

EDIN-USVI Clean Energy Quarterly

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Energy Systems Group workers replace old lights with energy-efficient ones at Yvonne E. Milliner-Bowsky Elementary School on St. Thomas. *Photo from Don Buchanan, VI Energy Office*

EDIN-USVI Celebrates Early Successes

Since Gov. John P. de Jongh Jr. established the goal to reduce fossil fuel-based energy use in the U.S. Virgin Islands (USVI) 60% by 2025, the Energy Development in Island Nations (EDIN)-USVI working groups have been working together to develop a road map and reach some initial milestones toward achieving this goal—and their efforts are beginning to bear fruit.

The Renewable Energy working group has focused much of its effort on deploying solar photovoltaics (PV) in the territory while exploring the potential of an interconnection with Puerto Rico’s electrical grid.

The Energy Efficiency working group has contributed to significant progress improving the efficiency of schools in the USVI while working on several fronts to raise awareness about the role of conservation in addressing the territory’s energy challenges.

The Transportation working group has provided guidance on government vehicle purchases while finalizing the *U.S. Virgin Islands Transportation Petroleum Reduction Plan*.

Learn more about the successes the EDIN-USVI partners and working groups are celebrating inside this issue.

USVI Clean Energy Events

Aug. 6–Sept. 8	University of the Virgin Islands (UVI) Community Engagement and Lifelong Learning (CELL) Center energy efficiency and renewable energy workshops
Sept. 15–16	EDIN-USVI Clean Energy Workshop, UVI–St. Croix
Sept. 20–21	Caribbean Electric Utility Service Corporation (CARILEC) Renewable Energy Conference, St. Thomas
Nov. 7–10	UVI-CELL building energy efficiency training



The first thing visitors see upon landing in St. Thomas is the VI Port Authority’s newly installed 450-kW PV system flanking the runway at Cyril E. King Airport. *NREL/PIX 18953*



A worker installing energy-efficient outdoor lights at Yvonne E. Milliner-Bowsky Elementary School on St. Thomas. Photo from Don Buchanan, VI Energy Office

UVI-CELL Center hosted a series of free workshops on energy-saving measures for homes and businesses, solar water heating, the ENERGY STAR® program, and wind and water renewable energy technologies.

Energy Efficiency

Energy Efficiency Working Group Focuses on Educational Outreach

The Energy Efficiency working group has played a pivotal role in supporting the Education and Workforce Development working group's efforts to raise awareness about clean energy solutions.

During a June gathering at UVI-St. Thomas, the group formed an educational outreach subcommittee dedicated to collaborating with all applicable organizations, businesses, boards, agencies, and schools to advance green energy initiatives and to educate all citizens on the habits, technologies, and modifications that they can apply to their daily lives in order to reduce petroleum-based energy consumption.

AARP has taken a leadership role in supporting the Energy Efficiency working group's outreach efforts by disseminating energy-efficient messaging via its website and launching a Spanish energy efficiency outreach campaign via the Spanish language radio program it sponsors.

UVI-CELL has also been instrumental in raising awareness about energy efficiency. It hosted a series of free workshops on energy-saving measures for homes and businesses, solar water heating, the ENERGY STAR program, and wind and water renewable energy technologies. The workshops were led by former Virgin Islands Energy Office (VIEO) Dir. Bevan Smith Jr. and Heru Ofori-Atta, who has been instrumental in launching the UVI

Caribbean Green Technology Center. This project was funded in part by a VIEO-administered grant made available by the U.S. Department of Energy (DOE) under the American Recovery and Reinvestment Act (ARRA) of 2009.

USVI Schools Lead by Example on Energy Efficiency

Earlier this year, Gov. John P. de Jongh Jr. announced that Energy Systems Group (ESG), an energy services and performance contracting company, was selected to implement energy efficiency upgrades at 11 USVI schools—four on St. Croix and seven on St. Thomas.

The first phase of the project kicked off in March, and all 11 building energy retrofits are on target to be completed in September 2011.

"We are excited about this project because of the tremendous impact on our facilities and ultimately in the reduction of our utility bills," said Education Commissioner La Verne Terry.

The building energy retrofits were made possible by \$6.9 million in ARRA funds administered through VIEO. The savings captured from reduced consumption, which are guaranteed to save the government more than \$11 million over a 10-year term, will be used to offset operational costs for the Department of Education and for upgrades at other public schools and agencies.

Noting that the project also presents the department with a platform from which to lead by example, Terry said, "We are going to use this as a teaching opportunity to change children's behavior as it relates to conserving energy."

ESG President Greg Collins commended the Virgin Islands government, the Department of Education, and VIEO for their commitment to sustainability and energy efficiency, noting that the energy efficiency upgrades will provide numerous environmental and economic benefits for the territory.

Pointing to the very aggressive energy efficiency goals that have been established for the government of the Virgin Islands, EDIN-USVI Dir. Karl Knight said, "This project demonstrates what is possible—what the potential return on our investment can be."

Local Businesses Partner with EDIN-USVI to VInenergize the Community

Several members of the Energy Efficiency working group represent local businesses with a strong commitment to advancing the territory's clean energy goals. These members have dedicated significant time and resources to the EDIN-USVI project over the past several months.

Vlenergize Partner Quality Electric Supply has exhibited its dedication to the cause on many fronts: The company sponsored a tropical environment energy workshop, paired with Miguel Quiñones of VIEO in presenting the value and benefits of energy-efficient modifications in the hospitality industry to the Hotel and Tourism Association, and is partnering with VIEO on the Worthwhile Investments Save Energy (WISE) program.

Local green architect Luis Huertas, in collaboration with Sean Corsaut of Horizon Energy Systems VI, Genie Lupo of Asencios Construction, and Jay Silva of Silva Energy, has been leading the charge to develop a USVI Green Resource Directory (GRD).

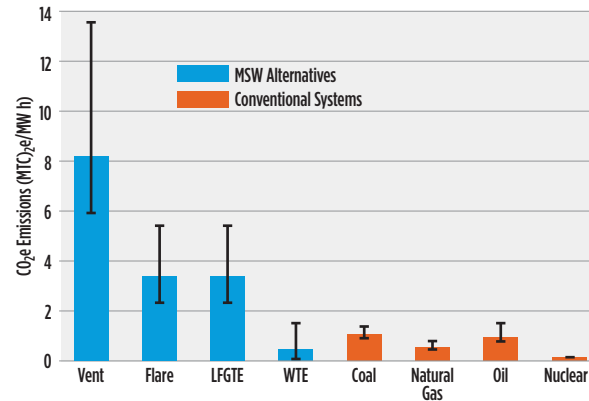
By recognizing and promoting local businesses that offer technically sound green products and services, the GRD will provide a valuable resource for VI residents and businesses seeking expert guidance on reliable vendors in the clean energy sector. The GRD application, as well as the directory itself, will be hosted on the VIEO website.



These Energy Efficiency working group members have submitted letters of intent to solidify their commitment to the EDIN-USVI project by becoming Vlenergize Partners. Their applications have been approved by the EDIN-USVI directors, and an official announcement on Vlenergize Partnerships is planned for the September workshop.

Renewable Energy

Renewable Energy Working Group Examines Waste-to-Energy Option



Comparison of CO₂ emissions from landfill gas-to-energy, WTE, and conventional electricity-generating technologies.

Illustration by NREL

The Renewable Energy working group has completed its technical analysis of waste-to-energy (WTE) as one potential solution to the territory’s energy and waste management challenges.

The study examined the state of the art in WTE technologies used in the United States, while also investigating their associated emissions and life-cycle environmental impacts.

The study, detailed in the *Waste-to-Energy Evaluation—U.S. Virgin Islands* report published by the National Renewable Energy Laboratory (NREL) in August,

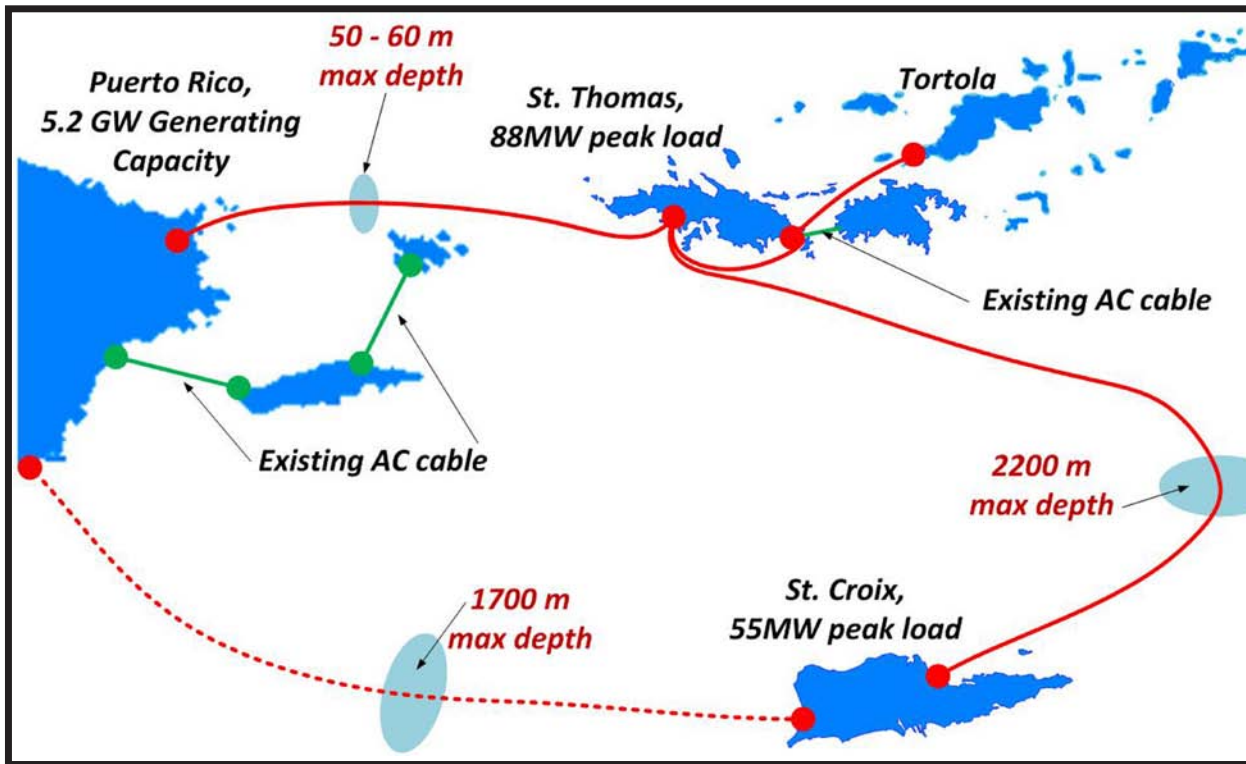
found that modern WTE technologies are able to meet all U.S. Environmental Protection Agency and European Union standards and that carbon dioxide (CO₂) emissions from these systems compare favorably to other waste-disposal options and to conventional sources of power. For example, Kaplan, Decarolis, and Thorneloe conducted a comparative analysis of air emissions from WTE and landfill gas-to-energy (LFGTE) operations in 2009. Their findings, summarized in the NREL report, indicate the carbon

footprint of WTE plants, as measured in metric tons of CO₂ emitted per megawatt-hour, is three to four times lower than comparable LFGTE systems.

Concluding that WTE has the potential to provide a clean, cost-effective energy and waste-management solution for the territory, the report recommends that the USVI “establish a recycling program for glass and metals, while using



Many Virgin Islands residents have taken advantage of rebates offered through VIEO for renewable energy systems. This 10-kW PV system is located on Skyline Road on St. Thomas, overlooking Charlotte Amalie. Photo from Don Buchanan, VI Energy Office



Map of potential undersea cable routes for island interconnection. Illustration by Vahan Gevorgian, NREL

the remainder of municipal solid waste feedstock as fuel for a WTE facility using modern conversion technology and emissions control equipment.”

The full report is available for downloading at edinenergy.org/usvi.html.

Solar PV Takes Off in the USVI

Solar energy is making its mark in the USVI, as evidenced by several large-scale solar PV systems that have been installed in the territory this summer. Visitors to St. Thomas are now greeted by a 451-kilowatt (kW) PV system that flanks the landing strip at Cyril E. King Airport. The new system, which was funded by a \$2.9 million DOE grant under ARRA, will produce 600,000 kilowatt-hours of clean power for the VI Port Authority for years to come.

Meanwhile, several mid-sized systems are also popping up around the islands. One such system, located on Skyline Road overlooking Charlotte Amalie bay, is providing the home of St. Thomas resident Nejeah Yusef with clean solar power.

Preparing to build on EDIN-USVI's early PV successes, the Virgin Islands Water

and Power Authority (WAPA) has released a request for proposal (RFP) for 10 megawatts (MW) of solar PV to be installed across St. Thomas and St. Croix. These systems will take advantage of available roofs and open spaces that have been identified across the territory to generate clean power for the utility. Responses to the RFP are due September 27, 2011.

Study Shows Island Interconnection Is a Win-Win for WAPA, Ratepayers

In July, Siemens Power Technologies delivered the final Phase I report of a study commissioned by WAPA to determine the feasibility of a proposed undersea electric interconnection between Puerto Rico and the Virgin Islands. The study, which was funded in part by a DOE grant administered by VIEO, confirmed that the project is not only feasible but would greatly improve service reliability, lower utility rates, and reduce carbon emissions.

The study determined that the most advantageous interconnections would be from Puerto Rico to St. Thomas and from St. Thomas to the British Virgin Island of Tortola. Another cable could run from Puerto Rico to a new substation that

will be located on St. Croix's west end. An extended grid would benefit many of the Caribbean islands, all of which are highly dependent on fossil fuel for power generation.

According to WAPA Executive Dir. Hugo Hodge Jr., WAPA is eager to pursue this project because it will enable the utility to reduce its dependence on fossil fuel while also helping to ensure that customers receive uninterrupted service.

“We are on a daily mission to improve reliability and reduce power costs in the territory,” Hodge said. “Establishing an electric grid with Puerto Rico and the British Virgin Islands is a very good beginning because it guarantees that whether or not the sun shines or the wind blows, WAPA will be able to meet customer demand for power.”

Phase II of the Siemens study, which is currently under way, will further evaluate the integration of renewable energy into WAPA's grid and how it will impact the proposed interconnection with Puerto Rico.

Transportation

Transportation Working Group Finalizes Petroleum Reduction Plan

Ground transportation accounts for 40% of fossil fuel use in the USVI, and the Transportation working group has been busy compiling a plan to reduce that 60% by 2025. Their work was informed by and has built upon the USVI Department of Public Works' 2030 USVI Transportation Master Plan.

The goal of reducing petroleum use 60% by 2025 is daunting. And, as with any daunting goal, this one needs to be broken down into achievable steps. The "wedge analysis" tool the Transportation working group used to develop its

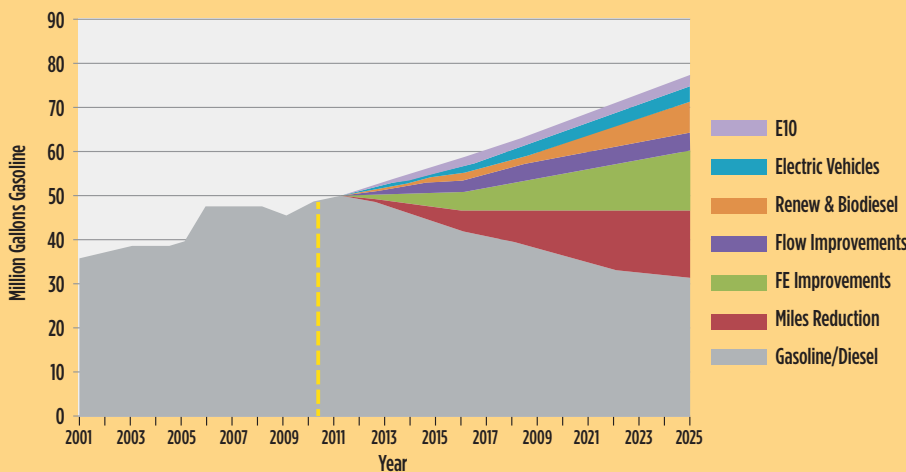
U.S. Virgin Islands Transportation Petroleum Reduction Plan does just that.

The tool takes the projected fuel use from the graph shown below and enables that amount to be decreased by "wedges" until the goal is reached. Wedges are shaped as such because the displacement from each one grows as projects get under way. This analysis tool allows the user to play with different scenarios for reaching the goal and thereby formulate a viable plan of action.

After examining a variety of options, the Transportation working group settled on a scenario that is aggressive but achievable on all fronts.

To view the full report, visit edinenergy.org/usvi.html.

USVI Transportation Fuel Use Reductions



Reduction wedges to meet the 60% transportation petroleum reduction goal by 2025.

Illustration by NREL

USVI: Embracing Energy Innovation, Influencing Change

Technical Assessments Inform Path Forward for EDIN-USVI Project

Achieving a 60% reduction in fossil fuel-based energy use in 15 years requires significant up-front planning.

Following a model developed by NREL through its work on other island energy projects, the EDIN-USVI working groups have made considerable headway. Eighteen months since the USVI project

launched, they are deep into the planning and assessment phases of the three-part community energy planning process. Much of their work over the past year has been dedicated to technical assessments needed to establish a viable path forward.

Several key analyses have been completed, and the resulting reports are available for download at edinenergy.org/usvi.html. These reports, which are summarized on the following page, explore the opportunities, barriers, and decisions that must be made if the territory is to achieve its audacious clean energy goals.

A Model for Energy Planning

The EDIN-USVI working groups are contributing to the community energy planning process.

Plan

The planning phase includes these steps:

- Create a vision
- Bring the right people together.

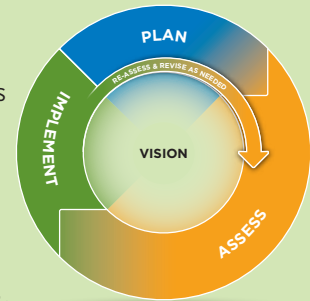


Illustration by NREL

The goal of this phase is to create a vision for the community's energy transformation.

Assess

The assessment phase includes these steps:

- Determine an energy baseline
- Evaluate options
- Develop goals
- Prepare a plan
- Get feedback on the plan from a broad set of stakeholders.

The goals of this phase are to:

- Determine the community's energy baseline
- Establish specific, measurable, attainable, relevant, and time-bound goals for energy transformation
- Put the goals into a plan for action.

Implement

The implementation phase includes these steps:

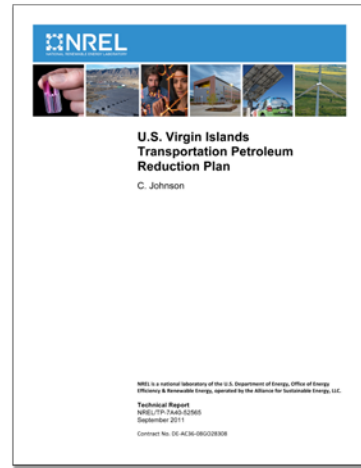
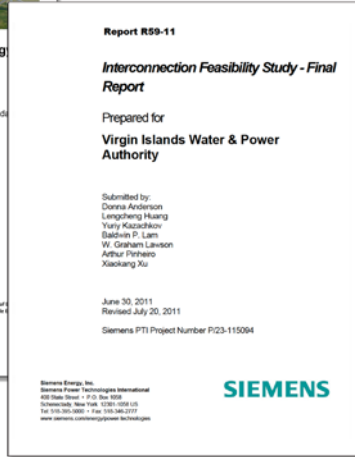
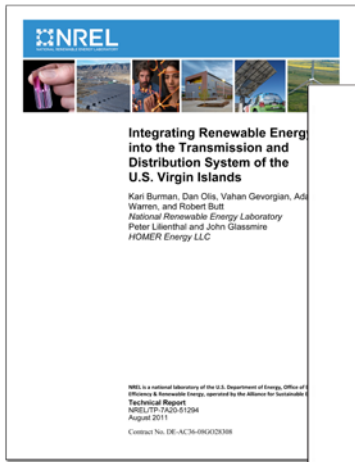
- Develop, finance, and implement projects
- Create early successes
- Evaluate effectiveness and revise as needed.

The goals of this phase are to:

- Implement energy projects that can build community support for ongoing and future energy projects
- Measure the progress and effectiveness of the plan and its projects.

For more information, search "community energy tools" at openei.com.

Technical Reports Inform Path Forward for the USVI



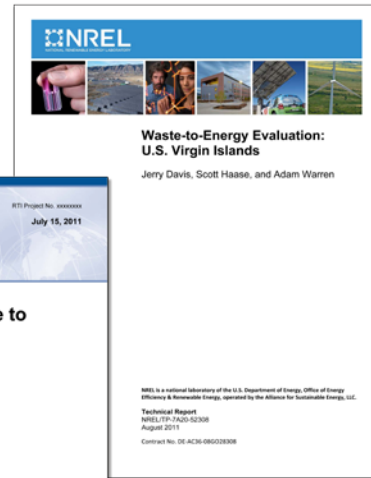
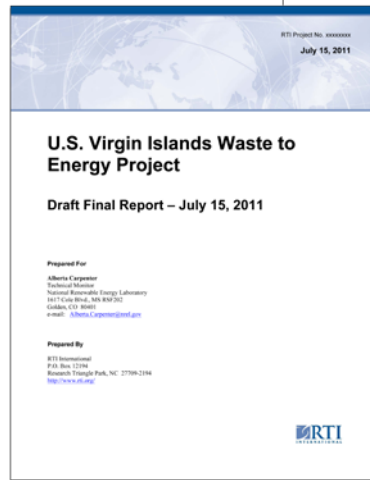
U.S. Virgin Islands Transportation Petroleum Reduction Plan—Using the USVI Department of Public Works’ 2030 USVI Transportation Master Plan as a foundation, the Transportation working group conducted analyses that informed its updated plan for reducing fossil fuel-based energy use 60% by 2025.

Integrating Renewable Energy into the Transmission and Distribution System

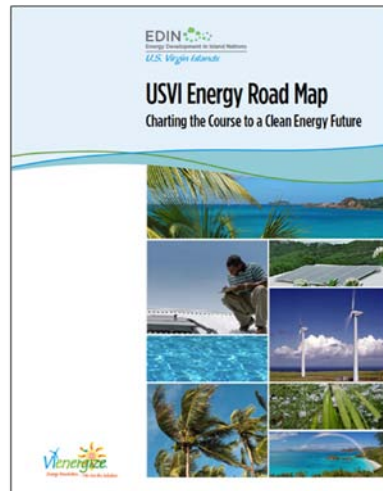
Sources of renewable energy, such as wind and solar, differ from conventional energy sources in that they are intermittent, which means they are not under the control of the utility. Significant planning is required to ensure that the intermittent nature of the power they produce does not compromise the reliability of the electrical system. One potential solution to address this challenge is a proposed interconnection of the USVI and surrounding islands’ electrical grids in the future.

Two reports, one on renewable energy integration and one on interisland transmission, were completed over the summer. Both examine the feasibility of integrating renewable energy technologies into the USVI transmission and distribution systems, including:

- The economics of deploying utility-scale renewable energy technologies on St. Thomas and St. Croix
- Potential sites for installing roof- and ground-mount PV systems and wind turbines
- The impact of renewable generation on the electrical subtransmission and distribution infrastructure
- The economic and technical viability of a 100- to 200-MW power interconnection of the Puerto Rico Electric Power Authority (PREPA), WAPA, and British Virgin Islands grids via a submarine cable system.



Waste-to-Energy Evaluation—Unlike wind and solar, WTE systems provide sources of renewable energy that are “dispatchable”—that is, under the control of the utility. Of course, pollution controls are important if this source of renewable energy is to be used. The Renewable Energy working group oversaw the publication of two reports exploring the state of the art in WTE technology, WTE emissions, and the implications for the USVI.



USVI Energy Road Map—The road map explores the technical, policy, and economic challenges to reducing the amount of fossil fuel used to generate electricity and water for the territory. The road map is presented in two publications, a brochure and a technical report.

To download these reports, visit edinenergy.org/usvi.html



USVI Leads the Way to a Sustainable Energy Future for the Caribbean Region

With a nod to the leadership role the USVI has taken on the clean energy front, the Caribbean Electric Utility Services Corporation (CARILEC) has selected St. Thomas as the venue for the CARILEC 2011 Renewable Energy Forum. The event will take place on September 20-21 at Sugar Bay Resort.

CARILEC's first-ever forum dedicated solely to renewable energy will focus on Caribbean grid integration and energy diversification, providing an opportunity for energy leaders and experts to present innovative ideas and solutions to the region's shared energy challenges.

Speakers from NREL, the Organization of American States, and the Caribbean Renewable Energy Development Programme (CREDP), as well as several regional utilities and leading energy services providers, will highlight what is already being done in the region and share insights on policies, programs, technologies, and investment opportunities.

Billed by CARILEC as a call to action for developing "one common strategy, one common purpose, and one common action plan" for the region, the event will serve as an opportunity for the EDIN-USVI project partners to network with regional energy leaders and exchange best practices and lessons learned on the path toward a clean energy future for the Caribbean.

The forum will provide an international platform for the USVI to showcase the progress it has already made toward its aggressive clean energy goals and to demonstrate clear leadership in the areas of energy security and sustainability.



CARILEC

An Association Of Electric Utilities

If you are interested in participating in the transformation of the USVI's energy future, we welcome your help!

Please contact anyone on the list below to get involved. We look forward to hearing your ideas and working with you.

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To learn more about the EDIN-USVI energy revolution and how you can be part of the solution, please visit:

edinenergy.org/usvi.html



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