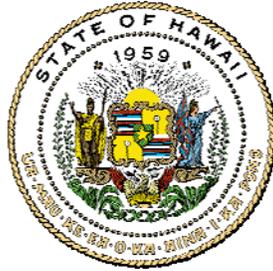


State of Hawaii



**PHOTOVOLTAIC WORKING GROUP REPORT
TO THE
GOVERNOR AND THE LEGISLATURE
OF THE
STATE OF HAWAII**

Pursuant to
Act 198, Session Laws of Hawaii 2011

*Submitted For the Photovoltaic Working Group
By The State of Hawaii
Department of Business, Economic Development and Tourism*

December 23, 2011

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I. Introduction

This report is submitted to fulfill the reporting requirement of the Photovoltaic Working Group pursuant to Act 198, Session Laws of Hawaii 2011, relating to determining the feasibility of requiring all new single-family residential construction to incorporate design elements and minimal equipment installation to make the structure photovoltaic-ready at the time of initial construction. The report is submitted for the Photovoltaic Working Group by the State of Hawaii Department of Business, Economic Development and Tourism (DBEDT).

The Legislature in passing Act 198(11), believed that as the cost of photovoltaic systems fell, the installation of residential photovoltaic systems would become increasingly cost-effective. However, it found that installation of these systems on existing structures can be hindered by initial construction design features that limit the physical space available for installation of photovoltaic systems and related equipment. Consequently, the Act seeks consideration for a policy requiring all new single-family residential construction to incorporate design elements and minimal equipment installation to make the structure photovoltaic-ready at the time of initial construction to facilitate the widespread adoption of photovoltaic systems. The Legislature reasoned that a policy containing photovoltaic-ready requirements would ensure that new residential construction would be designed to reap the maximum benefits of future solar technology installation, thus reducing the potential cost-recoupment periods after solar technologies are installed. Also, that widespread adoption of solar technologies on residential buildings would result in reduced energy demand and reduced greenhouse gas emissions.

The Act establishes a working group to study the feasibility of requiring all new single-family residential construction to incorporate design elements and minimal equipment installation to make the structure photovoltaic-ready at the time of initial construction.

II. Photovoltaic Working Group

The Act calls for and is comprised of the following as members of the Photovoltaic Working Group:

Appointments:

- Hawaii State House - Representative Denny Coffman
- Hawaii State Senate - Senator Mike Gabbard
- Representing DBEDT Director - Ms. Estrella Seese
- State Building Code Council - Mr. Timothy Hiu
- Photovoltaic industry - Mr. Rick Reed
- Photovoltaic industry contractor-builder - Mr. Michael Fairall

Representatives:

- City & County of Honolulu, Department Planning and Permitting - Mr. Glenn Yokomichi
- County of Hawaii, Department of Public Works, Building Division - Mr. Neil Erickson
- County of Kauai, Public Works - Mr. Brian Inouye
- County of Maui, Public Works - Mr. Ralph Nagamine
- Hawaii Association of Realtors - Ms. Sharon Au

Elected as Chairperson for the Photovoltaic Working Group was Senator Gabbard.

III. Work Group Objective

The Photovoltaic Working Group's objective, as established by the Act, is to consider strategies for facilitating the widespread adoption of photovoltaic systems, such as:

1. The incorporation of specific design elements in new residential structures to make the structures photovoltaic-ready;
2. Minimal retrofitting and equipment installation for future photovoltaic accommodation;
3. Blueprints and labeling that detail photovoltaic system accommodations and connections;
4. Identifying areas in the State where the use of photovoltaic systems would be impractical or where other renewable energy resources are more readily available; and
5. Any other issues the Photovoltaic Working Group considered appropriate.

IV. Work Group Findings

The Work Group's discussions resulted in the following findings in consideration of strategies one (1) through five (5) for facilitating the widespread adoption of photovoltaic systems:

1. *The incorporation of specific design elements in new residential structures to make the structures photovoltaic-ready.*

- Premise that having houses photovoltaic-ready would lower entry costs versus the costs that would occur later if no photovoltaic-ready preparations were made. Also, that initial construction could make for a better installation, account for aesthetics, and would be more costly to do after market.
- Mandating design elements to make structures photovoltaic-ready required consideration of other issues:
 - i. What if there was not enough sunlight to justify pre-installation for photovoltaic?
 - ii. What if wind was a viable alternative to photovoltaic? Would you be limiting homeowners to one energy source?
 - iii. That new single-family residential homes made up only a small amount of the supply of houses.
 - iv. Whether there would be equitable treatment between the small homeowner versus the big developer as the photovoltaic, as well as other renewables threshold on the grid is approached?
 - v. Need to consider solar access, roof pitch, and roof structural integrity in the design for PV accommodation.
- Each County building department would need to know what elements comprise photovoltaic-ready installations and examine the plans for incorporation.
- That standards need to be applied for uniformity in developing photovoltaic-ready houses.

2. *Minimal retrofitting and equipment installation for future photovoltaic accommodation.*

- Photovoltaic-ready legislation was giving preference to one renewable source, and that it could serve to restrict consumer choice via legislative mandates.
- Photovoltaic systems with tax incentives provide for a need, which installers will continue to do installations whether the group adopts anything or not.
- State Building Code has generic design parameters applicable to photovoltaic structures for both new development and retrofits. House orientation and wind loads are redundant to codes that are already in place with standards and ordinances.
- Legislation sought to offset photovoltaic installation costs, but photovoltaic-ready installations could be negated by consumer choice to not use the installations, by

developers who choose to fully incorporate photovoltaic systems, and by custom builders incorporating systems beyond the mandate. What is left is a small percentage of consumers for which photovoltaic-ready may be appropriate.

- Consumer and/or developer choice may preclude the use of pre-installed photovoltaic-ready preparations.
- Tax credits seemed to incent behavior that does not take place in their absence. We already have a significant tax incentive and it is substantially more important in inciting behavior that we want. The tax credit is a buying signal.
- As technology improves the mandated equipment installation could become obsolete and non-usable unless retrofitted for future building codes. There actually could be no cost savings, but rather additional costs imposed due to pre-installation of photovoltaic mandated equipment.
- As electric vehicles become more commonplace that photovoltaic system size will be impacted.
- Cost savings in construction is less in Hawaii due to the use of wood for housing.
- Out-of-pocket costs for homeowners may be negligible if instead of buying a photovoltaic system; they buy the power back from a vendor owned and installed system. Also, that power purchase agreements may allow the commercial entity advantages (write off of electric bill) that may not be available to homeowners.
- Need to ensure a process where more and more people will want to interconnect and can interconnect.
- The market may be quicker to effect future technology versus mandates.
- Estimates to pre-install conduit between a distribution panel to a J-box in the attic from two installers ranged from a low of \$250 to a high of \$500. If these costs are representative then the materials cost to make a home photovoltaic-ready won't save much.

Labor to complete the photovoltaic installation will comprise a larger portion of the expense. Also, a developer's process may be more efficient, so that varying how a home is made PV ready may cause it to be more costly.

- A concern that the profit margin for photovoltaic-ready homes could be higher if the developer was not required to discount for these installations. A real possibility is that the homeowner will not realize a reduction in the cost of installation.

3. *Blueprints and labeling that detail photovoltaic system accommodations and connections.*

- Blueprints and labeling important in identifying the installation components in a photovoltaic-ready construction. Better to have installation spelled out in plans and be available.

4. Identifying areas in the State where the use of photovoltaic systems would be impractical or where other renewable energy resources are more readily available.

- Solar mapping was deemed critical in determining where photovoltaic is appropriate and providing consumers a decision point for wise investment choices.
- There's a lot of solar mapping under development, but until it's available and in a more user friendly format, it is difficult to evaluate. Since solar maps are not accurate, it has led to applications for variances due to cost considerations.

5. Any other appropriate issues.

- Roof plans integrating competing uses.

V. **Work Group Recommendations**

The Work Group offered five recommendations for consideration, which were voted upon by the members. See Table below.

				RECOMMENDATIONS
	AYE	NAY	ABSTAIN	
#1*	5	1	1	No legislative action or recommendation should be taken at this time.
#2**	1	5	1	Developers shall be required to include in all new homes sealed conduits flush with the roof, from the most suitable location on the roof to the home's electrical panel and that the electrical panel be sized to accommodate potential PV generation.
#3***	2	3	2	Require that all new state or county buildings be made PV-ready through the inclusion of sealed conduits from the most suitable location on the roof to the buildings electrical panel and that the electrical panel be sized to accommodate potential PV generation.
#4	7	0	0	Make recommendations to builders, rather than mandate; in the form of a resolution, e.g. consider orientation of house, have adequate flat roof area, and conduits with roof penetration and route to distribution panel, standoffs.
#5	----	----	----	#4, but just as a report, not a resolution.

* Nay – Gabbard; Abstain - Seese

** Nay – Coffman, Au, Hiu, Reed, Erickson; Abstain - Seese

*** Nay – Coffman, Au, Reed; Abstain – Hiu, Erickson

VI. Legislative Resolution

A legislative concurrent resolution of recommended initial construction elements for incorporation of photovoltaic systems in home developments is attached for the Legislature's and builders' consideration.