

Sandia National Labs Hawaii Clean Energy Initiative Projects

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Hawaii Clean Energy Initiative

- Partnership between DOE's OE and EERE offices and the State of Hawaii
- Goal – Meet 70% of Hawaii's energy needs with renewable energy and energy efficiency by 2030
- Many stakeholders involved including SNL, NREL, developers, policy makers, county offices, utilities, HNEI, University of Hawaii, etc.

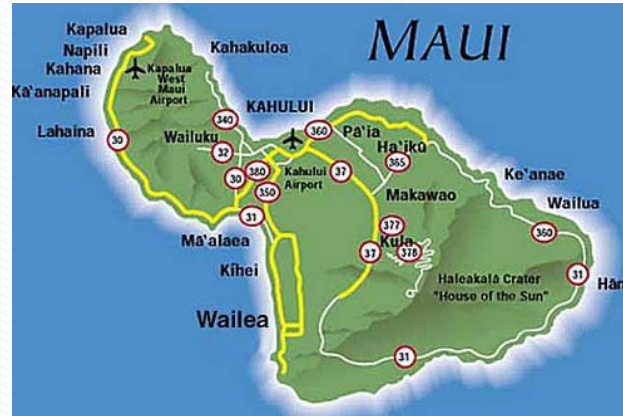
Sandia HCEI Presence in Hawaii



2010 Current Projects

300k from Office of Electricity (OE)

Maui Dynamic Simulation Energy Model - supporting Island of Maui's 95% renewable goals

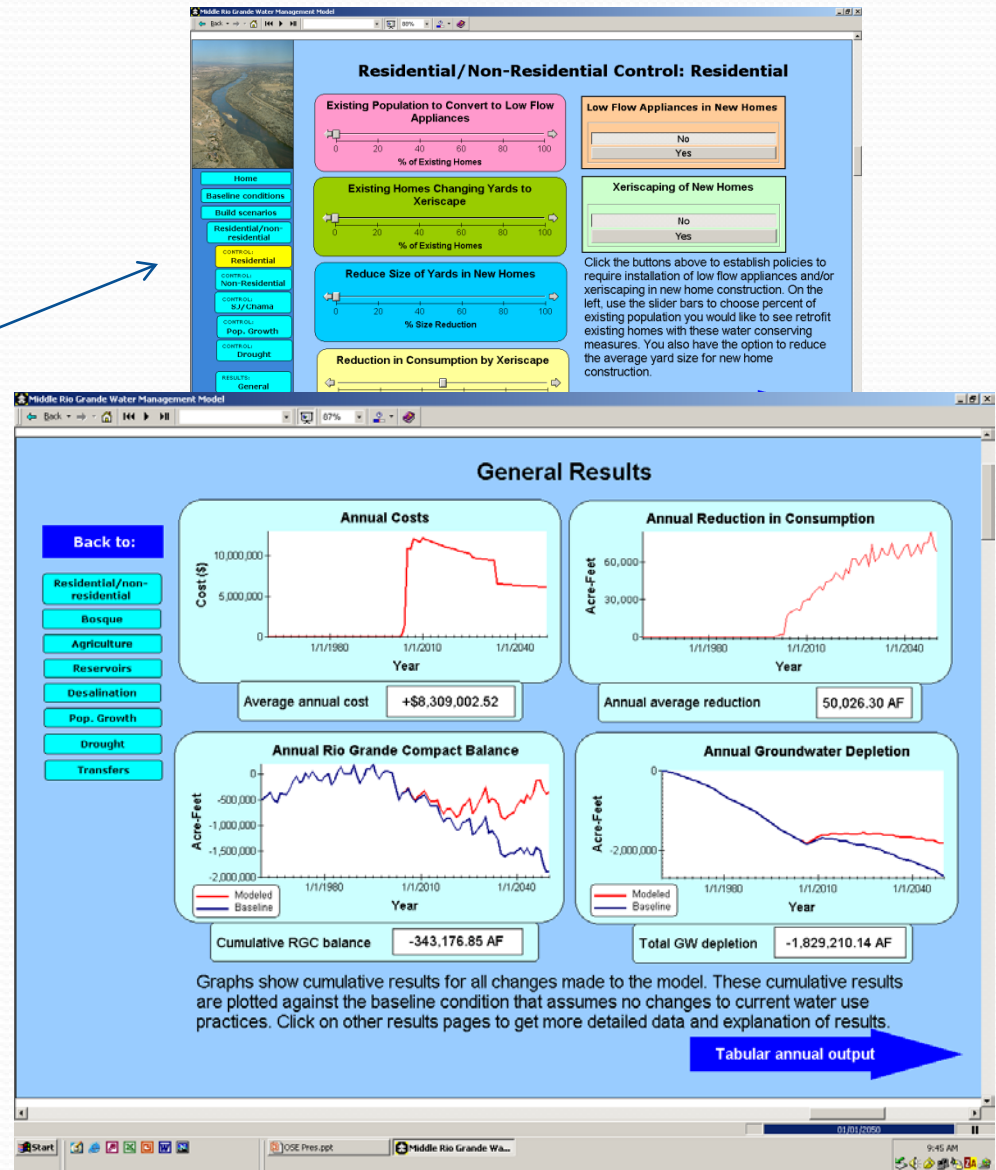


Technical Assistance to HCEI stakeholders for projects that will help Hawaii meet their renewable energy goals



Dynamic Simulation Modeling

- The models are developed in a software tool called Powersim Studio 8
- Provides interactive environment for scenario testing
- Lets the end user examine relationships between variables and constraints over time
- PC based
- User friendly interfaces
- Computations in seconds to minutes
- Not just a model, it's a process
 - Decision-makers and stakeholders help with model development and decision analysis
 - Expands knowledge base, stimulates group learning
 - Encourages group discussion
 - People that will be using the model play a role in the model development



Maui Dynamic Sim Energy Model

- Kick off meeting October 26, 27 (last week!)
- 25+ team members from Maui County, Maui Economic Development Board, State of Hawaii (DBEDT), MECO
- Based on Maui County Energy Development Plan
- Len Malczynski and Tom Drennen from SNL are the experts on the project
- The goal of the kick off meeting was to map out the variables and constraints that the group wanted to see in the model
- Goal of the project is to give Maui a decision making tool that they can use in working toward their 95% goal

Maui Dynamic Sim Energy Model continued...

- Variables and constraints...
 - Implementation of demand response programs
 - Population
 - Renewables – amount, cost, availability of wind and solar
 - Land and water availability
 - Biofuels
 - Storage
 - Energy efficiency program
 - Transportation (electric vehicle usage)
 - Public support; tax incentives; policy drivers
 - And many more...
- Commitment from meeting stakeholders to provide data and stay engaged throughout the process
- Prototype in February 2011 – iterations to continue

Technical Assistance Projects

- Kauai Island Utility Coop storage acquisition process – RFI Closed; RFP in process; 38 vendors responded to RFI
- Maui Electric Company (MECO) storage acquisition process
- Forest City distributed storage and distributed renewable generation projects (low income housing project on Big Island and military housing)
- Legislative education session scheduled for January
- Working with County of Maui to help them develop a potential public private Energy Testing and Evaluation Center
- Maui Economic Development Building distributed solar project
- Other as required

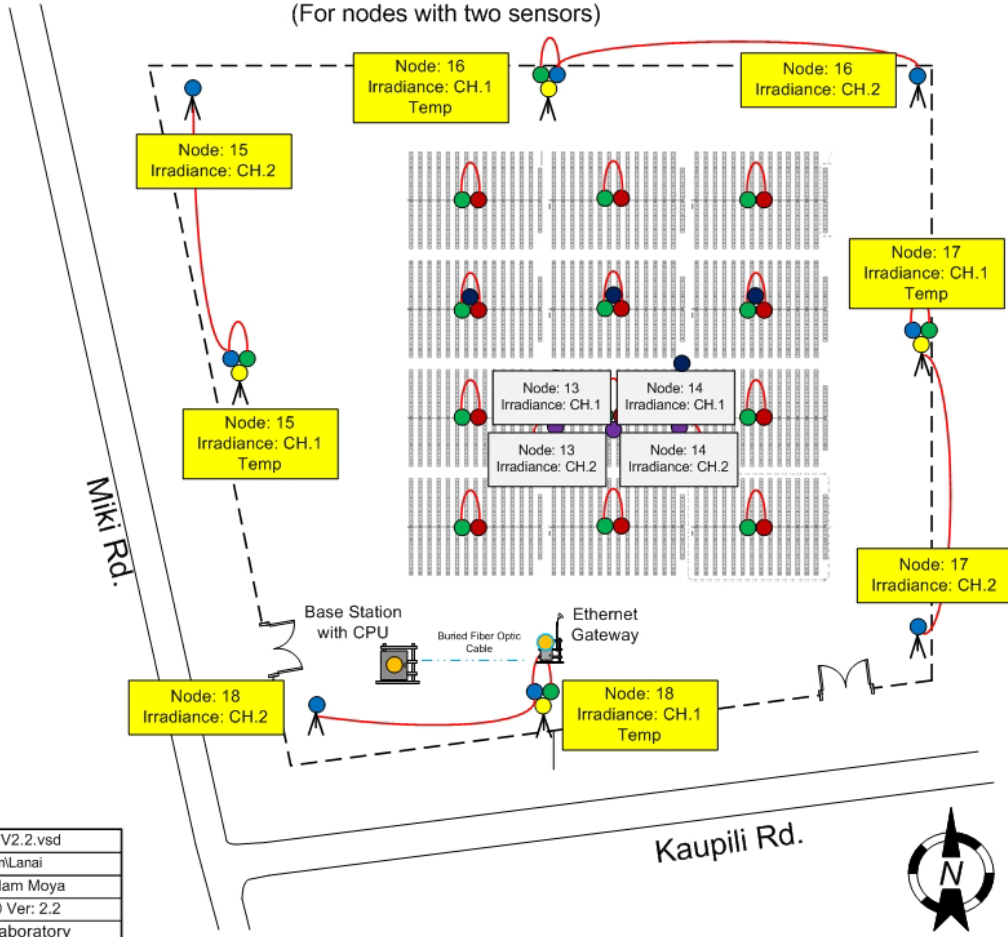
Projects Completed in FY '10

- Assisted NREL with Lanai Roadmap – Ben will expand on this
- Island of Lanai Battery Technical Assistance
 - Contract placed with Xtreme for 1.1 MW carbon enhanced lead acid battery; commissioning by next summer; will be used to mitigate sharp ramp rates due to cloud transients
 - This will allow the La Ola PV plant to come fully online, resulting in 30% peak load for the island being produced by solar
- LINE (Lanai Irradiance Network Experiment) in conjunction with Sandia's PV Program – on the La Ola PV Plant Goal: Investigate how distributed sensors can be used to predict plant output characteristics including AC plant power output and ramp rates
 - 16 plane of array and 8 global horizon irradiance sensors, 3 module temp sensors, and ambient temp sensor
- Preliminary analysis suggests that spatial average irradiance is a good predictor of plant output

L.I.N.E N.I. Licor Designation

(For nodes with two sensors)

- 18 ● I/O, RF
- 8 ● GH LI200
- 16 ● POA LI200
- 1 ● Base Station PC
- 1 ● Ethernet Gateway
- 4 ● Ambient TC Probes External
- 3 ● Module TC Frame of Module
- 3 ● Router
- 8 ▲ Tripod
- Fence



| | |
|--|---------------------------|
| | Lanai Site Plan V2.2.vsd |
| | U:\Users\Adam\Lanai |
| | Prepared By: Adam Moya |
| | Date: 02/02/2010 Ver: 2.2 |
| Distributed Energy Technology Laboratory | |

Additional Completed Projects

- Kauai Island Utility Coop (KIUC) IUC Solar Integration Study – performed by EnerNex
 - Work completed October, 2010
 - Gave KIUC better idea of reserve requirements for higher penetration of solar
 - Integration costs - increased operations requirements for generators for 5, 10, and 15MW solar penetration scenarios (mix of distributed and larger PV installations)
- Storage Seminar - June 2010
 - Highly successful, over 150 attendees; request for smart grid seminar!