

SUSTAINABLE RESOURCE EXCHANGE, MANAGEMENT, AND EDUCATION ON HAWAI'I ISLAND

SECTION 1: PROGRAM DESCRIPTION AND SCOPE OF WORK

Section 1a: Executive Summary

The Department of Environmental Management (DEM) at the County of Hawai'i (County) is responsible for solid waste disposal, landfill diversion programs, which includes recycling, amongst other responsibilities. Hawai'i Island has one landfill for the entire island (4,028 sq. mi.) with a projected life expectancy of around 30 more years. To bolster waste valorization, increase life expectancy of the landfill, and reduce greenhouse gas emissions, the County and partners seek to divest from a linear-waste approach to a closed-loop production/consumption system.

With a growing call to create significant structural changes, the County needs to prioritize data aggregation to determine outlets for waste diversion. At a minimum, the County recognizes thirty percent of organic materials end up in the landfill. In direct support with the Hawai'i Agricultural Cluster¹ and partners, the County's priority is to achieve Strategic Sustainable Materials Management (SSMM)² and construct Sustainable Resource Districts (SRDs)³ near agricultural hotspots and rural communities to process organic waste and divert materials for reuse. The outcomes of the project are to add value to the agricultural chain by generating a market for locally produced soil amendments and other recycled materials/products while at the same time bolstering workforce development in the green job sector.

¹ In the Full Overarching Narrative, Agricultural Cluster is defined as a regional economic cluster centered on the agricultural economy.

² EPA Definition of Strategic Sustainable Materials Management <https://www.epa.gov/smm/sustainable-materials-management-basics#WhatIs>

³ Sustainable Resource Districts (SRDs) are defined as geographical area which captures and sorts of reuse materials while linking technologies to locally produced soil amendments.

Section 1b: Scope of Work

DEM proposes catalyzing the creation of a closed-loop production/consumption system on Hawai'i Island. Over a 48-month period, the proposed projects, discussed below, address systemic barriers to waste diversion, enact foundational changes to the traditional linear waste management sector, bolster the agricultural value chain to increase long-term resilience, increase workforce development in the green jobs, and reduce greenhouse gas emissions while increasing carbon sequestration. **1.** To address the gap in aggregated data on landfill diversion, the County proposes establishing a **Landfill Diversion (LD) Data Program**, developed by the **LD Data Manager**. The last waste composition study was produced in 2009.⁴ The County needs aggregated data on waste diversion, what and how much diversion (e.g., lbs.), where and how to divert materials, and identifying the best course of action for SSMM. This project's purpose is to create a strategic asset aggregated dataset on materials/waste diversion. Key milestones include procuring a database and developing an action plan for SSMM. Deliverables include the creation of a robust dataset and a program annual report on SSMM trends and diversion opportunities. **2.** To link people with diverted resources, the County proposes establishing a **Hawai'i Island Resource Exchange & Network Program (HIREP)**, developed, and executed in tandem with the project above. HIREP, managed and promoted by the proposed **Resource Exchange & Network Coordinator (REN-C)**, institutes foundational changes to creating a sustainable collaborative resource management. This project's purpose is to develop an opportunity for residents, businesses, and organizations to trade resources, create a secondary market for materials that would have been landfilled, construct SRDs and establish a permitting process for SRDs. Key milestones include procuring a database / bulletin-board for exchanging resources, continuous input, and engagement in **Mā'ona Community**

⁴ Zero Waste Implementation Plan (2009) County of Hawai'i, Department of Environmental Management <https://ilsr.org/wp-content/uploads/2012/02/Hawaii-zero-waste-plan.pdf>

Gardens (MCG), a community research organization focused on composting from diverted organics, planning process to create a streamlined permission process for SRDs, and identifying Sustainable Resource Districts (SRDs) to site the construction of facilities for processing diverted materials. Deliverables include the establishment of a highly utilized database/bulletin board, the finalizing of a legal and streamlined permitting process for composting and starting the construction of Sustainable Resource Districts and facilities. **3. The Resource Education Specialist (RES)** will support the visibility of the HIREP and Landfill Diversion Data Program. The RES purpose is to conduct outreach and education in rural, under-resourced, and urban communities to ensure equitable economic opportunities and workforce development. Key milestones of the project are the development of education and presentation materials for promoting diversion opportunities, posting internship opportunities within the County focused on waste diversion, and establishing parallel workforce development opportunities with the University of Hawaii- Hilo. Deliverables include the development of a **Master Recycler / Composter (MRC) Program**, developing school programs related to workforce development, and onboarding interns every year to work in sustainable materials management.

SECTION 2: REGIONAL INDUSTRY ASSETS AND NEEDS

Section 2a: Project's Location and Region

The proposed component project is located on the island of Hawai'i also referred to as Hawai'i County, within the State of Hawai'i, Congressional District HI-002, FIPS Code 15001.

More than 2,500 miles from the nearest continent, Hawai'i Island is unfavorably dependent and over-reliant on imports. Due to the high demand for food, the importation of food is increasing where the agriculture sector is shrinking. By 2020,

almost 90%⁵ of all the island's food was imported and the population (200,629 people)⁶ had grown over 9% from 2010 (185,079). Hawai'i Island has a fragile and vulnerable food system with one deep seaport, located in an inundation zone, and climate change increasing the frequency of natural disasters (i.e., COVID-19 pandemic, Hurricane Lane, and Kīlauea volcanic eruption). To support the movement of a resilient food system there needs to be a systematic approach to using and reusing materials more productively over their entire life cycles (e.g., cardboard/organics to compost). The County of Hawaii does not have a repository on waste diversion metrics. This makes exploring the waste economy a challenge. In 2020, the West Hawaii Sanitary Landfill collected almost 210k tons of waste.⁷ The makeup of this total included around 30% of organic materials which were all deposited to the West Hawaii Sanitary Landfill (WHSL). That amount of waste emitted 237,234 metric tons of carbon dioxide⁸. While very little is known on the amount of waste that is diverted and can be diverted, the County ships nominal amounts of corrugated cardboard (OCC) to be recycled off-island. For example, in 2021, the County diverted 2,337 tons of OCC⁹, by shipping via barge to Asia, to be recycled. Although 4,664 of metric tons of carbon¹⁰ savings occurred from recycling OCC, still, this solution contributes to greenhouse gasses emissions via shipping and removes the opportunity to use the OCC in composting to produce soil amendments. The opportunity to reuse OCC on the island has not been exploited. Through network education, stakeholders will understand how existing resources exist on island to bolster agricultural output, jobs, landfill diversion as well as reduced carbon emissions through exportation of materials. For example, Mā'ona converted over 50 tons of cardboard¹¹

⁵ Increased Food Security and Food Self-Sufficiency Strategy (2012) Office of Planning https://files.Hawaii.gov/dbedt/op/spb/INCREASED_FOOD_SECURITY_AND_FOOD_SELF_SUFFICIENCY_STRATEGY.pdf

⁶ U.S. Census Hawaii County Quick Facts (2020)

⁷ Recycle Hawai'i (2021) Zero Waste Plan Update

⁸ County of Hawai'i. (2022) Hawai'i Island Greenhouse Gas Emissions Report for 2017

⁹ Personal interview with Department of Environmental Management on March 8, 2022

¹⁰ EPA Greenhouse Gas Equivalencies Calculator

¹¹ Personal interview with Mā'ona Community Gardens on March 9, 2022

over a year and a half to high-quality soil amendments. These products are in high demand due in part to the eroded soil quality on agricultural land from plantation-era sugar and pineapple operations and because most of the Island is covered in young, barren lava flows that have limited to no soil¹² for growing crops.

The logistics with hauling discards to the landfill are complex. There are 21 transfer stations¹³ dispersed around the island where residents can drop off solid waste, green waste, and/or some recyclables (i.e., OCC & kraft paper grocery bags, non-HI-5 glass containers). With this dispersed collection system, more than 650,000 vehicle miles are traveled annually by diesel dump trucks to transport collected discards from all the transfer stations to the West Hawaii Sanitary Landfill. This transportation alone produces 4,607 metric tons of carbon¹⁰ annually. There is a need to reduce transportation emissions by reducing the number of vehicle trips.

Although the island draws thousands of visitors each year through the tourism economy, what often goes unnoticed is the decrease in workforce labor (from 2016 to 2021 jobs declined by 7%) which fell short of the national growth rate of 0.4% by 6.6%. While unemployment reached near record lows in 2018, the number of low-wage jobs grew, wage increases were minimal, and job hours, schedules and benefits fluctuated more often. In Hawai'i, for two adults working 2080 hours per year and with two children, a standard wage is \$36.66 per hour.¹⁴ At least \$37.69 per hour is needed to afford a two-bedroom apartment. Access to well-paying jobs and careers within the green job sector is limited. There is a need to collect data on diversion so it can be shared and influence entrepreneurs and businesses to innovate within the green job sector.

Section 2b: Industry, Employer, and CEDS alignment

¹² Hawaii Soil Atlas <http://gis.ctahr.hawaii.edu/SoilAtlas>

¹³ Hawai'i Zero Waste Plan (2020) <https://www.Hawaiiizerowaste.org/recycle/greenwaste-recycling/>

¹⁴ National Low Income Housing Coalition. Out of Reach. The High Cost of Housing

County projects are aligned with the Hawai'i Statewide Comprehensive Economic Development Strategy (CEDs)¹⁵ by “building a sustainable agricultural industry that can provide a living that is satisfying and financially rewarding for island farmers [...] and agriculture sector workers and contribute to food self-sufficiency and mitigating imports.” The projects support specific objectives of CEDS by way of: (1) procuring a database and collecting aggregated data on waste streams to construct SRD facilities and “ensuring that necessary infrastructure [...] in place [...]” (2) Decreasing the amount of importance and instead supporting and promoting a culture of “Buy and Invest Locally.” (3) “Support sustained production of food, fiber, and fuel. Specific to food crops, support the Aloha+ Challenge goals of doubling local food production and ensuring 20-30% of food consumed is locally grown” by developing SRDs and constructing facilities. (4) Divesting from a linear economy and supporting a circular economy for Hawai'i Agricultural Cluster aligns with CEDs “to increase, support and promote adaptive capacity to better absorb and recover from economic, environmental, and other shocks and stresses.”

SECTION 3: PROGRAM SOLUTION

The proposal implements the following strategies to divest itself from the traditional linear economy approach of solid waste management to develop a closed-loop, SSMM which in turn feeds a circular economy.

1. The total amount of waste produced and sent to the West Hawaii Sanitary Landfill is enough to generate power for more than half of all households¹⁶ on Hawaii Island. One ingredient to reducing waste is to develop aggregated data to support the development of diversion streams. This solution is feasible through the recruitment of a **Diversion Database Manager** who will oversee the procurement and development of a **Landfill Diversion Database Program**. The project will accelerate industry growth by driving

¹⁵ Hawai'i Statewide Comprehensive Economic Development Strategy (2016)

¹⁶ <https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references#houseenergy>

value on the volume of materials available for diversion projects. Data is a strategic asset and will be shared with entrepreneurs to innovate solutions for SSMM. The County has minimal diversion projects occurring and is ripe for private investment, entrepreneurship, and employment opportunities. Key findings from the U.S. EPA Recycling Economic Information (REI) report, states 1,000 tons of materials recycled equates to 1.17 jobs¹⁷. The proposed project meets the EDA's Recovery and Resilience Investment Priority by laying the foundation for building a more resilient waste management system and provides an underpinning to recovery from supply chain disruption.

2. Another ingredient to reducing waste, using aggregated data, is to build a network of people, organizations, and businesses to obtain reusable materials. This solution is feasible through the recruitment of a **Hire a Resource Exchange & Network Coordinator (REN-C)** who will develop the **Hawai'i Island Resource Exchange & Network Program (HIREP)**. The purpose of the project is to procure and implement a database of discarded and surplus materials for reuse. Developing strategies, new applications, for reuse depends on access to information (Refer to Landfill Diversion Database Program) and making reuse within reach. Industry growth is projected to occur through information exchange to nurture reuse and grow reuse businesses and organizations. According to the Association of Resale Professionals, resale is a multi-billion-dollar industry, with more than 25,000 resale, consignment, and nonprofit shops in the United States. There are an estimated 25 reuse, resale, and consignment shops. The proposed project meets the EDA's Recovery and Resilience Investment Priority by optimizing SSMM, scaling up and diversifying the reuse market.

3. The best waste management programs and processes will not be sustainable without citizen involvement and education. Developing a SSMM school and jobs program is feasible through the recruitment of a Resource **Educational Specialist**. The program will

¹⁷ <https://www.epa.gov/smm/recycling-economic-information-rei-report#findings>

include education and engagement with stakeholders to identify potential diverted products for repurposing, up- or down-cycling, resource substitution, etc.; increase the visibility of the HIREP, the development training modules to assist businesses to process diverted materials for use; and the communication of landfill diversion strategies; develop school programs related to workforce development in the circular economy; and provide intern opportunities in DEM to develop a green work force. Workforce development opportunities is a priority pathway for this project.

SECTION 4: PARTNERS AND PROGRAM OUTREACH

Section 4a: Former, Current, or Future Partnerships/Working Relationships

The **Agricultural Coalition** is an invaluable asset to creating a robust agricultural economy and increasing participation with a diversity of communities. **Mā'ona Community Gardens (MCG)** 501(c)3, a community research and development organization, and a subrecipient under the Coalition Member **Big Island Resource Conservation and Development (BIRC&D)**, is focused on piloting, deploying and innovating community food systems. As a key partner, DEM seeks to work in tandem with MCG to aggregate diversion data, create a legal streamlined permitting process, identify locations, and construct SRDs.

MCG understands the level of involvement required to produce quality soil amendments through composting, anaerobic digestion, and other means. Through a Green Gigaton Challenge, MCG diverted 50.5 tons of cardboard from the landfill to use in its composting or mulching over 1.5 years. Diverting the cardboard from the landfill resulted in a reduction of 91.6 metric tons of carbon¹⁸. Every pound of cardboard, depending on the processing method, when mixed with a nitrogen source will produce 0.5-0.25 pounds of compost.

Data collection on SSMM is important to scaling up opportunities for diversion. For example, the County is looking for partnerships within the Agricultural Cluster and the

¹⁸ Personal interview with Mā'ona Community Gardens on March 9, 2022

private sector to use the organic waste as feedstock in an anaerobic digester to produce bio-methane to propane. The agricultural sector depends on fossil fuels for energy. For natural gas, Hawai'i pays on average \$48.44 per thousand gallons¹⁹ versus continental United States prices of \$13.13 per thousand gallons. Like many imported products, Hawai'i carries the burden of inflation of over three and half times the cost for natural gas. The County's outcome is to create lower energy costs, divert waste to energy, and reduce greenhouse gasses.

Section 4b: Promoting Diversity, Equity, and Inclusion

Underserved and socially disadvantaged communities are disproportionately affected by climate change. Disparities are exacerbated by the 48% of people (71,565 households)²⁰ living below the ALICE (Asset Limited, Income Constrained, Employed) threshold. Within that percentage, Native Hawaiian, and Hispanic households (54% and 51% respectively) live with higher inequities. In addition, there are other demographic groups that have long faced barriers to financial security: women; veterans; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) people; recent immigrants by country of origin; undocumented workers; formerly incarcerated people; and people with disabilities. The County aims to advance workforce equity through the inclusion of underserved and socially disadvantaged communities.

SECTION 5: MEASURABLE GOALS AND IMPACTS

Outlined in this section are DEMs anticipated goals, outputs, and outcomes expected from the proposed project activities. These measures were selected as feasible expectations based on project activities and partners' data collection capacity, as well as the concrete impacts that the Coalition's collaborative efforts are intended to produce. Temporarily, these projects will occur within a 48-month timeline.²¹ Albeit, while

¹⁹ U.S. Energy Information Administration (2021) Hawai'i Price <https://www.eia.gov/dnav/ng/hist/n3010hi3m.htm>

²⁰ Aloha United Way (2020) ALICE in Hawai'i: A Financial Hardship Study https://www.Hawai'ihealthmatters.org/content/sites/Hawai'i/2020ALICEReport_HI_FINAL_1.pdf

²¹ Refer to Budget Timeline: COH_DEM_05b_RLF-and-Non-Construction-Staffing-and-Budget-Template

construction of SRDs facilities will begin by the third year, realistically construction will take 8 to 12 years. Anticipated obstacles to engaging the community are dependent on how people value the secondary materials market, if marketed properly and the network is engaged this obstacle will be overcome.

1. Goal: Catalog aggregated landfill diversion data from all sources on Hawai'i Island and provide public as an asset of value to economic vitality and market growth. **Strategy:** Develop a Landfill Diversion Database managed by proposed Diversion Data Manager as a priority within the first year and continue collection/management of data. **Outcome:** The ability to make data-informed policy and SSMM, allocate resources accordingly, and inform construction location of SRDs and facilities. **Outcome Indicator(s):** Develop 1 database. Report number of SRD sites and types of facilities identified and constructed. Creating an inventory of diversion materials, volume, location, weight, and potential on-island uses.²² **2. Goal:** Reduce organic materials from being landfilled and use all diverted OCC on island to produce compost and increase the number of businesses producing compost. **Strategy:** Create an island-wide network of SRDs wherein decentralized composting facilities, anaerobic digestion, and other technologies will use island recovered OCC and other selected materials as feedstock. **Outcome:** Reduction in emissions from shipping OCC 5,000 miles, utilization of on-island resources, importing less compost. **Outcome Indicator(s):** Divert 20% of the 30% of the organics landfilled to be used for on-island compost, energy, and materials production. Increase production of compost from 584 to 1168 tons of compost. Increase the diversion rate from 21% to 40%. Reduce County vehicle miles traveled (VMTs) from 650k miles by 20% over 4 years and reduce transportation emissions by 20%. **3. Goal:** Create a Hawai'i Island Resource Exchange and Network Program for island residents to have a central location to post resources to give away, sell, or trade which also tracks pounds diverted from landfill. **Strategy:** Develop a community-driven materials management database managed by a

²² <https://www.epa.gov/smm/metrics-waste-reduction>

Resource Exchange & Network Coordinator (REN-C). **Outcome:** Diversion of resources otherwise landfilled, reduced purchases of new consumer goods by having one location to 'shop' for surplus or used goods prior to purchasing new. **Outcome Indicator(s):** Register 5,000 network users per year. Development of 1 database. 25% representation of socially disadvantaged groups within HIREP. 4. **Goal:** To develop a green workforce poised to enter the SSMM industry on Hawai'i Island, reduce brain drain and recruit talent. **Strategy:** Develop an internship program to recruit students to DEM for career exploration. **Outcome:** Local graduates who are interested in and qualified for positions at DEM. **Outcome Indicator(s):** Increase number of reuse, resale, consignment, and SSMM businesses from 25 to 50 at the end of four years. Track number of businesses/organizations diverting waste by year. Increase the number of green job businesses by 20% by the end of 48 months. Increase DEM internship program from 0 to 2 biannually. 5. **Goal:** A well-informed population on best management and SSMM with robust citizen involvement and education. **Strategy:** Develop Master Recycler / Composter (MRC) Program managed by the proposed Resource Education Specialist. **Outcome:** A network of volunteer certified MRCs who provide community education through outreach and events. **Outcome Indicator(s):** Develop 1 action plan within the first year. Certify 5 new MRCs every year. Increase volunteer hours from 25 hours for all volunteers to 50 hours by year 2. Double volunteer hours for years 3 and years 4. Plan 2 community events annually. Reach 10% of the population annually.

SECTION 6: SUSTAINABILITY PLAN

The project's Sustainability Plan beyond grant funding includes the current commitment from the County administration in support of the three DEM positions that further the County's sustainability platform; continuation software subscription fees; and political and community support for landfill diversion. However, the County needs four years of grant funding to work on establishing permanent positions for the three proposed roles. Hawai'i County Mayor, Mitch Roth is committed to working on establishing these new

jobs during his administration. The County is committed to retooling the economy and has committed a \$10 million dollar bond²³ to support the development of SRDs and facilities.

²³ County of Hawai'i Ordinance 2020-027 2018-2020