

12:15 pm – Luncheon Presentation

"Best Practices for Procuring Green in Construction"

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**GREEN
BUILDING
HAWAII**
CONSULTING & TRAINING



Best Practices for Procuring Green in Construction



**GREEN
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CONSULTING & TRAINING

- Sustainability Consultants
 - Building Certification Consulting
 - Third Party Energy Management Services
 - Green Training Programs
 - Construction Project Management
 - Renewable Energy Analysis

Agenda Overview

- What does “Green” mean
- Green in Hawaii- History and Programs
- Best practices and pitfalls
- Current Hawaii Laws
- Resources

What is Green Building?

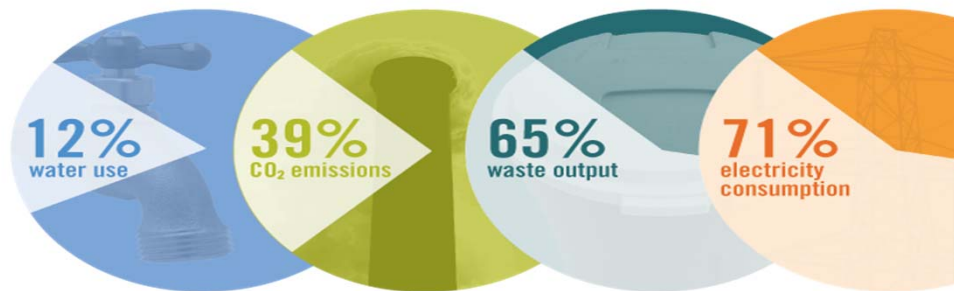


What Is Green Building?



U.S. Building Impacts

U.S. Building
Impacts:



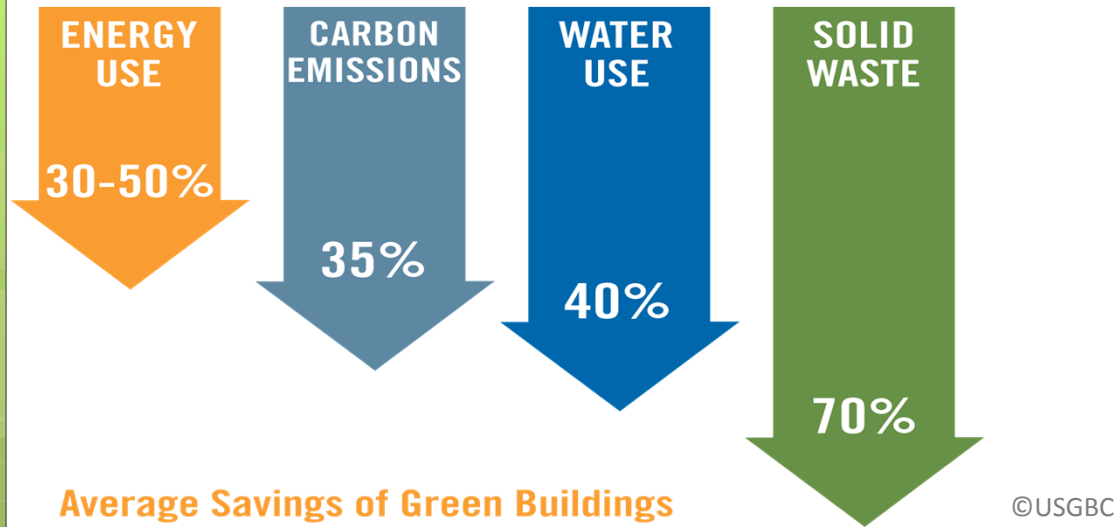
©USGBC

Impacts of Development



The New
Farmin

Green Building Benefits



Increased Productivity From Green Buildings



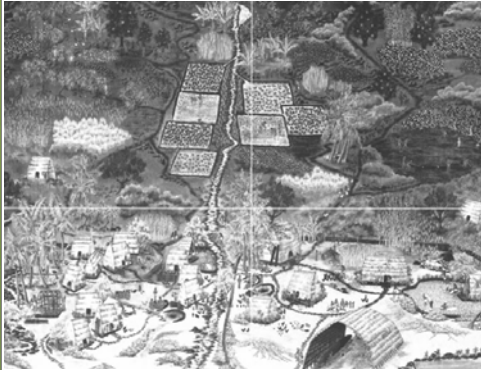
What is Green Procurement ?

- Generally speaking it typically addresses the following categories:
 - Energy
 - Water
 - Waste
 - Materials (recycled content, bio based etc.)
 - Indoor Environmental Quality
 - Transportation (fuel types, electric vehicles, etc.)
 - Landscape and Site
 - Carbon
 - Others- ESG themes- Environment, Social, Governance

Paradigm Shift



Hawaii Historical Perspective



Life in Early Hawai'i: The Ahupua'a
3rd Edition; Kamehameha Schools Press, 1994



www.skyscrapercenter.com/city/honolulu

A Historical Perspective

- Pre-Western Contact-Traditional Hawaiian Homes (Hale)
- 1970 **EPA is established under the Nixon Admin**
Clean Water Act, Clean Air Act, First Earth Day
- 1979 President Carter installs solar panels on the White House
- 1986 President Reagan removes solar panels from the White House
- 1988 **Efficiency standards for fluorescent lamp ballasts added by Congress**
- 1992 DOE and EPA create ENERGY STAR, voluntary labeling program, President Bush signs Energy Policy Act
- 1993 **US Green Building Council (USGBC) is formed**

A Historical Perspective

- 1994 Honolulu, Hawaii and Kauai counties adopt building energy codes
- 1998 LEED v1.0 Pilot Program
- 2001 Net metering established for individual systems up to 10 kW capacity in Hawaii
- 2008 State of Hawai'i and US Dept. of Energy launch Hawai'i Clean Energy Initiative: *70% clean energy by 2030, 30% efficiency measures, 40% locally generated renewables*
- 2009 Hawaii Energy is created to incentivize energy efficient equipment purchasing in Hawaii

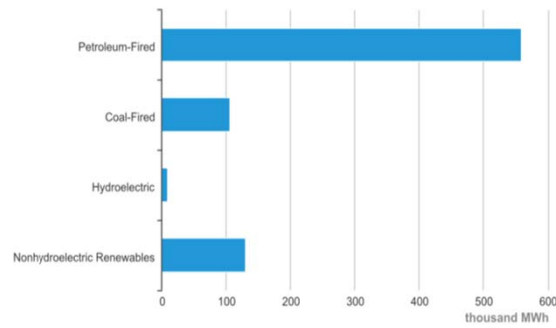
A Historical Perspective

- 2010 Feed In Tariff (FIT) for renewable technologies allows companies to sell energy to the utility
- 2015 Paris Climate Agreement signed by every country in the world
Aloha + Challenge commits to 100% renewable energy by the year 2045. Net Metering for PV ends in Hawaii
- 2017 USA pulls out of the Paris Climate Agreement
- 2018 University of Hawaii-Maui College proposes to be 100% renewable and fossil fuel free by 2019

Hawaii- Energy Facts

- In 2015, Hawaii **imported 91% of the energy** it consumed, mostly as petroleum.
- Hawaii had the **fourth-lowest per capita energy use in the nation** in 2015. The **transportation** sector accounted for **more than half (51%)** of Hawaii's total energy demand in 2015, led by jet fuel use.
- In 2016, **Hawaii generated more solar electricity per capita from distributed facilities than any other state**, and solar energy generated 38% of Hawaii's net generation from renewable resources.
- In 2016, Hawaii had the **highest electricity prices in the nation**; it is the **first state to set a legal deadline for producing 100% of its electricity from renewable energy sources**, a target it plans to achieve by 2045.

Hawaii Net Electricity Generation by Source, Jun. 2018



Source: Energy Information Administration, Electric Power Monthly

Hawaii Clean Energy Initiative

- The goal of the Hawaii Clean Energy Initiative is to achieve 100 percent clean energy by 2045
- In 2014 Governor Neil Abercrombie signed the initiative into policy



Hawai'i Powered
Hawai'i Clean Energy Initiative

The Aloha+ Challenge is a statewide commitment to achieve Hawai'i's sustainability goals, and locally driven framework to implement the United Nations Sustainable Development Goals.



State Procurement Has an Impact!

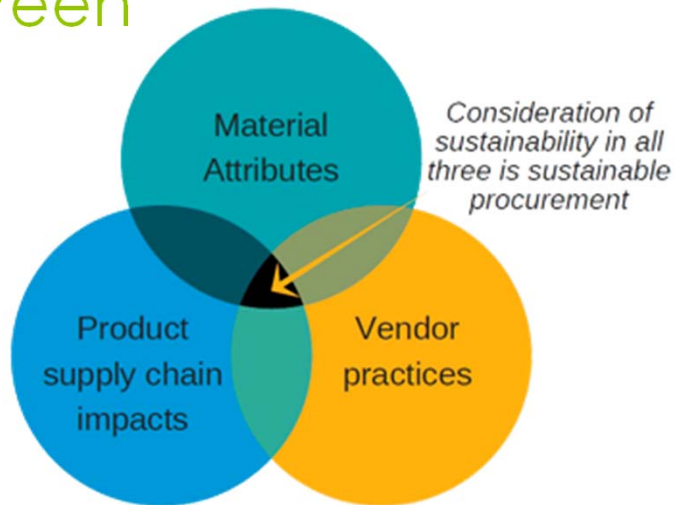
Measuring Capital Improvement Projects in Dollars Invested through December 2016

This goal is measured by tracking Dollars Invested in Capital Improvement Projects. [Explore the data](#)

1,176,610,034.57 Dollars Invested
Final Result from Dec 2013



National Themes for Best Practices in Green Procurement



Follow what others have done

- Plentiful resources online from Federal and State agencies as well as non-profits and universities.
- See **resource** section of this presentation

Shift the way Green Product Procurement is Achieved

- **Version 1** procurement includes specifying and shifting through each product for each RFP.
- **Version 2 is a “program approach”** where a variety of stakeholders are engaged through a facilitated process. The process requires more work upfront, but typically yields improved results including cost savings.
- Sustainable Purchasing Network-
<https://www.youtube.com/watch?v=re5LupxTMWA>

Hawaii Laws for Green Procurement and Pertinent Best Practices

- Meet LEED Silver criteria
- Include energy efficiency into building design
- Include energy and water efficiency into operations
- Reduce waste in operations through waste stream diversion and green purchasing practices
- Procure environmentally preferable products
- Perform life cycle cost-benefit analysis before equipment purchasing

Hawai'i Revised Statutes §169-9 (2006) Energy Efficiency and Environmental Standards for State facilities, motor vehicles, and transportation fuel.

- (a) **Each agency** is directed to implement, to the extent possible, the following goals during planning and budget preparation and program implementation.
- (b) With regard to buildings and facilities, each agency **shall**:

Hawai'i Revised Statutes §169-9 (2006) Energy Efficiency and Environmental Standards for State facilities, motor vehicles, and transportation fuel.

- (1) **Design and construct buildings** to meeting the **Leadership in Energy and Environmental Design silver** or two green globes rating system or another comparable State approved, nationally recognized, and consensus based guideline, standard, or system, except when the guideline, standard, or system interferes or conflicts with the use of the building or facility as an emergency shelter;
- **What is LEED?**

USGBC and LEED

- United States Green Building Council (USGBC)
- Leadership in Energy and Environmental Design (LEED)



More on LEED

LEED® Facts	
[Your Project Here] [City, State, Country]	
LEED BD+C: New Construction (v4)	
Platinum	100*
Integrative Process	1
Location & Transportation	16
Sustainable Sites	10
Water Efficiency	11
Energy & Atmosphere	33
Materials & Resources	13
Indoor Environmental Quality	16
*Out of a possible 100 points + 10 bonus points	
Innovation	4
Regional Priority	6

- Points based system across 7 category areas
 - Energy
 - Water
 - Indoor Environmental Quality
 - Materials
 - Sites
 - Location and Transportation
 - Integrative Design Process
 - Bonus
 - Regional Issues
 - Innovation
- Some credits mandatory, some give points,
- Total number of points equals final certification level of Certified, Silver, Gold, or Platinum.



Best Practices for Procurement

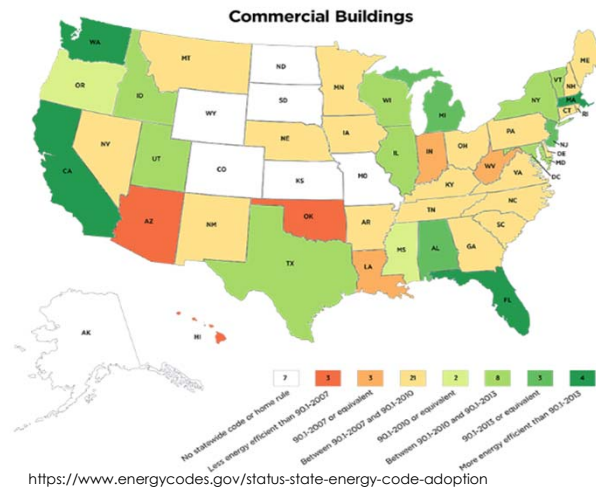
- Be as **specific** a possible in specifications.
 - Example- call out "Green Guard Gold" certification for paint compliance instead of "meet requirements for IEQ Low Emitting materials."
- Use required LEED items to **help meet other state requirements**:
 - Energy Model for LCA and code compliance
 - Commissioning for operator engagement
 - Materials and Resources Environmentally Preferred Product (EPP) purchasing

Hawai'i Revised Statutes §169-9 (2006) Energy Efficiency and Environmental Standards for State facilities, motor vehicles, and transportation fuel.

- (2) **Incorporate energy efficiency measures** to prevent heat gain in residential facilities up to three stories in height to provide R-19 or equivalent on roofs, R-11 or equivalent in walls, and high-performance windows to minimize heat gain and, if air conditioned, minimize cool air loss;
 - **Energy Codes!**
 - New codes supersede above mentioned requirements

IECC Energy Code

- State adopted 2015 IECC (International Energy Conservation Code)



Best Practice

- Put performance requirements in specifications.
- Who is responsible?
 - Architect, Contractor, End User?
- Choose performance or prescriptive approach to compliance for IECC Code
- Follow specification writing best practice
 - Workshop SPO 122- Basics of Writing Specs/scope of work training
 - More detailed specifications provide a better result.
 - Lighting Example, LED vs LED with a performance standard like efficacy, warranty, 3rd party rating etc.

Hawai'i Revised Statutes §169-9 (2006) Energy Efficiency and Environmental Standards for State facilities, motor vehicles, and transportation fuel.

- (4) Implement **water** and **energy efficiency** practices in **operations** to reduce waste and increase conservation
- **Building Operator Certification**- SLIM on Maui, UH outreach on Oahu
- **BA in Facility Management**- UH West Oahu. Tied to International Facility Management Association (IFMA)

Best Procurement Practice

- Engage stakeholders early including facility managers
- Use other goals like LEED commissioning requirements to help facilitate engagement
- When possible create feedback loops to understand how particular products etc. are being used and received by end users

Hawai'i Revised Statutes §169-9 (2006) Energy Efficiency and Environmental Standards for State facilities, motor vehicles, and transportation fuel.

- (5) Incorporate principles of **waste minimization** and **pollution prevention**, such as reducing, revising, and recycling as a **standard operating practice** in programs, including programs for **waste management in construction and demolition** projects and **office paper and packaging recycling** programs

Best Practices in Waste Management

- Identify issues in waste streams such as chemicals, excess packaging and disposable products
- Reducing packaging in your purchasing by leveraging manufacturers
- Initiate reusable utensil programs at cafeterias
- Minimize plastics by replacing with paper or cardboard
- Initiate recycling programs
- Go paperless in offices and classrooms
- Start responsible purchasing program to reduce upstream waste

Tip of the “Wasteberg” Impact

Municipal waste
tip of the
“wasteberg”



Upstream waste
produced is 70
times greater than
at municipal level

Hawai'i Revised Statutes §169-9 (2006) Energy Efficiency and Environmental Standards for State facilities, motor vehicles, and transportation fuel.

- (7) **Procure environmentally preferable products**, including recycled and recycled-content, bio-based, and other resource-efficient products and materials.
- **§103D-1005 Recycled products.** (a) To encourage the use of recycled products, contracts shall be awarded to the lowest responsible and responsive bidders, with preference being given to the products containing recycled material.

Best Procurement Practice

- Use third party certifications to verify performance.
- Use already created tools and resources to help vet products. (GSA, DBEDT, EPA)



Hawai'i Revised Statutes §169-9 (2006) Energy Efficiency and Environmental Standards for State facilities, motor vehicles, and transportation fuel.

- (6) Use **life cycle cost-benefit analysis** to purchase energy efficient equipment such as ENERGY STAR products and use utility rebates where available to reduce purchase and installation costs; and
 - **[§103D-410] Energy efficiency through life-cycle costing.** (a) The procurement practices of the State shall include energy efficient standards and policies, including life-cycle costing.
 - What is LCCA?
 - Example of LCCA
 - Hawaii Energy Rebates and integration

Life Cycle Cost Analysis (LCCA)

- LCCA is a tool to determine the **most cost-effective option** among different competing alternatives to **purchase, own, operate, maintain and dispose of** an object or process, when each is equally appropriate to be implemented on technical grounds

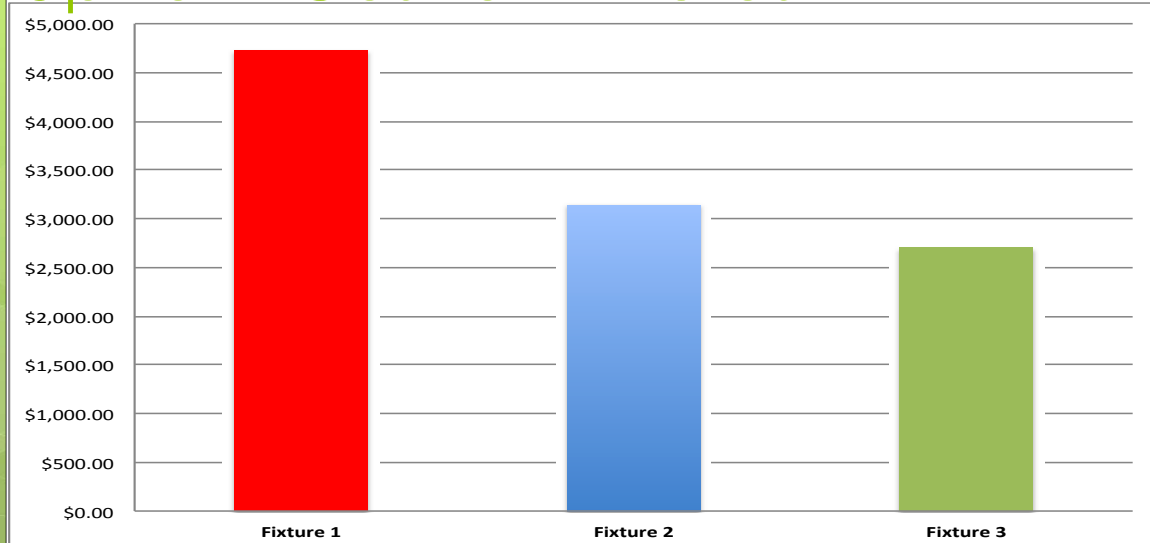
Simple LCCA Equation for Lighting

- Upfront cost (Purchase and installation price)
- Minus rebates (From Hawaii Energy)
- Plus operational cost (Energy and maintenance cost)
- **Upfront Cost – Rebates + Operational Cost = LCCA**
- LCCA is **different** than simple payback as it takes into account other factors including time.

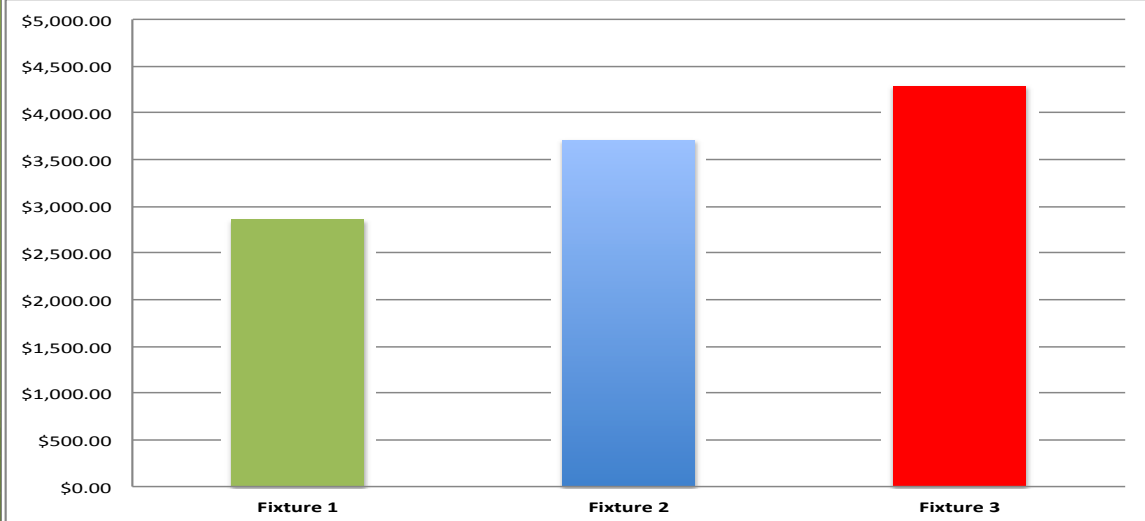
Sample of LCCA

- Three Parking Lot Lighting Fixtures
 - Most expensive-Most efficient
 - Mid priced-Less efficient
 - Least expensive-Least efficient
- All have 5 year warranties
- Total cost projected over 5 years
- Mid priced has least Life Cycle Cost
- Better equipment for less cost

Upfront Cost of Fixtures



Lifetime Energy Cost of Fixtures



Total Lifecycle Cost



Other Green Laws

- o §103D-408 Hawaiian plants; use in public landscaping
 - o (1) By January 1, 2019, **Hawaiian plants** shall constitute a combined **minimum of ten percent** of the total plant footprint for landscaping plans, designs, and specifications
 - o (2) Wherever and whenever possible, Hawaiian plants shall be used for landscaping on, and sourced from, the island and ahupua'a in which the species was found or known to occur prior to European contact.
- o Resources- Ecological Zones and Native Planting List- State of HI DOT
- o <https://hidot.hawaii.gov/highways/files/2013/01/Ecological-Zones-and-Native-Planting-List-Dec-2014.pdf>

Other Green Laws

- o **[§103D-1012] Biofuel preference.** (a) Notwithstanding any other law to the contrary, contracts for the purchase of diesel fuel or boiler fuel shall be awarded to the lowest responsible and responsive bidders, **with preference given to bids for biofuels** or blends of biofuel and petroleum fuel.

Hawai'i Revised Statutes §169-9 (2006) Energy Efficiency and Environmental Standards for State facilities, motor vehicles, and transportation fuel.

- (3) **Install solar water heating systems** where it is cost-effective, based on a comparative analysis to determine the cost-benefit of using a conventional water heating system or a solar water heating system;
- HB 14640- **Requires residential solar water on new construction** unless architect submits for a variance. (poor solar resource, electric powered by PV, or gas on-demand. Eliminated state tax credit for solar in new construction)

Resources for Sustainable Procurement

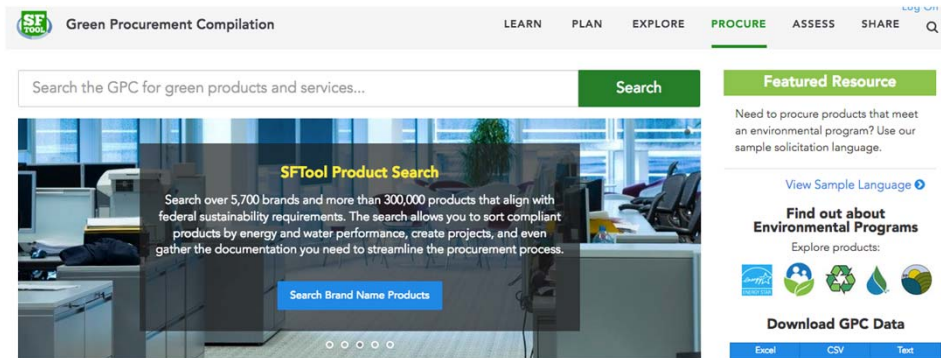
Resources- Energy Efficiency

- DOE- Contracting for Efficiency- A Best Practice Guide for Energy-Efficient Product Procurement.
 - https://www.energy.gov/sites/prod/files/2016/10/f33/femp_best_practices_guide_for_procurement.pdf
- DBEDT- IECC codes
 - <http://energy.hawaii.gov/hawaii-energy-building-code>
- Hawaii Energy
 - <https://hawaiienergy.com/>
- LCCA Programs from DOE
 - <https://www.energy.gov/eere/femp/building-life-cycle-cost-programs>

Resources for Finding Products

- DBEDT- Environmental Product Guide for Hawaii- 2016-
http://greenbusiness.hawaii.gov/wp-content/uploads/2017/05/2016_EPG_FINAL_May2017.pdf
- EPA Ecolabel Guide-
https://www.epa.gov/sites/production/files/2018-06/documents/recommendations_of_specifications_standards_and_ecolabels_6-19-18_0.pdf
- GSA Green Procurement Compilation-
<https://www.gsa.gov/tools/supply-procurement-etools/green-procurement-compilation>

GSA- Green Product Search Guide



Resources for Sustainable Purchasing Best Practices

- Green Purchasing Network-** Green Purchasing opportunities and best practices pdf.
http://www.responsiblepurchasing.org/purchasing_guides/general_green/naspo_rpn_general_green_purchasing_guide.pdf

Resources for Sustainable Purchasing Best Practices

- **Sustainable Purchasing Network-** Training and tools for building a robust and effective policy.
 - Version 1 policy reviews products item by item
 - Version 2 policy creates a comprehensive program that includes multiple stakeholders and various methods of measurement.

Sustainable Purchasing Network tools

Quick Assessment



Self-guided 11-question "Quick Assessment" Worksheet identifying current priorities and related activities

Maturity Model



Self-guided 38-question "Full Assessment" which sits behind the SPLC BENCHMARK online platform

Guided Individual Assessment



Contracted "coaching" project in which SPLC staff lead Full Assessment; leverages SPLC BENCHMARK online platform and provides validated maturity reports and action plan

Bi-Monthly Cohort Forum



Optional, interactive sharing of leading best practices from our Benchmark full assessment participants. Trends and insights.

YOU Can make a positive impact
on Hawaii!

<http://wallpapersdsc.net/cities/big-island-hawaii-29345.html>



<http://wallpapersdsc.net/cities/big-island-hawaii-29345.html>

Mahalo!

John Bendon,
Green Building Hawaii

www.GreenBuildingHawaii.com

Hawaii Green Growth Video

- https://youtu.be/c_4e3gzwww4