The Existing and Potential Economic Impact of the Energy-from-Waste Industry in Florida

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Forward

A Primer on Energy-from-Waste Industry

After recycling, there are only two proven options for disposal of municipal solid waste – otherwise known as household trash: bury the waste in a landfill or use Energy-from-Waste (EFW) to convert the trash into clean, renewable energy. EfW is the sophisticated process that recovers the energy contained in the actual trash while reducing the waste to just 10% of its original volume The energy is converted into high pressure steam that can be used directly for industrial and commercial processes, heating and cooling or can be directed to a turbine generator to continuously generate electricity. Importantly, EfW facilities operate on a 24 hour – 7 day a week basis, or "baseload" without regard to prevailing weather or sunlight conditions and can be located in any region or state within the United States.

Energy-from-Waste, when properly expanded and incentivized in the U.S., has the potential to:

- *Increase Recycling/Decrease Landfilling.* EfW has the potential to provide disposal for more than 140 million tons of U.S. municipal solid waste (MSW). By 2030, recycling could account for more than 50% of U.S. MSW generation, with EfW accounting for over 35% and thereby preventing the emission of over 140 million tons of greenhouse gases annually by 2030.

- *Deliver Clean, Renewable Energy.* By expanding EfW industry at this scale, the U.S. could produce approximately 2% of its electricity from this renewable source by 2030, up from 0.5% in 2007.[1]

- *Create Well-paying Jobs.* The construction and operation of new EfW facilities could provide over $250 billion of construction phase economic impact from 2010 through 2030 and create over 550,000 full-time equivalent construction jobs, and nearly 25,000 permanent jobs

The U.S. EfW industry has been in existence for more than 25 years, and there are 87 EfW facilities in the U.S. which, collectively,

- process more than 90,000 tons of MSW each day,
- supply electricity to more than 2 million U.S. homes and provide stable, good-paying jobs to approximately 6,000 Americans.[2]

1 U.S. Department of Energy Information Administration, U.S. Electricity Supply Data, June 2008.
2 "Waste Not, Want Not: The Facts Behind Waste to Energy," Integrated Waste Services Association (IWSA), September 2008.

In fact, this is "enough electricity to light all of the homes in Maine, New Hampshire, Vermont, Rhode Island, and most of Massachusetts," and equates to "enough electricity to displace over 1.2 billion gallons of crude oil, which could fill 15 supertankers."[3]

The U.S. Department of Energy and 24 state governments and the District of Columbia classify EfW as a renewable source of electricity. (A listing of those states may be found in Appendix A to this report.). Further, the United States Environmental Protection Agency (EPA) considers EfW one of the cleanest forms of energy generation, meeting or exceeding all federal standards. Notwithstanding its contribution and potential, there has not been a new EfW facility brought online in the U.S. in nearly 13 years, and much of the Country continues to rely on landfills. In fact, the EPA estimates that the U.S. landfilled almost 55% of its MSW in 2007. According to a 2006 study conducted by the Waste-to-Energy Research and Technology Council headquartered at Columbia University, approximately 1.5 billion tons of MSW are estimated to be deposited into landfills each year.[4] The U.S., with only 5% of the world's population, accounts for about 9% of all landfills based on EPA estimates. Admittedly, landfilling is the least expensive from strictly a cost perspective; however, the U.S. reliance on landfilling ignores the negative impacts to long term sustainability of the environment.

The situation in the U.S. contrasts sharply with what is going on elsewhere in the world as EfW usage and capacity additions continue to grow strongly throughout Europe and Asia. Overseas growth is driven by government policies that recognize the multiple benefits provided by EfW, which include climate change mitigation, renewable energy generation (and enhanced energy security) and sustainable waste and land management practices. In addition, EfW provides stable waste disposal costs and expanded employment and tax bases and long term sustainability. (A backgrounder on European EfW industry may be found in Appendix B.)

EfW is uniquely positioned to address some of the U.S.'s most pressing challenges, including:

- Dealing with climate change and reducing greenhouse gas emissions;
- Reducing our reliance on foreign energy sources and increasing renewable energy generation;
- Adopting more sustainable practices regarding land use and recycling; and
- Reinvigorating our economy through investments that will create both jobs and vital infrastructure and promote the long-term competitiveness of our nation.

3 " America's Own Energy Source," Published by the American Society of Mechanical Engineers, The U.S. Conference of Mayors, The Solid Waste Association of North America, and the Integrated Waste Services Association, December 2006.

4 Waste-to-Energy Research and Technology Council Brochure, October 2006.

Each challenge and EfW's contribution to meeting it are discussed below.

Climate Change

Waste disposal in the U.S. is a very serious issue from a greenhouse gas perspective. Decomposing MSW in landfills emits methane, a greenhouse gas over 20 times more potent than carbon dioxide (CO2).[5] According to the EPA, landfills account for approximately 23% of all anthropogenic U.S. methane releases – the largest source of man-made methane emissions, and methane accounts for 18% of greenhouse gas impacts.[6] At present, about 55% of U.S. MSW is buried in landfills each year.[7]

Waste reduction is the preferred first step in the waste management process, followed by reuse and recycling. Unfortunately, not all waste can be reused or recycled. After recycling, there are only two proven options for disposal: bury waste in a landfill or use the EfW process to convert the ever-growing supply of trash into clean, renewable energy.

EfW is the preferred option because it reduces the release of greenhouse gases by:

- Reduces the amount of MSW disposed of in landfills;
- Decreasing dependence on fossil fuel power plants and related CO2 emissions;
- Recycling metals (recovered through the EfW process), thus reducing mining of virgin materials and the associated CO2 emissions; and
- Reducing long-haul truck traffic to distant landfills.

The EPA estimates that EfW reduces greenhouse gas emissions by the equivalent of 30 million tons of CO2 per year in the U.S[8]. In effect, combusting one ton of waste in an EfW facility prevents the equivalent of one ton of CO2 from entering the atmosphere through the burning of fossil fuels to produce the same amount of electricity and the decomposition of MSW in landfills. Even assuming the best landfilling practices, each ton of MSW landfilled contributes the equivalent of about 10 tons of greenhouse carbon dioxide.

5 Themelis, N. J. and P. A. Ulloa, "Methane Generation in Landfills," Renewable Energy, vol. 32, 2007, page 1243.
6 "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006," U.S. Environmental Protection Agency, April 2008.
7 "Municipal Solid Waste in the United States: 2007 Facts and Figures," U.S. Environmental Protection Agency, November 2008.
8 See also "Waste Not, Want Not: The Facts Behind Waste to Energy," Integrated Waste Services Association (IWSA), September 2008.

Renewable Energy

Even when the nation's recycling rate increases significantly, – the most advanced recycling countries in the world only recycle approximately 70% of their waste today[9] – the volume of MSW will continue to increase. Recognizing this, EfW is currently classified as a renewable source of electricity by the Energy Policy Act of 2005, the U.S. Department of Energy and by 24 state governments and the District of Columbia. A summary of the strong historical federal support for EfW is provided in Appendix C.

Below are some interesting facts,

- EfW currently generates nearly 9% of U.S. renewable electricity, thereby reducing our reliance on fossil fuels and energy imports.[10]
- For every ton of waste processed at EfW facilities, we avoid the need to import one barrel of oil or mine a quarter ton of coal.
- In the aggregate, the U.S. EfW industry currently saves the equivalent of 30 million barrels of oil per year,[11] and, most importantly,
- While the EfW industry supplied approximately 0.5% of U.S. electricity consumption in 2007, an expanded EfW industry could provide approximately 2% of projected 2030 electricity demand (equal to 2.5% of current electricity demand).

Sustainability

In addition to providing clean renewable energy and reducing greenhouse gas emissions, EfW also promotes recycling and minimizes the environmental impact of MSW on land and other natural resources. According to the EPA, the U.S. MSW recycling rate was nearly 35% in 2007, approximately double the rate in 1990.[12]

Additionally, studies have shown that recycling rates tend to be higher in communities where EfW facilities are located.[13] The reason for this is simple: communities that invest in EfW facilities establish long-term, comprehensive solid waste management plans. This compatibility is clearly seen in European countries, where extensive use of EfW and higher recycling rates than those of the U.S. go hand-in-hand, e.g., Germany, Netherlands and Belgium.

9 Confederation of European Waste to Energy Plants, an organization representing approximately 340 waste-to-energy plants across Europe, www.cewep.eu.
10 "Municipal Solid Waste in the United States: 2007 Facts and Figures," U.S. Environmental Protection Agency, November 2008.
11 Waste Not, Want Not: The Facts Behind Waste to Energy," Integrated Waste Services Association (IWSA), September 2008.
12 "Municipal Solid Waste in the United States: 2007 Facts and Figures," U.S. Environmental Protection Agency, November 2008.
13 Kiser, J. V. L., "Understanding Why Recycling and Waste to Energy are compatible in the U.S.," IWSA 2007 Directory of Waste to Energy Plants, page 9, October 2007.

Job Creation and Economic Growth

Nationally, the EfW industry can have a significant impact on the U.S. economy. The construction of 226 new facilities in the U.S. by 2030 (approximately 13 per year), excluding tax revenues, could create approximately $215 billion (all dollars are express in 2008 dollars) in total economic activity and using U.S. labor and domestically-sourced materials and equipment. Including federal and state income taxes and sales taxes projected to be paid, the total economic impact of the construction of the new these 226 EfW facilities is estimated to be $255 billion. The construction effort would create both direct and indirect, good-paying jobs for approximately 28,000 people for 20 years.

In addition, it is estimated that the industry will create nearly 25,000 permanent jobs to operate the new facilities by 2030. On an ongoing basis, approximately $7.7 billion of economic activity would be generated annually as a result of the operations of the new facilities.

State of Florida

Based on the December 2008 NAVIGANT study commissioned by the Florida Public Services Commission, EfW was found to have tremendous potential to add to Florida's renewable energy generating ability. The report found that between now and 2020 EfW could add between 1,330 and 2,273 new megawatts of base load electrical generating capacity to the state's renewable energy generating capacity.

Currently, Florida has 11 EfW facilities providing 520 MW of base load generating capacity which is approximately 33% of Florida's installed renewable generation capacity. All of these facilities were built during the twelve year period between 1979 and 1991..

Assuming a similar commitment to EFW, Florida could produce an additional 500 MW of new renewable electricity; contribute over $7 billion in total construction economic impact, create over 1,200 new, non-exportable, and long term good-paying jobs, and, add over $240 million in local annual economic impact by 2020.

Existing and Potential Economic Impact to the State of Florida

This study, undertaken by Dr. Thomas Conoscenti of New York University, in conjunction with Covanta Energy Corporation, analyzes the economic impact associated with the construction of a new 1500 TPD EfW Facility in Florida. The purpose is to develop an understanding of the expected overall economic impact to the local Florida economy based on specific analysis of the following:

- Required capital investment for the new 1500 TPD EfW Facility (the "Facility")

- Estimated job creation resulting from:
  - Construction and permanent jobs directly created by the Facility
  - Construction and permanent jobs created indirectly

- Estimated wages/salaries generated from:
  - Construction of the Facility – directly
  - Construction of the Facility – indirectly
  - Permanent employment at the Facility – directly
  - Permanent employment related to the Facility – indirectly

- Estimated tax revenues generated from:
  - Employment (construction and operation) of the Facility
  - Supplies/materials purchased during construction of the Facility
  - Supplies/materials purchased during the operation of the Facility

Note: All dollar amounts in this study are expressed in 2008 dollars.

SUMMARY OF ECONOMIC IMPACT FOR ONE 1,500 TPD FACILITY IN FLORIDA*

KEY ASSUMPTIONS	
Size of New Facility	1,500 Tons/Day
Construction Period	36 Months
Construction Costs	$400 Million
On-Site Construction Jobs	250 Employees for 3 Years
Direct Permanent Jobs	50
CONSTRUCTION	
Economic Activity Generated from Construction	$553.8 Million
Total FTE Jobs (Direct and Secondary)	2,625 (875 Per Year for 3 Years)
Federal Income Taxes	$90.0 Million
Construction Phase Sales Taxes	$8.1 Million
Total Economic Impact of Construction	$651.9 Million
ONGOING ANNUAL OPERATIONS	
Jobs Created (Primary and Secondary)	115
Annual Economic Activity Generated from Operations	$19.3 Million Per Year
Federal Income Taxes	$2.3 Million Per Year
Annual Sales Taxes	$0.3 Million Per Year
Total Annual Economic Impact of Operations	$21.9 Million Per Year

*All dollar amounts expressed in 2008 dollars.

Economic Impacts Analysis

This analysis evaluates the overall expected economic impacts resulting from the construction of a new 1500 TPD EfW Facility in Florida. The economic impacts include those generated by the construction of the Facility and its eventual operation. These impacts were evaluated separately in measuring the projected effect on the Florida economy.

Value of Labor, Material, and Other Inputs

Assuming construction of the new EfW Facility begins in 2010, with 2009 devoted to the permitting process, the expenditure for U.S. goods and labor for the Facility stated in 2008 dollars is approximately $335 million. This amount includes the actual building construction cost, engineering, planning and other development costs. These costs do not include the value of land, taxes or financing charges. In addition, there would be additional material costs for international product purchases (approximately $65 million), which are not addressed in this study.

It is estimated that labor costs will account for $180 million of the Facility's total cost. Domestic building material expenses and other costs (e.g., engineers, planners, contractors, building fees, etc.) will account for approximately $155 million.

Framework for Analysis

Using the dollar estimates presented above, economic impacts were derived for each of the different cost components that make up the total value of the Facility. This was done to calculate the total economic impact on the Florida economy.

As a starting point, the following briefly describes the meaning of an economic impact:

- An economic impact refers to total change in employment and economic activity that results from the injection of spending into an economy. It is important to understand that a dollar in spending will generate more than one dollar in economic activity.
- For example, the wage income received by employees of a firm is spent in the local economy on the purchase of goods and services. Businesses that receive this spending now have the means to increase their spending by increasing employment, making payments on debts incurred, making outlays for items such as inventory, stock, advances on orders, etc.
- Thus, this money is spent several times, spreading into different sectors of the local economy, each time giving rise to new levels of income. This unbroken series of income conversions constitutes the multiplier or "ripple effect". The greater the number of hands through which such monies passes, the greater will be the beneficial effect on the economy.

Based on the above, the economic effects of construction projects are of two kinds:

- *First*, there are the direct effects of the projects that measure the specific construction related expenditures for labor, materials and other goods and services.

- *Second*, the material suppliers, construction workers and other workers involved in the project buy goods and services within the local economy. The economic activity generated by this spending is the secondary impact created by the initial spending. The multiplier measures the combined impact of the direct and secondary effects.

Therefore, the key to analyzing the economic impact of the construction of a new 1500 TPD EfW Facility in Florida is to determine the multipliers associated with the different types of spending involved in constructing the Facility.

The economic impact multipliers (factors) were obtained from an econometric model developed by Dr. Conoscenti and the RIMS II, Regional Input/Output Modeling System, developed by the Bureau of Regional Analysis. These factors allow us to identify the specific sources of changes in economic activity and employment activity in the Florida economy. The multipliers used to evaluate the impact of EfW construction activity on the economy represent RIMS II multipliers for the Miami-Ft. Lauderdale MSA, and are presented in the following table. As shown later in this report, different multipliers apply to project the economic impact in Florida from the ongoing operation of the new Facility.

MULTIPLIER FACTORS – CONSTRUCTION

Labor Payroll	2.00
U.S. Materials & Other Costs	1.25

Source: Dr. Thomas Conoscenti and RIMS II.

Applying these multipliers, every dollar spent on Labor Payrolls generates an additional one dollar in economic activity throughout the economy for a total impact of two dollars. In the case of U.S. Materials & Other Costs, each dollar spent results in an additional twenty five cents for a total impact of one dollar and twenty five cents of activity in the economy. It is important to note that this additional activity will also create new jobs in the economy. This is what is referred to as secondary employment.

Economic Activity Generated by Construction

To calculate total economic activity generated by construction of the new EfW Facility, the multipliers above were applied to Labor Payroll and U.S. Material & Other Costs:

ESTIMATED ECONOMIC ACTIVITY GENERATED BY CONSTRUCTION

(2010-2013, $ Millions)	
Total Economic Activity Generated	$ 553.8
Labor Payroll	$ 360.0
U.S. Materials & Other Costs	$ 193.8

Estimated Job Impact of Construction

Direct employment (on-site jobs) resulting from construction expenditures was estimated by Covanta Energy Corporation using a 36-month construction period. Based on Covanta's previous experiences developing facilities, it is estimated that 750 full-time equivalents (FTE), or 250 per year FTE, will be employed during the construction of the new EfW Facility.[14] Using a 2.50 multiplier for construction employment based on other comparable studies by Dr. Conoscenti, it is estimated that in addition to the direct employment, an additional 1,875 (625 per year) full-time equivalent jobs will be generated indirectly. This brings the number of jobs created by the construction of the new EfW Facility to an estimated 2,625 (875 per year) full-time equivalent jobs over the 36-month construction period.

FULL-TIME EQUIVALENT JOBS CREATED DURING CONSTRUCTION

(2010-2013)	
Total Employment	2,625
Direct (On-site)	750
Secondary (Off-site)	1,875
Secondary Employment Multiplier	2.50

Source of Multiplier: Dr. Thomas Conoscenti and RIMS II.

14 Full-time Equivalent (FTE) is the conversion of part-time worker hours to full-time jobs.

Estimated Permanent Jobs Created by Post-Construction Operations

Once the new EfW Facility is completed and operational, average permanent direct employment is estimated by Covanta Energy Corporation to be 50 full-time employees. Based on a 1.30 multiplier for permanent employment, the new EfW Facility is estimated to create an additional 65 secondary jobs in the economy.

JOBS CREATED BY OPERATIONS OF NEW EFW FACILITIES

Total Permanent Employment	115
Direct Employment	50
Secondary Employment	65
Secondary Employment Multiplier	1.30

Source of Multiplier: Dr. Thomas Conoscenti and RIMS II.

Economic Activity Generated by Post-Construction Operations

Annual payroll is estimated by Covanta Energy Corporation to be approximately $5.0 million for the new Facility. By applying the payroll operations multiplier of 1.80 developed by Dr. Conoscenti and RIMS II, it is estimated that the total payroll-related impact of operations on the economy as a result of the Facility would be $9.0 million per year, or $180 million total during the first 20 years of operation.

In addition to payroll, the new EfW Facility will purchase goods and services annually related to maintenance and operations. For the purposes of calculating annual economic activity generated in Florida, only the purchase of materials manufactured and services rendered in the U.S. are considered. Covanta estimates that on average the Facility will spend $10.0 million per year on these purchases. When multiplied by a 1.03 multiplier, the Facility is expected to generate $10.3 million of economic activity per year of Facility operation.

ESTIMATED ANNUAL ECONOMIC ACTIVITY GENERATED BY OPERATIONS

($ Millions)	
Total Annual Economic Activity from Operations	$ 19.3
Annual Economic Activity – Payroll	$ 9.0
Annual Payroll	$ 5.0
Multiplier – Operations Payroll	1.80
Annual Economic Activity – U.S. Materials & Services	$ 10.3
Annual Purchase of U.S. Manufactured Materials	$ 10.0
Multiplier –Operations Materials	1.03

Source of Multipliers: Dr. Thomas Conoscenti and RIMS II.

Tax Calculation Methodology

This section of the analysis examines the tax revenue implications of construction of a new 1500 TPD EfW Facility in Florida. Wages and salaries and materials and service purchases generate tax revenues to various levels of government in the form of income taxes and sales taxes.

Federal Income Taxes

Federal tax collection was calculated by applying a 25% average tax rate to the estimated total economic activity generated from labor payroll. Dr. Conoscenti has utilized this rate in other studies and believes it represents a conservative estimate of the average income tax rates paid by employees.

Income Taxes Generated During Construction

Construction of the new EfW Facility is estimated to generate economic activity related to labor costs of $360.0 million. Given this estimate, the federal government would receive an estimated $90.0 million in total income taxes during the construction phase of the new EfW Facility. This analysis considers both the primary and secondary impacts on economic activity resulting from the spending on labor associated with construction.

FEDERAL INCOME TAXES GENERATED DURING CONSTRUCTION

(2010-2013, $ Millions)

Economic Activity Generated From Construction Labor	$ 360.0
Federal Income Taxes Generated @ 25.00%	$ 90.0

Source of Tax Rate: Dr. Thomas Conoscenti.

Income Taxes Generated by Ongoing Operations

The ongoing operation of the new EfW Facility is estimated to generate annual economic activity related to payroll of $9.0 million. Given this estimate, the operation of the new Facility would contribute federal income taxes of $2.3 million per year.

ANNUAL FEDERAL INCOME TAXES GENERATED BY OPERATIONS

($ Millions)

Annual Economic Activity Generated By Payroll	$ 9.0
Annual Income Taxes Generated @ 25.00%	$ 2.3

Source of Tax Rate: Dr. Thomas Conoscenti.

Sales Taxes

State and local governments collect sales taxes on the purchase of goods derived from wages paid to employees during the construction and operation of the new EfW Facility. For the purposes of this study, Dr. Conoscenti assumed that for every dollar of economic activity created from labor, 50 cents would be spent on taxable consumption. This is a standard assumption used by governments to estimate sales tax revenues. In addition, federal income taxes are accounted for prior to calculating sales tax. The calculation of the sales tax assumes the 6% base sales tax rate for the State of Florida with no local option sales tax additions.

Sales Taxes Generated During Construction

Construction of the new EfW Facility is estimated to generate economic activity related to labor of $360.0 million. Given this estimate, the state and local governments would receive an estimated $8.1 million in sales taxes during construction.

SALES TAX GENERATED DURING CONSTRUCTION

(2010-2013, $ Millions)

Economic Activity Generated From Construction Labor	$ 360.0
(-) Federal Taxes @ 25.00%	($ 90.0)
Economic Activity After Federal Income Taxes	$ 270.0
(-) Taxable Consumption @ 50.00%	($ 135.0)
Economic Activity Subject to Sales Taxes	$ 135.0
Sales Tax Generated @ 6.0%	$ 8.1

Source: Dr. Thomas Conoscenti.

Sales Taxes Generated by Ongoing Operations

In estimating the impact of operations of the new EfW Facility on sales tax collections, two separate effects are considered:

> *First*, similar to construction sales taxes, a portion of the increase in economic activity resulting from employment at the facilities will be spent on taxable consumption, resulting in higher sales tax collections at the state and local levels. Payroll costs of the new EfW Facility are estimated to generate annual economic activity of $9.0 million. Given this estimate, the State of Florida and local governments would receive an estimated $203 thousand in sales taxes annually.

Second, sales tax will be collected on annual purchases of goods and services related to the operations and maintenance of the new EfW Facility. It is estimated by Covanta Energy Corporation that, on average, approximately $2.0 million of annual domestic purchases for the new Facility (assumed to average $10.0 million on U.S. good and services per year) will be subject to sales tax. This represents an average across any potential new facilities, accounting for the likely operation of some as publicly-owned facilities, which may not be subject to sales taxes. Using this estimate, the purchases of goods and services will contribute $120 thousand per year in sales tax revenues by 2030.

ANNUAL SALES TAXES GENERATED DURING OPERATIONS

($ Thousands)	
Annual Economic Activity Generated From Payroll	$ 9,000
(-) Federal Taxes @ 25.00%	($ 2,250)
Annual Economic Activity After Federal Taxes	$ 6,750
(-) Taxable Consumption @ 50.00%	($ 3,375)
Annual Economic Activity Subject to Sales Taxes	$ 3,375
Annual Sales Tax Generated from Payroll @ 6.0%	$ 203
Annual Purchases of Goods and Services	$ 2,000
Annual Sales Tax Generated from Purchases @ 6.0%	$ 120
Total Annual Sales Tax Generated	$ 323

Source: Dr. Thomas Conoscenti.

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Regional Input-Output Modeling System II

The calculations for the economic impact analysis were based on the Regional Input-Output Modeling System II (RIMS II) published by the Bureau of Economic Analysis. The model was first developed in the mid nineteen seventies to evaluate the impact of federal highway construction projects located in various states. The results of the model were widely accepted by governmental agencies at the federal, state and local levels. The model was called RIMS I. Due to the success of the RIMS I model, it was expanded to include the Metropolitan Statistical Areas (MSA's) in the U.S. (and eventually many of the counties surrounding central cities) and the expanded model is called RIMS II. This report uses the RIMS II model to calculate the economic impact on the economy resulting from the construction and operations of energy-from-waste plants. The RIMS II model and its factors are widely accepted by both the academic and professional community in doing these types of Analysis. Dr. Conoscenti has attended many of the workshops which the Bureau of Economic Analysis holds regularly regarding the RIMS II model.

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Appendix A

EFW Statutorily Recognized as Renewable in these States:

Alaska

Arkansas

California

Connecticut

District of Columbia

Florida

Hawaii

Indiana

Iowa

Maine

Maryland

Massachusetts

Michigan

Minnesota

Montana

Nevada

New Hampshire

New Jersey

New York

Oregon

Pennsylvania

South Dakota

Virginia

Washington

Wisconsin

Appendix B

International Usage and Growth of Energy-from-Waste

EfW is used extensively overseas and the industry is growing strongly across a number of markets. Global EfW capacity is currently estimated to total approximately 140 million tons per year , with about 50 million tons per year of capacity located in Asia (mainly in Japan), 60 million tons per year of capacity located in Europe , and 30 million tons per year of capacity located in the U.S.

Annual EfW investments to build new capacity and to maintain/upgrade existing facilities likely total $10 billion or more, with the the European Union (EU) expected to add as many as 100 new facilities by 2012 and to increase capacity by up to 13 million tons per year by 2018. The current outlook for U.S. EfW growth is very modest, however, with the U.S. currently expected to invest far less than its proportionate share.

The EU utilizes a simple but effective approach to managing MSW while reducing greenhouse gas emissions and expanding renewable energy generation. First, the EU reduces the amount of landfilled biodegradable waste (pursuant to the EU Landfill Directive of 1999) to 35% of its 1995 levels by dates in the 2015-2020 range (varying by country). Second, the EU acknowledges that EfW recovers both energy and metals from MSW. Third, the EU recognizes EfW is a net reducer of greenhouse gases, and some EU countries are using EfW to meet their respective Kyoto targets. Fourth, EfW is classified as a renewable energy source qualified to receive the same tariff incentives for the sale of the energy they produce as are provided for wood-fired biomass projects. Tariffs vary by country, but include a mix of feed-in tariffs as well as power market price premiums.

China is also advancing a number of policy objectives regarding EfW. First, China has a stated goal of processing 30% of its MSW in EfW facilities by 2030. Second, China has established a 15% renewable energy target by 2020 and EfW is included in the country's renewable energy scheme and benefits from a number of incentives such as premium power tariffs.

Appendix C

Historical Federal Support of the Energy-from-Waste Industry

The role of the EfW industry in addressing the nation's need to expand alternative energy production has been consistently recognized in important federal energy policy legislation.

Public Utility Restructuring Policy Act of 1978

- Required that investor-owned utilities must purchase privately produced power, including power generated by EfW facilities, at "avoided cost" rates
- Created the market context that stimulated the development of the independent power industry in the U.S.

Energy Tax Act of 1978

- Created special investment tax credits for the construction of alternative energy assets, including EfW facilities

Tax Reform Act of 1986

- Ended tax benefits to many industries
- Extended preexisting tax benefits for EfW facilities under strict transition rules
- Eased Tax-Exempt Bond Restrictions for publicly-owned EfW facilities

American Jobs Creation Act of 2004

- Expanded renewable energy production tax credits to include EfW facilities

Energy Policy Act of 2005

- Extended preexisting tax benefits for renewable energy production, including production from EfW facilities
- Encouraging the growth of EfW alongside other renewable energy sources makes more sense now than ever before given the increased U.S. focus on:
- Reducing greenhouse gas emissions;
- Increasing supplies of alternative energy;
- Promoting more sustainable environmental practices; and
- Investing in the buildout of U.S. infrastructure to promote job creation and economic - competitiveness.