

**REPORT TO THE THIRTY-SECOND LEGISLATURE
STATE OF HAWAI'I
2024**

PURSUANT TO SENATE CONCURRENT RESOLUTION 64 SD1 (2023),
REQUESTING THE DEPARTMENT OF HEALTH'S SOLID WASTE
SECTION TO DEVELOP A PLAN OF INITIATIVES FOR IMPROVED WASTE
DIVERSION BY WORKING WITH THE COUNTIES TO ADDRESS EACH
COUNTY'S UNIQUE NEEDS ACCORDING TO ITS GEOGRAPHY,
POPULATION, AND INDUSTRY MAKE-UP.

PREPARED BY:

STATE OF HAWAI'I
DEPARTMENT OF HEALTH
SOLID AND HAZARDOUS WASTE BRANCH • SOLID WASTE SECTION
December 2023

I. INTRODUCTION

Senate Concurrent Resolution 64 S.D. 1 requests that the Solid Waste Section (SWS) of the Hawai'i State Department of Health's (DOH) Solid and Hazardous Waste Branch (SHWB), subject to the availability of funding:

1. Evaluate the viability, particularly the economies of scale, of shipping waste from multiple counties to be recycled or incinerated in another county, given current county infrastructure, facilities, and deployed technology;
2. Evaluate the viability of shipping waste from multiple counties to be recycled or incinerated in another county with the development of additional infrastructure and facilities, which are appropriately zoned by the State, through a public-private partnership or otherwise;
3. Estimate the statewide legacy landfill capacity if an inter-county recycling and incineration program were to be established and without any additional State infrastructure and facilities; and
4. Submit a preliminary report of its findings and recommendations to the Legislature no later than thirty days prior to the convening of the Regular Session of 2024 and a final report no later than thirty days prior to the convening of the Regular Session of 2025.

DOH's SWS does not have available funds sufficient to conduct a detailed analysis and develop a comprehensive report to address this resolution's request. However, using available resources and existing reference documents, the SWS presents the following report to the 2024 Legislature.

II. Definitions

Incineration

"Incineration" is defined by Hawaii Revised Statutes (HRS) §342G-1 as "volume reduction by controlled burning of combustible solid waste."

Recycling

"Recycling" is defined by HRS §342G-1 as "the collection, separation, recovery, and sale or reuse of secondary resources that would otherwise be disposed of as municipal solid waste, and is an integral part of a manufacturing process aimed at producing a marketable product made of postconsumer material."

III. Evaluate the viability, particularly the economies of scale, of shipping waste from multiple counties to be recycled or incinerated in another county, given current county infrastructure, facilities, and deployed technology

A. Movement of Municipal Solid Waste for Incineration

Table 1: Waste Generation, Diversion, and Disposal in Fiscal Year (FY) 2023 (tons)

County	Generation	Diversion	Disposal	Diversion Rate	Incineration
Hawai'i	296,155	90,874	205,281	30.7%	n/a
Maui	332,355	43,181	289,174	13.0%	n/a
Honolulu*	1,507,445	371,280	1,136,165	24.6%	690,534
Kaua'i	127,272	39,064	88,208	30.7%	n/a
State	2,263,227	544,399	1,718,829	24.1%	690,534

Notes:

Differences in recycling rates from those published by the counties are attributed to different data collection processes and differences in the classification of recycling and landfill diversion activities as defined by statute.

*By definition, the City and County of Honolulu's disposal tonnage also includes incineration tonnage. The incineration amount is also separately identified in the last column.

Currently, the City and County of Honolulu on O'ahu is the only municipal county in the State with a facility that incinerates solid waste. Covanta's Honolulu Program of Waste Energy Recovery (H-POWER) converts solid waste into electricity through incineration. In FY 2023, approximately 691,000 tons of solid waste was incinerated at H-POWER. After incineration, ferrous and nonferrous metals are recovered and recycled from the waste ash using magnets and separators. H-POWER generates an average of 382 tons of waste ash daily that is disposed at the County's Waimanalo Gulch Sanitary Landfill. Recently, the City and County of Honolulu executed a contract with Covanta to evaluate and pursue recycling a portion of the ash, which may significantly reduce the amount of ash disposed at the Waimanalo Gulch Sanitary Landfill. Because this ash recycling project has not yet been implemented, the potential volume reduction has not been calculated and considered in this report.

For the purpose of this section, it is estimated that county waste diversion efforts will continue to be implemented and all county waste that is currently being disposed would instead be shipped to O'ahu and incinerated at H-POWER:

County of Hawai'i: 205,000 tons
 County of Maui: 290,000 tons
 County of Kaua'i: 90,000 tons

A draft study developed in 2014 analyzed the costs to ship municipal solid waste from the neighbor islands to O'ahu and estimated the following amounts:

Hawai'i to O'ahu: \$111/ton
 Maui to O'ahu: \$116/ton
 Kaua'i to O'ahu: \$111/ton

These estimates include capital expenditures like procuring the necessary number of shipping containers and container liners to prevent leakage, with each shipping container estimated to hold approximately twenty tons of compacted municipal solid waste. Containers have an

approximate lifespan of fifteen years in the State owing to the exposure to harsh environments, namely heat, UV, and salt water. The estimated costs also include transportation costs to truck the containers from the county landfill to the port, from the port to H-POWER, and to return the container to the originating county.

Current waste tonnage, applying the 2014 estimated costs, would result in the following estimated annual costs:

County of Hawai'i:	\$22,755,000/year
County of Maui:	\$36,640,000/year
County of Kaua'i:	\$9,990,000/year

In addition to the high estimated costs to ship municipal solid waste to O'ahu, there are several key issues that will also need to be addressed:

- H-POWER's current maximum capacity is approximately 1,000,000 tons of solid waste per year. As mentioned above, in FY23 the City and County of Honolulu incinerated approximately 691,000 tons of municipal solid waste. H-POWER's maximum capacity is insufficient to service the City and County of Honolulu and accept all waste disposal tonnage from the other counties.

In addition, PVT Land Company will not be pursuing its planned expansion at PVT Landfill as a result of the passage of Act 73 in 2020. PVT Landfill is expected to reach capacity in about five years, and the City and County of Honolulu may need to address the additional waste volume at H-POWER, which will impact its capacity to accept waste disposal tonnage from other counties.

- In FY23 H-POWER disposed approximately 139,500 tons of waste ash at the Waimanalo Gulch Sanitary Landfill, which has an estimated remaining capacity of approximately 4,000,000 cubic yards as of April 2023. At the current rate of disposal, and without factoring the ash recycling project discussed above, the landfill is estimated to have capacity to accept municipal solid waste and ash until May 2036. However, due to land use permitting issues, the City and County of Honolulu is currently planning to close the landfill by 2028. Therefore, the counties would likely be required to take back waste ash generated from incineration and an agreement would need to be negotiated between the counties and the City and County of Honolulu to address waste ash disposal.
- Potential cost savings could be realized if counties were able to negotiate reduced tipping fees applied by the City and County of Honolulu, and additionally negotiate additional shipping cost reductions through multi-year contracts with an interisland shipper, however the cost estimates presented in this report do not account for inflation between 2014 and present, which is approximately 30%.
- The Revised Ordinances of Honolulu Chapter 42 refers to waste generated "in the City and County of Honolulu," and would need to be amended by the Honolulu City Council to allow for the collection and incineration of solid waste generated outside of the City and County of Honolulu's jurisdiction.
- The public's support of transporting municipal solid waste, and potentially returning waste ash, may pose issues, particularly if there were an unforeseen shipping accident.

It is unlikely that the residents of O'ahu would support further inputs on existing landfill capacity by accepting the waste ash from neighboring counties.

B. Movement of Municipal Solid Waste for Recycling

Currently, the State's recycling efforts primarily result in the sorting and consolidation of materials by material type, and recyclable materials are shipped out-of-state to manufacturing end-markets. There are material recovery facilities on O'ahu and on the neighbor islands; some are designed for larger volumes with sort lines, while some are designed for relatively low volumes, with more labor-intensive sorting requirements that rely more heavily on customer source-separation. Given the cost to ship waste between counties, the shipping cost for the purposes of sorting and processing for volume reduction would be prohibitive, particularly if waste that cannot be recycled must then be shipped back to the originating county. We believe that if municipal solid waste is shipped to Oahu for incineration, then it would be most appropriate if the other counties first reduce their volumes of non-contaminated recyclables as much as possible.

IV. Evaluate the viability of shipping waste from multiple counties to be recycled or incinerated in another county with the development of additional infrastructure and facilities, which are appropriately zoned by the State, through a public-private partnership or otherwise

In 2014, it was estimated to cost approximately \$89m to build a waste-to-energy incineration plant in the County of Hawai'i. Operating costs were estimated at \$90/ton, although revenues could be realized through commercial tip fees (\$85/ton) and electricity generation (\$65/ton). There has been interest in the past to develop, through a public-private partnership, a waste-to-energy facility on Hawai'i Island, and the County of Hawai'i continues to explore all options for such a facility with the closure of the South Hilo Sanitary Landfill.

If a facility were built on Hawai'i Island, there is a potential solution of building excess capacity to also accept and incinerate municipal solid waste shipped from the County of Maui, with H-POWER on O'ahu having the capacity to incinerate the municipal solid waste generated by the City and County of Honolulu and solid waste shipped from the County of Kaua'i. This assumes that the additional solid waste inputs resulting from the pending closure of PVT Landfill does not in itself max out H-POWER's capacity. Both the County of Maui and the County of Kaua'i would likely be expected to accept the waste ash for disposal in their respective counties.

The estimated cost to build a waste-to-energy facility in the County of Hawai'i may be prohibitively expensive and the County will need to explore all options to secure funding, from issuing municipal bonds, enacting rate increases, securing State funds, and developing a public-private partnership similar to the arrangement that the City and County of Honolulu has with Covanta for H-POWER. Furthermore, there are several key issues that will also need to be addressed:

- The Revised Ordinances of Honolulu Chapter 42 refers to waste generated "in the City and County of Honolulu," and would need to be amended by the Honolulu City Council to allow for the collection and incineration of solid waste generated outside of the City and County of Honolulu's jurisdiction.
- The public's support of building a waste-to-energy facility on the Island of Hawai'i.
- Identifying and addressing how to dispose of the waste ash generated from incineration.

The estimated capital expenditure, in 2014, to convert the South Hilo Sanitary Landfill's manual sort into a MRF with a sort line was approximately \$400,000 with annual operating expenses of \$135,000. This expense may be higher today due to the closure of the South Hilo Sanitary Landfill. Building a new MRF in West Hawai'i would cost approximately \$7m with annual operating costs of approximately \$210,000. It is assumed that private haulers will ship the recyclable materials collected at the MRF to out-of-state recyclers and the County of Hawai'i would recognize little to no revenue after processing and shipping costs are accounted for.

Like the previous scenario, the counties shipping waste to other islands will need to implement policies that maximize waste diversion to minimize shipping costs for disposal. The estimated capital expenditure, in 2014, to build a new MRF in the County of Kaua'i's Resource Recovery Park is approximately \$8.7m with annual operating costs of approximately \$946,000. Like with the County of Hawai'i, it is assumed that private haulers will ship the recyclable materials collected at the MRF to out-of-state recyclers and the County of Kaua'i would recognize little to no revenue after processing and shipping costs are accounted for. We currently do not have cost estimates to support recycling enhancements on Maui. For the purposes of this evaluation, we did not consider the development of in-state manufacturing businesses to utilize the collected recyclables.

V. Estimate the statewide legacy landfill capacity if an inter-county recycling and incineration program were to be established and without any additional State infrastructure and facilities

The estimated statewide legacy landfill capacity, using data provided by 2023 Annual Operating Reports for each landfill, is as follows:

Owner	Landfill	Remaining Airspace (CY)	Annual Volume (CY)	Tons (FY 2023)
City and County of Honolulu	Waimanalo Gulch Sanitary Landfill (Ash*)	2,685,420	111,908	139,500
City and County of Honolulu	Waimanalo Gulch Sanitary Landfill (Municipal Solid Waste)	1,352,025	171,714	98,020
PVT Land Company	PVT Landfill**	No data	330,229	205,349
United States Marine Corps	Marine Corps Base Hawai'i Landfill	222,180	4,830	2,762
County of Maui	Central Maui Landfill	537,963	417,037	277,140
County of Maui	Moloka'i Integrated Solid Waste Management Facility	95,985	14,890	5,585
County of Maui	Hana Landfill	251,908	4,006	1,067
County of Maui	Lana'i Landfill	197,772	17,511	5,382
County of Hawai'i	West Hawaii Sanitary Landfill	8,054,500	335,029	205,281
County of Kaua'i	Kekaha Landfill	561,132	121,311	88,208

Notes:

* This is the ash monofil portion of the Waimanalo Gulch Sanitary Landfill and can only accept waste ash.

** PVT Land Company is a construction and demolition (C&D) landfill and can only accept C&D waste.

If the City and County of Honolulu incinerated approximately 691,000 tons of municipal solid waste in FY23, which resulted in approximately 140,000 tons of waste ash, a very rough estimate of the tonnage reduction by incineration would be 80%.

Using county annual waste disposal tonnage and the estimated tonnage reduction percentage, a rough estimate of waste ash generated annually for each county by incinerating municipal solid waste is as follows:

County of Hawai'i:	41,000 tons
County of Maui:	58,000 tons
County of Kaua'i:	18,000 tons

Incinerating municipal solid waste and instead disposing waste ash would increase the landfill capacity for county landfills provided that the landfills are designed to accept waste ash.