce and were in violation of the Commerce Clause.<sup>71</sup> In *Carbone*, the town had passed a flow-control ordinance that required all nonhazardous solid waste within Clarkstown, New York, to be processed at the town transfer station.<sup>72</sup> Essentially, this ordinance was enacted in order to subsidize construction of the transfer station and had eliminated outside competition from other pro-

64. J. Carlin, *The Impact of Flow Control and Tax Reform on Ownership and Growth in the U.S. Waste-to-Energy Industry*, in MONTHLY ENERGY REVIEW, DOE/EIA-0535(94/09) (Sept. 1994).

65. 437 U.S. 617, 8 ELR 20540 (1978).

66. U.S. CONST. art. I, §8, cl. 3.

67. *Id.*

68. *Fort Gratiot Sanitary Landfill, Inc. v. Michigan Dep't of Natural Resources*, 504 U.S. 353, 22 ELR 20904 (1992); *Oregon Waste Systems, Inc. v. Department of Env'tl. Quality*, 511 U.S. 93, 24 ELR 20674 (1994).

69. *Chemical Waste Management, Inc. v. Hunt*, 504 U.S. 334, 22 ELR 20909 (1992).

70. *C&A Carbone, Inc. v. Town of Clarkstown*, 511 U.S. 383, 24 ELR 20815 (1994).

71. U.S. CONST. art. I, §8, cl. 3.

72. *Carbone*, 511 U.S. at 384.

cessors in Clarkstown.<sup>73</sup> These local restrictions were held to be a trade barrier against competition from out-of-state waste processors and therefore unconstitutional.<sup>74</sup>

The holding in *Carbone* has been further clarified and distinguished over the past 10 years with respect to certain variants of local flow-control legislation. While the underlying function of *Carbone* has limited waste-flow ordinances, some local waste arrangements and ordinances were held valid by the courts. The U.S. Court of Appeals for the Third Circuit<sup>75</sup> and the U.S. Court of Appeals for the First Circuit<sup>76</sup> ruled in favor of certain specific flow-control scenarios that selected facilities by open competitive bidding where the out-of-state bidders were not disadvantaged. Likewise, the U.S. Court of Appeals for the Eighth Circuit upheld “in-state flow control” since the laws themselves did not prohibit waste from leaving the state, but only applied to waste “destined for disposal” within the state.<sup>77</sup> Within the U.S. Court of Appeals for the Second Circuit, the court upheld the scenario in which a municipality had hired contractors to collect waste, and then directed them to deliver it to specific facilities—referred to as contractual flow control.<sup>78</sup> In the case of *United Haulers Ass’n v. Oneida-Herkimer Solid Waste Management Authority*,<sup>79</sup> the Second Circuit clarified the differences between laws which favor public facilities from those which favor private facilities. Some analysts predict that this ruling will have a significant impact on the Second Circuit states of Connecticut, New York, and Vermont.<sup>80</sup> The Court in *United Haulers* held that the *Carbone* ruling only precluded state or local legislatures from enforcing flow-control regulations that benefit private waste facilities. It did not, however, limit the legislatures from enacting regulations which would benefit publicly owned waste facilities.<sup>81</sup>

The simple result of the decision in *Carbone* has been that waste haulers are now able to dispose of their collected solid waste at nearly any facility, with certain exceptions. Local governments are now unable to freely direct the flow of waste to particular projects, allowing haulers to take advantage of the lowest-priced disposal option, which is oftentimes not WTE facilities. The more costly tipping fees at WTE facilities have made it increasingly difficult for the WTE plants to obtain the necessary garbage (and tipping fees) that allow them to run at capacity and operate efficiently. The immediate impact after *Carbone* was that WTE facilities that once had a guaranteed waste stream were now being forced to compete with landfills or other facilities for the waste to run their operations. Many WTE facilities were

forced to lower their tipping fees in order to ensure that waste could be directed to their facilities. Since that time, many localities have found creative ways to assist their WTE facilities (see *United Haulers*<sup>82</sup> and *USA Recycling, Inc. v. Town of Babylon*<sup>83</sup>).

#### C. City of Chicago v. Environmental Defense Fund<sup>84</sup>

The decision in *Environmental Defense Fund (EDF)*<sup>85</sup> forced WTE facilities to reexamine their methods of ash handling and disposal. The decision had the greatest impact on the financial operations of the systems, adding new handling and testing requirements. While most facilities had little trouble passing the toxicity requirements, the TCLP test added another unforeseen cost to the process.

Concern arose about the potential environmental liabilities surrounding ash disposal—liability for leaching of metals into the water systems, for example. WTE facilities were largely concerned about potential Superfund liability. This not only caused concern among the WTE facilities, but also the companies that had sprung up as recyclers of the ash. The impact of the *EDF* decision led some WTE facilities to forgo profitable and efficient ash recycling opportunities to dispose of the ash in landfills.

#### D. Anytown Case Study: Flow-Control Restrictions

Prior to the 1994 decisions, Anytown had benefited from the increased tipping fees and increased waste incineration from the flow-control ordinances. After the May 1994 Court decisions, the facility was suddenly faced with a decrease in waste to process and an increased requirement of toxicity testing of its waste ash—and a greater skepticism toward recycling the ash over landfilling it. Suddenly, the Anytown plant was dealt two blows to its operations, forcing layoffs as process capacity went unused.

What impact would the Court holding have on a new venture in Anytown? It would depend. First, it appears that in the past 10 years after *Carbone*, localities have found new arrangements that courts have upheld as not in violation of the Commerce Clause.<sup>86</sup> A new venture will likely only be a part of the solid waste management strategy for Anytown and therefore it will need to find an appropriate structure to ensure appropriate waste distribution and fees for its entire management strategy. Second, a new venture will be aware of the limitations and should therefore build a facility that fits within the waste management and distribution structure. New ventures are now less reliant on volume than in the past and can operate more efficiently and economically due to improvements in technology and operations. The result is that while the major holdings in 1994, *Carbone* and *EDF*, will have an impact on any new WTE facility in Anytown, a new venture will benefit from a greater awareness of the environment it will be operating in, will be able to leverage the lessons learned from other ventures over the past 25 years,

73. *Id.*

74. *Id.*

75. *Harvey & Harvey, Inc. v. County of Chester*, 68 F.3d 788, 26 ELR 20018 (3d Cir. 1995).

76. *Houlton Citizens Coalition v. Town of Houlton*, 175 F.3d 178, 29 ELR 21086 (1st Cir. 1999).

77. *Ben Oehrleins & Sons & Daughter, Inc. v. Hennepin County*, 115 F.3d 1372, 28 ELR 20048 (8th Cir. 1997).

78. *U.S.A. Recycling, Inc. v. Town of Babylon*, 66 F.3d 1272, 25 ELR 21522 (2d Cir. 1995).

79. 261 F.3d 245, 31 ELR 20873 (2d Cir. 2001).

80. R.W. BECK, DRAFT REPORT SOLID WASTE ACQUISITION: CHITTENDEN SOLID WASTE DISTRICT (2005), available at [http://www.cswd.net/facilities/BECK\\_DraftReport012605.PDF](http://www.cswd.net/facilities/BECK_DraftReport012605.PDF).

81. *United Haulers Ass’n v. Oneida-Herkimer Solid Waste Management Auth.*, 261 F.3d 245, 31 ELR 20873 (2d Cir. 2001).

82. *Id.*

83. 66 F.3d 1272, 25 ELR 21522 (2d Cir. 1995).

84. 511 U.S. 328, 24 ELR 20810 (1994).

85. See *supra* Section II.B. for more information on this case.

86. See generally *Ben Oehrleins & Sons & Daughter, Inc. v. Hennepin County*, 115 F.3d 1372, 28 ELR 20048 (8th Cir. 1997); *U.S.A. Recycling, Inc. v. Town of Babylon*, 66 F.3d 1272, 25 ELR 21522 (2d Cir. 1995); *United Haulers*, 261 F.3d at 245.

and should be able to build a business plan that fits within the framework of the legislative restrictions it faces.

A new facility will likely require legislation that will in some way direct waste in some capacity to facilities such as a WTE facility as well as others that oversee municipal recycling efforts and landfill disposal. Therefore, the other major factor will be the political ramifications of such a proposal and the ability to gain public support for financing, the flow-control regulations under the current legislative scope, and the general support for compliance with respect to reopening a failed venture in Anytown.

## V. Changes in the Economics of Waste-to-Energy Ventures

WTE facilities still in operation have been stung by a number of challenges including greater regulation of emissions and waste ash, deregulation of electricity, and flow-control restrictions. While this impact has been felt directly on the existing ventures, the growth of new facilities has been non-existent since the early 1990s. At least some of this is driven by concerns raised by environmental groups and EPA. However, another major factor in the new development has been a change in the economic conditions that allowed for the significant development of the WTE industry in the 1980s.<sup>87</sup> WTE facilities were able to be put in place so rapidly due to the existence of low capital costs for a new startup WTE venture. During the 1980s, the existence of public financing for these facilities, investment tax credits, and accelerated depreciation schedules were key to their development. Those benefits disappeared with the Tax Reform Act of 1986.<sup>88</sup> Specifically, the Act eliminated the tax-free status of WTE power plants financed with industrial development bonds, reduced accelerated depreciation, and eliminated the 10% tax credit.<sup>89</sup> However, it appears that developments in just the past few years may once again set up WTE facilities to take advantage of reduced capital costs.

### A. Tax Reform Act of 1986

During the establishment period of the WTE industry in the late 1970s and early 1980s, financial incentives from the federal government existed which included direct grants for pilot projects or feasibility studies, investment tax credits, favorable tax treatment for equipment depreciation, and the ability of WTE ventures to receive public financing.<sup>90</sup> Such treatment by the federal government coupled with favorable investments by states and local governments led to a ripe environment for the development of WTE waste management systems.

In 1986, Congress passed the Tax Reform Act,<sup>91</sup> which cut or limited incentives offered to potential WTE facilities, many of which had been crucial to the development of the industry in the late 1970s and early 1980s. The incentives for privatization of the facilities were dramatically limited.<sup>92</sup>

Investment tax credits were cut with the Act and favorable depreciation schedules for capital investments in WTE technology and equipment were lengthened.<sup>93</sup> Additionally, the Act struck the exception for these private facilities started with public financing from qualifying as “public purpose.”<sup>94</sup> The impact was that states then began to limit the earmarked revenue bond financing for these public sector and private sector joint WTE facility ventures.<sup>95</sup> This effectively forced these WTE ventures into the same financing money pot as other locality infrastructure programs and projects.<sup>96</sup> Without access to the financial and tax incentives that encouraged private ownership, access to public capital financing, or broad public support, it was exceedingly difficult for new ventures to gain traction.

As a result of the Tax Reform Act of 1986, it is more difficult to publicly finance projects that are not controlled entirely by a public entity—specifically, projects such as WTE facility development. The ultimate effect of the limitation of capital financing and tax benefits was to stall a growing industry in its tracks. Evidence of this is seen in the lack of development of new facilities since 1994.

### B. Anytown Case Study: Economic Regulations

The changes in tax law from 1986 forward had a minimal effect on the Anytown facility which was built and financed prior to 1986. It would, however, have a much more significant effect on any future development. These changes remain a significant obstacle to building or rebuilding a new WTE facility in Anytown. According to analysis by bond underwriter for WTE facilities, David Livingstone of Smith Barney Shearson:

The elimination of tax credits, the extension of depreciation schedules, and other tax changes have reduced the amount of capital private firms are willing to invest to ensure that an acceptable and competitive rate of return can be maintained. Consider, for example, a 1,500-ton-per-day WTE facility with capital costs of \$150,000 per ton and a typical operating capacity of 85 percent. A firm that would have been willing to invest 17.5 percent of total costs under the old tax laws now must limit that investment to only 6 percent of total costs under the new tax laws in order to maintain the same 15-percent rate of return on equity. The other 11.5 percent of the capital costs must be financed with additional bonds and paid for with higher tipping fees. Tipping fees would have to rise by approximately 14 percent to fund the additional debt.<sup>97</sup>

The impact on a potential facility such as Anytown's is that the financial position will be relatively precarious. This does beg the question whether Anytown should consider developing a public venture—but given some of the risks of such a venture, it is uncertain if this would rectify the concerns.

were initially financed with public funds but were owned and operated by private company ventures.

93. Tax Reform Act of 1986, Pub. L. No. 99-514.

94. Williams, *supra* note 41.

95. Hickman, *supra* note 1.

96. *Id.*

97. Based on cash-flow analysis by David Livingstone of Smith Barney Shearson, one of the major underwriters of WTE bonds from Energy Information Administration, *supra* note 55, and Annual Energy Review 1995, *id.*

87. Berenyi, *supra* note 46.

88. Pub. L. No. 99-514 (1987).

89. Carlin, *supra* note 64.

90. Williams, *supra* note 41.

91. *Id.*

92. Privatization of facilities references the fact that a significant number of WTE projects (including our hypothetical Anytown, USA)

Considering public ownership would entail an upfront commitment and investment by the city of Anytown and payoff of the investment over the life of the revenue bonds, likely to be 25 years. The decision to make such an investment is a difficult one since it is probable that the investment will be substantial. For example, to build a WTE facility in Anytown may cost \$70 to \$100 million or as much as \$300 million for a full-size facility.<sup>98</sup> On the other hand, investment by Anytown in a new landfill would cost only \$20 to \$30 million.<sup>99</sup>

In California, typical WTE tipping costs range from \$30 to \$40 per ton, while landfill tipping fees range from \$15 to \$70, with most fees in the \$20 to \$30 range.<sup>100</sup> In general, land-filling of solid waste remains less expensive, in purely financial terms, except in cases like New York City where the MSW is transported long distances. In the case of New York, the tipping fee for a landfill is about \$30 in states such as New Jersey or Pennsylvania, but the truck transport costs an additional \$70 to \$100. The burden, now shifted to New Jersey and Pennsylvania, is not sustainable according to many experts.

Depending on location, size, and other factors, the capital costs range from \$110,000 to \$140,000 per daily ton of capacity.<sup>101</sup> Therefore, a plant that processes 1,000 tons of MSW per day may cost between \$110 and \$140 million. One that processes approximately 250 tons of MSW per day may cost between \$27.5 and \$35 million. It is likely that Anytown would develop a facility that had the capacity for between 250 and 500 tons daily, ultimately meaning that a new facility could cost upward of \$70 million dollars, perhaps as high as \$100 million. These costs could perhaps be minimized through the use of the existing space vacated by the former venture in Anytown; however, even with those savings, the investment into the waste management stream will be significant.

On October 22, 2004, President George W. Bush signed the \$137 billion corporate tax bill into law.<sup>102</sup> The bill included production tax credit provisions for new WTE facilities.<sup>103</sup> According to a release by the Integrated Waste Service Association:

The law includes waste-to-energy among its definition of “qualifying facilities” that are eligible for Section 45 production tax credits. Although no plant is expected to use the credit as written, it is important because federal law now treats waste-to-energy similar to wind, solar, biomass, and other energy sources worthy of federal incentives.<sup>104</sup>

98. Waste-to-Energy Research and Technology Council, *Answers to Frequently Asked Questions Regarding Waste-to-Energy*, <http://www.seas.columbia.edu/earth/wtert/wtertfaq.html> (last visited Nov. 3, 2006).

99. U.S. GOVERNMENT ACCOUNTING OFFICE, ENVIRONMENTAL INFRASTRUCTURE: EFFECTS OF LIMITS ON CERTAIN TAX-EXEMPT BONDS, GAO/RCED-94-2, at 29 (1993).

100. Integrated Waste Management Board, *2000 Solid Waste Tipping Fee Survey*, <http://www.ciwmb.ca.gov/Landfills/TipFees/2000/> (last visited Nov. 3, 2006).

101. Waste-to-Energy Research and Technology Council, *Answers to Frequently Asked Questions Regarding Waste-to-Energy*, <http://www.seas.columbia.edu/earth/wtert/wtertfaq.html> (last visited Nov. 3, 2006).

102. Integrated Waste Services Association, *IWSA Weekly Update, 10/22/2004*, <http://www.barlowprojects.com/industrynews.htm> (last visited Dec. 1, 2006).

103. *Id.*

104. *Id.*

While the impact, according to most experts, will be somewhat limited due to the written limitations of the credit, it does represent a step in the right direction. Many point to the fact that as WTE grows back into favor and new technologies are offered, the likelihood of future credits for the industry do exist. As it currently stands, Anytown will struggle with the decision of whether to publicly finance a venture or to assist a venture with a smaller size investment. The change in the tax laws will continue to limit expansion in Anytown and other jurisdictions.

## VI. What Will It Take for Waste-to-Energy to Again Become an Important Part of Energy and Environmental Policy?

Throughout the course of this Article, we have examined the obstacles arising in the late 1980s and early 1990s to serve as a staggering blow to the industry. Many major facilities and companies were forced to limit their proposed expansions and developments. Some facilities were forced to close, including our hypothetical Anytown facility. But what is most telling about the industry is that it did not cease to exist and did not fold altogether. Instead, the industry invested in the necessary technology and now stands as one of the best examples of environmentally friendly energy, according to EPA.<sup>105</sup>

We identified several key issues that arose during the 1980s and into the early 1990s that quickly changed the circumstances for the industry. A number of factors caused this stoppage:

- redaction of tax credits
- megafill landfills
- environmentalists and public perception
- lack of federal leadership
- adverse federal court decisions
- air emission regulations
- integrated solid waste management
- poor public relations strategy

The result of this is that an industry once poised for success was able to regroup and refocus on its strengths. Now, after 10 years of limitations, the industry may again be positioned to encourage future development.

### A. Changes on the Horizon for the Waste-to-Energy Industry?

While federal, state, and local governments passing legislation that will deregulate the electricity markets, they are also beginning to establish RPS which require electricity generators to provide a certain percentage of their power from renewable fuels such as WTE. What has become clear is that development of new sources of electricity from renewable sources is not simple; in fact, development of wind power,<sup>106</sup> solar power,<sup>107</sup> and hydroelectric power<sup>108</sup> requires

105. Horinko & Holmstead Letter, *supra* note 3.

106. American Wind Energy Association, *Frequently Asked Questions*, <http://www.awea.org/faq/cost.html> (last visited Nov. 3, 2006).

107. U.S. DOE, Solar Energy Technologies Program, *Solar Frequently Asked Questions*, <http://www.eere.energy.gov/solar/cfm/faqs/> (last visited Nov. 3, 2006).

substantial investments. As such, WTE seems poised to fill this need.

There are other looming environmental regulations that may soon face the country, including the proposed Kyoto Protocol. Many experts have said that the United States could make significant inroads to compliance with the Kyoto Protocol by a greater use of WTE technologies. According to the director of the Earth Engineering Center at Columbia University, use of WTE-produced electricity from 115 million tons of garbage would produce power that could replace coal, and the byproduct of this change would be a reduction in carbon dioxide emission by 2%—partial achievement of the 7% reduction set out.<sup>109</sup> Ultimately, it appears that WTE technology with its new emission standards will be compliant with future regulations.

The changes that faced the WTE industry in the 1980s and 1990s produced a painful process that ultimately slowed growth, but the challenges did effect rapid change in the industry and prepared it to capitalize on future opportunities. Other sources of electricity, including coal, have now begun to show limitations in their effectiveness and have drawn ire from environmentalists and experts at EPA for air emissions. It is quite possible that some of the older coal-burning plants will be shut down and replaced with other baseload technologies such as clean coal plants or WTE facilities. The energy infrastructure is aging and given the limits seen in California and Ohio in recent years, there is opportunity for facility and infrastructure expansion. It will take an investment into winning the public perception battle, but the industry has followed EPA requirements to ensure that it can be a player in the future.

Likewise, the technology available for WTE plants of the future far outstrips the facilities built 20 years ago. Investment in technologies such as higher temperature burns, cleaner emissions screening, and other technological innovations offer a range of options for the next generation of WTE facilities.

It appears that much as was seen in consumer products such as aluminum, plastics, and paper, electricity may still be available to consumers as green electricity. By ultimately allowing consumers to make choices as to their electricity sources—particularly from those that are qualified as green such as WTE—we will push the decisions to the end-user and away from government regulation. We have also begun to see investment or energy production tax credits for new WTE and conversion projects.

These efforts as a whole will expand future market opportunities for WTE and may help to encourage the expansion of incentives for the construction of new facilities and expansion of existing ones. If the Energy Policy Act of 2005 and recent decisions and statements by EPA are any indication, we may well see new incentive programs for investments in WTE technologies.

Additionally, barriers to implementation of new WTE and conversion technologies must be addressed. For example, in some states, landfill diversion credits are not allowed

for any WTE or conversion technologies. This has inhibited development and application of new technologies. To overcome these and similar obstacles, legislators need to be educated as to the benefit of these technologies and new laws passed recognizing WTE and conversion technologies as legitimate landfill diversion and recovery options.

As evidence of the potential future of the WTE industry, Frost & Sullivan issued a report in 2003 stating: “Biopower (Biomass & Waste-to-Energy) Likely to Dominate the Renewable Energy Market.”<sup>110</sup> The report goes on to state:

“New standards, legislation, and incentives along with growing environmental concerns will force strategic changes in several industries with respect to waste management, initiating installation of new renewable biomass energy capacities,” opines the analyst. Biomass power plants and waste-to-energy units are likely to call the shots as demand for renewable energy sources rises due to stringent greenhouse gas emission standards as well as the increasing transport cost and tipping fees for waste disposal.<sup>111</sup>

While such posturing may simply be a way to spur investment and sell research reports, there seems to be a growing interest in the technology and in investment in future facilities. Two new pilot plants have opened recently in Oklahoma and Pennsylvania.<sup>112</sup>

Is the state set for WTE to solve the continuing landfilling crunch and the approaching renewable energy requirements? Perhaps. This time it seems that the WTE industry represents a cautious opportunity. The future, it seems, may again be prepared to allow a single stone to kill two birds. This time, however, that stone may be thrown without fear of the future.

### *B. Anytown Case Study: Conclusions*

On December 13, 2005, the city council of Anytown met to make its announcement regarding its research into restarting the Anytown WTE facility. The announcement came after meetings with state officials, officials from EPA, analysis by business planners, and most importantly, the accountants of the city.

“Ladies and gentlemen of Anytown,” began the chairperson of the council. The other council members looked at the chairperson and nodded in agreement as he began his prepared remarks.

“After months of research and much discussion behind the scenes, Anytown has decided not to reopen its WTE facility that was closed just over six years ago. While much has changed in just the past six years, we are still not ready to make such a significant investment in a technology that had just recently been unfit for our city. The investment remains steep and for the current time, we are concerned that the investment remains too speculative for our city. The factors including our size, a lack of public support, concerns about financing, and the limited recent industry growth all led us to our ultimate decision. While we remain open to the opportunities in WTE technology and the ability to use WTE

108. Hydro Research Foundation, *Frequently Asked Questions*, <http://www.hydrofoundation.org/research/faq.html> (last visited Nov. 3, 2006).

109. Nickolas Themelis, Renewable Portfolio Standard Collaborative Presentation: April 8, 2003, *Overview of Waste-to-Energy Technology*, [http://www.dps.state.ny.us/rps/april\\_forum\\_presentations/themelis.PDF](http://www.dps.state.ny.us/rps/april_forum_presentations/themelis.PDF) (last visited Nov. 3, 2006).

110. NORTH AMERICAN BIOMASS AND WASTE-TO-ENERGY MARKETS (Frost & Sullivan 2003), abstract available at <http://www.mindbranch.com/listing/product/R1-2392.html>.

111. *Id.*

112. Barlow Projects, Inc., *Current Projects*, <http://www.barlowprojects.com/220000.htm> (last visited Nov. 3, 2006).

as a piece of our solid waste management, the current risks are not appropriate for a city of our size at this time. Unfortunately, the time is just not right. We will move forward with our current solid waste management plan, one that continues to emphasize recycling and use of landfills.”

Those in the audience assumed the discussion was done, but he continued.

“However, Anytown will continue to be a leader in waste systems and waste-to-energy technology. In a partnership with the state of Columbia and EPA, a pilot program will be developed in Anytown to process waste tires with a new technology called pyrolysis. We will start small with tires in hopes of setting the stage for future WTE projects. It is our hope that technology can be developed here that can spread throughout the country. This technology will help to provide a resource to address the growing issue of waste tires. This plant will convert the used tires into carbon black, oil, steel, and noncondensable gases. Our plant will attempt to collect

any energy used in the process to be converted back into electricity to run the plant itself. Plus, the oil generated would be able to fill countless applications.

While the future of waste-to-energy facilities in Anytown is not today, we are committed to development of future technologies. Our council officially tables the discussion of the use of waste-to-energy technology as a part of Anytown’s waste management strategy until a future meeting. Until that time, we will consider the issue closed.”

The chairperson banged his gavel on the table and closed the meeting. In the next six months, the old WTE facility in Anytown would soon be converted into a cutting-edge tire recycling and processing facility, one that might revolutionize the processing and use of recycled tires.

In another year or two, the chairperson would visit new facilities in Oklahoma and Pennsylvania to bring that information back to Anytown. For another discussion about killing two birds with a single stone . . .