STATEMENT
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REGARDING ENERGY AND INFRASTRUCTURE CHALLENGES AND OPPORTUNITIES IN ALASKA, HAWAII, AND THE U.S. TERRITORIES

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Chairman Murkowski and members of the Committee on Energy and Natural Resources, thank you for the opportunity to testify on the energy efforts of the Office of Insular Affairs in the U.S. territories. The Office of Insular Affairs (OIA) is responsible for coordinating Federal policy relating to the territories of Guam, American Samoa, the United States Virgin Islands (USVI), and the Commonwealth of the Northern Mariana Islands (CNMI). OIA also administers the financial assistance provided to the freely associated states (FAS) of the Federated States of Micronesia (FSM), the Republic of the Marshall Islands (RMI), and the Republic of Palau under the Compacts of Free Association. Our mission is to help the insular communities by promoting government efficiency, fostering economic development opportunities, and improving quality of life issues.

HISTORY OF THE OIA ENERGY PROGRAM

The U.S. territories face higher energy costs than the rest of the nation. The average residential rate for electricity is about $0.37 per kilowatt hour (kWh). This is about three times higher than the U.S. national average cost of electricity. The territories are also nearly 100% dependent on imported fossil fuels for electricity generation. The cost of imported diesel fuel is not only high, but also volatile, thereby making it difficult for territorial governments to conduct long-term energy planning.

The OIA Process -- with Partners NREL and Territories

To combat the high cost of electricity, the Office of Insular Affairs entered into an inter-agency agreement with the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) in 2010 to help the territories—

(1) establish baseline energy system data,
(2) form energy task forces,
(3) develop long-term strategic energy plans, and
(4) formulate energy action plans.

Baseline Assessment. In 2011, NREL published initial technical assessment reports that provided baseline energy system data including fossil fuel consumption and costs, electrical generation system profiles, inventories of policies and regulations, and detailed analyses of wind, solar, biomass, waste to energy, and energy efficiency opportunities for each of the territories.

As an example, the following table highlights current energy efficiency and renewable energy opportunities for Guam by designating them a low, medium, or high priority for impact from the Guam Energy Assessment.

Table 1. Energy Efficiency and Renewable Energy Opportunities and Potential Impacts

Opportunity Description	Impact Potential
Create a strategic plan to investigate and implement energy efficiency and renewable energy where technically appropriate and feasible	High
Increase energy efficiency standards in building codes	High
Further development of the Cotal 20 MW wind site with concurrent social acceptance outreach	High
Initiate a cool-roof program	Medium - High
Assess the potential for solar hot water heating in different sectors	Medium - High
Increase energy awareness through island campaigns	Medium - High
Continue to evaluate potential for sea water cooling project	Medium
Establish subcommittee to review options for possible modifications to PL 25-175	Medium
DOD and GPA continue to work together to evaluate the geothermal potential	Medium
Set an energy efficiency standard for island appliances and air conditioning equipment	Medium
Outdoor lighting technology and control improvements	Low

Guam Initial Technical Assessment report, NREL/TP-7A40-50580, April 2011

Territorial Energy Task Forces. Energy task forces in American Samoa, the CNMI, and Guam were established by territorial executive orders in 2011 and met regularly from 2011 through 2013. These task forces were composed of technical and policy experts representing a broad range of stakeholders including utilities, energy offices, academia, commercial sectors, environmental agencies, and legislative bodies. The task forces had the responsibility to identify comprehensive and implementable energy strategies that would reduce the territories' reliance on fossil fuels.

Strategic Plans. In 2013, each of the territories published a strategic energy plan that built on each territory's initial assessment report as well as the meetings of the energy task forces. The strategic energy plans provide island-specific policy options, energy efficiency and renewable energy deployment strategies, education and outreach campaigns, and technology-specific analyses and alternatives.

Action Plans. Shortly after the release of the strategic energy plans, each territory published an energy action plan detailing key strategies that can be implemented in the short term to help achieve goals outlined in the strategic energy plans. The energy action plans include specific actions, timelines, performance metrics, and details of the party responsible for implementing each strategy. The energy plans are meant to be living documents that are updated regularly by the energy task forces as circumstances change.

As an example, the American Samoa action plan lists strategies with their related actions and deadlines:

Table 1. American Samoa Petroleum Reduction Strategies

STRATEGY	ACTIONS	STRATEGY DEADLINE
Strengthen the institutional capacity of ASREC	• Hire a part-time coordinator • Develop proposal(s) for submission to the Empowering Insular Communities (EIC) grant program	July 10, 2013
Make Manu'a 100% renewable energy dependent by 2016	• Deploy photovoltaics (PV) on Ofu and Ta'u • Conduct initial engineering studies for a transition to 100% renewable energy on Manu'a	October 1, 2016
Deploy wind and solar power on Tutuila	• Conduct a prefeasibility study for grid integration • Issue a request for proposal (RFP) for a grid integration study • Determine the viability of issuing RFPs for wind and solar independent power producers (IPPs)	October 1, 2016
Assess the potential for geothermal power on Tutuila	• Conduct preliminary evaluation (Phase I) • Conduct resource confirmation (Phase II)	October 1, 2016
Develop hydroelectric power resources	• Develop a proposal for a feasibility assessment of the Fagatogo Hydroelectric Complex for submission to the EIC grant program • Develop an engineering design/architectural design, and access and trail design proposal, for the next round of funding based on the results of the feasibility study • Develop a restoration proposal for the next round of funding based on the results of the engineering and architectural design work	October 1, 2015

Energy Development in Island Nations (EDIN) in the U.S.Virgin Islands

On a slightly different track, the U.S. Virgin Islands was selected as the U.S. pilot project for the international Energy Development in Island Nations (EDIN) initiative due to the territory's high energy prices, its interest in energy efficiency and renewable energy, its close proximity to the mainland U.S., and its manageable size.

The Department of the Interior (DOI) and Department of Energy (DOE) provided technical assistance to the USVI throughout the initiative. In September 2011, NREL published the "U.S. Virgin Islands Energy Road Map" which outlines a path for achieving the territory's goal of reducing its dependence on fossil fuel by 60% by 2025. In accordance with the Energy Road Map, the USVI has implemented several renewable energy and energy efficiency initiatives including solar, wind, landfill-gas-to-energy, liquid propane, biomass energy, and energy efficiency upgrades in homes, schools, and businesses. As of December 2013, the territory has already achieved a 20% reduction in fossil-fuel energy consumption. The EDIN initiative sun-setted in December 2013. However, DOI and DOE continue to support the V.I. through the V.I. Energy Office and Water and Power Authority's V.I. energize Services Unit.

In the summer of 2013, the U.S. Virgin Islands announced the signing of a seven-year deal with Vitol Group to convert their power plants from diesel fuel to liquid propane. The conversion to propane is expected to reduce the USVI's fuel costs by 30% and reduce greenhouse gas emissions by 15%. The Vitol Group will finance all capital costs associated with project construction and the conversion is expected to be complete by September 30, 2015.

Capacity Building Support for the Insular Areas

The Office of Insular Affairs also provides financial support for energy capacity building in the insular areas through its financial support of Pacific Power Authority (PPA) programs and the Pacific Lineman Training Program (PLT). The PPA is an inter-governmental agency that promotes technical training, the exchange of information, and the sharing of management and engineering expertise. Its objective is to improve the quality of power in the Pacific region. OIA funding has been used for engineer capacity building

workshops, board member workshops, billing system training, and studies in the insular areas.

As an example, OIA funded a PPA workshop for the Engineers in Demand Side Management (DSM). In the past, there has been limited work by the utilities in energy conservation on the demand side, and this is a critical area for utility focus in their ongoing efforts to reduce fossil fuel consumption. Fossil fuel consumption reduction will help to reduce the amount of imported fuel, which improves economies and sustainability of insular areas.

OIA has also funded the Pacific Lineman Training, which yields substantial cost savings. Improved competency has been documented to improve the system reliability. Equipment failures and power outages are reduced, resulting in lower maintenance and repair costs, and less revenue loss. The system improvements and cost savings are vitally important to the financially struggling island power utilities.

The 2015 Pacific Lineman Training grant will fund 30 weeks of training for a minimum of 82 insular area linemen from American Samoa, Guam, CNMI, Yap, and Chuuk. The advanced training in construction of power distribution systems will enable Chuuk Public Utility Corporation to rebuild properly the distribution system on Weno, in Chuuk State that was damaged during Typhoon Maysak.

IMPLEMENTATION

Empowering Insular Communities

Now that the energy plans have been finalized by the governments of each of the territories, the Office of Insular Affairs' current focus is assisting the territorial governments with the implementation of those plans. The Office of Insular Affairs (OIA) administers the Empowering Insular Communities (EIC) grant program at about $3 million annually. The EIC program was first funded in fiscal year 2011 and has played a crucial role in supporting the highest-priority projects identified in the territories' strategic energy plans. Some project highlights include funding support for geothermal exploration drilling programs in American Samoa and the CNMI, a wind pilot project in Guam, solar panel systems for the hospitals on Guam and the

CNMI, and the integration of a hybrid renewable energy system in American Samoa to bring the Manu'a islands close to 100% renewable energy.

Manu'a. The Manu'a islands are a group of three islands located about 70 miles east of the main island of Tutuila. With the use of EIC funding the American Samoa Power Authority is planning to install a 341 kilowatt (kW) solar panel system along with a battery backup system integrated with the existing diesel generators. Soon after solar panels are installed the utility company will install wind turbines to reach 100% electricity generation from renewable energy. Once complete, the hybrid renewable energy system will be one of the first of its kind in the world.

Commonwealth Utility Corporation. OIA is funding an Integrated Resource Planning (IRP) effort for the Commonwealth Utility Corporation (CUC) in the CNMI for $500,000. The Integrated Resource Plan provides an opportunity for the Commonwealth Utility Corporation to address its current and future energy needs in a structured, comprehensive, and transparent manner. It also provides a chance for interested parties both inside and outside the region to review and provide input for planning decisions. In an effort to arrive at a holistic plan that will meet CUC's long-term energy needs, the IRP will include a comprehensive set of strategies that address plausible resource scenarios and outline the analytical steps needed to objectively evaluate those resource scenarios. Our contractor, NREL, is acting in an advisory capacity, providing both technical and process support.

Guam Memorial Hospital. OIA recently awarded a $500,000 EIC grant award to the Guam Memorial Hospital to install a rooftop solar panel system. As a facility that operates twenty-four hours a day seven days a week, the hospital is one of the largest energy consumers in the territory. The project supports Guam with its energy goal to generate five percent of electricity from renewable energy by December 2015.

DOI Remote Community Renewable Energy Partnership (RCRE)

The Department recognizes that many rural Alaskan communities and other remote jurisdictions in Alaska experience significant energy and infrastructure challenges. For example, of Alaska's approximately 270 communities, roughly 220 are considered rural in that they lack roads and

are only served by air or water-borne transportation. Of the 220 rural communities, 180 are primarily or solely reliant on diesel fuel for electricity generation and space heating. This dependence on diesel makes the communities subject to extremely high prices and environmental risk, thus constraining economic growth and self-reliance.

Given DOI's trust responsibility for the many Alaska Native residents of these communities, DOI has recently begun to partner with other federal agencies, the State of Alaska, the University of Alaska's Alaska Center for Energy and Power, local utilities and other interested parties to address the situation. Since 2013, the Department has prioritized the Remote Community Renewable Energy (RCRE) partnership to assist Alaskan rural communities in their energy needs. Led by the Department of Energy's (DOE) National Renewable Energy Lab (NREL) staff, RCRE seeks to replace diesel generation in rural Alaska by developing a standard package of technologies that can more efficiently integrate renewable energy into micro-grids[1].

The initial geographic focus of RCRE in Alaska started with $600,000 commitment. Phase 1a included $300,000 to define the project, conduct market and technical analyses and coordinate with partners at DOD, DOE and State. The next $300,000 will include $200,000 to analyze a village hybrid power and micro-grid system utilizing 20 to 30 percent renewable sources, and how that may be leveraged to a 50 to 75 percent renewable contribution. The remaining $100,000 will be used to develop a detailed analysis of how water treatment and pumping could be used as an energy storage mechanism within the context of these hybrid remote power systems.

The main challenges include developing electronic control systems to maximize the amount of renewable energy that can be placed into the system and right-sizing existing renewable generation and storage technologies. Along with the technology, capacity building for local utilities must ensure that their personnel can monitor, diagnose and address issues with equipment with little local support.

[1] A micro-grid serves a small area such as a rural, Alaska Native Village or university campus and may or may not have the potential to connect to a larger grid system such as exists within the so-called "Railbelt", which provides power to 75% of the State of Alaska's population.

RCRE's long-term objective is to develop modular, scalable hybrid power systems to reduce costs associated with the use of diesel fuel in remote, isolated communities. The initial RCRE target is focused on isolated communities below 2 megawatts. The technical objective is to provide up to 75 percent of isolated communities' thermal and electric power needs from local renewable resources, up-to-dated storage and controls, and modern, efficient diesel engines.

For the territories, we in the Office of Insular Affairs are proud of the RCRE Manu'a initiative. The goal is to have one village operating with greater than 50 percent renewables by the end of 2016, and later at 100 percent renewables for all three of the Manu'a islands.

CHALLENGES

Funding. The greatest challenge we face is the lack of funding for high priority projects identified in the strategic energy plans.

Some of the EIC grant projects must be supplemented with funding from OIA's Capital Improvement Project (CIP) and Technical Assistance programs—programs that are already stretched thin. For example, the American Samoa Power Authority is currently installing a 1.2 megawatt (MW) solar power system that is funded entirely with CIP funding amounting to about $1.8 million. In addition, the $2 million Guam wind turbine pilot project is mostly funded with CIP moneys as well as the $1.7 million geothermal exploratory drilling program in the Commonwealth of the Northern Mariana Islands.

OIA's current agreement with the NREL is scheduled to expire on September 30, 2015, and OIA has not yet identified a funding source to continue this important partnership, although some carryover funding may be available.

Puerto Rico. Public Law 113-235 included a provision for energy planning in Puerto Rico that would be funded by the Office of Insular Affairs. NREL's cost estimate for including Puerto Rico is $331,000. With no appropriation for this effort, OIA's EIC grant program would likely suffer.

High and Volatile Energy Costs. The insular areas are currently heavily dependent on imported petroleum for both power generation and transportation. The volatility of fuel prices makes long-term energy planning difficult in all of the insular areas, and affects energy security in the Pacific territories because their primary source of fuel is Asia. Remote locations lead to high shipping charges, which are themselves affected by fuel price volatility as the ships run on petroleum.

High and unpredictable energy project development costs. New energy projects face a number of significant challenges, including:

- The scarcity of local energy sector data for making informed decision.
- Absence of strong local regulations designed to ensure orderly development of energy projects.
- Absence of technical and process expertise for vendor selection.
- High shipping costs and long lead times that slow projects.
- Lack of engagement by the public, landowners, and local leaders that results in a lack of community support.
- Need to engage differing priorities as a single project -- such as energy consumption in the power and transportation sectors, disaster resiliency, solid waste handling, wastewater treatment, and climate change adaptation.
- A lack of enabling policies to reduce fossil fuel consumption and promote the growth of renewable energy – such as effective net metering laws, grid integration strategies, and alternative transportation plans.
- Failure to address post-construction operations and maintenance needs and financing.

OPPORTUNITIES

Although the challenges are many, we feel there are still significant opportunities for the territories to reduce the cost of electricity, diversify their supply of energy and become less dependent on imported diesel fuel. For example, the U.S. Virgin Islands already has achieved a 20% reduction in fossil-fuel energy consumption and has seen a significant drop in energy costs over the past year, with rates dropping from $.51/kWh to about $.39/kWh; V.I. rates may be even lower today.

The President's 2016 budget includes $4.4 million for pursuing sustainable energy strategies already identified in the territories' strategic energy plans. Additional opportunities present themselves:

- Territorial issuance of RFPs to implement ideas already identified in existing energy plans.

- Conducting energy audits, especially of major users, and to implement energy efficiency.

- Collection and analysis of wind and solar data in all insular areas.

- Development or updating of integrated resource plans (IRPs) with the utilities in each insular area to ensure that short-term actions serve long-term needs.

- Development of action plans that simultaneously address the interrelated issues of energy such as climate change, security and disaster resiliency, along with waste disposal and waste-to-energy initiatives.

- Study sustainable transportation alternatives to reduce consumption of petroleum.

- Actions to reduce financing risks for private sector investors and developers.

- Ensure that operations and maintenance needs and financing are addressed along with local workforce training.

- Install prepay meters in all territories to yield savings in electric consumption amounting to 10 to 30 percent.

Solutions to energy issues are always pressing, with significance for the environment, financing of territorial governments and the well-being of island societies as a whole. In recent years, the Office of Insular Affairs has played an important role in ameliorating energy problems in the territories. In the years to come, we expect to continue efforts that lead to new energy solutions.