

# H-POWER

***"The Cornerstone of O'ahu's Self-Sustaining Waste Management Program"***



# The Basics

**H-POWER** = Honolulu Program Of Waste & Energy Recovery

What happens *after* Reduce, Reuse and Recycle? **RECOVER!**

**Combust waste → Use heat to boil water & produce steam**



**→ Drive steam through a turbine → Generate electricity**



**Owner:** City & County of Honolulu (The tax-paying citizens of O'ahu)

**Operator:** Covanta Energy Corporation

**Start of Operations:** 1990



**Facilities:** Units 1 & 2, Refuse Derived Fuel (**RDF**) [est. 1990] & Unit 3, Mass Burn (**MBN**) [est. 2012]



# **By The Numbers...**

<b>Capacity</b>	<b>2900 Tons / Day (2000 RDF + 900 MBN)</b>
<b>Total Waste Received Since 1990</b>	<b>19 Million Tons</b>
<b>Electrical Production Capacity</b>	<b>90 MWh gross / 73 MWh net export</b>
<b>Total Electricity Exported Since 1990</b>	<b>10 Million MWh</b>
<b>Number of O'ahu Homes Powered Daily</b>	<b>65,000+</b>
<b>Quantity of Imported Oil Averted</b>	<b>1 barrel of oil / 1 ton of MSW</b>
<b>Recovered Recyclable Metals</b>	<b>22,000 Tons / Year</b> (20,000 Ferrous + 2,000 Non-Ferrous)
<b>Reduction of Waste by Volume/Weight</b>	<b>90% / 75%</b>
<b>Annual Operational Availability</b>	<b>85%</b>

*\*Many Values listed in this handout are data-driven, scientifically deduced approximations, not guarantees*

- *H-POWER is a multi-million dollar operation that generates revenue from three sources:*
  - *Hauler tipping fees (\$91/ton)*
  - *Sale of energy products (to HECO)*
  - *Sale of recovered metals (to O'ahu Recycling Vendors).*
- *H-POWER is a 24/7 operation with 300-400 deliveries occurring throughout all 7 days week. 25-30 truck loads of ash are taken to the landfill each day. A contract was awarded for beneficial use of ash.*
- *H-POWER receives both residential & commercial Municipal Solid Waste (MSW). Residential MSW is picked up by the City's yellow collection trucks & is consolidated at the island's three transfer stations (Ke'ehi, Kapa'a, and Kawaihoa or the Pearl City and Wai'anae Yards). The MSW is then delivered to H-POWER in larger capacity transfer trailers. Commercial MSW comes from private haulers who pick up MSW from apartments, businesses, and hotels.*
- *H-POWER maintains extremely sensitive radiation sensors and does not accept any radioactive, hazardous, chemical, or exclusively liquid wastes.*
- *H-POWER is a renewable energy source along with solar, wind, geothermal and biofuel. H-POWER makes a significant contribution to the Hawai'i Clean Energy Initiative, which set a goal of producing 40% of the state's energy from renewable sources by 2030. For more information, please visit <http://www.hawaiiicleanenergyinitiative.org/>*
- *H-POWER's annual availability is substantially greater than other renewable energy sources such as wind and solar. It is one of the few renewable energy supplies that can be classified as a "firm" (dependable and consistent) power source.*

- 2-3 regularly scheduled outages per year are required to perform maintenance on the boilers, turbines and other critical equipment. These outages are planned up to 5 years in advance by Covanta and HECO (Hawaiian Electric Co.).
- 170+ local employees keep H-POWER running 24/7. They are all skilled personnel who receive training from Covanta Energy programs, colleges, military service, technical schools, environmental compliance programs, and the American Society of Mechanical Engineers.
- H-POWER safety standards meet or exceed OSHA's Voluntary Protection Program (VPP), their top safety program. H-POWER is the only VPP power facility in the State. Covanta's on-site Quick Response Team (QRT) is trained in First Aid, CPR, and AED operation by the Honolulu Fire Department and HeartStart.
- H-POWER environmental controls are highly regarded and meet or exceed the EPA's most stringent requirements. An acid gas scrubber and fabric filter baghouse remove pollutants from the combustion exhaust gases. The exhaust is continuously monitored by state-of-the-art sensors and instrumentation (Continuous Emissions Monitoring System or CEMS) which provides complete real-time data and all requirements for reporting to plant operators, managers, and the Hawai'i Department of Health (state EPA). H-POWER's environmental record is quite exemplary!
- H-POWER avoids Methane emissions produced by decomposing organic waste in landfills. It has been shown Methane is a 21 times more destructive greenhouse gas than CO<sub>2</sub> (source: U.S. EPA). 800,000 barrels of imported oil (for electrical production) are averted every year due to H-POWER. These factors yield a net decrease of greenhouse gas emissions (as compared to exclusively dumping MSW in a landfill).
- H-POWER is the only facility in the United States that utilizes both RDF and MBN technology. This allows for the necessary capability and flexibility to handle O'ahu's diverse and growing waste stream.
- Recent Awards and Accolades:
  - 2016 Gold Excellence Award from the Solid Waste Association of North America (SWANA)
  - 2016 City Livability Award Winner
  - 2014 Gold Excellence Award from the Solid Waste Association of North America (SWANA)
  - 2013 Silver Excellence Award from the Solid Waste Association of North America (SWANA)
  - 2012 Facility of the Year from the American Society of Mechanical Engineers (ASME)



# The RDF Process

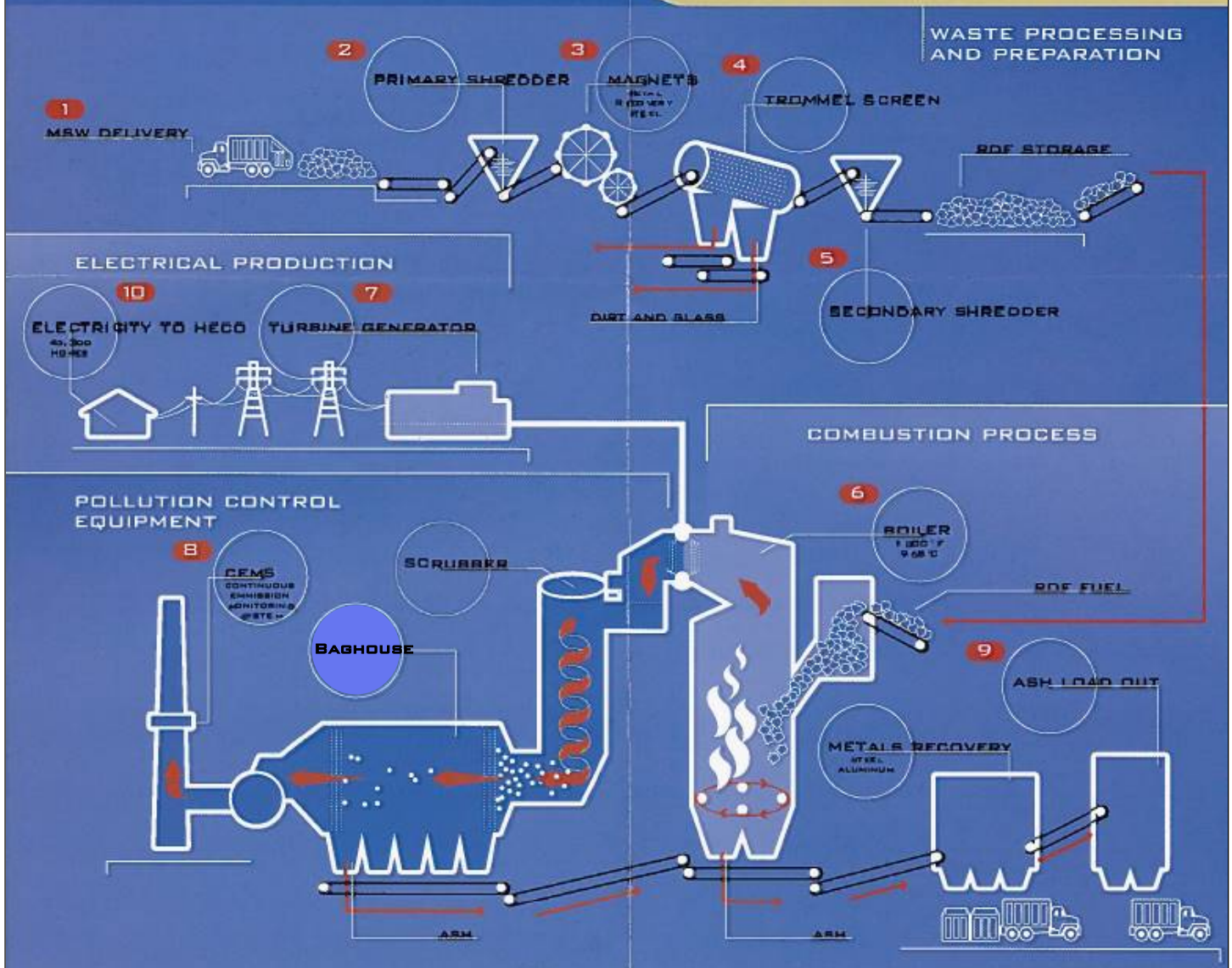
## STEP INSIDE THE HPOWER FACILITY AND YOU CAN FEEL THE ENERGY.

HERE, 24 HOURS A DAY, 365 DAYS A YEAR, ORDINARY HOUSEHOLD GARBAGE IS CONVERTED INTO ENVIRONMENTALLY SOUND, RENEWABLE ELECTRICITY THAT POWERS THOUSANDS OF OAHU HOUSEHOLDS. IN THE PROCESS, PRECIOUS LANDFILL SPACE IS PRESERVED, 800,000 BARRELS OF IMPORTED OIL PER YEAR ARE SAVED, AND THE BEAUTY OF OUR ISLAND HOME IS PROTECTED.

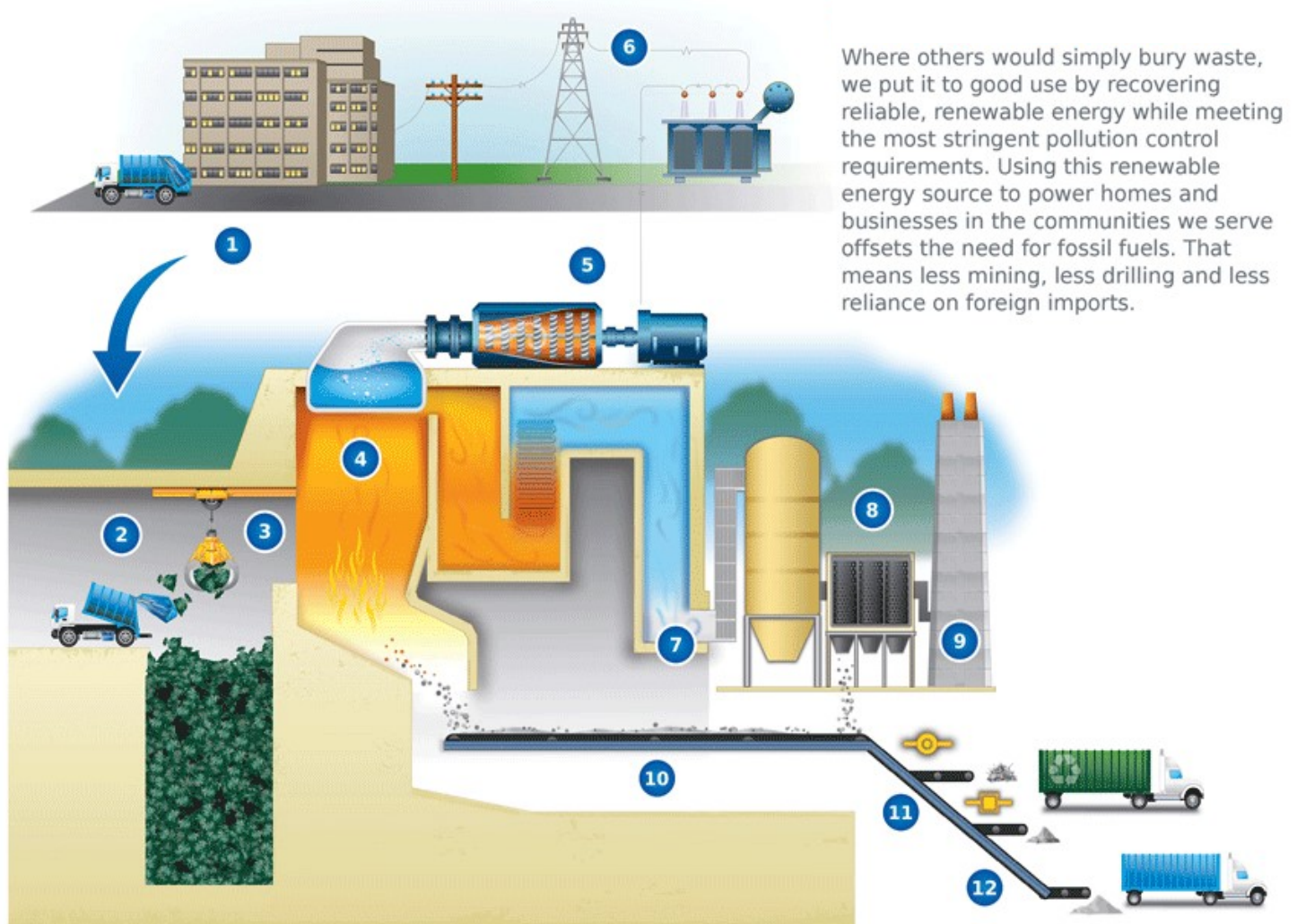
## THE HPOWER PROCESS:

(MATCHES UP TO NUMBERS ON DIAGRAM)

- 1 TRUCKS DELIVER MUNICIPAL SOLID WASTE
- 2 PRIMARY SHREDDERS OPEN AND SPREAD WASTE
- 3 ELECTROMAGNETS REMOVE METALS FOR RECYCLING
- 4 SCREENS REMOVE DIRT, SAND AND GLASS
- 5 SECONDARY SHREDDER PROCESSES REMAINING WASTE
- 6 WASTE IS COMBUSTED IN BOILER PRODUCING STEAM
- 7 STEAM DRIVES TURBINE TO GENERATE ELECTRICITY
- 8 AIR POLLUTION CONTROL EQUIPMENT CLEANS EXHAUST GAS
- 9 ASH IS HAULED TO LANDFILL FOR DISPOSAL
- 10 RENEWABLE ELECTRICITY POWERS 45,000 HAWAII HOMES



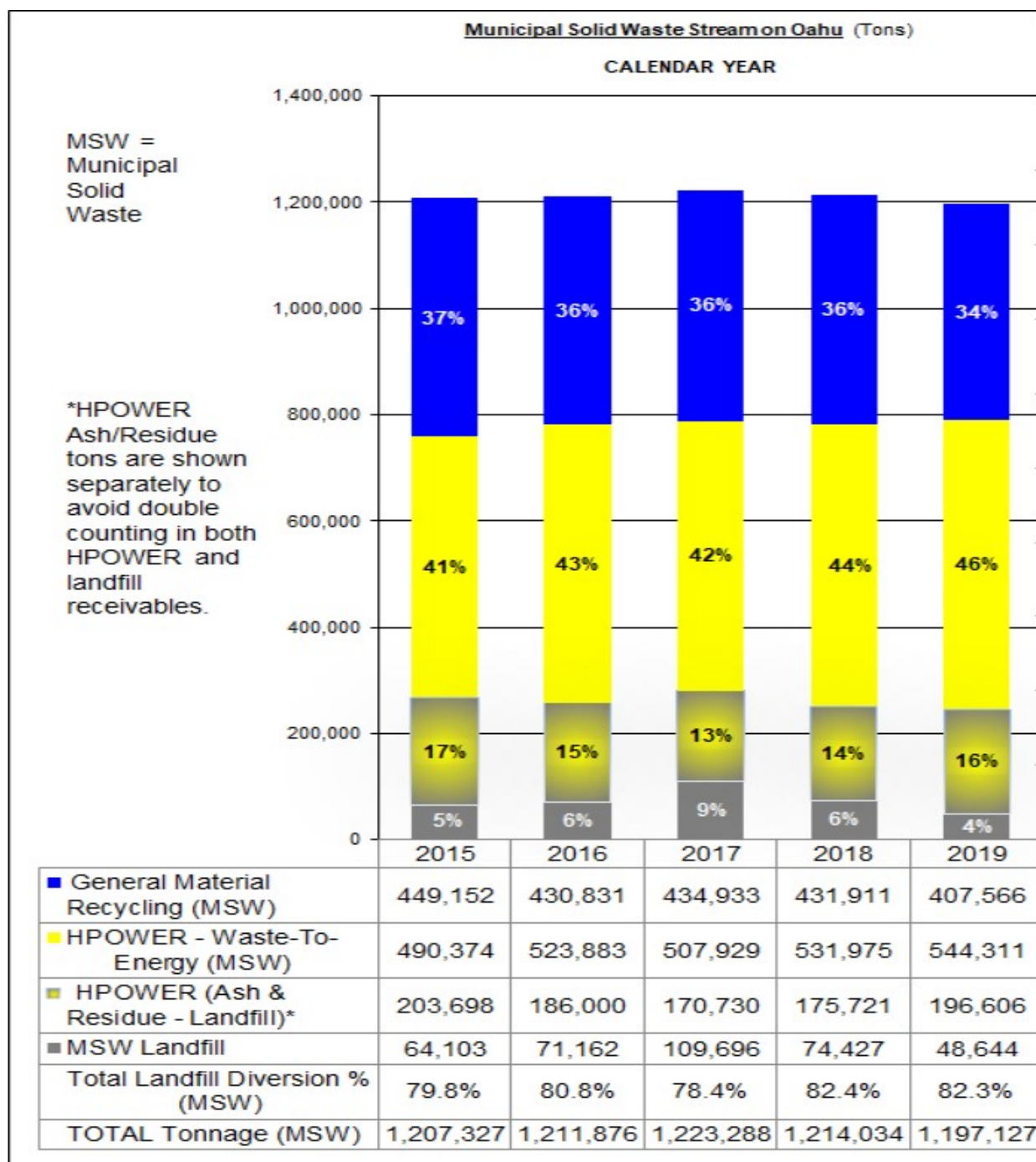
# The MBN Process



- 1 Post-recycled municipal solid waste is picked up at your home or business.
- 2 Waste is delivered and temporarily stored in a bunker. We maintain the building around the tipping and bunker area under negative pressure and use this air in the combustion process to control odor.
- 3 The waste is fed into a combustion chamber and burned at extremely high temperatures in a self-sustaining process.
- 4 Heat from combustion boils water to create steam.
- 5 The steam turns a turbine-driven generator to produce electricity, or may sometimes be used directly for heating or industrial processes.
- 6 Electricity is distributed to the grid and used to power homes and businesses.
- 7 State-of-the-art air pollution control equipment is used to cool, collect, and clean combustion gases. This equipment operates under stringent state and federal standards.
- 8 We control emissions of particulate matter primarily through a baghouse (fabric filter).
- 9 Emissions and other operating criteria are continuously monitored to ensure compliance with state and federal standards.
- 10 Residual material from the combustion process is collected for processing and metals extraction.
- 11 Ferrous and non-ferrous metals are extracted for recycling.
- 12 Remaining residual materials are beneficially reused or disposed of in a landfill.

Source: "Energy-From-Waste", Covanta Energy. <http://www.covanta.com>

# O'ahu's Waste Distribution



Source: "Recycling and Landfill Diversion", Opala.org. [http://www.opala.org/solid\\_waste/archive/facts2.html](http://www.opala.org/solid_waste/archive/facts2.html)