

EACP Committee

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Attachments: Maui County Council Energy Code v2 ay.pptx

For presentation to Environment, etc, committee tomorrow afternoon.

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Hawaii's 2015 Energy Code: The Next Big Step

Howard C. Wiig

Energy Analyst
Hawaii State Energy Office

The Environmental, Agricultural and Cultural
Preservation Committee, Maui County Council

January 29, 2019



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Energy Office

IEA Touts Energy Code Benefits

Energy codes are “...the single most important step (in tackling climate change) I want governments to take- and they can take it tomorrow”

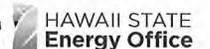
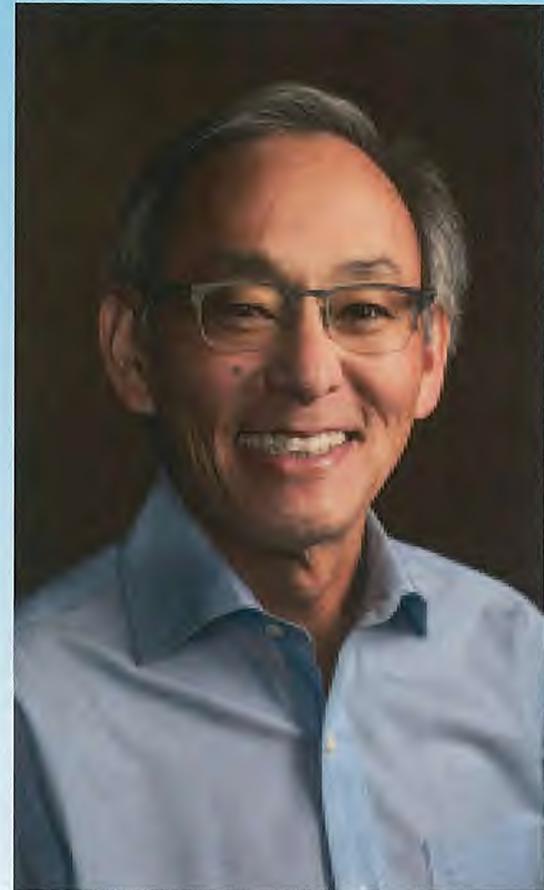
Fatih Birol -- Executive, Director, International Energy Agency



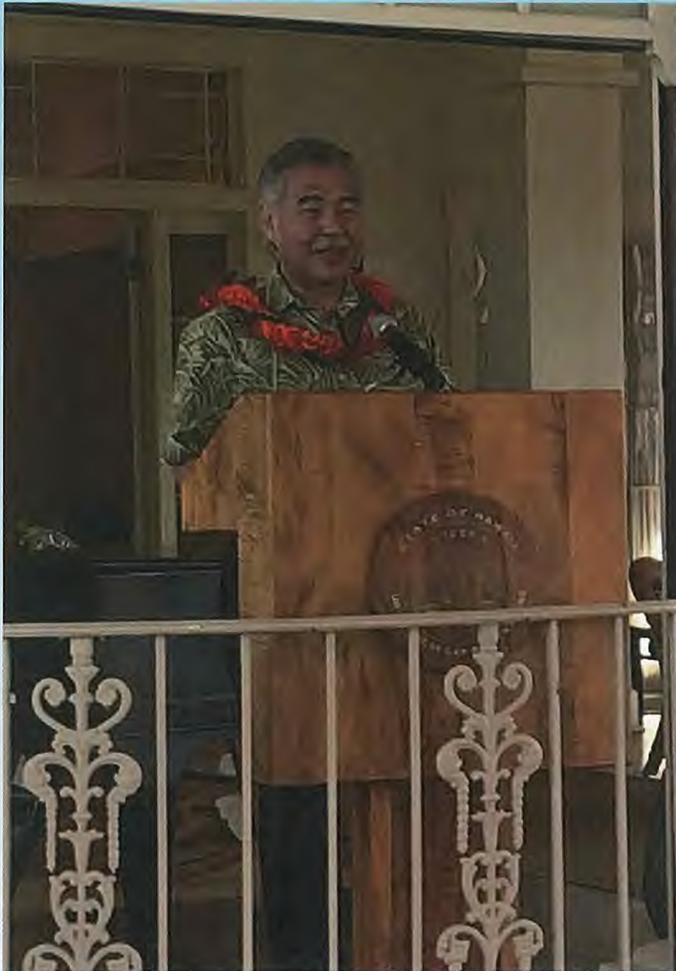
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Nobel Prize Winner Stephen Chu on Energy Codes

- Efficient buildings reduce America's fossil fuel use by as much as 33%.
- Efficiency is cheap--about \$12/barrel
- Efficiency offers more energy than solar, wind and nuclear combined.



State Government Leads the Way on Energy Codes



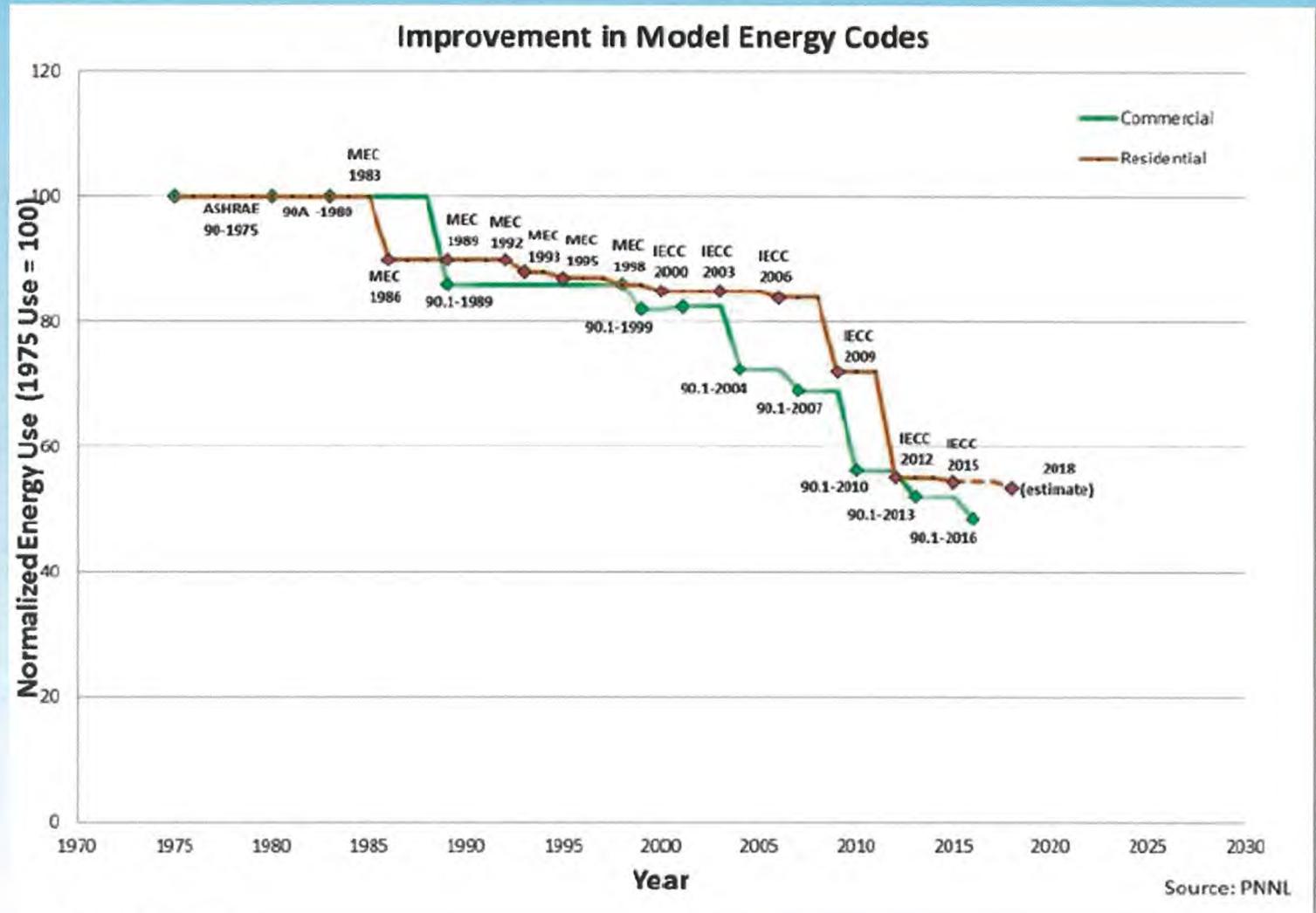
“We know that the greatest energy savings in residential electricity sector will come from reducing demand, increasing comfort and natural ventilation and eliminating electric water heaters. That’s why I approved the update to the international energy conservation code for the construction of state buildings because I always believe that leading by example is a good thing.”

-- Governor David Ige



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Energy Codes Boost Efficiency

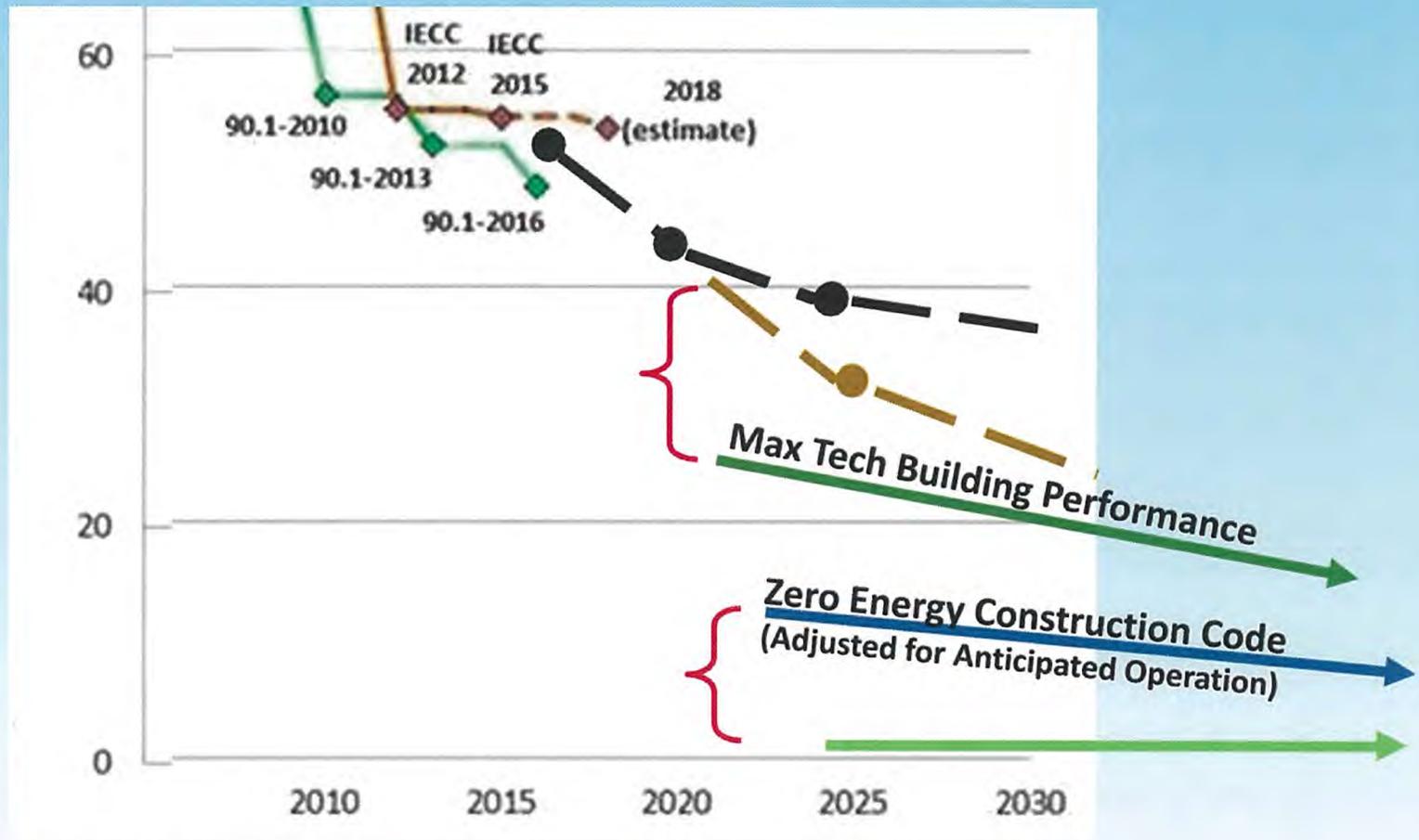


New Building Institute



HAWAII STATE Energy Office

Code Progression to Zero



New Building Institute



DBEDT
STATE OF HAWAII • DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

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IECC 2015: “The 50 Percent Solution”

- At national code hearings, IECC 2009, IECC 2012 and IECC 2015 goals were met
- IECC 2015 is 32% more efficient than IECC 2006
- The ideal tropical home will achieve a 48% reduction



Hawaii: 2006 IECC vs 2015

- The Hawaii Building Code Council (Council) was formed in 2007 and adopted 2006 IECC in 2008.
- Hawaii's IECC amendments have created a completely unique code
- Hawaii “leapfrogged” from 2006 IECC to 2015 IECC and added a Tropical Code



Changes in Commercial Code

Commercial Buildings

- Improved section on building commissioning
- Increased requirements for daylighting, lighting controls, and allowed lighting power densities.
- Allowed reroofing without adding new insulation if certain conditions are met.
- Sub-metering required for tenant spaces.



Changes in Residential Code

Residential Buildings

- The new Tropical Zone option provides section provides a path to high energy savings and reduced construction costs
- Minimum number of high-efficacy electrical lighting fixtures increased from 50% to 75%
- Minimum roofing insulation of R13 required
- Points option section added to increase compliance flexibility.



Cost Impacts

- Commercial Buildings - 33-40% energy savings over the 2006 Hawaii Energy Code (2014 study by Britt/Makela Group)
- Residential Buildings - Life-cycle cost savings of \$12,600 over the 2006 Hawaii Energy Code (2016 study for U.S. Department of Energy)



Hawaii's Tropical Zone Code -- Start from Scratch

- An option to 2015 IECC: Either production building path or tropical building path
- Emphasis on shading and minimizing interior space
- Projected low cost and low Energy Use Index

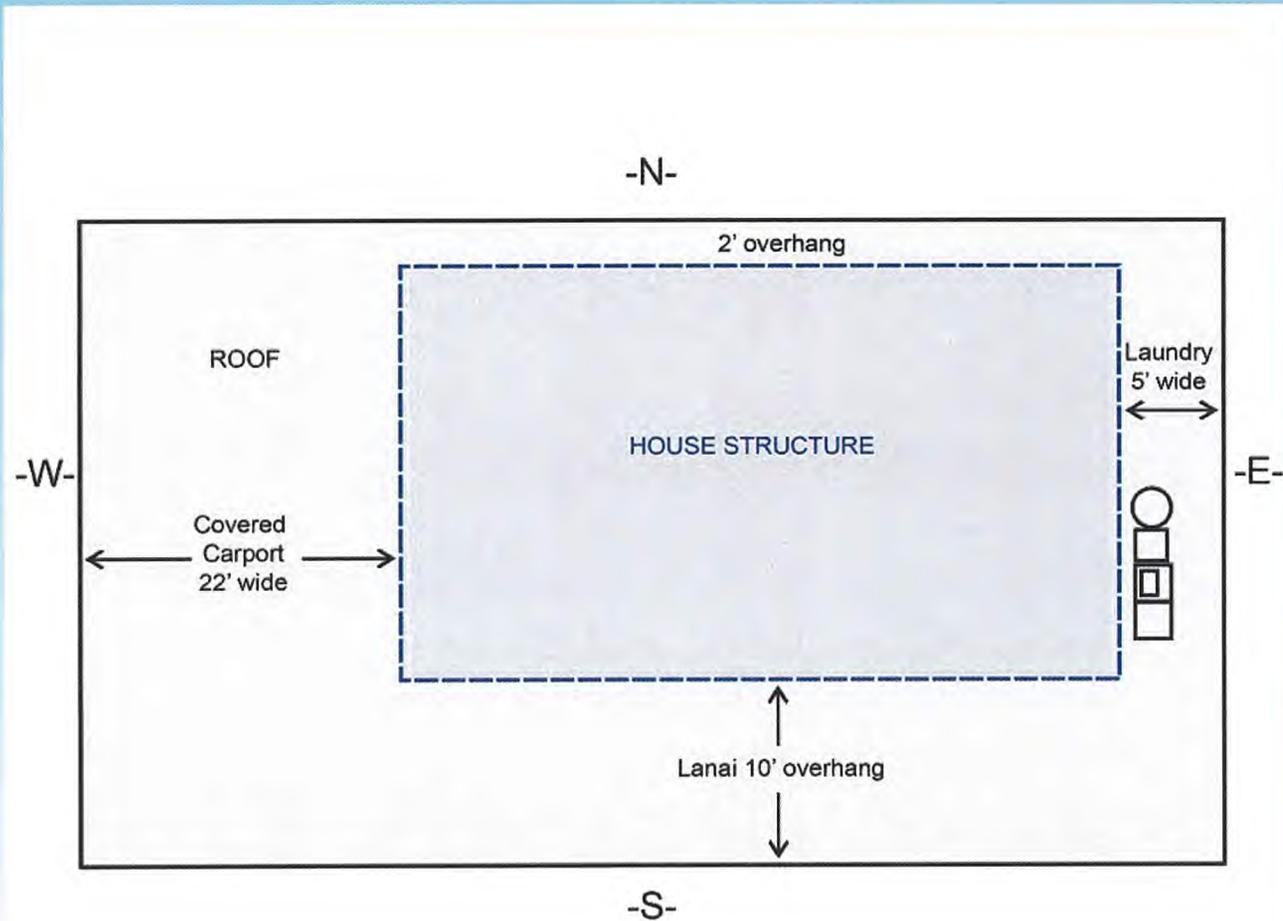


Tropical Ideal

- Smaller interior space
- Larger outdoor covered space
- Energy Star appliances, cable boxes and real time energy monitors
- Photovoltaics, solar hot water heating and attic fans
- Good cross ventilation and ceiling fans



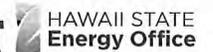
Tropical Code Overhead View: Small Interior, Large Exterior



Jalousies are Integral to the Tropical Design



Plantation-style Design is Suited to Hawaii's Climate



Striving for Net Zero

DEPARTMENT OF HAWAIIAN HOMELANDS KAUPUNI VILLAGE

Sustainable Materials

Recycled and low-carbon concrete

Climate-Resilient & Low-Water Solar Panels

Resistant to salt and high humidity

Clear Anodized Aluminum Cladding Material

High-UV resistant and minimizes heat absorption through the roof

Perforated Concrete Driveways

Perforated concrete driveways designed to reduce the amount of water runoff and improve drainage

High-Performance Coating

Protects the roof from UV rays and salt

Self-Cleaning Glass

Reduces heat gain through the roof

Insulation Board

Reduces heat gain through the roof and minimizes heat loss

High-Efficiency Windows

48% energy-efficient windows

Low-Emissivity Roofs

Roofs with low emissivity reduce heat gain and loss

Lighted Entryways

Lighted entryways reduce the need for interior lighting



Net Zero Energy

Location: Honolulu, Hawaii, USA

Kaupuni Village is a net-zero energy community applying the sustainable design strategies of Passive House and Regional Energy. The design includes solar energy efficiency, solar and battery storage, and a residential energy center to monitor and manage energy production and utilization. These affordable homes will also be constructed with recycled materials ranging from gypsum and steel to concrete and exterior finishes such as stone and metal mesh. The development also includes a car off the grid community center that is powered by its own solar and battery storage. The site plan and program are being designed, modeled, and packaged in the community center building and parking lot. The site plan is also planned.



Affordable?

- No air conditioning
- Reduced wall insulation when shaded
- No SHGC requirements when shaded
- No enclosed garage
- Small interior, large shaded exterior



Mahalo

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