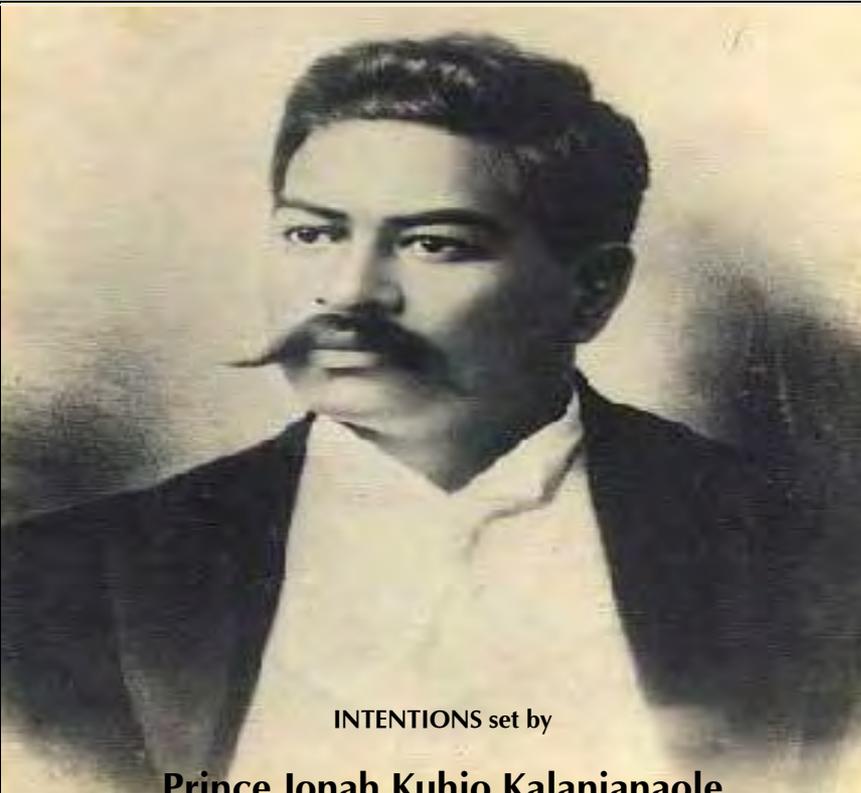


# Designing Hawaii's first LEED Platinum Net Zero Community

## Kaupuni Village Department of Hawaiian Home Lands



# Hawaiian Commission Act 1920



INTENTIONS set by

**Prince Jonah Kūhīō Kalanianaʻōlewi**

Enable Native Hawaiians to return to their lands  
in order to fully support self-sufficiency

## GUIDING PRINCIPALS

- **Pihapono**

*Establish a permanent land base for the benefit and use of native Hawaiians, upon which they may live, farm, ranch, and otherwise engage in commercial or industrial or any other activities as authorized in this Act*

- **Hoa 'Āina**

*Placing native Hawaiians on the lands set aside under this Act in a prompt and efficient manner and assuring long-term tenancy to beneficiaries of this Act and their successors*

*Preventing alienation of the fee title to the lands set aside under this Act so that these lands will always be held in trust for continued use by native Hawaiians in perpetuity*

- **Mālama 'Āina**

*Providing adequate amounts of water and supporting infrastructure, so that homestead lands will always be usable and accessible. Providing financial support and technical assistance to native Hawaiian beneficiaries of this Act so that by pursuing strategies to enhance economic self-sufficiency and promote community based development, the traditions, culture, and quality of life of native Hawaiians shall be forever self-sustaining*



DEPARTMENT OF HAWAIIAN HOME LANDS



# HO'OMALUŌ

## ***ENERGY POLICY***

*To enable native Hawaiians and the broader community working together to lead Hawai'i's effort to achieve energy self-sufficiency and sustainability.*



"If you don't fail at something, you weren't trying hard enough."

DHHL Chairman Micah Kane

Pilot Project

## the Team

Owner  
Department of Hawaiian Home Lands

Architect  
Group 70 International

Contractor  
Hunt Companies

## key Partners

National Renewable Energy Laboratory

Hawaiian Electric Company

State of Hawaii Department of Business Economic Development and Tourism

Ka'ala Farms

## Awards

AIA, Mayor's Choice Award, 2011

USGBC, Outstanding Green Project Team Award, 2011

APA, Innovation in Planning: Best Practices for Sustainability Award, 2010



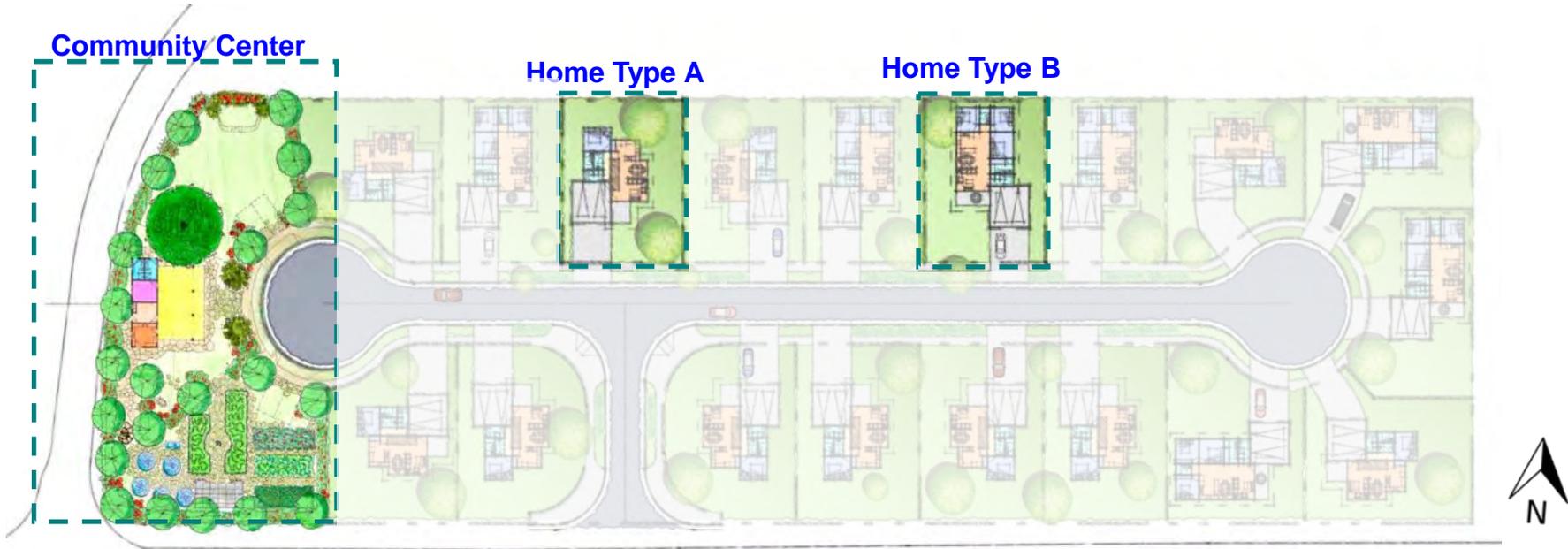


PROJECT SITE  
Kaupuni Village

<http://www.usa.com/waianae-hi-weather.htm>

# Site Considerations





## PROJECT SCOPE

- (19) single family homes
- 2-7 occupants
- (1) community center

## Home Type A

- 1 story 3 bedroom
- 1306 sf living
- 501 sf carport
- 112 sf lanai
- 1919 sf total
- ~\$265,000

## Home Type B

- 2 story 4 bedroom
- 1616 sf living
- 451 sf carport
- 140 sf lanai
- 2207 sf total
- ~\$305,000

# Site Plan





Prevents Air Leakage

Breathable Building

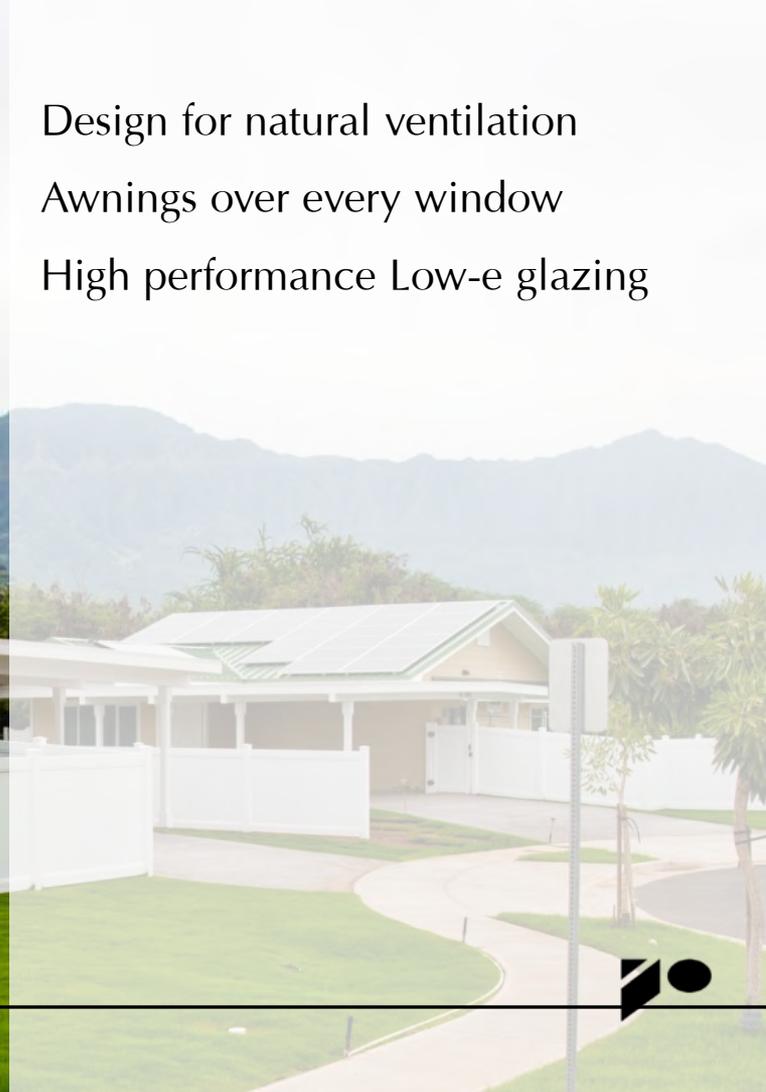


# Insulation & Energy Star





Design for natural ventilation  
Awnings over every window  
High performance Low-e glazing



# Awnings & Windows



Change from 4 ton split system to 2 ton central ducted system

Moved insulation line to underside of roof sheathing

Fresh air intake system

AC System



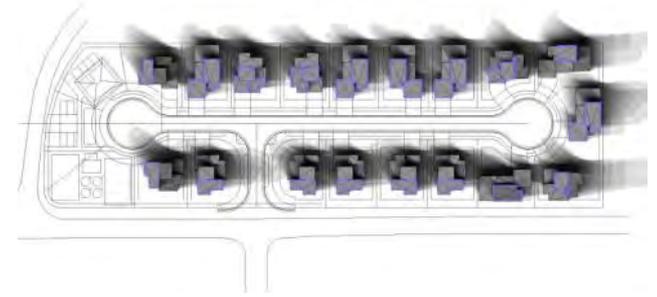
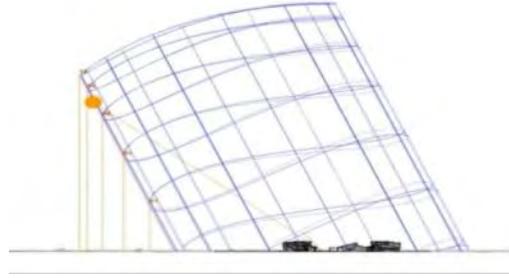
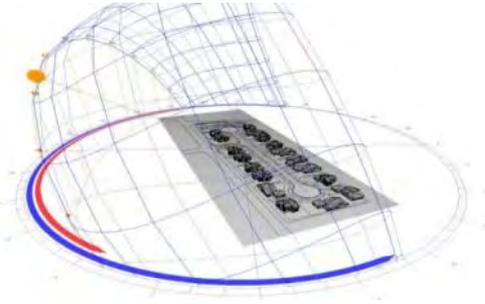


85 1032

Solar Hot Water System Required  
PV System Designed with NREL based on estimated family size  
6.3 kW - 26 panel 2 inverter system

# Solar Systems





# PV Orientation



BEopt 0.9 Beta - New Project

File Screen Case Run Graphs Reports Tools Help

Input: Output: Run: Tools:

Analysis: [0] Optimization Ref Bldg: User-Defined Costs: Default

Cases: Kaupuni-A Kaupuni-A (2) Kaupuni-A (3) Kaupuni-A half east window Kaupuni-A 2 story version Kaupuni-B Kaupuni-B (2) Kaupuni-B half east window Combined Graph

**Building**

- Orientation: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
- Neighbors: 1 2 3 4

**Operation**

- Heating Set Point: 1 2 3 4 5 6 7 8 9 10
- Cooling Set Point: 1 2 3 4 5 6 7 8 9 10
- Misc Electric Loads: 1 2 3 4 5 6 7
- Misc Gas Loads: 1 2 3 4
- Natural Ventilation: 1 2 3

**Walls**

- Wood Stud: 1 2 3 4 5 6 7 8 9 10 11
- Double Stud: 1 2 3 4 5 6 7
- CMU: 1 2 3 4 5 6 7 8 9
- SIP: 1 2 3 4 5 6 7 8 9
- ICF: 1 2 3 4
- Other: 1 2 3 4
- Exterior Finish: 1 2 3 4 5 6 7

**Ceilings/Roofs**

- Ceiling Insulation: 1 2 3 4 5 6 7 8 9
- Roof Insulation: 1 2 3 4 5 6 7 8
- Roofing Material: 1 2 3 4 5 6 7 8 9 10 11 12 13
- Radiant Barrier: 1 2

**Foundation/Floors**

- Slab: 1 2 3 4 5 6

**Thermal Mass**

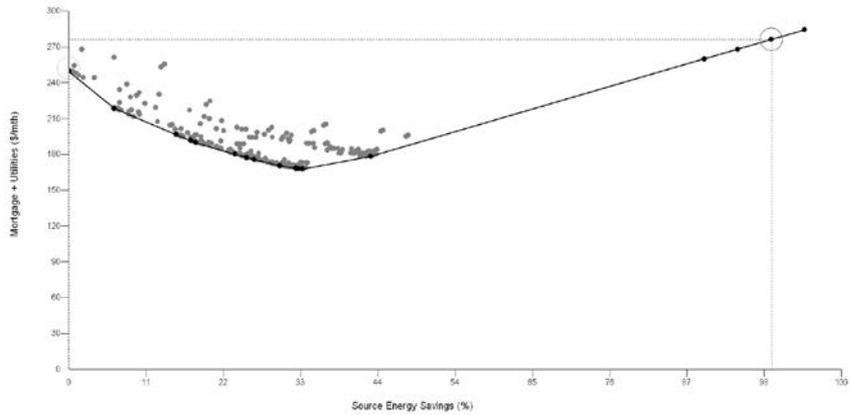
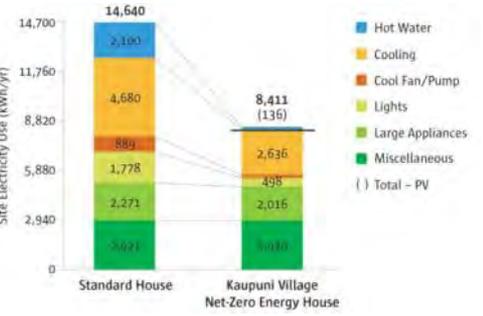
**Windows & Shading**

- Window Areas: 1 2 3 4 5 6
- Window Type: 1 2 3 4 5 6 7 8 9 10 11 12
- Interior Shading: 1 2 3 4 5
- Eaves: 1 2 3 4

**Airflow**

Ref Bldg Wood Stud options R Assembly [hr-ft<sup>2</sup>-°F/Btu]

1) None	-
2) R11 batts, 2x4, 16" o.c.	8.7
3) R13 batts, 2x4, 16" o.c.	9.5
4) R15 batts, 2x4, 16" o.c.	10.2
5) R19 batts, 2x6, 24" o.c.	15
6) R11 batts, 2x4, 16" o.c. + 1" foam	15
7) R21 batts, 2x6, 24" o.c.	15.9
8) R13 batts, 2x4, 16" o.c. + 1" foam	16.4
9) R19 batts, 2x6, 24" o.c. + 1" foam	21.7
10) R21 batts, 2x6, 24" o.c. + 1" foam	22.8
11) R19 batts, 2x6, 24" o.c. + 2" foam	28.1

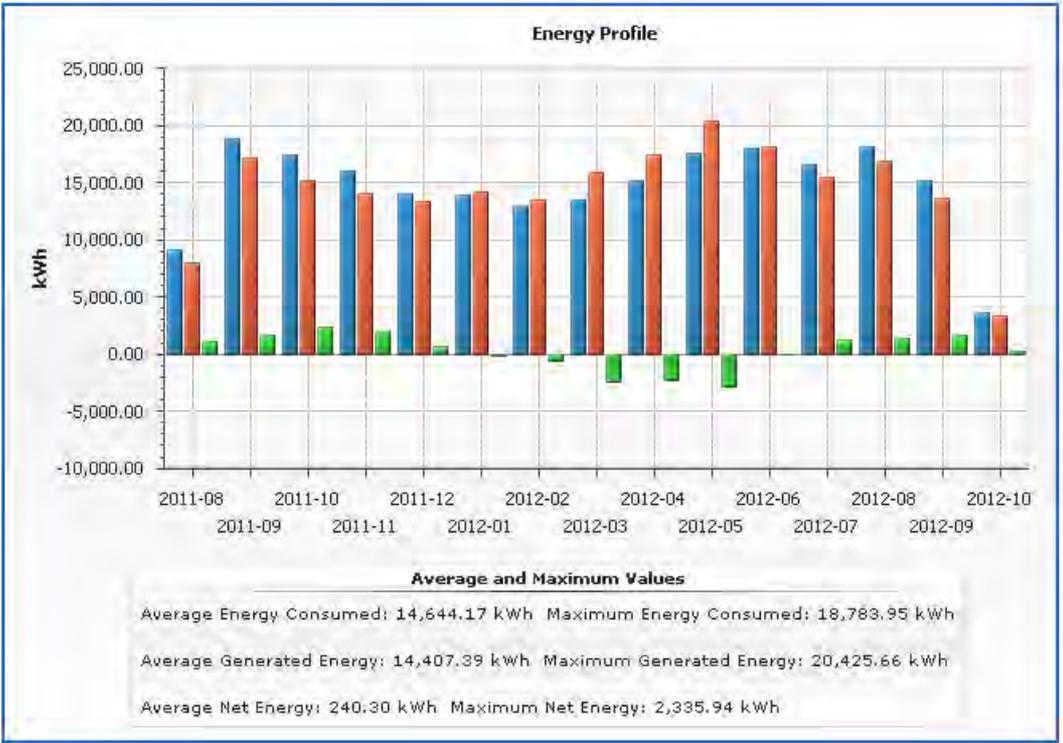
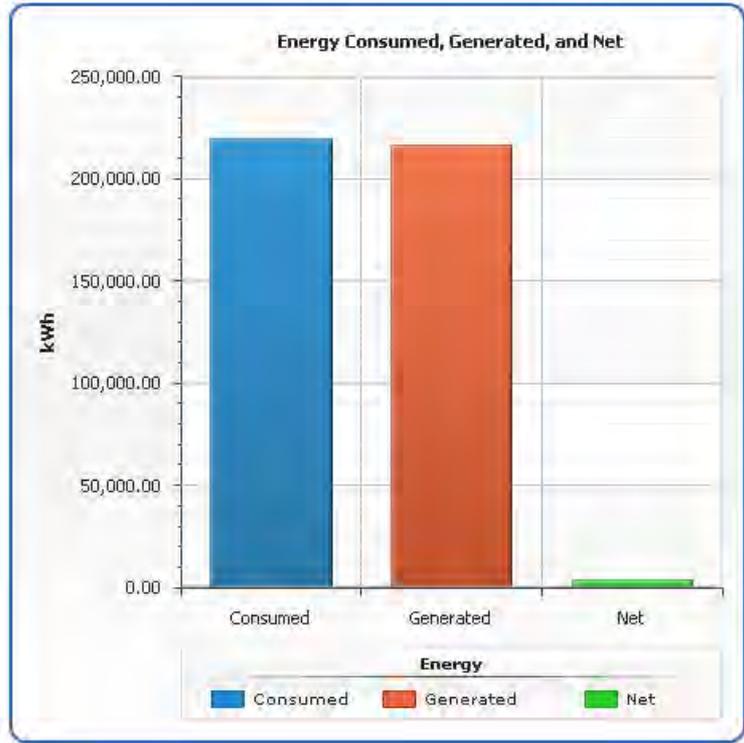


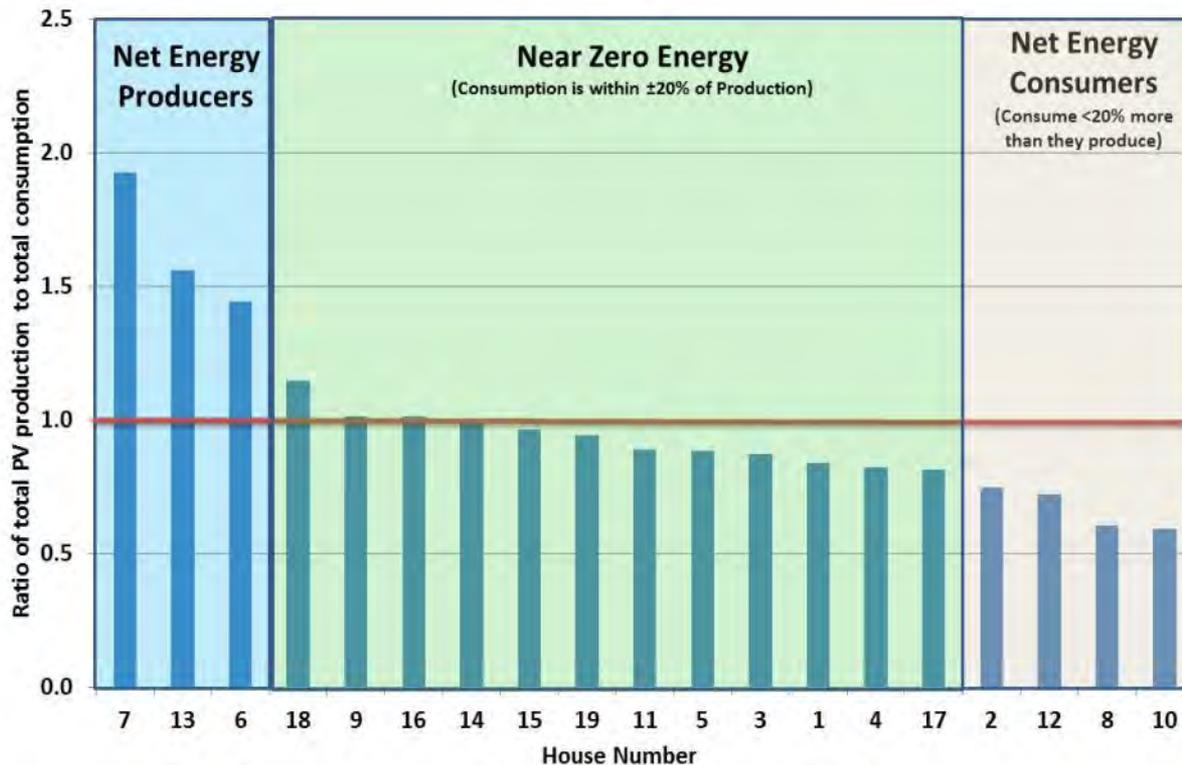
# Beopt





Select Date Range: Last 12 Months (Starts August 18, 2011) View Graph





# NREL Report



**Solatube Skylights**

Natural light in interior spaces

**Photo-Voltaic & Hot Water Solar Panels**

Produce power and minimize electric bills

**Fiber Board Siding (Recycled Material)**

**High SRI Roofing**

Reflects and minimizes heat absorption through the roof

**Pervious Concrete Driveway**

Minimizes run-off by allowing rainwater to percolate through hard surfaces and be absorbed by the ground

**High Performance Glazing**

Reduces heat gain through windows

**Light Colored Roof**

Minimizes heat gain through roof

**Insulated Roof**

Minimizes heat gain through roof, and minimizes cooling costs

**High Efficiency Appliances**

All appliances are Energy Star Compliant

**Low (VOC) Finishes**

Provides a healthier indoor environment with low and/or non-toxic adhesives and finishes

**Insulated Exterior Wall**

Reduces heat gain through exterior walls and minimizes cooling cost



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# Lessons Learned

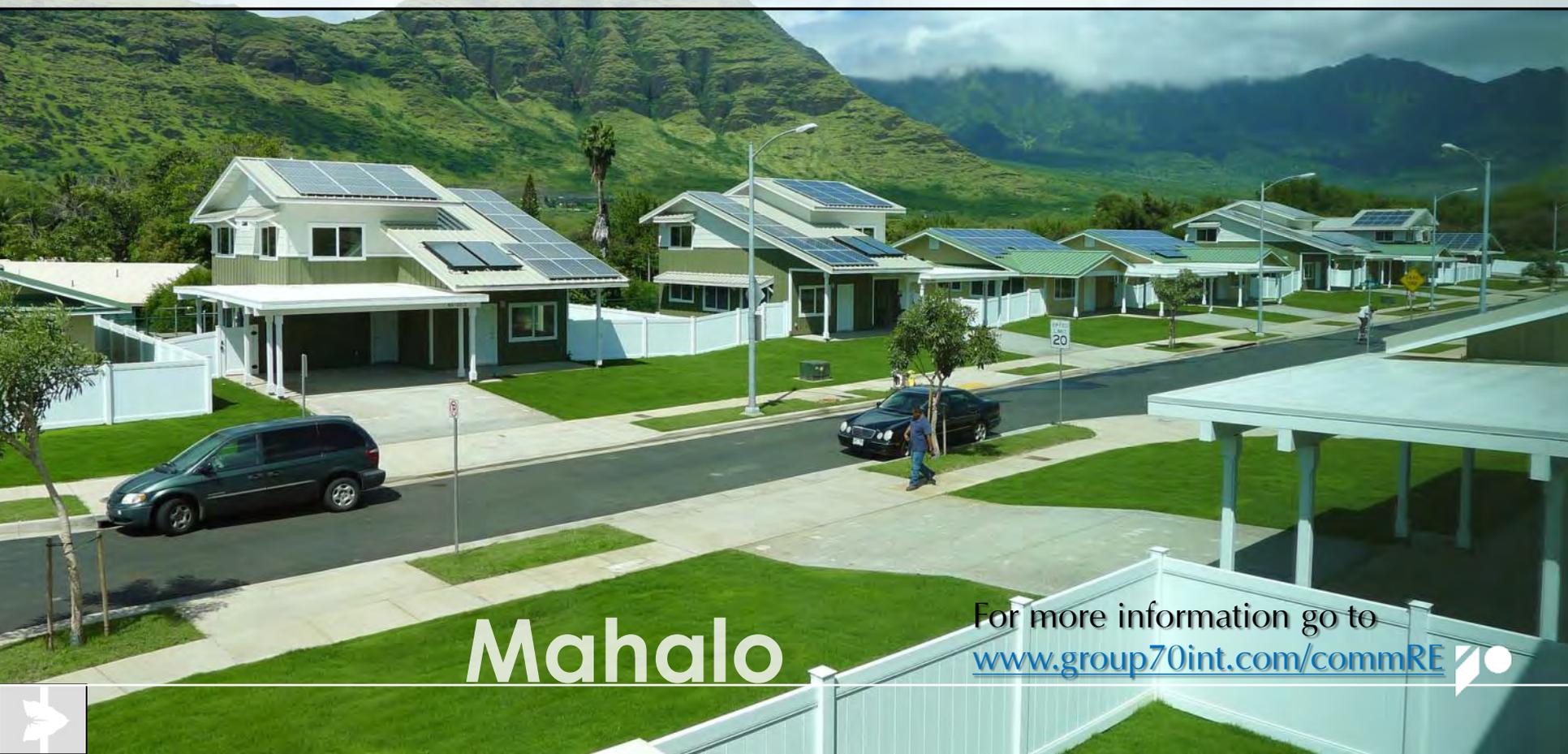




DEPARTMENT OF HAWAIIAN HOME LANDS



Hawaiian Electric Company



# Mahalo

For more information go to  
[www.group70int.com/commRE](http://www.group70int.com/commRE)

