2013 WASTE-TO-ENERGY EXCELLENCE AWARD

RELEASE FORM

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Date: 5/23/2013
**Executive Summary**

The Honolulu Project of Waste and Energy Recovery (H-POWER) provides unique and innovative contributions to the WTE field by having both Refuse-Derived Fuel (RDF) and Mass Burn (MBN) technologies on the same site, allowing for comprehensive and strategic management of the island’s wastes.

The facility is owned by the City and County of Honolulu (City) and operated by Covanta Energy Corp. (Covanta). The original service agreement for the RDF facility was signed in 1990. It was amended in 2009 for an additional 20-year term and to provide for the design, construction, and operation of a new MBN expansion unit.

H-POWER is critical to the City’s solid waste management plan and allows for nearly complete diversion of MSW from the island’s landfill. In addition, H-POWER produces up to 73 MW net renewable baseload power, which reduces reliance on imported fossil fuels.
1.) Engineering Design Systems and Technologies:

A Facility site layout and aerial photograph are shown in the Appendix.

RDF

The original facility (pictured below) began operations in 1990 and consists of two 100 tph waste processing trains (the daily processing capacity is 2,160 tpd in a single shift) and two 854 tpd combustion trains. The boiler design is the Combustion Engineering (CE) VU-40 Boiler and is similar to the RDF facilities in Hartford, Connecticut and Detroit, Michigan.

The diagram below shows the RDF process, including waste processing and preparation, combustion process from furnace to stack, and electrical production. The electrostatic precipitators (ESPs) have since been replaced with semi-dry scrubbers and reverse air baghouses.
Municipal solid waste (MSW) received on the tipping floor and front-end loaders are used to stack the waste. Bulldozers are used to compact the waste in storage piles that optimize the limited storage space in the receiving area.

The MSW is examined for bulky materials, household hazardous waste, medical waste, or other waste that is undesirable or unacceptable for the facility. These items are separated from the waste stream and staged for proper disposal or transport to the MBN.

MSW is then fed to the infeed conveyors of each of the two processing lines at a controlled rate using the front-end loaders. The conveyors elevate the MSW and convey
it past a picking station and to the processing system. Each of the two processing lines consists of a primary shredder (Flail mill), drum magnets, and two-stage trommel screens. The first stage removes process residue (glass, dirt and grit less than one inch) and the second stage removes appropriately sized materials (one to four inches) to send them directly to RDF storage. The trommel overs (or waste larger than four inches) is passed through a secondary shredder, and then to the RDF storage building.

The RDF storage building allows for surge capacity. Normal practice is to store the RDF for a few days because this tends to result in more uniform fuel properties. The storage floor is managed by limiting the amount of time that RDF is on the floor using a type of “first in first out” system. Front-end loaders are used to stack the RDF and to reclaim the material for feeding the boilers. The reclaim conveyors transport the RDF to the power block facility (PBF). The conveyors discharge into metering bins with five sets of auger screws at the bottom to meter the RDF to the boilers. The RDF is swept into the boiler by an air feed system.

Combustion occurs in a semi-suspension manner as the material is blown to the back of the grate in the furnace. Much of the lighter and smaller material is fully or nearly fully combusted above the grate while the larger and heavier particles complete combustion on the grate. The grate slowly travels toward the front of the unit as combustion is completed. The grate is a traveling design with under fire air passing through it from below. The under fire air cools the grate and provides oxygen for complete combustion and burnout of the RDF.

Flue gas passes through the furnace and into the boiler for heat recovery. The furnace walls consist of Inconel clad waterwall tube sections. A primary and secondary superheater is provided after the flue gas turns into a horizontal section. No screen tubes or generating section is provided ahead of the superheater. The superheater is followed by a generating bank, economizer and tubular air heater.

Superheated steam (850 psig/830°F) is sent to a 58.6 MW Toshiba condensing steam turbine (designated Turbine-Generator #1 or T/G #1) and a 75 MVA Toshiba A.C. generator (pictured below), and associated support systems. The electricity is sold to the island’s electric utility, Hawaiian Electric Company (HECO) and is considered baseload renewable energy.
The steam is condensed using water from the circulating water system and is reused in the boiler system. Heat is rejected at the facility cooling tower. Caprock wells provide brackish water that is used for makeup to the circulating water system. Cooling tower blowdown is reinjected. Other than the blowdown reinjection, the facility has zero liquid discharge.

City water is used for boiler make-up after passing through both reverse osmosis units and a demineralizer. The City and Covanta are completing improvements to provide the ability to use reclaimed (R1) and reverse osmosis (RO) water purchased from the island’s water utility (Board of Water Supply or BWS).

The flue gas passes into the air pollution control (APC) equipment for each boiler, which consists of a rotary atomizer type spray dryer absorber (SDA), and baghouse. An activated carbon system has been installed and is available, but is typically not required to be in operation to meet emission limits. The facility was originally proposed with only ESPs. SDAs were added to the design prior to construction due to a permit remand.

APC Improvements and RDF Refurbishment

The City replaced both of the existing ESPs with new reverse air fabric filter baghouses (pictured below) in 2009, which have provided improved performance with respect to particulate and heavy metal control.
After nearly 20 years of operation, the RDF facility was starting to need some refurbishment. As part of the preparation for the next contract term, the City wanted to replace key equipment and to give the facility a makeover. Projects were identified that would be necessary for continued operation to meet and exceed the contract performance guarantees. These projects were reviewed, and a budget of $48M was established for the anticipated work. The City began the first of these refurbishment activities in 2010, in parallel with the MBN construction in order to improve the reliability of the RDF units.

Most the refurbishment work included replacement of the original boiler waterwall tubes, which has been largely completed. Work began with replacement of half of the waterwall panels in the lower furnace area on both sides and the rear of the unit. The original panels with field overlaid Inconel (fire-side only) were replaced with spiral wound Inconel tubes. Subsequent phases of work have replaced many of the upper panels on the furnaces for both units, parts of the boiler roof, and other sections of the boilers. Remaining work includes a modification to the burner arrangement, bull nose, and portions of the front wall, and a possible modification to the superheater arrangement.

The existing five-cell wooden cooling tower structure was also deteriorating, and was totally replaced with a fiberglass frame structure (pictured below). To complete the replacement, a two-cell tower was added as an early part of the MBN construction, thereby allowing the existing tower to be rebuilt one cell at a time. This allowed continued operation of the RDF facility prior to the start-up of the MBN without loss of MSW processing capacity.
Other refurbishment projects have been completed or are planned over the next few years. The main condenser will be updated with titanium tubes and tubesheets, which are anticipated to have better performance with the brackish circulating water. This project will be completed in 2013 in conjunction with a major turbine overhaul. New feedwater pumps will be installed to replace the existing units. A number of projects are planned for the RDF production lines. New magnets (pictured below) are projected to improve ferrous recovery. The arrangement for the in-feed conveyors and bulky waste grapples will be upgraded. The secondary shredders will be replaced with new units. The RDF metering bins will also be improved.

A controls upgrade is also in progress. The T/G #1 Woodward Control System has been replaced. The control systems for the waste processing lines, boilers, and bulk of the facility will also be addressed including necessary repairs to electrical systems.
Other refurbishment projects include the following -

- Replacement of the eddy current separator for non-ferrous recovery from the ash
- Replacement of various air conditioning units
- Certain work on the boiler economizers and ash chute seals
- Certain work on the scrubbers and slakers
- Replacement of the pugmills
- Refurbishment of under grate air plenums
- Repairs to the building siding and roof

MBN

The MBN facility is pictured below.

The City prepared an RFP and received proposals in 2008 for the design, construction, and operation of a new 900 tpd WTE facility. The City chose as the winning bid Covanta Energy’s proposal for a mass-burn unit (MBN). Together with the addition of a shear shredder, the MBN gives the City the ability to process additional categories of bulky waste not possible with the original RDF facility, such as mattresses, carpets, and furniture.
The MBN broke ground in December 2009 and was completed in August 2012, on budget and 4 months ahead of schedule. The Dedication Ceremony was held by the mayor of Honolulu and Covanta Energy on October 9, 2012 (see media links in Appendix).

A second inbound scale was added to provide additional capacity for more refuse deliveries. The existing tipping floor and waste disposal area were determined to be inadequate for the additional traffic and waste capacity required for the MBN; therefore, two parallel inbound lanes and two separate, but connected tipping floors were designed and constructed. A dispatcher coordinates traffic to ensure that inbound trucks proceed to the correct tipping floor. The MBN tipping floor (pictured on a full day below) was designed to accommodate tilt-up trucks, end-dump packer trucks, roll-off containers, and transfer trailers with capacities up to 120 cubic yards. All vehicles delivering bulky materials such as mattresses, carpets and furniture are directed to the new tipping floor. This bulky waste is deposited onto the tipping floor for inspection prior to shredding. Shredded material is directly discharged to the pit via a chute and mixed with refuse prior to charging the feed chute.

The MBN includes a 3-day refuse storage pit. Refuse is deposited either onto the tipping floor for inspection or directly into the pit. Refuse is charged to the feed chute with a crane system. Dual Kone cranes have a semi-automated control system allowing the crane operator to press a button to deliver the crane load into a specific zone in the feed hopper with no manual steering required (pictured below). Refuse is then metered from the bottom of the feed chute by hydraulic ram feeders and fed onto the surface of the Martin stoker grate, controlled by the Martin combustion controller. The grate system is
Martin reverse reciprocating technology consisting of 6 grate runs, each 17 grate bars wide. This makes it one of the largest Martin grate systems in the world. The Martin boiler has a vertical radiant furnace, two convection passes, a horizontal superheater section, one vertical superheater section, and a vertical economizer.

The MBN contributes a major technology advancement to the WTE field - Covanta’s Very Low NOx (VLN™) technology, which lowers NOx generated as well as reduce the overall excess air from a typical Martin stoker boiler while increasing boiler efficiency. The MBN is the first boiler to have the technology built into the design. Prior to construction of the MBN, the only boilers to employ this proprietary technology have been retrofitted units.

VLN™ technology employs a unique combustion air system design, which in addition to the conventional primary and secondary air systems, features an internal gas recirculation (IGR) injection system located in the upper furnace above the secondary air nozzles. Gas is drawn from above the grate at the rear of the furnace and re-introduced to the upper furnace above the secondary air injection level. Recirculation of the flue gas reduces the need for combustion air for complete combustion in the furnace, resulting in a smaller boiler and APC equipment than in a typical MBN of similar capacity. This technology is designed to reduce capital costs while improving boiler efficiency and reducing NOx levels.

The quantity of primary air in the VLN™ technology is adjusted to minimize excess air during combustion of waste on the grate, thereby reducing the overall excess air rate from approximately 100 percent, as in previous boilers with Martin stokers, to 50 to 55 percent excess air. The combination of the IGR and reduced secondary air extends the combustion zone in the furnace, which in turn inhibits the formation of NOx. The VLN™ technology, combined with an aqueous ammonia SNCR system, is expected to reduce NOx emissions by more than 50 percent below the U.S. Environmental Protection Agency’s (EPA’s) current Maximum Achievable Control Technology (MACT) requirements.
Covanta’s research has shown that this technology will provide the following direct benefits:

- NOx guarantee of 110 ppm daily and 90 ppm annual mean
- Increased boiler efficiency
- Reduced particulate carry-over
- Reduced boiler fouling rates

The MBN APC equipment includes SNCR, a semi-dry scrubber, carbon injection, and a pulse jet fabric filter (baghouse). A new stack is also provided.

MBN steam conditions are 830°F and 900°psig. Steam is transported from the MBN via an elevated pipe rack to a new Siemens steam turbine-generator (designated Turbine-Generator #2 - or T/G #2), capable of producing up to 33.6 MW (pictured below). An important aspect of the design allows for the shared production of main steam between the existing and expansion units. Operation of the new and existing T/G sets can be optimized through cross-ties that allow for both independent operation of the RDF and MBN boilers as well as a combined configuration.

The MBN also added steam bypass dump condenser (DC, pictured below), which allows for continued operation of the MBN boiler to process waste even when T/G #2 is off-line. The main purpose of this system is to reduce the need to divert waste to the landfill if the T/Gs are offline. The DC also assists with increasing the ramp-up/ramp-down rate of the T/Gs. The City is currently reviewing a proposal for a second DC, which if approved, would be sized to handle the steam production of both of the RDF units.
2.) Environmental Impacts & Regulatory Compliance

H-POWER provides important environmental benefits to the residents of Oahu. The City has conducted several life-cycle studies, using RTI, MSW Decision Support Tool (DST), and triple-bottom-line methodology, to assess H-POWER’s global impacts. In every case has demonstrated cost savings, avoided imports of fossil fuels (about 1 barrel of oil avoided for every ton of MSW combusted), and avoided associated air pollution impacts including avoided greenhouse gas (GHG) emissions.

H-POWER meets or exceeds requirements in its environmental permits, which include Solid Waste, Clean Air, and Water. The facility consistently passes ash TCLP testing and stack performance testing.

Innovative Contributions to WTE

Combined Facilities

- Other facilities and communities will look to H-POWER to see how the integration of the RDF and MBN technologies has been accomplished.
• Shared production of main steam between units. Operation of each of the two T/G sets can be optimized through cross-ties that allow for both independent operation as well as a combined configuration.

• Two separate but connected tipping floors.

• H-POWER is one of the very few VPP facilities in Hawaii.

• Brackish water obtained through caprock wells is used for cooling RDF

• Bottom Ash Metals Recovery (BAMR) system and Enhanced Ferrous Recovery (FEEN) has been installed and operating since 1999.

• Air-to-air preheaters are an almost unique feature of the facility. Covanta has installed, tested and optimized modifications to the air preheater to slow cold end corrosion of the air preheater tubes. This modification incorporated a tube-in-tube design which reduces the heat transfer of the first section of the air heater tube, increasing the combustion air temperature while maintaining a tube metal temperature above the acid gas dew point.

• Experimented with various sized openings in the WPF trommels allowing the flexibility of adjusting the characteristics of the RDF and process residue.

• New baghouses have been equipped with bag break detectors at the outlet of each compartment to provide early warning of bag damage.

MBN

• Essentially eliminates MSW and bulky waste diversions to the landfill.

• Employs VLN™, a new and innovative technology for NOx control

• Bypass dump condenser allows for continued operation of the MBN boiler to process waste even when T/G #2 is off-line. With a future DC installed on the RDF facility, this potentially eliminates the need to divert waste to the landfill if the T/Gs are offline.

• Provides ability to manage the bottom ash separately as a recyclable by-product should State and Federal regulations change in the future.

• A unique sludge receiving, pumping and distribution system, with a separate odor control system, is being developed (see Section 5, Special Waste).

3.) Performance

Over nearly 25 years of operations, the RDF facility has consistently achieved 85% availability and 525 kwh/ton net electrical production. It processes on average 600,000 tons MSW annually, significantly exceeding the performance guarantee of 561,600 tons per year.

The MBN passed its 7-day Acceptance Test achieved commercial operations on August 4, 2013. After nearly a year of operations, the MBN is outperforming its contract
guarantees, including demonstrated 1000 tpd capacity (900 tpd guaranteed) and 600 kwh/ton energy efficiency (559 kwh/ton guaranteed).

For the combined H-POWER facility, Covanta guarantees and consistently meets or exceeds the following contract performance standards:

- **Energy:** RDF - 520 kwh/ton; MBN 559 kwh/ton
- **Throughput** – 840,825 tons/yr capacity
- **Metals**
  - 80% recovery of all ferrous metals which would not pass a 1” screen
  - 60% recovery of all non-ferrous metals which would not pass a 3/8” screen
- **Ash quality standard:** no more than 3% unburned carbon by wet weight; no more than 30% water
- **Reagents**
  - Pebble Lime – no more than 25 lb Pebble Lime consumed per ton MSW
  - Carbon – no more than 2.25 lb Carbon consumed per ton MSW
  - Ammonia – no more than 3 lb dry ammonia consumed per ton MSW
- **Meet, at a minimum, all requirements specified in all permits**

Ash Management

MBN

Bottom ash from the MBN is discharged from the grate using two ash dischargers and is conveyed past a grizzly scalper to remove large items (pictured below). The undersized bottom ash is then conveyed over a drum magnet and eddy current separator for ferrous and non-ferrous recovery, respectively, within a new ash residue loadout building (pictured below).
Fly ash is collected at the following collection points: convection pass, superheater, economizer, and APC train. It is then combined via screw and drag chain conveyors and conveyed to a fly ash silo in the ash residue building. From there, fly ash is blended with bottom ash prior to loading into transfer trailers for transport to the landfill.

The ash processing system was designed with the ability to process bottom ash separately or in combination with fly ash. The purpose of this design was to have the ability to sell the bottom ash as a recyclable by-product should state and federal regulations change in the future. Covanta and the City have engaged in discussions to simplify the system. These modifications will allow the ash handling system to operate more efficiently and improve availability.

RDF

Originally, the only metals recovery at the RDF facility was the ferrous metals removed from the MSW during processing and metals recovered from the bulky waste. Subsequently, a bottom ash metals recovery (BAMR) system was installed in the early 1990’s to recover ferrous and nonferrous metals from the ash using drum magnets and an eddy current separator, respectively. The recovered metals are sold to local recycler. The bottom ash is combined with fly ash and transported to the landfill in transfer trailers.

Emissions Control

The RDF operates under a Covered Source Permit and is considered a major source. The MBN has a separate Covered Source Permit. The requirements differ between the two facilities due to the technology employed. Both facilities operate well within their
specific performance requirements which are closely aligned with the performance requirements of the New Source Performance Standards for Large Municipal Waste Combustors (40 CFR 60, Subpart Eb). The MBN has a few requirements that are more restrictive than the EPA requirements. The table below summarizes the emission limits for both the RDF and MBN and presents representative results from the most recent testing campaign.

The RDF design included ESPs. However, prior to construction, this design was upgraded to include SDAs for control of acid gases. More recently, the ESPs have been replaced with new reverse air baghouses as a means of improving emissions performance. Each of the RDF units also has good combustion control and continuous emissions monitoring system (CEMS) for reporting carbon monoxide (CO), sulfur dioxide (SO₂), and nitrous oxides (NOₓ). Neither a carbon injection (CI) system for control of dioxins and mercury nor SNCR system for NOx control is needed on the RDF units to achieve the required performance.

The MBN is equipped with the following APC equipment to control pollutants:

- Covanta’s VLN™ technology and SNCR for the control of NOₓ
- Semi-dry scrubber for the control of acid gases such as hydrochloric acid (HCl) and SO₂
- Activated carbon injection for mercury (Hg) control
- Pulse jet fabric filter for particulate removal
- Good combustion control for control of combustion related pollutants

The test results indicate that the emission requirements for each unit can be achieved with margin for testing variation. For particulate-related pollutants, the performance of the RDF units equipped with reverse air baghouses does not appear to be substantially different from the performance of the MBN with its pulse jet baghouse. The CI system on the MBN may have improved dioxin emission performance over the RDF; however, all test results are well within their respective requirements.
### H-POWER Facility Emissions Performance

<table>
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<tr>
<th>Pollutant</th>
<th>Existing RDF Units</th>
<th>Expansion Mass Burn Unit</th>
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<tr>
<td></td>
<td>Emission Limits(^{1,2})</td>
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<td>SO(_2) 24-hr(^4,4)</td>
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<td>PM (filterable)</td>
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<tr>
<td>CO(^{5,8})</td>
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<td>Ammonia (slip)</td>
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<td>Lead (Pb)</td>
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<td>Dioxin/Furan(^9)</td>
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**Notes:**
1. Emission limits shall not be exceeded (except during warmup, startup, shutdown, or malfunction).
2. All emission limits are referenced to 7 percent oxygen (O\(_2\)), dry gas basis; ppmdv = parts per million dry volume; mg/dscm = milligrams per dry standard cubic meter; µg = micrograms.
3. 24-hour daily geometric average emissions limit.
4. Maximum emissions limit or at least 80 percent reduction by weight or volume (whichever is less stringent).
5. Arithmetic average.
6. Maximum emissions limit or 80 percent reduction by weight for RDF units and limit or 85 percent reduction by weight for mass burn unit (whichever is less stringent).
7. Maximum emissions limit or 90 percent reduction by weight or volume for RDF units and limit or 95 percent reduction by weight or volume for mass burn unit (whichever is less stringent).
8. RDF units have a 24-hr limit and the mass burn unit has a 4-hr limit.
9. Total tetra through octa PCDD/PCDF.

### 4.) Coordination and Cooperation with Waste Supply Organization

This application was prepared by the City and County of Honolulu Refuse Division, which is responsible for all aspects of integrated solid waste management on the island of Oahu, including H-POWER, recycling, landfills, transfer stations, and refuse collection. Local municipal and private waste professionals manage, supervise, consult, and coordinate all aspects of the facility, including administration, engineering,
refurbishment, future planning, environmental compliance, waste deliveries, and ash and residue disposal.

Close cooperation and significant subsidizing of the island’s recycling program allows for more efficient collection of aluminum and other recyclables. H-POWER has the ability to separate items such as white goods and propane tanks and deliver them to the appropriate recycling facility. For the metal that is not captured at the curbside, magnets remove ferrous metals from the RDF process and from the ash. Non-ferrous metal is also captured from the ash stream and subsequently returned to mills for reuse.

5. Facility Planning
Describe the special waste management/collection system planning process.  
Discuss the plan for managing the special waste.

H-POWER is irreplaceable to the integrated waste management for the island of Oahu. It accepts all the post-recycled MSW, bulky waste, and special wastes. If the facility did not exist, the only other means of disposal would be the Waimanalo Gulch Sanitary Landfill. Off-island shipping of waste was previously proposed but was proven to be too costly and controversial. With the landfill site constrained by a canyon environment, its remaining life would be severely limited to less than 10 years if all the MSW on the island were diverted there. The costs and controversy of permitting and constructing a new landfill could prove siting a new landfill infeasible.

Although a landfill is required for redundancy and emergency purposes, H-POWER has made possible the conversation to close the landfill. H-POWER, sited on a small footprint of 25 acres, has saved more than 500 acres of landfill space since its inception by reducing the volume of waste by 90%, and will save more area in the years to come. With land costs on Oahu easily approaching $1M per acre, H-POWER has provided significant savings by reducing the footprint of waste management on the island.

On an island with no fossil fuel resources and forced to import all oil and coal used for electrical generation, costs for electricity are very high (residents pay on average 37 cents per kwh). H-POWER generated up to 10% of the island’s electrical needs and that value is not lost on the community. HECO will soon be developing significant solar and wind generation, which makes H-POWER valuable to the utility considering that the facility is firm baseload power with high availability of 85-90% compared to the as-available generation of wind and solar which have less than 50% availability.

Special Waste

The City master plans special waste management through periodic updates to its Integrated Solid Waste Management Plan, which identifies types of special wastes, appropriate management or disposal facilities, and redundant systems for backup, alternative, or emergency disposal.
The City has planned a sludge receiving station at H-POWER. It will allow the MBN to receive, store, and process virtually all the island’s wastewater treatment plant (WWTP) sludge currently being disposed of at the landfill. The system is designed for a capacity of 90 tpd at 30% solids sludge. Delivery trucks will enter the tipping floor using the same inbound ramp as trucks carrying MSW and unload to a push floor bin with automatic bifold cover. Screw feeders will feed sludge to hydraulic wet cake pumps for distribution to the feed chute. A row of pinch valves in succession across the chute, will inject sludge into the MSW before it is loaded onto the feed table. Potential odors caused by the unloading and storage are to be treated through a dedicated bio-filtration system before venting to atmosphere. The net impact of mixing sludge with MSW is expected to reduce the overall heating value of the fuel by 230 Btu/lb or 4 percent, an insignificant impact considering the important benefits of landfill diversion and volume reduction. As of May 2013, the facility design is complete but construction has not yet begun pending a modification to the MBN air permit.

H-POWER has also been identified and permitted as a suitable facility for tires, automobile shredder residue (ASR), medical waste, combustible construction and demolition (C&D) waste, contaminated green waste, used oil, expired pharmaceuticals, and limited quantities of explosives including fireworks and flares. Also, the City is considering a Covanta proposal to either reduce the amount of process residue generated from the RDF, or to transport the process residue to the MBN for combustion, for additional energy generation and volume reduction.

Other plans for future expansion or refurbishments include:

- Superheater and bullnose modifications for improved energy recovery
- Ash residue building improvements to improve availability and reduce maintenance of the bottom and fly ash handling systems
- Rooftop solar generation project (up to 1 MW)
- Waste heat recovery project using Organic Rankine Cycle (ORC) unit
- Additional warehouse building for storage of equipment and spare parts
- Traffic improvements project including additional entry/queuing lanes and one-way traffic flow
- Pilot-scale waste conversion technology demonstration projects on-site
- Replacement of existing rolling stock (dozers/loaders) that have reached the end of useful life
- Office trailer purchase for library / visitor center
- Note: see Section 1 (RDF Refurbishment) for projects in progress

Community concerns directly related to H-POWER are rare and the facility consistently receives positive feedback. However, H-POWER has addressed many landfill-related concerns, including:

- Sludge odors at the landfill to be mitigated by diverting sludge to the planned sludge receiving facility
• Landfill disposal overall to be reduced by diverting MSW, bulky waste, and special waste to H-POWER

6.) Worker Health & Safety

H-POWER has demonstrated a commitment to health and safety through the programs as evident from the many awards it has to its credit, including:

2006 - Recognition as a SHARP (Safety & Health Achievement Recognition Program)
2007 - Designated as an Occupational Safety and Health Administration, Voluntary Protection Program (VPP) Star Facility. Currently H-POWER stands with Monsanto, Chevron, the Pearl Harbor Shipyard, and the Makewao Post Office, as the only 5 VPP Facilities in Hawaii.
2008 - Received first place for excellence in safety and health by the American Society of Safety Engineers and Hawaii Occupational Safety and Health.
2008 – Honored as a U.S. EPA National Environmental Performance Track site - Performance Track recognizes facilities that have a strong record of environmental compliance, set three-year goals for continuous improvements in environmental performance beyond their legal requirements, have internal systems in place to manage their environmental impacts, engage in community outreach and consistently report results.

Covanta conducts Step-Up for Safety training for all employees. Covanta’s on-site Quick Response Team (QRT) is trained in First Aid, CPR, and AED use by the Honolulu Fire Department and HeartStart. The QRT can respond immediately to any medical emergency.

Covanta reports safety statistics to the City monthly, including Total Case Incidence Rate (TCIR), Incident Index, OSHA recordables, non-OSHA recordable on-site/off-site first aid, contractor incidents, and near-misses. Covanta staff complete safety & health communication forms and job/task analysis cards to clearly document and communicate safety issues and procedures.

7.) Economics and Cost Effectiveness

The RDF facility was conceived in the late 1980s and constructed for $150M, plus an additional $40M to provide scrubbers due to environmental Change in Law. Taking advantage of the Tax Recovery Act of 1986, this depreciable asset was sold to the pension program of Ford Motor Company for $312.5M, was operated under a lease-back arrangement, and after 17 years was bought back by the City for a residual value of only $18M – a great deal for the residents of the island. The RDF facility is currently within a 6-yr refurbishment and replacement schedule with a total value of $48M.
The MBN facility was conceived in the mid-2000s, was constructed using $320M ($2008) of public financing (GO bonds), was completed on budget and achieved commercial acceptance on August 4, 2012 – four months ahead of schedule.

The combined H-POWER facility has an annual operating budget of up to $100M, which funds service fee payments to Covanta, ash and residue disposal, landfill development and operations, and debt service.

H-POWER’s unique island location profoundly affects its economic performance, contributing a number of factors that make a waste-to-energy facility a sound investment for the City and County of Honolulu, including high electric rates, high tip fees, and limited availability and high cost of land. The City has conducted several life-cycle analysis using RTI, MSW DST, and triple-bottom-line methodology. All the studies showed that H-POWER provides significant global economic benefits, including cost savings and development of a skilled professional workforce.

Tipping fees at H-POWER are $45/ton municipal and $81/ton commercial, the same as the landfill. Tipping fees generate up to $40M annual gross revenues for the City.

The additional electrical production from the combined H-POWER facility required an amended and restated Power Purchase Agreement (PPA) with HECO. The new PPA was approved by the Public Utility Commission (PUC) on January 17, 2013. On average, the City receives $0.20/kwh, of which Covanta receives 18.5% capped at $0.165/kwh. Electric revenues generate up to $85M annual gross revenues for the City.

Recovered ferrous and non-ferrous metals generate up to $5M annual gross revenues, of which about half is shared with Covanta.

Accounting for all costs, H-POWER returns to the City in excess of $30M net revenues annually through tipping fees, the sale of electricity, and recovered metals.

8.) Public Acceptance, Appearance and Aesthetics

Because of its quiet, reliable service to the island, H-POWER has earned a strong public acceptance and its value is noted in the community. Public hearings and neighborhood board presentations held over the years for H-POWER related environmental impact studies were consistently met with strong public support. Such studies have included –

- H-POWER Expansion Project (MBN) Environmental Impact Statement (EIS)
- Material Separation Plan (MSP)
- Air Permit hearings
- Environmental Assessment (EA) for Sludge Receiving

Covanta partnered with Schnitzer Steel Hawaii Corporation and formed a marine debris management program or Nets-to-Energy (see media link in Appendix). Covanta staff
have formed an E-Club who identify areas in the facility and in the community that need improvement and propose solutions.

H-POWER staff provide several public tours per week, for a wide range of interested parties, including middle school, high school, and college student groups, engineers, professional associations, civic organizations, government officials, and foreign dignitaries.

Covanta and Refuse Division staff sponsor, participate, and present at nationwide professional associations conferences, including NAWTEC, WASTECON, SWANA, WTERT, Asia Pacific Clean Energy Expo, and energy briefings at the State Capitol.

H-POWER’s location in Hawaii provides a unique oceanside vista rare in the WTE field. The area includes a beach, coral reef, palm trees, protected native and endangered Hawaiian plants and animals, archeological sanctuaries, a Luau, a lighthouse, an active harbor, a resort, and recreational and commercial marine activities.
Appendix

Facility Site Layout
Media Links

City and County of Honolulu Solid Waste System
http://www.opala.org/

MBN Groundbreaking
http://www1.honolulu.gov/refs/csd/publiccom/honnews09/HPowerExpansionProject.htm

MBN Construction Halfway Point
http://www1.honolulu.gov/refs/csd/publiccom/honnews11/hpowerexpansion.htm

2012 ASME MER Facility of the Year Award

MBN Dedication
http://www1.honolulu.gov/refs/csd/publiccom/honnews12/hpowerdedication.htm
http://www.youtube.com/watch?v=APSUzu831TI

Expanded Honolulu WTE Plant Delivers Triple Benefits for Oahu

Transforming Discarded Nets into Energy

MBN Construction Timelapse Video
http://www.youtube.com/watch?v=NdxKLu2c-Hg