


Hawaiian Electric Company, Inc.

Demand Response: A Reliability Tool Today; A Renewable Integration Tool Tomorrow

Dave Waller, VP Customer Service
Hawaiian Electric Company




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EnergyScout Programs

HECO's Direct Load Control programs designed to provide immediate, automated customer response to unplanned system-wide emergencies



- EnergyScout for Business
- EnergyScout for Homes



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Residential Direct Load Control

How RDLC Works



- \$3 per month bill credit
- Installed at no-charge
- Cancel participation at any time



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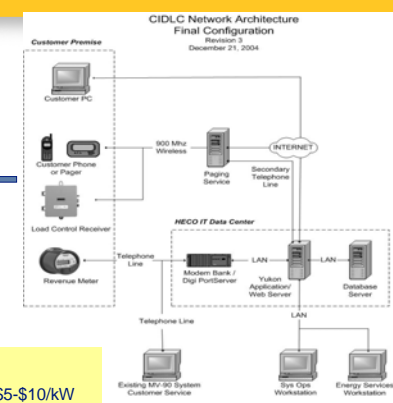
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Commercial & Industrial DLC

Back-up Generators

Interruptible Loads

- Heat Pumps
- Chillers
- Pumps
- Lights
- Industrial Processes




**CIDLC Network Architecture
Final Configuration
Revision 3
December 21, 2004**

Incentives:

Demand Reduction \$5-\$10/kW

Energy Reduction \$0.50/kWh



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Energy Scout for Busineses

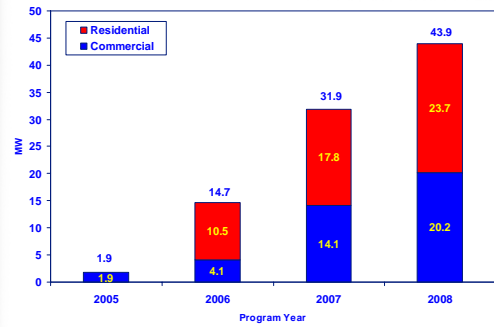
- Incentives to curtail use during critical peak periods
 - Identify non-essential interruptible loads
 - Utilize customer emergency generators
- Applies to customers with 200 kW to 10 MW of interruptible demand
- 41 Oahu Commercial Customer enrolled today



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EnergyScout Curtailable Load



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EnergyScout Programs

- Residential EnergyScout customers contribute over 23 MW!
- Commercial EnergyScout customers contribute over 20 MW!
- At 43 MW, that's nearly half the size of HECO's new power plant



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Hawaii Clean Energy Initiative

- Prospect to be stable financially with new 'regulatory compact'
- Focus on service & efficiency, not sales
- Committed to
 - RPS 40 percent/2030
 - 1,100 MW of new RE energy
 - Feed-in tariff, NEM





Renewable commitment

Large & mid-size wind projects Biofuels

- Waste-to-energy; biomass; land crops & algae

Solar power

- Customer sited & utility scale

Geothermal

Ocean power

- Seawater A/C
- Wave Energy
- OTEC



'Big Wind' agreement

Oahu has largest population & power demand but few renewable Resources

On Lanai, Castle & Cooke planning, 200+ wind farm MW

On Molokai, First Wind Hawaii planning 200+ MW wind farm

State to build inter-island cable to bring power to Oahu



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Implications of Wind Expansion

- **Load profiles & wind generation usually do not align**
- **Forecasting wind generation uncertain**
- **Mitigation measures include:**
 - Develop wind forecasting techniques
 - Place constraints on wind power facilities
 - Increase regulating reserves
 - Expand Direct Load Control



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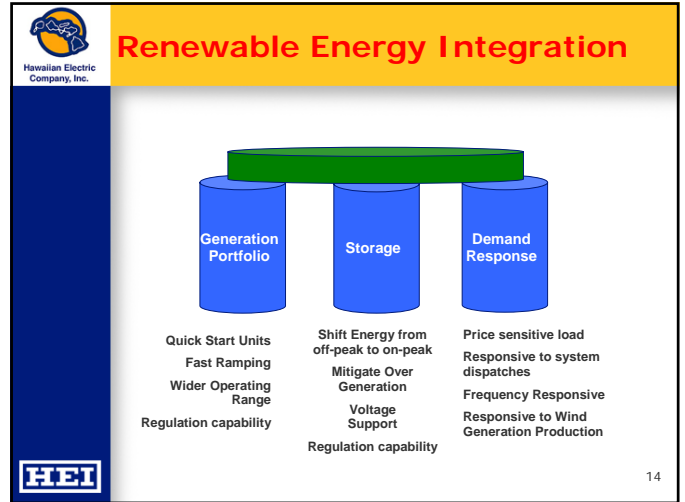
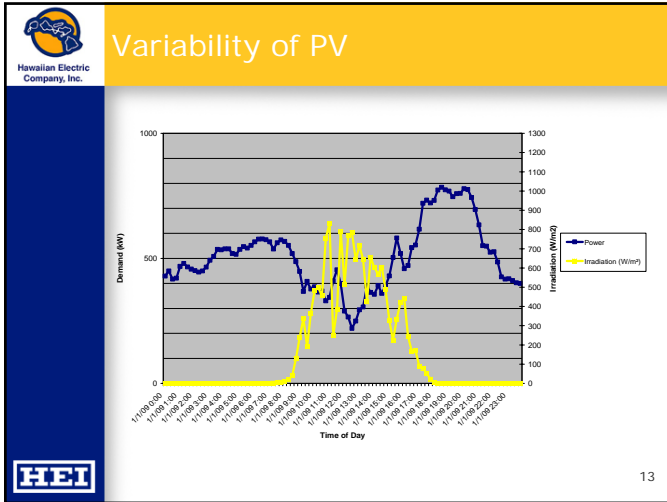


Putting the February 2008 ERCOT Events into Perspective

- Geographic diversity limit the speed that wind events propagate.
 - February 26, 2008 - three hours to drop 1,500 MW.
 - February 24, 2007 - two hours to drop 1,500 MW.
 - AES Truewind reports that ERCOT can expect:
 - less than one 2,800-MW, 30-minute drop per year - 15,000-MW wind
 - 2-4, 1,300-MW, 30-minute increases or decreases
 - Experience in Other Regions
 - Denmark: 2000 MW (83% of capacity) decrease in 6 hours - 1/8/05
 - Germany: 4000 MW (58% of capacity) decrease in 10 hours - 1/24/04
 - Portugal: 700 MW (60% of capacity) decrease in 8 hours - 6/1/06
 - Spain: 800 MW (7%) increase in 45 minutes
- Conventional generation contingencies require dedicated spinning reserves and immediate response (2300 MW of ERCOT Responsive Reserve Service).
- Multi-hour wind ramps give the system operator time to utilize **load response**, supplemental reserves, or non-spinning reserves.



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Electrify transportation

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- EVs are key to reducing fossil fuel use
- Plug-in Electric Vehicles; more efficient, cleaner & less expensive than ICE vehicles using gasoline
- Ideal Demand Response candidate

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Demand Response

Key Link for Renewable Integration

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- Capabilities of Demand Response to improve reliability well proven
- Should be considered as option for as available renewable integration
- Plug in hybrids and EV's
 - Off Peak Load for as available renewables
 - Demand Response well suited for EV

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Thank you!

**Further questions:
dave.waller@heco.com**

