

NARUC 2015

SUMMER COMMITTEE MEETINGS -

Modern Utility / Modern Regulation

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Hawaii Public Utilities Commission
July 12-15, 2015



Policy and Regulatory Reforms to Achieve Hawaii's Clean Energy Future

- ▶ Recent directives and orders to Hawaii's utilities to implement new business models to become a world leading operator of a high renewable energy resource grid
- ▶ Regulatory policies and pricing also need to reflect these new business models with new incentives to achieve Hawaii's clean energy future
- ▶ Review and revision of pricing of energy services to reflect new business and technical demands

Recent Major Decisions and Orders to Implement the Integrated Grid

- ▶ Integrated Resource Planning Docket No. 2012-0036, Order No. 32052
 - ▶ White Paper entitled: “Commission’s Inclinations on the Future of Hawaii’s Utilities” which outlines the vision, strategies and regulatory policy changes required to align new utility business models with customer’s changing expectations and state energy policy
 - ▶ Provided specific guidance for future energy planning and review, including strategic direction for capital investments in the integrated grid of the future

- ▶ Reliability Standards Working Group Docket No. 2011-0206 Order No. 32053
 - ▶ Adopted recommendations from the RSWG working group final work product for integrating utility scale and renewable energy resources in reliable and economic manner
 - ▶ Specific directives for actions to lower energy costs, improve system reliability and addressing emerging challenges to integrate additional intermittent renewable energy
 - ▶ Directed the utilities to prepare energy storage utilization plans for all island grids to be included in Power Supply Improvement Plans requirements

- ▶ Policy Statement and Order Regarding Demand Response Programs Docket No. 2007-0341 Order No. 32054
 - ▶ Specific guidance concerning the objectives and goals for demand response programs as distributed energy resources to be used by the utilities as generation resources
 - ▶ Requires integrated demand response portfolio that will enhance system operations and reduce electricity costs to customers
 - ▶ Required utilities to address using distributed energy storage and customer sided storage including electric vehicles for demand response

- ▶ **CUSTOMER CHOICE AND EMPOWERMENT**
- ▶ Key policy directive to involve the most important stakeholder - the customer
- ▶ Customers are active partners in the transformation of the utilities of the future
- ▶ Customer side and customer sited technologies including distributed generation, distributed energy storage systems and EVs support the grid of the future
- ▶ “Integrated energy districts” or microgrids directly assist in integration of more cost effective renewable energy onto the grid with DER while providing resiliency and reliability benefits

Envision the Integrated Grid of the Future

- ▶ Hawaii is the living laboratory for the integrated grid of the future
- ▶ Implementing real time DER actions and combining the tools of both traditional central plant and decentralized distributed generation models
- ▶ Implementing new programs to give all customers access to renewable energy
- ▶ On Bill Financing to focus on low income, renters and non profits ability to acquire energy efficiency equipment like solar water heaters and HVAC systems
- ▶ Green Infrastructure Financing program to focus on low income and hard to reach customers in underserved markets and provide ability to acquire distributed PV, energy storage systems and energy efficiency equipment with low cost financing through funding from securitized bonds

Hawaii Electric Systems

4 electric utilities; 6 separate grids

Kauai Island Utility Cooperative

27 MW PV (24 MW in development)

System Peak: 78 MW

Customers: 32,700

Maui Electric

Maui: 60MW PV / 72MW Wind

System Peak: Maui 200 MW

Lana'i: 1MW PV

System Peak: Lana'i: 5 MW

Moloka'i: 1.2 MW PV

System Peak: Moloka'i: 5.5 MW

Customers: 68,000

Hawaiian Electric

221 MW PV / 100 MW Wind /

69 MW WTE

System Peak: 1,100 MW

Customers: 300,000

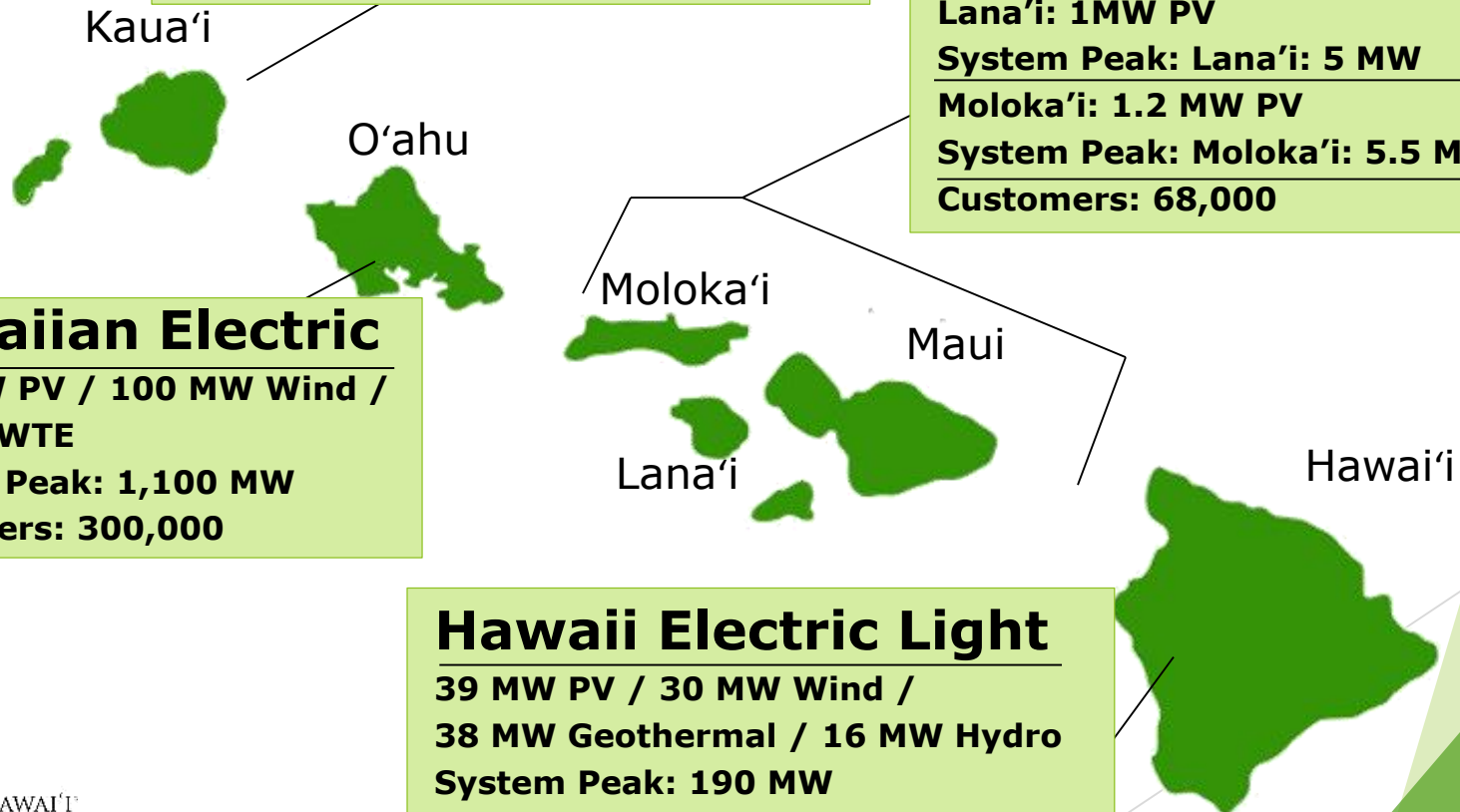
Hawaii Electric Light

39 MW PV / 30 MW Wind /

38 MW Geothermal / 16 MW Hydro

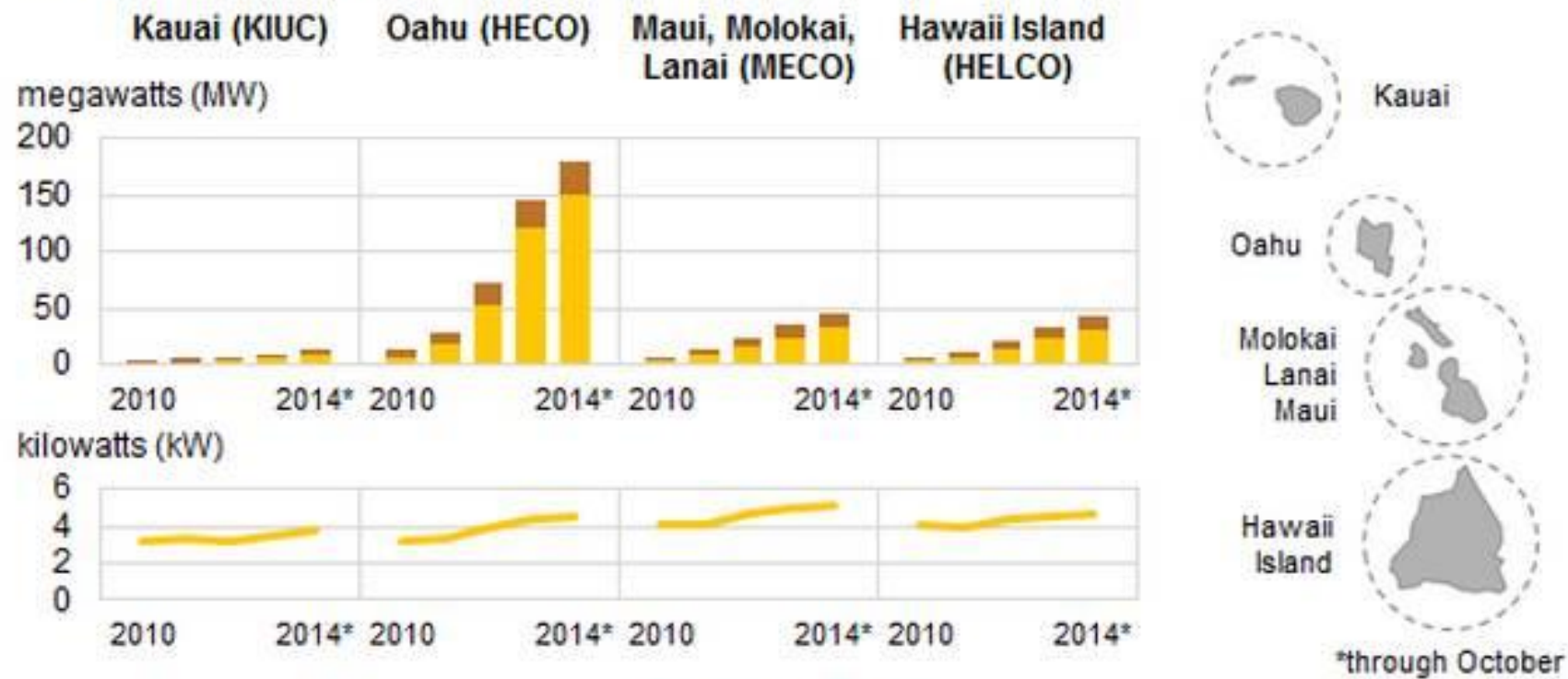
System Peak: 190 MW

Customers: 81,000





Residential (■) and commercial (■) net-metered solar PV capacity in Hawaii; average residential solar PV system size (—)



Source: U.S. Energy Information Administration, [EIA-861](#) and [EIA-826](#)

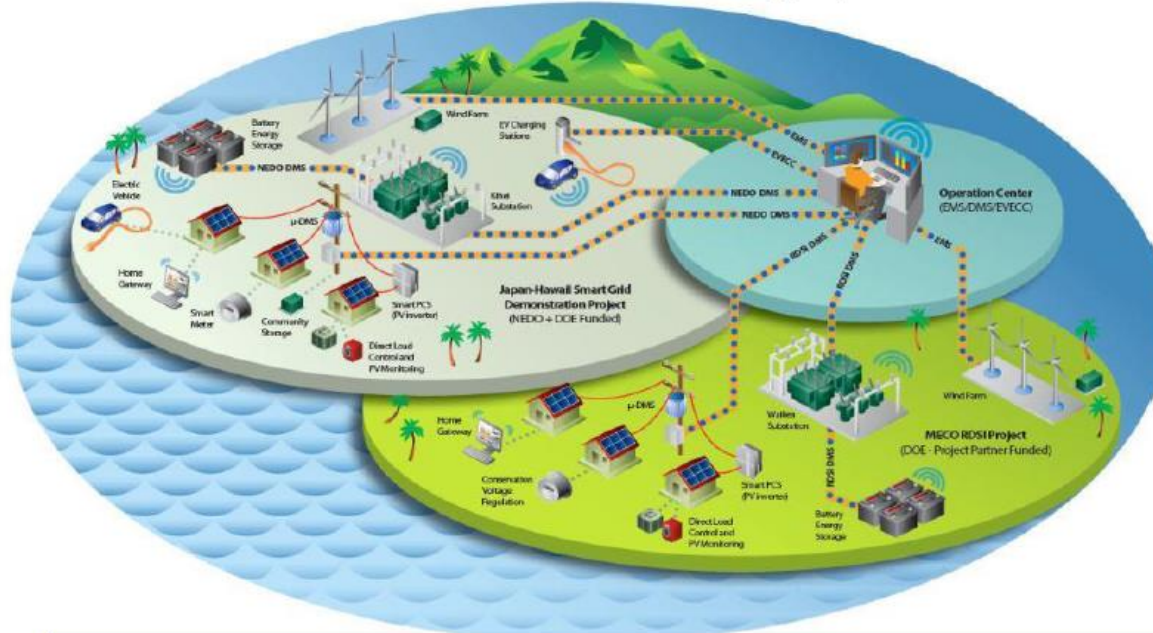
Note: Average residential solar photovoltaic (PV) system size calculated by dividing total installed capacity by number of meters. [HECO](#), [MECO](#), and [HELCO](#) are subsidiaries of Hawaiian Electric Industries Inc.; [KIUC](#) is an independent electric cooperative.

Hawaii Battery Energy Storage System (BESS) Projects; RFPs

Title	MW	MWh	Date
Kauai Island Utility Cooperative Koloa BESS	1.5	1	2011
Kauai Island Utility Cooperative Port Allen BESS	3	2	2012
Lanai La Ola Solar ... for 1.2 MW PV (solar) on 5 MW grid	1.125	0.5	2011
Kaheawa Wind I ... 1 st (30 MW) wind on 200 MW grid	1.5	1	2009
Auwahi Wind ... 2 nd (22 MW) wind on 200 MW grid	11	4.4	2012
Kaheawa Wind II ... 3 rd (22 MW) wind on 200 MW grid	10	20	2012
Maui Electric / USDOE Smart Grid BESS ... Wailea	1	1	2013
Hawi Substation ... for high wind penetration circuit	1	0.25	2012
HELCO Battery Energy Storage System ... utility owned	(2) 0.1	(2) 0.25	2012
Kauai Island Utility Cooperative Anahola BESS 6MW/4 MWh system; targeted for Fall 2015 completion			
HECO Energy Storage RFP ... 60 to 200 MW for Oahu. Finalists selected; targeted for 2017 completion			

Outline of JUMPSmart Maui

In Maui, large scale renewable energy (72MW of wind and 40+ MW of distributed PV) has been introduced. In addition, EV high penetrations are expected soon.



Issues

- Excess Energy
- System Frequency Impact
- Distribution Line Voltage Impact

Solutions

- Integrated DMS
- μ DMS & Smart PCS
- EV charger control
- Battery system
- Direct Load Control
- ICT Platform

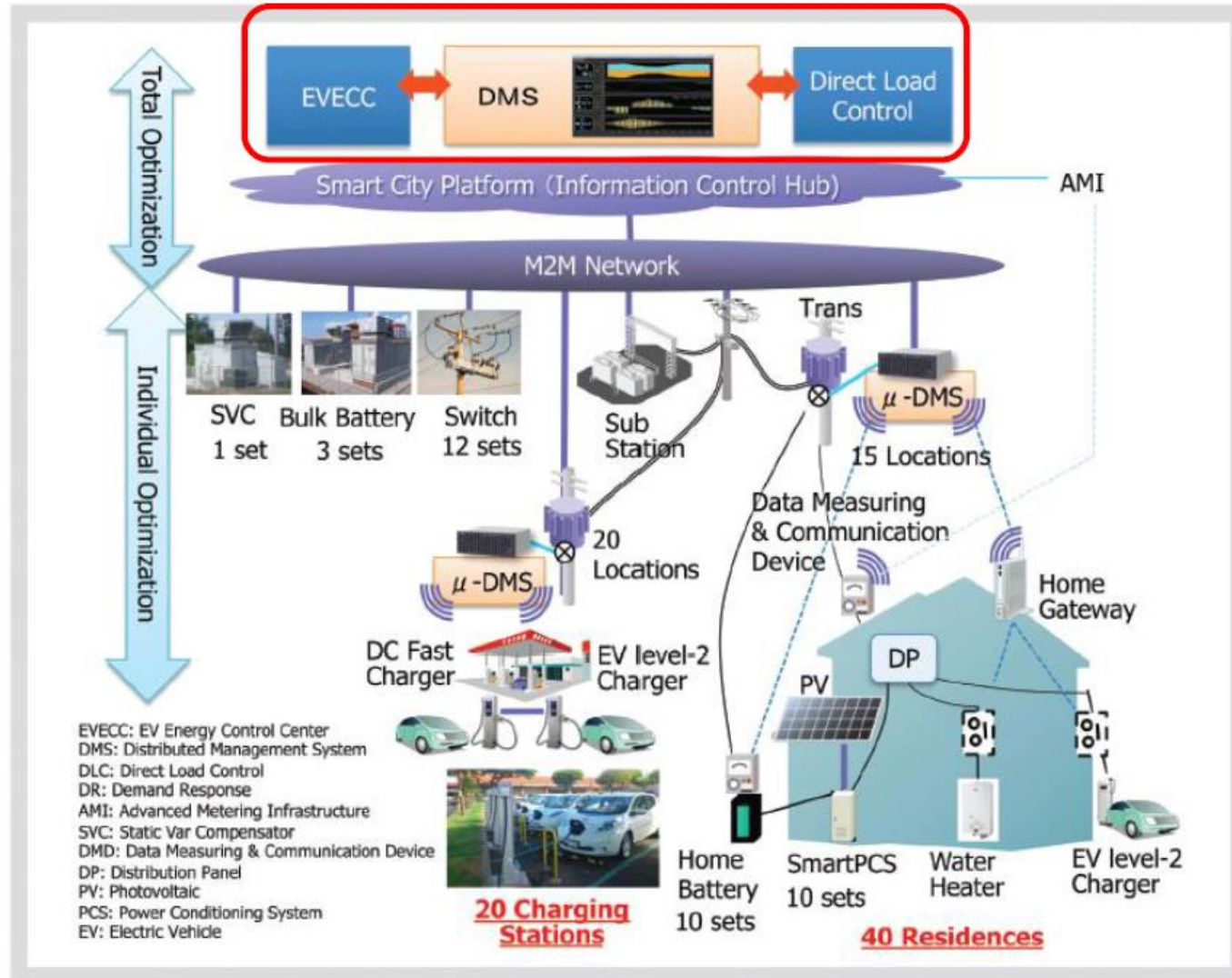
Basic Policy for Demonstration

Maximize Utilization of Renewable Energy (RE)

Stable Supply of Electric Power

Solution for Impact of EV & PV High Penetration

Overall View of System Configuration



Mahalo!

For any questions, please contact:

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