

**APPENDIX C.
COST ESTIMATE
FOCUS GROUP**



Appendix C. Cost Estimate Focus Group Findings

Description:

Cost estimates, concerns, and considerations for four exemplar Resilience Hub locations. Results are presented from two focus groups held in May 2023. The first focus group (F1) was held in-person at Kapi'olani Community College and the second focus group (F2) was held virtually online via Zoom. Findings are presented as direct transcriptions from focus group notes. These are general cost estimates created without any site-specific information. They are meant for illustrative purposes only, and any future retrofits would require additional site-specific assessments.

Focus Group Discussion Notes

Site Name	Cost	Concerns	Considerations
KEY Project (F1)	<ul style="list-style-type: none"> ● Retrofits need size of structure and roof top depending on the roof type. ● Solar roofing contractor cost estimate needs to be sealed, cool, and preferably metal ● Panels (depend on needs) and backup battery storage ● Pumped hydro storage well, above ground catchment and storage tank ● HAM Radio tower ● \$300k for a battery 	<ul style="list-style-type: none"> ● Definitive use and size of building ● Need information on access and communication ● Transportation access, parking (neighborhood park), building part w/ other agencies ● Occupancy during gray skies / blue skies (300 max) ● Wastewater and water systems ● Zoning change or variance for food distribution ● Blue and gray sky operations / staffing 	<ul style="list-style-type: none"> ● Definitions for meals (reimbursements?) ● Delivered meals, meal sites (USDA) ● Transportation support for multi-model access ● Full configurations retrofit of roofing and windows ● 6 acre lot size, 26,354 sq. ft.
KEY Project (F2)	<ul style="list-style-type: none"> ● Gas powered generators are covered by FEMA hazard mitigation grants 	<ul style="list-style-type: none"> ● Number of panels wouldn't produce as much...would need to take into account need. ● Alternative power sources in addition to solar would be important. ● Doesn't pay off as quickly 	<ul style="list-style-type: none"> ● Board of water supply station across the street...would be prioritized for electricity ● Connecting with school ● Permitting around backup generators ● Exposure to tsunamis...important for effective

		<ul style="list-style-type: none"> Doesn't generate as much, terrain, Ko'olau mountains, cloud cover 	communication equipment
Waikiki Community Center (F1)	<ul style="list-style-type: none"> Elevate? Underground utilities Photovoltaic Backup Battery AC, Kitchen? 	<ul style="list-style-type: none"> Non- guests accessing 4th floor Communication for different scenarios Underwater 	<ul style="list-style-type: none"> 1982: Building questions for non profits Lifelines Full retrofit? Graphic version of 10 items to assess local , serves vulnerable population Sea level rise List of neighbors Cooling center Network model
Waikiki Community Center (F2)	<ul style="list-style-type: none"> Investment economics? social? networking? 	<ul style="list-style-type: none"> Local hotel workers..where would local workers go, if trapped in that part of town during disaster event Site is very vulnerable to kids and older adults...if it's going to be inundated...should we invest in PV? Kitchens? At least put it on the second floor. Vulnerable to all levels. Very vulnerable to 	<ul style="list-style-type: none"> Do we need more power/battery storage for supporting cooling systems? – looks like feasible Coordinating with condo associations --what are they doing? Discussions of fit between the two spaces. Active health center in walking distance...connect with them for health

		<p>tsunamis.</p> <ul style="list-style-type: none">● Vertical evacuation better..who will open the doors?<ul style="list-style-type: none">○ Great site to give directions and run shuttle busses	<p>services</p> <ul style="list-style-type: none">● Vertical evacuation working with high rises...good communication equipment in place.● Building relationships with Diamond Head...building relationships with higher elevation sites.● More of a social and communications function for the site.● Planning for cooling centers especially because of vulnerable populations● Trusted point of contact and communication
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<p>Kroc Center (F1)</p>	<ul style="list-style-type: none"> ● 2020 Enforcement may not need retrofit ● Backup battery solution ● Costs for starting up food forest <ul style="list-style-type: none"> ○ Food and water security 	<ul style="list-style-type: none"> ● Need to get buy in from Salvation Army and Kroc Center 	<ul style="list-style-type: none"> ● Founded 2011 ● Safe room standard? ● Metal roof? ● May not need roof retrofit ● Hip style roof ● cooling , sealant, non leaking ● Window protection upgrades (find out cost?) ● Already has photovoltaic ● Partner w/ Leeward
<p>Kroc Center (F2)</p>		<ul style="list-style-type: none"> ● Possible parking capacity challenges ● Transportation capacity? ● More difficult to work with them because they aren't a "community" organization 	<ul style="list-style-type: none"> ● Good location ● Equipment wise, good shape ● Strengthen social side – reaching out to broader community. ● Recreation centers have their own way of doing things. "We aren't in charge". Did direct outreach during the survey. ● Not as familiar outside of membership ● Community perception...not viewed as a community partner, a little more exclusive. ● Working with DHHL

			<ul style="list-style-type: none"> • Have <i>regulated</i> way of doing things - not a lot of operational flexibility and local decision making
Waiialua High School & Intermediate (F1)	<ul style="list-style-type: none"> • Look at Ka'imuki cost estimates for solar • E15 Costs • Expand on photovoltaic • Low hanging fruit first • Training needs 	<ul style="list-style-type: none"> • Follow up w/ Waiialua Community Association 	<ul style="list-style-type: none"> • 1936 Founded • DOE support needed • Ka'imuki as template • Network model? • Challenge of it being a school • Leverage programs strength of other HUBS to support increasing program offerings
Waiialua High School & Intermediate (F2)		<ul style="list-style-type: none"> • Isolated area • Communication • Transportation • Big difference in planning for tsunami vs hurricane (only 15 minutes sometime - 8 hours) • Gridlock concern if panicked 	<ul style="list-style-type: none"> • Relatively good location, outside hazard zones – still tsunami risk • Area serves North Shore Communities, the majority of the population will be inundated...people will have trouble accessing the site. Storing supplies for the whole area....communication with local community members. • Alternative routes for transportation • 7 days minimum planning for extreme

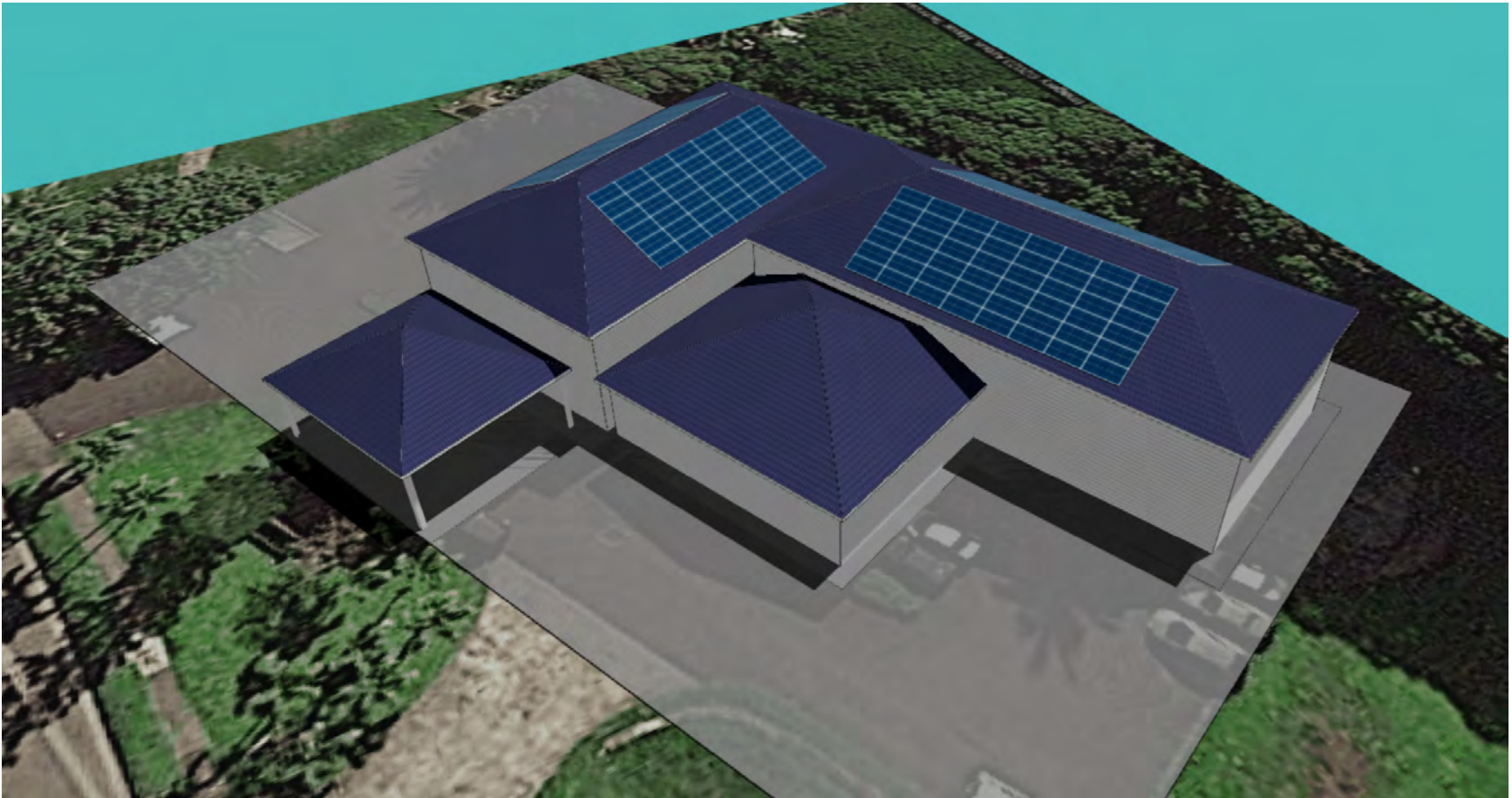
			<p>hazards - sufficient supplies on site.</p> <ul style="list-style-type: none"> • Further in-land food storage. • Shore up communications – especially for tsunami...evacuate outside area. • Communication equipment ...outside the north shore beforehand. • Wiring for resilience energy – connected vs standalone
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Solar Power Estimation

With an estimated cost of \$2.67 per watt for solar panels in Hawaii (the national average is \$2.66 per watt). For the modeling, a SunPower SPR-P17-355-COM solar panel was used and rated at 355 watts per panel. That gives the following estimates:

KEY Project:	180 panels x 355 W/panel x \$2.67/W = \$170,613
Waikiki Community Center:	400 panels x 355 W/panel x \$2.67/W = \$379,140
Waialua High:	400 panels x 355 W/panel x \$2.67/W = \$379,140
Kroc Center:	500 panels x 355 W/panel x \$2.67/W = \$473,925

KEY Project Solar Panel Design Estimate



At least 180 panels at the KEY Project

Waikiki Community Center Solar Panel Design Estimate



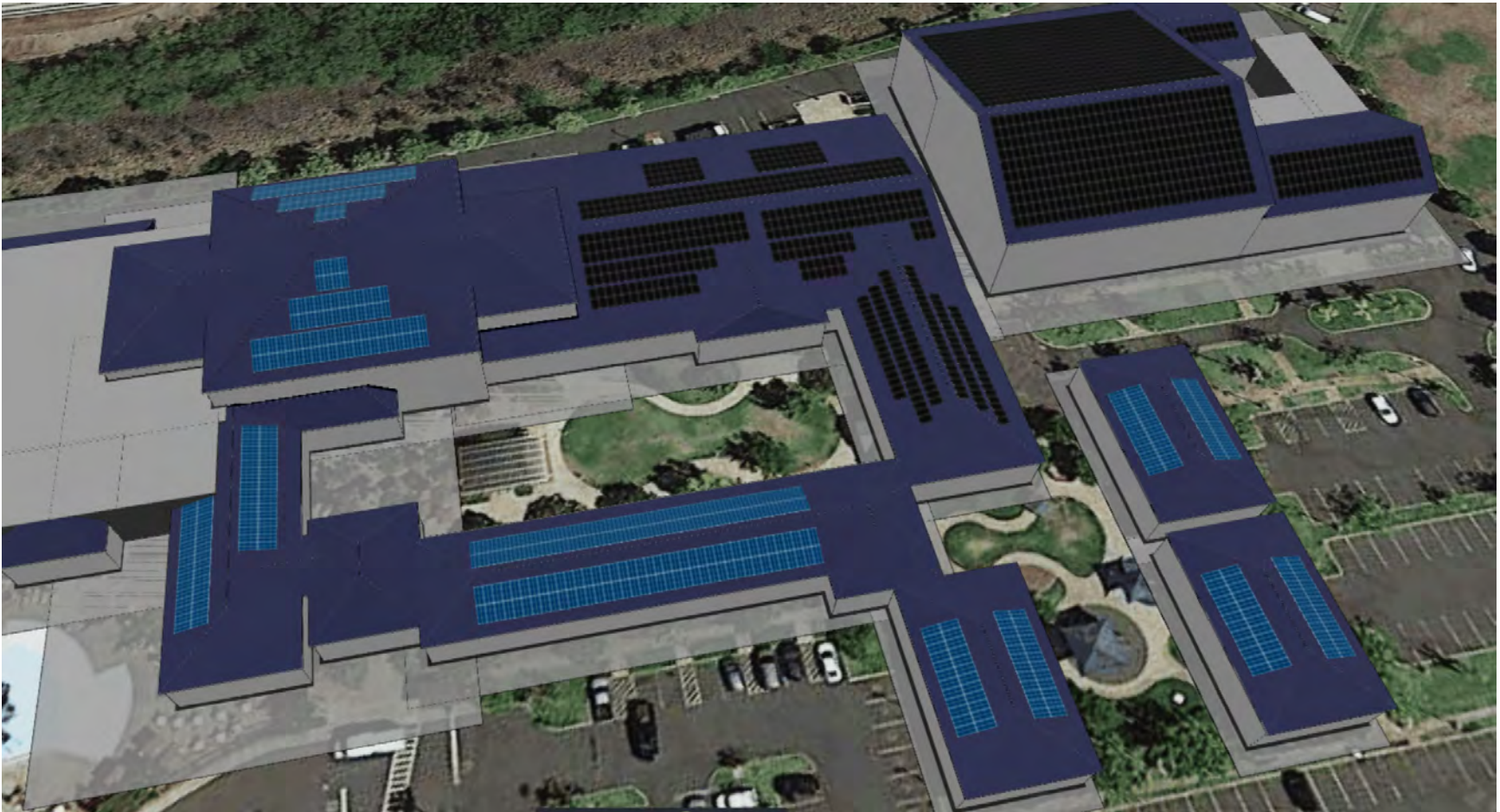
At least 400 panels each at the Waikiki Community Center

Waialua High Solar Panel Design Estimate



At least 400 panels at the Waialua High and Intermediate School

Kroc Center Solar Panel Design Estimate



Estimating that it already has about 1500 PV panels (black ones), there's enough space to add another 500 panels (blue ones).