



Hawaii Interisland Wind Project Status

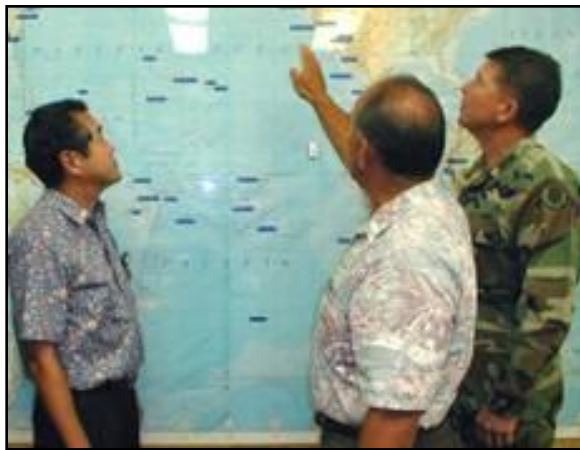
Leon Roose
System Integration
Hawaiian Electric Company

Utility Wind Integration Group
Lahaina, Maui
October 14, 2011

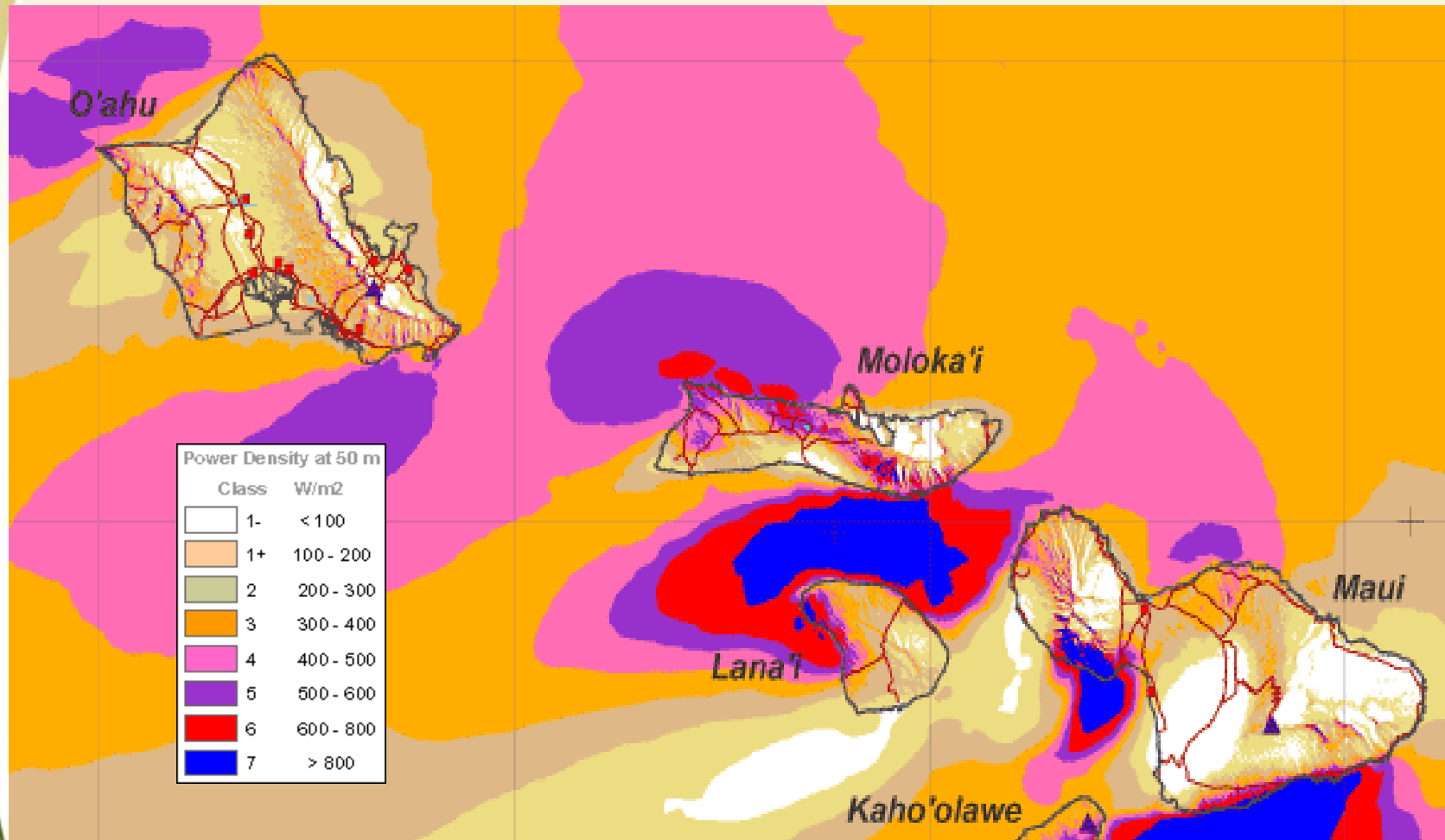
The enemy is oil

A Paradigm Shift is Required

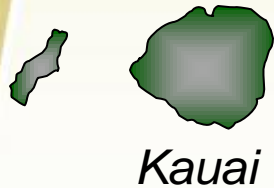
- Economic drain > Economic engine
- Energy insecurity > Energy security
- Environmental harm > Environmental compatibility
- Price volatility > Price stability



Wind on Molokai and Lanai



Interconnecting our islands: key to our energy goals



Renewable Poor

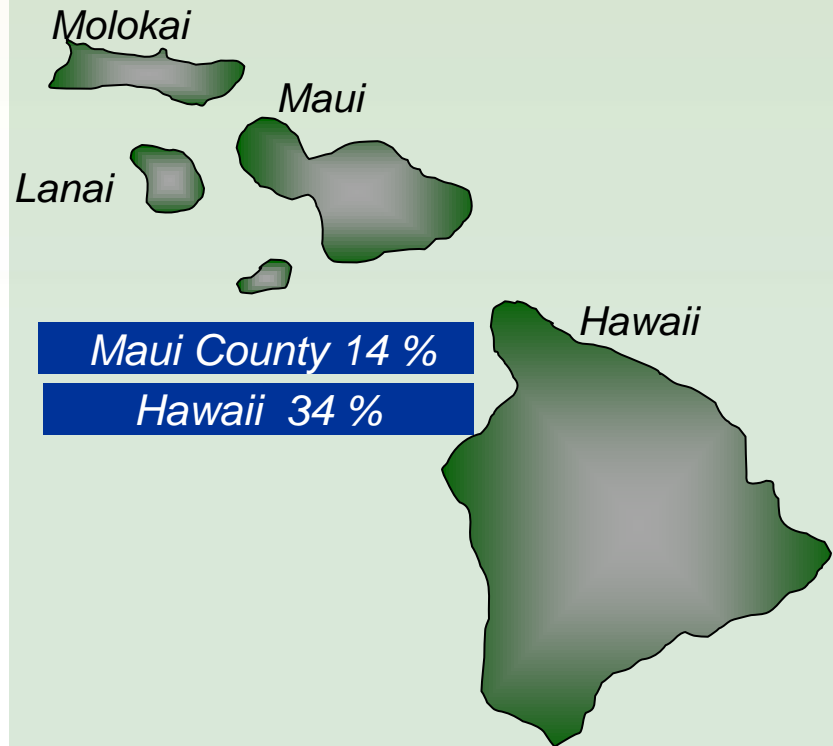
Population
907,574*



Oahu 5 %

Renewable Rich

Population
322,992 *

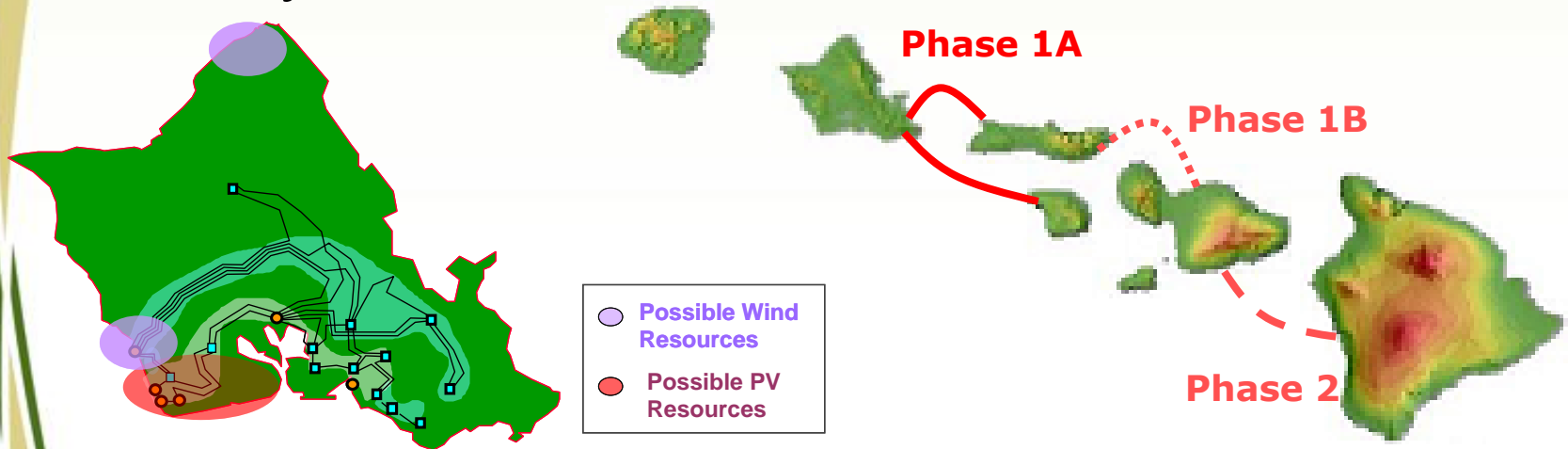


Maui County 14 %

Hawaii 34 %

MOTIVATION: HCEI & Interisland Wind Connection

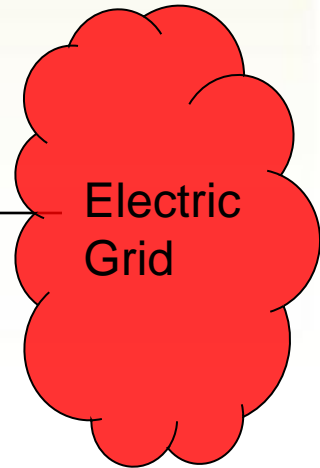
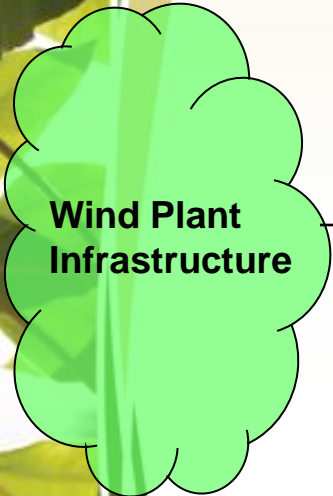
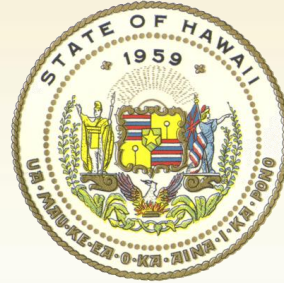
The Hawaiian Electric Companies are committed to integrating the maximum attainable amount of wind energy on their systems.



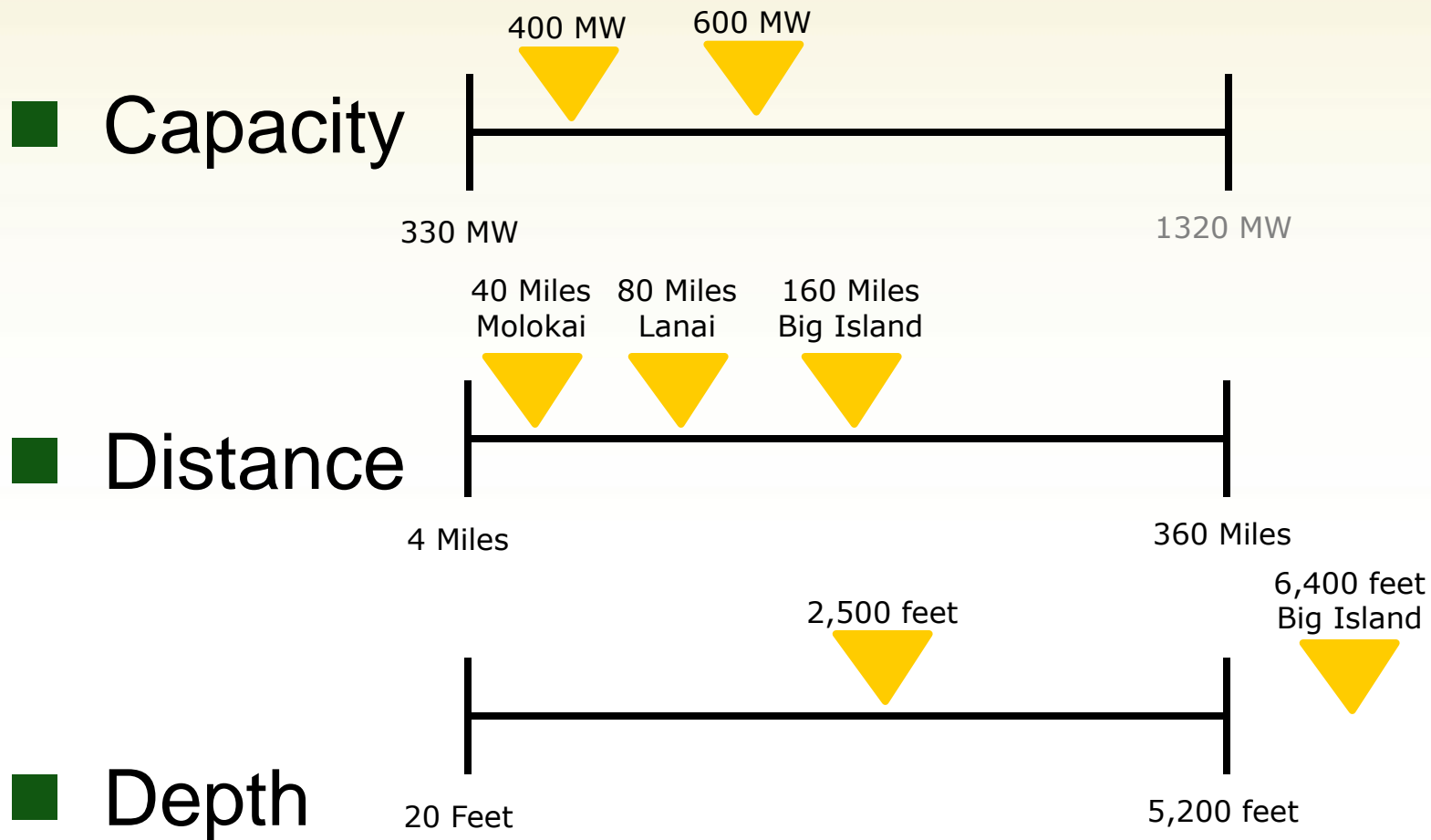
**100 MW of on-island
400 MW of neighbor-island
wind resources via
submarine cables and new
infrastructure**

***"BIG Wind" is
the Cornerstone
of HCEI***

Inter-island Cable Project



Undersea Cable Technical Feasibility



Undersea High Voltage DC Projects

Technically viable; focus is on other issues (e.g. sites, permits, etc.)

Project Name	Voltage (kV)	Capacity (MW)	Distance (miles)	Depth (feet)	Cable Manufacturer	Project Development	Year of Operation
Hawaii (Oahu to Maui County)	150 - 220	400 - 600	40 - 80	2,500	?	?	?
Cross Sound Cable	150	330	25	50	ABB	TransÉnergie U.S., a subsidiary of Hydro-Québec	2002
Estlink HVDC Light link	150	350	46	330	ABB	ABB	2006
Neptune Regional Transmission Project	500	660	53	20	Siemens/Prismian	Anbaric	2007
California's TransBay Cable	200	400	53	40	Siemens/Prismian	Siemens/Prismian	2009
Hudson HVDC	500	660	4	200	Siemens/Prismian	Anbaric	2011
Greenline HVDC (Maine to Boston)	500	660 – 1320	140	900	?	Anbaric	2014
Leyte - Luzon HVDC Power Transmission Project (Philippines)	350	440	13	490	ABB	ABB in cooperation with Marubeni Corporation, Japan	1997
The NorNed HVDC link	450	700	360	1,300	ABB	ABB	2008
East West Interconnector (Ireland and Wales)	200	500	115	400	ABB	ABB	2012
SAPEI (Sardinia to Mainland Italy)	500	1000	260	5,200	ABB/Prismian	Terna SpA	2010

What are the Issues?

- Cable Capacity
- Number of Cables
 - Reliability
- Landing Sites
 - Converter Stations
 - Transmission Lines
- Permitting
 - Wind Plant, Cable, & HECO Transmission
- Community Acceptance
- Financing
- Selecting the Developer



Example of Cable Landing Options

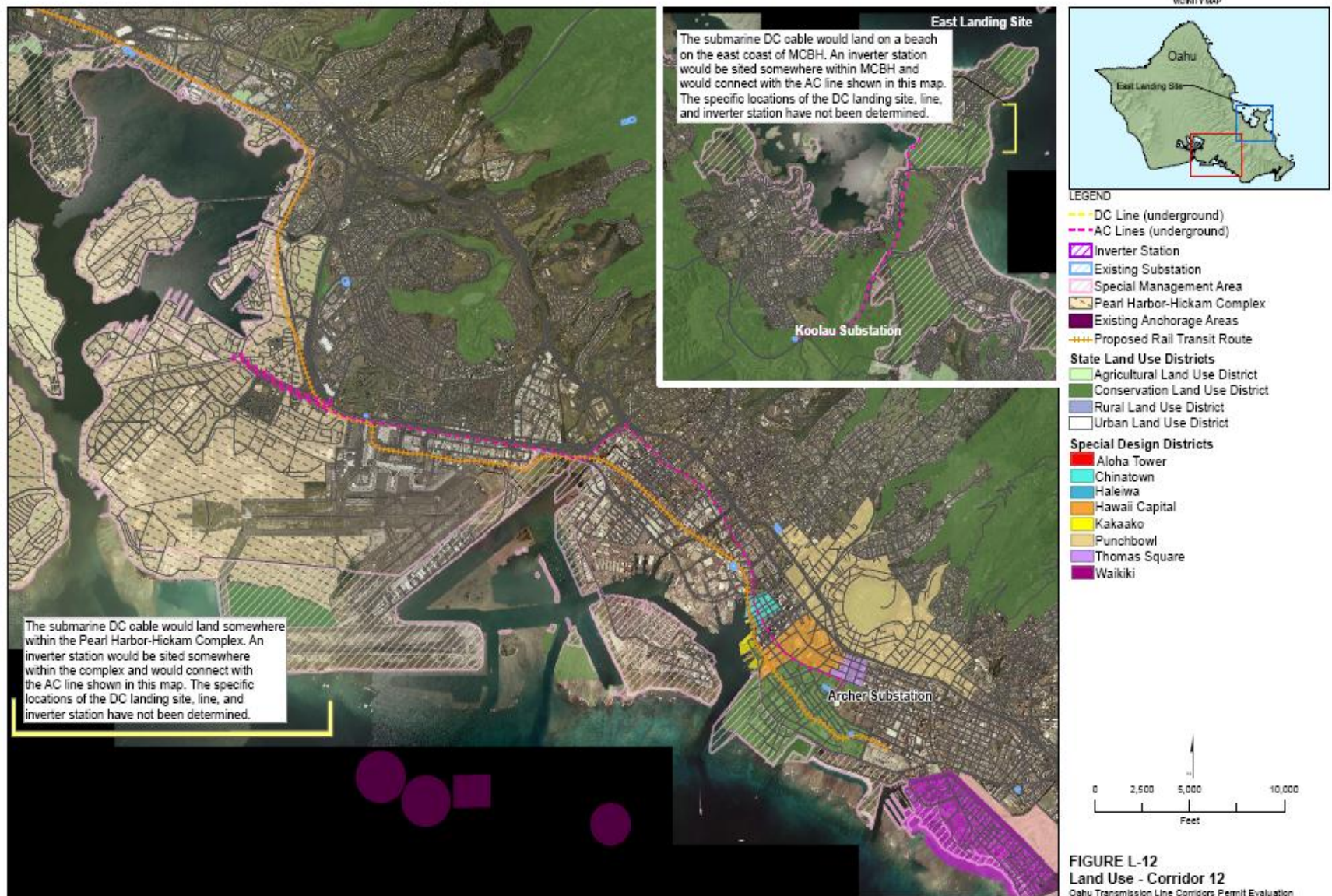


FIGURE L-12
Land Use - Corridor 12

Oahu Transmission Line Corridors Permit Evaluation

Interisland Wind Project

- Lanai & ~~Molokai~~ wind farms
 - 200 MW each
 - Undersea cable to Oahu

Ambitious plan for wind power

UNDERSEA CABLE TO POWER O'AHU

Gov. Linda Lingle outlined plans in one possible scenario to build an undersea cable that connects O'ahu, Maui, Molokai and Lanai to carry wind-generated electricity to O'ahu.

Here are some of the 20 1.5-megawatt turbines at the new Kaheewa wind farm built on the West Maui Mountains.

400 MW

HECO will purchase about 400 megawatts of electricity produced by wind farms on Lanai and Molokai.

ONE-THIRD

Wind power would supply about a third of O'ahu's electricity needs under the deal between HECO and the state.

2028?

The Lingle administration's goal is to have 70 percent of O'ahu's energy needs supplied by renewable sources by 2028.

State officials, HECO sign a deal they say could save us billions

BY RICK DAYBOG
Advertiser Staff Writer

About a third of O'ahu's electricity needs could someday be met by wind farms, under a sweeping agreement signed yesterday by state officials and Hawaiian Electric Co.

Gov. Linda Lingle said the accord will help reduce the state's dependence on foreign oil, improve the reliability of HECO's electrical system and boost the state economy by keeping hun-

drreds of millions of dollars in Hawai'i that would otherwise be sent to foreign oil producers.

"This agreement is historic. It's transformational, and it will make Hawai'i a world leader in renewable energy," Lingle said.

But critics say the plan would be costly for consumers and relies too heavily on wind power at the expense of cheaper technologies such as solar energy.

"It's a bunch of hot air," said Henry Curtis, executive director of the environmental group Life of the Land Hawaii.

Lingle, U.S. Sen. Daniel K. Inouye, Constance Lan, chief executive officer of HECO's parent, Hawaiian Electric Industries Inc., and other state officials were on hand at the state Capitol yesterday to sign the 60-page agreement, which is part of the Lingle administration.

See a video of officials announcing the plan for wind power at HONOLULUADVERTISER.COM

KGMB 9

SEE WIND, A2

HECO Renewable Energy & Undersea Cable RFP

Proposal Types

- Call for Commercially Proven RE Technologies
- Seeking delivery of 600 to 800 GWH to Oahu (~10% of Oahu energy demand)
- Minimum project size of 5 MW
- Single contingency outage no greater than 200 MW
- On O`ahu Generation
- Off O`ahu Generation & Undersea Cable
- Undersea Cable - at least 200 MW capacity for Lanai wind project; option to bid larger sizes
- Commercial operation by end of Dec. 2018

RFP Challenges

- Varied Combinations of Proposals to meet target energy amount
- Project on Project Risk Mitigation
- Evaluation Process – Scope of completed Integration Studies was specific to “Big Wind”

Draft RFP to be submitted to the Hawaii PUC today and made available to the public for review and comment.

Selection of the Award Group

- Price / Non-price weighting and evaluation
- Projects ranked based on combined price & non-price scores
- Develop Short list
- Conduct System Impact Study
- Best and final offer
- Selection of Final Award Group
- Conduct Interconnection Facilities Study
- PPA Negotiation



Mahalo

(“Thank You” in Hawaiian)