



DEPT. COMM. NO. 330
**DEPARTMENT OF BUSINESS,
ECONOMIC DEVELOPMENT & TOURISM**

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December 28, 2021

The Honorable Ronald D. Kouchi,
President and Members
of the Senate
Thirty-First State Legislature
State Capitol, Room 409
Honolulu, Hawaii 96813

The Honorable Scott K. Saiki,
Speaker and Members of the
House of Representatives
Thirty-First State Legislature
State Capitol, Room 431
Honolulu, Hawaii 96813

Dear President Kouchi, Speaker Saiki, and Members of the Legislature:

For your information and consideration, I am transmitting a copy of the Department of Business, Economic Development, and Tourism's Report on Diversifying the Hawaii Economy, as required by House Concurrent Resolution 137, HD1, SD1. In accordance with Section 93-16, Hawaii Revised Statutes, I am also informing you that the report may be viewed electronically at: <http://dbedt.hawaii.gov/overview/annual-reports-reports-to-the-legislature/>.

With aloha,

Mike McCartney -

Enclosure

c: Legislative Reference Bureau

REQUESTING THE DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT,
AND TOURISM TO COMPILE A SHORT LIST OF FORTUNE 500 COMPANIES AND
MULTI-NATIONAL CORPORATIONS THAT ARE SUITABLE TO RELOCATE TO
HAWAII AND IDENTIFY MEANS AND INCENTIVES TO ENTICE THESE
BUSINESSES TO RELOCATE PURSUANT TO HCR 137, HD1, SD1

A Report to the Hawaii State Legislature

Submitted by

The Department of Business, Economic Development & Tourism

January 2022



INTRODUCTION

STATEMENT OF PURPOSE

House Concurrent Resolution 137 (H.C.R. 137) requests the Department of Business, Economic Development, and Tourism (DBEDT) compile a short list of Fortune 500 companies and multinational corporations suitable to relocate to Hawai'i. This resolution seeks to target external investment to the Hawaiian Islands. The resolution states that business activity and a strong economy are vital to the public's health, safety, and welfare. It highlights the current economic reliance of Hawai'i on the tourism industry, which was disproportionately affected by COVID-19 and the subsequent shutdowns in April and August of 2020. The pandemic demonstrated the urgent need for business diversification, as the state's reliance on the tourism industry resulted in one of the highest unemployment rates in the nation. The pandemic also proved that many jobs and businesses can be performed virtually, supporting the feasibility of companies opening multiple geographic locations around the world, including Hawai'i.

Hawai'i consistently ranks among the top states in the country for clean air quality, happiness of its citizens, life expectancy, good weather, and overall quality of life. However, when compared to other states, scarcity of land, business climate, high energy costs, a lack of competitive tax incentives, and other factors have traditionally discouraged national and multinational companies from opening locations in the islands.

PROJECT SCOPE

DBEDT, in partnership with students in the Shidler College of Business Executive MBA program assisted with this project to identify 20 to 25 U.S. multinational companies with potential to initiate operations in Hawai'i. A team of four students in the New Venture Management course worked on this project over five weeks from November 2 to December 4 of 2021.

DBEDT provided the project framework and various reports for our team to consider. These materials helped to narrow the scope of the report. To supplement this information, additional research was done outside of these documents including online research and background discussions with business and government specialists. Information on resources used can be found in the References section of the report.

DBEDT provided the following parameters for the project: 1) The list may include any U.S. or international company not currently in Hawai'i that would be interested in establishing a presence here; 2) The companies are not limited in terms of revenue generation or specific job creation quotas; 3) This report should not focus on tax incentives as a *primary means* to attract businesses, but rather examine what assets Hawai'i has that would be of interest to a global company and 4) Additionally, the report may mention *growing local companies*, the main purpose of the report is to ascertain potential opportunities for *external* investment in Hawai'i. i.e., it does not intend to focus on start-ups; and finally; 5) This report does not include a comparative analysis of economic incentives, currently in place or planned, with other states or countries. Rather, this report is not intended to be all-inclusive but to serve as a starting point for further discussion among stakeholders. Our project scope was limited by time; sectors not mentioned should not imply that they are not suitable for consideration.

METHODOLOGY

The methodology used began with first identifying the unique benefits Hawai'i has to offer. Research was done on the state's demographics, facilities, economic makeup, business climate, imports, exports, geographic location, and various other assets to determine the state's strongest characteristics, resources, facilities, etc. The identified assets include only those DBEDT felt relevant to the purpose of this report.

These assets were then mapped to sectors that would be interested in and/or would benefit from those specific and somewhat unique assets. This resulted in identification of four sectors: **pharmacology/biotechnology**, **clean energy**, **agriculture/aquaculture**, and **information technology/cybersecurity**.

Next, companies were identified within each sector and a more comprehensive investigation of their business operations was performed in order to determine compatibility with the state. After excluding companies that already had a major Hawai'i presence, we measured the potential companies against a list of criteria to generate the final list of suitable candidates. The report further includes recommendations and suggestions such as the potential expansion of companies already located in Hawai'i.

|| Figure 1: Steps of Methodology



INITIAL FINDINGS

- 1) Inward investment attraction for a state with Hawaii's unique assets must be strategic. A one size fits all approach will not work for Hawai'i.
- 2) The state's unique assets, the reason a global firm would be interested in Hawai'i, need to be the starting points for an inward investment strategy.
- 3) Tax incentives and other tools can play a *supporting* role, but they should be used in a very tactical way.
- 4) A well-developed inward investment program based on a sound strategy takes resources and staff. The Business Development and Support Division (BDSD) of DBEDT given its current resources can only do this work now on an *ad hoc* basis.

PROGRESS TO DATE

BDSD has been involved in inward investment opportunities over the years sometimes pro-actively and sometimes in response to inquiries regarding DBEDT program such as Enterprise Zones.

As part of one of the targeted sectors in this report, BDSD is currently working with the University of Hawaii on attracting pharmaceutical companies to the state with the possibility of collaborative clinical trials research.

Another sector targeted in this report is IT and cybersecurity, particularly as these relate to the state's defense economy. In order to attract large defense contractors involved in these areas the state has initiated a number of workforce development initiatives to make the state attractive from a talent recruitment perspective. Specifically, DBEDT has contracted with both the Chamber of Commerce Hawaii and CyberHawaii in an effort to address the increasing demand for IT/Cyber professionals. In addition to those contracts, DBEDT has contracted with local tech firm Referentia to provide cybersecurity education and technical assistance to local businesses competing in the defense sector and subject to additional security regulations of the Department of Defense.

This report is a good starting point for further discussion on an inward invest strategy for the state.

HAWAI‘I ASSETS

In studying Hawai‘i assets, one should consider various aspects of the economic, physical, and cultural environment. The assets listed below are significant. There are many other characteristics and assets of Hawai‘i that contribute to the success and makeup of the state, but have omitted to maintain brevity of the report.

CLIMATE AND ENVIRONMENT

Weather in Hawai‘i is fairly steady throughout the year, without drastic variance in regard to precipitation or temperature. Although it varies from island to island, on average Hawai‘i receives upwards of 40 inches of rain annually. Temperatures range from mid-60s to 80s Fahrenheit and very rarely dip below 60 degrees Fahrenheit except in certain regions.

Hawai‘i’s soil is unique due to its volcanic properties. For example, Hilo soil is low in bulk density and high in water holding capacity. The water capacity is in large part due to the volcanic mineralogy. The soil supports various activities such as agriculture, engineering, and ecology. Since the departure of sugarcane and pineapple crops, there is significant idle cropland. In regard to proportion, Hawai‘i’s idle cropland is a much larger portion of total cropland compared with other states.

GEOGRAPHIC LOCATION

Hawai‘i is the only state that is not geographically located in North America, the only state in the tropics, and the only state that is an island archipelago. Located in the middle of the Pacific Ocean, Hawai‘i is the closest state to Japan and a popular travel destination for Japanese tourists. The Hawaiian islands are surrounded by a unique coral reef ecosystem with up to 410,000 acres of living reef and over 7,000 known species of plants and animals. Included in marine life are 500 species of marine algae.

LIFESTYLE

Hawai‘i is located in paradise, bathed in 270 days of sunlight and full of landscape to support an active lifestyle. The islands are perfect for people who are looking for work-life balance. A vacation every weekend is possible when your office is in Hawai‘i. Many aspects of lifestyle on the islands support strong environmental, social, and governance initiatives.

UNIQUE AND DIVERSE POPULATION

According to the 2020 United States Census, the resident population of Hawai'i is 1.45 million people, a 7.0% growth since 2010. Of the state's population, 18.9% are 65 years of age and over, an increase from 14.5% in 2010. In 2018, Hawai'i ranked 8th on the list of states with the oldest populations. Around 27% of the Hawai'i population indicated Native Hawaiian or Other Pacific Islander (NHPI) as their ethnicity, and 55.3% of the population identify as Asian.

GOVERNMENT RESOURCES

ENTERPRISE ZONES

The Enterprise Zones Partnership Program gives State and County benefits to companies in an effort to stimulate business activity, job preservation, and job creation in areas where they are most appropriate or most needed. Businesses which satisfy annual requirements will qualify for State tax benefits and County specific benefits, including priority business permit processing and exemption from increase in property taxes, for up to seven consecutive years.

DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS)

In response to Presidential Executive Order 13515 - Asian American and Pacific Islander Community, HHS has increased federal funding in order to address key health issues that specifically impact NHPI populations. HHS works closely with state and local governments to advance scientific research, medicine, and public health issues specific to these minority populations.

HAWAI'I CLEAN ENERGY INITIATIVE (HCEI)

In 2008, HCEI was launched when the State of Hawai'i and the U.S. Department of Energy signed a Memorandum of Understanding to support the State's goal of reaching 70% of its energy needs through clean and renewable resources and energy efficiency measures. HCEI is a framework of statutes and regulations supported by a diverse group of stakeholders committed to Hawai'i's clean energy future. In 2014, the State recommitted to its clean energy goal of achieving the nation's first-ever 100% renewable portfolio standards by the year 2045. Hawai'i generated 29.8% of energy from renewable resources in 2019.

HAWAI'I STATE ENERGY OFFICE

The Hawai'i State Energy Office's policy directives are to diversify our energy portfolio, connect and modernize our grids, balance technical, economic, environmental, and cultural considerations, leverage our position as an innovation test bed, and promote an efficient marketplace.

RENEWABLE ENERGY TECHNOLOGIES INCOME TAX CREDIT

This tax credit may be claimed by individual or corporate taxpayers for eligible solar and wind energy technology systems.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

NOAA's Pacific Islands Regional Center is based in Honolulu and works with the Pacific Islands Fisheries Science Center to integrate science into policy and management decision-making, working together for the conservation and management of domestic and international marine resources. The Regional Center coordinates several initiatives throughout the Pacific islands including sustainable fisheries, habitat conservation, and resource protection, with field offices in American Samoa, Saipan, and Guam.

HAWAI'I FOOD PRODUCERS FUND

This fund brings together The Kohala Center, the Hawai'i Department of Agriculture, County of Hawai'i, and Kiva. The Hawai'i Food Producers Fund provides 0% interest loans to Hawai'i food producers with the focus of increasing the amount of capital available to local food producers and stimulates local food production in Hawai'i.

THE MADE IN HAWAI'I WITH ALOHA (MIHA) BRANDING PROGRAM

This branding program is managed by the Hawai'i Department of Agriculture and jointly promoted by DBEDT and the Chamber of Commerce of Hawai'i. It was established to protect the integrity and value of authentic Hawai'i branded products. A MIHA logo utilized in the promotion or marketing of any product specifies its compliance with the Hawai'i Revised Statutes §486-119. As of October 2021, there are approximately 100 companies participating in the MIHA program.

U.S. INDO-PACIFIC COMMAND

United States Indo-Pacific Command (USINDOPACOM) is located in Honolulu as one of six geographic combatant commands defined by the Department of Defense's Unified Command Plan. USINDOPACOM is in charge of using and integrating United States Army, Navy, Air Force, and Marine Corps forces within the USINDOPACOM area of responsibility,

which includes the Asia Pacific from India to California, to achieve U.S. national security objectives while protecting national interests.

HAWAI'I TECHNOLOGY DEVELOPMENT CORPORATION (HTDC)

HTDC is a state agency attached to DBEDT that is responsible for diversifying Hawai'i's economy by developing a flourishing technology industry that provides quality, high-paying jobs for Hawai'i residents. HTDC offers start-up space, grants, training programs and resources to accelerate the growth of Hawai'i's technology industry to foster innovation and diversify Hawai'i's economy.

MAUI HIGH PERFORMANCE COMPUTING CENTER (MHPCC)

The MHPCC was established in 1993 as an Air Force Research Laboratory Center managed by the University of Hawai'i under contract to the Air Force Research Laboratory's Directed Energy Directorate at Kirtland Air Force Base, New Mexico. The MHPCC Department of Defense Supercomputing Resource Centers (DSRC) operates as one of the five DSRCs in the Department of Defense's High Performance Computing Modernization Program.

COUNTY OF HAWAI'I DEPARTMENT OF RESEARCH AND DEVELOPMENT

The County of Hawai'i Department of Research and Development awards grants to non-profit organizations for initiatives that improve the quality of life specifically through sustainable economic, societal, and environmental practices in agricultural research that is innovative or urgent in nature.

RESEARCH FACILITIES

UNIVERSITY OF HAWAI'I SYSTEM (UH)

UH is a public university system that offers associate, bachelor's, master's, and doctoral degrees through three universities, seven community colleges, multiple education and training centers, and several research facilities on six islands in Hawai'i. UH is a major driver of research in areas that are critical to Hawai'i's economy, including healthcare, agriculture, natural sciences, and technology. During fiscal year 2021, UH received over \$485 million in extramural funding from government, industry, and non-profit organizations that support research and training activities by UH directed toward research and innovation.

UH MĀNOA SCHOOL OF LIFE SCIENCES

The School of Life Sciences merges the biology, botany, and microbiology departments. The three-story life sciences building, which opened in the Fall of 2020, features 21 state-of-the-art teaching and research labs to support world-class research.

UH PACIFIC BIOSCIENCES RESEARCH CENTER (PBRC)

PBRC is a center of excellence in interdisciplinary biological sciences and follows the ethic of sustainability with respect for culture, values, and limited natural resources of Hawai'i. One of the researchers is attempting to understand the neurodegenerative and metabolic processes involved in diabetes.

UH JOHN A. BURNS SCHOOL OF MEDICINE (JABSOM)

JABSOM is home to a multidisciplinary Diabetes Research Center to promote research aimed at improving the metabolic health of the people of Hawai'i and the Pacific region. This Center of Biomedical Research Excellence focuses on diabetes mellitus and insulin resistance, specifically in the disproportionately affected Native Hawaiian, Pacific Islander, and Asian population.

UH CANCER CENTER

The UH Cancer Center supports a variety of state-of-the-art core facilities that provide services to facilitate basic and translational research programs. The Genomics and Bioinformatics Shared Resource offers a central service that uses cutting-edge and high-throughput genomic technologies with priority given to Cancer Center members with federal funding for cancer related projects. In 2020, the UH Cancer Center received a five-year Research Education Program Grant totaling \$1.36 million from the National Institutes of Health.

DANIEL K. INOUE COLLEGE OF PHARMACY AT THE UNIVERSITY OF HAWAI'I AT HILO

The Daniel K. Inouye College of Pharmacy has five research labs, including ones that focus on the evaluation of natural products as anticancer and cancer chemo preventive agents and targeted drug therapy for central nervous system diseases.

NATURAL ENERGY LABORATORY OF HAWAI'I (NELHA)

NELHA provides resources and facilities for energy and ocean-related research, education, and commercial activities. NELHA operates the Hawai'i Ocean Science and Technology Park in Kailua-Kona.

UH INSTITUTE FOR SUSTAINABILITY AND RESILIENCE

The Institute for Sustainability and Resilience aims to help Hawai'i meet local and global obligations to environmental sustainability through instructional, research, and outreach programs.

HAWAI'I NATURAL ENERGY INSTITUTE

The Hawai'i Natural Energy Institute is a research unit of the UH School of Ocean and Earth Sciences and Technology. The institute conducts research to develop, test, and evaluate novel renewable energy technologies. Current research projects are on alternative fuels, grid integration and renewable power generation, fuel cells and batteries, and energy efficiency in buildings and transportation.

U.S. NAVY WAVE ENERGY TEST FACILITY

This facility at Marine Corps Base Hawai'i in Kāne'ohe Bay is the only U.S. test site for emerging wave energy conversion devices to be evaluated under grid-connected open water conditions.

HAWAI'I CENTER FOR ADVANCED TRANSPORTATION TECHNOLOGIES (HCATT)

HCATT is a National Demonstration Center for fuel efficient and zero emission transportation technologies. HCATT is a program of HTDC and is a pioneer of hydrogen and fuel cell technologies in Hawai'i.

UNIVERSITY OF HAWAI'I COLLEGE OF TROPICAL AGRICULTURE AND HUMAN RESOURCES (CTAHR)

CTAHR acts as a land-grant institution which assists members and sectors of the food and agriculture system. Research projects include extramural grants and formula funds such as HATCH, McIntire-Stennis, and Animal Health and Disease. A number of patents were developed under CTAHR across the various research stations over all of the islands. As part of CTAHR, the college provides Agricultural Diagnostic Services such as conducting analyses and diagnostic tests related to plant disease, feed and forage, insect identification, chemical analyses of soils, and others.

HAWAI'I AGRICULTURE RESEARCH CENTER (HARC)

The purpose of the HARC is to develop and demonstrate technologies, perform research, and develop agribusiness opportunities. Research currently includes sugarcane, coffee, cacao, tropical fruits and flowers, forestry, and bioenergy. Specific research includes breeding programs of seed that take advantage of year-round growing conditions. There

are numerous experiment station laboratories located on Oahu that utilize state-of-the-art instrumentation and equipment. In addition to the seed program, HARC operates a micropropagation facility using plant tissue culture techniques. Lastly, the research center operates a water safety testing laboratory.

HAWAI'I INSTITUTE OF MARINE BIOLOGY (HIMB)

Hawai'i Institute of Marine Biology aims to be a global leader in marine research employing scientific and technical innovation and local and global collaboration. HIMB employs over 100 researchers, postdocs, students, and staff in one of the most unique settings in the world in order to implement cutting edge research and develop new technologies to advance the stewardship of marine and coastal biodiversity. Facilities include the Evolutionary Genetics Core Facility, a Boston Whaler research fleet, a scientific diving program flow-through sea water systems, tidal ponds, state-of-the-art laboratories, and algal and larval culture facilities.

UH APPLIED RESEARCH LABORATORY (ARL)

Established in 2008, the ARL is the latest of five Navy-sponsored University-Affiliated Research Centers. The ARL serves as a center of excellence for critical Navy and national defense needs, conducting research, development, testing, and evaluation to address challenging and emerging problems. The ARL primary focus areas include: Ocean Research; Astronomy; Sensor Development; Remote Sensing; Renewable Energy; and Mission Related and Public Service Oriented Research and Development. In 2019, Naval Sea Systems Command awarded a five-year Indefinite Delivery/Indefinite Quantity contract to the ARL at UH to continue its support of critical Navy and Department of Defense requirements.

HAWAI'I MARINE EDUCATION AND RESEARCH CENTER (Hawai'i MERC)

Hawai'i MERC is a state of Hawai'i and U.S. federal 501(c)(3) non-profit organization with 100% volunteer support. Its goal is to provide timely scientific information on marine ecosystems to the community. It supports a number of group collaborations and hands-on educational experiences.

PACIFIC ASIAN CENTER FOR ENTREPRENEURSHIP (PACE)

At the Shidler College of Business, PACE programs offer mentorship, training, and resources to UH students and faculty. PACE educates entrepreneurial thinkers and innovative problem solvers.

INFRASTRUCTURE AND COLLABORATORS

ELEMENTAL EXCELERATOR

Since 2009, Elemental Excelerator has invested in over 100 growth-stage companies and funded more than 70 technology projects to redesign systems at the root of climate change.

ULUPONO INITIATIVE

Ulupono Initiative is a for-profit investment firm that works toward sustainable solutions that support and promote renewable energy, clean transportation, locally produced food, and better water and waste management.

HATCH

HATCH's mission is to catalyze farmed and alternative seafood innovation through responsible investment, expertise, and insights, supported by a strong, committed community. In addition to financial support, HATCH provides a mentor network.

HAWAI'I DEFENSE ALLIANCE

Hawai'i Defense Alliance is a public-private partnership led by the Hawai'i Chamber of Commerce's Military Affairs Council that brings together industry, government, educational institutions, and community resources to help increase local business opportunities while identifying challenges to the local defense industrial base and offering solutions. Its mission is to increase U.S. Department of Defense opportunities and promote resilience among the local defense industrial base through four areas: small business support; workforce development; business ecosystem development; market development and resiliency.

CYBERHAWAI'I

CyberHawai'i is a non-profit organization designed to develop Hawai'i's cybersecurity capabilities. The organization is working to build a community that manages and mitigates cyber risk, shares threat information and encourages cyber hygiene best practices. CyberHawai'i is also committed to developing and accelerating educational and workforce opportunities for students via pathways from high school to two- and four-year cyber degrees. CyberHawai'i is an affiliate of CyberUSA, which is chaired by former Governor Tom Ridge, the first Secretary of Homeland Security.

INNOVATION ACCELERATORS

Hawai'i's growing innovation economy includes incubators and accelerators such as Blue Startups, XLR8HI, Mana Up, Purple Mai'a, and Hawai'i Investment Ready. These accelerators aim to stimulate economic growth in Hawai'i and create business opportunities through mentorship, peer review, introduction to investors, and many other activities.

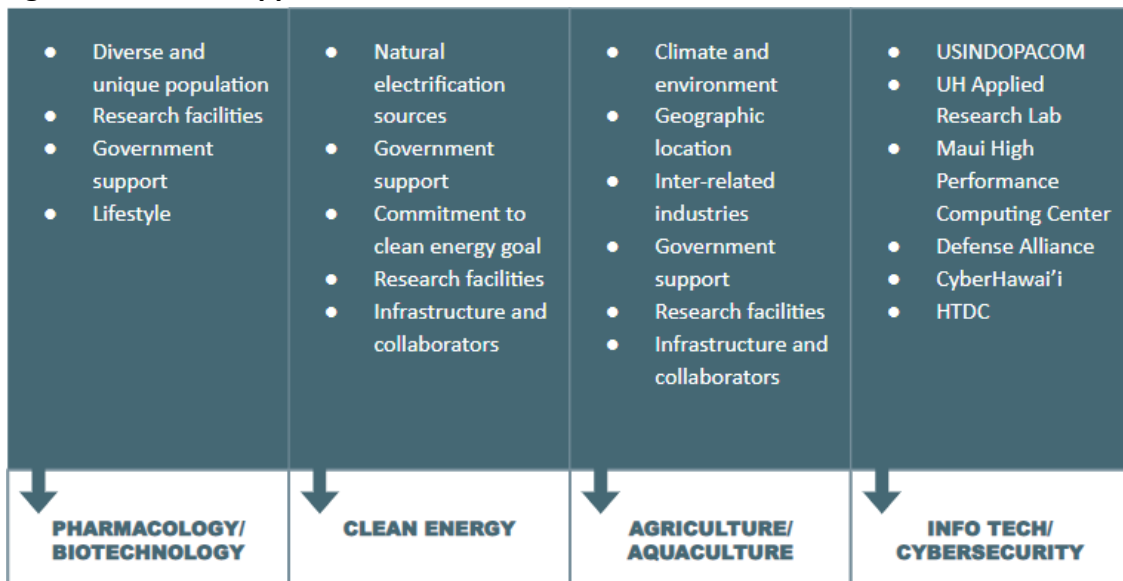
SUMMARY

After analyzing the state's unique strengths, assets, and infrastructure, we identified the following four sectors among several possibilities for further research:

- **Pharmacology/Biotechnology**
- **Clean Energy**
- **Agriculture/Aquaculture**
- **Information Technology/Cybersecurity**

The following graphic maps the related assets to each sector.

Figure 2: Assets mapped to sectors



SECTORS

PHARMACOLOGY/BIOTECHNOLOGY

OVERVIEW

The broad sector of life sciences focuses on improving the quality and standard of life through the study of microorganisms, plants, and human beings. Companies focused on pharmacology and biotechnology investigate living organisms on a cellular level in order to develop or improve products. It often includes work related to genomics, immunology, pharmaceutical drug therapies, and diagnostic testing. Pharmacogenomics is the analysis of how genetic makeup affects an individual's response to drugs in order to improve medication therapy by increasing effectiveness and reducing toxicity. For example, decreased response to clopidogrel (Plavix) is common among Asians due to genetic polymorphisms associated with clopidogrel resistance. It is estimated that around 70% of the Asian population is unable to convert the drug to its active form to properly thin the blood and prevent heart attacks and strokes. In addition, a number of medications have been developed under a genetically targeted approach, mostly for the treatment of cancer.

UNIQUE OPPORTUNITIES

The diverse and unique population of Hawai'i is the perfect study sample for pharmaceutical and biotechnology companies to use in their research. Compared to other states, Hawai'i has the largest NHPI population and the ninth largest Asian American population. In comparison to other ethnic groups, NHPI and Asian Americans have higher rates of certain chronic diseases. In 2018, NHPI were 2.5 times more likely and Asian Americans were 40% more likely to be diagnosed with diabetes, as compared to the non-Hispanic white population. In 2019, tuberculosis was 37 times more common in NHPI and 33 times more common among Asians, as compared to the non-Hispanic white population. The state's liver and stomach cancer incidence and mortality rates are significantly higher than the U.S. rates. Overall, there is variation in incidence of cancer across various racial and ethnic groups in Hawai'i which warrants further investigation.

ECONOMIC BENEFIT

According to a report by Grand View Research, the global biotechnology market size is expected to expand at a compound annual growth rate of 15.83% from 2021 to 2028. Government initiatives aimed at simplifying the drug approval process and improving reimbursement policies are helping companies in this growing industry to fund research

and development. COVID-19 has accelerated the interest in this sector, as companies look for novel treatments for the infectious disease that has plagued the world.

Hawai'i has only a limited number of local biotechnology companies, which results in locals relocating to the mainland to search for jobs within their field. By focusing on this sector, the state can capitalize on this lucrative industry and expand the job market through diversifying. Additionally, the median pay for technicians is \$45,000 per year and \$90,000 per year for research scientists. The increase of positions of these caliber would create a significant positive economic effect throughout Hawai'i.

CHALLENGES AND POTENTIAL INCENTIVES

Hawai'i Biotech, Inc., a local biotechnology company, says a major challenge is that there is limited biology research and development space in Hawai'i. In addition, while being fairly successful at obtaining federal grants and contracts, that money cannot be used to lease space or purchase a building. In 2015, the company was looking for a 12,000 square foot building, with 40% being dedicated to wet lab space. For potential companies to open locations here in the islands, there must be an **expedited, low-cost path for them to build wet lab space.**

CLEAN ENERGY

OVERVIEW

The clean energy industry generates hundreds of billions of dollars in economic activity and is expected to continue rapidly growing. Energy sources include solar, wind, water, geothermal, bioenergy, nuclear, and hydrogen and fuel cells. Solar energy is the most affordable source of new electricity in the U.S. Sunlight during the day is converted into electrical energy through photovoltaic panels or through mirrors that concentrate solar radiation. Energy can be stored in batteries or thermal storage. Wind energy is generated by propeller-like blades turning around a rotor. Water can generate electricity through energy from waves, tides, and river and ocean currents. Geothermal power plants can generate electricity by bringing steam and hot water to the surface constantly and regardless of weather conditions. Biomass is a renewable energy source that converts agricultural material, energy crops, and algae into gasoline, diesel, and jet fuel. Nuclear power generates electricity through sustained nuclear fission. Hydrogen can store energy after being produced from compounds that contain it.

UNIQUE OPPORTUNITIES

With natural electrification resources, research facilities, and bold clean energy goals, Hawai'i offers clean energy companies a place to collaborate with researchers, to design/develop and operate systems, and to improve new technologies. As a host to numerous energy and sustainability research and test facilities, existing and planned renewable energy projects, and Elemental Excelerator, Hawai'i is uniquely positioned as an international testbed for clean energy innovation. Hawai'i also has a workforce that can be trained to design, construct, and maintain clean energy systems through school training programs, community colleges and universities, and trade unions.

ECONOMIC BENEFIT

Hawai'i can reach its clean energy goal and create long-term jobs for residents through responsible development of energy sources. The Renewable Energy Technologies Income Tax Credit has helped to add solar and wind electrification sources and reduce Hawai'i's dependence on imported fossil fuels. Customer-sited, grid-connected renewable solar and wind accounted for 47.3% of Hawaiian Electric's renewable energy in 2020.

According to the Clean Jobs, Better Jobs report, workers in renewable energy, energy efficiency, grid modernization and storage, clean fuels and clean vehicles earned median hourly wages about 25% higher than the national median wage in 2019. In Hawai'i, the average clean energy hourly wage was \$23.78. President Biden's Build Back Better agenda will provide more than \$62 billion for the U.S. Department of Energy to deliver a more equitable clean energy future by investing in American manufacturing and workers, expanding access to energy efficiency, delivering reliable and affordable power, and building technologies through clean energy demonstrations.

Solar projects create many installation jobs but few long-term jobs and have a large footprint on scarce vacant land. Existing wind farms are located in certain areas that have suitable wind patterns and speeds for energy generation. Geothermal power plants can be built on smaller footprints than solar and wind systems. Modern closed-loop plants emit no greenhouse gasses and create long-term maintenance jobs. Hawai'i has limited flowing water resources for hydropower, but wave energy can be generated throughout the day and night, at varying rates.

Economic opportunities can be provided through the financing and design/development of new geothermal, wave energy, biofuel, and biomass projects, as well as through facility maintenance, grid integration, and optimization and automation services. By reducing the use of imported oil and generating renewable energy locally, Hawai'i can hopefully reduce its utility costs, which is a factor in the high cost of living and running a business in Hawai'i.

CHALLENGES AND POTENTIAL INCENTIVES

Hawai'i's remote geographic location presents transportation and shipping challenges to any business. Limited and expensive land resources, lengthy permit processes, and high operating costs such as electricity are additional challenges that companies must consider before expanding to Hawai'i. To encourage new clean energy companies to operate in Hawai'i, **government commitments, valuable research facilities, existing and planned clean energy generation projects, tax credits** for solar and wind projects, and Enterprise Zones **should be promoted**. Another way to provide clean energy companies, both new and present in Hawai'i, with a path to success includes an **expedited permit review** at the state and county level and **improved grid interconnection processes** with existing utility companies.

Hawai'i seeks to be an innovation testbed for clean energy and has already attracted many Fortune 500 companies. The Appendix provides a list of such companies that have registered businesses in Hawai'i. While this report is intended to provide a short list of suitable companies not already in Hawai'i, we also believe that the industry and state would benefit from local companies expanding their operations and providing products and services offered in other locations. Companies like Berkshire Hathaway Energy Renewables, which operates a hydroelectric power plant in Hawai'i, have a diverse portfolio of projects in other states and countries. These new projects would generate jobs that can be filled by Hawai'i residents, since companies with current operations have built community relationships and have experience running a business here. As our state becomes a hub for clean energy, we need to **provide our residents with workforce training opportunities** in our schools, community colleges, and universities statewide **to build the skills needed for project development and long-term maintenance and enhancement**.

AGRICULTURE/AQUACULTURE

OVERVIEW

Agriculture is one of the oldest industries in any economy and is historically volatile. Key external drivers of the agriculture industry include threat of natural disaster, the population, the price of feed, the agricultural price index, the price of fertilizer, and even culture trends. Despite this volatility, the U.S. industry revenue is expected to grow 0.5% to \$477.9 billion over the five years to 2026. Upstream industries include the utilities, construction, and manufacturing industries. Downstream industries also include manufacturing, as well as wholesale, retail, markets and other food stores, and general consumers. The industry is currently experiencing a degree of technological disruption related to genetically modified seeds, modern equipment, advanced biotechnology,

advanced fertilizers and pesticides, innovative irrigation techniques, and even drones. This disruption provides significant opportunity for expansion and change.

Aquaculture includes the farming of aquatic animals or plants. Similar to the agriculture industry, aquaculture is impacted by the general population, culture shifts, and the price of feed. A slightly greater projection, U.S. industry revenue is expected to grow 0.8% to \$2.0 billion by 2026. Imports are currently on the rise, as foreign products are often cheaper than domestic. As the trend of plant-based meat continues, seafood may be impacted. However, as seafood is generally seen as more sustainable and healthier, the industry is not projected to decline significantly. The main areas of innovation include breeding and product geographic-information system technology.

UNIQUE OPPORTUNITIES

Hawai'i has much to offer the agriculture and aquaculture industries. Regarding the agricultural industry, there are numerous areas of idle cropland as the sugarcane and pineapple plantations have departed Hawai'i. These areas contain soil ideal for many crops. Additionally, Hawai'i's climates allow for year-round growth. Despite these conditions, Hawai'i farming productivity is low. This is in large part due to the lack of mechanization relative to other high yield states. The lack of mechanization coupled with small, concentrated farms creates the opportunity for innovative technologies. Hawai'i has a number of local research facilities employing experienced researchers and students available to work in partnership with for-profit companies to develop and test new technologies. Hawai'i is also dependent on imported produce. Local demand for fresh produce could be filled by niche crops. Crossover industries such as agricultural tourism, export of Hawaii-branded products, or fulfillment of government contracts are also strong incentives of Hawai'i.

The aquaculture industry benefits from the state's close proximity to the sea, its numerous research facilities, and potential partnerships with HATCH.

ECONOMIC BENEFIT

Currently, Hawai'i agriculture sales are declining. Agriculture represents a small share of the Hawai'i economy. Accounting for the consumer price index specific to Hawai'i and the producer price index used by the U.S. Department of Agriculture (USDA), Hawai'i's agricultural value has been in decline since 1982. As previously described, this may be in part due to the high costs of Hawai'i coupled with the low productivity. Converting idle cropland and utilizing technological advancements to farm more efficiently would yield a higher value for Hawai'i. Additionally, this diversification would result in job creation outside of hospitality. The median salary of an agricultural scientist in Hawai'i was \$75,000 and reached up to \$110,000. Lastly, local production of crops would reduce the need for

imports. House Bill 817, currently pending approval, mandates a minimum of 10% of agricultural products purchased by state departments be grown locally by 2025, and increases 8% every five years to 50% by 2050. Utilization of technological advances will hasten the state's achievement of this goal.

63% of seafood consumed in Hawai'i is imported from international and mainland sources. There is significant demand for seafood in the state from both residents and visitors, reaching \$83.2 million in 2019 sales. Domestic production could lessen imports and generate revenue, meeting the strong demand in Hawai'i.

CHALLENGES AND POTENTIAL INCENTIVES

The largest cost in terms of percentage related to farm production is hired farm labor. Hourly rates are similar and even less than those offered by California, suggesting the rate is not the cause, but the intensity of the labor that increases costs. Hawai'i should **consider incentives to subsidize or support technological research and development focused on increased yield** to attract companies to Hawai'i. According to the latest data, 67% of total farmland has been set aside for permanent pasture and rangeland. **Incentivizing the conversion of this land into efficient cropland or providing access to government owned land** would further increase farming revenue. Land rental costs are similar to California, therefore an emphasis should be placed on access, not cost. Lastly, Hawai'i farmers face high costs related to electricity compared to U.S. mainland and Japanese competitors. **Incentives or support for clean energy and agricultural joint endeavors** may further attract multiple companies.

INFORMATION TECHNOLOGIES/CYBERSECURITY

OVERVIEW

Information Technologies (IT) have become a critical component of economic growth, national security, innovation, and competitiveness. Although IT firms tend to emerge from tech clusters, they are not as location dependent as other firms with physical supply chains, manufacturing, and distribution systems.

Hawai'i has several important strengths and assets geared toward IT, including the large USINDOPACOM complex, MHPCC, as well as public private partnerships between the defense department and local private sector business communities. Hawai'i's strategic location and the growing geopolitical competition in the Asia Pacific Region gives Hawai'i an outsized role in all aspects of national security and communications. Each of these disciplines requires management, analysis, and protection of massive amounts of data, which should make Hawai'i a focal point for large and small companies in these sectors.

Major IT companies that do not already have a presence in the state may be attracted to the opportunity to engage USINDOPACOM, recruit highly skilled former military and civilian workers, and identify opportunities in Hawai'i's adjacent business communities like travel and tourism, finance, and real estate. For the purposes of this report, we identified several firms with expertise in IT services, data management, and cybersecurity.

UNIQUE OPPORTUNITIES

In addition to USINDOPACOM as a driver for IT broadly in Hawai'i, the Defense Department operates one of only four national cryptologic centers in West O'ahu, employing 3,500 people, 25% of whom are civilian staff. According to its website, the Hawai'i regional facility conducts "signals intelligence and cybersecurity operations to protect U.S. Government communications, and conducts cyberspace operations..." This facility provides IT companies with potential contract opportunities, collaboration, and talent development within the local tech ecosystem. Cryptologic centers in other states have attracted large investments by major tech companies and have become the basis for future tech hubs.

Climate change is increasingly viewed as a major threat to national security, and all branches of the military are investing in technologies, research, and data to help understand emerging risks and challenges. Several UH departments and the UH ARL stand out as unique anchors for pioneering research at the intersection of defense, natural sciences, space and information technology, strengthening Hawai'i's attractiveness to companies in these areas.

Lastly, Hawai'i has an emerging tech start-up ecosystem, vast potential for work-from-home opportunities, and a significant number of personal links with the founders of major technology companies who live in and work from Hawai'i, which could all support IT sector development.

ECONOMIC BENEFIT

According to a November 2021 report by BusinessWire, the global cyber security market is projected to exceed \$330 billion by 2027. Developing a strong cybersecurity cluster in Hawai'i would not only directly support Hawai'i defense industry needs but also increase access to cyber security expertise by local small businesses, which are an important part of the defense contracting ecosystem and are required to meet Department of Defense security standards.

More broadly, IT management is increasingly part of nearly every industry, and strengthening the IT cluster in Hawai'i would also provide access to solutions and tools for local companies, academic institutions, healthcare providers, and financial institutions. Online training platform Coursera cites the U.S. Bureau of Labor Statistics data that the median salary for cybersecurity analysts in the U.S. in 2020 was \$103,590. U.S. News cites the median salary for software engineers in 2019 at \$107,510. According to the Census Bureau, Hawai'i's Median Family Income was \$96,462 in 2019.

Developing well-paid jobs associated with IT in Hawai'i also strengthens local technology ecosystems.

CHALLENGES AND POTENTIAL INCENTIVES

One of the biggest challenges to attracting IT, cybersecurity, and other information technology firms is workforce development, and the relative need for IT professionals, specialists, and advanced degree holders in related fields. Local industry groups like CyberHawai'i and the Defense Alliance, as well as the University of Hawai'i system, are developing outstanding workforce training programs, but more needs to be done to **develop a skilled workforce in target high-tech sectors.**

The State could also consider incentive programs for corporate clients that offset the cost of workforce training, expanding on the existing Employment & Training Fund under the State's Workforce Development Division. Pathway programs that are currently being developed to **encourage IT and software development skills at the high school, vocational, and advanced degree levels** should all be part of the ecosystem of talent development.

Technology infrastructure requires ongoing investment to maintain competitiveness, including greater access to broadband, fiber, and satellite communications. The State might consider **developing Economic Development Agency grant proposals for broadband and related digital infrastructure** and track developments with recent infrastructure investment legislation.

TARGET COMPANIES

SELECTION CRITERIA

After identifying hundreds of potential companies, we analyzed each potential company from two perspectives: reasons to consider Hawai'i from the company's perspective and the attractiveness of the company from Hawai'i's perspective. We understand that while the main focus of H.C.R. 137 is to note companies that might be attracted to Hawai'i, we also considered key factors to assess their suitability to fit within the Hawai'i business ecosystem and contribute to the state's success. The figures below provide a general overview of our basic screening criteria used in the selection process.

Figure 3: Attractiveness from company's perspective

Criteria	Definition
Comparative incentives	How does Hawai'i compare - Without implementing new incentives, how ideal is Hawai'i for this business' operations in comparison to other states or countries?
Local competition	Low or no competition in Hawai'i - Opening a branch/location would provide the business with little to no competition within Hawai'i.
Supportive tax policies	Current Hawai'i tax policies are beneficial for this company - Hawai'i provides certain tax incentives and funding for which this company is qualified.
Connection to Hawai'i	Personal ties - Are there non-business reasons a company may have ties to Hawai'i? Are the business' decision makers from Hawai'i or do they have other ties to Hawai'i?
Geographic location	Proximity to Asia and other island nations - Hawai'i's geographic location makes it an ideal spot for mainland companies to set up bases in order to expand their reach. Similarly, Asian countries such as Japan, etc. would benefit from Hawai'i's proximity to the mainland.

Figure 4: Attractiveness from Hawai'i's perspective

Criteria	Definition
Number and quality of jobs created	Potential for high-quality job creation based on current workforce - We assume that a company currently employing a large workforce would have the potential to similarly require a significant workforce in Hawai'i, creating desirable jobs for current residents.
Energy Consumption	Low or smart consumption of energy - Hawai'i is very conscious of the energy consumed and generated on the islands. We hope to attract companies utilizing renewable energy sources or those that require low energy consumption.
Physical footprint	Small physical footprint - Hawai'i's land is precious and rare. We hope to attract companies that require a small physical footprint or can reclaim land/facilities currently underutilized.
Long term sustainability	Staying power - Both Hawai'i and the company are making an investment by participating in a partnership. We would like a relationship to be long term and mutually beneficial, and for companies to plan for years of business in Hawai'i.

PHARMACOLOGY/BIOTECHNOLOGY

1. *Gilead Sciences, Inc.*

Gilead Sciences, Inc. is a publicly traded American biopharmaceutical company with the mission “to discover, develop, and deliver innovative therapeutics for people with life-threatening diseases.” In addition to the United States, the company operates in Canada, Mexico, Europe, the Middle East, Asia, and South America.

Website: <https://www.gilead.com>
Address: 333 Lakeside Drive
Foster City, CA 94404
Phone: (650) 574-3000 or 800-GILEAD-5 (800-445-3235)

The company website states they are “actively working to include a diverse group of participants, including underrepresented communities, across all (their) clinical trials.” Inclusion is one of Gilead’s core values and they state, “diversity in (their) research programs helps (them) understand how (their) treatments affect all the populations who may benefit from the treatments (they) are studying.” The incentive for the company to open a location in Hawai’i is the access to a large, diverse population within a 20 mile radius to participate in their clinical trials and support their mission to be inclusive and investigate the effects of their medications in all ethnicities.

2. *Eli Lilly and Company*

Eli Lilly and Company is the world's second largest antidiabetics pharmaceutical company. It is based in Indianapolis, Indiana, with offices in 18 countries. It was one of the first companies to produce human insulin using recombinant DNA, and is currently the largest manufacturer of psychiatric medications. Lilly has been a global leader in diabetes care since 1923, and the company is continuing to work on creating a better life for people with the disease.

Website: <https://www.lilly.com>
Address: 893 S Delaware Street
Indianapolis, IN 46285
Phone: (317) 276-2000

Lilly is committed to ensuring their medications work in a broad patient base by deliberately selecting a diverse range of participants in clinical trials. They have specific goals to ensure they follow through on their promise, including identifying and addressing barriers that keep underrepresented populations from participating in clinical trials, intentionally selecting a diverse range of trial sites and investigators, and collaborating

with community organizations to identify and implement solutions that will result in diverse representation. The company's focus on diabetes and commitment to investigating a diverse population are a perfect match for Hawai'i, as NHPI and Asians are more likely to be diagnosed with this chronic disease.

3. Daiichi-Sankyo

Daiichi-Sankyo is a global pharmaceutical company with 17 research and development locations in 10 countries, and the second largest pharmaceutical company in Japan. The company owns the American biotechnology company Plexxikon, American pharmaceutical company American Regent, and German biotechnology company U3 Pharma. The company developed its own antibody-drug conjugate (ADC) platform that was central to the development of a medication used to treat breast cancer by targeting the HER2 protein, which promotes the growth of cancer cells in 20% of all cases. ADCs are a combination of an antibody and a small molecule compound to form a medication, which allows the drug to seek out the cancer cells and deliver the drug with minimal exposure to other parts of the body. Their current "3 and Alpha" strategy is focused on their three most important ADCs, one of which is being studied in gastric cancer and non-small cell lung cancer.

Website: <https://www.daiichisankyo.com>
Address: 211 Mt. Airy Road
Basking Ridge, NJ 07920
Phone: (908) 992-6400

Hawai'i is geographically the closest state to Japan, where the company has its roots. With Hawai'i's liver and stomach cancer incidence and mortality rates significantly higher than the U.S. population, the state has particular interest in potential innovative treatments like the ADCs Daiichi-Sankyo is focused on. By opening a location in Hawai'i, the company would be better able to collaborate with the researchers here in the islands and also have access to a diverse population particularly interested in the diseases they are investigating.

4. Syneos Health

Syneos Health is the only fully integrated biopharmaceutical solutions organization created through the merger of INC Research and inVentiv Health. The company operates in more than 110 countries to accelerate the delivery of biopharmaceutical products to patients around the world. Syneos Health uses the Biopharmaceutical Acceleration Model to help clients increase the likelihood of regulatory approval and maximize commercial success. The company's goal is to decrease the time it takes to move from a concept in the lab to real world use.

Website: <https://www.syneoshealth.com/>
Address: 1030 Sync Street
Morrisville, NC 27560
Phone: (919) 876-9300

Syneos Health prides itself on having “access to specific patient populations including Japanese, Chinese, and patients who are obese or elderly.” Opening a location in Hawai‘i will enhance that available population by providing access to clinical trial participants who are U.S. citizens and potentially adding more ethnicities to the subject pool. While there is a lot of research going on in the state, there is currently a limited number of local biopharmaceutical companies who have taken products to market. A company like Syneos could take advantage of the possibilities for taking the current research to market and perhaps identify potential customers through the establishment of local presence.

5. *Illumina*

Illumina is a global leader in genomics — an industry at the intersection of biology and technology. The company’s goal is to apply innovative technologies to the analysis of genetic variation and function, making studies possible that were not even imaginable just a few years ago. Illumina has developed a comprehensive line of products that address the scale of experimentation and breadth of functional analysis to advance disease research, drug development, and the development of molecular tests. Their broad portfolio of leading-edge sequencing and array-based solutions address a range of genomic complexity and throughput enables researchers to select the best solution for their scientific challenge.

Website: <https://www.illumina.com>
Address: 5200 Illumina Way
San Diego, CA 92122
Phone: (858) 202-4500

Hawai‘i is the perfect place for a company focused on genetic research. Illumina has product offerings that support multiple cancer research applications, including next-generation sequencing to detect somatic mutations in cancer. Illumina can partner with the UH Cancer Research Center to support government-funded research aimed at addressing this prevalent disease. Genetic disease testing solutions are also not widely available, especially in isolated places like Hawai‘i. Often, diagnosis and advanced testing options are only available by traveling to the mainland. By opening a location in the islands, the company has a chance to capitalize on an unmet need and to help an underserved community.

CLEAN ENERGY

1. *Jabil Inc.*

Jabil is a worldwide manufacturing services company based in Florida. It serves several industries, including clean energy technology, through design engineering, manufacturing, and supply chain and logistic services. Jabil has partnered with leading renewable energy companies to deploy new solutions for the energy grid in solar, wind, energy storage, smart meters, and industrial internet of things (IoT) and automation. The company employs over 260,000 people in 23 countries and has its own university that enables it to promote employees from within the company.

Website: <https://www.jabil.com/>
Address: 10560 MLK Street
North Saint Petersburg, FL 33716
Phone: (727) 577-9749

With many existing and planned renewable energy projects across Hawai'i, Jabil would have better access to various companies designing, building, and operating different technologies. Jabil could also collaborate with researchers at UH facilities and test sites to develop component and system improvements that increase energy generation and lower costs.

2. *KKR & Co. Inc.*

KKR is a global investment firm that manages financial assets. The company has been an active investor in clean energy since 2011, investing about \$19.5 billion in renewable assets. KKR recently announced an exclusive partnership with Crossover Energy Partners to develop solar, wind, and energy storage projects in North America. KKR oversees project origination, development, financing, construction, and operation.

Website: <https://www.kkr.com/>
Address: 30 Hudson Yards
New York, NY 10001
Phone: (212) 750-8300

As an innovation hub for clean energy, Hawai'i provides KKR with an opportunity to build new energy generation facilities. Financing is an important part of the development of clean energy projects. Private equity firms are making more investments in the industry since President Biden recommitted to the Paris climate accord.

3. *Enbridge Inc.*

Enbridge is an energy delivery company in North America. The company transports crude oil and natural gas, but also has a diversified portfolio of renewable energy projects including 23 wind farms, 11 solar energy operations, five waste heat recovery facilities, one geothermal project, and one hydroelectric facility. Enbridge employs more than 12,000 people in the U.S. and Canada.

Website: <https://www.enbridge.com/>

Address: 200, Fifth Avenue Place
425 - 1st Street S.W.
Calgary, Alberta
Canada T2P 3L8

Phone: (403) 231-3900

Hawai'i has only one geothermal power generating facility in Puna. Facilities at the Puna Geothermal Venture were damaged by lava flows in 2018. Hawaiian Electric's geothermal supply accounted for only 0.3% of all renewable energy in 2020, and the utility company plans to expand geothermal resources. Enbridge has an opportunity to bid for selection in Hawaiian Electric's third procurement phase opening in February 2022.

4. *MasTec, Inc.*

MasTec is an infrastructure construction company with expertise in power generation, power delivery, civil and industrial, technology deployment, and communications. The company specializes in engineering, procurement, and construction of solar energy facilities, wind farms, alternative fuel power plants, and thermal power plants. MasTec has experience and resources to maximize efficiency during construction and operation. MasTec employs almost 22,000 skilled professionals in North America.

Website: <https://www.mastec.com/>

Address: 800 S. Douglas Road, 10th Floor
Coral Gables, FL 33134

Phone: (305) 599-1800

MasTac is currently registered in Hawai'i for telecommunications purposes. Hawai'i provides the company with an opportunity to expand its service offering where there is a strong commitment to adding new clean energy projects.

5. Renewable Energy Group, Inc.

Renewable Energy Group is a global producer and supplier of biodiesel and renewable biodiesel and chemicals. The company is the largest biodiesel producer by volume in the U.S.

Website: <https://www.regi.com/>
Address: 416 S. Bell Avenue
P.O. Box 888
Ames, IA 50010
Phone: (515) 239-8000

Less than 3% of Hawaiian Electric's renewable energy was derived from biofuels in 2020. Renewable Energy Group has an opportunity to grow this segment of the clean energy industry and encourage an agricultural energy industry with a workforce able to produce both food and fuel.

AGRICULTURE/AQUACULTURE

1. Archer Daniels Midland

The Chicago-based agricultural processor's business spans 200 countries and touches everything from animal feed and human food to cosmetics, alcohol, and paint. It has over 800 facilities and 50 innovation centers over six continents. It employs 38,000 employees. It earned approximately \$65 billion during the 2019 calendar year. It has made Fortune World's Most Admired Companies List and has been listed as a top employer in both the United Kingdom and Germany. It is committed to sustainability and responsible sourcing such as its Commitment to No Deforestation in 2015.

Website: <https://www.adm.com/>
Address: 77 West Wacker Drive, Suite 4600
Chicago, Illinois 60601
Phone: (312) 634-8100

The nutrition segment fits most with Hawai'i and includes aquaculture. The company is already multinational and has operations in Asia including Japan. Hawaiian microalgae/spirulina would be ideal for ADM's R&D department which continues to expand. The company continues to venture into probiotics and nutraceuticals. ADM Ventures identifies companies to invest in such as early-stage start-ups, which would benefit from a partnership with HATCH.

2. Darling Ingredients

The company is a global developer and producer of sustainable natural ingredients from edible and inedible bio-nutrients, creating a wide range of ingredients and customized specialty solutions for customers in the pharmaceutical, food, pet food, feed, industrial, fuel, bioenergy, and fertilizer industries. With operations on five continents, the company collects and transforms all aspects of animal by-product streams into useable and specialty ingredients, such as collagen, edible fats, feed-grade fats, animal proteins and meals, plasma, pet food ingredients, organic fertilizers, yellow grease, fuel feedstocks, green energy, natural casings, and hides. The company currently has over 10,000 employees.

Website: <https://www.darlingii.com/>

Address: 5601 N MacArthur Blvd
Irving, TX 75038

Phone: (972) 717-0300

Hawai'i's fifth biggest commodity is cattle, which is an essential raw material by-product of Darling. Although there may be some facilities required for these operations, the company's business operations utilize byproducts that would otherwise become waste. This includes used cooking oil and bakery residuals. As Hawai'i has a need for waste reduction, this partnership would be mutually beneficial. Besides physical footprint, there may be a challenge related to shipping logistics.

3. Locus Agricultural Solutions

The company uses unique, microbrewery-type production technology to develop non-genetically modified organisms (GMO), organic solutions that sustainably feed the world, improve plant vitality and minimize environmental impact—starting from the ground up. The treatments are customized to local conditions, soil types and plant types, and are delivered refrigerated for maximum freshness. Ongoing treatments result in improved plant resilience and vigor, higher productivity, more soil carbon deposition and reductions in greenhouse gas emissions. The cost-effective solutions are easily applied without changing standard practices and specifically address major challenges, including soil health, plant productivity, and climate change—while improving user profits.

Website: <https://locusag.com/>

Address: 30600 Aurora Road, Ste 180
Solon, OH 44139

Phone: (888) 331-5008

Locus soil aims to grow more food on less land, fight climate change, and reduce the use of chemicals. These goals coincide very closely with Hawai'i's economic environment. Hawai'i has a productivity issue and this would put Hawai'i on par with other states such as California. The company is very similar to Hawai'i Agricultural Solutions LLC, currently operating in Hawai'i. The former CEO, Paul Zorner, has personal ties to Hawai'i.

4. AppHarvest, Inc.

AppHarvest is building some of America's largest indoor farms, combining conventional agriculture techniques with today's technology to grow non-GMO, chemical-free produce. Their first greenhouse in Morehead, Kentucky, will span 60 acres and use 90% less water than a typical farm because of a sophisticated circular irrigation system and 10-acre rainwater retention pond. Their central location in Appalachia is within a day's drive of 70% of the U.S. population, allowing them to reduce the amount of diesel used in transportation by 80%.

Website: <https://www.appharvest.com/>
Address: 8556 Oakmont Lane
Indianapolis, IN 46260
Email: info@appharvest.com

The company currently operates in Appalachia to build a home-grown food supply and increase investment. It uses cutting edge technology to farm more sustainably, which is similar to the farming needs of Hawai'i. Hawai'i's research resources and year-round growing conditions could help AppHarvest expand its current technology.

5. Umitron

UMITRON is a Singapore and Japan based deep-tech company whose aim is to solve worldwide food and environmental problems by empowering aquaculture through technology. The company builds user-friendly data platforms for aquaculture by using IoT, satellite remote sensing, and AI. UMITRON technology helps farmers improve farm efficiency, manage environmental risks, and increase business revenues. The company's ultimate goal is to utilize computer models in combination with aquaculture to help the world sustainably and efficiently deliver protein in a human-friendly and nature-friendly way.

Website: <https://umitron.com/en/index.html>
Address: 1097, 2-11-7 Furuishiba
Koto, Tokyo 135-0045

The company is located in Japan and does not have any U.S. operations. Hawai'i would be an ideal location to enter the U.S. market. It utilizes computer technology, which Hawai'i has significant assets already established. It also focuses on sustainability which reflects the islands current economic environment.

INFORMATION TECHNOLOGIES/CYBERSECURITY

1. Palo Alto Networks

Palo Alto Networks is a large cyber security company based in Santa Clara, California. It develops a wide range of advanced firewalls, threat detection, IT planning and cloud-based security solutions. The company has public and private sector clients and has interests throughout the Asia Pacific.

Website: <https://www.paloaltonetworks.com/>
Address: 3000 Tannery Way
Santa Clara, CA 95054
Phone: 866-320-4788

Proximity to one of the four national cryptological centers, and the opportunity to provide services to USINDOPACOM, local contractors and the local ecosystem should be attractive to Palo Alto Networks. Working with the MHPCC and other UH labs provide unique venues for collaboration and technology innovation. The opportunities to straddle time zones in Asia, where Palo Alto Networks has a significant presence, and North America, may also provide advantages in supporting cross-border projects and teams.

2. Google Cloud

A division of Google Inc. in Mountain View, California, Google Cloud offers a suite of cloud computing services that run on the same network infrastructure of Google services like gmail, DropBox, and Youtube. Google Cloud offers a range of services geared toward government customers including artificial intelligence-enabled cyber security tools, collaboration and productivity, analytics, research, and development.

Website: <https://cloud.google.com/solutions/government#section-1>
Address: 1600 Amphitheatre Pkwy
Mountain View, CA 94043

Google is well funded and has multiple offices in key markets, including in several cities across the U.S., which demonstrates their desire to participate in local innovation and customer ecosystems. Google's interest in climate-related innovation, especially its goal

to run every office and data center on electricity from clean sources by 2030 aligns with Hawai'i's own clean energy goals and makes Hawai'i a unique laboratory for innovation in this area. Further, Google recently re-engaged the U.S. Defense Department after a hiatus and may find opportunities to engage in certain areas like cybersecurity, collaboration tools, and cloud services with major U.S. government customers located within USINDOPACOM.

3. Amazon Web Services

Amazon Web Services, Inc. is a subsidiary of Amazon providing on-demand cloud computing platforms and services to individuals, companies, educational institutions, and governments. AWS is the world's most broadly adopted cloud platform, offering over 200 digital information management services from data centers globally. Customers access AWS services over the internet, with no upfront costs or technology investment, and pay based on services used.

Website: <https://aws.amazon.com/>
Address: 410 Terry Avenue North
Seattle, WA 98109-5210

Amazon has extensive experience providing services to and partnering with the U.S. Federal Government. Proximity to one of the four national cryptological centers and the opportunity to provide services to USINDOPACOM should be attractive to AWS. AWS has deep experience with data privacy and security compliance regimes and offers services and solutions that are scaled to both large contractors as well as smaller companies that are part of the defense procurement ecosystem. In addition, AWS recently partnered with the State of Hawai'i and the Pacific Center for Advanced Technology Training to provide residents with the opportunity to train and receive AWS Cloud Foundations and AWS Solutions Architect Associate certifications. AWS recently announced the location in Hawai'i of one of eight Satellite Ground Stations as part of a global service to manage satellite communications.

4. CrowdStrike

CrowdStrike, from California, is a leading developer of endpoint detection and response, device control, managed threat hunting, vulnerability assessment and IT hygiene. CrowdStrike actively markets its services to Federal government agencies and also offers services designed to help contractors comply with Federal IT security requirements.

Website: <https://www.crowdstrike.com/>
Address: 150 Mathilda Place
Sunnyvale, CA 94068
Phone: 888-512-8906

Proximity to one of the four national cryptological centers, and the opportunity to provide services to USINDOPACOM should be attractive to CrowdStrike, which is focused almost exclusively on cybersecurity and related technologies. CrowdStrike has extensive experience collaborating with U.S. Federal Government agencies and offers services and solutions to contractors and smaller companies that are part of the defense procurement ecosystem. There are several examples of defense contractors making significant investments near national cryptologic centers in other states, becoming the backbone of local cyber security research and development ecosystems. Organizations like CyberHawai'i and Defense Alliance that strengthen workforce development are important assets that could play a role in similar investments. CrowdStrike does have a registered business agent in Hawai'i.

5. Cognizant Technology Solutions

Cognizant is a publicly listed Fortune 200 information technology firm headquartered in New Jersey with offices around the world. They have deep expertise in a wide range of information technologies, including AI, cybersecurity, and technology integration and provide business consulting, information technology, and outsourcing services.

Website: <https://www.cognizant.com/us/en>
Address: 1003 Bishop St. Ste 1600
Honolulu, HI 96813 (Registered Agent)
Phone: (201) 801-0233 (corporate HQ in New Jersey)

Based on their marketing materials, Cognizant does not appear to heavily pursue government contracts but may be attracted by Hawai'i's unique assets and opportunities to innovate around climate change, oceanographic and weather-related data. Cognizant Worldwide, a subsidiary of Cognizant Technology Solutions does have a registered agent and business presence in Hawai'i, but there was little information on its physical presence or operational assets in the State.

OTHER COMPANIES TO NOTE

During our research, the project team identified a number of companies in various sectors, including natural sciences, technology, and B Corporations. The following list provides a glimpse of some of the possibilities.

1. CSA Ocean Sciences

CSA Ocean Sciences is a multi-disciplinary marine and aquatic science and consulting firm, based in Florida with offices in several States and five international offices. They have extensive experience working with federal, state, and international governments as well as industrial and commercial customers. Their key focus areas include: Marine Sciences; Marine operations such as conducting surveys and collecting data; and Analysis, interpretation and management of large environmental data sets.

Website: <https://www.csaocean.com/>
Address: 8502 SW Kansas Avenue
Stuart, FL 34997

CSA would likely find Hawai'i's NOAA Regional Office and the UH Applied Research Lab, along with Hawai'i's marine tech ecosystem attractive for research and project development throughout the Pacific.

2. Soletrac

Soletrac, located in California, is supported by a team with diverse experience in engineering, agriculture, business, marketing and sales. In early 2020, Soletrac launched an equity crowdfunding campaign to support increased manufacturing of electric tractors. Soletrac was awarded a \$500,000 grant from the Bay Area Air Quality Management District as part of its Funding Agriculture Replacement Measures for Emission Reductions Demonstration Program, or FARMER program, which provides incentives to reduce agriculture sector air pollutants and greenhouse gas emissions. Soletrac is the recipient of the World Alliance's Solar Impulse Efficient Solutions label.

Website: <https://soletrac.com/>
Address: 3663 Regional Parkway
Santa Rosa, CA 95403
Phone: (866) 219-6750

The company currently participates in California incentives and recently donated a tractor to Jack Johnson and his Kokua Hawai'i Foundation. The company would like to expand internationally, which makes Hawai'i an ideal secondary location as a gateway to Asia.

3. SkyHaven Systems

Skyhaven Systems, LLC is a specialty research and development firm that focuses on solving critical U.S. Government needs in the Defense, Energy, Aerospace, and Environmental sectors. With the firm's headquarters located in Steamboat Springs, CO and its main research and development laboratories located in Westford, MA, the firm applies advanced electrochemical engineering and science principles to solve technical problems of concern to the Government including the Department of Defense, NASA, Environmental Protection Agency, National Science Foundation, Department of Energy, USDA, NIH, and the Centers for Disease Control.

Website: <http://skyhavensystems.com/>
Address: 25557 Bella Vista Circle
Steamboat Springs, CO 80487
Email: sales@SkyhavenSystems.com

The company works closely with the U.S. government, which already has a strong presence in Hawai'i. Its environmental research sector relies on aqua research which could be supplemented by Hawai'i's research facilities. It additionally has a technology focus area related to animal feeding operations, which would benefit from Hawai'i's cattle commodity.

4. Xylem

Xylem is a leading manufacturer of laboratory, field, portable, online analytical instrumentation and data collection platforms centered around water with applications across multiple sectors including the environment, life sciences, agriculture, and infrastructure. Xylem Ocean and Coastal product lines include solutions for environmental research in oceanographic, hydrographic, and climate research markets. Xylem researches and delivers technologically advanced self-contained and integrated remote underwater observation systems, environmental monitoring buoys, telemetry, water quality and velocity sensors.

Website: <https://www.xylem.com/en-us>
Address: 1 International Drive
Rye Brook, NY 10573

Hawai'i's ocean resources, the UH School of Ocean and Earth Science and Technology School and the Applied Research Lab, represent important innovation and research arenas likely of interest to Xylem or their specialized subsidiary companies. Xylem appears to have a distributor for their YSI brand equipment in Hawai'i.

CONCLUSION

This report has identified a number of companies in Hawai'i's high-potential sectors to serve as a starting point to explore targeted *inward* investment. There are many other sectors, sub-sectors, and individual companies that have not been included due to time constraints and a limited five-week project timeline. Indeed, in-depth research in just one sector could unearth hundreds of high-potential prospects. There are surely many more companies that will appreciate the unique advantages and opportunities that Hawai'i has to offer.

The study focused on knowledge-based sectors, recognizing Hawai'i's unique strengths and assets as well as its limitations with land, energy, and distance between Hawai'i and major markets. Most of the identified sectors and companies have a common thread of **leveraging Hawai'i's special environment for technology research, development, and testing**. The importance of technology and the need for **investments in a skilled workforce** to support these sectors emerged as a significant challenge that will require government and private sector support to sustain their development.

The research also highlighted the **importance of focusing on economic development efforts that reflect Hawai'i's community, culture, and values**. It has also highlighted the need for the various local communities to form a universal definition of "successful economic development". While companies, and this report itself, might analyze Hawai'i through a business lens, ultimately, any investment or corporate engagement should be a partnership that is sustainable and that contributes to Hawai'i's long-term needs, prosperity, and quality of life.

Going forward, there is tremendous potential for identifying and attracting companies that can create high-quality jobs and contribute to Hawai'i's future. However, identifying the key sectors and researching, screening, and assessing company suitability is not easy. By design, the process was largely qualitative in nature, and there is ample room to incorporate data-driven research to substantiate findings and priorities. While the process mapped potential companies to specific assets and sectors, there is an **opportunity to identify specific resources, grants, tax incentives, and other tools** that may further attract the best possible companies for maximum impact.

To further the State's development of investment attraction, the following recommendations are offered:

1. **Create and fund a position for an inbound statewide investment manager** to develop target sectors, integrate strategies with local business ecosystems, develop strategies, and build a network of U.S. and international prospective investors. Manager should proactively pursue and recruit potential candidates based upon “most likely to establish/relocate to Hawaii” factors specifically relevant to the candidate.
2. **Allocate program funds** for inward investment program to be used primarily for research materials (e.g., subscription databases), travel, e.g., meetings at company headquarters or other venues, trade and investment events in US and abroad, ad hoc consulting services and other expenses related to inward investment program.
3. **Review existing State tax incentives, workforce development programs and other resources** that can attract appropriate investors to the state. More than likely, because each candidate company is unique, more tailored incentives addressing the needs and desires of the candidate company would be necessary. Handholding is necessary to get companies to establish or relocate and this is a time consuming and intensive endeavor that requires the full attention of an inbound investment manager.
4. **Link investment attraction opportunities to local communities** to ensure that inbound partners meet local needs; develop in-depth criteria for company selection that incorporates these community and development needs. Community sensitivity is important to assess whether the corporate culture of a candidate firm fits with the potential locational factors.
5. **Maximize opportunities for incentive funding** and seed projects by assisting candidate companies with agencies that can provide funding, including the State government. As noted, customized incentives and intensive handholding is necessary to move the needle on first getting the attention of a candidate company and then the more consuming follow through.

APPENDICES

COMPLETE LIST OF TARGET COMPANIES

#	Company name	Sector	Website
1.	Gilead Sciences, Inc.	Pharma/Biotechnology	https://www.gilead.com
2.	Eli Lilly and Company	Pharma/Biotechnology	https://www.lilly.com
3.	Daiichi-Sankyo	Pharma/Biotechnology	https://www.daiichisankyo.com
4.	Syneos Health	Pharma/Biotechnology	https://www.syneoshealth.com/
5.	Illumina	Pharma/Biotechnology	https://www.illumina.com
6.	Jabil Inc.	Clean energy	https://www.jabil.com/
7.	KKR & Co. Inc.	Clean energy	https://www.kkr.com/
8.	Enbridge Inc.	Clean energy	https://www.enbridge.com/
9.	MasTec, Inc.	Clean energy	https://www.mastec.com/
10.	Renewable Energy Group, Inc.	Clean energy	https://www.regi.com/
11.	Archer Daniels Midland	Ag/Aquaculture	https://www.adm.com/
12.	Darling Ingredients	Ag/Aquaculture	https://www.darlingii.com/
13.	Locus Agricultural Solutions	Ag/Aquaculture	https://locusag.com/
14.	AppHarvest, Inc.	Ag/Aquaculture	https://www.appharvest.com/
15.	Umitron	Ag/Aquaculture	https://umitron.com/en/index.html
16.	Palo Alto Networks	IT/Cybersecurity	https://www.paloaltonetworks.com/
17.	Google Cloud	IT/Cybersecurity	https://cloud.google.com/solutions/government#section-1
18.	Amazon Web Services (AWS)	IT/Cybersecurity	https://aws.amazon.com/
19.	CrowdStrike	IT/Cybersecurity	https://www.crowdstrike.com/
20.	Cognizant Technology Solutions	IT/Cybersecurity	https://www.cognizant.com/us/en
21.	CSA Ocean Sciences	Other	https://www.csaocean.com/
22.	Solectrac	Other	https://solectrac.com/
23.	SkyHaven Systems	Other	http://skyhavensystems.com/
24.	Xylem	Other	https://www.xylem.com/en-us

SUPPLEMENTAL CLEAN ENERGY GENERATION OR SUPPORT SERVICES COMPANIES

The companies listed below were found on the Fortune 500 Company list and are registered with the Hawai'i Department of Commerce and Consumer Affairs in Clean Energy Generation or Support Services.

AES
AECOM
American Electric Power - AEP Renewables
Applied Materials
BP - Wind Energy
Baker Hughes
Berkshire Hathaway - Energy Renewables
Bosch
Emcor
Emerson Automation
Enel North America
Fluor
GE
Honeywell
Idemitsu Apollo
Jacobs
KBR
Kiewit
Leidos
Lockheed Martin
NRG Energy
NextEra
PSEG
Parker-Hannifin
Primoris
Quanta
Rockwell Automation
Samsung - E&C America
Schneider Electric
Siemens
Sumitomo Electric
Tetra Tech
Toshiba - America Energy Systems
Tutor Perini
Veolia ES Technical Solution

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