DOE/EA-1939

FINAL
ENVIRONMENTAL ASSESSMENT

FOR THE

CENTER FOR COMMERCIALIZATION OF ELECTRIC TECHNOLOGY (CCET), REESE TECHNOLOGY CENTER (RTC) WIND AND BATTERY INTEGRATION PROJECT, LUBBOCK COUNTY, TEXAS

U.S. Department of Energy
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COVER SHEET

Responsible Agency: U.S. Department of Energy (DOE)

Title: *Final Environmental Assessment for the Center for Commercialization of Electric Technology (CCET), Reese Technology Center (RTC) Wind and Battery Integration Project, Lubbock County, Texas* (DOE/EA-1939)

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Abstract: DOE prepared this EA to evaluate the potential environmental consequences of providing a financial assistance grant under the *American Recovery and Reinvestment Act of 2009* (Recovery Act; Public Law 111-5, 123 Stat. 115) to the Center for Commercialization of Electric Technology (CCET) to demonstrate battery technology integration with wind generated electricity by deploying and evaluating utility-scale lithium battery technology to improve grid performance and thereby aid in the integration of wind generation into the local electricity supply. This EA analyzes the potential environmental impacts of DOE's proposed action of providing the Recovery Act funding and of the No-Action Alternative.

In this EA, DOE evaluated potential environmental consequences from a portion of the overall project that would involve land disturbance. Other portions are described as major elements of the project, but because they involve only installation of equipment in existing facilities, they do not involve potential for significant environmental impact and are not evaluated further. With regard to the land disturbing actions considered in this EA, DOE evaluated impacts to air quality, noise, aesthetics and visual resources, surface water resources, biological resources, and areas of environmental concern. After performing a screening analysis of other environmental resource areas, DOE concluded that impacts to some aspects of the environment would not be likely to occur or would be negligible. The proposed project would be designed in compliance with federal and state air quality regulations, would reduce greenhouse gas emissions, and would have a net beneficial impact on air quality in the region. New construction would involve: (1) above ground and underground 12.5 kV distribution lines, (2) 1.5 MW storage battery facility and foundation, (3) an access road, and (4) site clearing. Two wind turbines and foundations would also be constructed as part of the proposed action. Although DOE is not funding the wind turbines, the effects will be assessed as a connected action, as it is part of the overall action.

Operation of the proposed project would not result in any increase in noise in the vicinity. The aesthetics of the Reese Technology Center *(*RTC) and along the easements would change with the addition of the above ground distribution lines, which would be along 5.5 miles of right-of-way utility easements, storage battery facility, access road, and wind turbines. There are two alternatives for the aboveground distribution lines; Option A extends through agricultural fields and Option B along county roads. The storage battery facility is proposed to be 20 by 40 feet with a 20 foot wide by 600 foot long access road. The wind turbines will not adversely affect the aesthetics as the location since it is in an open field with limited development in the area, and there is an existing wind turbine already on-site at the RTC along with several transmission and meteorological towers near the proposed location.

RTC is a campus centered technology, research and education facility that supports renewable energy related economic development in West Texas. RTC is used regularly by wind turbine manufacturers to test and certify turbine design and operation.

Clearing of 3 acres for the proposed project on the RTC site would not significantly impact any plant or animal species population because: (1) the project site has previously been disturbed; (2) the project site is currently vacant land that is isolated from larger tracts of undisturbed land; and (3) because plant and animal species found there are expected to be widespread in the region or, for sensitive species, the area is not unique habitat. The whooping crane, which is an endangered species under the federal *Endangered Species Act*, occurs in Lubbock County. However, the habitat needed for the whooping crane is not located within the vicinity of the project.

Availability: DOE encourages public participation in the NEPA process. A Notice of Availability was placed in The Avalanche-Journal on November 18, 19, and 20, 2012. The draft EA was made available for public review on DOE's National Energy Technology Laboratory web site and at the Mahon Library beginning November 19, 2012. This final EA is available on DOE's National Energy Technology Laboratory web site, http://www.netl.doe.gov/publications/others/nepa/ea.html, and DOE's NEPA web site at http://nepa.energy.gov/DOE_NEPA_documents.htm.

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ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
CCET	Center for Commercialization of Electric Technology
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy (also referred to as the Department)
EA	environmental assessment
ELF	Extremely Low Frequency Fields
EMFs	Electric and magnetic fields
EPA	U.S. Environmental Protection Agency
GSEC	Golden Spread Electric Coop
kV	kilovolt
mG	milligauss
MW	megawatt
NEPA	National Environmental Policy Act, as amended
NIEHS	National Institute of Environmental Health Sciences
NIRE	National Institute of Renewable Energy Holding Corporation
NOx	nitrogen oxides
ppm	parts per million
RAPID	Research and Public Information Dissemination
Recovery Act	American Recovery and Reinvestment Act of 2009
rpm	revolutions per minute
RTC	Reese Technology Center
SHPO	State Historic Preservation Office(r)

SPEC	South Plains Electric Cooperative, Inc.
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TTU	Texas Tech University
µg/m3	micrograms per cubic meter
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USGS	United States Geological Survey
VOC	volatile organic compound
WISE	Wind Science and Engineering Research Center

Note: Numbers in this EA generally have been rounded to two or three significant figures. Therefore, some total values might not equal the actual sums of the values.

SUMMARY

The U.S. Department of Energy (DOE) proposes to award a financial assistance grant under the *American Recovery and Reinvestment Act of 2009*, as part of a cooperative agreement, to the Center for Commercialization of Electric Technology (CCET). DOE's proposed action would award a $1.85 million financial assistance grant to CCET to demonstrate battery technology integration with wind generated electricity by deploying and evaluating utility-scale lithium battery technology to improve grid performance and thereby aid in the integration of wind generation into the local electricity supply. The estimated total cost of the project is $5.4 million. CCET would also purchase and install two wind turbines and pads.

In compliance with the *National Environmental Policy Act* (42 U.S.C. Section 4321 et seq.) and DOE's *National Environmental Policy Act* implementing regulations (10 CFR Part 1021) and procedures, this EA examines the potential environmental impacts of DOE's proposed action, CCET's proposed project, and the No-Action Alternative. Its purpose is to inform DOE and the public of the potential environmental consequences of the proposed project and the alternatives.

In this environmental assessment, DOE analyzed impacts to air quality, noise, aesthetics and visual resources, surface water resources, and biological resources from construction and installation of (1) above ground and underground distribution lines; (2) a 1.5 MW storage battery facility and foundation; (3) an access road; (4) site clearing; (5) and two wind turbines and pads. Operation of the storage batteries, distribution lines, and wind turbines would not have any meaningful or detectable impacts on land use; geology and soils; groundwater; cultural resources; socioeconomics; environmental justice; occupational health and safety; transportation and traffic; utilities, energy, and materials; and waste generation.

The proposed project is located in Lubbock County, Texas, which is in an attainment area for all six National Ambient Air Quality Standard criteria pollutants. The proposed project would produce air emissions during construction. Once completed, the proposed project would produce a quantity of electricity via wind energy, thereby reducing the amount of pollutants produced from burning fossil fuels via conventional electricity generation. The proposed project would contribute to reducing regional greenhouse gas emissions and aid in keeping the area in attainment for air quality.

Any associated noise from operation of the proposed project would be similar to the existing noise levels at the Reese Technology Center (RTC) and the noise produced by the adjacent wind turbine and distribution lines. The distribution lines noise level may approach a maximum of 48 dBA, which is comparable to typical office noise levels.

The aesthetics of the RTC community would change with the addition of the 12.5kV distribution lines, storage battery facility, and wind turbines. However, the proposed project would not result in significant aesthetics and visual resources impacts because it would not create a visual interruption that would dominate a unique viewshed or scenic view. Existing electric

infrastructure, such as distribution lines, transmission towers, substations, and a wind turbine are already scattered throughout the landscape.

Clearing 3 acres for the proposed project on the Reese Technology Center site would not significantly impact any population of plant or animal species because the project site is small and isolated from larger tracts of undisturbed land, and because plant and animal species found there are expected to be widespread in the region or, for sensitive species, the area is not unique habitat. The whooping crane, which is an endangered species protected under the federal *Endangered Species Act*, occurs in Lubbock County. However, the project would take place within areas which do not contain suitable habitat for this federally listed species. There would also be a potential risk for bird and bat mortality due to collisions with wind turbines.

Operation of the proposed project would involve no discharge of liquids or wastes of any type to the ground. Operations and maintenance would not impact surface water. There would be no impacts to groundwater from the proposed project, as it would not involve use of groundwater or discharges that could adversely affect groundwater quantity or quality.

According to the National Wetland Inventory, there are two wetlands adjacent to the project site on RTC and one wetland within the project site of the above ground distribution line. All best management practices would be applied to mitigate impacts to the wetlands. The project is not located in a 100 year floodplain.

Under the No-Action Alternative, DOE would not provide funding to CCET and the distribution lines, storage battery facility, the access road, and wind turbines would not be installed or operated. For comparison purposes, it is assumed no impacts to the existing environment would occur, and the beneficial impacts discussed above would not be realized.

1. INTRODUCTION

As part of the *American Recovery and Reinvestment Act of 2009* (the Recovery Act; Public Law 111-5, 123 Stat. 115), the U.S. Department of Energy's (DOE or the Department) National Energy Technology Laboratory, on behalf of DOE Office of Electricity Delivery and Energy Reliability, is providing up to $435 million in competitively awarded funding for the deployment of Smart Grid Demonstrations. Smart grid projects include regionally unique demonstrations to verify smart grid technology viability, quantify smart grid costs, validate new smart grid business models at a scale that can be readily adapted that can be replicated around the country, and to develop new and innovative forms of energy storage. The funding of these projects requires compliance with the *National Environmental Policy Act of 1969*, as amended (NEPA; 42 U.S.C. 4321 et seq.), Council on Environmental Quality regulations (40 CFR Parts 1500 to 1508), and DOE NEPA implementing procedures (10 CFR Part 1021).

DOE is considering providing CCET with financial assistance under Funding Opportunity Announcement DE-FOA-0000036, *Recovery Act – Smart Grid Demonstrations*, to facilitate its proposed demonstration project. CCET would use DOE funding to demonstrate battery technology integration with wind generated electricity by deploying and evaluating utility-scale lithium battery technology to improve grid performance and thereby aid in the integration of wind generation into the local electricity supply. CCET's proposed project is to support the objectives of the Smart Grid Demonstration Program—to demonstrate advanced smart grid technologies and integrated systems that will help build a smarter, more efficient, more resilient electrical grid—and the goals of the Recovery Act, namely to stimulate the economy and reduce unemployment. The Program will help verify smart grid technology viability, quantify smart grid costs and benefits, and validate new smart grid business models at a scale that can be readily adapted and replicated around the country. Also, the proposed action would expand the wind research that is already occurring on the RTC.

New construction would involve (1) above ground and underground distribution lines; (2) a 1.5 MW storage battery facility and foundation; (3) an access road; and (4) site clearing. Two wind turbines and foundations would also be constructed as part of the proposed action. Although DOE is not funding the wind turbines, the effects will be assessed as a connected action, as it is part of the overall action.

DOE prepared this environmental assessment (EA) to evaluate the potential environmental consequences of providing funding under DOE's program. In compliance with NEPA and its implementing procedures, this EA examines the potential environmental consequences of DOE's proposed action (that is, providing funding), CCET's proposed project, and the No-Action Alternative (under which it is assumed that CCET would not proceed with the project). The EA's purpose is to inform DOE, resource agencies, and the public of the potential environmental consequences of the proposed project and alternatives.

This chapter explains NEPA and related procedures (Section 1.1), the background of this project (Section 1.2), the purpose and need for the proposed DOE action (Section 1.3), and the environmental resource areas DOE did not carry forward to detailed analysis (Section 1.4). Chapter 2 discusses DOE's proposed action, CCET's proposed project, action alternatives, and the No-Action Alternative. Chapter 3 details the affected environment and potential environmental consequences of the proposed action, proposed project, and No-Action Alternative. Chapter 4 addresses cumulative impacts, and Chapter 5 provides DOE's conclusions from the analysis. Chapter 6 lists the references for this document. Appendix A contains the distribution list for this document, Appendix B contains copies of DOE's consultation letters with other agencies, and Appendix C contains a copy of the environmental synopsis prepared at the time the CCET project proposal was initially evaluated.

1.1 National Environmental Policy Act and Related Procedures

In accordance with DOE NEPA implementing procedures, DOE must evaluate the potential environmental impacts of its proposed action that could have a significant impact on human health and the environment, including decisions on whether to provide financial assistance to states and private entities. In compliance with these regulations and DOE's procedures, this 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.

DOE must meet these requirements before it can make a final decision to proceed with any proposed federal action that could cause adverse impacts to human health or the environment. This EA fulfills DOE's obligations under NEPA and provides DOE with the information needed to make an informed decision about helping finance the above ground and underground distribution lines and storage battery facility, which would be utilized with CCET's wind turbines.

This EA evaluates the potential individual and cumulative impacts of the proposed project. No other action alternatives are analyzed. 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 that CCET would not proceed with the project, allowing DOE to compare the impacts of an alternative in which the project occurs with one in which it does not.

1.2 Background

DOE's National Energy Technology Laboratory (NETL) and the Office of Electricity Delivery and Energy Reliability manage the research and development portfolio of the Smart Grid Demonstrations Program. Their mission is to lead national efforts to modernize the electrical grid; enhance the security and reliability of the energy infrastructure; and improve the recovery from disruptions to electricity supply. The Smart Grid Demonstrations Program will help verify the technological and business viability of new technologies and show how fully integrated smart grid systems can be readily adapted and copied around the country. Further, implementation of smart grid technologies could reduce electricity use by more than 4 percent by 2030 (DOE 2009). It is estimated that smart grid technologies can save U.S. businesses and consumers about $20.4 billion in electricity costs (DOE 2009).

Congress appropriated funding for the Smart Grid Demonstration Program in the Recovery Act to stimulate the economy and reduce unemployment in addition to furthering the existing objectives of the program. DOE solicited applications for this funding by issuing a competitive Funding Opportunity Announcement (DE-FOA-0000036), *Recovery Act: Smart Grid Demonstrations*, on June 25, 2009. The announcement invited applications in two areas of interest:

- Area of Interest 1. Smart Grid: Regionally unique demonstration projects to quantify smart grid costs, benefits, and cost-effectiveness; verify smart grid technology viability; and validate new smart grid business models, all at a scale that can be readily adapted and replicated around the country. Smart grid technologies of interest include advanced digital technologies for use in planning and operation of the electrical power system and the electricity markets such as microprocessor-based measurement and control, communications, computing, and information.

- Area of Interest 2. Energy Storage: Demonstration projects for major, utility-scale, energy storage installations to help establish costs and benefits; verify technical performance; and validate system reliability and durability, all at scales that can be readily adapted and replicated across the United States. Energy storage systems include advanced battery systems (including flow batteries), ultracapacitors, flywheels, and compressed air energy systems. Application areas include wind and photovoltaic (PV) integration with the grid, upgrade deferral of transmission and distribution assets, congestion relief, and system regulation.

DOE prepared an environmental critique to evaluate and provide a comparison of potential environmental impacts for each proposal deemed to be within the competitive range and requiring either an EA or an EIS. DOE used the critique to evaluate DOE's alternatives for purposes of NEPA review. Subsequently, based on the critique, DOE prepared an environmental synopsis for public review. The synopsis includes: (1) a brief description of background information related to the Smart Grid Demonstration area of interest; (2) a general description of

the proposals received in response to the Funding Opportunity Announcement and deemed to be within the competitive range; (3) a summary of the assessment approach used in the initial environmental review to evaluate the potential environmental impacts associated with the proposals; and (4) a summary of the environmental impacts, focusing on potential differences among the proposals. The environmental synopsis prepared at the time of the initial proposal evaluations is provided in Appendix C of this EA.

On November 24, 2009, DOE announced its selection of 16 projects in Area of Interest 1 and 16 projects in Area of Interest 2 based on the evaluation criteria in the funding opportunity announcement and giving special consideration to projects that promoted the objectives of the Recovery Act—job preservation or creation and economic recovery—in an expeditious manner.

CCET's proposed project was one of the projects DOE selected for funding under Area of Interest 1. DOE's proposed action would provide $1.85 million in financial assistance under a cost-sharing arrangement with CCET and CCET would provide $3.59 million.

1.3 Purpose and Need

In June 2009, the Department initiated a process to identify suitable projects to lead the way for deploying integrated smart grid systems by issuing Funding Opportunity Announcement DEFOA- 00000036, *Recovery Act: Smart Grid Demonstrations*. This funding opportunity announcement was funded under the Recovery Act.

The purpose of the proposed action is to support the objectives of the Smart Grid Demonstration Program—to demonstrate advanced smart grid technologies and integrated systems that will help build a smarter, more efficient, more resilient electrical grid—and the goals of the Recovery Act. The Program will help verify smart grid technology viability, quantify smart grid costs and benefits, and validate new smart grid business models at a scale that can be readily adapted and replicated around the country. DOE believes CCET's project can meet these objectives because it would: (1) increase power quality and reliability of the localized area; (2) reduce damages as a result of carbon emissions; (3) increase energy security through reduced oil consumption; and (4) further national knowledge and technology of new renewable energy generating systems.

The Recovery Act enacted legislation to create jobs, restore economic growth, and strengthen America's middle class through measures that modernize the nation's infrastructure, enhance America's energy independence, expand educational opportunities, preserve and improve affordable health care, provide tax relief, and protect those in greatest need. There has been chronic underinvestment and parochialism in getting energy where it needs to go through transmission and distribution, further limiting grid efficiency and reliability. While hundreds of thousands of high-voltage transmission lines course throughout the United States, only 668 additional miles of interstate transmission lines have been built since 2000 (DOE n.d.). As a result, system constraints worsen at a time when outages and power quality issues are estimated to cost American business more than $100 billion on average each year (DOE n.d.). DOE's

action of providing this project with funding would help initiate modernization of a small portion of the nation's electrical grid system.

1.4 Environmental Resources Not Carried Forward

With regard to the RTC elements of CCET's proposed project, Chapter 3 of this EA examines the potential environmental consequences of the proposed project and the No Action Alternative for the following resource areas:

- Air quality
- Noise
- Aesthetics and visual resources
- Biological resources – wildlife
- Water resources – surface water
- Areas of Environmental Concern

DOE EAs commonly address the following resource and subject areas. In an effort to streamline the NEPA process and enable a timely award to the selected project, this assessment did not examine these areas at the same level of detail as the resource areas listed above. The focus for the more detailed analysis was on those activities or actions that would require new or revised permits, have the potential for adverse environmental impacts, or have the potential for public controversy. For the reasons discussed below, DOE concludes that CCET's proposed project would result in no impacts or very minor impacts to the following resource areas, and the detailed description and analyses of these resource areas are not carried forward into Chapter 3.

- Land use. The storage battery facility and wind turbines would be located in an area already designated for research development and currently contains electricity generation structures and associated appurtenances. DOE assumes that CCET has obtained all necessary permits and approvals for the development, and the distribution lines, storage battery, and wind turbines would require no additional approvals related to land use.

- Geology and soils. The subject property rests on the Quaternary Blackwater Draw Formation, which consists of mostly very fine sand, silt, clay, and calcareous sediments. The majority of soils found in the RTC area are part of the Amarillo soil association. Amarillo soils are deep, nearly flat to gently sloping, moderately permeable, well drained loamy soils on uplands. Amarillo soils have slopes from 0 to 3 percent. The surface layer is friable, mildly alkaline, reddish-brown, fine, sandy loam, about 14 inches thick, grading to a pink, sandy, clay loam that is weakly cemented and moderately alkaline. Clearing and minor construction would not result in impacts to geology and soils.

- Historical earthquake activity in Texas includes 28 recordable events between 1882 and 1974, including a magnitude 5.8 earthquake centered in the western Texas town of Valentine. All other events were magnitude 4.5 or less (USGS 1977). The U.S. Geological Survey (USGS) publishes Seismic Hazard Maps, and in maps of the lower 48

states (USGS 2008a) the area around Lubbock is consistently shown as being in one of the lowest categories for earthquake hazards in the nation, which has a rating of seismic zone 0.

- Water resources – groundwater. The proposed project would involve no significant use of groundwater, nor would it involve any actions that could result in groundwater contamination.

- Biological resources – vegetation and special status species. The area designated for the Proposed Project is described as predominantly disturbed grassland with developed and landscaped areas. The area on the RTC where the storage battery, distribution lines and wind turbine pads would be placed has previously been disturbed and is currently grassland and scrub brush. Fire suppression and intensive agricultural use and/or continuous domestic livestock grazing have changed the abundance and composition of native grasses. The above ground distribution line will span all previously disturbed grassland and residential areas and roadways. The relatively small area of disturbed surfaces created by the storage battery facility, pole structures for distribution lines, dirt access road, and wind turbine pads is unlikely to have any negative impacts on plant resources. No sensitive vegetation exists at the project sites.

  The U.S. Fish and Wildlife Service administers the Endangered Species Act of 1973, as amended. This law provides federal protection for species designated as federally endangered or threatened. An endangered species is "in danger of extinction throughout all or a significant portion of its range," and a threatened species "is likely to become an endangered species within the foreseeable future" (USFWS 1988). Special status species are listed as threatened or endangered, are proposed for listing, or are candidates for listing by the state and/or federal government. The USFWS has determined that adverse impacts to federally listed species resulting from the proposed actions would be highly unlikely. This is due to the fact that the Proposed Project would take place within areas which do not appear to contain suitable habitat for the federally listed species known to occur in Lubbock County.

Cultural resources. Installation of the underground and above ground distribution lines, storage battery facility, access road, and wind turbines would not directly impact cultural resources or historic properties. There are no known sites listed on the National Register of Historic Places within or around the project site (NPS 2012) and the Texas Historical Commission responded to DOE by letter dated October 11, 2012, stating that the project would not affect historic properties.

- DOE contacted the Apache Tribe of Oklahoma, the Comanche Nation, and the Kiowa Indian Tribe of Oklahoma in writing regarding places of cultural and/or historical significance in the area. DOE did not receive a response from any of the Tribes.

- Environmental justice. Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations,* directs federal agencies to address environmental and human health conditions in minority and low-income communities. The evaluation of impacts to environmental justice is dependent on demonstrating that significant, adverse impacts from the proposed project are not disproportionately borne by any low-income or minority groups in the affected community. As illustrated in this EA, no significant adverse impacts would occur to any member of the nearby community; therefore, no adverse and disproportional impacts will occur to minority or low-income populations.

- Census tract 104.05 is an area that encompasses the entire proposed project (see Figure 1-1). The population of this census tract in 2010 was 71 percent Caucasian, 23 percent Hispanic, 3 percent Asian, 2 percent African-American, 1 percent Native American, and 1 other reported race (U.S. Census Bureau 2010). Minority areas are identified as: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (Council on Environmental Quality 1997). Therefore the project area is not located in a minority area under EO12898.

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Figure 1-1. View of the proposed project located in Census Tract 104.05 (outlined in blue) (© Google).

- The U.S. Census Bureau defines the poverty level as the income that is considered too low to meet essential living requirements without regard to the local cost of living; based on family size, age of householder, and the number of children less than 18 years of age. According to 2010 census data, 10.2% of all persons within census track 104.05 were

living below the poverty level (U.S. Census Bureau 2010). A "poverty area" is defined by the Census Bureau as an area in which at least 20% of the population lives below the poverty level. Therefore, the project area is not located in an area considered a low-income community under EO 12898. Although the project is not located in a poverty area, construction of the distribution lines could possibly occur near those living below the poverty level. Since no significant adverse impacts would occur, there would be no disproportional impacts to any of the surrounding community.

- Socioeconomics. The project would not significantly change socioeconomic factors such as employment, housing, or income in the surrounding area. The project would not place an increased demand on municipal services such as police and fire departments, hospitals, or schools. A small beneficial increase in employment would occur as 3-6 permanent jobs would be created. During construction, there would be up to an additional 40 temporary jobs creating a minor economic benefit to the area.

- Occupational health and safety. There would be no unique risks to occupational health and safety during installation and operation of the storage battery, above and below ground distribution lines and wind turbines. Minor electrical safety concerns would be present, but CCET foresees no special hazards or risks. Also, minor risks are present when installing permanent magnet synchronous generators, which would be mitigated with the use of best management practices. Occupational health and safety requirements would be similar to those for other small construction and renewable energy projects.

  Past studies have shown a risk from electric and magnetic fields (EMFs). EMFs are invisible lines of force associated with the production, transmission, and use of electric power such as those associated with high-voltage transmission lines, secondary power lines, and home wiring and lighting. EMFs also arise from the motors and heating coils found in electronic equipment and appliances. Because the use of electric power is so widespread, humans are constantly exposed to EMFs. Studies conducted in the 1980s showed a link between magnetic field strength and the risk of childhood leukemia. The National EMF Research and Public Information Dissemination (RAPID) Program, which was established under the Energy Policy Act of 1992 to address this issue, directed the National Institute of Environmental Health Sciences (NIEHS) to report to Congress on RAPID's findings and conclusions. This authoritative report (NIEHS, 1999) noted that evidence from epidemiological studies suggests "a fairly consistent pattern of a small increased risk with increasing exposure" associated with two forms of cancer, childhood leukemia and chronic lymphocytic leukemia in occupationally exposed adults. However, the results of laboratory (animal and human) toxicology and mechanistic studies have failed to indicate a cause-and-effect relationship between exposure to EMF at environmental levels and disease status or changes in biological function. As new research results became available, other national and international organizations convened scientific panels with expertise in various fields to conduct new evaluations. The World Health Organization concluded in 2007 that virtually all of the laboratory

evidence and the mechanistic evidence failed to support a relationship between low-level magnetic field, or Extremely Low Frequency Fields (ELF), exposure and changes in biological function or disease status. In addition, the International Agency for Research on Cancer concluded in 2002 that children who are exposed to residential ELF magnetic fields less than 4 milligauss (mG) have no increased risk for leukemia (EPRI 2009). The proposed 12.5kV distribution lines are not expected to produce magnetic fields above 0.1 mG at 100 feet from the line.

- Transportation and traffic. There would be short-term increased traffic during construction. However, since the entire RTC is continually used for research for government agencies, local businesses, and college students, traffic would be mostly related to that activity and the increase would not disrupt conditions in the vicinity of the proposed project.

- Utilities, energy, and materials. Production of approximately 1.5-3 megawatts of electricity by the CCET would result in a very small reduction in the use of electricity and natural gas relative to the amounts consumed in the Lubbock, Texas, area. There are no unique materials required to manufacture, install, or operate the, distribution lines, storage battery, or wind turbines.

- Waste generation. Waste generated during installation and operation of the wind turbines and storage battery would be similar to that generated during construction of the new housing developments in the area. The facility would not generate hazardous or nonhazardous waste beyond small temporary amounts of construction debris.

1.5 Consultations and Public Comment-Response Process

1.5.1 CONSULTATIONS

DOE consulted with the Apache Tribe of Oklahoma, the Comanche Nation, and the Kiowa Indian Tribe of Oklahoma and the Texas SHPO to comply with the review requirements of Section 106 of the *National Historic Preservation Act*, as amended (16 U.S.C. 470 et seq.). DOE also communicated with the U.S. Fish and Wildlife Service (USFWS) to meet the requirements in the *Endangered Species Act of 1973*, as amended (16 U.S.C. 1531 et seq.). Copies of DOE's consultation correspondence are in Appendix B.

Tribes

On September 14, 2012, DOE sent letters to the Apache Tribe of Oklahoma, the Comanche Nation, and the Kiowa Indian Tribe of Oklahoma requesting information on properties of traditional religious and cultural significance within the vicinity of the proposed project. DOE also requested any comments or concerns the Tribes might have on the potential for the proposed project to affect the properties. This information was requested to aid in the preparation of this EA and to meet the Department's obligations under Section 106 of the *National Historic*

Preservation Act to take into account the effects of undertakings by federal agencies on historic properties and cultural resources. DOE did not receive a response from any of the Tribes.

Texas SHPO

DOE sent a letter to the Texas SHPO on September 14, 2012, requesting information on historic properties within and near the proposed site. DOE also requested any comments or concerns the SHPO might have on the potential for the proposed project to affect the properties. This information was requested to aid in the preparation of this EA and to meet the Department's obligations under Section 106 of the *National Historic Preservation Act* to take into account the effects of undertakings by federal agencies on historic properties and cultural resources. The Texas SHPO responded to DOE by letter dated October 11, 2012, stating that the project would not affect historic properties, and it could proceed.

U.S. Fish and Wildlife Services

On September 14, 2012, DOE sent a letter to the USFWS stating that it had obtained a list of federally listed threatened, endangered, proposed, and candidate species to determine if any federally listed species occur in the vicinity of the project location. DOE accessed the USFWS Southwest Region website (http://www.fws.gov/southwest/es/ES_ListSpecies.cfm). Per the directions on the website, DOE provided the species list in its letter to USFWS to document DOE's compliance with 50 CFR 402.12 (c). The USFWS responded to DOE in an email dated October 4, 2012, stating that the USFWS had determined that the project site is not suitable habitat for federally listed species in Lubbock County and that the proposed project would not adversely affect the species.

1.5.2 COMMENT-RESPONSE PROCESS

DOE issued the draft EA on November 18, 2012, and advertised its release in *The Avalanche-Journal* on November 18, 19, and 20, 2012. In addition, the Department sent copies for public review to the Mahon Library. DOE established a 30-day public comment period that began November 19, 2012 and ended December 17, 2012. The Department announced it would accept comments by mail, email, and fax. The draft EA was also sent to the applicable Federal, state, and local agencies.

Texas Parks and Wildlife Department

The Texas Parks and Wildlife Department (TPWD) responded to the draft EA by letter to DOE dated December 17, 2012, requesting that RTC incorporate several recommendations to protect wildlife. DOE responded to the TPWD outlining what measures RTC would implement to protect wildlife during project siting, construction and operation. These recommendations address power-line protection devices, prairie dog concerns, western burrowing owls, wind energy development guidelines, and post-construction monitoring.

2. DOE PROPOSED ACTION AND ALTERNATIVES

This chapter describes DOE's proposed action (Section 2.1), CCET's proposed project (Section 2.2), the basis for not considering other alternatives (Section 2.3), and the No-Action Alternative (Section 2.4).

2.1 DOE's Proposed Action

DOE's proposed action would award $1.85 million of financial assistance, under a cooperative agreement, to CCET through the Recovery Act to facilitate CCET's proposed project in Lubbock, Texas. CCET would provide $ 3.59 million.

2.2 CCET's Proposed Project

CCET is a consortium of 15 Texas electric and high-tech companies and five universities with a goal to modernize the Texas electric system (CCET 2012). The objective of CCET's proposed project would be to demonstrate battery technology integration with wind generated electricity by deploying and evaluating utility-scale lithium battery technology to improve grid performance and thereby aid in the integration of wind generation into the local electricity supply.

In 2010, Texas was the first state to reach 10,000 MW of wind capacity (DOE 2012), and by 2020 it is expected that wind capacity will increase by an additional 10,000 MW (CCET 2009). Integrating this increasingly large, fluctuating energy source into the transmission grid, while maintaining system stability and reliability, is a challenge that will face Texas as well as other states as the United States moves to develop more renewable energy sources. CCET envisions this being done through better system monitoring capabilities, enhanced operator visualization, and improved load management. To promote and demonstrate these objectives, the proposed project involves two primary components: (1) installation of batteries and distribution lines to transfer power from RTC to Erskine substation (DOE funded) and (2) install two wind turbines to generate energy to be transferred to the Erskine Substation (CCET funded). These two project components are addressed further in the sections that follow.

2.2.1 BATTERY TECHNOLOGY INTEGRATION

The objective of the DOE funded component of the CCET project is to provide the ability to store energy in batteries, which would then be transferred through distribution lines to a substation. The site chosen for this project is a 3 acre parcel of the RTC. A portion of the DOE-funded activity, installation of distribution lines under the CCET project, would occur outside of the RTC. The regional location of the RTC is shown in Figure 2-1; Figures 2-2, 2-3 and 2-4 provide detailed views of the proposed action.

The land cover prior to clearing is disturbed vacant grasslands onsite of the 2,467-acre former Reese Air Force Base (AFB), in Lubbock County. The area surrounding the project consists of agricultural fields with limited residential development to the north and west and to the south and

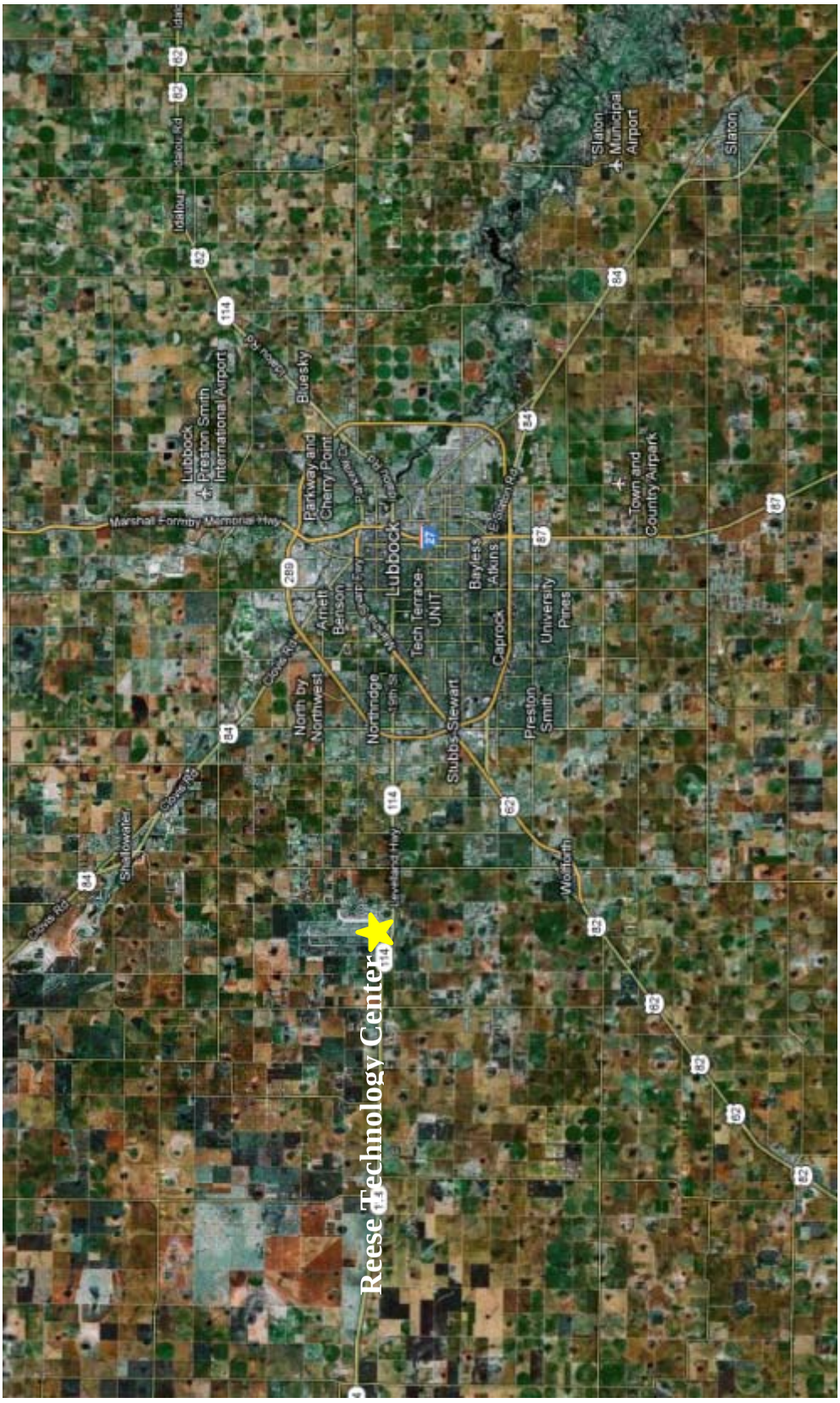

Figure 2-1. Regional map showing approximate location of the RTC in relation to Lubbock (©Google).

east lie the RTC and former Reese AFB runway and tarmac. The land would be cleared of the limited vegetation that exists and some reshaping of the surface would occur so as to provide drainage and aesthetics. A 20 feet wide by 600 feet long dirt access road would be installed to access the storage battery facility and the wind turbine sites. There would be underground distribution lines that extend to the overhead lines that would transfer energy to the Erskine Substation, approximately 5.5 miles to the east. With or without DOE funded activities, the area is currently being developed for wind research. In addition, construction would occur with all required storm water runoff requirements to avoid the temporary impacts of construction. Without DOE funding, the 3 acre area set aside for the storage battery facility and wind turbines could be used for additional RTC research activities.

The proposed 1.5 MW storage battery would be housed in a 20 by 40 feet container and sited on a concrete pad with a slightly larger footprint. The purpose of the batteries are to store power from the turbines for the CCET DOE research project and for optimum pricing on power sales to the grid. The proposed storage battery facility would be located adjacent to the north end of the runway and north of the existing transmission and meteorological towers. The utility-scale lithium battery technology system would aim to improve grid performance. Lithium batteries provide stationary storage of wind generated energy until it is needed by the grid. Stationary storage systems can be applied as an interim storage system for peak load balancing. During times of weak loads, wind electricity would be fed into the battery. At times of peak load, the energy from the wind generator and battery are fed into the grid.

The energy stored in the batteries would be transferred via underground and above ground distribution lines. The underground 12.5 kV distribution lines would extend from the storage battery facility to the northeast corner of the RTC. The distribution lines must be underground in that area due to use of the runway and as to not interfere with wind flow near the turbines. This component requires 0.6 miles of underground 12.5 kV distribution lines. The underground lines would connect to above ground 12.5 kV distribution lines and continue east towards Erskine substation. The above ground distribution lines would be 12.5kV lines mounted along wood poles that are typically between 37-40 feet in height, the same as common electrical distribution lines in the area. There are two options for the above ground distribution lines which are expected to have similar environmental impacts. Options A and B both start at the northeast corner of RTC and continue diagonally to the intersection of Quitsna Ave and Urusline St. The distributions lines would then follow Urusline St. to the east until it ends at CR1500 where Options A and B split into different directions.

Option A would go south on CR1500 for approximately 0.4 miles and then would turn east between two fields along a private farm access road. The distributions lines would continue heading east through farm fields along the private farm access roads where available until it reaches Erskine Substation. The distribution lines would run north along a housing development on CR1600 and between 2 housing developments on North Milwaukee Ave. Option A requires the purchase of a right-of-way easement through private property.

Figure 2-2. Vicinity map showing general location of the RTC and the location of the proposed distribution lines storage battery facility, and wind turbines (©Google and NIRE 2012).

Figure 2-3. Vicinity map showing the different locations of Option A and Option B for the distribution lines and the Erskine substation (©Google and NIRE 2012).

Option B would go north on CR 1500 for approximately 380 feet then head east on CR 6400. The distribution lines would run along CR 6400 for approximately two miles until it reaches North Milwaukee Ave. The lines would then go south for approximately 0.5 miles to Erskine Substation. There are currently electrical lines that run along these roads. South Plains Electric Cooperative, Inc. (SPEC) and Golden Spread Electric Coop (GSEC) own the existing electric distribution lines located on the RTC and will continue to provide utility distribution after the proposed distribution lines are built.

2.2.2 WIND GENERATION

The objective of the CCET proposed project would be to demonstrate battery technology integration with wind generated electricity. The CCET funded component of the project proposes to install two wind turbines to generate electricity to store in the batteries and transfer to the Erskine Substation to improve grid performance (Figure 2-4). Two 52 feet diameter by 10 feet deep foundations would be installed to support the wind turbines. One wind turbine would be a 2.3 MW turbine with a 295 foot hub height and 394 foot rotor diameter. The other wind turbine would be a 2.7 MW wind turbine with a 295 foot hub height and 394 foot rotor diameter (Zambelli 2012). Both wind turbines would have a permanent magnet synchronous generator. The permanent magnet synchronous generator is a gearless alternative to geared induction generator systems. These types of generators do not need to continually create a magnetic field to operate, so there is less energy wasted. A permanent magnet synchronous generator has a set of permanent magnets, typically mounted on the rotor, and a set of electromagnets, typically mounted on the stator, which is the stationary part of the rotor system. These generators can have an efficiency rating between 60 and 95 percent, normally operating at approximately 70 percent, require less maintenance, and are typically very reliable (Binder 2005). The 5 MW between the two wind turbines generates approximately the same amount of electricity as used in 1,100 homes (Reese Technology Center 2011). On most horizontal wind turbine farms, a spacing of about 6-10 times the rotor diameter is needed between the siting of the turbines.

Current plans call for the storage battery facility and two wind turbines to be located along the northwest boundary of the RTC adjacent to agricultural fields (Figure 2-4). Directly to the south of the proposed site are 4 large structures: (1) two V-shaped transmission towers that are being certified for commercial use by LS Power, which are approximately 131 feet tall; (2) a free standing meteorological tower which is 256 feet tall; and (3) a tall guyed wire meteorological tower, which is 656 feet tall.

South of the 4 structures is 67 acres devoted to the Texas Tech University wind research program. The development of the Texas Tech wind research program is not part of the proposed action but is associated with the overall wind research being conducted at the RTC. Currently there is one 1.67 MW wind turbine located in the area, which is being used for wind turbine efficiency research. The existing turbine has a 262 foot hub height and a 282 foot rotor diameter. Three and half miles of above ground 12.5 kV distribution lines were recently constructed to transport power from the turbine to the grid via the South Plains Electric Cooperative.

Underground distribution lines have been installed and another 0.05 miles will be installed in the future to connect to the Hurlwood substation.

Figure 2-4. Proposed location of the storage battery facility and wind turbines view on the northwest corner of the RTC (©Google and NIRE 2012).

2.3 Alternatives

DOE's alternatives to its proposed action for the Smart Grid Program consist of the other technically acceptable applications received in response to the Funding Opportunity Announcement DE-FOA-0000036, *Recovery Act: Smart Grid Demonstrations*. Prior to selection, DOE made preliminary determinations regarding the level of review required by NEPA. A portion of DOE's technical reviews was based on potentially significant impacts that could be identified. The projects' significant impacts were considered within the context and intensity of possible impacts. DOE conducted these preliminary environmental reviews pursuant to 10 CFR 1021.216 and prepared environmental critiques and synopses for projects under the Funding Opportunity Announcement. These preliminary NEPA determinations and environmental reviews were provided to the selecting official, who considered them during the selection process. Appendix C of this EA contains DOE's environmental synopsis that was prepared when the CCET proposal was initially reviewed.

Because DOE's proposed action under the Smart Grid Program is limited to providing financial assistance in cost-sharing arrangements to projects submitted by applicants in response to a competitive funding opportunity, DOE's decision is limited to either accepting or rejecting the project as proposed by the proponent, including its proposed technology and selected sites. DOE's consideration of reasonable alternatives is therefore limited to the technically acceptable applications and a No-Action Alternative for each selected project.

2.4 No-Action Alternative

Under the No-Action Alternative, DOE would not provide funding to CCET for the proposed project, and assumes the project would not proceed. Furthermore, increase of power quality and reliability of the localized area, reduction of damages as a result of carbon emissions, increase of energy security through reduced oil consumption, and further national knowledge and technology of new renewable energy generating systems would not occur, and DOE's ability to achieve its objectives under the Smart Grid Program and the Recovery Act would be impaired.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

In this chapter, DOE assesses the following resources: air quality, noise, aesthetics and visual resources, water resources, and biological resources. The "environmental baseline" for each of these resource areas is described first, followed by an assessment of the potential consequences of the proposed project and of the No-Action Alternative.

3.1 Air Quality

3.1.1 AFFECTED ENVIRONMENT

This section describes the existing air quality conditions at and surrounding the project site. Climate and ambient air quality conditions are discussed followed by a discussion of air quality conformity and greenhouse gas emissions.

3.1.1.1 Climate and Ambient Air Quality Conditions

The proposed project is located on the 2,467-acre former Reese AFB in Lubbock County, now referred to as the Reese Technology Center (RTC), in the northwestern part of Texas. This area of Texas is categorized as high plains consisting of continental steppe or semi-arid savanna (TWDB 2012). The average annual maximum temperature is 74.5 degrees, average annual minimum temperature is 47.0, and average annual precipitation is 19.12 inches (NOAA 2011). Relative humidity varies throughout the state, depending on rainfall and evaporation rates, but generally decreases from east to west. While the Gulf of Mexico is the predominant geographical feature affecting the state's climate, providing the major source of precipitation for most of the state, precipitation in the Trans-Pecos and the Panhandle regions of Texas originates mostly from the eastern Pacific Ocean and from land-recycled moisture. Although most of the state's precipitation occurs in the form of rainfall, evaporation exceeds precipitation—yielding a semiarid or steppe climate that becomes arid in far west Texas (TWDB 2012).

The ambient air quality in an area can be characterized in terms of whether it complies with the primary and secondary National Ambient Air Quality Standards. The *Clean Air Act* (42 U.S.C. 7401 et seq.) requires the U.S. Environmental Protection Agency (EPA) to set national standards for pollutants considered harmful to public health and the environment. National Ambient Air Quality Standards have been established for six criteria pollutants: carbon monoxide; lead; nitrogen dioxide; ozone; particulate matter (including particulate matter with both an aerodynamic size less than or equal to 10 microns and less than or equal to 2.5 microns); and sulfur dioxide. Primary standards define levels of air quality the EPA has determined as necessary to provide an adequate margin of safety to protect public health, including the health of "sensitive" populations such as children and the elderly. Secondary standards define levels of air quality deemed necessary to protect the public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. According to the U.S. EPA guidelines, an area with air quality better than the National Ambient Air Quality Standards is

designated as being in attainment; areas with worse air quality are classified as nonattainment areas. The state of Texas has adopted the National Ambient Air Quality Standards as their representative air quality standards. The National Ambient Air Quality Standards are presented in Table 3-1.

Table 3-1. National and Texas Ambient Air Quality Standards

Pollutant	Averaging period	Primary Standard	Units
Carbon monoxide	1 hour	35	ppm
	8 hours	9	ppm
Lead	Quarterly	1.5	$\mu g/m^3$
Nitrogen dioxide	Annual	0.053	ppm
Ozone	1 hour	0.12	ppm
	8 hours	0.075	ppm
PM_{10}	24 hours	150	$\mu g/m^3$
$PM_{2.5}$	24 hours	35	$\mu g/m^3$
	Annual	15.0	$\mu g/m^3$
Sulfur dioxide	24 hours	0.14	ppm
	Annual	0.03	ppm

Source: 40 CFR 50.4 through 50.13
µg/m3 = micrograms per cubic meter
ppm = parts per million

According to the USEPA Green Book Nonattainment Areas for Criteria Pollutants (USEPA 2012) and the Texas State Implementation Plan (TCEQ 2012a), Lubbock County is in attainment for all six National Ambient Air Quality Standard criteria pollutants. The TCEQ operates air quality monitoring stations throughout Texas. However, due to its attainment status, ambient air quality is not measured within the vicinity of the RTC, with the exception of $PM_{2.5}$ which is collected at the Lubbock Station monitor. TCEQ began monitoring $PM_{2.5}$ at the Lubbock Station in August of 2008. Table 3-2 provides air quality data for Lubbock County for the last 4 years of record available from the TCEQ. Since 2008, average annual concentrations for $PM_{2.5}$ in Lubbock County have not exceeded national standards (TCEQ 2012b).

Table 3-2. Ambient Air Quality Measurements for $PM_{2.5}$ for Lubbock County, Texas from 2009 through 2011

Pollutant	Averaging period	Primary Standard	Units	Lubbock County by Year 2008[1]	2009	2010	2011
$PM_{2.5}$	24 hours	35	$\mu g/m^3$	6.96	6.98	6.75	8.92

Source: TCEQ 2012b
[1]Data collected in 2008 was available only for the months of August, part of September, November, and December.

3.1.1.2 Greenhouse Gas Emissions

The burning of fossil fuels, such as diesel and gasoline, emits carbon dioxide, which is a greenhouse gas. Greenhouse gases can trap heat in the atmosphere and have been associated with global climate change. The Intergovernmental Panel on Climate Change, in its Fourth Assessment Report issued in 2007, stated that warming of the earth's climate system is unequivocal, and that most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in concentrations of greenhouse gases from human activities (IPCC 2007). Greenhouse gases are well mixed throughout the lower atmosphere, such that any emissions would add to cumulative regional and global concentrations of carbon dioxide. The effects from any individual source of greenhouse gases therefore cannot be determined with presently available technologies.

3.1.2 ENVIRONMENTAL CONSEQUENCES

3.1.2.1 Proposed Project

Impacts to air quality during construction of the proposed project would be temporary and considered negligible. In general, the primary source of air pollutants during any construction project is attributed to the movement and operation of construction equipment. Construction activities would be temporary, would occur in a localized area, and emissions would be very small compared with existing emissions in Lubbock County. Contaminants generated from construction would include particulate matter (primarily from fugitive dust) and vehicle emissions. Impacts to air quality during operation of the proposed project would be negligible. The above ground and underground distribution lines, storage batteries, storage battery facility, and wind turbines would not generate criteria pollutants, carbon dioxide, or ozone.

3.1.2.2 Greenhouse Gas Emissions

Carbon dioxide is the predominant greenhouse gas that would be generated during the proposed project (from construction and maintenance vehicles) since it is produced by combustion that occurs during the burning of fossil fuels. The carbon dioxide generated would be short term and negligible. A primary objective of the project is to improve the efficiency of the electrical transmission grid and its integration with renewable energy sources such as wind power. Over the long run, it is expected the success of this project would lead to a reduction in the amount of fossil fuel needed for generation of electricity with a corresponding reduction in greenhouse gases.

3.1.2.3 Air Quality Conformity

Section 176(c) (1) of the Clean Air Act requires federal agencies to ensure that their actions conform to applicable implementation plans for the achievement and maintenance of the National Ambient Air Quality Standards for criteria pollutants (DOE 2000). To achieve conformity, a federal action must not contribute to new violations of standards for ambient air quality, increase the frequency or severity of existing violations, or delay timely attainment of

standards in the area of concern. The EPA's general conformity regulations (40 CFR 93, Subpart B) contain guidance for determining whether a proposed federal action would cause emissions to contribute to a new National Ambient Air Quality Standards violation in an area working to attain or maintain the standards.

CCET's proposed project would occur in an area that is in attainment for all National Ambient Air Quality Standard criteria pollutants. Air emissions associated with the proposed project would be limited to fugitive dust and equipment exhaust from construction and bringing materials into the site. Internal combustion engines using either gasoline or diesel fuel emit nitrogen oxides (NOx) and volatile organic compounds (VOCs), but the limited duration and size of the project would result in relatively minor quantities of these air pollutants. For example, according to EPA emission factors (AP-42 – Compilation of Air Pollutant Emission Factors) for internal combustion engines, a piece of equipment with a moderately large 300 horsepower gasoline engine could run for 8 hours per day for a full year and would emit about 4.8 tons of NOx and no more than 9.5 tons of VOCs. In the case of a 300 horsepower diesel-fueled engine under the same condition (running 8 hours per day for a full year), emissions of NOx would be about 13.6 tons and VOCs emissions would be no more than 1.1 tons. The proposed project would be expected to involve more than a single piece of equipment, but the construction period would be a matter of several weeks, and it is unlikely the equipment would operate for 8 hours a day during the short construction period. Using the calculations above it is clear that the proposed project would not involve either NOx or VOC emissions that approach the 100-ton threshold and, as a result, a conformity determination is not necessary (40 CFR 93, Subpart B).

3.1.2.4 No-Action Alternative

Under the No-Action Alternative, DOE would not provide funding to CCET for the proposed project. As such, no changes or impacts from DOE's proposed action would occur to existing air quality.

3.2 Noise

3.2.1 AFFECTED ENVIRONMENT

The proposed storage battery facility and wind turbines, as well as the access road would be situated on approximately three acres located on previously disturbed portions of the former Reese AFB in Lubbock County, Texas. The above ground and underground distribution lines would be located along a 5.5 mile right-of-way utility easement along Ursuline Street to transport power from wind turbines and storage battery to the Erskine Substation. The closest residence is approximately 0.7 miles to the northwest of the battery site and 0.5 miles to the west of the turbine pad sites. The above ground 12.5kV distribution lines would be placed adjacent to residential homes located on Ursuline Street, County Road 1500, County Road 1600, County Road 6430, and N Milwaukee Avenue. The primary source of noise in the area is residential traffic. Texas 289 Loop and Texas Route 84 are to the east of the Erskine Substation, approximately 2.2 miles and 2.13 miles away, respectively.

3.2.2 ENVIRONMENTAL CONSEQUENCES

3.2.2.1 Proposed Project

Potential noise impacts are not expected to be significant. Construction and installation activities associated with the proposed project would generate temporary noise; however, construction noise would be localized to the immediate area of the proposed project site planned for the placement of the storage battery, access road, and wind turbines, all of which are located at least one half mile away from the closest residence. Therefore, any effects from construction noise would be diminished by distance from the proposed project site. During installation of the distribution lines, temporary noise consistent with a construction project would be expected along the 5.5 mile right-of-way utility easement, which would occur during normal work hours. Operation of the storage battery and wind turbines would not generate significant noise. Any associated noise from operation of the storage battery would be about 35 to 45 A-weighted decibels, comparable to a whispered conversation in a library (GCA 2012).

Conductors on transmission lines and transformers at substations produce noise under certain conditions. The level of noise, or its loudness, depends on conductor conditions, voltage levels, and weather conditions. The proposed 12.5kV distribution lines are expected to be inaudible during fair weather conditions. Noise emission from a transmission line occurs during heavy rain and wet conductor conditions. In foggy, damp, or rainy weather conditions, power lines can create a subtle crackling sound due to the small amount of the electricity ionizing the moist air near the wires. During heavy rain the general background noise level, rain falling and wind blowing, is usually greater than the noise from the transmission line. Additionally, few people are typically near the transmission line during heavy rain. For these reasons audible noise is not noticeable during heavy rain. During light rain, dense fog, snow, and other times when there is moisture in the air, the proposed transmission lines would produce audible noise higher than rural background levels but similar to household background levels (typically in the 40 dBA range) (DOE, 2012). During dry weather, audible noise from transmission lines is a barely perceptible, sporadic crackling sound. Lubbock, Texas is a low humidity, semiarid or steppe climate, receiving approximately 19.12 inches of rain annually. Under the worst weather conditions, the noise level may approach a maximum of 48 dBA, comparable to typical office noise levels (DOE, 2012).

3.2.2.2 No-Action Alternative

Under the No-Action Alternative, DOE would not provide funding to CCET for the proposed project. As such, no new sources of noise from DOE's proposed action would occur at the proposed project site.

3.3 Aesthetics and Visual Resources

3.3.1 AFFECTED ENVIRONMENT

This section describes the existing aesthetic and visual resource conditions in the area of the proposed project site. Visual resources include natural and manmade physical features that provide the landscape its character and value as an environmental resource. The proposed project site is located on vacant land onsite of the 2,467-acre former Reese AFB, in Lubbock County and is bordered by the city of Lubbock on the east. The former Reese AFB, now referred to as the RTC, is located in the High Plains region in the northwestern part of Texas. The topography in the proposed project area is mostly flat with some rolling hills. Most of the property involved in this Project has been previously disturbed by military activities, with the majority of the RTC property formerly dedicated to airfield uses. The east and southeast sides of the property contain multiple buildings and improvements, and asphalt and concrete roads. The airfield land use on the former base consisted of three north-south concrete runways, the aircraft parking apron, and associated taxiways. The two westernmost runways were 10,500 by 150 feet (USAF 1997) and were located just east of the proposed location for the storage battery facility and wind turbines. The south side of the property contains several former landfill locations, as well as concrete and gravel roads. Deteriorating asphalt roads run along the north, west, and south boundary of the property and sparse desert vegetation and scrub brush is located across the site, mostly on the north, south, and west sides of the property. Old deteriorating structures utilized when the base was active are scattered along the western half of the property (NIRE 2010). Existing electric infrastructure, such as transmission lines, distribution lines, and substations are scattered throughout the landscape. The area surrounding the former Reese AFB is mostly agricultural, with many playas that dot the region, and some residential development. Residential uses are scattered around the main base, with one large, low-density residential development northeast of the base and another located to the east, adjacent to the 5.5 mile right-of-way utility easement for the proposed above ground 12.5kV distribution lines. Figures 3-1 and 3-2 show views of the proposed location for the underground transmission line, storage battery facility, and wind turbines. In both photographs, the areas that would be used for the proposed project are open vacant fields.

Figure 3-1. **Facing south near the proposed location of the storage battery facility and wind turbines.**

Figure 3-2. **Facing northeast near the proposed site of the underground distribution line**

3.3.2 ENVIRONMENTAL CONSEQUENCES

3.3.2.1 Proposed Project

DOE does not expect potential impacts to aesthetics and visual resources to be significant. During construction, the proposed project would cause minor, short-term visual impacts resulting from ground disturbance; the presence of workers, vehicles, and equipment; and the generation of dust and vehicle exhaust associated with constructing the storage battery facility, access road, site clearing and two wind turbines. The volume of soil excavated for the two wind turbine foundations should not exceed 1,600 cubic yards. Additional trenching from the turbine pad to the battery and for the grounding grid to be installed around the turbine would be necessary. Actual dimensions of the grounding grid are undecided, but should not be much larger than the diameter of the rotor. Excavation would also be required to install the dirt access road and the underground 12.5kV distribution line. Final cleanup and restoration of the project area would occur immediately following construction. Excavated soil would be redistributed around the project site as per RTC requirements, removing these visual impacts. All construction waste material would be removed from the area, and recycled or disposed of at approved facilities.

In the long term, the aesthetics of the area would change with the installation of the 12.5kV distribution lines, storage battery, and wind turbines. However, the proposed project would not result in significant aesthetics and visual resources impacts because it would not create a visual interruption that would dominate a unique viewshed or scenic view. Figure 2-2 identifies the proposed project located in relationship to existing roads and vacant fields. Generally, the area visible from the RTC is characterized by a low visual sensitivity. The former airfield is a large expanse of flat pavement and grassland. These areas are characterized as having a low visual sensitivity. There are no areas having a high visual sensitivity on or in the vicinity of the RTC.

Existing electric infrastructure, such as transmission lines, distribution lines, and substations are already scattered throughout the landscape. Four large structures can be viewed directly south of the proposed site including two large V-shaped transmission towers that are in the process of being certified for commercial use by LS Power; a 256 foot tall meteorological tower; and a 656 foot tall meteorological tower. The wind turbines under consideration for the proposed project have an approximate tower height of 295 feet, and rotor diameter of 394 feet, with a total height of 492 feet. The rotor blades turn slowly at 32-43 revolutions per minute (rpm). The turbines would be visible from Ursuline Street and NCRR 1100 and the adjacent residential homes.

Installation of the above ground 12.5kV distribution lines would span a 5.5 mile right-of-way utility easement from the RTC property line to the Erskine Substation. There are two available options for routing the line substation (See Figure 2-3). Both routes would start at the RTC property line and travel two miles east to County Road 1500. Option A would have the distribution line travel south on County Road 1500 for 0.4 miles and then travel east to the Erskine Substation across open fields for 2.2 miles. Option B would have the distribution line extend north on County Road 1500 for 0.1 miles, then east on County Road 6400 for 2 miles, then south to the Erskine Substation on Milwaukee Avenue for 0.5 miles. Both Option A and

Option B require the installation of additional 12.5kV distribution lines along Ursuline Street, however, electric infrastructure already exist on this road and additional lines would not result in impacts to the aesthetics and visual resources. Additionally, Option B would continue to route along a residential road that has existing transmission and distribution lines and poles. Therefore, this option would also not result in any additional impacts to the aesthetics and visual resources as it would not alter the landscape. Option A requires a new distribution line across open fields where lines do not currently exist. While the long term aesthetics of the field would change with the installation of the new distribution lines, it would not result in significant aesthetics and visual resources impacts because it would not create a visual interruption that would dominate a unique viewshed or scenic view. For most of the Option A route, the visual impact from the proposed transmission line would be negligible or only incremental compared to existing conditions.

3.3.2.2 No-Action Alternative

Under the No-Action Alternative, DOE would not provide funding to CCET for the proposed project. As such, there would be no impacts from DOE's proposed action to aesthetics or visual resources.

3.4 Water Resources

3.4.1 AFFECTED ENVIRONMENT

This section describes the existing surface water resources on and near the area of the proposed project site. Surface water includes lakes, rivers, perennial, intermittent, or ephemeral streams. This section also discusses wetlands and floodplains. As stated in Section 1.4, the proposed project would have no potential for significant impacts to groundwater, so groundwater is not further addressed in this section.

3.4.1.1 Surface Water

The proposed project site is located within the Brazos River basin, an area comprising approximately 45,000 square miles in Texas and New Mexico. Approximately 9,600 square miles of the basin, including all of the RTC property, are considered a noncontributing drainage area. Within this area almost all runoff is collected in playas. There are no natural, permanent surface water bodies or streams on the RTC. The only stream near the former base is the North Fork of the Double Mountain Fork of the Brazos River, known as Yellowhouse Draw. Yellowhouse Draw is located approximately 5 miles northeast of the proposed project location and is intermittent. There are seven playa lakes located either on or adjacent to the RTC property (USAF 1997).

All storm water runoff at the RTC property either naturally drains towards or is directed into one of the playas located on or near the former base through a series of storm drains and sewers. Storm drain inlets are located throughout the former AFB in low-lying areas, with storm

drain/sewer outlets directed towards the nearest playa. Two of these playas, Picnic Lake, which receives storm drain runoff from much of the sites cantonment, and Golf Course Lake, which receives effluent from the sewage lagoon in overflow conditions, remain wet year round.

3.4.1.2 Wetlands

DOE regulations at 10 CFR Part 1022, "Compliance with Floodplain and Wetland Environmental Review Requirements," implement the requirements of Executive Order 11990, Protection of Wetlands. These regulations require, among other things, that the Department notify appropriate government agencies (the U.S. Army Corps of Engineers in the case of wetlands associated with waters of the United States) and interested parties of a proposed wetland action. Also, DOE conducts a wetlands assessment to evaluate the impacts of that action to wetlands in an EA or environmental impact statement, consider alternatives that would avoid or minimize impacts to wetlands, design or modify the action to minimize potential harm to wetlands; and allow for public review and comment of the analysis. According to the United States Fish and Wildlife Wetland Mapper, there are no wetlands located on the proposed sites for the storage battery facility and wind turbines (USFWS 2012). The closest wetland is located approximately 0.7 miles to the south of the proposed location for the storage battery facility. There are three wetlands identified as "freshwater emergent" adjacent to the proposed aboveground distribution line. The two adjacent wetlands located on the RTC property are 500 feet north and 30 feet south from where the proposed distribution line would span. However, these wetlands are isolated and do not extend to the location of the storage battery facility or the wind turbine foundations. The third wetland is located along Ursuline Street, directly under the span of the proposed aboveground distribution line. However, the road is already disturbed land and the 12.5kV distribution line would be designed to span and/or avoid surface water features, including wetlands. Construction of the distribution line would not be expected to alter existing surface water drainage patterns due to the small cross section per pole and their relatively wide spacing. Access roads would be routed to avoid wetlands.

3.4.1.3 Floodplains

Executive Order 11988, Flood Plain Management, requires that development in floodplains be avoided if practicable. A Phase I Environmental Site Assessment completed in 2010 identified the 100-year floodplains on the former base. The 100-year floodplains mapped on the former base are associated with playa lakes. However, the floodplain maps indicate that no 100-year floodplains associated with the playas lay directly on any portion of the proposed project sites (NIRE 2010). The closest designated 100-year floodplain located near the proposed storage battery facility is approximately 0.7 miles to the south. The above ground distribution line would be located immediately north of a designated 100-year floodplain associated with a playa. However, construction of the distribution line would not be expected to alter existing surface water drainage patterns due to the small cross section per pole and their relatively wide spacing. The small area of impermeable surfaces created by the pole structures would not cause an increase in the susceptibility of the region to flooding.

3.4.2 ENVIRONMENTAL CONSEQUENCES

3.4.2.1 Proposed Project

The proposed project would not significantly affect drainage and runoff from the proposed project site, which currently naturally drains toward or is directed into one of the playas located on or near the former base through a series of storm drains and sewers. The closest playa that receives drainage and runoff is Picnic Lake, located in the southeast corner of the RTC. The above ground and underground distribution lines, storage battery, access road, and wind turbines would be installed in accordance with terms under a city construction permit, which would ensure management of storm water runoff so that the area down gradient would be protected from erosion or sedimentation. Since the proposed project site is relatively flat, erosion and runoff control would be relatively easy to achieve. Some soil would be converted to impervious surfaces to provide foundations for the storage battery and wind turbines; these impervious surfaces would be relatively small and would not be expected to significantly impact surface water infiltration or runoff. There should be little potential for adverse impacts to area surface water as a result of construction. Operation of the wind turbines would involve no discharge of liquids or wastes of any type to the ground. Operations and maintenance would not impact surface water. The storage battery facility and wind turbine foundations would not encroach on the nearby areas that are shown as wetlands on the National Wetland Inventory and the wetland located beneath the span of the above ground distribution line along Ursuline Street would not be negatively impacted as the distribution line would be designed to span and/or avoid surface water features, including wetlands. The project site is not within areas designated by the Federal Emergency Management Agency as being 100-year flood zones, so there would be no impacts to floodplains.

3.4.2.2 No-Action Alternative

Under the No-Action Alternative, DOE would not provide funding to CCET for the proposed project. As such, there would be no impacts from DOE's proposed action to water resources.

3.5 Biological Resources

3.5.1 AFFECTED ENVIRONMENT

This section describes existing biological resources at the proposed project site. It focuses on plant and animal species or habitat types that are typical or are an important element of the ecosystem, are of special category importance (of special interest due to societal concerns), or are protected under state or federal law or statute regulatory requirements. A framework of ecoregion classifications have been established for the country under cooperative efforts of state and federal agencies (including U.S. EPA, the U.S. Department of Agriculture, and the USGS). In Texas, Lubbock County lies in the Level III ecoregion designated as the High Plains. At a lower level of resolution, the location of the RTC is designated as being within the Level IV Llano Estacado ecoregion of the larger High Plains and is characterized as smooth to slightly

irregular plains, historically dominated by native grassland and now with a high percentage of cropland (Griffith et al. 2007).

3.5.1.1 Wildlife

Lubbock County is located in the Level IV Llano Estacado ecoregion, a level, treeless, elevated plain characterized by thousands of playa lakes (seasonal depressional wetlands), many serving as recharge areas for the important Ogallala Aquifer. These playa lakes are also essential for waterfowl during their yearly migration along the Central Flyway of North America. The area designated for the proposed projects is described as predominantly disturbed grassland with developed and landscaped areas. The majority of RTC is the abandoned airfield that consists of 3 north-south oriented runways. Native short-grass prairie grasslands are located in between and surrounding these runways, which function as habitat for grassland and open country birds. Additionally, trees planted on a nearby golf course and among the operational and residential structures of the former AFB provide habitat for other avian species.

Wildlife in the vicinity of the RTC includes numerous birds, amphibians, reptiles, and small mammals. Typical birds in the mowed grasslands surrounding the airfield include meadowlark, grasshopper sparrow, lark sparrow, horned lark, and northern mockingbird. Mammals potentially occurring in the grasslands include the Mexican ground squirrel, cottontail rabbit, black-tailed hare (jack rabbit), coyote, red fox, badger, skunks, bats, deer mouse, and white-throated wood rat. The Texas spotted whiptail, bullsnake, and desert kingsnake are reptiles commonly found in the open grasslands (USAF 1997).

A recent winter bird survey completed between November 2011 – February 2012 recorded the following most common species of birds: rock doves, i.e., pigeons *(Columba livia),* Canada geese *(Branta canadensis),* great-tailed grackles *(Quiscalus mexicanus),* and unknown passerine species. The large numbers of pigeons and great-tailed grackles detected will likely have a year-round presence at the RTC, while the Canada geese are a winter migrant and are present in large numbers during the winter months at the RTC because of the semi-permanent water sources on the golf course. Birds of prey recorded in the bird survey included 129 raptors between the months of December and February. The researchers were able to identify 63 percent of these two species and only red-tailed hawks, ferruginous hawks, and northern harriers were recorded consistently. Other raptors detected included Cooper's hawks, prairie falcons (*Falco mexicanus*), and American kestrel (*Falco sparverius*).

The winter bird survey also estimated that the largest number of species detected to fly at a height estimated to be within the rotor sweep of the proposed wind turbines were Canada geese, pigeons, unknown passerines, and great-tailed grackles. Only six percent of the raptor detections where of birds flying within the estimated rotor swept area; those raptors consisted of red-tailed hawks *(Buteo jamaicensis),* northern harriers *(Circus cyaneus),* and ferruginous hawks *(Buteo regalus).* During their survey, sandhill cranes, Canada geese, snow geese, and the majority of

raptors were recorded as flying at heights estimated to be greater than the rotor sweep area (Boal and Teague 2012).

3.5.2 ENVIRONMENTAL CONSEQUENCES

3.5.2.1 Proposed Project

The proposed project would not significantly impact wildlife populations located on the RTC or surrounding areas. The area on the RTC where the storage battery building, access road, and wind turbines would be placed has previously been disturbed and is currently grassland and scrub brush. In addition, the proposed project site is isolated from larger tracts of undisturbed land and the plant and animal species found there are expected to be widespread in the region. The area is also not considered to be a unique habitat for sensitive species found in Lubbock County. The above ground distribution line would span previously disturbed grassland, agricultural land, and residential areas and roadways. There is a chance of birds potentially colliding with wind turbines.

Current wind turbines have much lower rates of avian mortality associated with them than those built 25 or more years ago. The lattice design of towers that wind turbines previously used provided perches for raptors, which allowed many more birds to be in close proximity, resulting in higher mortality rates. Newly designed wind turbine blade configurations and size, and reduced speeds, have also resulted in lower mortality rates. Current designs have larger surface areas but spin slower, which results in more visibility to birds, thereby reducing bird collisions (Wisconsin Bird Conservation Initiative 2012). The proposed CCET wind turbine rotors would turn slowly, at 32-43 rpm. However, no wind turbine design completely eliminates mortality of birds or other wildlife, including bats.

Determining the location of wind power installations may be the most important consideration in regard to limiting bird and bat mortality. Each proposed wind power installation should be scrutinized for its potential impact on nesting and migrating birds and other wildlife and native plant communities. Ideally, wind turbine installations will be situated on already disturbed land (e.g. agricultural land) to minimize or eliminate the loss of habitat for wildlife (America Bird Conservatory 2012). The two proposed CCET wind turbines would be sited on previously disturbed land.

Relative to other sources of mortality, wind power has a low impact in terms of avian mortality. Among these other sources, collisions with window glass and communications towers, pesticide-caused deaths, and predation by free-ranging and feral cats are all considerably more important sources of mortality for birds (Wisconsin Bird Conservation Initiative 2012).

The America Bird Conservatory (ABC) maps Globally Important Bird Areas signifying them as either: 1) Key Migration Corridor**s** 2) Key Habitat Areas; or 3) Marine Important Bird Areas. The ABC also maps bird areas of Critical Importance which includes:

- Important Bird Areas with congregations of 500,000 or more migratory birds at some point during the year.
- Important Bird Areas for the very rarest WatchList birds—or those that have very specific and limited habitat requirements and/or are especially likely to be vulnerable to wind-related mortality or habitat impacts.
- Critical Habitat designated for bird species listed under the Endangered Species Act (ESA). Important habitat for bird species listed under the ESA for which ESA Critical Habitat has not yet been designated
- The very highest importance "bottleneck areas" for migrant birds, such as those where 500,000 or more birds are present seasonally (ABC 2012).

According to the ABC, the proposed project is not located in an area designated as a highly importance or critical importance area for birds.

The National Audubon Society made the following statement regarding wind turbines:

> On balance, Audubon strongly supports wind power as a clean alternative energy source that reduces the threat of global warming. Location, however, is important…. Every source of energy has some environmental consequences. Most of today's rapidly growing demand for energy is now being met by natural gas and expanded coal-burning power plants, which are this country's single greatest source of the greenhouse-gas emissions that cause global warming. If we don't find ways to reduce these emissions, far more birds—and people—will be threatened by global warming than by wind turbines (National Audubon Society 2006).

As of September 20, 2012, there have been no recorded bird collisions with the existing Alstom wind turbine (Harral 2012).

The TPWD responded to the draft EA by letter to DOE dated December 17, 2012, requesting that RTC incorporate several recommendations to protect wildlife. DOE responded to the TPWD outlining what measures RTC and the National Institute of Renewable Energy Holding Corporation (NIRE), doing business as Group NIRE, must implement to protect wildlife during project siting, construction and operation. These recommendations address power-line protection devices, prairie dog concerns, western burrowing owls, wind energy development guidelines, and post-construction monitoring. CCET hired Group NIRE as a sub recipient to contract-out construction activities at the RTC, which includes construction and installation of the proposed 12.5 kV power lines, battery storage facility foundation, and access road.

The TPWD recommended that the project proponent use available resources such as the USFWS Avian Protection Plan Guidelines to develop an Avian Protection Plan for the project site that would not compromise safety or cause excessive management problems. In an effort to minimize the potential impact to wildlife posed by the proposed 12.5 kV distribution line, Group

NIRE and RTC will review the USFWS Avian Protection Plan Guidelines and consider implementing its recommendations regarding the use of power-line protection devices to the extent practicable where it does not create safety risks or utility management problems.

Group NIRE currently has a year-round prairie dog relocation program employing a full-time wildlife manager that regularly moves prairie dogs to other parts of the RTC, as necessary. While Group NIRE and Texas Tech University (TTU) have completed other federally funded projects that did not require prairie dog relocation, if prairie dog surveys indicate their presence within or near the proposed project areas, RTC will avoid directly impacting the prairie dogs to the extent feasible during project siting and construction. However, if a direct impact appears likely, any prairie dogs found on-site would be relocated to another location prior to site cleaning and construction. TTU is a sub recipient under CCET's proposed project, and responsible for storage battery research and data analysis. TTU also has the Wind Science and Engineering Research Center (WISE) located at RTC.

The TPWD provided Group NIRE and RTC with information regarding the nesting period timeline for the Western burrowing owl. Since the exact extent of prairie dog burrows throughout the project sites are not known, RTC will follow a similar protocol it has used with other federally funded projects and initiate construction outside of the Western burrowing owls nesting period to avoid impact until their eggs have hatched and the young have fledged.

Group NIRE and RTC have reviewed the provided TPWD Voluntary Recommendations and the U.S. Fish and Wildlife Service's Final Land-Based Wind Energy Guidelines and regularly follows these recommendations to the extent practicable. Since commercial operation began in September 2010, the existing Alstom wind turbine generator has never had a bird or bat strike based on observations conducted by personnel from Group NIRE and TTU.

Group NIRE and TTU are preparing to start two years of post-construction bird and bat fatality monitoring at it its recently completed wind turbine and plans to initiate a similar program upon completion of the two proposed wind turbines. If post-construction monitoring results indicate that wildlife fatalities are above the national average, Group NIRE and RTC will consider modifying its operational plan to reduce future bird and bat fatalities to the extent practicable.

3.5.2.2 No-Action Alternative

Under the No-Action Alternative, DOE would not provide funding to CCET for the proposed project. As such, there would be no impacts from DOE's proposed action to wildlife resources.

3.6 Environmental Concerns

3.6.1 AFFECTED ENVIRONMENT

This section describes existing environmental concerns at the proposed project site. It focuses on contamination at the Northwest Rubble Area Landfill, located in the northwest corner of the

airfield and proposed location of the Samsung wind turbine pad site 1. The proposed storage battery facility, access road, and wind turbines would be situated on approximately three acres located on previously disturbed portions of the former Reese AFB in Lubbock County, Texas.

3.6.1.1 Environmental Concerns

According to the *Draft Final RFI/Closure Report* dated June 1999, contamination at the Northwest Rubble Area Landfill is limited to soil, and the nature and extent of soil contamination is defined. Waste reportedly deposited at the Northwest Rubble Area Landfill consisted of piles of asphalt construction debris from the demolition of runways, and drums of liquid waste. Sometime in the 1970s, at least some of the debris at the site was spread over a 3- to 5-acre area. Groundwater at the site is not affected. No soil contaminant concentrations exceed RRS2 clean-up levels. In a letter dated July 10, 2000, the TCEQ approved the deed certification for the property where SWMU No. 8, the Northwest Rubble Area Landfill, is located and released the facility from post-closure care responsibilities. The deed restriction limiting use of the property to industrial purposes remains in effect (Air Force Real Property Agency 2011).

3.6.2 ENVIRONMENTAL CONSEQUENCES

3.6.2.1 Proposed Project

The proposed action would not have a significant impact on areas of environmental concern. The Samsung wind turbine pad site 1 would be located adjacent to the soils restricted area of the Northwest Rubble Area Landfill. DOE assumes CCET would follow all best management practices while working near the restricted area during site preparation. During site clearing, precautions would be taken as to not disturb the soil restricted area. If any soil within the restricted area is excavated, it needs to either remain within the deed restricted area or needs to be sampled and if hauled off, properly disposed of at an approved facility (NIRE 2010).

3.6.2.2 No-Action Alternative

Under the No-Action Alternative, DOE would not provide funding to CCET for the proposed project. As such, there would be no impacts from DOE's proposed action on areas of environmental concerns.

3.7 The Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

Council on Environmental Quality regulations that implement the procedural requirements of NEPA requires consideration of the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity (40 CFR 1502.16). Installation and operation of the proposed above ground and underground distribution lines, storage battery, access road, and wind turbines would require short-term use of land and other resources. Short-term use of the environment, as used here, is that used during the life of the storage battery and

wind turbines, whereas long-term productivity refers to the period of time after the equipment has been decommissioned and removed. The short-term use of the project site and other resources for CCET's proposed project would not impact the long-term productivity of the area. When it is time to decommission and remove the storage battery and wind turbines, the land and facilities occupied by those systems could be used for other industrial activities, residential purposes, or the land could be reclaimed and revegetated to resemble pre-disturbance conditions.

3.8 Irreversible and Irretrievable Commitments of Resources

There would be an irretrievable commitment of materials for equipment and facilities at the proposed project site. The parcel of property is already committed to development as part of CCET's goal to support the objectives Smart Grid Demonstration Program. The materials that would be committed under the proposed project would support the integration of wind generation into the local electricity supply.

3.9 Unavoidable Adverse Impacts

Installation and operation of the above ground and underground distribution lines, storage battery, access road, and wind turbines would cause unavoidable visual impacts to the immediate area. However, the proposed project would not result in significant aesthetics and visual resources impacts because it would not create a visual interruption that would dominate a unique viewshed or scenic view. Existing electric infrastructure, such as distribution lines, transmission towers and lines, substations, and a wind turbine are already scattered throughout the landscape. Unavoidable adverse impacts to wildlife could occur from operation of the wind turbines due to an increased chance of bats or birds colliding with turbines. However, impacts would be minor because of the relatively small number of avian species flying within the estimated rotor sweep area.

4. CUMULATIVE IMPACTS

Council on Environmental Quality regulations stipulate that the cumulative impacts analysis in an EA consider the potential environmental impacts resulting from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions (40 CFR 1508.7). Because the impacts of the proposed project generally would be minor and localized (see Section 3), DOE focused this evaluation of cumulative impacts on activities immediately surrounding the proposed project site and other past, present, and reasonably foreseeable future actions on and around the RTC in Lubbock.

Recent activities at the project site have included the upgrade and replacement of the RTC power grid and the installation of a fiber optic network. Recent activities in the vicinity around the project site have mainly consisted of residential development. The following sections describe reasonably foreseeable future actions (Section 4.1) and the incremental cumulative impacts of installation and operation of the proposed wind and battery integration project (Section 4.2).

4.1 Reasonably Foreseeable Actions

To identify reasonably foreseeable actions in and around the project site, DOE primarily considered information from RTC on the future redevelopment of the project site, and the Lubbock County Public Works Department and Frenship Independent School District on future planned projects in the vicinity. Reasonably foreseeable actions are summarized below.

- Construction of the Scaled Wind Farm Technology facility for the TTU's WISE began on 14 July 2012. The site will initially include three wind turbines and could expand to include seven or more turbines (Texas Tech Today, 2012).
- The long-range master plan for the RTC includes the redevelopment of the campus and its facilities. The RTC is currently exploring the future redevelopment of its current facilities for commercial, retail, restaurant, laboratory and Class A office space (RTC, 2011).
- A new Frenship Independent School District elementary school is currently being constructed at the intersection of North Milwaukee Avenue and Itasca Street, south of the Erskine Substation. Planned development includes an approximately 116,000 square foot building with a gym (Frenship Today, 2012).
- Sierra Vista Estates is located at the intersection of County Road 6430 and North Milwaukee Avenue and contains 56 one to one and one-half acre lots for the construction of new 2,200 square feet minimum homes (Sierra Vista Estates LLC, 2012). At present, approximately half of the homes have been built while the remaining lots are available for purchase or have been purchased and are awaiting future construction. Other residential development near the Erskine Substations continues to occur, given market conditions.

4.2 Summary of Cumulative Impacts

In this analysis of cumulative impacts, DOE determined that only impacts to air quality, noise, and biological resources from past, present, and reasonably foreseeable actions in the vicinity of the project site would be cumulative with the installation and operation of the above ground and underground distribution lines, storage battery, access road, and wind turbines. Impacts of the proposed project to other resources would be negligible or would not occur. DOE considers cumulative impacts to be minimal for this project since installation and operation of the distribution lines and wind turbines would be limited to the RTC. Installation and operation of the proposed distribution lines would also have minimal cumulative impacts since much of these lines would follow existing distribution rights-of-way.

4.2.1 AIR QUALITY

Ongoing and planned development activities would cause emissions of particulate matter and other pollutants in the project area. However, emissions from each construction project individually would be temporary. Installation of the above ground and underground distribution lines, storage battery, access road, and wind turbines would have a very small incremental adverse impact while heavy equipment would be required. The TTU WISE is expected to be ongoing before and after the CCET project. Therefore, air emissions from these various sources might not be additive in terms of occurring at the same time, but the same people could be present throughout and be exposed to air emissions for a longer duration.

Operation of the storage battery and wind turbines would contribute to the region's independence from fossil fuel for energy, which would contribute to the beneficial cumulative impact on air quality by reducing air emissions from traditional power generating sources.

4.2.2 NOISE

Construction of the distribution lines, storage battery facility, and wind turbines would add to the cumulative noise generated with the construction of the reasonably foreseeable projects listed in Section 4.1. However, the contribution of the distribution lines to noise in the area would be minor in comparison with the much larger construction of the Frenship Independent School District elementary school and the surrounding housing development construction. Noise from construction of the storage battery and wind turbines would be similar to the noise already occurring at the RTC. Noise from these various sources might not occur at the same time, but they could all contribute to the amount of time that people in the area would be exposed to the sounds of construction.

4.2.3 BIOLOGICAL RESOURCE

The CCET's proposed project and the reasonably foreseeable projects listed in Section 4.1 are actions that would result in construction on undeveloped, or less developed, lands. These actions are accompanied by a loss of habitat for plants and animals. This spread of residential

development can include efforts to protect some habitat but overall, loss of habitat cannot be avoided. This conversion of undeveloped lands to residential and other research technology uses would cause a decline in the abundance of native plant and animal species in the area surrounding the projects. The CCET's proposed project would contribute to that cumulative effect by installing wind turbines, which have the potential for bat or bird collisions.

4.2.4 AREAS OF ENVIRONMENTAL CONCERN

The CCET's proposed project and the reasonably foreseeable projects on the RTC listed in Section 4.1 are actions that would result in construction on or near areas of environmental concern. These actions must abide by all restrictions placed on the areas of environmental concerns to ensure the health and safety of the workers, RTC employees and users and members of the surrounding community. The environmental concern areas have all been studied in detail and remediated with and without land restrictions with some continually being monitored. The CCET's proposed project would follow all land use restrictions regarding the area of concern near the proposed storage battery, access road, and wind turbines.

5. CONCLUSIONS

DOE's proposed action would provide CCET with $1.85 million in financial assistance in a cost-sharing arrangement to facilitate the installation of distribution lines, storage battery facility, access road, and site clearing at RTC. CCET would also purchase and install two wind turbines and pads. DOE concludes the following about the potential environmental impacts of its proposed action and CCET's proposed project.

- Installation and operation of above ground and underground distribution lines, storage battery, access road, and wind turbines would involve no potential for significant environmental impacts.

- Installation and operation of the proposed above ground and underground distribution lines, storage battery, access road, and wind turbines would not have any meaningful or detectable impacts on land use; geology and soils; groundwater; cultural resources; environmental justice; socioeconomics; occupational health and safety; transportation and traffic; utilities, energy, and materials; and waste.

- Installation and operation of the proposed above ground and underground distribution lines, storage battery, access road, and wind turbines would create temporary construction and manufacturing jobs and 3-6 permanent jobs.

- Operation of the storage battery and wind turbines would not generate criteria pollutants or carbon dioxide, but construction actions would result in air emissions. The proposed project is located in Lubbock County, Texas, which is an attainment area.

- The proposed project would produce a quantity of electricity via wind energy, which would reduce the amount produced from burning fossil fuels via conventional electricity generation. Therefore, the proposed project would slightly reduce regional greenhouse gas emissions.

- Operation of the distribution lines, storage battery, and wind turbines would not cause a significant increase in sound levels. Any associated noise from operation of the storage battery would be about 35 to 45 A-weighted decibels, comparable to a whispered conversation in a library. Operation of the distribution lines, under the worst weather conditions, would have a noise level that may approach a maximum of 48 dBA, comparable to typical office noise levels.

- The aesthetics of the area would change with the addition of the distribution lines, storage battery, and wind turbines. However, the proposed project would not result in significant aesthetics and visual resources impacts because it would not create a visual interruption that would dominate a unique viewshed or scenic view. There are no areas having a high visual sensitivity on or in the vicinity of the RTC. Existing electric infrastructure, such as

a wind turbine, transmission towers and lines, distribution lines, and substations are already scattered throughout the landscape. The turbines would be visible from Ursuline Street and NCRR 1100 and the adjacent residential homes.

- Construction actions would be performed with necessary controls on runoff and best management practices followed to ensure there would be no erosion or sedimentation issues. The project location does not involve floodplains. No impacts to surface water are expected. There are no wetlands located on the proposed sites for the storage battery and wind turbines. There are three wetlands identified as "freshwater emergent" adjacent to the proposed above ground distribution line. The two adjacent wetlands located on the RTC property are 500 feet north and 30 feet south from where the proposed distribution line would span. The third wetland is located along Ursuline Street, directly under the span of the proposed aboveground distribution line. However, the road is already disturbed land and the 12.5kV distribution line would be designed to span and/or avoid surface water features, including wetlands.

- Developing 3 acres on a currently disturbed vacant site would not significantly impact any population of plant or animal species because the project site is small and isolated from larger tracts of undisturbed land, and because plant and animal species found there are expected to be common and widespread in the region. The proposed project would have no effect on species protected under the federal *Endangered Species Act*, and there is no reason to suspect the project site has unique habitat for any State-protected or rare species. No impacts to wetlands are expected to occur since the adjacent wetlands are isolated.

- DOE does not expect CCET's proposed project to adversely impact traditional religious and culturally significant resources that would be of concern to Native American Tribes. DOE sent consultation letters and copies of the draft EA to the Apache Tribe of Oklahoma, the Comanche Nation, and the Kiowa Indian Tribe of Oklahoma. DOE did not receive a response from any of the Tribes.

- Relative to the cumulative changes in the environment that would be caused by the proposed project in combination with other planned activities nearby, the installation and operation of the distribution lines, storage battery, and wind turbines at RTC would cause small, adverse incremental changes to air quality and noise during construction, and to wildlife habitat. The proposed project would result in a small, beneficial, incremental impact to regional air quality by reducing air emissions, including carbon dioxide emissions.

- Under the No-Action Alternative, DOE would not provide funding to CCET and the distribution lines, storage battery, access road, and wind turbines would not be installed or operated. For comparison purposes, it is assumed no impacts to the existing

environment would occur, and any beneficial impacts of the proposed project would not be realized.

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APPENDIX A

DISTRIBUTION LIST

Army Corps of Engineers, Headquarters
Mr. John C. Furry
Agency NEPA Contact (3-I-23)
Civil Works Policy and Policy Compliance Division
441 G Street, NW
Washington, DC 20314-1000
Phone: 202-761-5875
Fax: 202-761-8957
Email: john.c.furry@usace.army.mil
Website: www.usace.army.mil

Albuquerque Regional Office – AR, LA, NM,
OK, TX
Mr. Stephen R. Spencer, Ph.D.
Regional Environmental Officer
Office of Environmental Policy and Compliance
Department of the Interior
1001 Indian School Road, NW, Suite 348
Albuquerque, NM 87104-2303
Phone: 505-563-3572
Email: stephen_spencer@ios.doi.gov
Website:
www.doi.gov/oepc/albuquerque.html

EPA Region 6 – AR, LA, NM, OK, TX
Mr. Michael P. Jansky
Regional Environmental Review Coordinator
Office of Planning and Coordination
Environmental Protection Agency
1445 Ross Avenue, Mail Code 6EN-XP
Dallas, TX 75202-2733
Phone: 214-665-7451
Email: jansky.michael@epamail.epa.gov
Website: www.epa.gov/region6

Texas NEPA Points of Contact:
Mr. Toby Baker
Governor's Advisor – Natural Resources and Agriculture
PO Box 12428
Austin, TX 78711
Phone: 512-463-5856
Email: toby.baker@governor.state.tx.us

Mr. Terry Zrubek
Governor's Advisor –Natural Resources
PO Box 12428
Austin, TX 78711
Phone: 512-475-3547
Email: terry.zrubek@governor.state.tx.us

U.S. Senators and Representatives:
The Honorable Senator John Cornyn
517 Hart Senate Office Building
Washington, DC 20510
Phone: (202) 224-2934

The Honorable Senator Kay Bailey Hutchison
284 Russell Senate Office Building
Washington, DC 20510
Phone: (202) 224-5922

The Honorable Representative Randy Neugebauer
611 University Ave.
Suite #220
Lubbock, Texas 79401
Phone: (806) 763-1611
Fax: (806) 767-9168

Washington, D.C. Office:
1424 Longworth HOB
Washington, DC 20515
Phone: (202) 225-4005
Fax: (202) 225-9615

Texas House of Representatives:
The Honorable **Charles Perry**

Capitol Address:
Room E1.418, Capitol Extension
P.O. Box 2910
Austin, TX 78768
(512) 463-0542
(512) 463-0671 Fax

District Address:
11003 Quaker Avenue, Suite 101
Lubbock, Texas 79424
(806) 783-9934
(806) 783-9738 Fax

Native American Tribes (federally listed):
Apache Tribe of Oklahoma
Mr. Louis Maynahonah
Apache Tribe of Oklahoma
511 E. Colorado
Anadarko, OK 73005
Phone: 405-247-9493
Fax: 405-247-2686

Comanche Nation
Mr. Michael Burgess
Comanche Nation
HC-32, Box 1720
Lawton, OK 73502
Phone: 580-492-4988
Fax: 580-492-3796
Email: ivanj@comanchenatgion.com

Kiowa Indian Tribe of Oklahoma
Mr. Ron Twohatchet
Kiowa Tribe of Oklahoma
P.O. Box 369
Carnegie, OK 73015
Phone: 508-654-2300
Fax: 508-654-2188
Email: kbo@kiowatribe.net

State Historic Preservation Office
Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission
P.O. Box 12276
Austin, TX 78711-2276

U.S. Fish and Wildlife Service
Thomas J. Cloud Jr.
U.S. Fish and Wildlife Service
Arlington, Texas Ecological Services Field Office
2005 Northeast Green Oaks Boulevard, Suite 140
Arlington, Texas 76006

County Commissioner
Patti Jones
County Commissioner, Precinct #4
Lubbock County Courthouse
904 Broadway, Suite 101
Lubbock, TX 79401

Libraries
Mr. Kevin Haggerty
U.S. Department of Energy
Freedom of Information Act Reading Room
1000 Independence Avenue, SW, 1G-033
Washington, DC 20585

Mahon Library
1306 9th Street
Lubbock, TX 79401

Other:
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, TX 78744
Toll Free: (800) 792-1112, Austin: (512) 389-4800

Dr. Milton Holloway, President and CEO
Center for the Commercialization of Electric Technologies
816 Congress Avenue, Suite 1260
Austin, TX 78701

APPENDIX B

CONSULTATIONS

This appendix contains copies of consultation letters sent by DOE to fulfill its responsibilities under the *Endangered Species Act* and *National Historic Preservation Act*.

NATIONAL ENERGY TECHNOLOGY LABORATORY
Albany, OR • Morgantown, WV • Pittsburgh, PA

September 14, 2012

Apache Tribe of Oklahoma
Louis Maynahonah
Apache Tribe of Oklahoma
511 E. Colorado
Anadarko, OK 73005

SUBJECT: Section 106 Compliance of the National Historic Preservation Act the Native American Graves Protection and Repatriation Act of 1990 for the proposed Reese Technology Center Wind & Battery Integration Project, Lubbock, TX

Dear Mr. Maynahonah:

The U.S. Department of Energy (DOE) is proposing to provide financial assistance (DOE's Proposed Action) to the Center for Commercialization of Electric Technologies (CCET) as part of the funding opportunity announcement titled "Recovery Act – Smart Grid Demonstration," which is funded through the American Recovery and Reinvestment Act of 2009.

This CCET project would demonstrate battery technology integration with wind generated electricity by deploying and evaluating utility-scale lithium battery technology to improve grid performance and thereby aid in the integration of wind generation into the local electricity supply.

DOE would provide the funding to cost-share in the design and installation of: (1) above ground and underground distribution lines; (2) batteries, battery containment building and foundation; (3) an access road; and (4) site clearing. The facility would be situated on approximately three acres and located on previously disturbed portions of the former Reese Air Force Base in Lubbock County, Texas. The project would also provide renewable power generation to the local electrical grid.

DOE is initiating consultation and requesting information your Tribe may have on properties of traditional religious and cultural significance within the vicinity of the proposed facility and any comments or concerns you have on the potential for this proposed project to affect those properties. This information is being requested to aid in the preparation of that environmental assessment (EA) and to meet our obligations under Section 106 of the National Historic Preservation Act and the Native American Graves Protection and Repatriation Act of 1990.

Please see the supporting documents attached to this letter for further details on this project and forward the results of your review and any requests for additional information to:

3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507
Joseph.Zambelli@netl.doe.gov • Voice (304) 285-4913 • Fax (304) 285-4403 • www.netl.doe.gov

BSA Environmental Services, Inc.
Attn: Dr. John R. Beaver
23400 Mercantile Rd. Ste 8
Beachwood, OH 44122-5139
Telephone: (216) 765-0582

An EA is being prepared and will be released to the public in the near future. DOE will provide your office a copy of the EA where you may further comment on any of your concerns. All correspondence between DOE and the Tribes will be included in an appendix to the EA. At this time, DOE anticipates a 30-day public comment period for this proposed project.

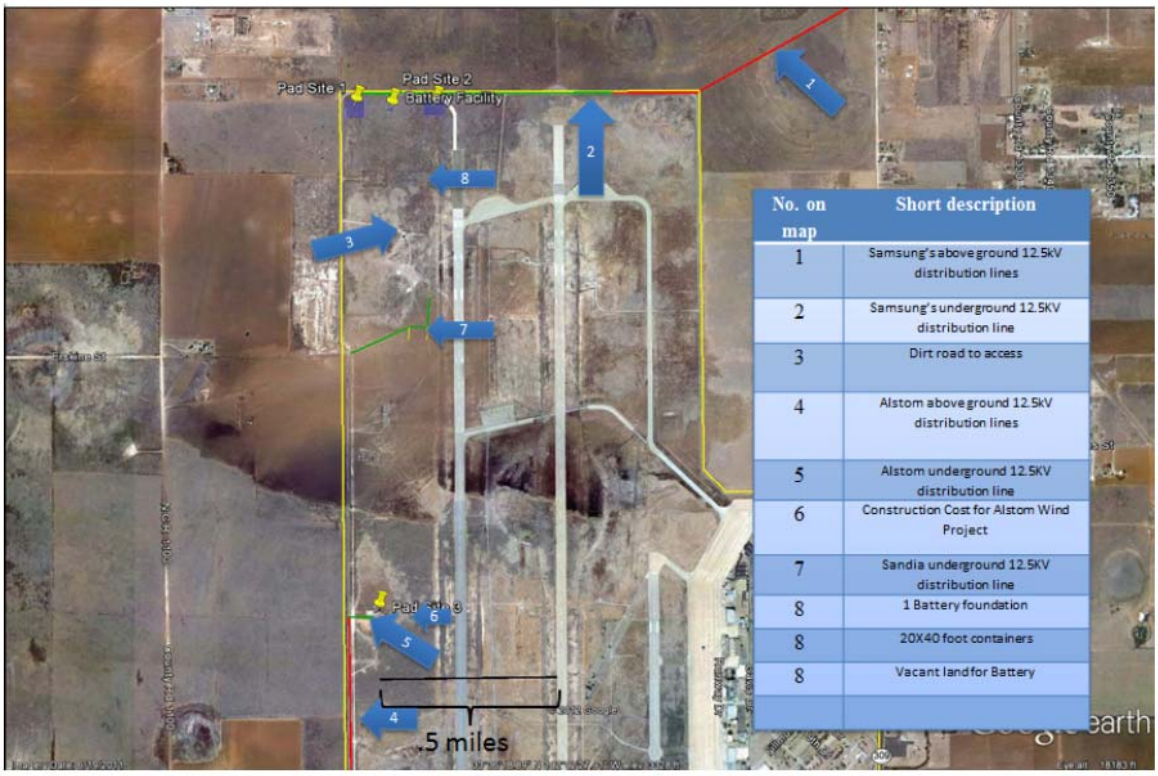
If you have any questions, I can be reached at 304-285-4913 or by e-mail Joseph.Zambelli@NETL.doe.gov.

Sincerely,

Joseph Zambelli
NEPA Document Manager

Attachments:
Regional location map
Ariel view of proposed project

Regional Location


Pad Site 1
Pad Site 2
Battery Facility
Pad Site 3
.5 miles
1
2
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No. on map
Short description
1
Samsung's above ground 12.5kV distribution lines
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Aerial View

NATIONAL ENERGY TECHNOLOGY LABORATORY
Albany, OR • Morgantown, WV • Pittsburgh, PA

U.S. DEPARTMENT OF ENERGY

September 14, 2012

Comanche Nation
Michael Burgess
Comanche Nation
HC-32, Box 1720
Lawton, OK 73502

SUBJECT: Section 106 Compliance of the National Historic Preservation Act the Native American Graves Protection and Repatriation Act of 1990 for the proposed Reese Technology Center Wind & Battery Integration Project, Lubbock, TX

Dear Mr. Burgess:

The U.S. Department of Energy (DOE) is proposing to provide financial assistance (DOE's Proposed Action) to the Center for Commercialization of Electric Technologies (CCET) as part of the funding opportunity announcement titled "Recovery Act – Smart Grid Demonstration," which is funded through the American Recovery and Reinvestment Act of 2009.

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DOE is initiating consultation and requesting information your Tribe may have on properties of traditional religious and cultural significance within the vicinity of the proposed facility and any comments or concerns you have on the potential for this proposed project to affect those properties. This information is being requested to aid in the preparation of that environmental assessment (EA) and to meet our obligations under Section 106 of the National Historic Preservation Act and the Native American Graves Protection and Repatriation Act of 1990.

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Joseph.Zambelli@netl.doe.gov • Voice (304) 285-4913 • Fax (304) 285-4403 • www.netl.doe.gov

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Beachwood, OH 44122-5139
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If you have any questions, I can be reached at 304-285-4913 or by e-mail Joseph.Zambelli@NETL.doe.gov.

Sincerely,

Joseph Zambelli

Joseph Zambelli
NEPA Document Manager

Attachments:
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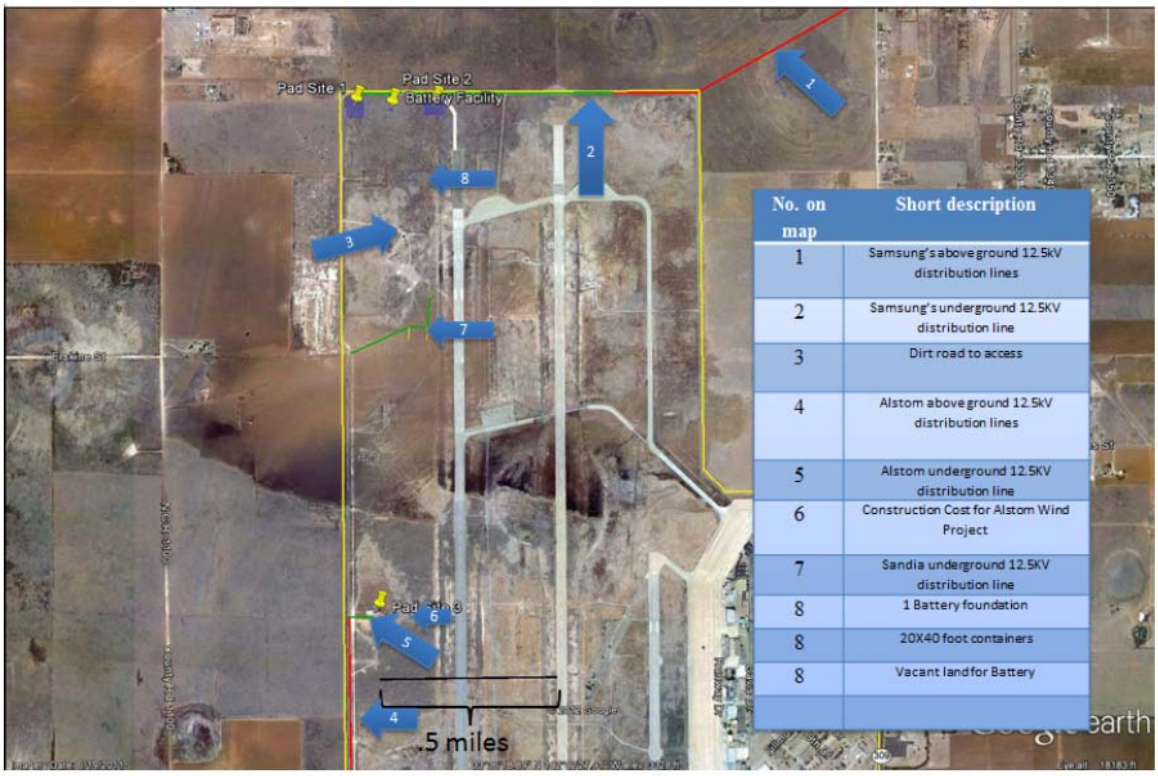
Ariel view of proposed project

Regional Location



No. on map	Short description
1	Samsung's above ground 12.5kV distribution lines
2	Samsung's underground 12.5KV distribution line
3	Dirt road to access
4	Alstom above ground 12.5kV distribution lines
5	Alstom underground 12.5KV distribution line
6	Construction Cost for Alstom Wind Project
7	Sandia underground 12.5KV distribution line
8	1 Battery foundation
8	20X40 foot containers
8	Vacant land for Battery

Aerial View

NATIONAL ENERGY TECHNOLOGY LABORATORY
Albany, OR • Morgantown, WV • Pittsburgh, PA

U.S. DEPARTMENT OF ENERGY

September 14, 2012

Kiowa Indian Tribe of Oklahoma
Mr. Ron Twohatchet
Kiowa Tribe of Oklahoma
P.O. Box 369
Carnegie, OK 73015

SUBJECT: Section 106 Compliance of the National Historic Preservation Act the Native American Graves Protection and Repatriation Act of 1990 for the proposed Reese Technology Center Wind & Battery Integration Project, Lubbock, TX

Dear Mr. Twohatchet:

The U.S. Department of Energy (DOE) is proposing to provide financial assistance (DOE's Proposed Action) to the Center for Commercialization of Electric Technologies (CCET) as part of the funding opportunity announcement titled "Recovery Act – Smart Grid Demonstration," which is funded through the American Recovery and Reinvestment Act of 2009.

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Please see the supporting documents attached to this letter for further details on this project and forward the results of your review and any requests for additional information to:

3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507
Joseph.Zambelli@netl.doe.gov • Voice (304) 285-4913 • Fax (304) 285-4403 • www.netl.doe.gov

BSA Environmental Services, Inc.
Attn: Dr. John R. Beaver
23400 Mercantile Rd. Ste 8
Beachwood, OH 44122-5139
Telephone: (216) 765-0582

An EA is being prepared and will be released to the public in the near future. DOE will provide your office a copy of the EA where you may further comment on any of your concerns. All correspondence between DOE and the Tribes will be included in an appendix to the EA. At this time, DOE anticipates a 30-day public comment period for this proposed project.

If you have any questions, I can be reached at 304-285-4913 or by e-mail Joseph.Zambelli@NETL.doe.gov.

Sincerely,

Joseph Zambelli

Joseph Zambelli
NEPA Document Manager

Attachments:
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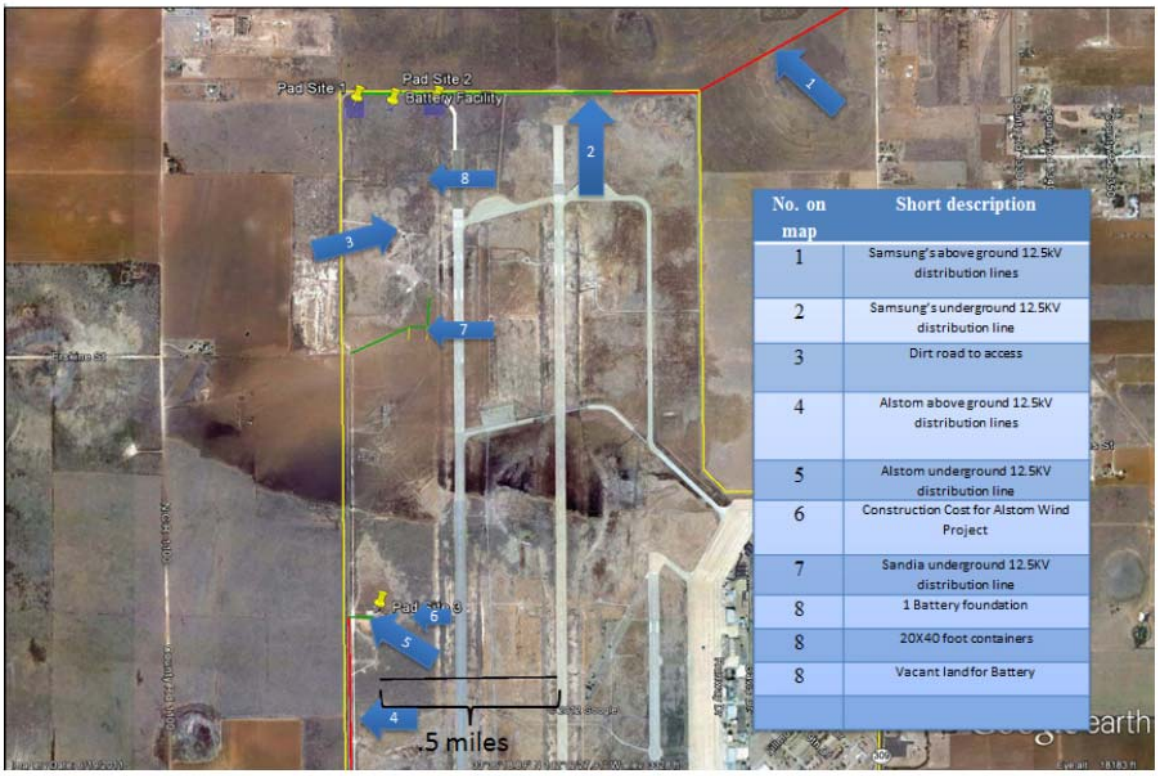
Ariel view of proposed project

Regional Location



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Aerial View

NATIONAL ENERGY TECHNOLOGY LABORATORY
Albany, OR • Morgantown, WV • Pittsburgh, PA

U.S. DEPARTMENT OF ENERGY

September 14, 2012

Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission
P.O. Box 12276
Austin, TX 78711-2276

SUBJECT: Section 106 Compliance of the National Historic Preservation Act for the proposed Reese Technology Center Wind & Battery Integration Project, Lubbock, TX

Dear Mr. Wolfe:

The U.S. Department of Energy (DOE) is proposing to provide financial assistance (DOE's Proposed Action) to the Center for Commercialization of Electric Technologies (CCET) as part of the funding opportunity announcement titled "Recovery Act – Smart Grid Demonstration," which is funded through the American Recovery and Reinvestment Act of 2009.

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In November 1995, a technical report was completed for an archaeological resources investigation on the main base. Results of the report indicated that no significant archaeological sites existed within its boundaries. It concludes by noting that the Texas State Historic Preservation Office (SHPO) concurred with this finding in a letter dated April 30, 1996, found in Appendix I of the Reese Air Force Base Environmental Impact Statement (EIS). Also in the EIS, it is noted that there was one prehistoric site located within the boundaries of the main base in a parcel designated for public facilities/recreation land use but the site did not meet the criteria for eligibility for listing in the National Register.

Based on the determination of "no findings" during literature research of the project site, DOE has made a finding of No Historic Properties Affected for archeological resources in regards to this undertaking. DOE asks for your concurrence with this finding and thanks you in advance for your consideration. Please see the supporting documents attached to this letter for further

3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507
Joseph.Zambelli@netl.doe.gov • Voice (304) 285-4913 • Fax (304) 285-4403 • www.netl.doe.gov

details on this project, and forward the results of your review and any requests for additional information to:

BSA Environmental Services, Inc.
Attn: Dr. John R. Beaver
23400 Mercantile Rd. Ste 8
Beachwood, OH 44122-5139
Telephone: (216) 765-0582

An environmental assessment (EA) is being prepared and will be released to the public in the near future. DOE will provide your office a copy of the EA where you may further comment on any of your concerns. All correspondence between DOE and the SHPO will be included in an appendix to the EA. At this time, DOE anticipates a 30-day public comment period for this proposed project.

If you have any questions, I can be reached at 304-285-4913 or by e-mail Joseph.Zambelli@NETL.doe.gov.

Sincerely,

Joseph Zambelli
NEPA Document Manager

Attachments:
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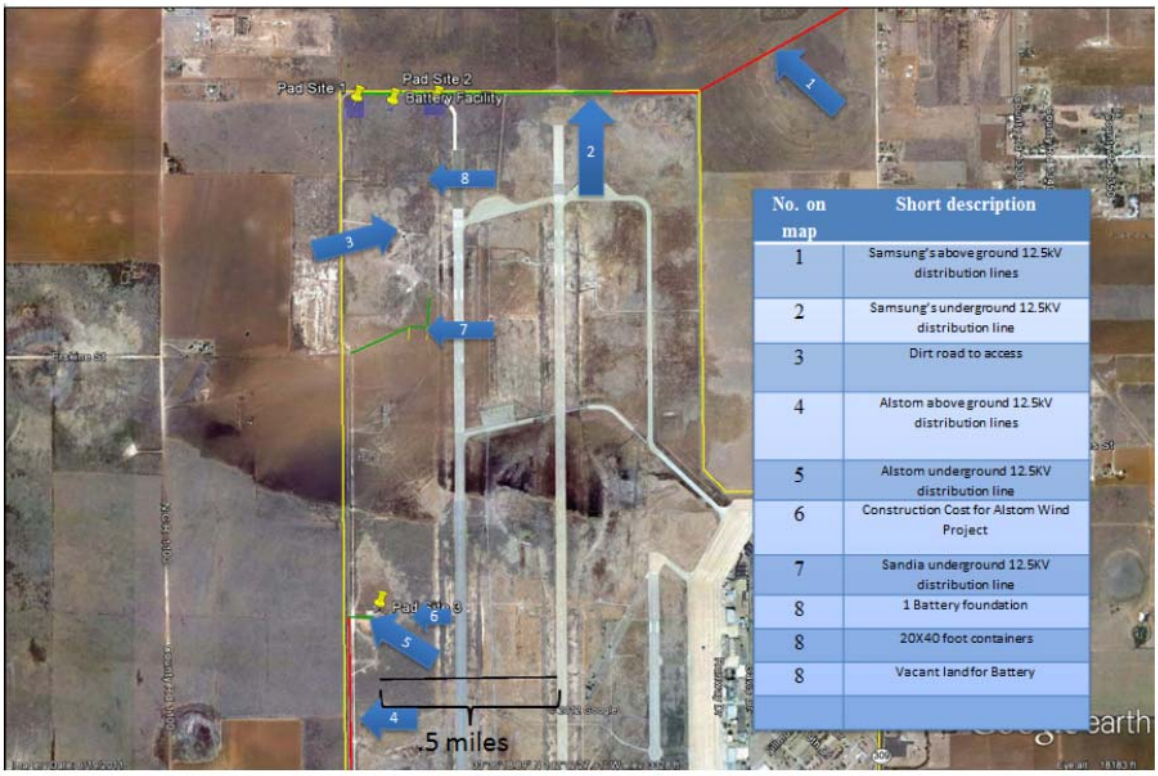
Ariel view of proposed project

Regional Location



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NATIONAL ENERGY TECHNOLOGY LABORATORY
Albany, OR • Morgantown, WV • Pittsburgh, PA

U.S. DEPARTMENT OF ENERGY

September 14, 2012

Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission
P.O. Box 12276
Austin, TX 78711-2276

NO HISTORIC PROPERTIES AFFECTED
PROJECT MAY PROCEED
by
for Mark Wolfe
State Historic Preservation Officer
Date 10/11/12

SUBJECT: Section 106 Compliance of the National Historic Preservation Act for the proposed Reese Technology Center Wind & Battery Integration Project, Lubbock, TX

Dear Mr. Wolfe:

The U.S. Department of Energy (DOE) is proposing to provide financial assistance (DOE's Proposed Action) to the Center for Commercialization of Electric Technologies (CCET) as part of the funding opportunity announcement titled "Recovery Act – Smart Grid Demonstration," which is funded through the American Recovery and Reinvestment Act of 2009.

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If you have any questions, I can be reached at 304-285-4913 or by e-mail Joseph.Zambelli@NETL.doe.gov.

Sincerely,

Joseph Zambelli
NEPA Document Manager

Attachments:
Regional location map
Ariel view of proposed project

NATIONAL ENERGY TECHNOLOGY LABORATORY
Albany, OR • Morgantown, WV • Pittsburgh, PA

U.S. DEPARTMENT OF ENERGY

September 13, 2012

Thomas J. Cloud Jr.
U.S. Fish and Wildlife Service
Arlington, Texas Ecological Services Field Office
2005 Northeast Green Oaks Boulevard, Suite 140
Arlington, Texas 76006

RE: Section 7 Consultation under the Endangered Species Act for the proposed Reese Technology Center Wind & Battery Integration Project, Lubbock, TX

Dear Mr. Cloud:

The U.S. Department of Energy (DOE) is proposing to provide financial assistance (DOE's Proposed Action) to the Center for Commercialization of Electric Technologies (CCET) as part of the funding opportunity announcement titled "Recovery Act – Smart Grid Demonstration," which is funded through the American Recovery and Reinvestment Act of 2009.

This CCET project would demonstrate battery technology integration with wind generated electricity by deploying and evaluating utility-scale lithium battery technology to improve grid performance and thereby aid in the integration of wind generation into the local electricity supply.

DOE would provide the funding to cost-share in the design and installation of: (1) above ground and underground distribution lines; (2) batteries, battery containment building and foundation; (3) an access road; and (4) site clearing. The facility would be situated on approximately three acres and located on previously disturbed portions of the former Reese Air Force Base in Lubbock County, Texas. The project would also provide renewable power generation to the local electrical grid.

To comply with Section 7(a)(2) of the Endangered Species Act, DOE reviewed the U.S. Fish and Wildlife Service (USFWS), Southwest Region's list of federally endangered and threatened species (at URL http://www.fws.gov/southwest/es/ES_ListSpecies.cfm) that are known to occur in Lubbock County, Texas where the construction-type activities would occur as part of the proposed action. Table 1 contains a list of those species identified from this review. DOE is requesting verification of the information in Table 1 and identification of any other listed or proposed species or designated or proposed critical habitat that may be present in the project area.

Table 1. Listed Species in Lubbock County

Group	Species	Status
Bird	bald eagle *(Haliaeetus leucocephalus)*	Recovery
	whooping crane (*Grus Americana)*	Endangered/ **Experimental Population, Non-Essential**

3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507
Joseph.Zambelli@netl.doe.gov • Voice (304) 285-4913 • Fax (304) 285-4403 • www.netl.doe.gov

Based on the above information, DOE determined that there would be no adverse effects to federally threatened or endangered species. DOE asks for your concurrence with this finding and thanks you in advance for your consideration. Please forward the results of your review and any requests for additional information to:

BSA Environmental Services, Inc.
Attn: Dr. John R. Beaver
23400 Mercantile Rd. Ste 8
Beachwood, OH 44122-5139
Telephone: (216) 765-0582

An environmental assessment (EA) is being prepared and will be released to the public in the near future. DOE will provide your office a copy of the EA and where you may further comment on any of your concerns. All correspondence between DOE and the USFWS will be included in an appendix to the EA. At this time, DOE anticipates a 30-day public comment period for this proposed project.

If you have any questions, I can be reached at 304-285-4913 or by e-mail Joseph.Zambelli@NETL.doe.gov.

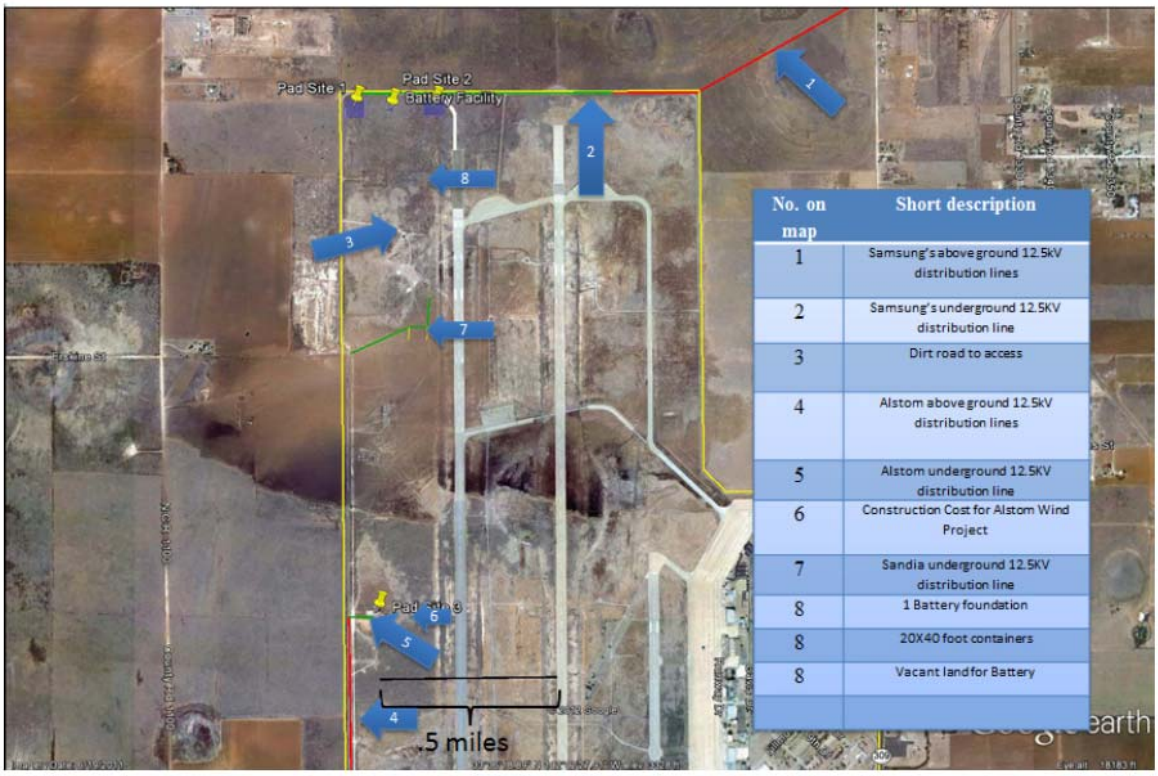
Sincerely,

Joseph Zambelli

Joseph Zambelli
NEPA Document Manager

Attachments:
Regional location map
Ariel view of proposed project

Regional Location



No. on map	Short description
1	Samsung's above ground 12.5kV distribution lines
2	Samsung's underground 12.5KV distribution line
3	Dirt road to access
4	Alstom above ground 12.5kV distribution lines
5	Alstom underground 12.5KV distribution line
6	Construction Cost for Alstom Wind Project
7	Sandia underground 12.5KV distribution line
8	1 Battery foundation
8	20X40 foot containers
8	Vacant land for Battery

Aerial View

From: Sean_Edwards@fws.gov
Sent: Thursday, October 04, 2012 12:52 PM
To: joseph.zambelli@netl.doe.gov
Subject: Reese Technology Center

Mr. Reinecke,

We have received and reviewed NETL's September 13, 2012 letter regarding the proposed Reese Technology Center Wind & Battery Integration Project to be constructed in Lubbock County, Texas. Upon review of your materials and our information, we believe that adverse impacts to federally listed species resulting from the proposed actions would be highly unlikely. This is due to the fact that the project would take place within areas which do not appear to contain suitable habitat for the federally listed species known to occur in Lubbock County. Therefore, we have no comments or recommendations to offer. Please contact me if I may be of further assistance.

Kind Regards,

Sean Patrick Edwards
Program Coordinator, Conservation Planning
U.S. Fish & Wildlife Service
Ecological Services Field Office
2005 NE Green Oaks Blvd., Suite 140
Arlington, Texas 76006
817-277-1100
sean_edwards@fws.gov

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Bill Jones
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Margaret Martin
Boerne

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Houston

Dick Scott
Wimberley

Lee M. Bass
Chairman-Emeritus
Fort Worth

Carter P. Smith
Executive Director

December 17, 2012

Mr. Joe Zambelli
U.S. Department of Energy
National Renewable Energy Laboratory
3610 Collins Ferry Road
Morgantown, WV 26507-0880

RE: Reese Technology Center Wind and Battery Integration Draft Environmental Assessment, Lubbock County

Dear Mr. Zambelli:

Texas Parks and Wildlife Department (TPWD) received the draft Environmental Assessment (EA) of the above-referenced project located west of Lubbock. TPWD staff has reviewed the draft EA and offers the following comments and recommendations concerning this project.

Project Description

The U.S. Department of Energy proposes to provide funding to the Center for Commercialization of Electric Technology (CCET) to facilitate a demonstration project. CCET is a consortium of 15 Texas electric and high-tech companies and five universities with a goal to modernize the Texas electric system. The proposed project would demonstrate battery technology integration with wind generated electricity by deploying and evaluating utility-scale lithium battery technology. New construction would involve approximately 5.5 miles of above-ground and 0.6 mile of underground distribution lines, a 1.5-megawatt (MW) storage battery housed in a 20-foot by 40-foot container, a 20-foot wide by 600-foot long access road, and site clearing. A 2.3-MW wind turbine, a 2.7-MW wind turbine, and their foundations would also be constructed as part of the proposed action. The site is a 3-acre parcel of the Reese Technology Center (RTC), located on the former Reese Air Force Base, although a portion of the distribution lines would be located outside the RTC.

Section 3.4.1.2 Wetlands

This section of the draft EA states that although no wetlands are located adjacent to the proposed site of the wind turbines or battery facility, three wetlands are located adjacent to the proposed above-ground distribution line. Based on a review of the Texas Tech University (TTU) Playa Lakes Digital

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512.389.4800
www.tpwd.state.tx.us

Database, these three wetlands may be playa lakes. One wetland would be 30 feet south of the line, another would be 500 feet north, and the third would be directly under the span of the proposed line. Additional information regarding the TTU Playa Lakes Digital Database can be obtained at http://www.rw.ttu.edu/gstlab/playas.pdf.

As stated in Section 3.5.1.1 of the draft EA (discussed below), playa lakes are essential for waterfowl during their yearly migration along the Central Flyway. TPWD notes that there is potential for electrocution and collision of large-bodied waterfowl and avian predators with electrical wires near these upland lakes. Direct loss of wildlife from collisions with wires or from electrocution may be less significant than the potential for disease created by decomposition after these fatalities. Indirect adverse impacts imposed by these collisions and subsequent decomposition of animal tissue within a water regime significantly contributes to the concentration of botulism bacteria that is highly toxic and often fatal to wildlife. During disease epidemics, playa lakes that are highly concentrated with botulism bacteria can have devastating adverse impacts on the remaining waterfowl and wildlife populations that use them.

Recommendation: TPWD recommends distribution lines that cross or are located near playa lakes have line markers installed at the crossings or closest points to the wetlands to reduce potential collisions by birds using these water features. Based on a summary of data on available power line marking systems in the report "Mitigating Bird Collisions with Power Lines: The State of the Art in 1994," bird flight diverters (BFD-4), spaced about every 16 feet, appear to be the most effective in reducing collisions with overhead ground wires. To prevent electrocution of perching raptors, raptor protection measures such as adequate conductor spacing, perch guards, and insulated jumper wires should also be installed on the distribution lines. For additional information, please see the guidelines published in the *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* and the *Avian Protection Plan Guidelines*.

Section 3.5.1.1 Wildlife

This section of the draft EA lists typical birds and mammals potentially occurring in the mowed grasslands surrounding the airfield within the project area. The list of potentially occurring mammals does not include the Black-tailed prairie dog (*Cynomys ludovicianus*). TPWD notes that based on a review Figure 2-4 in the draft EA, a colony of the Black-tailed prairie dog

may be present at the battery facility site as well as within the path of the proposed access road.

The Black-tailed prairie dog is a keystone species that provides food and/or shelter for rare species tracked by TPWD such as the Ferruginous Hawk (*Buteo regalis*) and the Western Burrowing Owl (*Athene cunicularia hypugaea*), as well as many other wildlife species. A review of Texas Natural Diversity Database (TXNDD) records indicates that a Ferruginous Hawk has been documented on the RTC exploiting prairie dog towns in the area (see attached TXNDD printout).

Recommendation: If prairie dog towns are discovered in or near the project area, TPWD recommends that they be avoided to the extent feasible during project siting and construction. Turbines should be sited as far as possible from the towns to avoid direct impacts to the prairie dogs as well as to minimize the potential for collision-related mortality of raptors that may be attracted to the area due to the availability of prey.

Please note that absence of TXNDD information in an area does not imply that a species is absent from that area. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state. Although it is based on the best data available to TPWD regarding rare species, the data from the TXNDD do not provide a definitive statement as to the presence, absence or condition of special species, natural communities, or other significant features within your project area. These data are not inclusive and **cannot be used as presence/absence data**. They represent species that could potentially be in your project area. This information cannot be substituted for on-the-ground surveys. The TXNDD is updated continuously. As the project progresses and for future projects, please request the most current and accurate information at txndd@tpwd.state.tx.us.

The Western Burrowing Owl is a ground-dwelling owl that uses the burrows of prairie dogs and other fossorial animals for nesting and roosting. The Western Burrowing Owl is protected under the Migratory Bird Treaty Act and take of these birds, their nests, and eggs is prohibited. Potential impacts to the Western Burrowing Owl could include habitat removal as well as displacement and/or destruction of nests and eggs if ground disturbance occurs during the breeding season.

Recommendation: If prairie dog towns would be disturbed as a result of the proposed projects, TPWD recommends the burrows be surveyed for

burrowing owls. If nesting owls are found, disturbance should be avoided until the eggs have hatched and the young have fledged.

Section 3.5.2.1 Environmental Consequences, Proposed Project

This section of the draft EA states that there is a chance that birds could potentially collide with the wind turbines. The draft EA states that although the current design of the turbines and proposed turning speed of the rotors would reduce bird collisions, no turbine design completely eliminates mortality of wildlife including birds and bats.

Recommendation: TPWD recommends CCET review the attached draft TPWD Voluntary Recommendations for Wind Energy Development. These guidelines are provided to promote the continued responsible development of wind facilities across the state. These guidelines are intended to enable Texas to develop its wind resources in a manner that minimizes adverse impacts to the wildlife, habitats, and natural resources of Texas through proper pre-project risk assessment, good project design and operation, and effective adaptive management practices.

TPWD also recommends review of the U.S Fish and Wildlife Service (USFWS) Final Land-Based Wind Energy Guidelines which can be found at http://www.fws.gov/windenergy/. Although the TPWD and USFWS guidelines were designed with much larger wind energy generation facilities in mind, both sets of guidelines contain valuable information regarding the assessment of impacts on wildlife and should be used as a resource during project planning.

This section of the draft EA also states that as of September 20, 2012 there have been no recorded bird collisions with the existing Alstom wind turbine. The draft EA does not state whether bat collisions have been reported and does not provide details regarding the level of post-construction fatality monitoring that has occurred at the existing turbine.

Recommendation: TPWD recommends a minimum of two years of post-construction bird and bat fatality monitoring on the proposed site. TPWD also recommends CCET consider what potential modifications might be necessary for the operational plan should wildlife fatalities be found to be above the national average. For example, increasing the cut-in speed has been shown to significantly reduce bat fatalities and could be considered if operational modifications become necessary.

I appreciate the opportunity to comment on this draft EA. Please contact me at (512) 389-4579 if you have any questions.

Sincerely,

Julie C. Wicker

Julie C. Wicker
Wildlife Habitat Assessment Program
Wildlife Division

JCW:gg.ERCS-3611

Attachments (2)

TXNDD Tracked Species in Project Area

Element Occurrence ID (EOID)	6521
Scientific Name	Buteo regalis
Common Name	Ferruginous Hawk
Global Rarity Rank	G4
State Rarity Rank	S2B,S4N
Federal Status	
State Status	
First Observation Date	<null>
Survey Date	1993-12-09
Last Observation Date	1993-12-09

EO Data

WINTERING BIRDS EXPLOITING PRAIRIE DOG TOWNS, PLAYA LAKES, AND FALLOW FIELDS ON AND AROUND SITE VICINITY; ONE FORAGING HAWK WAS SEEN FORAGING OVER THE SOUTH RUNWAYS AT REESE AFB ON 9 DECEMBER 1993; THIS BIRD IS PART OF A LARGER WINTERING POPULATION OF FERRUGINOUS HAWKS THAT OCCURS REGULARLY IN THE SITE VICINITY

General Description

<null>

Protection Comments

<null>

Management Comments

<null>

General Comments

AN ACTIVE PRAIRIE DOG ERADICATION PROGRAM IS ON-GOING WITH THE HOPE OF ELIMINATING THESE HAWK ATTRACTANTS

Texas Parks and Wildlife Department
Voluntary Recommendations for Wind Energy Development

February 2008

I. INTRODUCTION

The following Voluntary Recommendations for Wind Energy Development (herein referred to as Recommendations) were developed by Texas Parks and Wildlife Department and do not necessarily represent the opinions of the wind industry or non-governmental organizations.

The purpose of these recommendations is to establish best management practices (BMP) for development of wind energy in Texas, promote the continued responsible development of wind facilities across the state, and enable Texas to develop its wind resources in a manner that minimizes adverse impacts to wildlife, habitats and natural resources of Texas through proper pre-project risk assessment, good project design and operation, and effective adaptive management practices.

II. BACKGROUND

Texas became the number one state in the U.S. for installed wind energy capacity in 2006. Texas citizens and their elected officials strongly support the continued expansion of wind generation to supply an increasing portion of the State's electric generation portfolio for many reasons, including:

- wind energy is an inexhaustible natural resource, and greater utilization of wind energy promotes Texas energy independence, directly offsetting the need for mining of lignite coal in Texas and other types of coal elsewhere, and decreasing the need for transportation of such fossil fuels by rail and truck, thereby reducing harmful impacts on wildlife, the environment, and human health caused by such activities

- wind turbines, once constructed and operational, consume no fuel and have no air emissions, directly decreasing the emissions of mercury, CO2, NOX, SOX and other harmful emissions associated with combustion-generated power, which contribute to global warming and adversely impact all wildlife and humans

- wind turbines consume no water and emit no wastewater, helping conserve Texas' scarce water resources for wildlife and human consumption and preserving the purity of Texas groundwater and surface waters, to the benefit of Texas wildlife and humans

As the State adds new transmission infrastructure to support additional wind energy resources, the parties involved in developing these Recommendations recognize the importance of responsible development, construction, operation and eventual re-powering or potential decommissioning of wind projects.

These Recommendations are intended to ensure wildlife and habitats are protected throughout the project life by encouraging and facilitating continued responsible practices and promoting development of wind resources in a manner that minimizes adverse impacts on Texas wildlife.

III. RECOMMENDATIONS

Mitigation measures are recommended to occur in four general stages:

A. The first stage involves project siting and development, where mitigation should focus on avoiding and/or reducing potential adverse impacts of a site before the facility is constructed.
B. The second stage is construction where careful planning should avoid important habitat and reduce disturbance by conducting construction at appropriate times of year when practicable, and away from sensitive habitat areas.
C. The third stage is operations, where measures should be implemented to minimize ongoing impacts.
D. The fourth stage is the decommissioning stage at the end of the project's useful life, where restoration measures should be implemented to return the project area largely to its pre-construction state in accordance with landowner requests and contracts.

A. DEVELOPMENT PHASE BMP

1. Developers will collaborate early in the process with qualified expert consultants and relevant regulatory agencies to identify potential environmental concerns, such as the presence of Federal and State listed endangered and threatened species, wetlands, archeological and historical sites and similar issues, and to ensure compliance with all applicable laws and regulations, such as the Endangered Species Act, the Migratory Bird Treaty Act and all Texas laws governing the protection of threatened and endangered species. Developers will use qualified local expert consultants with specialized knowledge of local conditions when available and appropriate.

2. Developers or their consultants will contact TPWD Wildlife Habitat Assessment Program to gather information about habitat or the presence of sensitive species in a proposed project area.

3. Prior to construction, developers should contact TPWD to obtain a list of qualified experts with relevant expertise for specific project areas, if available. Information should be shared with such experts subject to signed confidentiality agreements.

4. Developers will, in collaboration with consultants and agencies, develop appropriate measures to assess the significance of such issues for a given project site, and appropriate means to minimize adverse impacts. Such assessments may include studies on archeological and cultural resources, navigable waterways and wetlands delineation, a Phase 1 environmental site assessment, and similar analysis appropriate for specific projects. For avian and other wildlife species, such assessment measures include pre-construction monitoring surveys, literature surveys, and may include raptor nest surveys, radar monitoring and similar approaches as appropriate for individual projects, and in consideration of the level of pre-existing development in the region.

5. Developers will collect appropriate and pertinent information suitable for identifying the risk of potential impacts of the project on wildlife and habitat. This information would include avian use surveys conducted for a minimum of a twelve month period that take into consideration factors associated with region and habitat and designed to capture species, occurrence and abundance during all four seasons of the year. These studies are to be conducted on representative areas of the site that are expected to include wind turbines, unless not necessary due to availability of sufficient studies which have already been completed for other projects or phases in the region. Information should be collected that considers the following issues as appropriate:

- Identify avian use of a project area by species;
- Understand potential impacts from construction and operation of the proposed site;
- Determine seasonal variation, if any; and
- Collect data to aid in the analysis of impacts such as topographic features and weather conditions.

6. In areas of significant identified raptor activity, a minimum of one raptor nest survey is recommended to be conducted during breeding season and up to within 1-mile of proposed wind turbines location when possible and where appropriate to determine the location and species of active nests potentially disturbed by construction activities, and to identify active and potentially active nest sites with the highest likelihood of impacts from the operation of the wind plant.

7. There is not a consensus on which methodology is effective in predicting bat impacts for pre-construction studies. Wind energy representatives commit to continue to work with bat organizations and scientists to implement methodologies to assess potential bat mortality at prospective wind project locations in sensitive areas. In areas of known bat concentrations or near sensitive bat habitat, information should be collected that considers the following issues as appropriate:

- Seasonal patterns of abundance and use of a prospective site by bats; and
- Roosting areas and daily movement patterns.

8. If existing information suggests the probable occurrence of state and/or federal threatened or endangered species or their habitat on the project site, focused surveys may be recommended by the project's consultants and/or relevant regulatory agencies during the appropriate season to determine the presence or likelihood of presence of the species. For listed species, US Fish & Wildlife Service survey protocols should be followed, if available.

9. Preconstruction assessments may use existing information from comparable projects in comparable habitats within the same region for the relevant issues of concern. Preconstruction assessments should be compared with post construction monitoring data to assess the effectiveness of the guidelines.

10. Turbines should be located in consideration of topographic features that serve to concentrate birds or wildlife at particular areas within the site if determined during pre-construction assessment, or mitigation should be provided that addresses significant impacts.

11. Use of disturbed lands, if feasible, should be considered for priority siting (i.e. developed, cultivated, or otherwise disturbed by road or other development) unless these areas exhibit high use by birds or other wildlife species that are likely to be adversely affected by wind projects.

B. CONSTRUCTION PHASE BMP

1. Use reputable construction contractors and subcontractors, and adhere to best practices in wind project construction.

2. During construction, avoid areas of high risk potential to birds, or other species of concern that are likely to be adversely affected

3. Use tubular towers and avoid creating perching spots on wind turbines.

4. Electrical collection systems between turbines should be buried when feasible and environmentally sound, and bird flight diverter markings used where appropriate when overhead collection lines are used.

5. Use raptor protection measures such as adequate conductor spacing, perch guards and insulated jumper wires.

6. Limit substation and other associated facility pads to as small an area as is practical.

7. Ensure appropriate replacement of topsoil to the surface post-construction and use of best practices to minimize erosion.

8. Locate linear facilities (such as collector cable routes, transmission line routes, or access roads) in or adjacent to existing disturbed corridors or in areas of low habitat value in order to minimize habitat fragmentation and degradation;

9. When feasible, use existing surface roads and align roads to limit habitat fragmentation and erosion;

10. Use pilot warning and obstruction avoidance lighting as recommended by the FAA;

11. Avoid permanently installed upward-firing lighting for substation and O&M building lighting, when possible.

12. Stormwater runoff management plans should be developed to comply with stormwater runoff management plan requirements and all other applicable laws and regulations relating to stormwater.

C. OPERATIONS PHASE BMP

1. Post vehicle speed limits to minimize avian and wildlife mortality.

2. Follow construction, reduction of project road rights-of-way to extent practical and consistent with safety needs and code requirements and the requests of the landowner.

3. Revegetate reclaimed project road rights-of-way with appropriate site-specific native species, unless otherwise directed by the landowner based on prior land use, and properly maintain such rights-of-way in accordance with recommendations of qualified environmental consultants.

4. Implement 12 months of post-construction carcass studies that account for searcher efficiency and scavenging. The duration and intensity of such studies will vary by region, project and various factors such as site sensitivity and pre construction determination of bird and wildlife density, and pre existing information from comparable projects in comparable habitats for the relevant species of concern.

D. DECOMMISSIONING PHASE BMP

1. Developers will commit, as addressed in the landowner agreements, to removal of turbines, towers and all above-ground equipment, and proper disposal of same, through recycling where possible.

2. Remove foundations to an appropriate depth, consistent with local conditions and land uses, and properly dispose of same through recycling where possible in accordance with landowner requests and agreements. To the extent possible, return the project site to its pre-construction condition through filling in foundation excavations, and reseeding with appropriate native species, unless otherwise directed by landowner.

3. Remediation of Recognized Environmental Conditions at the Project Site (*e.g.*, lubricant leaks, etc) caused by the wind facility or its operation.

E. PROSPECTIVE USE OF BMPs

Wind representatives and other stakeholders are cognizant of the fact that developers must place turbine orders and other long-lead equipment orders well in advance of the expected delivery dates for such equipment, and will have invested significant sums, time and effort in development of projects prior to adoption of these BMPs. Nothing herein is intended, nor should be construed, to suggest that projects already under development and with construction timelines dictated by equipment orders already placed, should be in any way delayed or impacted by wind representative's endorsement of these BMPs. It is expected that these BMPs will serve as a tool to help facilitate the continuation of responsible wind project development in Texas. Therefore, it is expected these BMPs to be effective for all projects that reach commercial operations date ("COD") after December 31, 2008.

Joseph Zambelli - TPWD Draft EA comments on the Texas Reese Technology Center Wind & Battery Integration Project

From:	Joseph Zambelli
To:	julie.wicker@tpwd.state.tx.us
Date:	3/5/2013 12:50 PM
Subject:	TPWD Draft EA comments on the Texas Reese Technology Center Wind & Battery Integration Project
CC:	Donald Geiling; mark.harral@groupnire.com; mholloway@electrictechnolog...
Attachments:	SPEC Ltr re TPWD Comments 03-04-2013.pdf; RTC TPWD wildlife protection recommendations response 03-05-2013.pdf

Hi Julie,

In response to your December 17, 2012, comments on the above noted subject, please see the attached information pertaining to wildlife protection recommendations that the Group NIRE and Center for Commercialization of Electric Technology plan to implement. Also attached is a support letter that goes along with their response to Recommendation #1.

Please let me know if these are acceptable. My plan is to incorporate these recommendations and responses into the Final Environmental Assessment.

Thanks for your assistance.

Sincerely,

Joe Zambelli

NEPA Document Manager

U.S. Department of Energy
National Energy Technology Laboratory
3610 Collins Ferry Road
P.O. Box 880
Morgantown, WV 26507-0880

Phone: 304.285.4913
Email: joseph.zambelli@netl.doe.gov

In response to the December 17, 2012, letter from Julie Wicker of the Texas Parks and Wildlife Department (TPWD) regarding wildlife protection recommendations, Group NIRE and Center for Commercialization of Electric Technology (CCET) plan to implement the following:

Recommendation 1: Power-line Protection Devices

Based on the planned design of the 12.5 kV overhead distribution line, Group NIRE, who has consulted with local utilities, believes the installation of line and pole diverters would create serious utility management problems and potential safety risks. Because the project site is located in a semi-arid, high-wind environment, line diverters would increase the likelihood of distribution line interruptions, create problematic turbine downtime, and increase the risk of fire during high-wind events. Additionally, because playa lakes that exist in the areas beneath the proposed distribution line rights-of-way only hold water for approximately 3-6 days a year, Group NIRE believes the potential for safety risks and utility management problems far outweighs the anticipated wildlife benefit. A letter from South Plains Electric Cooperative, dated March 4, 2013, reiterating our concerns, is attached.

Recommendation 2: Prairie Dog Concerns

Group NIRE working with the Reese Technology Center (RTC) currently has a year-round prairie dog relocation program employing a full-time wildlife manager that regularly moves prairie dogs to other parts of the RTC, as necessary. While Group NIRE and Texas Tech University has completed other federally funded projects that did not require prairie dog relocation, if prairie dog surveys indicate such within or near the projects areas, Group NIRE will avoid directly impacting the prairie dogs to the extent feasible during project siting and construction. However, if a direct impact appears likely, any prairie dogs found on-site would be relocated to another location prior to site cleaning and construction.

Recommendation 3: Western Burrowing Owls

Since the exact extent of prairie dog burrows throughout the project sites is not know, Group NIRE will follow a similar protocol it has used with other federally funded projects. Based on such, Group NIRE will initiate construction outside of the Western burrowing owls nesting period to avoid impact until their eggs have hatched and the young have fledged. The TPWD will need to provide the Group NIRE with information regarding the nesting period timeline.

Recommendation 4: Wind Energy Development Guidelines

Group NIRE has reviewed the provided TPWD Voluntary Recommendations and the U.S. Fish and Wildlife Service's Final Land-Based Wind Energy Guidelines and regularly follows these recommendations to the extent practicable. In fact, since commercial operation began in September 2010, the existing Alstom wind turbine generator has never had a bird or bat strike based on observations conducted by personnel from Group NIRE, Alstom, and Texas Tech University.

Recommendation 5: Post-Construction Monitoring

Group NIRE and Texas Tech University is preparing to start two years of post-construction bird and bat fatality monitoring at it its recently completed Sandia wind turbine and plans to initiate a similar program upon completion of the two proposed wind turbines. If monitoring results indicate that wildlife fatalities are above the national average, Group NIRE will consider modifying its operational plan to reduce future bird and bat fatalities to the extent practicable.

From: "Julie Wicker" <Julie.Wicker@tpwd.state.tx.us>
To: "Joseph Zambelli" <Joseph.Zambelli@NETL.DOE.GOV>
CC: <mholloway@electrictechnologycenter.com>, <mark.harral@groupnire.com>, "...
Date: 3/12/2013 5:04 PM
Subject: RE: TPWD Draft EA comments on the Texas Reese Technology Center Wind & Battery Integration Project
Attachments: burrowing_owls.pdf

Hi Mr. Zembelli,

TPWD received your response to comments and recommendations submitted to NREL in December of last year. The response states that TPWD recommendations regarding prairie dogs, western burrowing owls, state and federal wind energy development guidelines, and post construction monitoring would be implemented. Under Recommendation 3: Western Burrowing Owls, the response states "TPWD will need to provide the Group NIRE with information regarding the nesting period timeline." TPWD notes that the burrowing owl breeding season is generally March through September. Additional information about burrowing owls in the Texas panhandle is attached for your reference and can also be found in various bird field guides and internet sites.

In the December 2012 letter, TPWD recommended that distribution lines which cross or are located near playa lakes should have line markers installed to reduce potential bird mortality from collisions. The response and an associated letter from South Plains Electric Cooperative state that installation of line diverters tend to cause shorting between closely spaced conductors during high-wind conditions causing fires, distribution line interruptions, turbine downtime, and significant increases in service calls. The response also states that pole diverters pose safety concerns and unnecessary strain on management duties. Based on these concerns and the project proponent's determination that the playa wetlands in the area do not hold water for a sufficient duration every year to support heavy bird traffic, the response states that safety risks and utility management problems far outweigh the anticipated wildlife benefit and "neither line diverters nor pole diverters are desirable or needed."

TPWD notes that in 2005, the Avian Power Line Interaction Committee and the U.S. Fish and Wildlife Service (USFWS) announced their jointly developed Avian Protection Plan Guidelines <http://www.aplic.org/uploads/files/2634/APPguidelines_final-draft_Aprl2005.pdf> . An Avian Protection Plan (APP) is a voluntary, utility-specific plan for reducing the risks to birds and system reliability that result from avian interactions with electric utility facilities. An APP provides the framework necessary for implementing a program to reduce bird mortalities, document utility actions, improve service reliability, and comply with bird protection laws including the Migratory Bird Treaty Act (MBTA). These guidelines are intended to help utilities craft their own APPs for managing avian/power line issues that are particular to their location and operations. Also, the recently released Reducing Avian Collisions with Power Lines: The State of the Art in 2012 <http://www.eei.org/products/Pages/ReducingAvianCollisions.aspx> provides additional guidance as well as an overview of numerous line-marking devices available in the U.S. TPWD recommends the project

proponent use these resources to develop an APP for the project site that would not compromise safety or cause excessive management problems. It is the responsibility of the project proponent to ensure compliance with the MBTA as well as any applicable Memoranda of Understanding with the USFWS regarding implementation of Executive Order 13186.

Please let me know if you have any questions or if you need anything else!

Julie

Julie C. Wicker

Texas Parks and Wildlife Department

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From: Joseph Zambelli [mailto:Joseph.Zambelli@NETL.DOE.GOV]
Sent: Tuesday, March 05, 2013 11:50 AM
To: Julie Wicker
Cc: mholloway@electrictechnologycenter.com; mark.harral@groupnire.com; Donald Geiling
Subject: TPWD Draft EA comments on the Texas Reese Technology Center Wind & Battery Integration Project

Hi Julie,

In response to your December 17, 2012, comments on the above noted subject, please see the attached information pertaining to wildlife protection recommendations that the Group NIRE and Center for Commercialization of Electric Technology plan to implement. Also

attached is a support letter that goes along with their response to Recommendation #1.

Please let me know if these are acceptable. My plan is to incorporate these recommendations and responses into the Final Environmental Assessment.

Thanks for your assistance.

Sincerely,

Joe Zambelli

NEPA Document Manager

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APPENDIX C

ENVIRONMENTAL SYNOPSIS OF SMART GRID DEMONSTRATIONS PROGRAM AREA OF INTEREST ONE – SMART GRID

Environmental Synopsis of

Smart Grid Demonstrations Program
Area of Interest One – Smart Grid

Funding Opportunity Announcement
DE-FOA-0000036

Prepared for

U.S. Department of Energy
National Energy Technology Laboratory
Morgantown, West Virginia

October 2009

Prepared by
Jason Associates Corporation
San Diego, California

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1. INTRODUCTION AND BACKGROUND

With funds made available by the *American Recovery and Reinvestment Act of 2009*, the U.S. Department of Energy (DOE or the Department) Office of Electricity Delivery and Energy Reliability issued a competitive Funding Opportunity Announcement (FOA) (DE-FOA-0000036), *Recovery Act – Smart Grid Demonstrations* (DOE 2009). Smart grid projects funded under the FOA would include regionally unique demonstrations to verify smart grid technology viability, quantify smart grid costs and benefits, and validate new smart grid business models, all at a scale that can be readily adapted and replicated around the country. These projects would demonstrate technologies that are widely available for use in the United States.

The goal of the FOA is to demonstrate technologies in regions across the states, districts, and U.S. territories that embody essential and salient characteristics of each region and present a suite of use cases for national implementation and replication. From these use cases, the goal is to collect and provide information necessary for customers, distributors, and generators to change their behavior in a way that reduces system demands and costs, increases energy efficiency, optimally allocates and matches demand and resources to meet that demand, and increases the reliability of the grid. The social benefits of a smart grid are reduced emissions, lower costs, increased reliability, and greater security and flexibility to accommodate new energy technologies, including renewable, intermittent, and distributed sources.

To reap the full benefits of smart grid technologies, advancements in grid-scale energy storage are also needed. Electric grid operators can utilize electricity storage devices to manage the amount of power required to supply customers at times when the need is greatest, which is during peak load. Electricity storage devices can also help make renewable energy resources, whose power output cannot be controlled by grid operators, more manageable. They can also balance microgrids to achieve a good match between generation and load. Storage devices can provide frequency regulation to maintain the balance between the network's load and power generated, increase asset utilization of both renewables and electric systems, defer technology and development investments, and achieve a more reliable power supply for high-tech industrial facilities.

Projects to demonstrate energy storage technologies include battery storage for utility load shifting, wind farm diurnal operations, ramping control, frequency regulation services, distributed energy storage, compressed air energy storage, and demonstration of promising energy storage technologies.

The FOA included two program Areas of Interest (AOIs): (1) Smart Grid and (2) Energy Storage. This environmental synopsis addresses AOI-1; a separate synopsis has been prepared to address AOI-2.

The objective of the FOA under AOI-1 is to support regionally unique demonstration projects to quantify smart grid costs, benefits, and cost-effectiveness; verify smart grid technology viability;

and validate new smart grid business models at a scale that can be readily adapted and replicated around the country. Smart grid technologies of interest include advanced digital technologies for use in planning and operations of the electric power system and the electricity markets such as microprocessor-based measurement and control, communications, computing, and information. These demonstration projects directly support the Smart Grid Regional Demonstration Initiative, as described under Section 1304 (b) (2) (A) – (E) of the *Energy Independence and Security Act of 2007*, which aims to provide regional solutions and best practices in implementing smart grid technologies.

As a federal agency, DOE must comply with the *National Environmental Policy Act of 1969* (NEPA) (42 USC 4321 et seq.) by considering potential environmental issues associated with its actions prior to undertaking the actions. The NEPA environmental review of projects evaluated under the Smart Grid Demonstrations FOA will be prepared pursuant to Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500 – 1508), and the Department's NEPA implementing procedures (10 CFR Part 1021), which provide directions specific to procurement actions that DOE may undertake or fund before completing the NEPA process. Per these regulations, DOE has prepared an environmental critique and this environmental synopsis to support the procurement selection process.

The environmental critique prepared for AOI-1 evaluated seven proposals submitted for the Smart Grid Demonstrations AOI-1. The critique was developed to meet DOE NEPA implementing procedures and, specifically, to meet the requirements in those procedures for environmental critiques of procurements, financial assistance, and joint ventures [10 CFR 1021.216(f) and (g)].

Only those proposals for which an environmental assessment or environmental impact statement could be required were evaluated. The critique did not address proposals submitted for the FOA that could be categorically excluded in accordance with Subpart D of 10 CFR Part 1021.

The environmental critique provided an evaluation and comparison of potential environmental impacts for each proposal deemed to be within the competitive range. DOE used the critique to evaluate appreciable differences in the potential environmental impacts from those proposals. As delineated in 10 CFR 1021.216(g), the environmental critique focused on environmental issues pertinent to a decision among the proposals and included a brief discussion of the purpose of the procurement and each proposed project, a discussion of the salient characteristics of each project, and a brief comparative evaluation of the environmental impacts of the projects. The critique represents one aspect of the formal process used to select among applicants for funding under the Smart Grid Demonstration AOI-1 FOA. As such, it is a procurement-sensitive document and subject to all associated restrictions.

This document is the environmental synopsis, which is a publicly available document corresponding to the environmental critique. The environmental synopsis documents the evaluation of potential environmental impacts associated with the proposals in the competitive

range and does not contain procurement-sensitive information. The specific requirements for an environmental synopsis delineated in 10 CFR 1021.216(h) are as follows:

> *(h) DOE shall prepare a publicly available environmental synopsis, based on the environmental critique, to document the consideration given to environmental factors and to record that the relevant environmental consequences of reasonable alternatives have been evaluated in the selection process. The synopsis will not contain business, confidential, trade secret or other information that DOE otherwise would not disclose pursuant to 18 U.S.C. 1905, the confidentiality requirements of the competitive procurement process, 5 U.S.C. 552(b) and 41 U.S.C. 423. To assure compliance with this requirement, the synopsis will not contain data or other information that may in any way reveal the identity of offerors. After a selection has been made, the environmental synopsis shall be filed with EPA, shall be made publicly available, and shall be incorporated in any NEPA document prepared under paragraph (i) of this section.*

To address the above requirements, this environmental synopsis includes: (1) a brief description of background information related to the Smart Grid Demonstration AOI-1, (2) a general description of the proposals received in response to the FOA and deemed to be within the competitive range, (3) a summary of the assessment approach used in the environmental critique to evaluate the potential environmental impacts associated with the proposals, and (4) a summary of the environmental impacts presented in the critique, focusing on potential differences among the proposals. Because of confidentiality concerns, the proposals and environmental impacts are discussed in general terms.

2. DESCRIPTION OF APPLICATIONS

The environmental critique evaluated seven proposals under AOI-1. Three of these projects are subprojects of the same application; thus, the environmental critique evaluated projects associated with five applications.

The projects evaluated are large- and small-scale smart grid demonstration projects, most of which include one or more of the following activities:

- Installation of new distributed energy sources such as generators, solar photovoltaic (PV) panels, or wind turbines, and/or installation of energy storage systems;
- Construction of new pipelines, transmission lines, or fiber-optics systems; and
- Other construction of infrastructure required for the development of smart grid technology.

The following are brief descriptions of the characteristics of each of the seven projects evaluated. The aspects of the projects that could result in environmental impacts, and that were considered

in the Environmental Critique, are briefly described. All procurement sensitive information has been removed from the descriptions. Most projects include other activities that would result in minor or no impacts on the environment (for example, installation of meters, switches, and other equipment on existing electrical distribution systems); such activities are not described.

1. Project 1 – Subproject A

Period: 5 years
Location: Washington

The applicant proposes to manage the implementation of a large-scale smart grid demonstration project to be conducted at 15 distribution sites operated by 12 utilities across five states. As part of Subproject A, the applicant would demonstrate a full range of demand response measures for all or a portion of two separate microgrids. New diesel-powered generators would be installed to produce 1.6 megawatts of new generator capacity. These generators would result in additional air emissions and would require new or modified air quality permits.

2. Project 1 – Subproject B

Period: 5 years
Location: Washington

As part of Subproject B, the applicant would expand its installed capacity of solar and wind generation at a renewable energy park located within a recreational park, which would provide valuable information on different solar and wind technologies. Construction of this project would include installation of up to 85 kilowatts of solar panels and up to 70 kilowatts of small wind systems, with associated underground wiring and communication lines.

3. Project 1 – Subproject C

Period: 5 years
Location: Idaho

As part of Subproject C, the applicant would automate voltage reduction and integrated voltage/VAR response, reduce outage duration and extend distribution automation, and use demand response to improve customers' load shape. These improvements would be conducted at schools, residences, businesses, and on the existing electric distribution system. The applicant would also conduct a project focused on reliability. For this project, the applicant would extend its 161-kilovolt system and fiber optic network by 18 miles and deploy a 1- to 2-megawatt battery energy storage system.

4. Project 2

Period: 5 years

Location: Hawaii

This project would demonstrate a smart grid integrated with three pilot microgrids deployed at three communities. This project would involve approximately 750 homes, 539 of which are to be constructed and the remainder of which would be retrofitted. Smart appliances, home energy managers, roof-mounted solar PV panels, and communications equipment would be installed at the residences. A community area network would be installed, at least in part, at existing substations. To implement this project, the applicant would deploy community battery storage systems and small community wind systems; erect three or more repeater stations, each with a 50- to 75-foot antenna; and modify the foundation and fence line of a substation.

5. Project 3

Time Period: 5 years
Location: Mississippi

This project would develop, demonstrate, and evaluate a fully integrated, utility owned, production-grade smart grid power interface system for integrating intermittent renewable resources, different energy storage technologies, and electric vehicle fast charging. For this project, the applicant would manufacture three power interface systems at existing facilities, resulting in emissions of regulated air pollutants.

6. Project 4

Period: 4 years
Location: Minnesota

This project would be implemented to develop and demonstrate technologies to manage a campus microgrid with renewable energy. The project consists primarily of three activities: construction of two 1.65-megawatt wind turbines, utilization of biomass from the local agricultural industry for gasification, and construction of a 10,000-square foot experimental facility to convert electrical energy to hydrogen. This hydrogen would be converted back to energy after storage or would be used to produce anhydrous ammonia, a fertilizer. These projects would require the delivery of 7,500 tons of biomass annually and would produce about 300 tons of ash per year.

7. Project 5

Period: 5 years
Location: Maryland

This project would be part of a large-scale demonstration of smart grid technologies. The applicant would demonstrate technologies to reduce line losses and power consumption by loads, increasing performance and efficiency of transmission and delivery systems. This would be

accomplished through optimization of voltage/VAR management and enhanced power flow control via optimized network configuration. As part of this project, a 2-acre solar farm would be constructed, and three residential solar/battery facilities would be deployed.

3. ASSESSMENT APPROACH

Each of the applicants that provided a proposal in response to the Smart Grid Demonstrations FOA was required to submit an environmental questionnaire. The questionnaires included detailed information on the project including the following:

- Project Summary and objectives
- Work locations
- Materials used and produced (e.g., water, electricity, wastewater, air emissions)
- Proposed alternatives
- Land use changes
- Proximity to local, state, or national parks, forests, monuments, scenic waterways, wilderness, recreation facilities, or Tribal lands
- Potential impacts of construction activities
- Potential impacts to surface waters , floodplains, or wetlands
- Potential impacts to any vegetation and wildlife resources
- Changes to could result in socioeconomic or infrastructure conditions
- Potential impacts to historic or cultural resources
- Attainment status for the air quality conditions for the immediate project area
- Potential air emissions from the proposed project
- Potential amounts of solid and hazardous wastes produced
- Unique health and safety factors associated with the project
- Any required permitting or other regulatory compliance activities
- Potential for public controversy

For each project considered in the environmental critique, the potential direct and indirect effects, short-term and long-term effects, and unavoidable adverse effects were identified for 20 resource areas. These resource areas are included as the first 20 entries in Table 1 in Section 4. The critique also includes a summary of project activities, mitigation measures proposed by the applicant, areas where important environmental information is incomplete and unavailable, unresolved environmental issues, and practicable mitigation measures. Also included is a list of federal, tribal, state, and local government permits, licenses, and approvals identified by the applicants or known to be required for each project.

4. SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

This section provides a summary of the potential impacts for each project. Table 1 identifies the resource areas that could be adversely or beneficially impacted for each of the seven projects. For each project, the potential direct and indirect, short-term and long-term, and unavoidable impacts were identified and classified into one of the following four color-coded categories:

- No impacts to a resource area are expected – blank
- Potential for minor adverse or beneficial impacts or unknown impacts of possible minor concern – black text or dot, no shading
- Potential for moderate adverse impacts or unknown impacts of possible moderate concern – light shading
- Potential for major adverse impacts or unknown impacts of possible major concern – darker shading

As summarized in Table 1, most projects have the potential to affect only a few aspects of the environment. Because of the nature of the projects (for example, wind towers and solar PV panels), many of the projects would have minor or moderate impacts on visual resources and land uses. Some of the projects would also have minor or moderate impacts on cultural and biological resources, and some would have short-term noise impacts during construction and minor health and safety risks during operations. Most or all of the projects would have minor beneficial impacts on socioeconomic conditions and utility operations.

Two of the projects could have moderate adverse impacts. Some of these impacts were classified as potentially moderate because of uncertainties about the projects, such as the lack of information (for example, location and design) about the facilities. The classification of these impacts may eventually be downgraded as the design of projects mature and more information becomes available.

- Project 1 – Subproject C

  An 18-mile extension of a transmission line and fiber optics system could result in moderate impacts to visual and biological resources and to land uses adjacent to the power line. In addition, the applicant noted the possibility of public controversy from construction of the power line and, thus, is planning for a public outreach program to address this controversy.

- Project 4

  Operation of a biomass gasification facility at the proposed location could cause minor to moderate impacts to air quality from combustion of biomass. This project would produce up to 350 tons of ash per year. If this ash is not used as a soil amendment, disposal in local

landfills could have moderate impacts on the operating lifespan of those landfills. The impacts of transporting biomass and ash to and from the facility are uncertain but could be moderate, as the project could result in localized traffic congestion.

None of the projects analyzed in the environmental critique were identified as having the potential for major adverse impacts, unknowns, or uncertainties that would result in major potential impacts to the environment.

Table 1. Summary of Potential Impacts of Smart Grid Demonstration Projects – Area of Interest 1

Resource Areas	1A	1B	1C	2	3	4	5
Aesthetics		●	●	●	●	●	●
Air Quality	●	●	●		●	●	●
Biological Resources		●	●				●
Climate							
Community Services							
Cultural Resources			●			●	
Environmental Justice							
Floodplains			●				
Geology							
Groundwater						●	
Human Health and Safety		●	●				●
Land use		●	●	●		●	●
Noise	●	●	●			●	●
Wastes and Materials						●	●
Soils		●	●			●	●
Socioeconomics	●		●	●	●	●	●
Surface Water			●			●	●
Transportation/Traffic						●	●
Utilities	●	●	●	●	●	●	●
Wetlands			●				
Public Controversy	●		●				
Permits	●		●	●		●	●
Mitigation	●	●	●	●	●	●	

(Blank) No impacts expected.

● Potential to be minor adverse or beneficial impacts or there are unknowns of possible minor concern.

● Potential to be moderate adverse impacts or there are unknowns of possible moderate concerns.

● Potential to be major adverse impacts or there are unknowns of possible major concerns.

5. REFERENCES

DOE 2009 U.S. Department of Energy, National Energy Technology Laboratory, *Recovery Act – Smart Grid Demonstrations, Funding Opportunity Number: DE-FOA-0000036*, June 25, 2009.