

2013
Annual
Report



NATURAL ENERGY
LABORATORY of HAWAII
AUTHORITY



**MISSION
STATEMENT**

“To develop and diversify Hawaii’s economy by providing resources and facilities for energy and ocean related research, education, and commercial activities in an environmentally sound and culturally sensitive manner.”

www.nelha.org

FORWARD

2013 was another eventful year for NELHA. Our overall goal to diversify and grow the economy provides us the chance to help the State in a manner that is beneficial to the people while protecting the beautiful environment of this island and its waters.

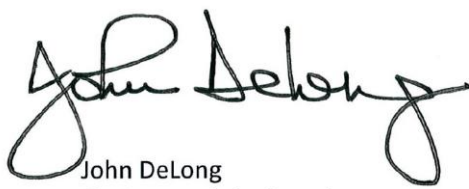
NELHA is a world class competitor and leader in research and development of OTEC and secondary use of cold and warm seawater for related ocean science businesses. In this regard, HOST Park continues to grow its worldwide reputation as a location for innovation and commercial applications of our natural resources. Likewise, commercial activities continue to prosper utilizing other resources which include reliable infrastructure, skilled administrative support personnel and a superior analytical laboratory.

HOST Park continues to grow its position as a magnet for ocean science and high technology businesses on the Island of Hawaii. As we found out last year with the economic impact study completed by the University of Hawaii, these businesses contribute to the development of natural resource utilization technologies and the future of our community, State, and Nation at a level approaching \$100 million annually. New commercial business ventures from around the world have continued to locate at NELHA; most notably Shrimp Improvement Systems has moved its world headquarters from Key West, Florida to HOST Park. NELHA is committed to the success and growth of all the businesses in the park.

We have been moving toward self-sufficiency for several years and today, NELHA is on track with its budget. Fiscal year 2013 is the fourth consecutive year it has operated without any State subsidy. We continue to streamline operations; increase automation; and, improve and expanded the infrastructure at HOST Park to service the growing operations of current businesses as well as businesses that are making plans for new projects. It is very clear that we cannot achieve continued success without strong strategic partnerships. We have spent considerable effort in building relationships with Federal, State, and County agencies, the University of Hawaii, as well as the private sector.

Governor Abercrombie and the Hawaii State Legislature provided critical support of NELHA's plans for growth by passing several key appropriations for new public works projects at HOST Park. Among these were a total of \$12.017 million in CIP allocations for a new frontage road with new intersection connections at Queen Kaahumanu Highway and seawater system upgrades. The funding for the road improvements will provide a new "front door" for HOST Park connecting to a new fully signalized four-way intersection at Kaiminani Drive to greatly improve safety for all residents entering and leaving HOST Park. The seawater system improvements will provide much needed redundancy to the seawater system by allowing for the transfer of surface seawater from the North to the South seawater systems.

Over the past 39 years, NELHA has received a significant commitment of time, money and people. The Board of Directors and staff understands the responsibility of this commitment and we intend to provide the people of Hawaii with the best return on investment possible. Looking ahead, NELHA is well positioned for an era of growth and we look forward to a strong future for NELHA and the State of Hawaii.



John DeLong
Chairman of the Board



Gregory P. Barbour
Executive Director

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NELHA FY 2013 ANNUAL REPORT

1.0 Introduction

The Natural Energy Laboratory of Hawaii Authority (NELHA) is a master-permitted ocean science and technology park whose mission is to bring economic development and diversification to the State of Hawaii and specifically West Hawaii. HOST Park is comprised of 870 acres at Keahole Point, Kailua-Kona, on the Island of Hawaii. NELHA was created to host and support research, development, pre-commercial and commercial enterprises that make use of the unique resources at the laboratory's site at Keahole Point, particularly the clean, cold, deep ocean water accessible near the shore as well as high solar irradiation. Its assets include a unique complement of support facilities, infrastructure, pristine natural resources and leasable land for a wide range of business research, commercial and educational applications. The NELHA story now spans 39 years and is an example of public investments by visionary State leaders that have yielded multiple returns for the benefit of all.

The original ocean science and energy concept for HOST Park was developed in 1974 as a response to the national oil crisis. The Research Corporation of the University of Hawaii and the High Technology Development Corporation originally developed two sites in Kona separately. The two projects in Kona were combined with a geothermal test site in Puna in 1990 and placed in the newly formed NELHA.

As its name implies, NELHA was formed to operate and further develop the State's geothermal experimental project in Puna and ocean thermal energy conversion (OTEC) experiments and re-use of the seawater for other projects in Kona. Over time, as geothermal matured and became commercially viable and the federal governments interest in OTEC waned, due to lower oil prices, NELHA has de-emphasized its initial involvement in geothermal development and looked to other secondary uses for its ocean science facilities and expansive seawater system in Kona.

Today, other uses for the seawater system have included projects needing to take advantage of the sites other main resource: high solar insulation. This includes aquaculture, mainly as algae production for nutraceuticals and fish/seafood hatcheries, water desalination, clean energy research and development such as solar thermal energy production, algae growth for biofuels, and seawater air conditioning.

This success has not happened on its own and NELHA acknowledges the strong support in the past that has helped it achieve success. The State administration, Legislature, small and large businesses, Hawaii residents and consumers and particularly NELHA's Board of Directors and excellent staff who have taken bold actions over the years to meet the demands and challenges of developing the world's premier ocean science and technology park.

2.0 Defining NELHA – Who we are

As a “first mover” into the economic development space of ocean science and energy the State, Federal and County of Hawaii investment of \$150M has appreciated considerably in value over the past 40 years. It is imperative that NELHA move towards taking advantage of this comparative advantage of the most extensive land based surface and deep seawater system in the world by focusing on maintaining the seawater system, providing the infrastructure to make development at Ocean Centerpiece possible and growing the existing microgrid by adding additional clean energy power generation and storage.

Chart 1 below illustrates three main sectors that are the current and long-term target focus areas for programs, projects, and businesses envisioned for HOST Park. The illustration generally follows the concepts and ideas presented in the NELHA 2012 Master Plan. While the master plan talked generally about growth in “applied technology” it was not sufficiently defined and too broad to be useful for implementation of the master plan. Accordingly, this illustration better defines the specific target areas for future growth.

The main areas of focus are ocean science, ocean energy and storage, and ocean cooling. The strong ocean science and energy orientation of HOST Park is due to unparalleled comparative advantage that exists in the extensive seawater system developed over the past 40 years. There is no other seawater system in the world that can compare to the one found at HOST Park. It is also interesting to note that, in general, the size of the circle corresponds with the time frame the projects will experience the most explosive rates of growth and development.

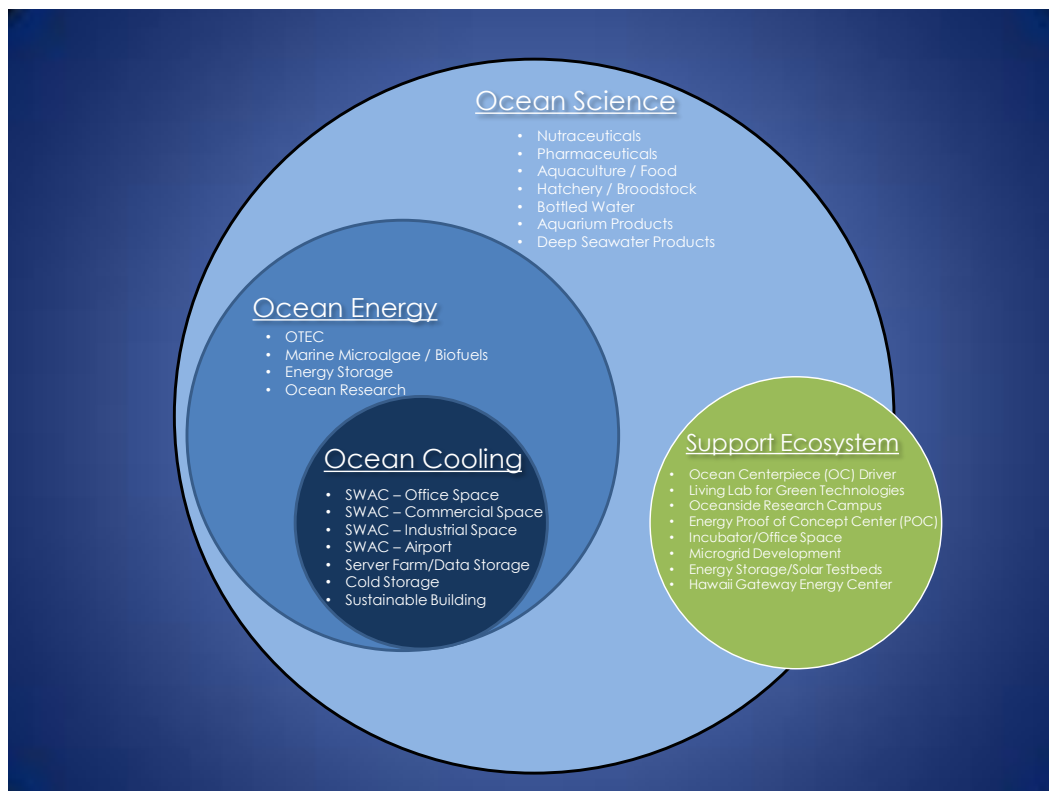
Ocean Science

The largest circle, ocean science, includes the entire array of projects and products found in HOST Park today. Many of these non-energy related uses were developed in the timeframe between 1990 and 2005 after the demand for OTEC

waned. These projects currently make up a significant portion of the developed land at HOST Park. Growth in these types of companies is expected to continue, albeit at a slower rate. It is also important to note that one of the main ways to make a park with OTEC facilities, as the central element is to find other uses for the secondary use of the seawater. In this regard, these ocean science businesses will always play an important role at HOST Park. Also new ocean science projects are continually evolving with recent interest in areas of potential high growth that include thermal aquaponics, tuna hatcheries, and offshore activities such as habitats.

The existing business base (aquaculture, nutraceutical, energy, and desalination) in ocean science also affords the opportunity to grow synergistic support service businesses. For example, the current plastic pre-form business recently located at Destiny Seawater for the desalinated water bottling businesses, aquaculture feed, aquaculture supply chain and distribution, CO2 generation, and pipe/tank manufacturing.

Chart 1: Defining NELHA



Ocean Energy

A community of like-minded entrepreneurs involved in ocean energy innovation can be created at HOST Park. Companies in this sector are beginning to emerge at HOST Park and/or will be targeted over the short-term for future growth.

HOST Park is unique in that there is a significantly high electric load (1.5 – 2MW) consumed for pumping seawater. In this regard, a focus on ocean energy, microgrid, and storage can more easily be developed jointly and part of a larger support ecosystem for all businesses in the park. Successful growth in this subset also has the very important benefit of lowering seawater pumping costs for businesses in the park.

In terms of energy generation, national and international interest in OTEC research has seen resurgence in recent years due to rising oil prices and NELHA's seawater system is highly valued. Currently one small R&D OTEC project (100kW) is underway and expected to begin energy production trials within the next year. NELHA continues to seek a partner for a larger 1MW OTEC R&D test facility. Both of these projects are expected to provide large amounts of both cold and warm seawater for other secondary uses. In addition, there has been at least one project focusing on the creation of biofuels from marine algae.

Worldwide energy storage space is potentially one of the areas in clean energy development that will see considerable growth and technological advancement over the next ten years. Interest in this area is being driven due to the increasing number of the utility electrical circuits that have a high degree of penetration of renewable energy. There has been considerable interest in underwater compressed air storage at NELHA as well as other energy storage devices.

NELHA is well positioned as a future site for prototype and pre-commercial energy storage devices due to a combination of factors which include: unique infrastructure, high prices, strong policy framework and a high load demand for pumping seawater. Perhaps more importantly the development of a small microgrid at the park will allow entrepreneurs the opportunity to test pre-commercial storage devices in "real world" simulations connected to the demand side of the grid. The microgrid will provide additional energy efficiency information for the necessary validation of storage systems.

Ocean Cooling

Ocean Cooling, primarily seawater air conditioning (SWAC), is a unique subset of Ocean Energy in which HOST Park has a significant comparative advantage over many other sites around the world and the State. The primary cost of a SWAC system is the initial capital cost. The energy costs for pumping the seawater are a small fraction of the total cost. While relatively new from a commercial standpoint, it is a proven technology which is extremely cost effective and an attractive "green energy" investment. SWAC also has the important advantage of providing a solid uninterrupted constant supply of cool air (24/7)

vis-à-vis using more intermittent renewable clean energy technologies such as wind and solar power.

A private firm in Honolulu is currently in the process of developing a 25,000 ton SWAC district cooling system for properties in downtown Honolulu. The cost for this system, using one 63" deep seawater intake, is estimated to be approximately \$280 million.

It is to NELHA's advantage to find ways to capitalize its ability to provide low cost cooling, as for the most part, developers or businesses at HOST Park can already take advantage of SWAC. Virtually all of the capital costs have already been incurred. The pipeline system is based on one 55", one 40" and one 18" deep seawater intake pipelines. As such, the current deep seawater pipeline system at HOST Park already has the capacity to support a district SWAC cooling system significantly larger than the \$280 million Honolulu system. The NELHA SWAC district would be on land controlled by NELHA. A majority of the additional cost would be for heat exchangers and connections to NELHA's seawater backbone that would most likely be borne by developers or businesses.

It is also important to note that the current system has the capacity to include the airport and the University of Hawaii's new Palamanui Campus, which is across from the airport, into NELHA's SWAC district. The concept of using SWAC at the new proposed \$36 million international terminal at Kona International Airport and Palamanui has been considered for many years. Selling deep seawater to the operators of their individual systems is another source of new revenue for NELHA.

While the original seawater air conditioning (SWAC) prototypes were originally developed at NELHA about 30 years ago, other than the NELHA buildings in the research campus, there is currently relatively little use of this technology at HOST Park today. It is anticipated that growth in this area will be significant when the infrastructure is in place to allow development of the Ocean Centerpiece driver (also referred to as the "economic driver" in the recent 2012 master plan).

The development of the Ocean Centerpiece has always been key to the long-term viability of the park. NELHA will need to seek a strategic partner to develop this 80A parcel of prime real estate in a manner that demonstrates strong revenue generation opportunities for both the developer and for NELHA. The key to successfully developing this parcel will be finding a strategic partner with a long-term vision, adequate financial resources, and a strong desire to complete a unique one-of-a-kind development entirely focused on sustainable living.

It is envisioned that this site will eventually become a world-renowned living laboratory and showpiece for green technologies that builds upon the natural assets at HOST Park such as deep-sea water, access to transportation, ocean research corridor and high solar insulation. In this regard, future development should emphasize the use of new and existing resources and clean technologies to reduce fossil fuel dependence, conserve

potable water, green technologies that are environmentally friendly and provide community enhancement.

While the development must specifically emphasize and take advantage of the use of the large volumes of deep-sea water for cooling and air-conditioning that are currently available to the site, other concepts include:

- Opportunities to directly engage national laboratories, corporate laboratories and universities;
- Marine research laboratory and support facilities for publically sponsored and/or privately sponsored research;
- Facilities encompassing applied research, development and demonstration of prominent or emerging ocean technologies; and,
- Creative Industry accelerators and facilities including ocean-theme education, art and film studios;
- Ocean-theme exhibits and associated commercial activities for the general public (may include water parks, restaurants, and other retail components);
- Commercially viable enterprises that are compatible with and enhance the theme of the proposed Ocean Centerpiece.

Despite the unique advantage afforded by the availability of SWAC, it is anticipated that the Ocean Centerpiece driver will suffer from “low-absorption rates” similar to other commercial and industrial land in the West Hawaii region. As such, it is anticipated that it will take 25 to 30 years to approach full build-out.

3.0 HOST Park Year in Review

Fiscal year 2013 marked the beginnings of an expansion year for businesses in the park. As shown, in Table 1 below, a total of 14 major construction projects are either underway or planned for the next several years. These projects total over \$50 million in construction spending.

A total of eight major construction projects were underway or just beginning in 2013. These projects totaled over \$30 million in spending. It is important to note that a significant majority of these projects were funded by private sector investments.

It appears that this growth phase will continue into 2014 and beyond. Table 1 also shows planned projects that have received funding. These projects total over \$20 million and are expected to be completed within several years.

TABLE 1: HOST PARK CONSTRUCTION PROJECTS

NAME	AMOUNT	COMMENT	FUNDING
Projects Under Construction			
1 Marine Mammal Center	3,200,000	Monk Seal Hospital (Phase I)	Private
2 Cyanotech	4,500,000	Office Building and Extraction Facilities	Private
3 Shrimp Improvement Systems	6,000,000	Move World HQ from Key West FL (Phase I)	Private
4 Taylor Shellfish	1,000,000	Expansion Building and Ponds	Private
5 West Hawaii Explorations Academy	8,500,000	New Charter School (USDA loan)	Federal
6 NELHA Pipeline Repairs	5,300,000	Deep Sea 40" Pipeline	State
7 Destiny Deep Seawater/Encon Inc	2,000,000	New Preform Manufacturing Equipment	Private
8 NELHA SCADA System and PV Testbed	412,000	Ntl. Renewable Energy Laboratory (Grant)	Federal
Sub-Total Projects Under Construction	30,912,000		
Planned Projects			
1 Shrimp Improvement Systems	4,000,000	Phase II	Private
2 Makai Ocean Engineering	4,000,000	OTEC Turbine – Office of Naval Research (Grant)	Federal
3 NELHA Kahilihili Road Construction	9,690,000	CIP funding	State
4 Marine Mammal Center	600,000	Monk Seal Hospital (Phase II)	Private
5 NELHA SSW Connector Pipe	2,323,000	CIP funding	State
6a NELHA Main Building Renovation	3,000,000	US Department of Commerce – EDA (Grant)	Federal
6b NELHA Main Building Renovation	1,000,000	CIP funding (Reimbursable GO Bonds)	State
Sub-Total Planned Projects	20,613,000		
GRAND TOTAL	51,525,000		

4.0 NELHA Year in Review

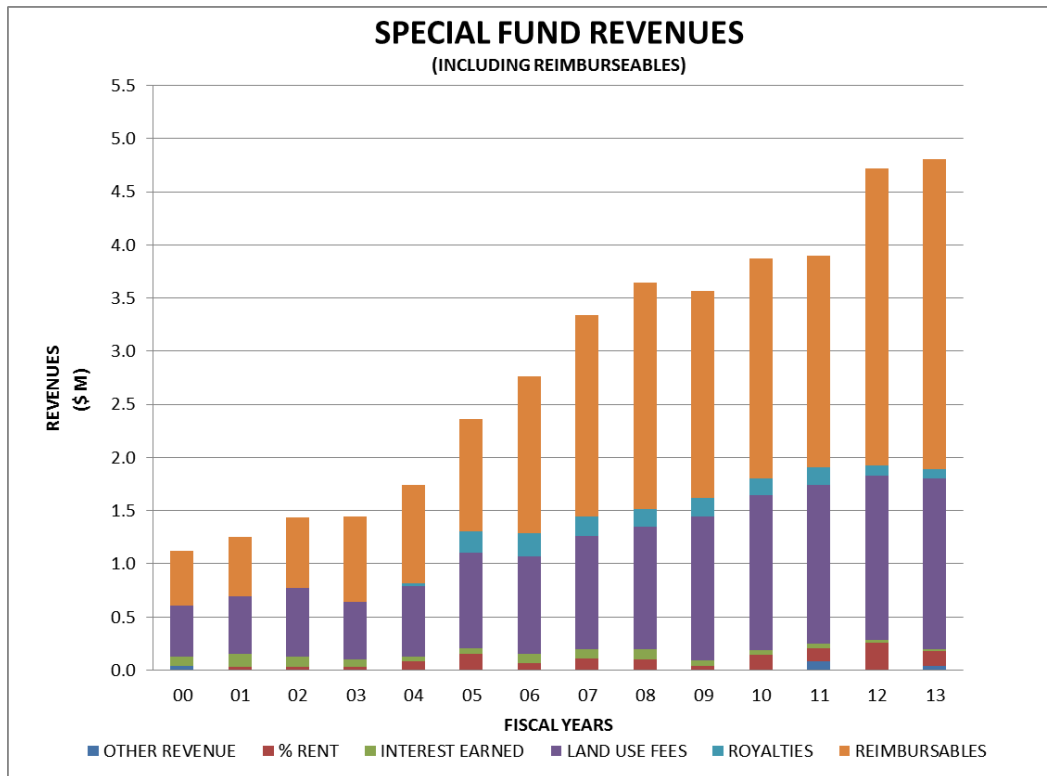
FY 2013 was a year of transition and building a vision for NELHA as an agency. Our efforts to date are yielding results and we are poised to grow and fulfill our potential as a site to advance research, stimulate scale-up models and nurture market acceptance of green and clean energy technologies.

A summary of major achievements in FY 2013 is listed below. These achievements illustrate NELHA's desire to move from functioning as a landlord for an ocean science and technology park towards developing an environment or ecosystem where private sector businesses can grow.

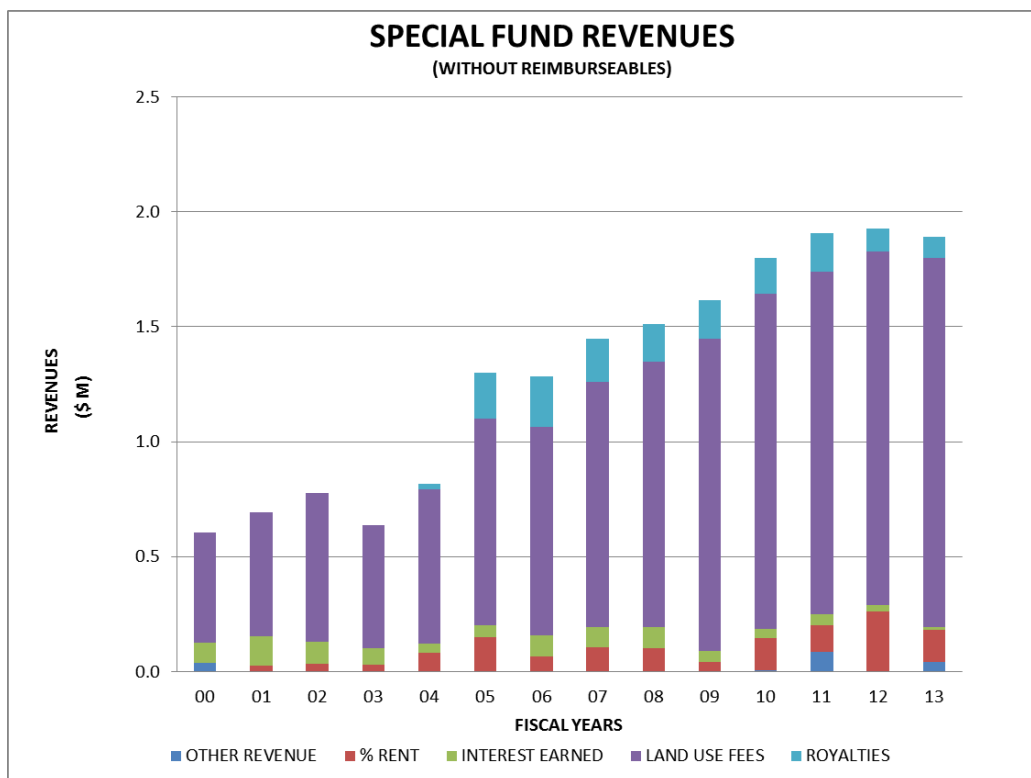
- Update of DER Plan.
- Begin efforts to \$3.0M in Federal funds improvements for Alternative Energy and Biotechnology Incubator in Research Campus.
- Implement \$400,000 in Federal funds for initial development of micro-grid in Research Campus.
- Continue initiative to reboot OTEC by securing large 1MW OTEC demonstration facility.
- Build and grow relationships with key Federal, State, County and University institutions and initiate new marketing efforts.
- Begin major repairs to the major 40" deep sea pipeline to extend lifetime.

In terms of financial review, three charts are shown below. These charts illustrate the strong growth that NELHA has seen in revenue and its ability to become self-sufficient over the years.

The chart below illustrates the growth of total revenues over the past twelve years. It shows growth from approximately \$1 million in 2000 to almost \$5 million last year. Much of this growth is due to increasing costs for seawater delivered to businesses in HOST Park. This system operates on a break-even basis. In addition, revenue from electrical and freshwater sub-meters is included in the reimbursable category.

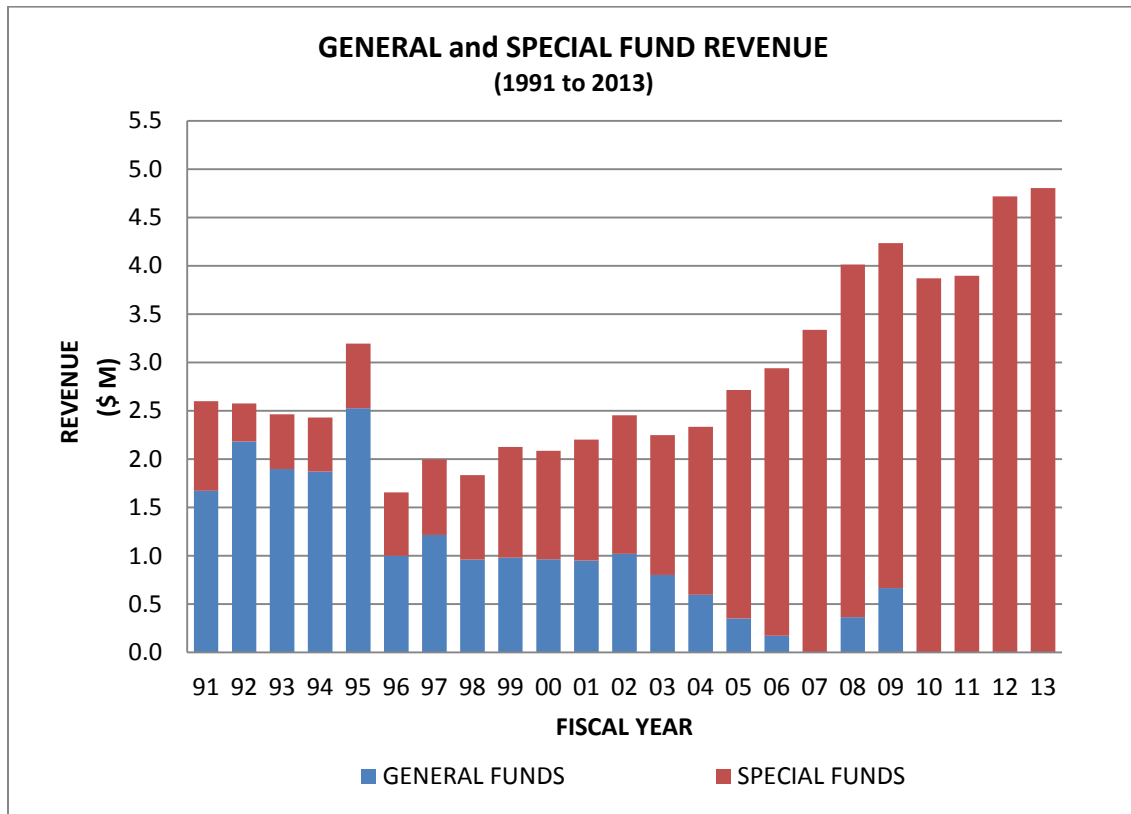


The following chart illustrates the growth of total revenues without reimbursables over the past twelve years. The majority of revenue shown in purple is from



land use fees or base rent from businesses in HOST Park. These businesses also pay a percentage of gross receipts and are shown in red. Royalties are shown in light blue and received from the businesses that began to desalinate and bottle deep-sea water for sale mainly to foreign markets in Asia. These businesses began to operate in HOST Park in 2004. Other revenue was received from the Federal government in FY 2011 to repair earthquake damage and from NREL in 2013.

The chart below speaks for itself in illustrating the success that NELHA has achieved in attaining self-sufficiency over the past 10 years. Around 2000, the State of Hawaii made a major policy decision in that those State agencies with large assets, and therefore the ability to generate additional revenue, should begin to become self-sufficient. The chart shows an annual subsidy, shown as general funds in light blue, of approximately \$1 million annually being replaced by revenue from the seawater and land use fees being placed in NELHA's special fund. The basic concept was that general funds were subsidizing those individual businesses in the park. The State still continues to provide funds for capital improvement projects which are considered a "public good" and available to all businesses in the park as well as residents throughout the State.

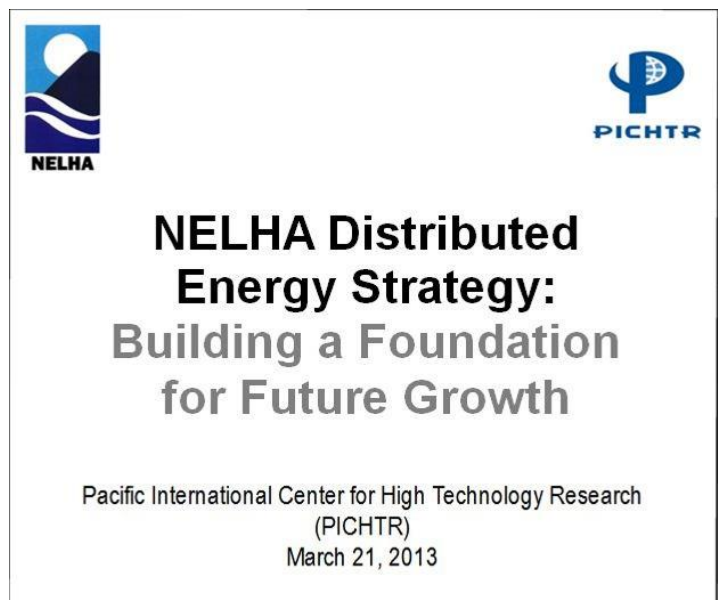


The State government does continue to help support NELHA's capital improvement projects such as roads and pipelines. During the 10-year period from 2000 to 2010, NELHA has received an average of \$2 million per year in State support. A listing of CIP projects that were completed or in-progress during FY 2013 is listed below.

PROJECT DESCRIPTION	AMOUNT	CONTRACTOR
Design of 40" deep sea water pipeline system repairs	\$300,000	Makai Ocean Engineering
Plans and design for additional seawater pipeline distribution system	\$538,440	RM Towill
Plans and design for access roads and utilities in HOST Park	\$800,000	Parsons Brinkerhoff Inc.
Construction upgrades for 40" deep sea water pipeline system	\$5,300,000	Healy Tibbitts Inc.
Main Building Renovation in conjunction with EDA \$3.0M grant	\$1,000,000	Procurement process underway.

5.0 Planning

In an effort to compliment the update of the Master Plan and Strategic Plan in FY 2013 more detailed plans were developed. In this regard, NELHA contracted with the Pacific International Center for Technology Research (PICHTR) to update the 2003 DER strategy for HOST Park. As some may recall, this strategy was initially developed to provide the underpinnings for attracting new renewable energy companies and projects to the park in conjunction with the development of the Gateway Renewable Energy Center. This project was paid for with US Department of Energy funds received via the National Renewable Energy Laboratory in Golden, Colorado.



HISTORICAL PERSPECTIVE: FLASHBACK TO EARLY 2002



The images above show much of the infrastructure that is underground the main 55" pump station that was constructed in 2002. The image in the upper right shows the massive underground sump that is buried below the pumps on the surface that are shown in the upper left. The lower images shows the 55" pipeline being towed out to sea (faint white line) before it was "sunk in place". The pipeline is over 10,000 ft. in length.

6.0 US Department of Commerce Funding

NELHA applied for and received a grant of \$3.0 million from the US Department of Commerce Economic Development Administration in FY 2012. The funding will be used to renovate the main administration building that is located in the six-acre research campus on Keahole Point. The proposed project will provide a focal point to facilitate a “pipeline” for pre-commercial and commercial tenants for the HOST Park, especially in the fields of alternative energy, biotechnology and ocean science.

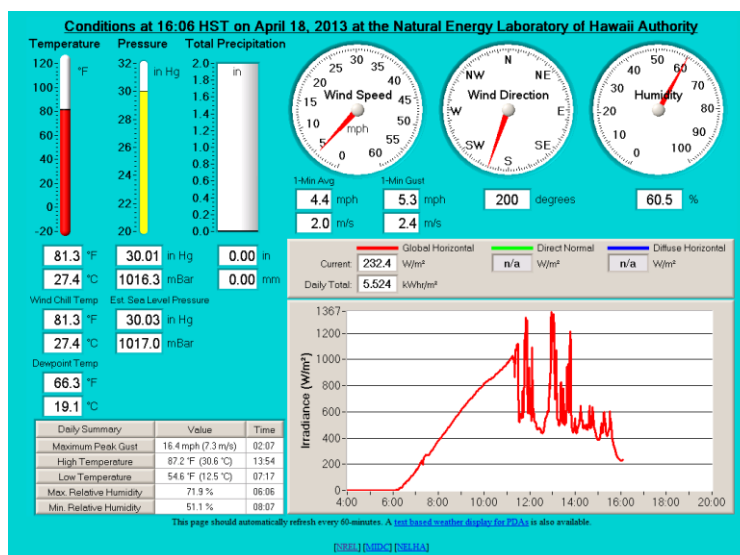


The proposed design will allow for an additional 10,270 SF of net leasable office space. NELHA began the procurement process to select an architectural and engineering firm. Design work will begin in the late summer 2013 and construction will begin in 2014. Completion is scheduled for 2015.

7.0 US Department of Energy Funding



NELHA received a \$412,000 grant from the U.S. Department of Energy in FY 2012 to fund the development and deployment of distributed energy systems at HOST Park. The funds were used to update the NELHA Distributed Energy Resources



plan as described above and complete a scientific weather station at the HOST Park research campus.

The weather station became operational in November 2012. Data is transmitted to NREL in Golden Colorado in real time. The station was installed and is operated by the Analytical Laboratory and data is available via the NELHA website at www.nelha.org.

Many of the businesses at HOST Park are dependent on weather conditions and are now able to take advantage of the new data for their projects and businesses. It is also important to note that as part of NREL's national network weather stations, NELHA's climate can easily be compared to other NREL weather stations around the country.

In addition, procurement of a contractor to install a new SCADA system and photovoltaic test bed began in FY 2013. Both of these projects are expected to be complete in 2014.

8.0 Ocean Thermal Energy Conversion (OTEC) Demonstration Facilities

There continued to be significant activity regarding OTEC at HOST Park in FY 2013. HOST Park continues to be seen as the world's pre-eminent OTEC research and demonstration site. Projects currently underway or planned will reinforce HOST Park's leadership as a test bed for this technology.

Makai Ocean Engineering (MOE) officially opened the OTEC heat exchanger test facility at the Research Campus in July 2011. The test facility is a 40 foot tall tower that supports evaporators, condensers, seawater piping, and an accurately instrumented ammonia working fluid piping system. NAVFAC and ONR sponsored the facility as a cost-effective means to test the performance of heat exchangers on land using NELHA's existing seawater pipe infrastructure. MOE recently received an additional grant of approximately \$4.0M from the Office of Naval Research.

NELHA continued to negotiate a lease for approximately 2 acres with OTEC International in FY 2013. A term sheet was agreed upon and the NELHA BOD approved the project in concept. This led the way to further and more detailed negotiations regarding the sublease and numerous technical items associated with the demonstration facility which was proposed to be constructed near the main 55" pump station. OTEC International completed an environmental assessment in FY 2013.

Hawaii Ocean Science and Technology Park

Featured Business 2013

SHRIMP IMPROVEMENT SYSTEMS HAWAII LLC

Shrimp Improvement Systems (SIS) is HOST Park's fastest growing business and one the largest producers of shrimp broodstock on the planet. The recent decision to move their world headquarters to HOST Park and invest \$10 million is another example of the kind of sustainable technology that is occurring at HOST Park to provide economic growth and generate local opportunities for long-term employment. They are one of the larger employers at HOST Park with approximately 40 full and part time employees.



Shrimp farm expanding to Big Island

September 27, 2012

By Hunter Bishop – Tribune-Herald Staff Writer

A worldwide shrimp breeder is moving its headquarters from Florida to the Natural Energy Laboratory of Hawaii and expanding its Hawaii operations. Shrimp Improvement Systems, which started in 1998 in Plantation Key, Fla., will invest \$8 million in new facilities at NELHA at Keahole Point, said SIS President Joe Tabrah.

SIS produces mature, adult broodstock for shrimp farming operations around the world. Specifically, they are "genetically improved and specific pathogen free (SPF)" stocks of Pacific white shrimp, Tabrah said, and one pair of healthy broodstock can produce two million offspring, he said.

Advantages of consolidating operations in Hawaii over Florida include proximity to the company's largest markets in Asia, strict contamination controls at NELHA, less risk of hurricane damage, and warmer ocean water, Tabrah said. Some costs such as energy and shipping will be higher in Hawaii, he acknowledged, but there are "offsets."

"Where there are costs, you look for offsets," Tabrah said. One of them is ocean water temperature, which is warmer here than in Florida. "Shrimp need warm water to grow," he explained. "(But) during the winter in Florida the water gets quite cold. Now we won't be heating water in the winter months." Sanitation is crucial to the successful production of high quality shrimp, Tabrah said. Diseases caused by viruses, bacteria, fungi and protozoans have caused losses for shrimp operations for years so strict precautions are employed to keep the product pathogen free. But NELHA has "a history of being clean," he said, which should improve production.

Said to be one of the world's largest shrimp breeders, the privately held SIS doesn't release its sales revenue figures. "We're doing well, that's why we're expanding," Tabrah said. The company will keep its existing production facilities and an office in the Florida Keys. Earlier this year, SIS purchased High Health Aquaculture Inc., a smaller shrimp breeding company, which was operating on two acres at NELHA. SIS also acquired leases on an additional 6.5 acres and is negotiating to acquire two more to build on at the Hawaii Ocean Science and Technology Park at NELHA.

Shrimp is the most popular seafood consumed in the United States at 4 pounds per person in 2010, according to the National Marine Fisheries Service, and the U.S. is the largest shrimp consumer in the world. Canned tuna was the second most popular seafood in the U.S. at 2.7 pounds consumed per person. Shrimp is largely imported to the United States, though. There is little domestic production resulting in a U.S. shrimp trade deficit of about \$3.7 billion a year.

SIS ships broodstock to markets in the U.S., Europe and Latin America but the company's biggest buyers are in Asia. The move to Hawaii puts SIS in closer proximity to its largest markets. Although marketed as "genetically improved," Tabrah said that doesn't mean SIS produces GMO shrimp. Tabrah said the broodstock are selectively bred to be disease-free and are not genetically modified as the term "genetically improved" might imply. SIS already sells its broodstock without restriction to shrimp operations in nations concerned about introducing GMO or genetically modified products into their food supply.

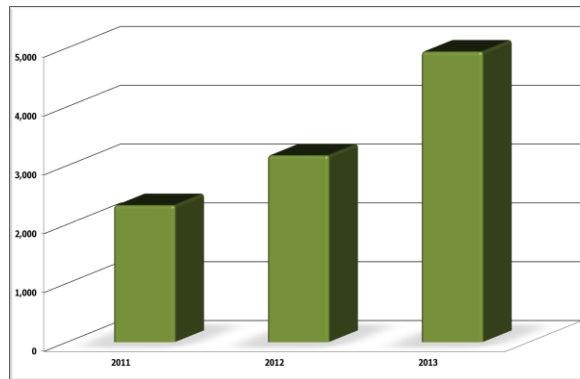
Tabrah is a former employee of Oceanic Institute, an affiliate of Hawaii Pacific University, where a research project was the genesis of Shrimp Improvement Systems. Tabrah also formerly headed Pacific Aquaculture in Hawaii at the Campbell Industrial Park on Oahu, later also moving to NELHA, which merged with SIS four years ago. With High Health Aquaculture, "we're consolidating breeding programs in Hawaii," Tabrah said, which is the primary reason for the move. After that it's the "excellent conditions" — weather and infrastructure.

Tabrah said he expects to be up and running by the end of 2013, "if we get our (building) permits from the county." SIS has about 25 employees now and would add about 20 more when the new facilities are completed. Most of the new employees will be hired locally, Tabrah said.

SIS has partnerships with firms under the umbrella of CP Group of Indonesia, a transnational firm with investments in 15 countries and earnings of US \$30 billion.

9.0 Education and Outreach

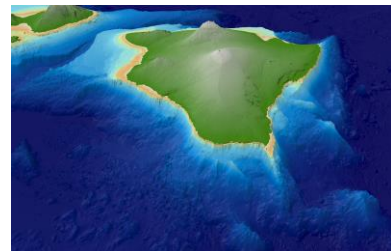
For the past several years, the Friends of NELHA (FON) have recorded the number of visitors to the Hawaii Gateway Energy Center and their tours of businesses at HOST Park. As shown in chart below, FON's effort in attracting new visitors and providing presentations has seen much success over the past three years. The



number of visitors has grown from 2,327 in 2011 to 4,938 in 2013. This is an annual average growth rate of almost 50 percent. FON also began collecting visitor characteristics and the results show that approximately 60 percent of visitors are from the US Mainland, 20 percent from the Island of Hawaii and 10 percent from Neighbor Islands and 10 percent international visitors. Data collected by FON on age profile show that about 50 percent of visitors are adults, 40 percent are students, and 30 percent are senior citizens.

10.0 Pipeline Infrastructure

NELHA operates one of the world's only seawater utilities and provides both pristine surface and deep seawater throughout HOST Park. A listing of major pipelines is shown below. In addition, NELHA operates and maintains three major pump stations, four major (three fixed and one mobile) backup generators and an extensive seawater pipeline distribution system throughout the park.



PIPELINE DESCRIPTION	DEPTH (ft)	SURFACE SEA WATER	DEEP SEA WATER
40-inch diameter	2,210		13,400 GPM
28-inch diameter	69	9,700 GPM	
18-inch diameter	2,060		3,000 GPM
24-inch diameter	33	5,400 GPM	
55-inch diameter	3,000		27,000 GPM
55-inch diameter	79	40,500 GPM	

In addition to routine maintenance on the system, a major effort was underway in FY 2013. This included the design of upgrades to the main 40-inch deep seawater pipeline. This pipeline is one of the oldest at NELHA and was installed in 1986. Work to repair bridles, which secure the pipeline to the ocean floor at a depth of 500 feet, is necessary to extend the life of the pipeline.

The work consisted of several underwater operations including: 1) cutting existing chain bridles and replacing them with new bridle chains; 2) cleaning of certain components on the pipeline for subsequent anode installation; and, 3) cleaning of portions of the pipeline in preparation for the installation of custom designed pipe clamps. Some of the most challenging work included the installation of three 3,000 pound buoyancy modules and the laying of over 800 feet of 1-1/4 inch chain in 500 feet of water with a precision of 6 inches.

In addition, NELHA is in the process of designing a new pipeline distribution system for the upper elevations of the park to open up some of the last remaining land available for development in the park. This work is being completed by RM Towill.

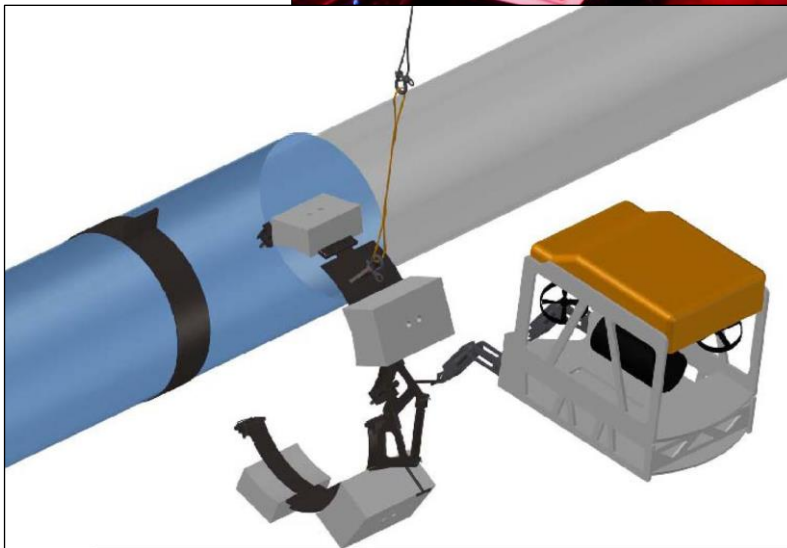
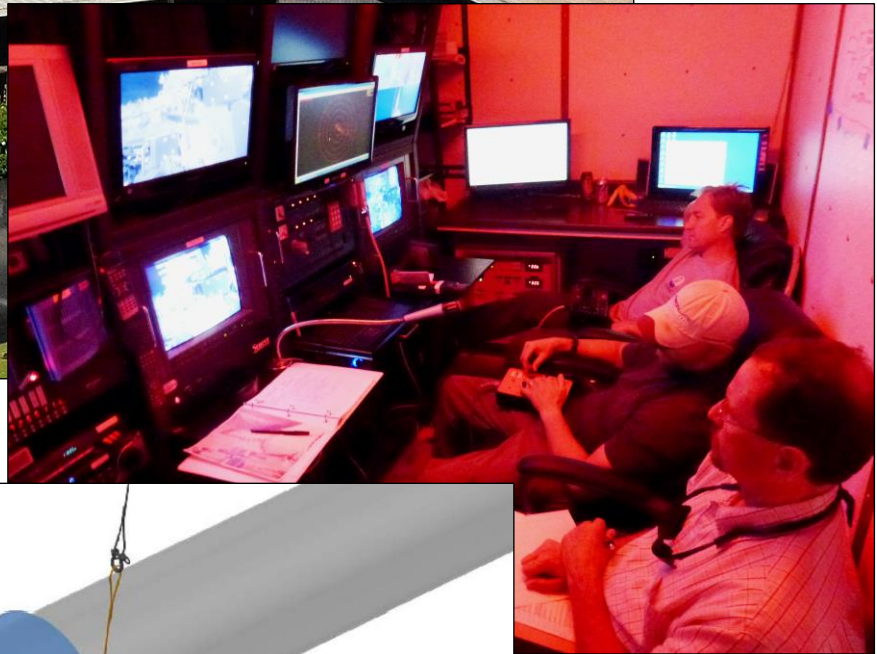
The picture below shows the barge located offshore of Keahole Point to oversee and control operations for the 40" pipeline repair. The following pages include additional pictures to illustrate the complex operation that involved two remote operated vehicles to complete the repairs.



Before work to repair the 40" pipeline could begin, an 18" pipeline, that was no longer in use, had to be removed from the ocean. This operation included the removal of coral growing on the pipeline and replanting in the immediate vicinity of the pipeline.



The overall repair operation was a very complex operation and the images below show 1) the proximity of the barge to the research campus at Keahole Point; 2) the control room for the remote operated vehicles on the barge; and, 3) an illustration of one of the remote operated vehicles placing a new sleeve on the 40" pipeline. Healy Tibbitts was the general contractor for this project and was assisted by sub-contractors including Sea Engineering, American Marine and Global Diving and Salvage. Construction management was provided by Makai Ocean Engineering.



11.0 Analytical Laboratory

NELHA's Analytical Laboratory specializes in environmental sampling and marine water chemistry sample analysis. The NELHA Analytical Laboratory again received its certified acceptable proficiency rating in FY 2013 from the US Environmental Protection Agency's Discharge Monitoring Report-Quality Assurance Program on routinely performed water chemistry analyses. The NELHA Analytical Laboratory collects, processes, and disseminates analytical and biota study information needed to protect NELHA's valuable seawater and groundwater resources.

The environmental monitoring activities the NELHA Analytical Laboratory performs include sample collection, analysis, and data recording of environmental samples from NELHA's seawater pipeline distribution system, groundwater wells, anchialine pond water, and the near shore seawater environment fronting NELHA's shoreline.

Yearly reports are issued in compliance with regulatory requirements of the Hawaii County Planning Department and State of Hawaii government agencies including the Department of Land and Natural Resources, the Office of Environmental Quality Control, and the Department of Health. NELHA has established a forward-looking, multi-disciplinary environmental monitoring program and has maintained and operated an analytical laboratory to meet all of its environmental monitoring permitting requirements.



Much of the environmental monitoring work involved the implementation of NELHA's Comprehensive Environmental Monitoring Program (CEMP), collecting and analyzing samples from more than 120 sites located both onshore and offshore.

The onshore sites are sampled every 90 days. The CEMP allows NELHA to monitor its pristine environment and serves as an early detection system should any irregularities in onshore effluent disposal occur, and observing the pristine offshore environmental water quality. The FY 2013 CEMP Annual Report was submitted to the Hawaii County Planning Department, marking 32 continuous years of reporting by NELHA. The CEMP Annual Report is online and can be accessed via the NELHA website at www.nelha.org.

The Analytical Laboratory also looked at the impacts of the Fukushima Daiichi power plant discharge in 2012 on the Greater Pacific Ocean region water quality in FY 2013. NELHA took advantage of an opportunity to participate in a study the

University of Hawaii was conducting regarding the impacts of this event. Based on water samples from our deep sea pipelines, the study found that Cesium 137 and Cesium 134 concentrations are well below EPA's drinking water limits. More detailed information regarding this study can be found in the manuscript by Kamenik, Dulaiova, Buessler, Pike and Stastna titled: "Far-field monitoring of the 134-Cs and 137-Cs in seawater in the North Pacific Ocean after Fukushima Daiichi nuclear power plant accident". It was recently submitted for a special issue of the journal of Biogeosciences. For more information and the article see: http://www.biogeosciences-discuss.net/special_issue100.html.

The NELHA Water Quality Laboratory implemented schedule changes in FY 2013 to the discharge-sampling program. These scheduling changes increased the number samples taken per sampling day, which in turn, increased the daily efficiency of the required analytical work. The outcome from these changes was a 25% reduction in time, 160 hours/year, to perform the sampling, analytical analysis, data analysis and reporting for the discharge-sampling program.

12.0 Land and Leasing

NELHA saw a significant amount of lease activity in FY 2013. As shown in the table below, activity included renewing existing agreements, new leases, negotiation of existing leases during rent re-opening periods, merger of existing leases and review of a multitude of new projects.



Number new agreements including subleases	8
Number new tenants	1
Number new subleases	1
Potential projects (some NELHA staff time investment)	17
Potential projects (significant NELHA staff time investment)	11
Total potential projects	28
Number of promising long term projects	1

13.0 CEROS

The National Defense Center of Excellence for Research in Ocean Sciences (CEROS) was created by congressional action in 1992. CEROS was established through

cooperation between the Defense Advanced Research Projects Agency (DARPA) and the State government for the purpose of conducting research and development (R&D) activities of interest to the Department of Defense on such topics as ocean environment preservation technology, new ship hull design concepts, shallow water and surveillance technologies, ocean measurement instrumentation, and the unique properties of the deep ocean environment.

The purpose of CEROS was to solicit and support innovative technology development for national maritime military applications and sustained technology-based economic development in Hawai'i. CEROS supported R&D projects that were intended to produce measurable results or products within 12 months. The CEROS program was formulated as an exploratory and advanced technology development program, with little, if any, basic research. The project selection process was based on priorities that were issued in published solicitations, emphasizing near-term, tangible results. In selecting projects to fund, trade-offs among cost, performance, and schedule are evaluated relative to programmatic goals and planned procurement schedule, and appropriate risk-reduction strategies were identified and implemented.

In FY 2012, CEROS continued to operate under a no cost extension of the DARPA-NELHA Cooperative Agreement. This no-cost extension was established by modification of the agreement in August 2011, which set overall "effective period" to be extended to August 31, 2012 for program activities supported by federal funds received over the course of 4 fiscal years (FY 2007-2010).



Having received no new federal appropriations of program funding in FY 2013 and with no further funding expected in FY 2014, NELHA closed out CEROS operations on October 15, 2012 ending one of its most successful and highly respected programs.

14.0 Road Infrastructure

NELHA is in the process of designing new roads in the upper elevations of the park. This design is being aided with approximately \$400,000 in Federal Highway Administration funds. In FY 2013 NELHA received an additional \$85,000 in federal funds to be used towards this effort. The new roads, when constructed will open up much of the remaining land at the upper elevations of the Park. Governor Abercrombie and the Legislature also approved funding of approximately \$10

million for a road to connect our current entrance with the new planned entrance at Kaiminani Street in FY 2013. This connector road is very critical to connect to the new entrance for HOST Park at Kaiminani Drive and Queen Kaahumanu Highway. When the Department of Transportation (DOT) completes the new Queen Kaahumanu divided highway, HOST Park will only have direct access to the southbound lanes. As part of their widening project, DOT has agreed to build a new 4 way fully signalized intersection at Kaiminani and the highway. The new road will connect Makako Bay Drive to the new intersection at Kaiminani.

NELHA began installing new blue and white address signs at each property in FY 2013. The purpose of these signs is to assist emergency response vehicles find your location faster and assist visitors finding businesses in the park.

15.0 Employee Awards

Four NELHA employees recently received awards. Jan War, Sheryll Kaniho, Georgie Espinueva and Tony Mitchell are shown below receiving awards from NELHA Chair of the Board of Directors John DeLong.



NATUAL ENERGY LABORATORY OF HAWAII AUTHORITY

FINANCIAL STATEMENT

(Fiscal Year - July 1 to June 30)

	Fiscal Year 2012	Fiscal Year 2013
<u>REVENUES</u>		
Land Use Fees	1,537,817.46	1,604,930.75
Royalties	99,656.57	89,850.54
Reimbursable	2,791,785.20	2,913,492.20
Interest Received	26,848.94	14,500.47
Other	1,920.10	40,679.28
Percentage Rent	259,258.00	139,699.06
Subtotal	4,717,286.27	4,803,152.30
<u>EXPENDITURES</u>		
Salaries	1,291,418.33	1,290,399.82
Operations	2,983,191.26	3,508,842.39
OHA (Ceeded Lands Transfer)	359,774.35	357,061.80
Subtotal	4,634,383.94	5,156,304.01
 FINANCIAL POSITION		
Special Fund Cash Balance (July 1)	1,483,441.78	1,592,151.20
Prior Year Unrequired claims	25,807.09	7,522.92
Special Fund Revenues	4,717,286.27	4,803,152.30
Subtotal	6,226,535.14	6,402,826.42
Special Fund Expenditures	4,274,609.59	4,799,242.21
OHA (Ceeded Lands Transfer)	359,774.35	357,061.80
Special Fund Cash Balance	1,592,151.20	1,246,522.41

Note: All data as of end of fiscal year (June 30) unless otherwise noted.

Board of Directors

John DeLong, Chair

President, Hawaiian Cement

At Large Member appointed by Governor

Harvey Kim, Vice-Chair

President and Chief Operating Officer, Pelatron Inc.

At Large Member appointed by Governor

Michael Buchal

At Large Member appointed by Governor

Owner, Aquaculture Consulting Hawaii, LLC

Bobby Command

Executive Assistant, Mayor's Office

Ex-Officio – Mayor, County of Hawaii

Dr. Patricia Cooper Ph.D.

Dean, Graduate Division, University of Hawaii

Ex-Officio – President, University of Hawaii

Dr. Gerry Cysewski, Ph.D.

Chief Science Officer/Executive Vice-President, Cyanotech Corporation

Ex-Officio – Tenant Representative

Richard C. Lim

Director, Department of Business, Economic Development and Tourism

Ex-Officio – Director, Department of Business, Economic Development and Tourism

Todd Low

Aquaculture & Livestock Support Services

Hawaii Department of Agriculture

Ex-Officio - Vice-Chair, Research Advisory Committee

Board of Directors

H. Brian Moore

Senior Vice-President, Pacific Guardian Life Insurance Co, LTD
Ex-Officio – Hawaii Strategic Development Corporation

Race Randle

Director, The Howard Hughes Corporation
Ex-Officio – Hawaii Technology Development Corporation

Dr. Donald Thomas Ph.D.

Geochemist and Director of Center for the
Study of Active Volcanoes
University of Hawaii at Hilo
Ex-Officio - Chair, Research Advisory Committee

Russell Y. Tsuji

Administrator, DLNR Land Division
Ex-Officio – Director, Department of Land and Natural Resources

Larry Visocky

Plant Manager, KOYO USA Corporation
Ex-Officio – Tenant Representative

NELHA employees as of June 30, 2013

POSITION TITLE	INCUMBENT
NELHA Executive Director	Barbour, Gregory
NELHA Senior Secretary	Appleby, Karen
NELHA General Laborer II	Debina, Chad
NELHA Secretary III	Espinueva, Georgette
NELHA Maintenance Mechanic I	Gibo Jr., Celestino
NELHA Groundskeeper II	Haleamau, Karin
NELHA Fiscal Officer	Kaniho, Sheryll
NELHA Accounting Clerk III	Miranda, Jerrae
NELHA Maintenance Mechanic I	Mitchell, Anthony
NELHA Engineering Project Coordinator	Nichols, Jeffrey
NELHA Water Quality Lab Mgr	Olson, Keith
NELHA Electrician II	Pierce, Eugene
NELHA Utility Electrician	Pierce, Thomas
NELHA Vehicle Const Equip Mech	Robinson, Richard
NELHA Chief Marketing Officer	Sombardier, Laurence
NELHA Operations Manager II	War, Jan
NELHA Marketing Intern	Hutchison, Alexandra
NELHA Laboratory Intern	Ross, Delany
NELHA Laboratory Intern	Richno, Camie
NELHA Laboratory Intern	Van Pernis, Kristiana
NELHA Laboratory Intern	Jackson, Keli

Appendix 1 – Timeline of Major Events

1974	Natural Energy Laboratory of Hawaii, operated by the University of Hawaii, was established as a response to the first oil crisis.
1979	Mini-OTEC was anchored offshore of Keahole Point, demonstrating the world's first production of net electrical power via closed-cycle OTEC.
1980	Laboratory facilities and its first pipeline to draw deep seawater from 2,000 feet and surface seawater from 45 foot depths were completed.
1981	Shore-based OTEC research began with a project testing biofouling and corrosion countermeasures for the closed cycle OTEC process.
1984	Legislation authorized commercial activities, allowing the Laboratory to host new business ventures.
1985	Legislature authorizes NELH to assume the management responsibility of the Puna Geothermal Facility to NELHA. Facility consists of a 3 mW electric power plant and the Noi'i O Puna Research Center
1986	Hawaii Ocean Science and Technology (HOST) Park was created on an adjacent 500+ acres and operated by the Hawaii Technology Development Corporation (HTDC). US DOE and HOST Park combine resources to install 40" deep seawater and 28" surface seawater system at Keahole Point. Laboratory building air conditioning system converted to deep seawater cooling. Legislature appropriates funds for 18" deep seawater pipeline.
1987	Heat and Mass Transfer Scoping Test Apparatus (HMTSTA) open cycle OTEC test tower constructed and operated by Pacific International Center for High Technology Research (PICHTR).
1989	Puna Geothermal Facility and HGP-A well shut down. The Aluminum Company of Canada (ALCAN) develops program at the Laboratory for testing "roll bonded" aluminum heat exchangers.
1990	NELH, operated by UH, and HOST Park, operated by HTDC, merge to become the Natural Energy Laboratory of Hawaii Authority (NELHA).
1992	210 kW open-cycle OTEC Net Power Producing Experiment (NPPE) constructed at NELHA and operated by PICHTR.
1994	Micro-tunneling begins to construct two 66" diameter tunnels under the shoreline and offshore reef as a pipeline protection crossing in preparation for NELHA's new 55" warm and cold seawater pipelines.
1995	CEROS transferred from HTDC to NELHA
1998	NPPE Open-cycle OTEC power plant decommissioned.

2000	Construction begins for NELHA's new 55" offshore intake pipelines and pump station. Planning and design process started for new Hawaii Gateway Distributed Energy Center.
2002	Successful deployment of 55" deep seawater pipeline offshore and construction of initial phase of onshore pump station using specially designed fiberglass reinforced (FRP) intake canisters. First deep seawater desalinization project begins experimentation to develop bottled drinking water.
2003	NELHA tenant count reaches 34. Non-profit "Friends of NELHA" (FON) formed to assume basic public relations and outreach functions for NELHA.
2004	Construction of Hawaii Gateway Distributed Energy Center completed.
2005	55" warm and cold seawater pump station and distribution pipelines completed.
2006	NELHA Foreign Trade Zone status granted by US Department of Commerce. Keahole Solar Power LLC begins construction of solar thermal research and demonstration facility. Five leases to desalinize deep seawater to produce boutique drinking water.
2007	Cellana in partnership with Royal Dutch Shell begins construction of a 6 acre micro alga to biofuels research center.
2010	Makai Ocean Engineering begins construction of corrosion lab and heat exchanger test tower to investigate the use of aluminum alloys for OTEC.
2012	UH Economic Research Organization (UHERO) completes first economic impact study regarding HOST Park. Results indicate economic impact and job creation is much higher than anticipated and is almost \$90 million annually and 600 jobs. Master Plan and Strategic Plans updated. Federal grants totaling almost \$3.5 million received for renovation of Main Administration building and micro-grid infrastructure for the Research Campus.
2013	Pipe upgrades. State CIP funding received (\$12M) to complete road and connector pipe. Over \$30M in public/private sector projects underway.

In Memoriam



Guy Toyama

1970 – 2012

Executive Director – Friends of NELHA

Clean Energy Evangelist



*2013
Annual
Report*

