

# Little St. James Island

## *Solar Photovoltaic, Wind & Energy Storage Proposal*

**February 22, 2013**

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Jeanne Brennan  
LSJ, LLC  
6100 Red Hook Qtr B3  
St. Thomas, VI 00802

-----Submitted via email -----

REF: Little St. James Island  
**RENEWABLE ENERGY PRODUCTION PROPOSAL**

Dear Ms. Brennan:

Toshiba International Corporation (“Toshiba”) is proud to provide this preliminary proposal to evaluate and develop a renewable energy production system for island of Little St. James. Per our discussions we have provided you with several different options to evaluate and consider.

Toshiba is a market leader in the development, installation and operations of fossil, nuclear and renewable energy power plants worldwide. We have developed and installed power plants as small as a few hundred kilowatts up to and exceeding 1,500 MWs. Our innovative power and electronic products along with our conservative design approach has yielded consistent customer satisfaction.

It will be important for you as the owner of this project to choose a provider that has not only the experience and capabilities to ensure your system functions as designed but also has the financial wherewithal to stand behind the project’s performance. TIC has already installed the largest commercial PV system in the Virgin Islands for a big box retailer and is currently in the process of implementing a utility scale solar project for WAPA on the island of St. Croix.

We look forward to discussing these options with you at your convenience.

Regards,

*Mark Lonkevych*  
Business Unit Manager

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**Toshiba International Corporation (“Toshiba”) proprietary information for use by TIC designated recipient.**

This Proposal is confidential and proprietary to Toshiba and is submitted to you for your evaluation purposes only. The information contained herein may only be disclosed to your employees or representatives who have a "need to know" in order to properly evaluate Toshiba's response for you and who have been informed of these confidentiality restrictions.

## Executive Summary

Toshiba International Corporation (“Toshiba”) has prepared the following high level overview of several different renewable energy production options for Little Saint James Island in the USVI. The first three options require LSJ to continue to purchase part of your power needs from WAPA while participating in WAPA’s renewable energy net metering program. The fourth option is based upon LSJ disconnecting completely from WAPA and the final option contemplates the sale of extra power to WAPA under a power purchase arrangement which is subject to WAPA’s agreement and participation.

The options are as follows:

1. Solar under WAPA’s Net Metering Program – Install a 100 kW<sub>AC</sub> solar photovoltaic system on the rooftops of the generator and desalination plant buildings, remain connected to WAPA’s grid and purchase all additional power at WAPA’s published rates.
2. Wind under WAPA’s Net Metering Program – Install a 100 kW<sub>AC</sub> wind turbine at the Kite House, remain connected to WAPA’s grid and purchase all additional power at WAPA’s published rates.
3. Wind under WAPA’s Net Metering Program with stand-alone solar for the desalination plant – Install a 100 kW<sub>AC</sub> wind turbine at the Kite House, a 70 kW<sub>AC</sub> solar photovoltaic system on the roof of the desalination plant and a 100 kW/100 kWh load leveling battery energy storage system. Other than the desalination plant the rest of the island will remain connected to WAPA’s grid and purchase all additional power at WAPA’s published rates.
4. Maximize solar and wind to disconnect from WAPA – Install a 100 kW<sub>AC</sub> solar photovoltaic system on the rooftops of the generator and desalination plant buildings, a 150 kW<sub>AC</sub> solar photovoltaic system at the Kite House location, a 250 kW<sub>AC</sub> wind turbine at the Kite House and a 200 kW/1,000 kWh battery energy storage system.
5. Maximize solar and wind assets with the intension of exporting power to WAPA – Install a 100 kW<sub>AC</sub> solar photovoltaic system on the rooftops of the generator and desalination plant buildings, a 150 kW<sub>AC</sub> solar photovoltaic system at the Kite House location and a 750 kW<sub>AC</sub> wind turbine at the Kite House.

## Preliminary Project Economics

Toshiba has developed these preliminary project economic analyses using budgetary information and very basic pricing models. None of the preliminary economics include any dollars for long term component replacement, insurance or cost of capital.

In evaluating these options it is important to not only look at first costs (simple payback) but also to understand the long term costs to operate and maintain these systems and supply fuel over a period of 20 to 30 years. Our analysis shows that options 1 - 4 should bring down the average cost of a kilowatt hour to between 30 and 40 cents. Option 5 could further reduce your average cost of a kilowatt hour below 20 cents however this option would require approvals and buy in from WAPA.

Table 1: Capital Costs and Savings

Options	Rooftop PV Solar	Kite House Wind Turbine	Kite House Ground Mounted PV Solar	Stand-Alone RO Plant PV Solar	Battery Energy Storage	VIWAPA Connection	Estimated Project Installation Cost	Estimated Engineering Cost	DC kW	AC kW	Estimated Annual Savings	Simple Payback	Annual Island Generation (kWh)	% of Annual Island Load
1	100 kW <sub>ac</sub> Net Metered Rooftop PV Solar System (140 kWp)					Yes	\$ 700,000	\$ 20,000	140	100	\$ 78,073	8.97	187,484	23%
2		100 kW <sub>ac</sub> Net Metered Kite House Wind Turbine				Yes	\$ 800,000	\$ 20,000	N/A	100	\$ 85,159	9.39	204,500	25%
3		100 kW <sub>ac</sub> Net Metered Kite House Wind Turbine		70 kW <sub>ac</sub> RO Plant Stand Alone PV Solar System (98 kWp)	100 kW/100kWh Load Leveling Battery Storage System	Yes	\$1,510,000	\$ 55,000	98	170	\$147,541	10.23	354,303	43%
4	100 kW <sub>ac</sub> Rooftop PV Solar System (140 kWp)	250 kW <sub>ac</sub> Kite House Wind Turbine	150 kW <sub>ac</sub> Ground Mounted PV Solar System (210 kWp)		200 kW/1,000 kWh Battery Energy Storage System	No	\$4,830,000	\$ 100,000	350	500	\$345,350	13.99	1,068,490	129%
5	100 kW <sub>ac</sub> Rooftop PV Solar System (140 kWp)	750 kW <sub>ac</sub> Kite House Wind Turbine	150 kW <sub>ac</sub> Ground Mounted PV Solar System (210 kWp)			Yes	\$4,250,000	\$ 95,000	350	1000	\$943,834	4.50	1,647,290	199%

Notes: The above table assumes an annual island consumption of 829,318 kWh from December 2011 to November 2012 at the billed VIWAPA rates (41 cents kwh). Option 5 assumes a \$0.014/kWh power purchase agreement with VIWAPA for power sold back to the grid.

## Next Steps

The next step would be to select one or two options to evaluate while at the same time facilitating a discussion with WAPA as to their interest in purchasing power from LSJ. The evaluation and detailed design phase costs are included in Table 1 above and can be started immediately. This phase will include site visits to examine the existing equipment and select final installation sites. The design will include all of the equipment and controls needed to construct a fully automated renewable energy power plant. At the conclusion of the detailed evaluation and design phase, the results will be presented to LSJ along with the updated costs to install, operate and maintain the systems. Should you select Toshiba to implement any of the options listed above the design fee above will be waived as it will be incorporated into the capital costs for each option.

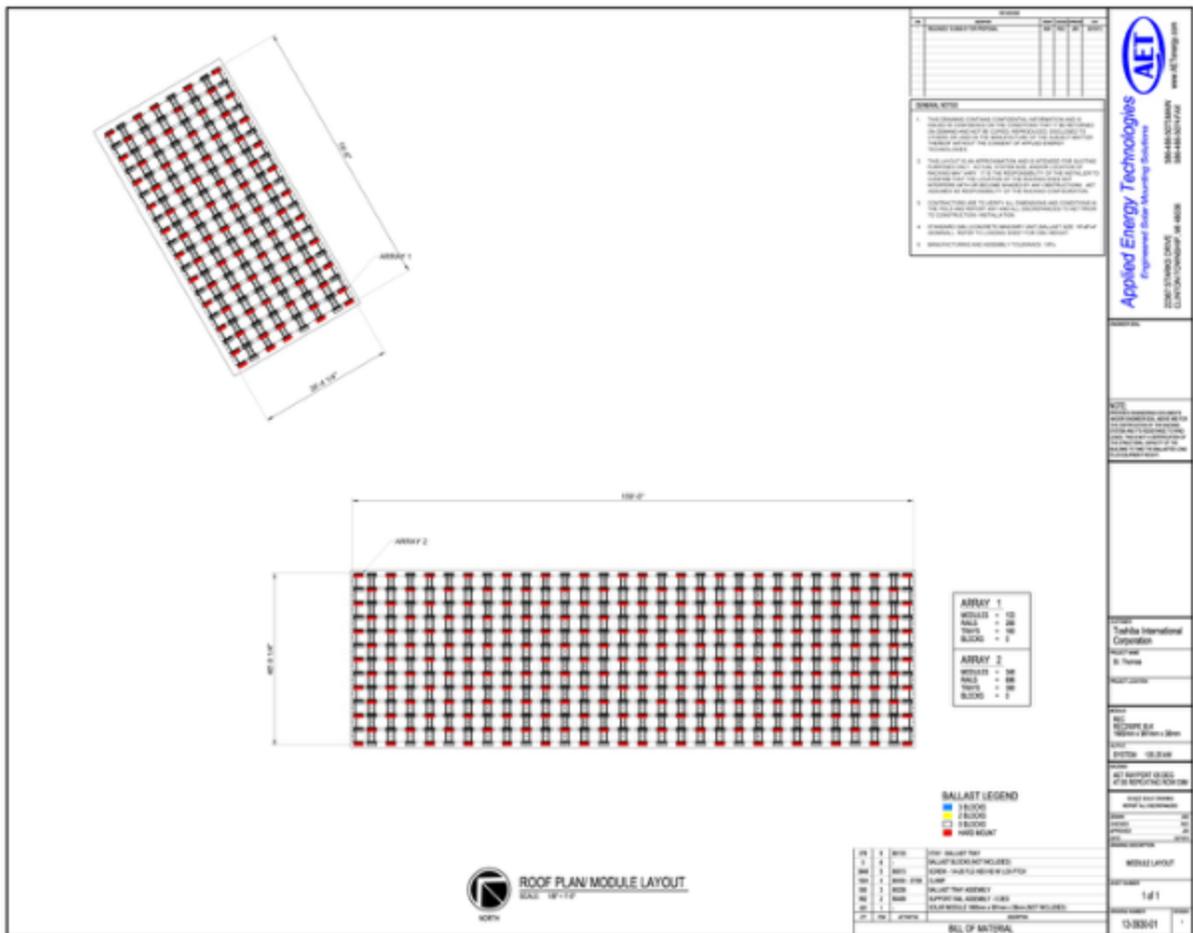
## Preliminary System Overview

Based upon the option selected by LSJ, Toshiba will evaluate and design the solar photovoltaic and wind energy generating plants and if applicable a battery energy storage system utilizing fixed tilt mono- or poly- crystalline solar modules, class IA/II wind turbines and lithium ion or other similar battery storage technology.

## Facility Descriptions

### Solar Photovoltaic Options

The 100 kW<sub>AC</sub> or 70 kW<sub>AC</sub> solar system options would be located on the roofs of the generator and desalination plant buildings. The 150 kW<sub>AC</sub> ground mounted PV system would be located on the grounds of the existing Kite House. All systems will be designed to withstand hurricane force winds and be resistant to corrosion.





The PV systems have conceptually been designed to be comprised of a fixed tilt photovoltaic solar system utilizing poly-crystalline solar technology or equal with the following specifications:

PV Module:	REC 250PE-BLK-US
Manufacturer:	REC Group
Interconnection:	480 VAC island distribution voltage
Inverters:	Various Sizes-480VAC PV Powered, Schneider Electric or equivalent
Fixed Tilt:	5° (roof), 16° (ground)
Azimuth:	10° Generator Bldg, 45° Desalinization Bldg, 0° Ground Mount
Racking Components:	Aluminum and/or stainless steel

Although not included in the options presented in this proposal there is a potential to install an additional 420 kWp (300 kWAC) of ground mounted PV solar in the shaded area below. This larger solar option would only be applicable to option 5 in which power would be exported to WAPA for their purchase.



**Wind Turbine Options**

We have specified three different size wind turbines; all certified for use in high wind marine environments. The 100 kW and 250 kW wind turbines can be lowered to the ground when high winds are expected. The 750 kW wind turbine remains erect during high wind events, but the turbine blades are held in a locked position. All of these turbine models are currently installed in the Caribbean and have survived hurricanes. We have preliminarily sited the wind turbine options at a location on the northern end of the Kite House plateau. The purpose of this is to reduce/eliminate shading on a ground mounted solar array in the same location.

Turbine Model: WES100  
 Manufacturer: Wind Energy Solutions  
 Rated Power: 100 kW  
 Interconnection: 480 VAC island distribution voltage  
 Cut In Speed: <3 m/s, (6.7 mph)  
 Cut Out Speed: 25 m/s (56 mph)  
 Wind Class: II



Turbine Model: WES250  
 Manufacturer: Wind Energy Solutions  
 Rated Power: 250 kW  
 Interconnection: 480 VAC island distribution voltage  
 Cut In Speed: <3 m/s, (6.7 mph)  
 Cut Out Speed: 25 m/s (56 mph)  
 Wind Class: II



Turbine Model: GEV MP C  
 Manufacturer: Vergnet  
 Rated Power: 250 kW  
 Interconnection: 480 VAC island distribution voltage  
 Cut In Speed: 3.5 m/s, (7.8 mph)  
 Cut Out Speed: 25 m/s (56 mph)  
 Wind Class: IIA



Turbine Model: U50  
 Manufacturer: Unison  
 Rated Power: 750 kW  
 Interconnection: 480 VAC island distribution voltage  
 Cut In Speed: 3 m/s, (6.7 mph)  
 Cut Out Speed: 25 m/s (56 mph)  
 Wind Class: IA



### Battery Energy Storage System Options

The battery systems have conceptually been designed to be comprised of Toshiba SCiB quick charging and long life battery cabinets with the following specifications:

Battery Cabinet:	SCiB
Manufacturer:	Toshiba
Rated Size:	54 kWh
Number of Cabinets:	37
Interconnection:	480 V island distribution voltage
Nameplate Capacity:	200 kW <sub>ac</sub> , 1,998 kWh <sub>ac</sub>
Battery Inverter:	(2) – 100kW-480V Toshiba



There are two different operating modes proposed:

1. For Option 3, the 70 kW<sub>ac</sub> stand-alone Desalinization Plant, a small battery energy storage system is needed to level the load of the plant during times when overhead clouds reduce the PV plant output to a level lower than is required to operate the plant.
2. For Option 4, the disconnected from WAPA option, a large battery energy storage system is needed to power the island whenever the sun is insufficient to supply the PV system with the required irradiance to meet the island load.

## Preliminary Proposal Assumptions and Clarifications

- Interconnection to the distribution system can be completed without major surprises (such as excessive costs or unreasonable delays). Interconnection can be completed within 1,500 feet of the edge of the array fields.
- There are no existing environmental conditions at the site which will prevent the project from being permitted by local, state, or federal authorities in a reasonable time frame. No wetlands, endangered species, etc. exist within the solar array boundary. Approvals from the DPNR can be obtained in a timely manner.
- Site storm water management requirements can be completed without major surprises (such as excessive costs or unreasonable delays) during construction.
- There are no significant underground obstructions. LSJ, LLC will locate any underground obstructions that may be in the path of proposed underground electrical cables.
- Design wind speeds are less than or equal to 145 mph.
- Land is suitable to support ground mounted structures. Only minor grading is required and no backfill, import or export of soils is needed.
- Galvanized steel posts ("H piles") able to be driven directly into the soil at an average rate of no less than 40 per hour per pile-driving machine. Required depth below grade to be not greater than 6 feet. Excludes delays caused by unforeseen subsurface conditions, such as rock, that may require drilling or other excess labor or a water table higher than the pile design depth which would require concrete foundations.
- Minimal if any removal of trees and/or grubbing is required
- We have not included sales tax on the construction of the system.
- Any costs for site recording, test excavation of archaeological sites, or formal evaluation of archaeological sites or historic resources are not included.
- Biological or environmental surveys will not be required for the site and if any such environmental documentation is required it shall be completed by LSJ, LLC.
- If desired, Toshiba will be responsible for O&M for a predetermined period at an additional cost.
- All output of the renewable energy project shall be used by LSJ, LLC. Toshiba is not responsible for low loads (present or future).
- It has been assumed that there are no land remediation issues at the proposed site.
- Proposed design and system costs will remain valid through March 2013, but pricing will remain indicative and subject to change based on market conditions, actual site conditions and final system configuration
- Insurance - Risk or Loss (Hurricane) has not been included in our cost estimate.

## Project Evaluation and Design Activities

Toshiba will begin the initial engineering and design of the renewable energy systems based upon the data we collect on site. The project design package will include:

1. The design and drafting of Solar PV, Wind & ESS installation plans, including:
  - a. Title page
  - b. Site plan
  - c. PV array plan
  - d. Building elevations (if applicable)
  - e. Balance-of-system (BOS) equipment details and elevations (racking, concrete pad, elevations, combiner boxes, re-combiners, disconnects, etc.) (if applicable)
  - f. PV array electrical plan (string diagram, conduit runs, etc.)
  - g. Wire diagram(s)
  - h. Electrical interconnection plan/details
  - i. System specifications
  - j. Labels & markings
  - k. PV array-to-inverter and ESS battery-to-inverter matching
  - l. PV and ESS string sizing calculations
  - m. Wind load calculations for PV mounting system and wind turbine provided by OEM or Structural Engineer (PE)
  - n. Structural analysis & calculations provided by OEM or Structural Engineer (PE)
  - o. NEC wire sizing calculations
  - p. Voltage drop calculations
  - q. Conduit fill calculations
  - r. Electrical Engineering review and seal/stamp
  - s. Structural Engineering review and seal/stamp (if applicable for concrete pad(s), enclosures, etc.)
  - t. ESS layout
  - u. ESS electrical plan
  - v. ESS thermal and auxiliary power distribution details (if applicable)
2. Permitting support, equipment research and trouble-shooting, technical support for installers, plan checkers, permit couriers/runners, field technicians, and engineers.
3. Deliverables will be electronic PDFs of 8-1/2" x 11", 11" x 17", and/or 22" x 34" sized plan sheets.

Toshiba is currently in the design phase of a PV solar and battery energy storage system demonstration project at our factory in Houston, TX. There may be synergies of developing these projects together.

## Toshiba Overview

As a leading global manufacturer and integrator of power systems, Toshiba is uniquely qualified to meet the power generation needs of today and tomorrow. Toshiba has pioneered many industry advancements with innovative and environmentally friendly products and services, representing more than 100 gigawatts of power throughout the world.

Toshiba boasts over 100 years of power systems experience, with over 40 years in the Americas. Toshiba's power systems expertise and experience includes:

- **Steam Turbine Generation** – over 1,700 units delivered worldwide; #1 provider in United States for past six years
- **Hydroelectric Generation** – over 240 hydroelectric turbines and 300 hydraulic generator units delivered
- **Nuclear Generation** – delivered 32 nuclear reactor units and constructed 112 nuclear power plants representing 110,000,000 MW of generation
- **Renewable Generation** – designed and constructed over 50 MW of distributed and utility scale solar power plants
- **Transmission and Distribution Systems**

Our rich history, paired with our focus to be one of the world's foremost eco-companies, has sparked Toshiba's commitment to provide customers with renewable energy and smart grid solutions.

As a global solutions provider of photovoltaic and renewable energy systems, Toshiba offers ground and roof mounted solutions for utility scale and behind-the-meter applications. From design to power plant operation and maintenance, Toshiba delivers comprehensive, customizable solutions for a variety of users including utilities, governments, commercial energy users, land owners, and developers.

**“One of our core commitments is the Toshiba Group Environmental Vision 2050, with an aggressive goal of raising the eco-efficiency of our products and business processes 10 times by 2050 as we endeavor to address one of today's most pressing problems, global warming. We are proactively implementing environmental initiatives throughout our business activities. More specifically, we are helping to mitigate the impact of global warming by promoting state-of-art environmental technologies, such as carbon capture and storage (CCS) systems, solar photovoltaic systems for solar power generation, a new generation of innovative rechargeable batteries for industrial and automotive applications and new eco-friendly LED lighting systems.”**

**Norio Sasaki**  
President and CEO



Toshiba's proven track record of delivering highly reliable power from clean renewable sources, backed by performance guarantees, make Toshiba the ideal solar power solutions provider. The full suite of services includes:

Power Plant Development

- Full Turnkey Engineering & Construction
- Operations & Maintenance
- Performance & Availability Guarantees
- Battery Storage and MicroGrid Control System

The Toshiba Photovoltaic Team is comprised of over 120 employees located throughout the world. Photovoltaic projects in the Americas are the responsibility of Toshiba. Toshiba is headquartered in Houston, Texas at a 650,000 square foot, state-of-the-art facility for manufacturing hybrid electric vehicle motors, uninterruptible power supplies, adjustable speed drives, inverters, motor control centers, and other power electronics. The manufacturing process is totally integrated, from research and development, design, engineering, production and manufacturing to after-market service and support.

Toshiba's Photovoltaic Systems Team leverages the extensive knowledge and capability of Toshiba's power electronics engineers and field service technicians and the systems expertise of Toshiba's Power and T&D Divisions to deliver highly efficient and very reliable photovoltaic power systems. Additionally, Toshiba's Photovoltaic Systems Team works closely with our colleagues in Japan to thoroughly qualify technologies deemed reliable and of the highest quality in order to meet Toshiba Corporation's standards. This includes exhaustive quality assurance audits of the manufacturing process involved in the production of photovoltaic modules.

**Toshiba International  
Corporation**

- Incorporated 1967
- Headquartered in Houston, Texas
- Offices in San Francisco, Denver, Philadelphia, Milwaukee, Detroit
- Wholly owned subsidiary of Toshiba Corporation
- Power, T&D, and Industrial businesses throughout the Americas
- 1,100 employees
- ISO9001 & 14001



## Past Experience

### Photovoltaic Experience

Toshiba has designed and constructed over 50 MW of both utility scale and distributed generation photovoltaic systems, and has a development pipeline of over 1,000 MW. Following is a sampling of notable utility-scale projects in operation that demonstrate Toshiba's experience with photovoltaic technology.

### Projects Under Development

#### Citizens Energy Corporation:

Toshiba International Corporation is in the final phase of construction of a portfolio of five photovoltaic projects in Massachusetts representing 9.3 MW<sub>DC</sub> in aggregate. Toshiba's scope includes:

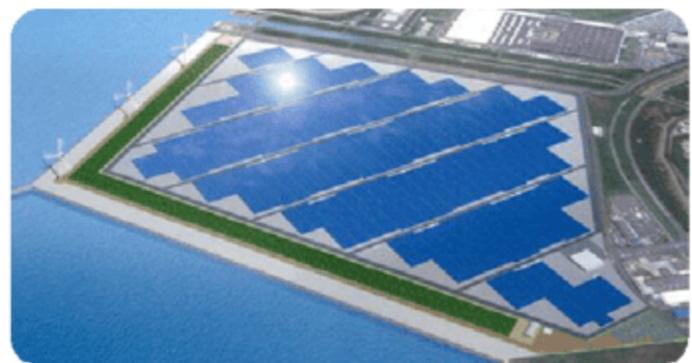
- final detailed design and value engineering
- procurement
- full turnkey construction
- commissioning and startup
- operations and maintenance

#### Contact Information:

Brian Morrissey  
Citizens Energy Corporation  
88 Black Falcon Avenue  
Boston, MA 02210

#### Mitsui Chemical Plant:

On November 7, 2012, Toshiba Corporation, in partnership with Mitsui Chemicals, Inc., Mitsui & Co., Ltd., C-Tech Corporation, Toagosei Co., Ltd., Toray Industries, Inc., and Mitsui Engineering & Shipbuilding Co., Ltd., broke ground on Japan's largest solar and wind power generation facility. Located in Tahara City, the power generation facility will consist of a 50 MW of solar power plant and 6MW of wind turbines. The project total investment is around 18 billion yen.



#### Minamisoma City, Fukushima Prefecture:

In June, 2012, Toshiba Corporation and the city of Minamisoma partnered to develop and build mega-solar power plants in an effort to boost reconstruction from the March 2011 earthquake and tsunami, and ensuing nuclear disaster.

The large-scale solar farms, currently in the development phase, will produce a total of 100,000 kilowatts of electricity. Commercial Operation is planned for 2014.

**SB Energy, a subsidiary of SoftBank:**

Toshiba is developing two utility-scale solar projects in partnership with SB Energy, including the 111MW Yasuhira Plant which will likely be the largest solar plant in Japan. The other 22MW plant is located in Arao, Kumamoto Prefecture.

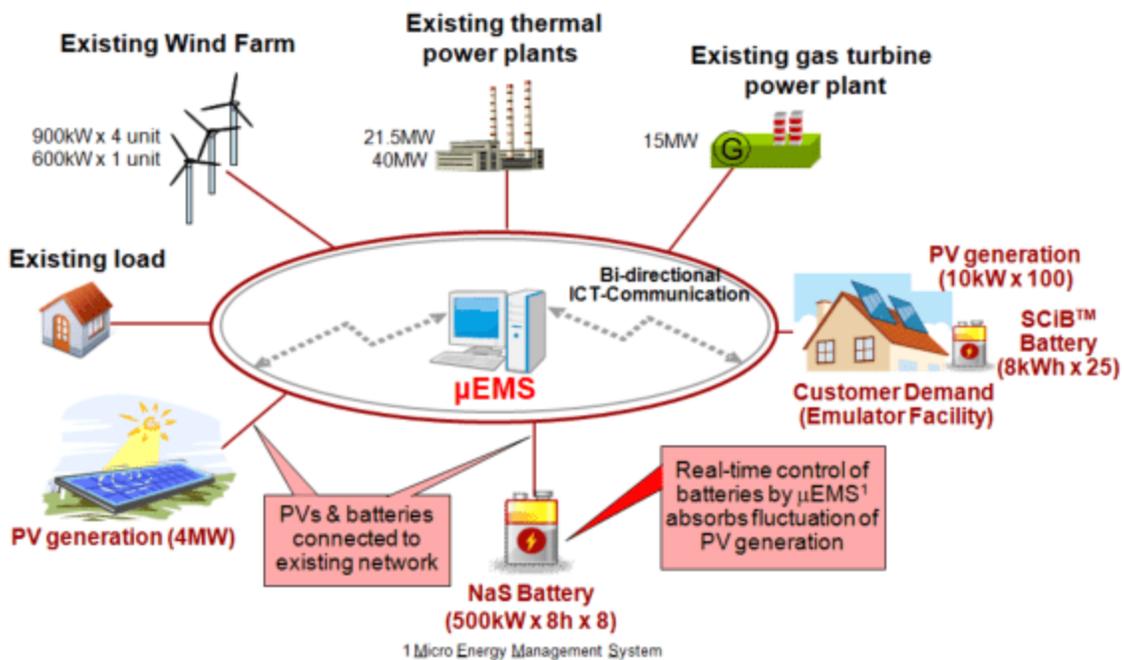
Additional projects under development include a 10MW plant in Kyushu Prefecture and a 10MW plant in Himeji Hyogo Prefecture.

**Completed Projects**

**Solar Project #1: Miyako Island Smart Grid Project**

Toshiba was the prime contractor for the Miyako Island Smart Grid Project, located on Miyako Island, Okinawa prefecture, Japan. The project demonstrates the benefits of implementing a next-generation supervisory control Micro Energy Management System to optimize supply and demand management for networks with a high penetration of renewable energy sources. As prime contractor for the project, Toshiba was responsible for all engineering, procurement of major equipment, and implementation of a 4MW photovoltaic system. The project incorporated Toshiba’s highly-advanced SCiB™ battery technology for electricity storage. It also included Toshiba inverters which have a conversion efficiency of 97.5% and are in the world’s highest class for power conditioners.

**Schematic of Miyako Island Smart Grid**



### Miyako Island 4MW Photovoltaic System



### Solar Project #2: Ukishima Solar Power Plant

Toshiba was the prime contractor for the 7MW Ukishima Solar Power Plant, a project jointly developed by Tokyo Electric Power Company and Kawasaki City. The project is located at the Ukishima First Waste Landfill owned by Kawasaki City, Japan.

### Ukishima 7MW Photovoltaic System



**Solar Project #3: Italy (San Rocco)**

Scope: 3.2 MW – Full EPC Contract  
Contract Value: 10,530,000 €  
Contract Award: October 2010  
Contract NTP: December 2010  
Completion Date: December 2010

Scope of Works: Design, engineering, supply and commissioning of PV parks )PV panels, MV switchgears, inverters, SCADA, cabling, steel supports, civil works and O&M for two years.

Main Suppliers: LG (PV panels), Inverters (Toshiba), SCADA (Prisma Impianti)



**Solar Project #4: Italy (Alessandria)**

Scope: 7.3 MW – Full EPC Contract  
Contract Value: 27,000,000 €  
Contract Award: September 2009  
Contract NTP: November 2009  
Completion Date: September 2010

Scope of Works: Design, engineering, supply and commissioning of PV parks )PV panels, MV switchgears, inverters, SCADA, Anti-intrusion system, cabling, steel supports, civil works and maintenance for twenty (20) years.

Main Suppliers: Panels (Upsolar), Inverters (Siemens), SCADA (Siemens)



**Solar Project #5: Italy (Carpi)**

Scope: 2.2 MW – Full EPC Contract  
Contract Value: 7,500,000 €  
Contract Award: November 2010  
Contract NTP: March 2010  
Completion Date: March 2010

Scope of Works: Design, engineering, supply and commissioning of PV parks )PV panels, MV switchgears, inverters, SCADA, cabling, steel supports, civil works and O&M for two years.

Main Suppliers: LG (PV panels), Inverters (Toshiba), SCADA (Cematech)

**Solar Project #6: Italy (Valenza)**

Scope: 5.0 MW – Full EPC Contract  
Contract Value: 13,000,000 €  
Contract Award: May 2011  
Contract NTP: August 2011  
Completion Date: August 2011

Scope of Work: Design, engineering, supply, and commissioning of PV parks (PV panels), MV Switchgears, inverters, SCADA, Anti-intrusion system, Cabling, steel supports, civil works) and maintenance for twenty years.

Main Suppliers: Panels (LG), Inverter (Toshiba), SCADA (in Trattativa con Ufficio Acquisiti)

**Solar Project #1: US Industrial Facility**

Build, Own and Operate solar power system in accordance with a PPA. The solar PV system consists of both solid crystalline panels and flexible thin-film panels – installed 2,100 Solar World 175 W crystalline panels, and 92,000 square feet of flexible thin-film material. The total system output is 1,000 kW and annual energy produced by this system is approximately 1,100,000 kWh.



The electricity generated was sold to the customer under a 20-year Power Purchase Agreement (PPA). PPAs allow customers to reduce or completely avoid up-front capital costs. Estimated reduction in electricity costs of approximately 30%.

Federal tax credits and the value of Renewable Energy Credits were utilized to provide this renewable solution.

**Solar Project #2: State Government Facility**

This solar system involved the installation of both crystalline and thin film panels on the roof of the building and nearby grounds. The 294 kW system includes 1,488 Solar World 175W crystalline solar panels as well as 5,522 sq ft of Uni-Solar thin film PV panels. The total output of the system is approximately 300 kW and the annual output is approximately 399,000 kWh. The system offsets 50% of the facility's total power needs.



The PV system provides 50% of customer's annual electric needs. Power is sold to customer under a 15 year Power Purchase Agreement. Tax credits and Renewable Energy Credits were utilized to provide this renewable solution.

**Solar Project #3: Federal Facility**

Completed and brought on-line a 520 kW solar PV system on the roof top of the customer's building. Completed the design, procured major equipment, engaged local subcontractors to build, and continue to own and operate the system.



The thin-film photovoltaic (PV) system covers 95,000 sq. ft. of rooftop, and is expected to generate about 667,000 kWh per year with a peak rating of 468 kW. The system supplies approximately 13% of the building's electricity needs.

Approximately 50% of the project's cost was avoided through the use of rebates and incentives. Power is sold to customer via a 10 year Power Purchase Agreement.

**Solar Project #4: Industrial Facility**

This installation features approximately 50,000 square feet of thin-film solar panels—lightweight, flexible photovoltaic material that can be easily applied directly to existing rooftops. The project is estimated to reduce greenhouse gas (GHG) emissions by 200 metric tons annually and reduce electricity costs by approximately six percent. This system produces approximately 200 kW peak output and 303,000 kWh annual output. The system will offset 15% of the facility's peak kW power needs. Power is sold to the customer under a 15 year Power Purchase Agreement.



**Solar Project #5: Industrial Facility**

This 5 MW solar installation produces approximately 20% of the customer's electricity requirements. This is a ground-mounted system on approximately 21 acres and utilizes a single axis tracker to optimize the exposure of solar panels to sunlight. Electricity is sold to the customer under a 20 year Power Purchase Agreement.

**Solar Project #6: Commercial Airport**

This 4.4 MW solar power installation supplies approximately 7,000 megawatt-hours of electricity to the customer, utilizing approximately 19,000 Yingli solar panels. Generating the same amount of electricity that will be produced by the new solar installation using non-renewable sources would result in the release of more than 5,000 metric tons of carbon dioxide. Electricity is sold to the customer under a 20 year Power Purchase Agreement.

**Solar Project #7: Industrial Facility**

The system features 2,490 Uni-Solar 136-watt, thin film solar panels. The 400 kW system is expected to supply approximately 16% of the energy for the customer. Electricity is sold to the customer under a 15 year Power Purchase Agreement.

**Solar Project #8: Commercial Facility**

This 525 kW solar power installation supplies approximately 30% of the customer's power and spans over 7 building rooftops. The installation required approximately 2,800 crystalline panels. The system generates more than 12 million kWh of electricity over 20 years, and will prevent the release of more than 8,800 metric tons of carbon dioxide into the atmosphere. Electricity is sold to the customer under a 20 year Power Purchase Agreement.