

## BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETANIA STREET  
HONOLULU, HI 96843  
www.boardofwatersupply.com




March 29, 2018

KIRK CALDWELL, MAYOR

BRYAN P. ANDAYA, Chair  
KAPUA SPROAT, Vice Chair  
DAVID C. HULIHEE  
KAY C. MATSUI  
RAY C. SOON

ROSS S. SASAMURA, Ex-Officio  
JADE T. BUTAY, Ex-Officio

ERNEST Y. W. LAU, P.E.  
Manager and Chief Engineer

ELLEN E. KITAMURA, P.E.  
Deputy Manager and Chief Engineer 

The Honorable Donovan M. Dela Cruz, Chair  
and Members  
Committee on Ways and Means  
Hawaii State Capitol, Room 208  
Honolulu, Hawaii 96813

Dear Chair Dela Cruz and Members:

Subject: House Bill 634, H.D. 1, S.D. 1 Relating to the Issuance of Special Purpose Revenue Bonds for the Nuuanu Hydroelectricity Project

The Board of Water Supply (BWS) strongly supports House Bill (HB) 634, HD1, SD1, which authorizes the issuance of special purpose revenue bonds under Part XII, Chapter 39A, Hawaii Revised Statutes, assisting dam and reservoir owners for the purpose of repairing and upgrading Nuuanu Reservoir No. 1 to meet the State dam safety standards and provide adequate flood control for Nuuanu communities along the Waolani Stream between Nuuanu Avenue and Liliha Street.

Nuuanu Reservoir No. 1 is an earthen dam constructed in 1908, 38 feet high, 588 feet wide and retains 21 million gallons. The 70-foot spillway is vegetative and needs to be replaced with concrete and a drain system needs to be installed along with remote gage monitoring equipment. The preliminary construction cost estimate is approximately \$3 million.

When the dam repairs are completed and the opportunity presents itself at a future point, the Nuuanu hydro-electric power generation and managed aquifer recharge project feasibility study and environmental assessment project will be initiated and additional community outreach and field surveys will occur.

Thank you for your consideration of our supporting testimony on HB 634, HD1, SD1.

Very truly yours,



ERNEST Y.W. LAU, P.E.  
Manager and Chief Engineer



ONE WORLD ONE WATER  
677 Ala Moana Blvd, Suite 1100  
Honolulu, Hi 96713

Testimony in Support of H.B. 634 HD1 SD1  
Relating to the Nuuanu Hydroelectricity Project

Senate Committee on Ways and Means  
March 29<sup>th</sup>, 2018  
10:50am  
Conference Room 211

**Subject:** House Bill (HB) 635 Relating to the Issuance of Special Purpose Revenue Bonds for the Nuuanu Hydroelectricity Project

Aloha Chair Dela Cruz, Vice Chair Keith-Agaran, and Members of the Senate Committee on Ways and Means,

At One World One Water we are dedicated to reinvesting in water infrastructure and restoring natural environments, and **we strongly support HB634 HD1 SD1** which will help produce clean energy in Hawaii while increasing flood control and dam safety. This measure will also help enhance groundwater recharge in the upper Nu'uuanu watershed, which will help Hawaii recharge more water back into our aquifers. Freshwater resources are already constrained in Hawaii and will only become more limited as climate change persists, meaning we must act now to promote natural water recharge.

This bill will help Hawaii reach both the renewable energy goals of the state and the water goals of the Fresh Water Initiative, so as an organization committed to improving our water system **we ask your support of HB634 HD1 SD1** to invest in Hawaii's future.

Please contact us at [globalwater@gmail.com](mailto:globalwater@gmail.com) should you have any questions or require additional information regarding this matter.

Sincerely,  
*One World One Water*



Email: [communications@ulupono.com](mailto:communications@ulupono.com)

SENATE COMMITTEE ON WAYS & MEANS  
Thursday, March 29, 2018 — 10:50 a.m. — Room 211

**Ulupono Initiative Strongly Supports HB 634 HD 1 SD 1, Relating to the Issuance of Special Purpose Revenue Bonds for the Nuuanu Hydroelectricity Project**

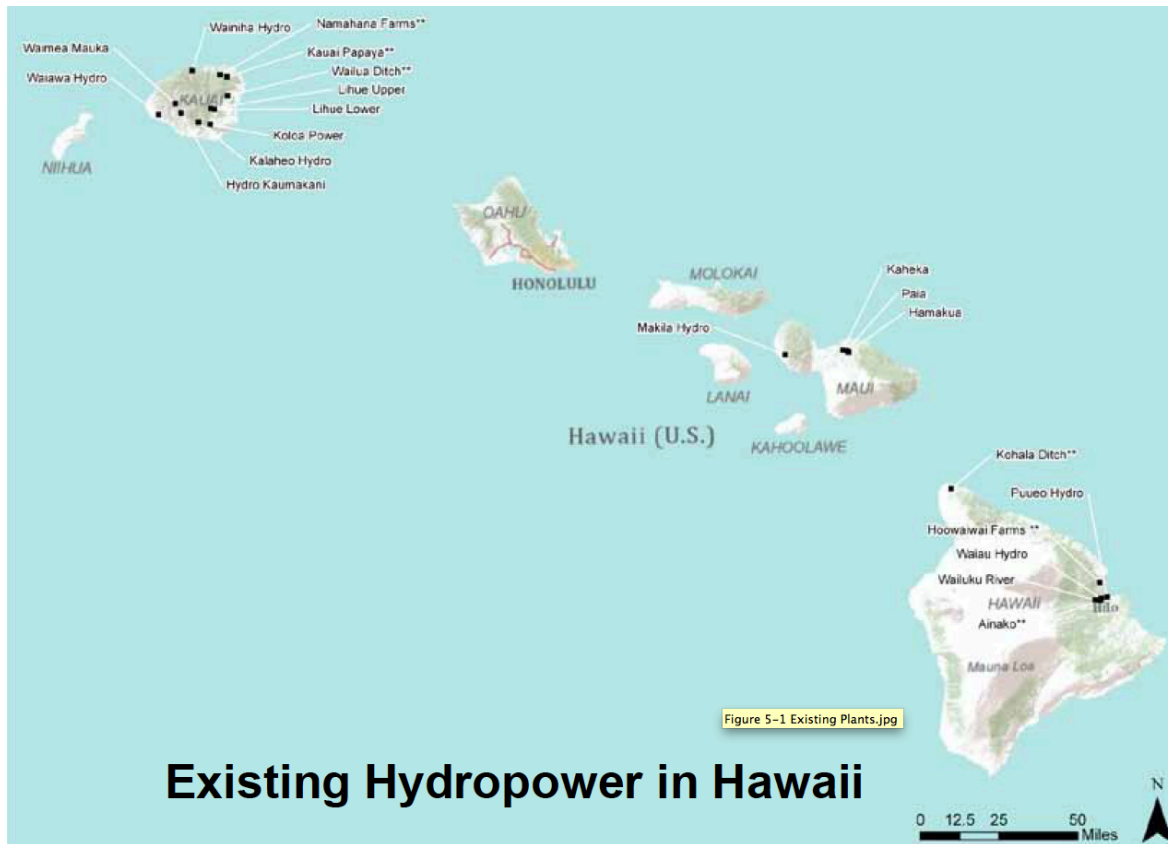
Dear Chair Dela Cruz, Vice Chair Keith-Agaran, and Members of the Committee:

My name is Kyle Datta and I am General Partner of Ulupono Initiative, a Hawai'i-based impact investment firm that strives to improve the quality of life for the people of Hawai'i by working toward solutions that create more locally produced food; increase affordable, clean, renewable energy; and better management of waste and fresh water. Ulupono believes that self-sufficiency is essential to our future prosperity and will help shape a future where economic progress and mission-focused impact can work hand in hand.

**Ulupono strongly supports HB 634 HD 1 SD 1**, which authorizes special purpose revenue bonds for upgrading Nuuanu Reservoir #1 for a hydroelectric project, because it aligns with our goal of increasing the production of clean, renewable energy in Hawai'i.

Currently, hydroelectric projects exist in all of Hawai'i's counties except Honolulu. Hydroelectric power production is highest on Kauai where it provides 7.5 percent of the island's electricity.

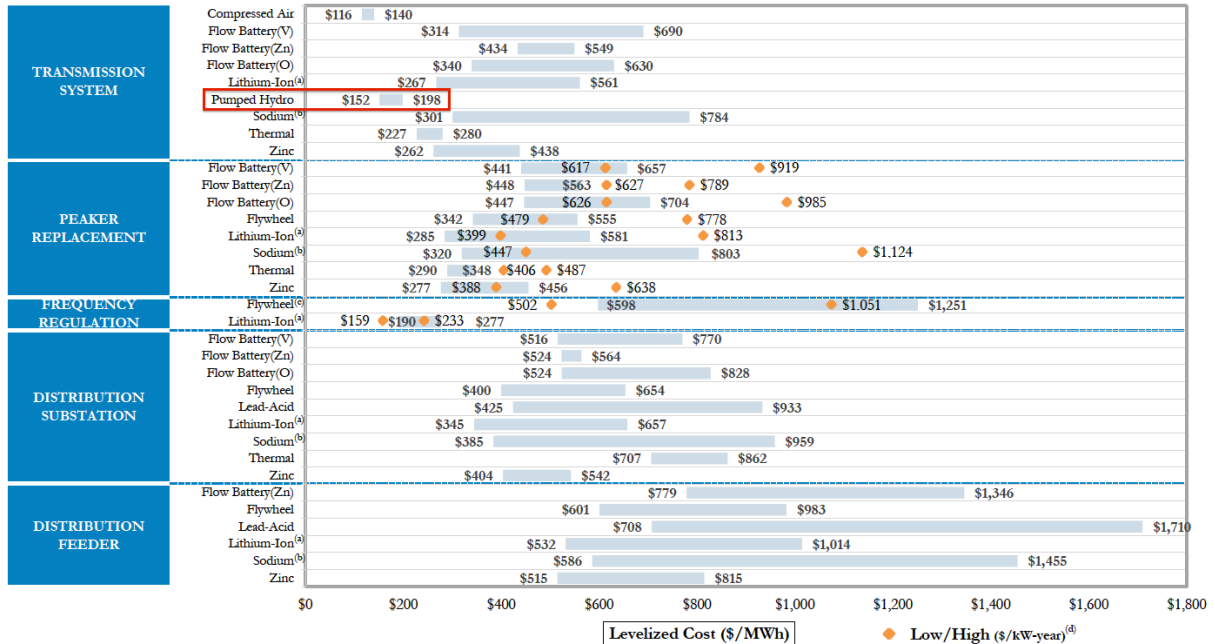
*Investing in a Sustainable Hawai'i*



The combined statewide hydroelectric plants have a total generating capacity of about 37 megawatts, which is approximately equal to the generating capacity of a 70 megawatt solar farm. Hydroelectric plants also replace 250,000 barrels of oil equivalent. Hydroelectric plants statewide would represent 1.67 percent of O‘ahu’s 2016 generating capacity and roughly 0.49 percent of the state’s primary energy production.

While this project is currently slated for hydroelectric and aquifer recharge, Ulupono also believes this project could serve as a pumped storage hydro facility. Pumped storage hydro is one of the cheapest forms of energy storage currently available. The chart below indicates the price ranges for different types of energy storage.

### Unsubsidized Levelized Cost of Storage Comparison



Source: Lazard and Enovation Partners estimates.

Note: Flow Battery(V) represents Vanadium Flow Batteries; Flow Battery(Zn) represents Zinc-Bromine Flow Batteries; Flow Battery(O) represents Other Flow Batteries. Lazard's LCOS v1.0 study did not separately analyze each of these distinct technologies within Flow Battery.

- (a) Lithium-Ion-Power technology used in the Frequency Regulation and Microgrid Use Cases due to low duration/high power requirements. Lithium-Ion-Energy systems are used in all other Use Cases that include Lithium-Ion technology.
- (b) Sodium-Low Temperature systems are used in Commercial Appliance and Residential Use Cases. Sodium-High Temperature systems are used in all other Use Cases that utilize Sodium technology.
- (c) Flywheel storage in the Frequency Regulation Use Case represents short-duration storage. Flywheel storage in all other Use Cases represents long-duration storage.
- (d) Reflects conversion of LCOS figure (\$/MWh) by multiplying by total annual energy throughput (MWh) and dividing by capacity (kW).

With high intermittent renewable energy production, Hawai'i requires more energy storage to increase its use of additional renewable energy sources. Yet, there are few locations, particularly on O'ahu where power demand is highest amongst all Hawai'i counties, that a pumped storage hydro project makes topographic and economic sense. Nuuanu reservoirs provide an opportunity to develop a needed energy project using reservoir infrastructure that exists.

As Hawai'i's energy issues become more complex and challenging, we appreciate this committee's efforts to look at policies that support renewable energy production.

Thank you for this opportunity to testify.

Respectfully,

Kyle Datta  
General Partner



**HAWAI'I COMMUNITY FOUNDATION**  
*Amplify the Power of Giving*

**Testimony of the Hawaii Community Foundation on HB634 HD1 SD1  
Relating to the Nu'uau Hydroelectricity Project  
Senate Committee on Ways and Means  
Thursday, March 29<sup>th</sup>, 2018  
10:50am  
Conference Room 211**

Aloha Chair Dela Cruz, Vice Chair Keith-Agaran, and Members of the Senate Committee on Ways and Means,

The Hawaii Community Foundation (HCF) strongly supports **HB634 HD1 SD1**, which relates to the issuance of special purpose revenue bonds for the Nu'uau Hydroelectricity Project.

As Hawaii is gradually getting less precipitation as the climate changes, initiatives that help increase groundwater recharge are becoming increasingly important. Hawaii Community Foundation is currently coordinating the Fresh Water Initiative, which includes a goal of increasing water recharge by 30 million gallons per day. HCF is in support of **HB634 HD1 SD1** since it not only helps increase water recharge for the Nu'uau Watershed but it will also help generate renewable energy for the state. Additionally, this bill might assist in bringing the dam facility up to more stringent safety standards.

HCF strongly supports **HB634 HD1 SD1** and we stand ready to collaborate and assist in moving Hawaii towards increased water reuse and strengthened water security.