



ENERGY TRANSITION INITIATIVE

De-Risking Island Energy System Investments

*Lessons from
Hawaii, USVI,
Puerto Rico*

October 2015

IEA EGRD



Energy Transition Initiative: Islands

The *Energy Transition Initiative: Islands* is an opportunity for insular areas to define and realize their own vision for a clean economy

Our Goal/Mission:

- Accelerate commercial opportunities to transition island economies off imported fossil fuels by focusing on local resources

Anticipated Outcomes:

- Eliminate the dependence of island economies on imported fuels
- Replicable solutions for others around the world

Islands Are Deployment Leaders

Jurisdiction

	Island	City	City with Municipal Utility*	State with Regulated Monopoly	State with Generation Separated	Federal (Non-PMA)	RTO/ISO
Central Power Stations	✓	Siting*	✓	✓ (IPPs get special treatment)		Hydro only (IPP PURPA?)	Limited
Distributed Generation	✓	Siting*	✓	✓		PURPA?	Limited
Capacity Requirements	✓		✓ (Can be shared with Regional Interconnect)	Can be shared with Regional Interconnect (not MISO)		Limited	✓, Can be shared
Reserve Margins / Reliability							
Interconnection	✓		✓		✓	Interstate wires / Bulk Power System	Interstate wires / Bulk Power System
DG Compensation	✓		✓		✓	PURPA	Wholesale participation
DG Financial Incentives	✓	✓	✓		✓	✓	
Environmental Requirements for Energy Infrastructure	✓	Some, in construction or delegated from state		Delegated authority from Fed		✓	
Transmission	Sometimes / Rarely Shared	Siting*	Shared with State	Shared with Federal		Shared with States	
Distribution	✓	Siting*	Shared with State	Shared with Federal			
Utility-Led Energy Efficiency	✓		✓	✓			
Energy Efficiency Financial Incentives	✓	✓	✓	✓		Some	
Building Energy Codes	✓*			Shared with Federal		Shared with States	
Public Transportation	✓	Shared with State and Fed		Shared with Cities & Fed		Shared with States & Cities	
Alternative Fuel Vehicle Incentives	✓	✓	✓	✓		✓	
Alternative Fuel Infrastructure	✓	Some	Some	✓		Shared with States	

NB: U.S. Focus.

*Siting authority of local governments varies under state law

ETI: Islands Playbook

“The Islands Playbook (the Playbook) provides an action-oriented guide to successfully initiating, planning, and completing a transition to an energy system that primarily relies on local resources to eliminate a dependence on one or two imported fuels. It is intended to serve as a readily available framework that any community can adapt to organize its own energy transition effort.”

Islands Playbook Content

- **Highlights the process - the *how* - of organizing an energy transition and implementing projects**
 - Eliminating a dependence on imported fuels requires iteration
- **Lessons learned from islands work to date**
 - USVI and Hawaii
 - Aruba, Barbados, Canary Islands
- **Downloadable worksheets and templates**
 - Community organizing tools, such as stakeholder and donor coordination matrices
 - Project management tools, such as a Risk Register and Strengths-Weaknesses-Opportunities-Threats matrix

www.energy.gov/islandsplaybook

Playbook Themes

- **Focus on people**

- Engaging stakeholders proactively
- Empowering the community to set vision
 - Not just the government and not just the utility
- Developing human capital
 - Effort not dependent on one administration or one person

- **Focus on projects**

- Identifying near-term actions that support long-term goals
- Tracking progress to maintain momentum
- Improving execution for the next project(s)

Based on experience of USVI and Hawaii

- **Hawaii Energy Goal from 2009:** 70% clean energy goal by 2030, with 40% renewable and 30% efficiency
→ Recently increased to 100% by 2045
- **Hawaii Success Indicators:**
 - Met its 2015 renewable electricity target two years early
 - 226 MW oil-fired generation is scheduled for retirement by 2016
 - Doubled the percentage of electricity supplied from renewable resources



For more background info:

<http://www.hawaiicleanenergyinitiative.org>

Examples of World-Class Leadership

- 2nd in Ernst & Young's U.S. Renewables Attractiveness Indices (2013)
 - Before innovative financing, 100% target in past years
- Solar growth of 40X, wind power capacity growth of 200%
 - Solar capacity has almost doubled every year since 2006
- Substantial energy efficiency retrofits
 - Highest ESPC investment per capita
- Net-zero Affordable Housing
- Most charging stations per capita in US
- Oil use at levels not seen since 20th century
 - HECO use has fallen 16% since 2008
- Pushing the boundaries for distributed generation finance, penetration, and interconnection

→ Required Entrepreneurial Spirit of Private Sector, DBEDT, and Legislature

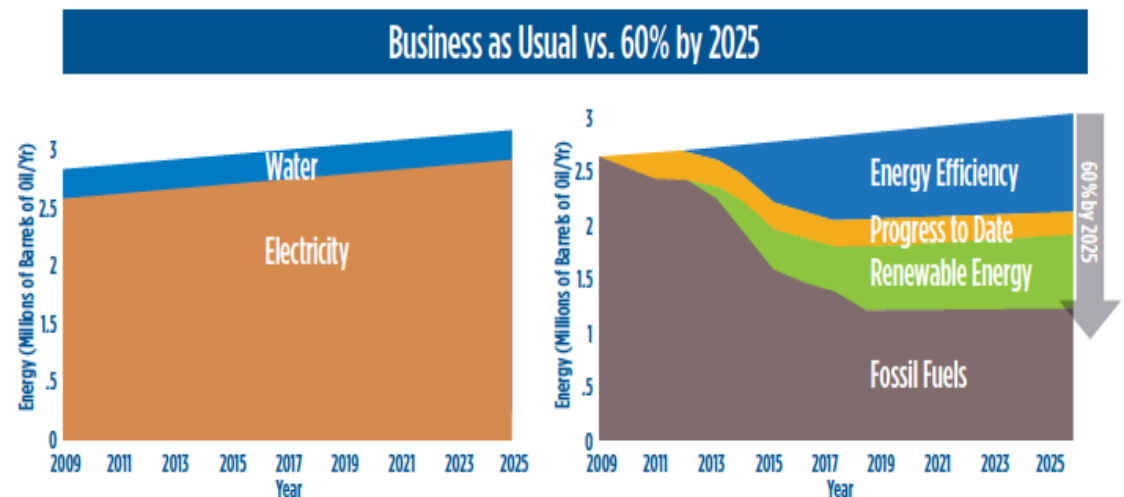
Based on experience of USVI and Hawaii

- **USVI Set Energy Goal in 2010:** Achieve 60% reduction in fossil fuel-based energy consumption by 2025 through renewable energy generation and energy efficiency.

→ After 6 years, fossil fuel use is down 30%, electricity rates down 35%

- **USVI Supporting goals:**

- Minimize dependence on fossil fuels
- Reduce energy costs
- Enhance energy affordability and reliability
- Reduce environmental threats associated with global warming
- Build a thriving clean energy sector that generates local green jobs
- Preserve the natural beauty that is the lifeblood of the islands

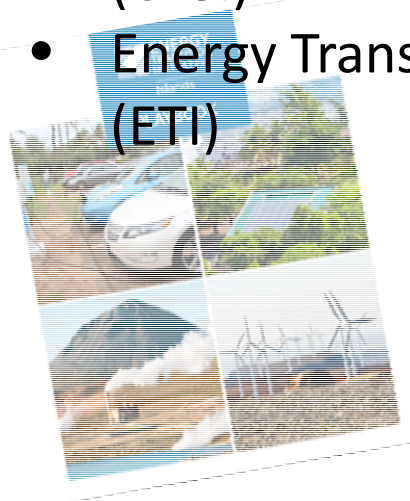


USVI Energy Leadership

- **2014-2015** – USVI recognized as regional leader. Begins to share best practices with others in Caribbean.

- *Examples*

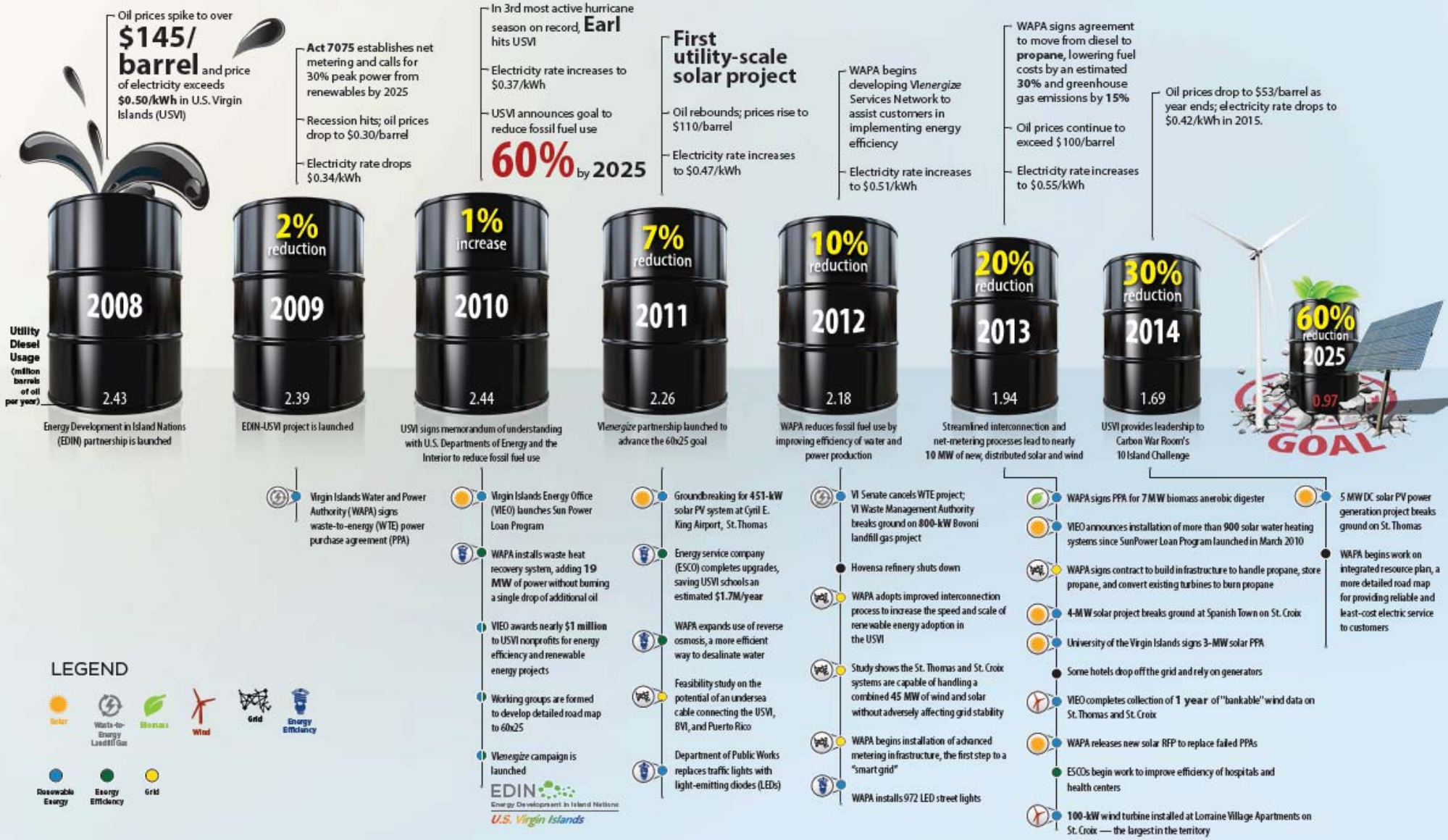
- Carbon War Room's 10 Island Challenge
- Caribbean Regional Energy Forum (CREF)
- Vice President's Caribbean Energy Security Initiative (CESI)
- Energy Transition Initiative (ETI)



Meeting 60% by 2025



USVI Makes Headway Toward Goal to Reduce Fossil Fuel 60% by 2025



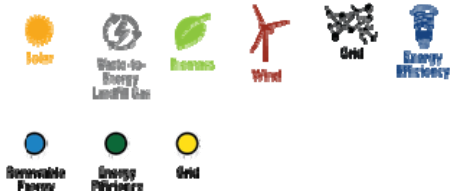
Meeting 60% by 2025

→ Rates down to ~\$0.33/kwh in 2015, from height of >\$0.50/kWh in 2008

→ Propane use will reduce GHG pollutants and particulate matter by over ~~65%~~ **200%**

	2010	2011	2012	2013
 <p>Virgin Islands Water and Power Authority (WAPA) signs waste-to-energy (WTE) power purchase agreement (PPA)</p>	 <p>Virgin Islands Energy Office (VIEO) launches Sun Power Loan Program</p>	 <p>Groundbreaking for 451-kW solar PV system at Cyril E. King Airport, St. Thomas</p>	 <p>VI Senate cancels WTF project; VI Waste Management Authority breaks ground on 800-kW Boveni landfill gas project</p>	 <p>WAPA signs PPA for 7 MW biomass anaerobic digester</p>
	 <p>WAPA installs waste heat recovery plant, adding 10 MW of power without burning a single drop of additional oil</p>	 <p>Energy savings performance contracting company (ESCO) completes upgrades, saving USVI schools an estimated \$1.7M/year</p>	<ul style="list-style-type: none"> • Hovensa refinery shuts down 	 <p>VIEO announces installation of more than 900 solar water heating systems since SunPower Loan Program launched in March 2010</p>
	<ul style="list-style-type: none"> • VIEO awards nearly \$1 million to USVI nonprofits for energy efficiency and renewable energy projects 	 <p>WAPA expands use of reverse osmosis, a more efficient way to desalinate water</p>	 <p>WAPA adopts improved interconnection process to increase the speed and scale of renewable energy adoption in the USVI</p>	 <p>4-MW solar project breaks ground on St. Croix</p>
	<ul style="list-style-type: none"> • Working groups are formed to develop detailed road map to 60x25 	 <p>Feasibility study on the potential of an undersea cable connecting the USVI, BVI, and Puerto Rico</p>	 <p>Study shows the St. Thomas and St. Croix systems are capable of handling a combined 45 MW of wind and solar without adversely affecting grid stability</p>	 <p>University of the Virgin Islands signs 3-MW solar PPA</p>
	<ul style="list-style-type: none"> • Energize campaign is launched 	 <p>Department of Public Works replaces traffic lights with light-emitting diodes (LEDs)</p>	 <p>WAPA receives grant to install advanced metering infrastructure</p>	<ul style="list-style-type: none"> • Some hotels drop off the grid and rely on generators
			 <p>WAPA installs 972 LED street lights</p>	 <p>WAPA releases new solar RFP to replace failed PPAs</p>
				<ul style="list-style-type: none"> • ESCOs begin work to improve efficiency of hospitals and health centers
				 <p>100-kW wind turbine installed at Lorraine Village Apartments on St. Croix — the largest in the territory</p>

LEGEND



DOE Technical Support For Energy Transition Activities

- **Technical Assistance** from DOE and its national labs:
 - Conducted energy resource and site assessments
 - Performed policy, grid, technology, and financial analyses
 - Helped develop interconnection policies and procedures to encourage distributed solar
 - Supported development of energy road map / strategy
 - Helped utility develop and execute requests for proposals for solar project development
 - Compiled Playbook tools and lessons learned to support more energy transition efforts in other islands

Playbook Lessons Learned Example

PHASE 0

PHASE 1


PHASE 2

PHASE 3

PHASE 4

PHASE 5

PHASE 6

Download
Playbook 

PHASE 0

Committing to an Energy Transition

OVERVIEW

LESSONS LEARNED

ADDITIONAL RESOURCES

U.S. Virgin Islands Leadership Embraces Inclusiveness to Ensure Community Ownership of Clean Energy Vision

In 2010, U.S. Virgin Islands (USVI)—serving as a pilot project for the Energy Development in Island Nations initiative—set a goal to reduce its almost 100% dependence on imported fossil fuels. At an inaugural workshop in February 2010, USVI Gov. John P. de Jongh Jr. announced his goal to reduce the territory's dependence on fossil fuel by 60% by 2025. In support of this goal, Gov. de Jongh worked to charter and empower an effective, inclusive leadership team to engage stakeholders and set a generated stakeholder buy-in from the start for meeting the goal. By appointing local energy champions and other technical experts, the USVI was able to pave the way for future successful projects in support of the 60% by 2025 goal.

Learn more about how the USVI engaged stakeholders to develop its clean energy vision.



More than 25 government leaders, energy office officials, and utility company executives from the USVI attended a workshop at NREL in Golden, Colorado, in February 2010. Photo by Adam Warren, NREL

Screenshot from Playbook website

Playbook Lessons Learned

- **The Lessons Learned provide brief studies of how a common problem has been addressed by another island, such as:**
 - Energy Permitting Wizard Helps Reduce Project Barriers in Hawai'i
 - Assessing Pathways in Aruba
 - Solar Hot Water Heater Industry in Barbados
 - U.S. Virgin Islands Clears the Way for Unprecedented Levels of Solar Energy
- **Designed to support decisions in other locations – Not dictate them or prescribe solutions**

Playbook Worksheets & Templates

Template: Donor Coordination Matrix

Donor Name	Project Scope and Name	Project Partners and Consultants	Timeline (Start & End)	Funding Amount	Point(s) of Contact

- **Downloadable tools for personalized use, such as:**
 - Periodic project reporting templates
 - Donor coordination matrix
 - Responsible-Accountable-Consulted-Informed (“RACI”) matrix

Playbook Phases

	<u>USVI Dates</u>
• Phase 0: Committing to a Transition	2008-09
• Phase 1: Setting the Vision	2009-10
• Phase 2: Assessing Opportunity Pathways	2010-11
• Phase 3: Project Preparation	2011-13
• Phase 4: Project Execution and Quality Control	2011-15
• Phase 5: Operations and Maintenance	2013 +
• Phase 6: Process Improvement	2015-16

Next items

- Reduce Capital Costs of Energy Efficiency
- Continue to Modernize Grid Infrastructure
- Diversify Utility-Scale RE
- Deploy Alternative Fuel Vehicles
- Identify Paths for Distributed Generation
- Apply Entrepreneurial Spirit to Policy Development
- Take a fresh look at paths to success with updated wedge analysis

Phase 6 Example: “HCEI 2.0”

- **“Hawaii has made great strides in achieving its clean energy goals and now finds itself in a new energy ecosystem. HCEI 2.0 will help drive the formation of this new ecosystem by implementing grid modernization and interconnections, as well as bridging the gap between conventional and renewable energy sources with transitional fuels.”**
- **HCEI 2.0 Organization**
 - Core Executive Management Team (EMT), primarily public sector representatives, will focus on achieving Hawaii’s clean energy goals
 - Advisory Board from private, academia, and non-profit sectors, engages directly with the EMT to provide input on priority issues
 - Charrettes are ad hoc groups of stakeholders vital to a particular hot button issue to provide critical thinking around those developing issues
 - Each charrette will be designed around the unique needs of the subject matter. Outcomes from the charrettes will help inform future HCEI actions and can result in the formation of “strike teams”, or action groups, to delve even deeper into specific issues.

USVI Phase 6: Energy Roundtable

- **Experience tell us** success depends on collaboration among the public and private stakeholders whose commitment is foundational to the energy transition
- **Fresh look** at paths forward, given progress to date
- **Energy Roundtable** can provide the forum for the USVI to plan and execute the next stage of its transition
- *Such as . . .*
 - Next 20% of fossil fuel reduction target
 - Increasing fuel diversity
 - Tailoring grid to expectations for electric service
 - Scaling energy efficiency services
 - Deploying alternative fuel vehicles
 - Adding clean energy jobs
 - Reducing energy cost further
 - . . .

USVI & Hawaii Next Steps

- **Build** on exceptional starts
 - Both examples form key parts of *Islands Playbook*, <http://www.eere.energy.gov/islandsplaybook/>
- **Plan** for next tranches of reduction in fossil fuels
 - Integrated Resource Plan
 - Distributed Solar
 - Policy Development
 - Advanced Metering / Smart Grid
 - Utility-Scale Renewables
- **Energy Roundtable and Charettes** will provide forum for constructive, on-going dialogue among stakeholders about next five years of progress



Questions and Discussion

Thank you for your time

Island Playbook Website:

www.energy.gov/islandsplaybook

ETI web-site:

<http://energy.gov/eere/technology-to-market/energy-transition-initiative>

Island Energy Snapshots:

<http://energy.gov/eere/about-us/island-energy-snapshots>

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