Hawaii's Clean Energy Transformation

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Hawaii State Energy Administrator

BOEM/Hawaii Intergovernmental Renewable Energy Task Force Meeting

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Hawaii Clean Energy Initiative (HCEI)

- 100% Renewable Energy by 2045 (electricity sector)
- Reduce 4,300 GWh by 2030 - Efficiency
- New Energy in Transportation Road Map

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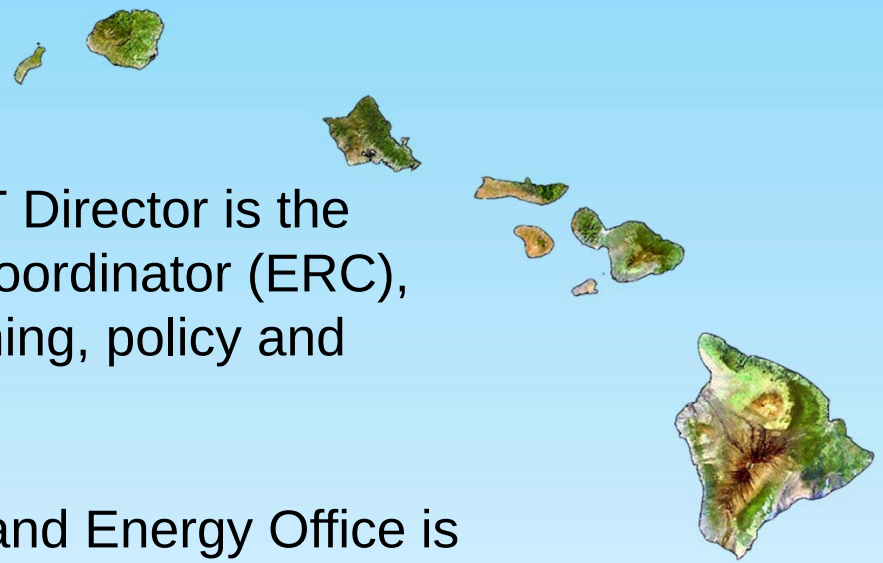
Hawaii's Energy Policy

The Energy Resources Coordinator sets Hawaii's energy policy



- Under HRS 196, the DBEDT Director is the state's Energy Resources Coordinator (ERC), responsible for energy planning, policy and programs
- State Energy Administrator and Energy Office is delegated with fulfilling ERC energy policy directives
- In 2011, the ERC repositioned clean energy as economic driver – departing from original principal focus on environmental and energy security

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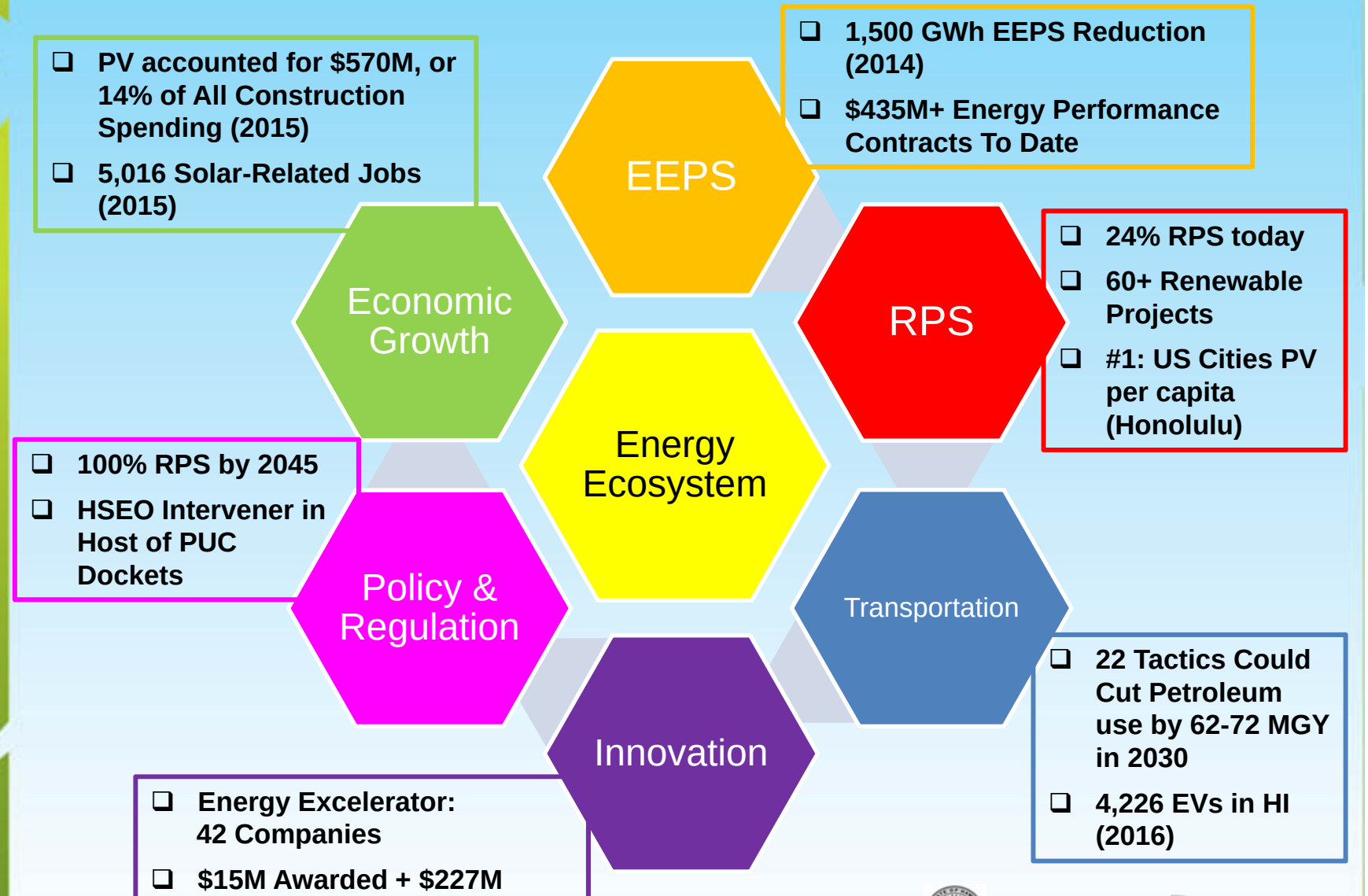
Progress in Key Areas



- ❑ PV accounted for $570M, or 14% of All Construction Spending (2015)
- ❑ 5,016 Solar-Related Jobs (2015)

- ❑ 1,500 GWh EEPS Reduction (2014)
- ❑ $435M+ Energy Performance Contracts To Date

- ❑ 24% RPS today
- ❑ 60+ Renewable Projects
- ❑ #1: US Cities PV per capita (Honolulu)

- ❑ 100% RPS by 2045
- ❑ HSEO Intervener in Host of PUC Dockets

- ❑ 22 Tactics Could Cut Petroleum use by 62-72 MGY in 2030
- ❑ 4,226 EVs in HI (2016)

- ❑ Energy Excelerator: 42 Companies
- ❑ $15M Awarded + $227M Follow-on Funding Raised

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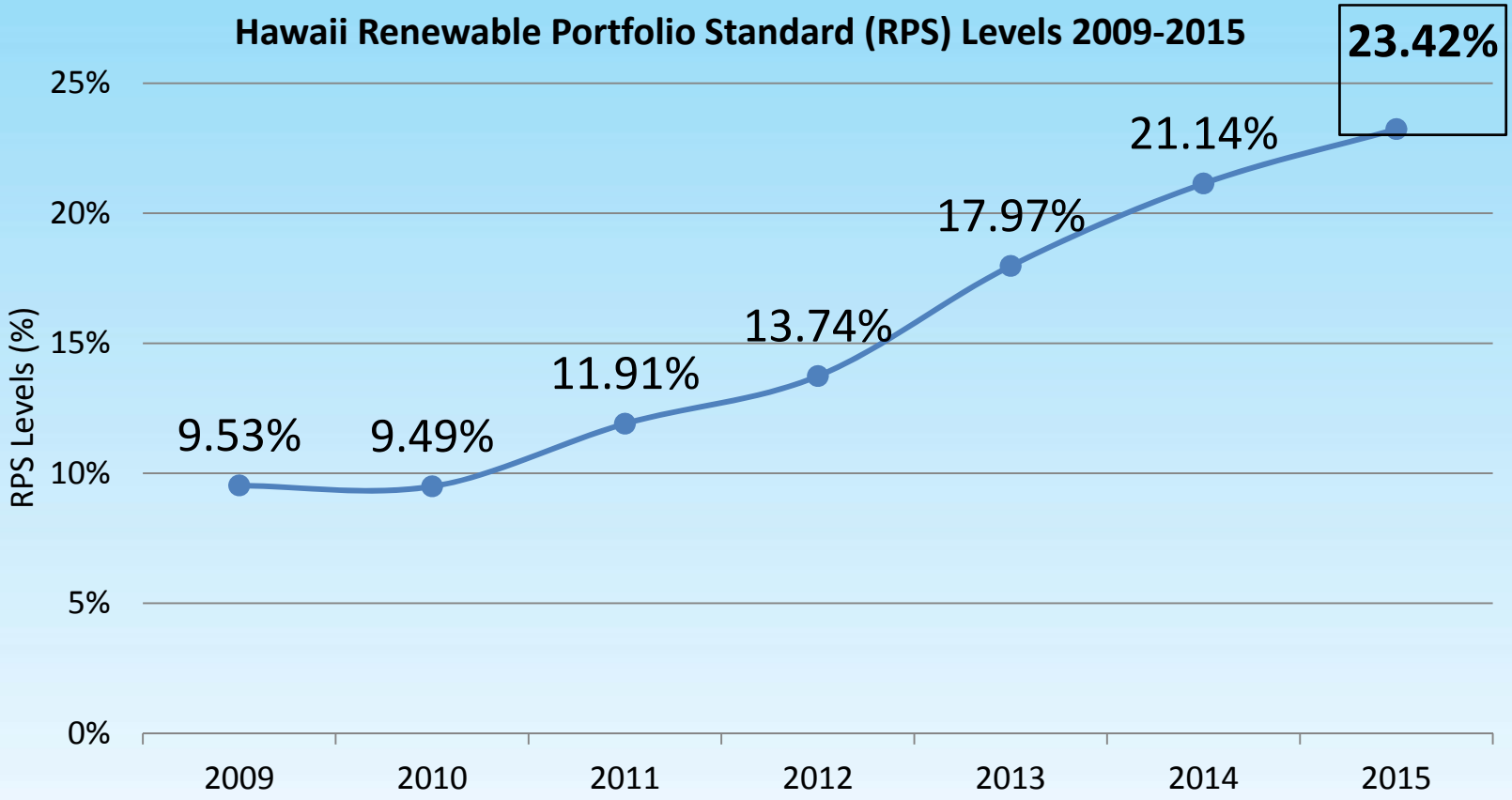
Renewable Energy Progress



Source: *Renewable Portfolio Standards Status Reports,* 2009-2015 (Hawaii Public Utilities Commission).

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Balanced Approach

- Diversifying our energy portfolio
- Connecting and modernizing our grids
- Balancing technical, economic, environmental and cultural considerations
- Leveraging our position as a test bed to launch an energy innovation cluster
- Create an efficient marketplace that benefits producers and consumers

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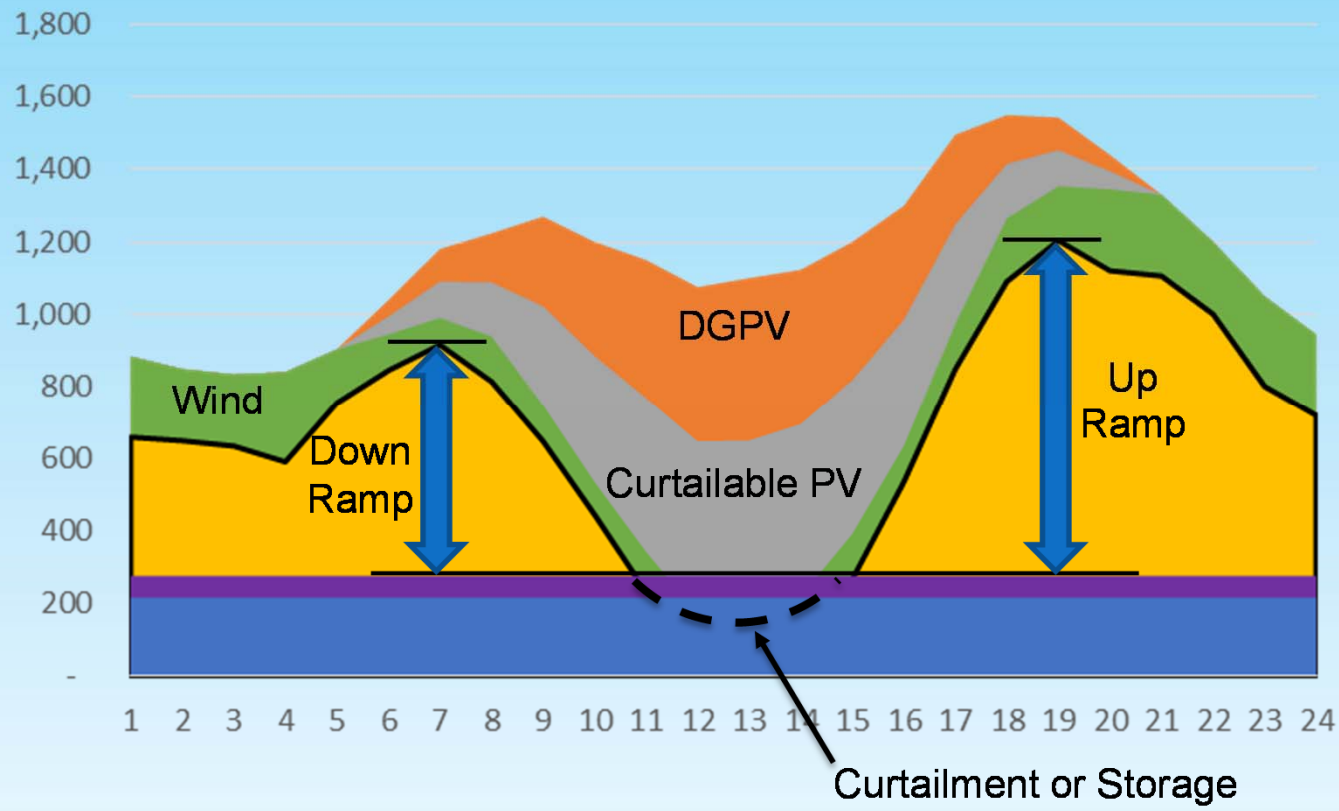
Energy Transition: Today



System operations are dependent upon the combination of resources serving the entire energy system

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Plan for Success

- State (HSEO) planning efforts to get to 100% by 2045
  - Build capacity for energy systems planning & modeling
  - Proposed new planning paradigm – a collaborative process
- Test Case: Hawaiian Electric Companies Draft Power Supply Improvement Plan
  - To reach 100%, Oahu needs additional resources beyond those on Oahu (e.g., offshore wind, biofuels, neighbor island renewables transmitted via interisland cable)
  - Up to 800 MW off-shore wind in HECO's Preferred Plan
    - o 200 MW by 2030, 400 MW by 2040, 800 MW by 2045
- Visualization Tools

Source: Hawaiian Electric Companies, Power Supply Improvement Plans Update Report (April 1, 2016)

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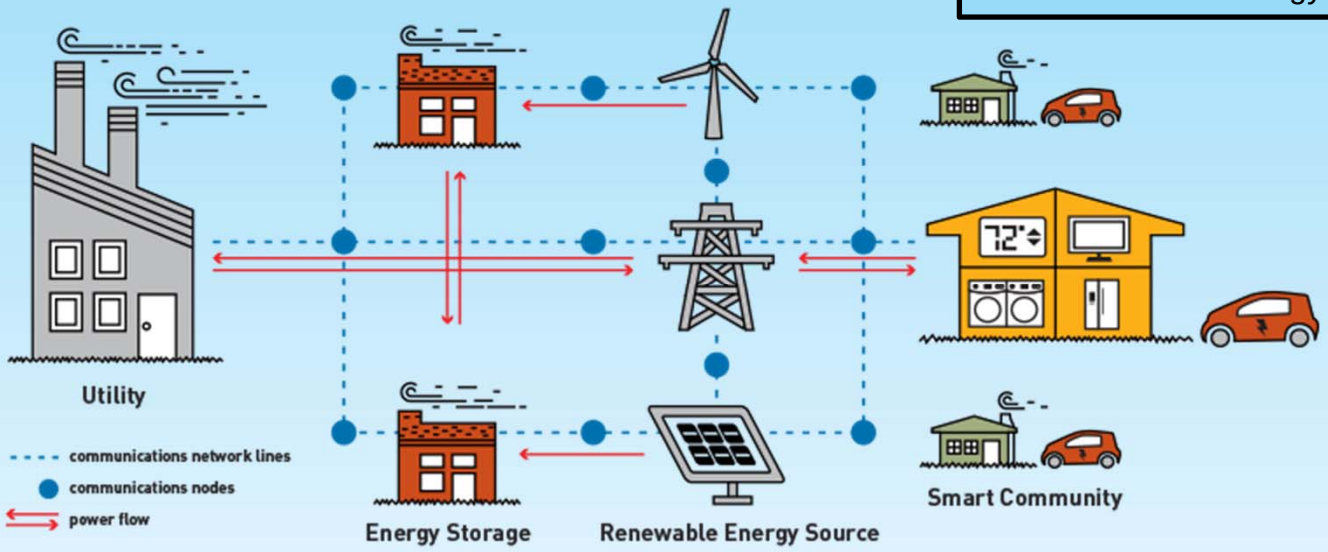
Modernizing The Grid

Instantaneous Response and Integration:
The electric grid joins the digital age with fast, reliable and secure communications.

Customer Engagement:
An integrated grid with smart meters gives customers better control over their energy use.



More Renewable Capacity:
Better optimization will renewable resources allow Hawaii's to be utilized to their fullest extent.

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Hawaii Clean Energy Programmatic EIS (Sept. 2015)

- Developed by US DOE with support from State of Hawaii
- **Programmatic** analysis of five clean energy categories:
  1. Energy Efficiency
  2. Distributed Renewables
  3. Utility-Scale Renewables
     - **Wind (Offshore) – Section 6.9**
  4. Alternative Transportation Fuels and Modes
  5. Electrical Transmission and Distribution
- Community engagement in PEIS process
  - Statewide scoping meetings in 2011 (HIREP) and 2012
  - Statewide public hearings in 2014
  - Public comments on Draft PEIS

Source: http://energy.hawaii.gov/testbeds-initiatives/hawaii-clean-energy-peis

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Offshore Wind Considerations

- Table 6-11. Areas of Potential Impacts and Best Management Practices in Future Project Specific EISs.

Geology and Soils	Coastal Zone Management
Air Quality/Climate Change	Scenic and Visual Resources
Surface and Ground Waters	Recreation Resources
Biological Resources	Land and Marine Transportation
(Submerged) Land Use	Airspace Management
Historic Resources	Noise and Vibration
Cultural Resources	Utilities and Infrastructure
Hazardous Materials and Waste Management	Health and Safety

- US DOD and National Security Issues

Source: http://energy.hawaii.gov/testbeds-initiatives/hawaii-clean-energy-peis

HCEI MAX – The Power of Stakeholder Engagement

- Consensus on the Overall Mission
  - Energy Self Sufficiency & Security, Carbon Reduction, Economic Growth
- Fulfill Promise via Principled Approach
  - Optimize investments in the energy sector
  - Balanced, portfolio approach for efficiency and strategies to maximize intermittent & firm resources
- Knowledge Sharing and Collaborative Planning & Deployment
  - BOEM Task Force, HCEI, HEPF, VERGE Hawaii

Source: http://energy.hawaii.gov/testbeds-initiatives/hawaii-clean-energy-peis

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Mahalo

Energy Transformation for a Better Hawaii!

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