PUBLIC SCHOOL SYSTEM
COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS

DRAFT PROPOSAL

A GREEN ENERGY SCHOOLS PROJECT

PROPOSAL

CNMI PUBLIC SCHOOL SYSTEM GREEN ENERGY PROJECT

THIS PROPOSAL IS WRITTEN AS A REQUEST FOR REVIEW AND CONSIDERATION OF AND FOR CNMI PUBLIC SCHOOL SYSTEM IN PARTNERSHIP WITH THE BOARD OF EDUCATION, LOCAL AND FEDERAL GOVERNMENTAL AGENCIES TO SUPPORT PSS GREEN ENERGY SCHOOLS PROJECT DEVELOPMENT. THE PROGRAM DESIGN GOAL IS TO ESTABLISH SAIPAN SOUTHERN HIGH SCHOOL AS A MODEL SCHOOL FOR GREEN ENERGY WITH EXPECTED OPERATIONAL ENERGY SAVINGS TO A FACTOR OF GREATER THAN 80% BY PROJECT COMPLETION.

ABSTRACT

This report covers the proposed development and operation of the CNMI-PSS Green Energy Project in The Commonwealth of the Northern Mariana Islands Public School System on the island of Saipan. The project began initial first phase operation in January 2009 and consisted of a single Skystream Wind generation system and three solar panels, grid tied and supporting the schools water needs along with two model classrooms within the science department building at Saipan Southern High School. All lighting, instructional media i.e. LCD projectors, teacher computers, laptops and air-conditioning needs are currently being met during scheduled and unscheduled power outages. The wind turbine and accompanying solar panel array were installed and software deployed to the school which took over operations and monitors data reporting on energy from a wireless command access point on the turbine. The CNMI-PSS Green Energy Project is proposing to enter into the second phase in the school year 2009-2010 with school wide classroom and facilities involvement across the PSS school system and will continue efforts through school years 2011-2012 for project completion on phase II and full grid tie in of solar arrays and a multiple wind generation facility capable of producing in excess of 120kw of renewable energy.

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SUMMARY

This report covers the proposed development and operation of the CNMI-PSS Green Energy Project in The Commonwealth of the Northern Mariana Islands Public School System on the island of Saipan. The project began initial first phase operation in January 2009 and consisted of a single Skystream Wind generation system and three solar panels, grid tied and supporting the schools water needs along with two model classrooms within the science department building at Saipan Southern High School. All lighting, instructional media i.e. LCD projectors, teacher computers, laptops and air-conditioning needs are currently being met during scheduled and unscheduled power outages.

The wind turbine and accompanying solar panel array were installed and software deployed to the school which took over operations and monitors data reporting on energy from a wireless command access point on the turbine. The CNMI-PSS Green Energy Project is proposing to enter into the second phase in the school year 2009-2010 with school wide classroom and facilities involvement across most PSS schools and will continue efforts through school years 2011-2012 for project completion on phase two. This project is created to allow the school to continue operations throughout major island wide or short term minor outages. A major outage occurs when the entire island power plant or an affected feeder is shut down for more than a day. A minor outage occurs when the entire plant or a selected feeder is shut down for more than one hour. During the past 6 years of school operations there have been multiple major and minor power outages that continue to disrupt the school instructional program. These outages also cause damage to equipment and critical failures result in the closure of rooms and even the whole school at times.

In the most recent years the school and island has seen countless outages. This problem provided the catalyst for the schools development of renewable energy not only to preserve instruction and learning, but to use this project to further enhance the islands power needs through the use of ‘net metering’ technology that provides renewable energy back to the public utilities and ultimately reducing the need for power plant production. In ten years the energy needs of not only the Commonwealth but the entire nation will be higher than ever. The US Department of Energy recognizes the need for alternative fuels and energy if we are to meet our needs both now and in the immediate future. We must go green and champion the cause of renewable and sustainable energy in the pacific to better prepare for our islands future and the future of our children.

ABOUT THE PROJECT

Installation of a solar generation system in support of the water and sewage system along with the science classrooms and laboratory was completed during Phase I of this project. During Phase II, further development of CNMI grid tie in Green Energy infrastructure and educational content is to be applied. The US Department of Energy, The Foundation for Environmental Education, and numerous cooperating agencies will work with the school to make this project a great success. The current energy program at the school provides a basis for the continued development of the CNMI-PSS Green Energy Project.

OBJECTIVES

CNMI-PSS Green Energy Project primarily was designed to take advantage of the favorable wind resource in the schools location, Koblerville, Saipan. Other objectives include the renewable and reliable source of power to the schools critical needs, evaluating the wind energy development process in the Commonwealth, and assessing wind turbine and solar arrays' for future wind energy development for the school and 'net metering' along the public utilities grid.

Along with grid tie in solar and wind generation, classroom energy conservation techniques are also being undertaken by the school. Each classroom will be retro-fitted with electronic ballasts and high efficiency LED lighting fixtures which will replace the old magnetic ballast and bulbs which will save 75% more energy in the classroom. These combined efforts to conserve coupled with the production of renewable energy provide maximum benefit to both the school and the CNMI utilities grid. The current model classrooms are already retro-fitted under the previous phase of the project.

Classroom energy outputs are calculated based on Underwriter Laboratories inspection data and may vary based on classroom needs, i.e. science classroom versus a reading room, the initial goals during phase II will be to supply power to the classrooms overhead lighting, teachers instructional desktop computers and laptops, overhead LCD projectors, standing fans, air-conditioning units. Additional buildings including administration, counseling, library and computer labs are also tied.

PARTICIPANTS AND HISTORICAL

Saipan Southern High School in cooperation with Asia Pacific Environmental Consulting (APEC) acquired the phase I project proposed in the CNMI as a result of an environmental fine assessed on a local garment manufacturer and additional funding from an individual corporate donation of $20,000 to the school. With an overall budget in excess of $70,000. The APEC group served as the lead agency for the renewable energy project. The US Environmental Protection Agency, Local governmental agencies and the school administration all participated in the planning and permitting. Project management

and construction was sub-contracted out for the electrical needs and also for the concrete and fencing requirements with the Skystream wind generation unit being supplied by the regional distributor located on the island of Saipan, Pacific Wind and Solar Company.

TURBINE DESCRIPTION AND SPECIFICATIONS PHASE I

Technical Specifications

Model	Skystream 3.7
Rated Capacity	1.9kW continuous output, 2.6 kW peak
Weight	170lb (77 kg)
Rotor Diameter	12 ft (3.72 m)
Swept Area	115.7 ft² (10.87 m²)
Type	Downwind rotor with stall regulation control
Direction of Rotation	Clockwise looking upwind
Blades	3-Fiberglass reinforced composite
Rated Speed	50 - 345 rpm
Maximum Tip Speed	216. ft/s (66 m/s)
Alternator	Slotless permanent magne brushless
Yaw Control	Passive
Grid Feeding	Southwest Windpower inverter 120-240 VAC 50-60 Hz
Battery Charging	Battery sensor available for battery charging systems
Braking System	Electronic stall regulation with redundant relay switch control
Cut-in Wind Speed	8 mph (3.5 m/s)
Rated Wind Speed	21 mph (9.4 m/s)
User Control	Wireless 2 way interface remote system
Survival Wind Speed	140 mph (63 m/s)
Warranty	5 year limited warranty

Actual photo above of the Skystream 3.7 after installation on the campus of SSHS. Photo insert of ground breaking. In attendance are far left. US Congressional Delegate Greg Killii Sablan, CNMI Director of Energy Ms. Thelma Benevente-Inos, Board of Education Chair Ms. Lucia Blanco-Maratita, Tan Holdings legal counsel Steve Pixley, SSHS Student body president Janina Maratita, APEC owner Mike, Governor representative, far right SSHS Principal Mr. Peter Le'au

PUBLIC OUTREACH

In order to facilitate open communication between the project developers and the local community, Saipan Southern and its partners will develop a public outreach plan. Saipan Southern and its partners will meet with local government and civic organizations to disseminate information about the project and receive public feedback during the permitting and construction phases. PSS-SSHS will sponsor a first public meeting on campus as part of the review process. PSS-SSHS will establish a community liaison to promote and maintain communication with key audiences and exchange information between the community and project management during the project construction.

EDUCATION PROGRAM.

This program also features community education – CNMI-PSS Green Energy Project will be helping the community by hosting open houses in which members of the public can learn how they, too, can "go green," and in some cases tour the installation. In addition, the creation of a "GE Buddies' program will have the school partnering with other schools in the CNMI for tours and educational activities. It is all part of CNMI-PSS Green Energy Project commitment to help the CNMI students learn how to use the power of the sun and wind at school and at home.

We've teamed up with the Department of Education, US Department of Energy, and the Foundation for Environmental Education to help create multi-disciplinary materials to meet CNMI state education standards. These lesson plans for grades K-12 describe creative, interactive ways for students to learn more about the sun and solar energy.

Students at the school will learn hands-on how GE (Green Energy) works, as well as additional features to link the hardware on the roof and in the field with lessons in the classroom.

Students will discover not only that a PV (Photo-voltic) system can meet about 55 to 80 percent of the energy needs of a typical classroom, but also how solar electricity works, and why it is an important option for producing clean, reliable and inexhaustible energy.

As another feature of this project, the school will be outfitted with instrumentation and educational software that provides computerized, up-to-the-minute performance data, with information posted on the school website. (data will be posted on the website daily so that each public school can monitor the performance of the GE systems of the school.

One of the most exciting features of the program is that any school in CNMI can log on and use the data from any or all of the classrooms, either alone, or in conjunction with the lesson plans available on the school website.

SOLAR CURRICULUM AND TRAINING

Each year the school will provide sub-grant allotments allowing teachers to attend solar schools workshops and receive classroom kits and curriculum resources. These one-day workshops provide instruction and background to teachers, allow for networking, and prepare participants to return to their classrooms with the tools and knowledge to teach about solar energy and other energy sources and topics as well.

ADDITIONAL PROGRAM CONTENT

Saipan Southern High School recognizes that the CNMI public schools are facing hard economic times. This is why the school has additional plans to expand its Green Energy Program to include new categories that will provide additional learning opportunities for students and teachers while creating energy and money saving programs for school campuses throughout CNMI. Credentialed teachers, professors, instructors, principals, department heads, and district administrators may apply to receive $1000, $2,500, $5000, or $10,000 grants to promote Green Energy initiatives in any of the five following categories.

- Educational Solar Projects: Successful submissions will include innovative classroom and extracurricular programs/projects that explore the science of solar energy and the generation of electricity from solar energy.

- Youth Energy and Environmental Programs: Successful submissions will include energy efficiency, recycling, composting, water reclamation and/or gardening programs and clubs that serve as learning and leadership opportunities for students, the faculty, and the community at large.

- Renewable Energy or Science Related Field Trips: Successful submissions will include transportation, admission, or expenses associated with field trips that excite students about science, energy, careers in energy and the environment.

- Green Your School Projects: Successful submissions will include energy efficiency upgrades, energy monitoring systems, and communication tools that will promote energy education and smart energy use at the school and in the community.

- Professional Development/Service Learning Projects/ Workforce Investment Programs: Successful submissions will include projects that expand the teacher's knowledge about renewable energy, energy resources and/or the future of the energy industry. High Schools and Community colleges may consider using the funding to create programs and curriculum to address workforce development in the growing renewable and efficiency industry and service learning opportunities in the local community.

SCOPE OF WORK WIND GENERATION TURBINES

GENERAL REQUIRMENTS

- The contractor team must be composed of experienced and highly regarded professionals who have demonstrated their ability to produce superior renewable energy facilities on a cost-effective basis.
- All Architects, Engineers, and other disciplines shall be registered in the CNMI for each task or area of expertise as required by law.
- The PSS-GEP seeks a team, under a single, responsible lead entity, which includes both design and construction services.
- The contractor team as submitted must include, as a minimum:
    1. General Contractor
    2. Structural Engineer
    3. All Consultants and Sub-consultants
- Any changes to these key team members for the duration of the project shall require PSS-GEP approval.
- The PSS-GEP team will help prepare a program of the functional requirements for the facility.
- The design and construction may occur sequentially, and may be fast-tracked where design and construction phases occur concurrently.
- A contractor team concept will be utilized between the designer and the constructor.
- The contractor team will deliver the project through a guaranteed maximum price contract.

Design phase services by the contractor team shall:

1. Provide detailed independent cost estimating
2. Provide project planning and scheduling
3. Provide alternate systems evaluation and constructability studies
4. Advise the PSS-GEP management of ways to gain efficiencies in project delivery
5. Initiate procurement of long-lead items
6. Obtain building permit from CNMI Planning
7. Protect the owner's sensitivity to quality, safety, and environmental factors
8. Engineer windmill's diameter & strokes appropriately
9. Structurally engineer tower's height & corner post dimensions appropriately
10. Provide a mechanism to disengage the windmill when it is not needed and/or a mechanism to bring it down during typhoons or high winds.
11. Provide a design for review and approval by the project manager, and allow for one round of comments and revisions
12. Provide a final design that is sealed by an qualified Engineer
13. Comply with the CNMI laws on renewable energy and wind turbine installation.

Construction phase services by the contractor team team shall:

1. Supply to the site the windmill, tower; assembly & fully operational system is required. *Fully operational is defined by wind turbine generating power to net meter on the CNMI grid*.
2. Provide a minimum of 5 years warranty for parts and labor
3. Provide an owner's operation and maintenance manual
4. Coordinate with various CNMI departments and other agencies, utility company.
5. Coordinate & schedule CNMI government inspections
6. Arrange for procurement of materials and equipment
7. Schedule and manage site operations
8. Manage all construction related contracts and subcontracts while meeting the CNMI requirements
9. Provide quality controls
10. Bond and insure the construction
11. Address all federal, CNMI permitting requirements
12. 14. Maintain a safe work site for all project participants
13. 15. Comply with the CNMI laws on renewable energy and wind turbine installation.

SCOPE OF WORK SOLAR ELECTRIC SYSTEM DESIGN AND INSTALLATION (PHOTOVOLTAIC abbreviated as PV)

GENERAL REQUIREMENTS

Materials

The following are minimum recommended materials specifications:

• Materials used outdoors shall be sunlight resistant

• Urethane sealants shall be used for all non-flashed roof penetrations.

• Materials shall be designed to withstand the temperatures to which they are exposed.

• Dissimilar metals (such as steel and aluminum) shall not be used in direct contact with one another.

• Aluminum shall not be placed in direct contact with concrete materials.

• Only high quality fasteners are to be used (stainless steel is preferred).

• Structural members should be either:

  o hot dip galvanized steel per ASTM A 123

  o corrosion resistant aluminum, 6061 or 6063

  o stainless steel (particularly for corrosive marine environments)

  o coated or painted steel marine grade

Equipment requirements and installation methods

The following are equipment requirements and installation guidelines that, if carefully followed, will result in the installation of a PV system that will provide years of reliable service:

• All electrical equipment must be listed for the voltage and current ratings necessary for the application.

• PV modules must be listed to UL 1703 and warranted for a minimum of 20 years

• Inverters must be listed to UL 1741 and warranted for a minimum of 5 years

• All exposed cables or conduits must be sunlight resistant. PVC conduit is not recommended where exposed to long periods of direct sunlight.

• All required over current protection must be included in the system and must be accessible for maintenance

• All electrical terminations must be fully tightened or secured and strain relieved.

• All mounting equipment must be installed according to manufacturers specifications and roof penetrations sealed with an acceptable sealing method that does not impact the roof warranty.

• Integral roofing products must be properly rated (e.g., class A roofing materials)

• All cables, conduit, exposed conductors and electrical boxes must be secured and supported according to code requirements.

• PV Array should be free of shade between 9:00 a.m. and 4:00 p.m. This includes even small obstructions such as vent pipes and chimneys. A small amount of shade can have a disproportionably high impact on system performance

PV SYSTEM DESIGN AND INSTALLATION

Select System

• Select a pre-engineered PV system that meets the goals of the project to ensure that the system components are properly matched and sized.

• Compare various product and system warranties between suppliers.

• Confirm that the PV equipment has the necessary listings required by the building officials (e.g. UL 1703, UL 1741, and any applicable evaluation reports from National Evaluation Services (NES) or International Conference of Building Officials (ICBO) Evaluation Services); Figure 10 Simple PV System Diagram

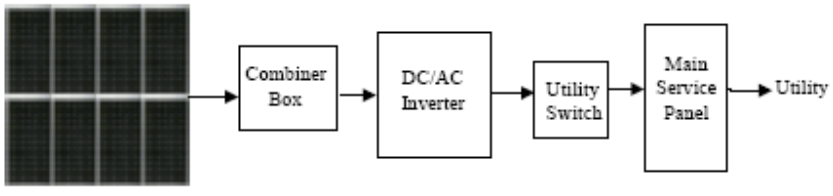


Figure 10 Simple PV System Diagram

Sizing and Performance
The PV system supplier typically provides the builder with detailed sizing and performance information. Many tools exist to provide design guidance. The builder is to identify those suppliers that are thorough in their design and those that are not. Knowing the physical size and dimensions of the system is critically important in determining where the PV array and ancillary equipment is to be mounted.

Lay Out PV Array

- Lay out PV array on roof plan and determine required location of PV modules on roof and any potential roof penetrations due to plumbing or combustion appliance vents that could effect array placement or shade the array;
- Potential obstructions that can be relocated to another roof surface should be specifically called out on the plans so that plumbing and HVAC contractors are adequately notified;
- Attempt to provide for an aesthetically pleasing layout by attempting to follow the dimensional shape of the roof section (example: if the roof is rectangular, try to maintain the same shape rectangle in the array layout). If modules are to be grouped in panels of several modules for ease of wiring and mounting, try to arrange the panels in symmetrical arrangements. 3.2.4. PV Array Wiring
- Size PV array wiring such that the maximum voltage drop at full power from the PV modules to the inverter is less than 3%. If array combiner box is located remote from the inverter, spread the voltage drop accordingly between the PV array-to-combiner wiring and the combiner-to-inverter wiring (example: with a 120-foot wire run from PV modules to inverter (3% total); with a 40 ft. wire run from PV modules to combiner box—use a maximum of 1% loss for this section, and with an 80 ft. wire run from combiner box to inverter—use a maximum of 2% loss for this section for a total of 3%);
- Size combiner box fuses according to the maximum series fuse rating specified on the back of the PV module.

Assemble and Install PV Array Packaged systems should include detailed instructions on each phase of the installation process. If this information is not provided, serious consideration should be given to finding another supplier that will provide this information. Some basic guidelines that may help in reviewing installation procedures are:

- Check modules visually and check the open circuit voltage and short circuit current of each module before hauling onto the structure to verify proper operation—see checklist
- Use plug connectors to connect panels together where listed products are available. This reduces installation time.
- Use only as many attachment points and roof penetrations as necessary for structural loading concerns. The number of attachment points and structural requirements of the roof must be specifically identified in the drawings.

Performance Test
The PV System Installation Checklist
Established protocol must have a detailed performance testing procedure checklist such as a System Acceptance Test.

SCOPE OF WORK EIS

Environmental Impact Statement considerations and Scope of Work for Wind/Solar Power Facility Proposed by Saipan Southern High School Green Energy Project Team (PSS-GEP)

This is the PSS-GEP EIS scope of work relevant to our proposal for 6 wind turbines and Solar Arrays' on the campus of Saipan Southern High School in the village of Koblerville. This scope was developed based upon the comments received through the scoping meetings and from the general public, and local, state and Federal agencies. The intent is to list the issues to be addressed; more specifics on how to address them will be developed further through coordination with the cooperating agencies. This scope of work is expected to be a dynamic document and will evolve as our review progresses. We have attempted to include all issues raised into this scope.

We will continue to meet with cooperating agencies representatives and the state and federal agency representatives to further develop the details of the alternatives screening and field studies and to review information as it becomes available. This proposal must contain a complete discussion of scope and purpose of the proposal, alternatives, and impacts so that the discussion is adequate to meet the needs of local, state and federal decision makers.

A brief summary will include the purpose and need, alternatives, and both the beneficial and adverse impacts of the proposal. Purpose & Need will be described in sufficient detail to indicate the geographic range of the alternatives analysis, and criteria to screen sites and power generation technologies which do not fulfill the project purpose & need.

The purpose is to develop a commercial scale renewable energy facility providing power to the CNMI grid in addition to the school. The range for "commercial scale" will be described. Projections of future need for electricity, including the portion that should come from renewable energy sources based on regional, state and Federal requirements and policies will be included. The National Energy Policy recommendations will be included. Typhoon or Seasonal differences may need to be included. This will be compared to the projected power generation expected from existing facilities as well as those under construction. A brief description of the CNMI power grid, physical interconnection and the power market will be needed for context.

Project description needs to include not only the structures but also the construction, operations and maintenance and decommissioning phases. Construction activities include transportation, staging, access, and any "onsite" assembly. The Alternatives

section will include reasonable terrestrial renewable energy facility locations, alternative cable routes and grid interconnection points which must be explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study, with a brief discussion of the reasons for eliminating them. Initial alternatives will include alternative renewable energy technology, and alternative commercial scale generation capacity in addition to alternative terrestrial and wind energy sites. Alternative technologies will include wind, solar, and biomass.

As was stated in the scope, only reasonable alternatives need to be considered in detail. These do not need to be limited to those available to the school. Onsite modification of, or siting of individual structures within, the final site(s) will be discussed as minimization of impacts after final site selection. Appropriate mitigation measures for the final alternative site(s) will be included. We expect a number of alternatives will be quickly screened based upon criteria which will include, but not be limited to, wind sites, available land area, legal/regulatory constraints, engineering limitations, and environmental concerns. The screening criteria are being developed with input from the cooperating agencies.

The scope will include the criteria used to screen sites, and a summary of the screening process. The cooperating agencies have will be asked to provide suggested alternatives in addition to those provided though the public scoping comment period. The initial list of sites will include the schools football/soccer pitch, unused PSS land under the schools previous boundary and the adjacent Elementary school land. We will screen these alternatives to develop a short list of reasonable alternatives for site specific evaluation. Grouping of sites may be considered if small but otherwise potentially suitable sites are in close proximity. This screening of alternatives will be coordinated with the cooperating agencies.

Affected Environment will describe the existing resources of the final alternative sites in terms of physical geography, geology; wildlife, avian, aesthetics, cultural resources, socioeconomic conditions, and air quality. Environmental consequences will describe the potential direct, indirect and cumulative impacts of each of the final alternative sites. In addition to the topics required the following will need to be addressed: **Avian Impacts** – The Study will describe the current use of the final alternative sites by birds, in order to establish a baseline data set. The species, number, type of use, and spatial and temporal patterns of use should be described. Information derived from other studies, which provides a baseline data set, should be included if available. Information should be based on (1) existing, published and unpublished research results, especially research that describes long-term patterns in use, and (2) new field studies undertaken for this scope. Data on use throughout the year, especially through migratory periods for species, and under a range of conditions should be collected. Data collection methods should include remote sensing through radar and direct observations through aerial reconnaissance surveys.

Data gathered through radar should be validated with direct observations. The survey schedule is being coordinated with CNMI Department of Fish and Wildlife (DFW). Data collection should allow a statistically rigorous analysis of results. Known impacts to birds from former or current Wind Turbine Generators (WTGs) and other tall, lighted structures (such as communications towers) should be thoroughly reviewed in order to identify potential impacts which could result from terrestrial structures. Issues needing to be addressed include: (1) bird migration, (2) bird flight during storms, foul weather, and/or fog/vog conditions, (3) food availability, and (4) predation.

The Biological Assessment required for compliance with Section 7 of the Endangered Species Act will be a clearly identifiable section. The species to be addressed include Marianas Fruit Dove, Nightingale Reed Warbler, and Fairy Tern. Published data on avian impacts available from existing governmental agencies will be included. Terrestrial habitat impacts assessment should include vibration, sound, and shading. Physical and acoustical impacts during construction and operation need to be assessed. Studies for all final sites should include an assessment of: 1) species type, life stage, and abundance; based upon existing, publicly available information, and 2) potential changes to habitat types and sizes.

Aviation-Once a final alternative site is established for the wind farm and for each of the turbine towers an application will need to be submitted for a determination by the Federal Aviation Administration (FAA) that the activity will not cause an unacceptable interference with air navigation. FAA will need the precise coordinates of each tower. Their review will address lighting requirements, and radar interference and radio frequency interference. This review may require 6 months. It is highly recommended that this process be concluded and a determination made so this information can be included in the proposal. The lighting scheme will need to minimize impacts to birds while also providing for safe aviation. Possible impacts to telecommunication systems vary with the different telecommunication technologies utilized in the area, and need to be considered. Microwave transmission typically requires “line of sight” between towers; installation of the wind turbine generators may interfere with existing transmission paths. Boaters use a variety of communication devices including cellular phones, pagers, and VHS radios. The PSS-GEP scope will consider the possible impacts on existing and proposed communications equipment. Commercial and recreational navigation impacts need to be addressed specifically for construction, operation and maintenance and decommissioning. Cable installation activities will be included. Appropriate lighting will be addressed. National security issues may be included based upon further coordination with the FAA.

Socio-Economics-This project’s possible impacts on electricity rates and reliability in the CNMI need to be described. Explanation of any public funding and any applicable tax credits can be requested. Explanation of how this may affect the local economy including affects to employment, tourism, property values and local tax revenues and other fiscal impact to local governments needs to be included. The PSS-GEP scope will contain information relative to compliance with Executive Order 12898 “Federal Actions

to address Environmental Justice in Minority Populations and Low-income Populations." New educational and tourism opportunities are to be explored.

Aesthetic and Landscape/Visual- the assessment as described by the PSS-GEP scope needs to include documentation (an Appendix) of how the simulations were developed.

Cultural resources-needs to fulfill the requirements of Section 106 of National Historic Preservation Act including coordination with the CNMI Historic Preservation Officer. In addition to the requirements we will need to determine the "area of potential effect". Any impact on historic sites or objects, local character and culture, tradition, and heritage will be included. Archeological surveys may be needed for the final site(s). Based on previous archaeological and geological investigations. If resources are found which are eligible for listing as historically significant, ways to avoid, then minimize, impacts to cultural resources will be considered and discussed. If avoidance is not an option, a Memorandum of Agreement may be required to mitigate potential impacts.

Recreation-Recreation impacts may be addressed within other sections such as the aesthetics. Due to the potential for noise and vibrations associated with construction and operation of the facilities, some concerns have been expressed regarding the impacts on feral habitats and migration. The PSS-GEP scope should include an assessment of the magnitude and frequency of noise and vibrations, and the potential for adversely affecting feral habitats and migration. The scope will also include the potential of noise impacts to human activity at any of the final sites. The installation technique for the cables and affect will be described. The types of materials to be used such as stone, metals, concrete, etc. and likely effects of interactions between water/encrusting organism/sediment will be assessed.

Electric and magnetic fields (EMF)-Concerns have been raised about the potential human health impacts of exposure to EMF, as some studies have suggested a possible link between EMF and health risks. The potential impact from electric and magnetic fields produced from wind turbine generators and their associated cables, and the transmission cable, will be considered. The scope should identify populations that could be exposed to EMF greater than 85mG, including human. There are particular concerns about possible locations for the landfalls of transmission lines and the EMF should be specifically evaluated at those locations.

Air and climate, Environmental Impact Study (EIS) –The EIS will include a description of compliance with the requirements of the Clean Air Act for construction and operation phases. Any potential for impact on the climate of the region should also be addressed. Safety considerations will include public and employee safety through construction, operation and decommissioning. Design standards for the structures will be explained. List of preparers will include the names and qualifications of persons who were primarily responsible for preparing an Environmental Impact Study (EIS) and agency personnel who wrote basic components of the EIS or significant background papers must be identified. The EIS should also list the technical editors who reviewed or

edited the statements. Cooperating Agencies and their role in the EIS will be listed. Public Involvement will list the dates, locations and nature of all public notices, scoping meetings and hearings. The scoping meeting transcripts and summary of comments report will be provided as an appendix. Acronym List-will define all commonly used acronyms within the text of the EIS. Index will provide easy reference to items discussed in the main text of the EIS. Appendices will include the lengthy technical discussions of modeling methodology, and baseline studies of the affected environment.

L**AYOUT LOCATION MAPPING**

Initial design layout is pictured above. Placement is along the perimeter fencing between the high school football field and Koblerville elementary school open field area. This is an ideal location with an unobstructed path for maximum wind generation.

Wind/Solar lighting is shown in replacement of existing parking lighting below. Above is the solar covered parking structure that supports a grid tied solar array. The parking structure above is provided as a model for placement in the parking area shown below.

OPERATIONS AND MAINTENANCE

The wind turbines are to be dispatched and controlled from the SSHS Campus operations center, which will also be responsible for wind generation maintenance. The contracting team will take charge of inspection, adjustment, and repair of the turbines (both scheduled and unscheduled) and establish an operations and maintenance facility in the area. The maintenance staff will include an office coordinator, a site supervisor, three permanent technicians for the school site, and one temporary technician. Regular maintenance is scheduled at six-month intervals. The PSS-GEP operations center personnel will notify the maintenance staff of any necessary unscheduled repairs. The necessary maintenance events are described in further detail in the Outages section in this report. A DOC and NCCR Accredited compliant Certified Alternative Renewable Energy and Conservation Coordinator is available on island to meet the requirements as set forth in this proposal.

PROGRAM BUDGET: next two pages

PSS-GEP

Budget for CNMI-PSS Green Energy Project:

Wind Generation	Estimated	Actual
Turbine Unit (6 units)	$76,166	$456,996
Transfer Switch	$240,000	$240,000
Inverter Equipment	$210,000	$210,000
Wiring/Cables	$325,000	$325,000
Total		**$1,231,996**

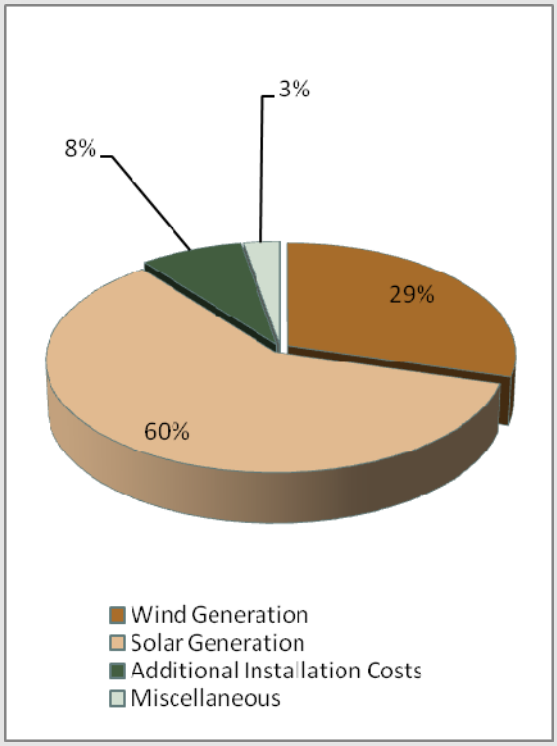
Solar Generation	Estimated	Actual
Solar Panels (160 units)	$7,093.75	$1,135,000
Transfer Switch	$220,000	$220,000
Inverter Equipment	$210,000	$210,000
Wiring/Cables	$125,000	$125,000
Solar hallway Retro-fit	$415,000	$415,000
Solar External Lighting	$120,000	$120,000
Solar Parking structure	$280,000	$280,000
Total		**$2,505,000**

Additional Installation	Estimated	Actual
Concrete footings/housing	$48,000	$48,000
Electrical wiring	$80,000	$80,000
Steel beam placement	$76,000	$76,000
Solar Array installation	$122,000	$122,000
Total		**$326,000**

Miscellaneous	Estimated	Actual
Warranty	$0	$0
Permitting	$0	$0
Spare parts	$20,000	$20,000
Training	$25,000	$25,000
Additional Personell	$52,000	$52,000
Environmental	$17,000	$17,000
Total		**$114,000**

SubTotal Expenses		
	$	**4,176,966**

Actual Cost Breakdown



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- Additional Project Budget Consideration for expansion to include five (8) additional schools in the CNMI. Added to the two (2) primary schools of SSHS and KES is a total of eight (8) schools. The same project scope of work is followed and a slight reduction in number of solar panels or wind generation turbines as calculated in the budget.

- This design is made in the CNMI-PSS Green Energy Project so that it is able to be broken down or expanded to other schools without the need for significant change to the scope of work and or the justification for the project.

- The CNMI-PSS Green Energy Project will work in dual capacity with the Koblerville Elementary school as a direct link to their schools grid and thereby supplying the needs of both schools.

- The location of the two elementary schools provide equal opportunities for solar power as they lack wind on site. On the other hand the two secondary schools have increased wind performance and may be more ideal for wind and solar.

PROJECT BUDGET EXPANSION DATA

SSHS/Koberville Elementary Grid tied	**$120,000**	**$120,000**
Garapan Elementary School	**Solar Only**	**$200,000**
Gregorio T Camacho Elementary	**Solar Only**	**$200,000**
Kagman High School	**Wind/Solar**	**$500,000**
Cha Cha Oceanview Junior High	**Wind/Solar**	**$500,000**
Tinian Junior High/HS	**Solar**	**$200,000**
Rota Sinapalo Elementary School	**Solar**	**$200,000**
Rota High School	**Wind/Solar**	**$200,000**
Tinian Elementary School	**Solar**	**$200,000**
SSHS-KES BUDGET		**$4,176,966**
	TOTAL Estimated	**$6,376,966**

CONCLUSIONS

The PSS-GEP phase I has been a successful demonstration of small-scale wind development in the CNMI. Since the installation of the PSS-GEP phase I facility, other ideas for wind farms are being considered using lessons learned from the PSS-GEP. The experience at Saipan Southern shows that the energy production from a wind facility is primarily dependent on the actual wind experienced and the performance and reliability of the turbines. The Skystream 3.7 turbine performed well when it was online because they produced the expected amount of energy for a given wind speed. However, the actual wind speeds experienced during the period and the reliability of the turbines were both higher than expected. The wind speeds were higher most times than expected due to the incomplete meteorological record used to predict the wind resource, the higher-than-average wind speeds in this village during plant operation, and the difference in elevation of the project tower.

Continued evaluation of the projected wind speeds during plant operation can clarify trends and enhance understanding of the site's wind resource. As such, it is expected that the overall wind resource at SSHS main facility will be more favorable during the lifetime of the facility. Valuable knowledge and information has been gained from the PSS-GEP that will improve the quality and cost-effectiveness of wind farms being planned throughout the CNMI. The experience at SSHS has enabled local governmental agencies, community organizations and individuals, independent developers, and wind energy consultants to gain experience with small-scale wind development and turbine technology. The data gathered in this project will be used to educate the public and decision makers regarding the characteristics of wind energy facilities, investigate the impacts on the grid of large/small-scale wind energy development, and improve models to predict energy production of wind plants. These efforts will help to remove barriers to large-scale wind energy development in the CNMI.

The additional considerations for expansion to other schools in replicating the infrastructure improvements to SSHS and KES are solid in belief that as all schools collectively contribute to the CNMI utilities grid the islands power needs will be reduced and there will be a significant source of renewable energy being used in schools in the CNMI thus saving the school system and the CNMI government a large amount of money per annum resulting in the ability for the Public School System and the CNMI utilities Corp to spend savings on critical improvement needs that otherwise would not be able to be funded.