

**DRAFT  
ENVIRONMENTAL ASSESSMENT**

for the

**GREEN ENERGY SCHOOL WIND  
PROJECT**

**SAIPAN, COMMONWEALTH OF THE  
NORTHERN MARIANA ISLANDS**

**U.S. Department of Energy  
Office of Energy Efficiency and Renewable Energy  
Golden Field Office**



OCTOBER 2012

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# COVER SHEET

**RESPONSIBLE AGENCY:** U.S. Department of Energy

**TITLE:** *Draft Environmental Assessment for the Green Energy School Wind Project* (DOE/EA-1923)

**CONTACT:** For additional copies or more information on this draft Environmental Assessment (EA), please contact:

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**ABSTRACT:** The U.S. Department of Energy (DOE) has provided Federal funding to the Commonwealth of the Northern Mariana Islands (CNMI) through the State Energy Program (SEP) under the DOE's American Recovery and Reinvestment Act of 2009 (Recovery Act). The Recovery Act appropriated \$3.1 billion to the SEP. States are allocated funding via formula grants. CNMI was allocated ~\$18.6 million. The Department of Public Works (DPW) administers SEP funds for CNMI. DPW is seeking to provide ~\$1.5 million of its SEP funds to the CNMI Department of Education and Public School System (PSS) for its Green Energy School Project.

Before DOE decides whether to authorize DPW to provide SEP funds to the CNMI Green Energy School Project, DOE must first complete review under the *National Environmental Policy Act* (NEPA). Thus, this EA analyzes the potential environmental impacts of the construction, operation, and decommissioning of the proposed project and the alternative of not implementing this project (the No-Action Alternative).

DPW has used a portion of their funding for the Green Energy School Project, which provides energy to CNMI schools. Part of Green Energy School Project includes installing six, 20 kW and six, 2.4 kW unit wind turbines at five public schools on the island of Saipan. The proposed wind turbines would consist of two sizes: Jacobs 20 kW and Skystream 2.4 kW. These wind turbines would be installed at the following locations: between Saipan Southern High School and Koblerville Elementary School (one 2.4 kW wind turbine and six 20 kW wind turbines); Kagman High School (one 2.4 kW wind turbine); Cha Cha Oceanview Junior High School (one 2.4 kW wind turbine); Gregorio T. Camacho Elementary School (one 2.4 kW wind turbine); and Garapan Elementary School (two 2.4 kW wind turbines).

The wind turbines located at Kagman High School, Cha Cha Oceanview Junior High School, Gregorio T. Camacho Elementary and Garapan Elementary School were categorically excluded from further NEPA review by the DOE. Therefore, this Draft EA analyzes the potential environmental impacts of the proposed construction, operation, and decommissioning of the one 2.4 kW wind turbine and six 20 kW wind turbines between Saipan Southern High School and Koblerville Elementary School (proposed project); the cumulative impacts of installed and proposed wind turbines, and the alternative of not implementing this project (the No-Action Alternative), under the assumption that the project would not go forward without the SEP funding.

**PUBLIC INVOLVEMENT:** The public is provided with an opportunity to comment on this Draft by sending comments via email or mail marked to the attention of the NEPA Document Manager listed above. Envelopes and the subject lines of emails should be labeled “The Commonwealth of Northern Mariana Island’s Green Energy School Project Draft EA Comments.” Letters should be postmarked no later than October 29, 2012. Use of email to submit comments will avoid processing delays associated with delivery of mail to Federal agencies. Please email comments to the DOE NEPA Document Manager at: [Melissa.Ardis@go.doe.gov](mailto:Melissa.Ardis@go.doe.gov).

**AVAILABILITY:** The Draft EA is available on the DOE Golden Field Office Reading Room website at [http://www.eere.energy.gov/golden/Reading\\_Room.aspx](http://www.eere.energy.gov/golden/Reading_Room.aspx) and the DOE NEPA website at <http://nepa.energy.gov>.

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## ACRONYMS AND ABBREVIATIONS

APE	area of potential effect
CFR	Code of Federal Regulations
dBA	decibel on an A-weighted scale, used to approximate the human ear's response to sound
DNL	Day Night Average Sound Level (also $L_{dn}$ )
DOE	U.S. Department of Energy
DPW	Department of Public Works
EPA	U.S. Environmental Protection Agency
EA	Environmental Assessment
FAA	Federal Aviation Administration
GHG	greenhouse gas
kW	Kilowatt
MBTA	<i>Migratory Bird Treaty Act</i>
NEPA	<i>National Environmental Policy Act</i>
NRHP	National Register of Historic Places
PSS	Public School System
Recovery Act	<i>American Recovery and Reinvestment Act of 2009</i>
SEP	State Energy Program
SHPO	State Historic Preservation Office (r)
U.S.C.	United States Code
USACE	U.S. Army Core of Engineers
USFWS	U.S. Fish and Wildlife Service

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## 1. INTRODUCTION

Congress created the U.S. Department of Energy (DOE) State Energy Program (SEP) in 1996. As part of the American Recovery and Reinvestment Act of 2009 (Public Law 111-5, 123 Stat. 115; (Recovery Act), SEP provides for up to \$3.1 billion in formula grants and technical assistance to states. States use their formula grants to develop strategies and goals to address their energy priorities. They issue competitive grant solicitations annually for the adoption of energy efficiency and renewable energy products and technologies based on available funding. The energy offices in each state and territory are a vital resource for delivering energy benefits, addressing national energy goals, and coordinating energy-related emergency preparedness across the nation.

DOE has awarded Federal funding to the Commonwealth of the Northern Mariana Islands (CNMI) through the SEP under the Recovery Act. The Recovery Act appropriated \$3.1 billion to the SEP. States are allocated funding via formula grants. CNMI was allocated \$18.6 million. The Department of Public Works (DPW) administers SEP funds for CNMI. DPW has provided \$1.5 million of its SEP funds to the CNMI Department of Education and Public School System (PSS).

The proposed wind turbines would consist of two sizes: Jacobs 20 kW and Skystream 2.4 kW. PSS has used a portion of SEP funds to install 2.4 kW wind turbines at the following locations: one, 2.4 kW wind turbine at Kagman High School; one, 2.4 kW wind turbine at Cha Cha Oceanview Junior High School; one, 2.4 kW wind turbine at Gregorio T. Camacho Elementary School; and two, 2.4 kW wind turbines at Garapan Elementary School. This EA analyzes the environmental impacts of the one 2.4 kW wind turbine and six 20 kW wind turbines that would be located between Saipan Southern High School and Koblerville Elementary School.

For purposes of this EA, DOE's Proposed Action would authorize the construction, operation, and decommissioning of the one 2.4 kW wind turbine and six 20 kW wind turbines between Saipan Southern High School and Koblerville Elementary School (proposed project).

Federal funding of projects under SEP requires compliance with the *National Environmental Policy Act* of 1969, as amended (NEPA; 42 U.S.C. 4321 et seq.), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500 to 1508), and DOE NEPA implementing procedures (10 CFR Part 1021). The purpose of this EA is to evaluate potential environmental consequences of DOE's Proposed Action, CNMI's proposed project, and the No-Action Alternative (Chapter 2).

This chapter explains NEPA requirements (Section 1.1), DOE's purpose and need (Section 1.2), and the public involvement process and consultations with other agencies (Section 1.3). Chapter 2 discusses DOE's Proposed Action, the applicant's proposed project, and the No-Action Alternative. Chapter 3 discusses the environmental resource areas DOE did not carry forward to detailed analysis, the affected environment, and potential environmental impacts of the proposed project, and the No-Action Alternative. Chapter 4 discusses cumulative impacts. Appendix A contains copies of the DOE scoping letter and consultation letters with other agencies.

### 1.1 National Environmental Policy Act and Related Procedures

The National Environmental Policy Act (42 U.S.C. 4321 et seq.; NEPA), the Council on Environmental Quality's NEPA regulations [40 Code of Federal Regulations (CFR) Parts 1500 to 1508], and the DOE NEPA implementing regulations (10 CFR Part 1021) require that DOE consider the potential environmental impacts of the Proposed Action before making a decision to implement the Proposed Action. This requirement applies to decisions about whether to provide different types of Federal

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financial assistance to States and private entities. DOE has determined that an EA must be completed to examine the potential environmental impacts of DOE's Proposed Action and the No-Action Alternative.

In compliance with these regulations, this Environmental Assessment (EA)

- Examines the potential environmental impacts of the Proposed Action and the No-Action Alternative;
- Identifies unavoidable adverse environmental impacts of the Proposed Action;
- Describes the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and
- Characterizes any irreversible and irretrievable commitments of resources that would be involved should DOE decide to implement its Proposed Action.

This EA provides DOE and other decisionmakers the information needed to make an informed decision about the construction, operation, and eventual decommissioning of the proposed CNMI Green Energy School Project. The EA evaluates the potential individual and cumulative impacts of the proposed project. For purposes of comparison, this EA also evaluates the impacts that could occur, if DOE did not provide funding (the No-Action Alternative), under which DOE assumes the project would not proceed. The EA does not analyze other action alternatives.

## **1.2 Purpose and Need**

### **1.2.1 PURPOSE AND NEED OF DOE'S PROPOSED ACTION**

DOE's purpose and need is to ensure that SEP funds are used for activities that meet congressional statutory aims to improve energy efficiency, reduce dependence on imported oil, decrease energy consumption, create and retain jobs, and promote renewable energy. DOE allocates SEP funds to states via a formula grant. CNMI allocated SEP funds to various Market Titles. Providing funding to CNMI would partially satisfy the purpose of DOE's SEP in assisting U.S. cities, counties, states, and territories in developing, promoting, implementing, and managing energy efficiency and conservation projects and programs designed to:

- Reduce fossil fuel emissions;
- Reduce the total energy use of the eligible entities;
- Improve energy efficiency in the transportation, building, and other appropriate sectors; and
- Create and retain jobs.

Congress enacted the Recovery Act to create jobs and restore economic growth through measures that, among other things, modernize the nation's infrastructure and improve energy efficiency. Provision of SEP funds for the proposed project would partially meet these goals.

### **1.2.2 CNMI DEPARTMENT OF PUBLIC WORKS' AND DEPARTMENT OF EDUCATION AND PUBLIC SCHOOLS SYSTEM PURPOSE AND NEED**

The purpose of the proposed project is to develop renewable energy resources that improve the reliability of energy supply and reduce energy costs.

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## 1.3 Public Involvement and Consultations

### 1.3.1 PUBLIC SCOPING

NEPA regulations require public participation in the environmental review process to maximize public consultation and input during preparation of this EA, DOE sent scoping letters to potentially interested local, State, and Federal agencies, including the Governor of CNMI, the State Historic Preservation Office (SHPO), U.S. Fish and Wildlife Service (USFWS), and the Environmental Protection Agency (EPA). DOE also sent scoping letters to other potentially interested individuals and organizations to solicit public comment (Appendix A), and published the scoping letter on DOE's Golden Field Office's Public Reading Room ([http://www.eere.energy.gov/golden/reading\\_room.aspx](http://www.eere.energy.gov/golden/reading_room.aspx)). The scoping letter described DOE's Proposed Action and requested assistance in identifying potential issues to be evaluated in the EA.

In response to the scoping letter, DOE received one comment from the Division of Fish and Wildlife (DFW). The DFW expressed concern about seabirds, shorebirds, and other migratory bird species. PSS has agreed to implement bird-detering measures and will follow the mitigation measures contained in the USFWS Biological Opinion.

### 1.3.2 CONSULTATIONS

Below is summary of the consultations that were conducted. Consultation request and response letters are included in Appendix B.

#### *State Historic Preservation Office*

Consultation with the State Historic Preservation Office occurred during permit application and receipt of Permit No. 2011 COM 058 from the Division of Environmental Quality.

#### *U.S. Fish and Wildlife Service*

Formal Consultation was entered into on January 5, 2012. Consultation was completed in February 2012, with the issuance of USFWS's Biological Opinion and Incidental Take Statement.

#### *Division of Environmental Quality:*

The Division of Environmental Quality issued Permit No. 2011 COM 058 on March 15, 2012.

## 2. PROPOSED ACTION AND ALTERNATIVES

### 2.1 DOE's Proposed Action

DOE's Proposed Action in this EA is to authorize DPW to expend Federal funding to purchase and install six, 20 kW and one, 2.4 kW unit wind turbines at Saipan Southern High School and Koblerville Elementary School (Proposed Action). The proposed project will include construction, operation, and eventual decommissioning. DOE has authorized DPW and PSS to use a percentage of its Federal funding for preliminary activities, including the preparation of this EA, associated analyses, and land clearing as required in the Biological Opinion and Take Statement. Such activities are associated with the proposed project and do not impact the environment or represent an irreversible or irretrievable commitment by the DOE in advance of the conclusion of the EA for the CNMI Green Energy Schools Project.

### 2.2 CNMI Green Energy Schools Project Proposed Project

The DPW and PSS propose to purchase, install, operate and eventually decommission six, 20 kW Jacobs turbines and one, 2.4 kW Skystream turbine at Saipan Southern High School and Koblerville Elementary School. The wind turbines would provide energy to power these schools.

### 2.3 Project Locations and Uses

Six, Jacobs 20 kW wind turbines and one, Skystream 2.4 kW wind turbine would be installed between Saipan Southern High School and Koblerville Elementary School (Figure 1). Both schools are located on the southeast side of the island and 0.5 mile northwest of the coast. Lake Susupe and adjacent wetlands are located 1.5-2.5 miles north of the proposed site. The Coral Ocean Point Golf Course is located between the schools and the ocean. Residences surround the schools to the north and east and there is an open space south of the site. The Francisco C. Ada International Airport is located approximately 1 mile east of the proposed site.

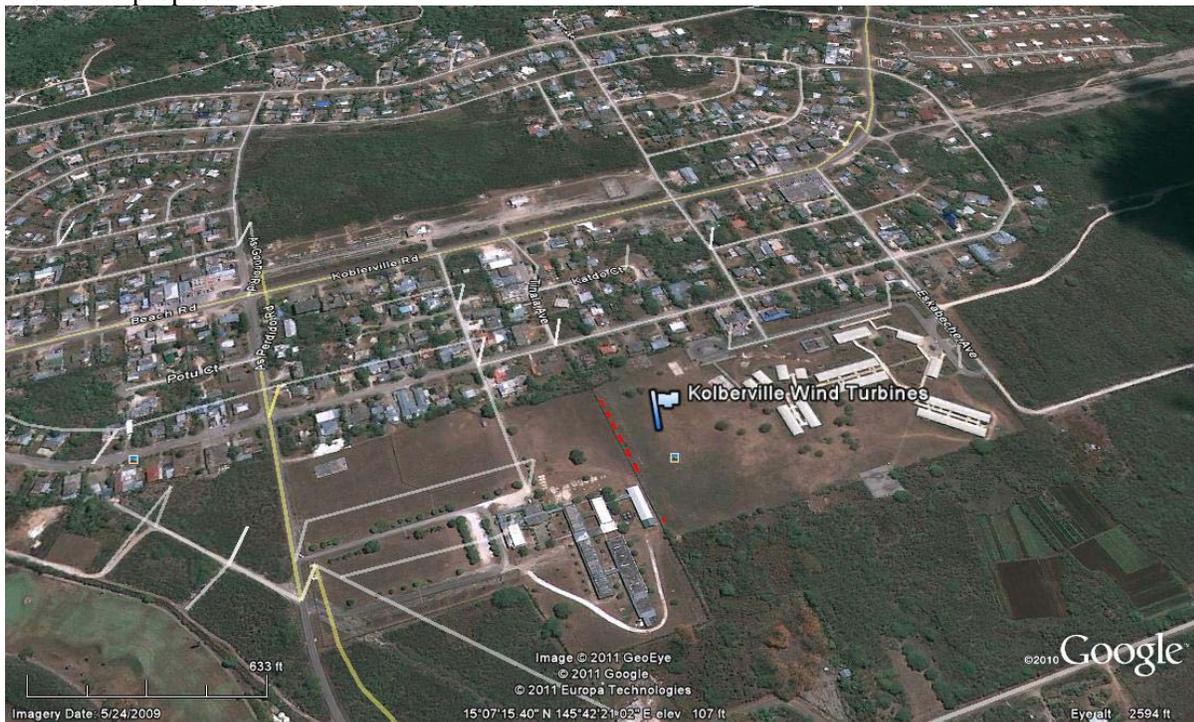


Figure 1. Approximate location of the six 20 kilowatt wind turbines at the Saipan Southern High School and the one 2.4 kilowatt wind turbine at Koblerville Elementary School.

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### 2.3.1 DESCRIPTION OF PROPOSED FACILITIES

The proposed project would consist of two sizes of wind turbines: 20 kW and 2.4 kW. The 20 kW turbine and tower consists of an 80 foot monopole with a top mounted Jacobs 20 kW wind turbine (Figure X). The Jacobs wind turbine has a 31 foot rotor diameter with a rotor swept area of 755 square feet. Total turbine height with blades would be 95.5 feet. The 2.4 kW turbine consists of a 33 foot monopole with a top mounted Skystream 2.4 kW wind turbine (Figure 2). The Skystream wind turbine has a 12 foot rotor diameter with a rotor swept area of 115 square feet. Turbine height at full blade extent would be 39 feet. These proposed wind turbines are small in comparison to commercial-scale wind turbines. The operational lifespan of the turbines is estimated to be 20 years. A small area would be disturbed during installation of the turbine foundations. All turbines would be installed in open, maintained grass fields or previously disturbed areas on school property and connected to the electrical system for the respective schools and local grid as appropriate. The following paragraph describes the individual proposed projects.



Figure 2. Skystream 2.4 kW wind turbine

The proposed location of the wind turbines at Saipan Southern High School and Koblerville Elementary School is in a maintained grass field near the boundary between the high school and elementary school.

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### **2.3.2 CONSTRUCTION AND INSTALLATION**

Construction of the wind turbines is anticipated to begin in 2012. This project must be completed and operational by September 30, 2013. Installation of the turbines and required infrastructure would require the temporary disturbance of land that has been graded or otherwise previously disturbed. Electrical cable would be buried from each turbine to the School. Once the wind turbines were constructed, the temporary staging area and the path of the buried electrical line would be restored to existing conditions. Use of the area is and would continue to be for institutional and public purposes as part of the School's property. The area surrounding the proposed wind turbines would continue to be used for a variety of purposes. The turbine towers and blades are currently stored in shipping containers at the project site. A crane would be used to assemble the tower, place the nacelle on top of the tower, and attach the blades to the nacelle hub. Construction of the foundation, tower erection, turbine nacelle placement, and blade installation would be contingent on temperature and weather conditions.

### **2.3.3 OPERATION**

The School would operate the proposed project with N15 Architects. As part of operating the wind turbine, N15 Architects and the School would ensure workers are properly trained for turbine maintenance and safety. Routine maintenance of the turbines would be necessary to maximize performance and identify potential problems or maintenance issues. Most servicing would be performed by laying the turbines down to access the nacelle and blades.

### **2.3.4 DECOMMISSIONING**

Impacts evaluated with respect to the decommissioning of the turbines would be similar to those considered for construction of the turbine. The turbines and other infrastructure would be expected to have a useful life of at least 15 to 20 years. Retrofitting the turbines with upgrades might allow the turbines to produce efficiently for many years after the original useful life. When the proposed project is terminated, the School will be responsible for decommissioning. The turbines and other infrastructure would be decommissioned and all facilities would be removed to a depth of approximately three feet below grade. The soil surface would be restored as close as possible to its original condition. Buried equipment would either be removed or safely secured and left in place. Salvageable items (including fluids) would be sold, reused, or recycled as appropriate; unsalvageable material would be disposed of at authorized and approved disposal sites. All decommissioning construction activities would be performed in accordance with the manufacturer's guidelines as well as all applicable Federal, Territorial, and local regulations.

## **2.4 No-Action Alternative**

Under the No-Action Alternative, DOE would not allow DPW to use its SEP funds for the proposed project. For the purposes of this EA, DOE assumes for the No-Action Alternative that the project would not proceed without federal funding. This assumption allows a comparison between the potential impacts of the project as proposed and the impacts of not proceeding with the project. Without the proposed project, the operations and energy usage of the five public schools would continue as otherwise planned but without the proposed wind projects; therefore, the public schools would continue to use electricity primarily generated using fossil fuels and the potential reduction in greenhouse gases would not be realized. The ability of DPW to use its SEP funds for energy efficiency and renewable energy activities would be impaired, as would its ability to create jobs and invest in the nation's infrastructure in furtherance of the goals of the Recovery Act.

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## 2.5 Committed Measures

PSS has committed to the following the provisions contained in the Biological Opinion and associated Take Statement (Appendix C):

1. CNMI will donate one CNMI Government Credit in the Saipan Upland Mitigation Bank prior to any site disturbance at Saipan Southern High School;
2. Clearing of vegetation will only occur October through December or April through June;
3. Plastic fencing will be placed and maintained around any habitat that is to be avoided to prevent impacts to habitat from construction personnel and equipment;
4. All on-site construction personnel will receive instruction regarding the presence of listed species and the importance of avoiding and minimizing impacts to these species;
5. CNMI PSS will ensure that no unauthorized take of the nightingale reed warbler or destruction of their habitat occurs;
6. All construction equipment will have proper brown snake inspections completed by CNMI Customs or Quarantine personnel under established CNMI procedures;
7. A litter-control program will be implemented during construction;
8. All workers will ensure their food scraps, paper wrappers, food containers, cans, bottles, and other trash from the project area are deposited in covered or closed trash containers;
9. No contamination of adjacent properties will occur from project-related activities;
10. No invasive species other than tangantangan will be planted and measures will be taken to ensure these species are not established on the property;
11. CNMI will paint one blade black and two blades white on each turbine installed;
12. Annual surveys for the nightingale reed warbler will be conducted;
13. CNMI PSS and CNMI Division of Fish and Wildlife will implement a predator control program at Mariana Swiflet caves on Saipan.

PSS would use standard best management practices for the construction industry to reduce risks to workers.

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### **3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS**

This chapter of the EA examines in detail the potential environmental impacts of the proposed project and of the No-Action Alternative for the following affected environmental resource areas:

- Land Use
- Visual Quality
- Noise
- Cultural Resources and Historic Preservation
- Biological Resources
- Human Health and Safety
- Socioeconomics and Environmental Justice
- Infrastructure and Energy

Other resource and subject areas commonly addressed in DOE EAs are identified in Section 3.2 along with a basis for excluding them from the more detailed analysis.

#### **3.1 No-Action Alternative**

Under the No-Action Alternative, DOE would not authorize the use of Federal funds for the proposed project; therefore, there would not be any impacts to the resource areas analyzed in this EA. However, without the proposed project, approximately 70-80 percent of the school's average annual electrical power that could have been provided by the proposed project would continue to be purchased from the Commonwealth Utility Corporation (CUC). The fuel source for the electricity generated by CUC is imported diesel. Thus, carbon dioxide emissions from electricity generation to serve the school would remain the same under the No-Action Alternative, and CNMI would not meet its objective of reducing its carbon footprint.

Additionally, the jobs created and retained by construction and operation of the wind turbine would not be realized and the local area would forego the economic benefit associated with these new jobs.

#### **3.2 Environmental Resource Areas Not Carried Forward for Further Analysis**

Consistent with CEQ and DOE NEPA implementing regulations and guidance, DOE focuses the analysis in an EA on topics with the greatest potential for environmental impacts. This sliding-scale approach is consistent with NEPA [40 CFR 1502.2(b)], under which impacts, issues, and related regulatory requirements are investigated and addressed with a degree of effort commensurate with their importance. DOE concluded that the proposed project would result in no impacts or minor impacts to the following resource areas and did not carry them forward for detailed description and analysis.

##### **3.2.1 GEOLOGY AND SOILS**

Construction would occur in an open, previously disturbed area between Saipan Southern High School and Koblerville Elementary School. Preliminary plans indicate the construction of the turbine foundation would require approximately 42 cubic yards of ground disturbance and would be poured concrete reaching a depth of approximately 4 feet below ground. There is nothing unique or unusual in the site's geology and soils that would hinder or adversely affect the proposed project. The School would take actions during construction to minimize soil erosion. After construction is completed and the site

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revegetated, the potential for soil erosion should be no different than under existing, pre-project conditions.

CNMI, like most Pacific islands is an area of intense seismic activity (USGS 2012). The proposed project would not affect or be adversely affected by site geology.

### **3.2.2 WATER RESOURCES**

The School would use water, provided by CUC, as necessary during construction for soil compaction and dust suppression. Such water demand would be short term, approximately two months. The proposed project would require excavation to a depth of approximately 4 feet for the wind turbine foundation. It is unlikely that groundwater would be encountered during construction and due to the small area of disturbance, construction activities would not adversely affect such groundwater or deeper aquifers.

There would be no water needs during operation of the wind turbines, and there would be no storage of hazardous substances that could be released and migrate to groundwater. The School would handle, collect, transfer, and reuse or recycle the small amounts of oil and lubricants used during maintenance and operation in accordance with applicable Federal, State, or local regulations. Neither construction, operation, nor decommissioning of the wind turbines would involve discharges that could contaminate surface or ground water, and it is anticipated there would be no reduction in surface water quality or availability as a result of the Wind Turbine Project.

Runoff from the constructed wind turbine foundation, compacted temporary staging area, and access road could have increased runoff compared to surrounding vegetated areas. However, the affected areas are relatively small and the potential for runoff is low. The only hazardous materials to be used during operations are the lubricants in the turbine machinery and possibly other lubricants and cleaning materials required during maintenance. Decommissioning would be very similar to construction, in that fuels and other petroleum products would be present in equipment and the same precautions would be taken to ensure there were no releases of hazardous materials. Once the wind turbine materials were removed, the area would be recontoured and revegetated, which would minimize storm water runoff.

### **3.2.3 WASTE MANAGEMENT**

Solid wastes generated during installation include equipment packaging materials and construction-related material debris. Minimal solid wastes would be generated during operation of the turbines. Solid wastes that are anticipated to be generated during decommissioning include dismantled equipment and construction-related material debris. No hazardous wastes would be generated during installation, operation, or decommissioning. The School would handle, collect, transfer, and dispose of all wastes generated over the life of the proposed project in accordance with applicable Federal, State, and local regulations. Used oil (e.g., spent gearbox oil, hydraulic fluid, and gear grease) would be generated during operation of the wind turbine, but it would not be considered a waste because it can be reused and/or recycled. The School would manage used oil from the wind turbine in accordance with applicable Federal, State, and local regulations.

### **3.2.4 TRANSPORTATION**

#### **Affected Environment**

Primary access into the School area is via Beach/Koblerville/Asilito Road and As Gonno/Flame Tree/As Perdido Road. These roads would see traffic volumes typical of roads in CNMI that service schools and residential areas. There are multiple smaller roads in the project vicinity that connect the various residential neighbors to the main arteries.

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As noted above, the Saipan International Airport is approximately 1 mile from the proposed project site. It is a commercial service airport with one runway and connecting taxiways. (<http://www.cpa.gov.mp>).

### **Direct and Indirect Impacts**

Construction of the wind turbine would involve increased vehicular traffic, including heavy equipment, in the area of the School campus. However, because of the relatively small size of the wind turbines involved, construction would be of relatively short duration (about 1 month) and the workforce small (a maximum of 12 workers at any given time). Possibly of more concern would be the traffic associated with delivery of the wind turbine components, not because of the volume of traffic but because of the size of the loads. The turbine blades, towers, and other large parts are currently being stored onsite. Transportation of the turbine blades and other large components to the project site has already taken place.

As described in below, the School has already addressed any issues related to potential air traffic interference and has received notification from the FAA that the proposed wind turbines would not be a hazard to air navigation (Appendix B).

Decommissioning of the wind turbines would require equipment similar to that present during construction and would be expected to result in similar minor and temporary transportation impacts.

### **3.2.5 AIR QUALITY**

#### **Affected Environment**

The affected air environment can be characterized in terms of concentrations of the criteria pollutants carbon monoxide, sulfur dioxide, particulate matter, nitrogen dioxide, ozone, and lead. The EPA has established National Ambient Air Quality Standards for these pollutants. There are two standards for particulate matter: one for particulates with an aerodynamic diameter less than or equal to a nominal 10 micrometers and one for particulates with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers. According to CNMI's Department of Environmental Quality and EPA, CNMI is in attainment for all pollutants listed above.

The EPA has found that the "aggregate group of the well-mixed greenhouse gases (GHG)" constitutes an air pollutant that contributes to climate change. Carbon dioxide is a GHG, and the proposed project would have an indirect and positive impact on reducing carbon dioxide emissions from fossil fuel sources. Electricity for the School is currently supplied by the CUC is imported diesel.

#### **Direct and Indirect Impacts**

The proposed project would be an emissions-free energy generation project that would not degrade air quality. Aside from temporary dust generated during construction and decommissioning, which would be minimized to the extent practicable, this proposed project would not result in any adverse impacts to air quality. The proposed project would not require any air permits.

Carbon dioxide is a GHG that contributes to climate change, which in turn causes harm to many physical and biological systems. The proposed project would reduce the School's carbon footprint by reducing reliance on fossil fuels. It is assumed if this wind energy project was not built, the School would continue to receive the vast majority of the electricity it uses from fossil-fuel sources – primarily imported diesel. Therefore, the proposed project would have a minor, but beneficial impact on air quality.

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### **3.2.6 INTENTIONAL DESTRUCTIVE ACTS**

DOE considers intentional destructive acts (that is, acts of sabotage or terrorism) in its EAs and environmental impact statements (DOE 2006). Construction and operation of the proposed project would not involve the transportation, storage, or use of radioactive, explosive, or toxic materials. The proposed project would not offer any particular attractive targets of opportunity for terrorists or saboteurs to inflict adverse impacts on human life, health, or safety. In the unlikely event an attack were to occur, its consequences would be similar to those of an accident, such as those discussed below.

## **3.3 Considerations Carried Forward for Further Analysis**

### **3.3.1 LAND USE**

#### **Affected Environment**

The proposed wind turbines would be located between Saipan Southern High and Koblerville Elementary School. Land use in the vicinity of the proposed project is typical of a school campus. The proposed project site is currently a vacant grass field along the edge of the soccer field between Saipan Southern High School and Koblerville Elementary School. The field is bordered by the two schools and residences. The closest building is about 490 feet from the closest the proposed wind turbine site. According to the local zoning ordinances, the proposed wind turbines would be located on land with a designated land use of “village/residential” along with the rest of the school campus ([www.zoning.gov.mp](http://www.zoning.gov.mp)). Because of the height of the proposed wind turbines, there are other land uses in the surrounding area that could be impacted. The Saipan International Airport is approximately 1 mile from the proposed project site. There are no known communications or cellular towers within a mile of the project site.

There are height restrictions in the zoning ordinance; however, during the building permit application process, the proposed project received zoning clearance to construct the proposed project.

#### **Direct and Indirect Impacts**

Implementation of the proposed project would temporarily commit up to less than 1 acre of previously disturbed land. Once the wind turbines are constructed, the School would restore both the temporary staging area and the area where the electrical lines would be installed, to existing conditions. The wind turbine foundations are the only long-term commitment of ground. The general land use of the area is and would continue to be used as it currently is (i.e. soccer fields) since it is part of the school’s property. The area surrounding the proposed wind turbine location would continue to be used for a variety of purposes, primarily residential.

The only “set-back” requirement associated with the proposed wind turbines is the ability to be able to lay them down during typhoons and there must be at least one times the length of the turbine from any structures or power lines. This is approximately 95.5 feet for the Jacobs 20 kW wind turbines and 39 feet for the 2.4 kW turbine from base to the tip of the rotor blade at its highest point. The nearest structures are approximately 490 feet from the proposed wind turbine site.

Based on the height and location of the proposed wind turbines, DOE concludes that the proposed project would have no adverse impacts on air traffic in the area and, in that regard, would not present a conflict of land use.

Wind turbines have the potential to interfere with existing microwave systems and broadcast stations by physically blocking line-of-sight between transmitters and, in case of television signals, by reflecting

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signals that can result in “ghosting” in receptions. There no communications towers in the immediate project vicinity and the proposed project is not anticipated to interfere with microwave paths.

### 3.3.2 VISUAL QUALITY

#### **Affected Environment**

Visual quality refers to the scenic or visual appeal of the landscape and includes all natural and manmade objects (moving and stationary) that are visible on the landscape (BLM 2005a). The visual character of the proposed project site is that of a soccer field, the school campus, residential neighborhoods, and a golf course located approximately 2 miles away.

The School and the proposed project site are at the southeast edge of the island of Saipan and most of the surrounding area is already developed.

#### ***Shadow Flicker***

Another potential visual impact associated with wind turbines is shadow flicker. Shadow flicker is defined as alternating changes in light intensity caused by a moving object (such as a rotating rotor blade) casting shadows on another object. Shadow flicker from wind turbines can occur when moving turbine blades pass in front of the sun, creating alternating changes in light intensity or shadows. These flickering shadows can cause an annoyance when cast on nearby “receptors,” such as residences, schools, and hospitals. The spatial relationship between a wind turbine and a receptor, the location of trees, topography, buildings, and other obstacles, and weather characteristics such as wind speed/direction, and cloud cover, are key factors related to shadow flicker impacts. The effect is most pronounced when the sun is at a low angle and shadows are long.

The farther the observer is from the wind turbine, the smaller the portion of the sun being blocked, allowing the distance to diffuse (weaken) the shadow. In the case of proposed project, the wind turbine being evaluated (the Jacobs 20 kW wind turbine) has a rotor diameter of 31 feet, so the impact area of primary concern would lie within about 310 feet of the proposed turbine site.

Because of the strobe-like effect of shadow flicker, there have been investigations into whether it might have the potential to produce epileptic seizures in individuals with photosensitivity. It has been determined that modern utility-scale wind turbines do not have the potential to cause these types of problems because of their relatively slow blade rotation. One study (Harding et al. 2008) reported that flickers with a frequency greater than 3 hertz could pose a potential for inducing photosensitive seizures; that is, a light flashing at a rate of more than 3 times per second. The American Epilepsy Foundation reports that lights flashing in the range of 5 to 30 hertz are most likely to trigger seizures and recommends that flash rates of visual alarms be kept under 2 hertz (Epilepsy Foundation 2010). A wind turbine with three blades would have to make a full revolution every second (or 60 revolutions per minute) to reach a frequency of 3 hertz. The Jacobs 20kW wind turbines being evaluated for this project operates at 175 revolutions per minute at rated output power; however because these are small-scale turbines shadow flicker created by the turbines do not extend past the turbine laydown area. (Figure 3).

Health or safety concerns aside, shadow flicker is often considered annoying by those exposed. For example, in rooms with windows exposed to sunlight, the rotating blades could cause a shadow in the room every one to two seconds and during certain times of the year, this could go on for up to about an hour (but could occur only once per day). The closer the room to the wind turbine, the more intense the shadow (that is, the more contrast there is between the dark and light intervals). The level of annoyance this might cause is very subjective and would depend on the individual and the activity being performed. Depending on the options available and the level of annoyance, the exposed individual might choose to

move to an unaffected portion of the building, close blinds or drapes to block the sunlight (and the shadows), or change the activity being performed.

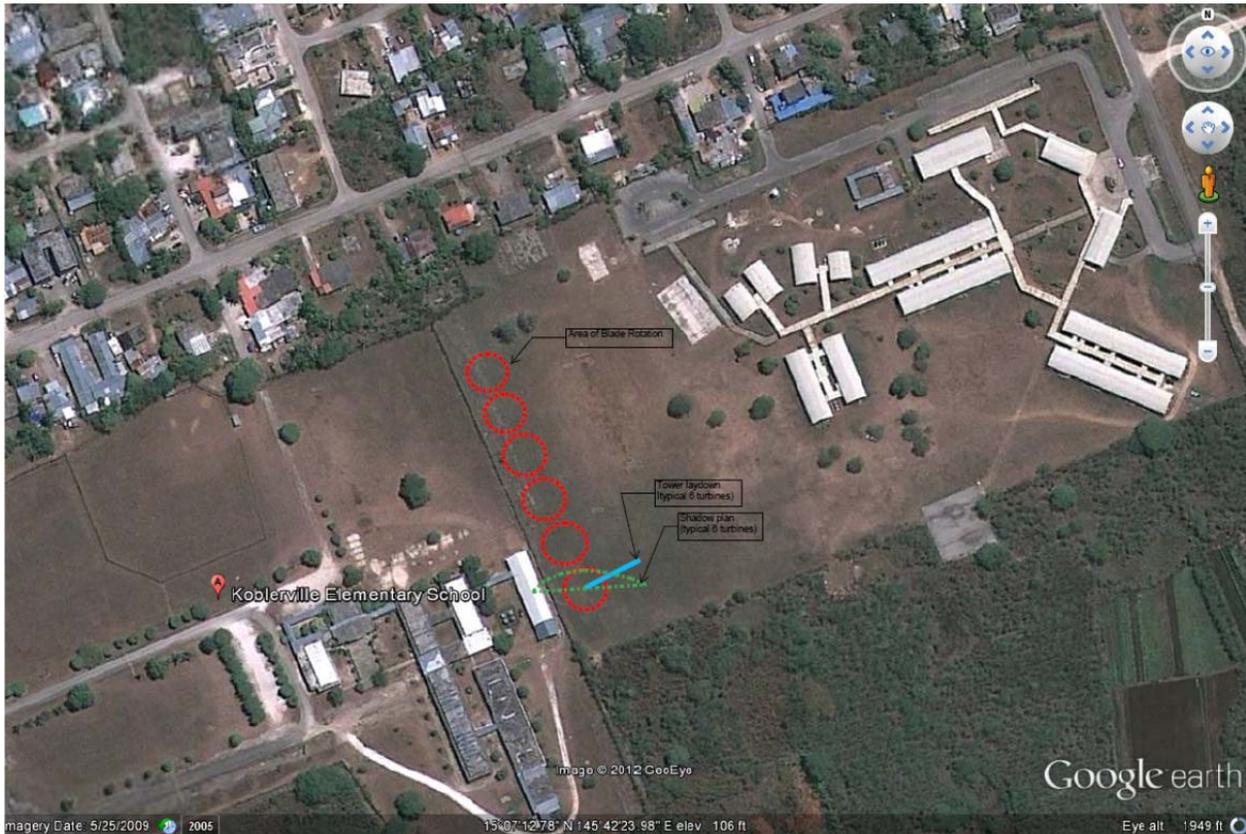


Figure 3, Shadow Flicker Plan

## Direct and Indirect Impacts

### *Visual Effects*

Construction of the wind turbine would involve the presence of heavy equipment, construction workers and their vehicles, dust and vehicle exhaust emissions, and, for a 1 to 2 week period, a crane to lift the wind turbine components. All of these items would be in contrast to the normal visual landscape of the site. However, these actions would be of relatively short duration and would occur primarily in an area that is somewhat shielded from ground view in much of the surrounding area. The crane would be the exception and would be visible for some distance when in the upright position, as would the wind turbine components as they were erected. Because of the relatively small size of wind turbines involved, the duration of construction would be relatively short (estimated at about 2 months). Decommissioning would require the same types of activities as construction and, similarly, would be expected to have minimal visual effects (other than the change of eliminating the visual impact of the wind turbine).

Once construction was complete, the proposed project would result in several tall, narrow structures on the school property. The wind turbines would have any lighting, per the request of the Federal Aviation Administration and the U.S. Fish and Wildlife Service. This would ensure pilots do not confuse the turbines with the nearby airport runways and would decrease the potential for birds and bats to be attracted to the turbines at night.

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Although the wind turbines would be a new feature at the school campus, the School has concluded that the presence of the wind turbines would be consistent with future development and would provide a visual landmark for identifying the school's location. The proposed turbines would result in minimal impacts to the area's visual resources.

### **Shadow Flicker**

As can be seen in Figure 3, because of the small scale of the turbines, the shadows only extend slightly outside the area of blade rotation. There would only be one building at Koblerville Elementary that would potentially be impacted by shadow flicker. However, the closest building's windows are blocked against the sun because that area faces west; in the event the windows were exposed, there would be no impact to students from shadow flicker as flicker on that building would not occur until after 4:45 PM - after school hours. There are "reducing" factors that must also be considered in analyzing the amount of shadow flicker on a receptor: 1) cloud cover, 2) wind direction attributed to meteorological conditions and 3) the average percentage of time the wind turbine would be operating. It does not appear that any residences would be impacted by shadow flicker.

Considering only the impacts to the human environment from exposure to shadow flicker, there are no firm criteria on what is acceptable or unacceptable. As noted previously there are no specific, identified health impacts associated with the exposures. The level of annoyance is very subjective and depends on how the exposed portion of the facility is being used, and on the individual observer. If an individual is annoyed by the phenomenon, a solution can be as simple as temporarily moving to an unaffected portion of the facility, hanging drapes or blinds, or planting screening vegetation. It is recognized, however, that such solutions may not always be available or practical and, in some cases, feeling the need to implement a solution just adds to the annoyance. There are some guidelines or reference points on what some might term acceptable levels of exposure to shadow flicker occurrences. The Danish Wind Industry Association identifies a court case in Germany in which a judge set 30 hours of actual shadow flicker per year as a tolerable level (DWIA 2003). The National Wind Coordinating Committee, a collaboration of U.S. industry and government groups, identifies shadow flicker of 20 to 30 hours per year as the threshold for concern (NWCC 2006). Based on this information, it does not appear that any sensitive receptors would experience adverse impacts related to shadow flicker.

The above Figure 3, from the shadow plan shows that the field would experience some level of shadow flicker. Although the field would be subjected to shadow flicker events, individuals would be moving through the area and would be exposed to only short durations of the phenomenon. These wind turbines are not expected to generate shadow flicker impacts beyond which most guidelines define as acceptable. It is recognized, however, that some individuals might find any exposure to shadow flicker unacceptable and in such cases, those individual could be adversely affected, but there is no evidence to date that such individuals would be harmed by the low duration exposures expected in this case.

### **3.3.3 NOISE**

Sound is a result of fluctuating air pressure. The standard unit for measuring sound pressure levels is the decibel. A decibel is a unit that describes the amplitude (or difference between extremes) of sound equal to 20 times the logarithm to the base 10 of the ratio of the measured pressure to the reference pressure, which is 20 micropascals. Typically, environmental and occupational sound pressure levels are measured in decibels on an A-weighted scale (dBA). The A-weighted scale deemphasizes very low and very high frequency components of sound in a manner similar to the frequency response of the human ear. Using the A-weighting filter adjusts certain frequency ranges (those that humans detect poorly) (Colby et al. 2009). Typical indoor and outdoor sound levels are shown in Table 1.

Common Outdoor Sound Levels	dB(A)	Common Indoor Sound Levels
Jet flyover at 1,000 ft	110	Rock Band
Gas Lawnmower at 3 ft	100	Inside Subway Train (New York)
Diesel Truck at 50 ft Noisy Urban Daytime	90	Food blender at 3 ft Garbage Disposal at 3 ft
Gas Lawnmower at 100 ft	80	Very loud Speech at 3 ft
Commercial Area Heavy Traffic at 300 ft	70	Normal Speech at 3 ft
	60	Large Business Office Quiet Speech at 3 ft Dishwasher Next Room
	50	Small Theater, Large Conference Room (Background)
Quiet Urban Nighttime	40	Library
Quiet Suburban Nighttime	30	Bedroom at Night Concert Hall (Background)
Quiet Rural Nighttime	20	
	10	Broadcast and Recording Studio
	0	Threshold of Hearing

Table 1: Common Outdoor and Indoor Sound Sources and Typical Associated Sound Levels (dBA)

Noise is any unwanted, undesirable sound. It has the potential to interfere with communication, damage hearing, and, in most cases, is viewed as an annoyance. Noise can occur in different volumes and pitches depending on the type of source and distance from the source. It is important to consider the amount of noise that would be created during both the installation and operation phases of the proposed project to avoid inconveniencing people working or living in the surrounding areas (HUD 2009).

The U.S. Environmental Protection Agency (EPA) identifies noise levels necessary to protect public health and welfare against hearing loss, annoyance, and activity interference in its document, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA 1974). These noise levels are in terms of an average “24-hour exposure” and over long periods of time such as years. A cumulative 24-hour measure of noise accounts for the moment-to-moment fluctuations in A-weighted decibel levels due to all sound sources during 24 hours, combined.

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A 24-hour exposure level of 70 dBA is indicated by EPA as the maximum level of environmental noise at which any measurable hearing loss over a lifetime may be prevented, and levels of 55 dBA or less outdoors and 45 dBA or less indoors are defined as preventing activity interference and annoyance to human receptors. For noise-sensitive areas such as where people sleep, EPA considered Day Night Average Sound Level (DNL) values. The DNL values represent energy averages over a 24-hour period, but a 10-decibel penalty is added to sounds that occur between 10 p.m. and 7 a.m. Accordingly, in residential areas, for example, EPA's guidelines for sound levels to avoid activity interference and annoyance are DNL levels of 55 dBA outdoors and 45 dBA indoors. At those levels (or less), spoken conversation and other daily activities such as sleeping, working and recreation, can occur without interference.

In 1981, the Federal government concluded that noise issues were best handled at the State or local government level. As a result, the EPA phased out Federal oversight of noise issues to transfer the primary responsibility of regulating noise to State and local governments. The EPA has an existing design goal of a DNL less than or equal to 65 dBA and a future design goal DNL of 55 dBA for exterior sound levels (EPA 1977). It is important to note that the EPA noise guidelines are design goals and not enforceable regulations. However, these guidelines and design goals are useful tools for assessing the affected environment.

## **Affected Environment**

There are no official noise regulations or ordinances for the island of Saipan. The proposed location for the wind turbines is along with school's soccer fields between the high school and elementary school. The closest facility to the turbines is Koblerville Elementary School directly to the west. The closest off-campus buildings are the residential areas to the north.

The evaluation in this EA assumes, as a matter of conservatism, that a daytime sound limit of 50 dBA for the residential areas and 60 dBA is applicable to the school facilities because the nearest school facilities do not include buildings where people would sleep.

### ***Existing Conditions***

Because of the small scale of the proposed turbines, the School did not commission an ambient noise survey to measure baseline sound conditions in the area of the proposed wind turbines or to evaluate the impacts of the wind turbines' operation.

## **Direct and Indirect Impacts**

### ***Sound Levels Associated with the Proposed Wind Turbine Project***

Noise produced during Wind Turbine Project construction (estimate to last about 2 months) would be a result of heavy equipment operating at the site. Sound levels from typical construction equipment (for example, bulldozers, rollers, or other heavy equipment with diesel engines and limited movement) are generally in the 80 to 90 dBA range at a distance of 50 feet (EPA 1974). Sound attenuation factors such as air absorption and ground effects from terrain and vegetation would decrease sound levels at the nearest receptors (residences and the school). In addition, the sounds would be relatively short term and would occur only during the daytime when they would be less likely to interfere with sound-sensitive activities such as sleeping. Thus, construction of the wind turbines would have minor noise impacts on nearby residents.

Noise produced during decommissioning of the wind turbines would be expected to be similar to, if not less than, that generated during construction. That is, with appropriate control of nighttime activities, noise impacts would be minor.

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Operating wind turbines generate two types of sound: mechanical sound from components such as gearboxes, generators, yaw drives, and cooling fans, and aerodynamic sound from the flow of air over and past the rotor blades. Modern wind turbine design has greatly reduced mechanical sound and it generally can be ignored in comparison to aerodynamic sound, which is often described as a “swishing” or “whooshing” sound (BLM 2005b). The Jacobs 20 kW wind turbine has a hub height of 80 feet, and rotor diameter of 31 feet, and has design characteristics that reduce aerodynamic sound levels in comparison to older wind turbine designs.

The Jacobs 20 kW wind turbine has a maximum sound power level of 70 decibels.

Sound levels of 52-55 dBA (nearly the equivalent of quiet speech, which occurs at 50 dBA)] would occur at any distance greater than 100 feet from the proposed wind turbines.

Predicted sound levels at nearby residences range from about 43 to 47 dBA. Within the campus, Koblerville Elementary, which is located 490 feet from the closest turbine, would experience sound levels of less than 50 to 55 dBA.

DOE recognizes that wind turbine sounds can be relatively constant for long periods, during which ambient sound levels can fluctuate substantially and might drop below those of the wind turbine. Under those conditions, individuals outdoors would be able to hear the wind turbine. Further, some individuals are sensitive to the differences between the constant sound of a wind turbine and fluctuating sounds from other sources, even when the ambient and wind turbine sound levels are similar, and can distinguish wind turbine sounds from other sources. In summary, sounds that would be produced by the wind turbines would likely be below ambient sound levels in the area, would not adversely affect sound sensitive activities in the nearest residences, and would not adversely affect residents other than, possibly, those most sensitive to the sounds of a wind turbine.

### **Conclusion**

DOE recognizes there are sound issues associated with the operation of wind turbines. The predicted sound levels would be consistent with the residential and educational uses of the area, achieving EPA’s recommendation of DNL levels of 55 dBA or less outdoors. With a normal 15-dBA reduction in sound level between indoors and outdoors (with partially open windows), predicted sound levels would easily be below the recommended level of 45 dBA indoors and even at the closest residences would be at or near an indoor nighttime noise level of about 30 dBA, which is a sound level generally recommended for sleep and consistent with World Health Organization guidelines (WHO 1999). Noise generated from the wind turbine would result in no or minor adverse impacts.

## **3.3.4 CULTURAL RESOURCES AND HISTORIC PRESERVATION**

### **Affected Environment**

#### **Regulatory Background**

Cultural resources are archaeological sites, historical structures and objects, and traditional cultural properties. Historic properties are cultural resources that are listed in or eligible for listing in the National Register of Historic Places (NRHP) because they are significant and retain integrity (36 CFR 60.4). Section 106 of the *National Historic Preservation Act* (16 U.S.C. 470 *et seq.*) requires that Federal agencies take into account the effects of their actions on historic properties. Section 101(b)(4) of NEPA requires Federal agencies to coordinate and plan their actions to identify any unique historic or cultural characteristics of the geographic area (40 CFR 1508.27) of the proposed project and act accordingly. The first step of the process is for an agency to determine whether an action is an undertaking (36 CFR 800.3(a)). The proposed project is an “undertaking” because it is “a project, activity, or program funding in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out

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by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval” (36 CFR 800.16(y)).

The regulations at 36 CFR Part 800, “Protection of Historic Properties” describe the process for compliance with Section 106, including defining the area of potential effect (APE), steps to identify resources, evaluate effects, and consultation with interested parties including the SHPO and other concerned parties. The regulations state, “If the undertaking is a type of activity that does not have the potential to cause effects on historic properties, assuming such historic properties are present, the agency official has no further obligations under Section 106, or this part” [36 CFR 800.3(a)(1)]. By definition, an “effect” is an “alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register” [36 CFR 800.16(i)].

The following section describes the existing historic and cultural resource conditions in the area of the proposed project site. The APE considered for evaluation of direct impacts to cultural resources during construction of the wind turbine consists of the school campus and neighborhood.

According to regulations on the protection of historic properties [36 CFR 800.5(a)(2)(v)], an adverse effect can include “introduction of visual, atmospheric, or audible elements that diminish the integrity of the property’s significant historic features.” A project can have adverse visual effects by involving either a negative aesthetic or obstructive effect on historic properties. An obstructive effect is one that diminishes the historic property’s integrity by blocking the property from view or by blocking the view from the property.

### ***Status of Consultations***

On March 15, 2012, the Commissioner of the CNMI Public School System was issued a “Commercial Earthmoving & Erosion Control Permit No. 2011 COM 058 (Permit). The Permit required that the permittee notify the Division of Historic Preservation no less than five working days prior to the commencement of the land clearing project; that no excavation occur in the absence of SHPO personnel; and that in the event historic or archaeological deposits or features are discovered, the permittee must immediately cease work and notify the Division of Historic Preservation.

## **Direct and Indirect Impacts**

### ***Construction***

Because the site of the proposed project is located on highly disturbed land the presence of unknown archaeological sites is unlikely. If the School encounters archaeological resources during construction, ground-disturbing activities would immediately cease, and the School would contact the CNMI Division of Historic Preservation for resolution and further instruction regarding additional studies and/or potential avoidance, minimization, or mitigation measures in accordance with the NHPA.

### ***Operations***

Once in operation, the proposed project would be a vertical visual presence in the vicinity and would be visible from multiple locations surrounding the site. However there are no NRHP-listed historic buildings in the project vicinity; therefore, DOE concluded that adverse visual impacts related to the proposed project are minimal.

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### 3.3.5 BIOLOGICAL RESOURCES

#### Affected Environment

The proposed project at the Saipan Southern High School and Koblerville Elementary School consist of six 20 kW Jacob turbines and one 2.4 kW Skystream turbine. The proposed location of these wind turbines is in a maintained grass field near the boundary between the high school and elementary school.

#### Impacted Species

The common moorhen (*Gallinula chloropus*) is distributed world-wide but the Mariana subspecies is endemic to the Mariana Archipelago. The Mariana moorhen is a species closely associated with emergent vegetation of freshwater marshes and ponds, including both man-made and natural wetlands (USFWS 1992, Takano and Haig 2004a, b). One of the key characteristics of moorhen habitat is a combination of deep marshes with emergent vegetation with equal areas of cover and open water. Recent research demonstrates that the Mariana moorhen will use small ponds; even man-made ponds provided adequate vegetation cover is available (Takano and Haig 2004a). Daily and intra-seasonal (dry vs. wet season) activity is spent primarily in one or two wetland habitats. Takano and Haig (2004a) estimated that moorhens on Saipan visited about 1.2 wetland sites per individual. During the dry season (January – May), moorhens typically remain at one wetland and use more permanent wetlands. As the wet season (July – November) progresses, moorhens tend to disperse to seasonal wetlands.

On Saipan, moorhens were observed on 41 of 56 wetlands surveyed including wetlands on golf courses and an abandoned 0.5 hectare oil tank inundated by rainwater (Takano and Haig 2004b). The wetlands occur along the coastal plain surrounding the central highlands. However, more wetlands occur on the western side of the island. The proposed wind turbine site is 1.5 – 2.5 miles south of Lake Susupe and the adjacent wetlands.

The Mariana Swiftlet (*Aerodramus bartschi*) is a highly colonial species whose life history is closely tied to natural limestone caves that are used for nesting and roosting. Swiftlets in the genus *Aerodramus* are unique in that they use echolocation similar to bats to navigate in the darkness of the caves. Unlike bats, the Swiftlet does not use echolocation to detect prey and forages for aerial insects during the daylight. Most birds in a colony leave their cave at dawn to forage for insects over ridge crests, forests, and open grassy fields.

The Mariana Swiftlet occurs on Guam, Aguijan, and Saipan and is locally extirpated on Rota and Tinian. On the island of Saipan, the Mariana Swiftlet is considered locally common and in recent years have increased to their highest abundance (>5,000 birds) since 1985. There are 10 known caves on Saipan that Swiftlets use for roosting and nesting. These caves are located in the central uplands surrounding Mount Tapochau. The proposed wind turbines at Southern Saipan High School are ~4.5 miles to the nearest cave (Hourglass). Mariana Swiftlets are strong fliers and aerial insect foragers. However, little to no information has been reported on how far and wide-ranging Swiftlets' foraging activities are in relation to the caves they use for roosting and nesting. Conservation measures have largely focused on protecting the limestone caves that are a critical part of their habitat. Protective measures have included limiting human disturbance, public education, and trapping non-native cockroaches in the caves.

The Nightingale reed-warbler (*Acrocephalus luscini*) is a medium-sized passerine species with a large, long bill. The species was long considered to inhabit primarily wetland habitats, but it also occupies open, secondary forest habitats (USFWS 1998, Camp et al. 2009). Historically, the nightingale reed-warbler was known in six islands in the Mariana archipelago: Guam, Tinian, Aguijan, Saipan, Alamagan, and Pagan. It has been extirpated from most of its range including Guam, Tinian, and Pagan (USFWS

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1998). A few sightings have been made on Aguijan but the only sizeable populations occur on Saipan and Alamagan.

On Saipan, the nightingale reed-warbler is distributed island wide and occurs in a variety of habitats such as wetlands, secondary forests and Tangantangan thickets. The species also occurs in residential areas, golf courses, and limestone forest but those are considered less suitable habitats (Camp et al., 2009). Camp et al. (2009) performed an island-wide avifauna survey in 2007 on Saipan with emphasis on the nightingale reed-warbler and evaluated the trends from previous surveys in 1982 and 1996. Although abundance trends declined in all habitats, the declines were most notable in the less suitable residential, golf course, and limestone forest habitats. This was attributed to the four-fold increase in the human population on Saipan since 1982 and the increased conversion of land cover from forest to anthropogenic-dominated habitats. Nightingale reed-warblers are usually found in thick vegetation. They primarily eat insects and glean other invertebrates from leaves but will consume lizards and geckos. The species is territorial and occupies territories of approximately 1 ha. Individuals exhibit site fidelity from year to year but will leave their territories for short time periods.

### **Direct and Indirect Impacts**

During consultation with the U.S. Fish and Wildlife Service, it was determined the proposed *project may adversely affect* the Mariana Swiftlet and the Nightingale Reed Warbler and DOE entered into formal consultation with the USFWS. On January 2, 2012, the DOE initiated formal consultation with the USFWS and submitted a Biological Assessment to the USFWS. (Appendix B). The USFWS issued its Biological Opinion and Incidental Take Statement to DOE on February 1, 2012. (Appendix C).

### ***Threatened and Endangered Species***

To minimize harm to the endangered Mariana Swiftlet and the Nightingale Reed Warbler the Biological Opinion contains the following Conservation Measures:

- No lighting will be installed on any of the wind turbines;
- One (1) hectare will be cleared at Saipan Southern High School to minimize the impacts to the reed-warbler<sup>1</sup>;
- The Biological Opinion also required the CNMI government to donate one CNMI Government Credit in the Saipan Upland Mitigation Bank.<sup>2</sup>;
- Plastic fencing will be used during construction;
- Construction personnel will receive instruction on the presence of and avoiding these species;
- All construction equipment arriving from Guam will have proper brown treesnake inspections conducted by CNMI Customs or Quarantine personnel;
- A litter-control program will be implemented during construction;
- No invasive plant species will be planted (other than tangantangan);
- One turbine blade on each turbine will be painted black and two blades will be painted white.

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<sup>1</sup> The Biological Opinion required that this land be cleared either between October-December or April-June. In order to make the award deadline, the land was cleared in June 2012.

<sup>2</sup> This credit has already been issued.

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The Biological Opinion, attached as Appendix C, is incorporated by reference into the EA.

The proposed turbine towers are monopoles; no external features such as ladders or guy wires would be attached to the turbine, and all electrical cables would be buried.

The above requirements and the Biological Opinion will be incorporated into DOE's award to CNMI and will be monitored by DOE.

### **3.3.6 HUMAN HEALTH AND SAFETY**

#### **Affected Environment**

The project site is school land, and as such, public access occurs during the day and evening when sporting events or other events are held on school campus. Access to the area would continue to be monitored in accordance with PSS standards. Signs on the turbines, posting the presence of high voltage would likely discourage tampering or vandalizing. Existing public safety hazards include traffic on public and private roads, potential for fires, accidents related to school and recreational activities, and electromagnetic fields.

Safety signing would be posted around all towers, in conformance with applicable State and Federal regulations.

The potential for fire or explosion at the wind energy facility does exist. Potential sources include power transformers, the internal workings of the turbine nacelle, lightning strikes, and combustion of flammable liquids, such as lubricating oils. Fire protection in the area is provided by the Department of Public Safety, Commonwealth Fire Division.

If someone were to intentionally break into a power transformer associated with the wind turbines, protective devices would prevent electrocution, and power transformers include safety devices to prevent short-circuits that would result in explosions and fires. Electrical protection for power transformers is accomplished with surge arresters, grounding, bonding, instrumentation, and switchgear. Fuses, switches, vacuum fault interrupters, circuit breakers, relays, meters, control power systems, and instrument transformers are all commonly used. Over-current protection would be provided on both the primary and the secondary side of each transformer.

Hazardous materials are not anticipated to be used or stored on site with the exception of chemical constituents contained in fuels (gasoline and diesel fuel), coolants (ethylene glycol), and lubricants (oils and greases).

#### **Direct and Indirect Impacts**

The potential for fire or explosion at the proposed project site is minimal. A variety of power transformers would be employed at the turbine sites, and would incorporate fire protection elements into their design. These elements, such as barrier walls and metal housings, help to reduce the likelihood of property damage should a fire occur. Wind turbine nacelles incorporate additional fire suppression equipment to control fires and limit danger to the general public. Lastly, all wind turbines, blades, and towers would be fully grounded for lightning strikes. DOE has concluded that the risk of fire is minimal.

PSS and its contractors would comply with all applicable hazard communication and hazardous materials laws and regulations regarding hazards chemicals and would implement a SPCC Plan. SPCC plans provide for the rapid response and clean-up of hazardous chemicals, including lubricating oils used in turbine nacelles.

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In addition, PSS and its contractors would comply with all applicable Federal and State regulations regarding notices to Federal and local emergency response authorities and development of applicable emergency response plans, if required. To mitigate impacts from leaks of hazardous materials during on site storage, materials storage, and dispensing areas, any fuel, coolant, or lubricant storage would be equipped with secondary containment features in accordance with all applicable laws and regulations and appropriate engineering practices.

### **3.3.7 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE**

Executive Order 12898 (February 11, 1994) directs Federal agencies to identify and address “disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” In 2000, CNMI was 31.8% Native Hawaiian and other Pacific Islands, 55.8% Asian, 1.8% White, .1% Black or African American and .7% “other.” (www.census.gov). No racial minority nor ethnic minority persons would experience adverse socioeconomic impacts from the proposed Wind Turbine Project.

#### ***Direct and Indirect Impacts***

No potential for adverse impacts to human health or environmental effects have been identified as part of the proposed project. Therefore, there would be no disproportionately high and adverse socioeconomics- or environmental justice-related impacts on minority populations and low-income populations.

The construction of the proposed project is expected to generate a short-term and small increase in employment due to temporary construction related jobs for the wind turbine. A local engineering firm is responsible for the design work, specification, and supervision work. The School would use its existing personnel and would hire a small number of contractors for the construction, installation, and maintenance work. This contractor vendor would perform final checks and bring the turbine into operation. Therefore, a few new permanent direct or indirect jobs would be likely and beneficial to the local economy.

### **3.3.8 INFRASTRUCTURE AND ENERGY**

Discussions in this section are limited to the electrical energy associated with the proposed project. The proposed project would not impact other utilities or utility services of the community. Water would be required during construction for activities such as soil compaction and dust suppression; however, this would not be expected to impact water supplies or the water distribution system. The proposed project would not involve routine production of sanitary sewage or other wastewater, and other than the waste debris generated during construction (which would go to the local landfill), there would be no routine production of solid waste. Fabrication of the wind turbine components would involve the unavoidable commitment of various materials, but these materials represent a small fraction of those available in the world marketplace.

#### **Affected Environment**

Electricity at the School and the proposed project site is provided by CUC. CUC’s electricity generating capacity relies on imported diesel.

#### **Direct and Indirect Impacts**

The proposed project would involve a peak electrical power production capability of 576 kWh per day. All of the electricity would be used by the school and the proposed project would provide approximately

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70-80% of the School's power. The proposed project would have a very minor positive impact on the electricity generating capacity of the region.

### **3.4 Irreversible and Irretrievable Commitment of Resources**

Irreversible commitments of resources are actions of a proposed project that would result in the loss of resources, whether those are natural or cultural, that consequently could not be recovered or replaced promptly in the original or current condition. The proposed project would result in no irreversible or irretrievable commitments of resources during the construction or operational phase. The property has been previously developed and environmental resources have already been impacted. Reuse of the property for the proposed project would result in a temporary, but not irreversible use of that property for other projects. The amount of new construction materials required for the proposed project would be minimal relative to the availability of those materials or the raw materials could be replenished. There would be a negligible irretrievable commitment of manufacturing resources. Long-term or permanent use of other resources, such as landfill space or the use of transportation corridors would be negligible. Minimal consumption of raw materials or resources would be required for operation.

The expenditure of Recovery Act funding from DOE would also be irreversible.

### **3.5 Unavoidable Adverse Impacts**

Unavoidable adverse impacts associated with the proposed Wind Turbine Project include:

- Long-term loss of approximately 165 square feet of vegetation resulting from the construction of the tower foundation;
- Take of less than 4 endangered birds per year struck or otherwise harmed by the spinning turbine blades;
- A minimal increase in noise during construction;
- Introduction of an additional vertical element into the existing viewshed;
- Minimal shadow flicker impacts for local residences and roadways; and
- A risk of tower collapse within 95.5 and 39 feet of the turbine towers.

The impacts from construction noise would be temporary; whereas, the other unavoidable adverse impacts could occur throughout the operational life of the wind turbine. Overall, impacts of the proposed Wind Turbine Project on the environment and human health would be minimal.

### **3.6 The Relationship Between Local Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity**

Short-term use of the environment, as the term is used in this document, is that used during the life of the proposed project, whereas long-term productivity refers to the period of time after the proposed project has been decommissioned, the equipment removed, and the land reclaimed and stabilized. The short-term use of the project area for the proposed project would not affect the long-term productivity of the area. When operation of the turbines was no longer practicable, the turbine, tower, and foundation would be removed and the site reclaimed and revegetated to resemble the pre-disturbance conditions (vacant grassy field), and the site would be available for other uses.

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## 4. Cumulative Impacts

### 4.1 Introduction

The Council on Environmental Quality regulations stipulate that the cumulative impact analysis within an EA consider whether the potential environmental impacts resulting “from the incremental impacts of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7). Because the impacts of the proposed Wind Turbine Project generally would be minor and localized, DOE focused its evaluation of the cumulative impacts of the proposed Wind Turbine Project and reasonably foreseeable future actions within the boundaries of the island of Saipan.

### 4.2 Reasonably Foreseeable Actions

DOE conducted online research and consulted with the CNMI Energy Office to determine current and future development projects in proximity to the Saipan Southern High School and Koblerville Elementary School location. The proposed location had been considered for construction of a Junior High School until it was determined that the site was not large enough and the proposed development was moved approximately 1 mile (1.6 km). Private developers have proposed additional wind energy projects but due to consultation requirements with USFWS, the proposals are no longer considered viable.

There are additional wind energy projects identified on the islands of Saipan and Tinian funded by Recovery Act SEP. The projects are listed as follows with wind turbine size and approximate distance from the proposed Wind Turbine Project site:

- Energy Office, Capitol Hill-2.4 kW turbine, approximately 9.94 miles (16 km).
- Kagman High School-2.4 kW turbine, approximately 7.76 miles (12.5 km)
- Cha Cha Oceanview Junior High School-2.4 kW turbine, approximately 8 miles (12.9 km).
- Gregorio T. Camacho Elementary School-2.4 kW turbine, approximately 11.8 miles (19 km).
- Garapan Elementary School-two, 2.4 kW turbines, approximately 7.45 miles (12 km).

Additionally, Kagman, Cha Cha, Camacho and Garapan schools have each installed roof-mounted solar photovoltaic systems, consisting of nine panels with an approximate area of 235.41 sq. ft. (21.87 sq. meters). The proposed and installed projects, in combination with the Saipan Southern High School wind energy project, would have negligible cumulative impacts.

Short term use is considered to be the lifespan of the project, while long-term productivity refers to the period of time after the project has been decommissioned, the equipment removed, and the land reclaimed and stabilized. The short-term use of the project area would not affect the long-term productivity. If it is decided in the future that the project has reached its useful life, the turbines and towers could be decommissioned and removed. The concrete footings would remain at the proposed site because the footings would be level with current site grading and the site could be reclaimed to resemble a similar habitat to the pre-disturbance conditions. The installation of wind turbines at this site would not preclude using the land for purposes that were suitable prior to the proposed project.

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## **4.3. Climate Change and Greenhouse Gas**

While the scientific understanding of climate change continues to evolve, the Intergovernmental Panel on Climate Change Fourth Assessment Report has stated that warming of the earth's climate is unequivocal and that warming is very likely attributable to increases in atmospheric GHGs caused by human activities (anthropogenic) (IPCC 2007). The Panel's Fourth Assessment Report indicates that changes in many physical and biological systems, such as increases in global temperatures, more frequent heat waves, rising sea levels, coastal flooding, loss of wildlife habitat, spread of infectious disease, and other potential environmental impacts are linked to changes in the climate system, and that some changes may be irreversible (IPCC 2007).

The release of anthropogenic GHGs and their potential contribution to global warming are inherently cumulative phenomena. It is assumed that the proposed project would displace fossil fuel electricity currently used by the Elementary and High Schools, resulting in a decrease in emissions of carbon dioxide equivalents for each year of operation. The proposed project in combination with the above-listed Wind Turbine projects would not measurably reduce the concentration of GHGs in the atmosphere nor reduce the annual rate of GHG emissions. The proposed project would marginally decrease the rate at which GHG emissions are increasing every year and contribute to ongoing global efforts to reduce GHGs and slow climate change.

### **4.3.1 Visual Resources**

The proposed project would affect the viewshed in the Wind Turbine Project area. The six 20 kW turbines would be a dominant vertical component in the landscape due to their height, but would not obstruct views in the way a large building could. The proposed location is located approximately 100 ft. from residential homes. No other turbines or other projects with large vertical elements are proposed within the viewshed of the proposed project. There would be small cumulative visual impacts from the proposed project.

### **4.3.2 Biological Resources**

The proposed project would result in Take of the Swiflet; however, it was determined that Take would not result in any long-term or cumulative impacts to the Swiflet population.

### **4.3.3 Noise**

The reasonably foreseeable actions do not include any that are expected to change the local ambient noise patterns. The noise impact from the wind turbines is anticipated to be small compared with the existing ambient noise except in cases of extreme weather based on the manufacturer's specifications.

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## 5. References

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