DOE/EA-1750D

DRAFT
ENVIRONMENTAL ASSESSMENT

FOR THE

SMART GRID, CENTER FOR COMMERCIALIZATION OF ELECTRIC TECHNOLOGY (CCET), TECHNOLOGY SOLUTIONS FOR WIND INTEGRATION IN ERCOT, HOUSTON, TEXAS

U.S. Department of Energy
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ACRONYMS AND ABBREVIATIONS

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
EPA	U.S. Environmental Protection Agency
ERCOT	Electric Reliability Council of Texas
NEPA	National Environmental Policy Act, as amended
NOx	nitrogen oxides
PHEV	plug-in hybrid electric vehicle
PV	photovoltaic
Recovery Act	American Recovery and Reinvestment Act of 2009
U.S.C.	United States Code
USGS	United States Geological Survey
VOC	volatile organic compound

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.

COVER SHEET

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

Title: *Draft Environmental Assessment for the Smart Grid, Center for Commercialization of Electric Technology (CCET), Technology Solutions for Wind Integration in ERCOT, Houston, Texas* (DOE/EA-1750D)

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Abstract: DOE prepared this draft 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 facilitate the development and demonstration of a multi-faceted, synergistic approach to managing fluctuations in wind power within the Electric Reliability Council of Texas transmission grid. This draft 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 draft EA, DOE evaluated potential environmental consequences from a portion of the overall project that would involve land disturbance. Other portions are described as significant 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, and biological resources. 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 a 500-kilowatt solar farm with an array of solar panels, a 250-kilowatt storage battery, and other green technologies. Operation of the solar farm would not result in any increase in noise in the vicinity. The aesthetics of the Discovery at Spring Trails community would change with the addition of the solar photovoltaic panels, which would be housed on rows of metal framework designed to allow the panels to be sloped toward the south for optimal exposure to the sun. The

top edge of the modules would be 10 to 11 feet above the ground and the bottom edge would be about 2 feet above the ground.

Developing 4 acres for the solar farm on the Discovery at Spring Trails 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 red-cockaded woodpecker, which is an endangered species under the federal *Endangered Species Act*, occurs in Montgomery County. However, forest habitat in the project vicinity is second growth due to past development of the area, and it is unlikely that this species would occur there.

Availability: The draft EA is available on DOE's National Energy Technology Laboratory web site (http://www.netl.doe.gov/publications/others/nepa/ea.html) and at the following public library:

Montgomery County Memorial Library
South Regional Library
2101 Lake Robbins Drive
The Woodlands, TX 77380

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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). This agreement would facilitate development and demonstration of a multi-faceted, synergistic approach to managing fluctuations in wind power within the Electric Reliability Council of Texas (ERCOT) transmission grid. DOE's proposed action would award a $13.5 million financial assistance grant to CCET to facilitate (1) the purchase, installation, and demonstration of the Texas Future Community (Discovery at Spring Trails) and (2) the installation of monitoring equipment in 13 existing or proposed electrical substations within the regional transmission system, including installation of microwave radio towers at three of the sites. The estimated total cost of the project is $27.4 million. CCET would purchase and install a solar panel array, a storage battery and pad, a supervisory control and data acquisition, or SCADA, system, electronic equipment in select homes, monitoring equipment for 13 substations, and three microwave radio towers.

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 a 500-kilowatt solar farm with an array of solar panels, a 250-kilowatt storage battery, and other green technologies. Operation of the solar farm and storage battery 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. Although a significant component of the overall project, the ERCOT transmission grid monitoring system was not evaluated for specific environmental impacts in this environmental assessment because of the negligible effects of installing equipment in existing electrical substations.

The proposed project is in Montgomery County, Texas, which is a nonattainment area for 8-hour ozone. The Texas State Implementation Plan for the Houston-Galveston-Brazoria area, which includes Montgomery County, addresses the measures required to achieve attainment for this criteria by June 2019. The proposed project would involve air emissions during construction. Once completed, the proposed project would produce a quantity of electricity via solar 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 the attainment goals for air quality of the area.

The solar photovoltaic arrays would not generate noise. Any associated noise from operation of a 250-kilowatt storage battery would be similar to, or less than, that produced by the adjacent water treatment facility, which is about 35 to 45 A-weighted decibels, comparable to a whispered conversation in a library.

The aesthetics of the Discovery at Spring Trails community would change with the addition of the solar photovoltaic panels, which would be housed on rows of metal framework designed to allow the panels to be sloped toward the south for optimal exposure to the sun. The top edge of the modules would be 10 to 11 feet above the ground and the bottom edge would be about 2 feet above the ground. Mitigation for visual impacts could involve peripheral landscaping to the adjoining area.

Developing 4 acres for the solar farm on the Discovery at Spring Trails 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 red-cockaded woodpecker, which is an endangered species protected under the federal *Endangered Species Act*, occurs in Montgomery County. However, forest habitat in the project vicinity is second growth due to past development activities in the area, and the potential occurrence of the red-cockaded woodpecker is low in this type of habitat.

Operation of the solar farm 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.

According to the National Wetland Inventory, there are wetlands labeled “freshwater emergent” adjacent to the project site. However, these wetlands do not extend into the location of the solar arrays, battery storage, and PHEV station and, as a result, the project would not affect any wetlands, nor would any Section 404 permitting be required.

Under the No-Action Alternative, DOE would not provide funding to CCET and the solar array and storage battery would not be installed or operated, nor would the ERCOT grid monitoring system be installed. 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 facilitate the purchase and installation of monitoring equipment for the regional electrical transmission system (grid), the solar panel array, the storage battery, plug-in hybrid electric vehicle (PHEV) station, and electronics for select homes. CCET's proposed project is to develop and demonstrate a multi-faceted, synergistic approach to managing fluctuations in wind power within the Electric Reliability Council of Texas (ERCOT) transmission grid. The proposed project consists of one component to demonstrate the use of synchophasor technology to better determine grid operating status and margins when moving remote wind resources through the ERCOT transmission grid to consumers. A second component would demonstrate the use of advanced technology in a smart grid community termed the Texas Future Community that combines household and community battery storage with an innovative demand response program and will be integrated into a planned community (Discovery at Spring Trails), already in the early stages of construction, located about 25 miles north of downtown Houston, Texas.

New construction would involve a 500-kilowatt solar farm with an array of solar panels, a 250-kilowatt storage battery, and other green technologies. The disturbed area would also contain a parking lot. Other activities within the Texas Future Community would include software and devices installed inside homes and in the case of 10 homes, additional 2-kilowatt rooftop solar panels. Also, power measurement instruments would be placed by CenterPoint Energy (the local electric distribution company) on its power line and/or within its existing right of way. (Construction of the planned community, utilities, and other infrastructure considerations are not identified as being part of this action, as they are already planned and ongoing efforts.)

DOE prepared this draft 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 draft 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 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 purchase and installation of electrical system monitoring equipment for the regional electrical grid and the solar panel array, the storage battery, the SCADA system, and electronic equipment for specific homes at the CCET Texas Future Community.

This draft 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 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. Even though the CCET proposal underwent the evaluation described above and the same information was generated, it is not specifically included in the appended synopsis because it was initially deemed to require only a Categorical Exclusion. DOE subsequently reconsidered its determination of the appropriate level of NEPA review and included the CCET proposal in the group of projects that would need either an EA or an EIS

On November 24, 2009, DOE announced its selections 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, development and demonstration of a smart grid community and regional-scale monitoring system, was one of the 16 projects DOE selected for funding under Area of Interest 1. DOE's proposed action would provide $13.5 million in financial assistance under a cost-sharing arrangement with CCET. The total cost of the project is estimated at $27.4 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 DE-FOA-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

A significant portion of CCET's proposed project would involve installation of monitoring equipment within existing substations in the electrical distribution grid of Texas. At three of the substations, short (estimated at 30 feet in height) microwave radio towers would also be installed to support transmission of data from the new monitoring equipment. These three towers would be located in Ector County, near Odessa; Howard County near Big Spring; and Scurry County near Sweetwater. These actions would involve no additional land disturbance, no noise, and no air emissions, and, with the possible exception of the new towers, would be expected to have no noticeable effect on the appearance or operation of the substations. In the preliminary environmental impact analysis DOE performed (and leading to the environmental synopsis described in Section 1.2), these actions, by themselves, were determined to be consistent with classes of actions that DOE has determined, per 10 CFR Part 1021, do not individually or cumulatively have a significant effect on the human environment and, therefore qualify for categorical exclusion (CX) from further NEPA evaluation. Specifically, the substation monitoring equipment portion of the CCET project was determined to fit into the following classes of action from Appendix B of 10 CFR Part 1021 that normally do not require EAs or environmental impact statements: (1) B1.19 – *Siting/construction/operation of microwave/radio communication towers* and (2) B4.11 – *Construction or modification of electric power substations*. As a matter of full disclosure and in order to present the full intent of the project, this EA describes all actions to be performed; however, because of their negligible effects, provides no further detail on the potential environmental impacts associated with the monitoring equipment that would be installed at existing substations.

With regard to the "Texas Future Community" elements of CCET's proposed project, Chapter 3 of this draft 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
- Water resources – surface water

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 solar panel array and battery would be located in an area already designated for residential development. DOE assumes the developers of Discovery at Spring Trails have obtained all necessary permits and approvals for the development, and the solar array and storage battery would require no additional approvals related to land use. If the array and battery were not built, plans developed by Discovery at Spring Trails show the 4-acre land area being used for additional residential lots.

- Geology and soils. The subject property rests on the Beaumont Formation, which consists of mostly sand, silt, and clay. These soils have shown moderate permeability and drainage, low to moderate compressibility and shrink-swell potential. 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 Houston is consistently shown as being in one of the lowest categories for earthquake hazards in the nation. Recent records indicate no seismic activity in Montgomery County (USGS 2008b).

- 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. The minor amount of water that would be used for dust suppression during construction would come from the water source already established for the Discovery at Spring Trails development.

- Cultural resources. Installation of the solar panel array at the Texas Future Community would not directly impact cultural resources or historic properties. There are no known sites listed on the National Register of Historic Places within 1 mile of the project site (NPS 2010; Goby 2010; TX Hometown Locator 2010); however, upon further

coordination with the Texas Historical Commission, final results and finding will be included in the final EA.

DOE has requested consultation with the Texas State Historic Preservation Officer and the Alabama-Coushatta Tribe of Texas regarding places of cultural and/or historical significance in the area. Responses to these letters have not been received. DOE's letters are included in Appendix B of this EA.

- Environmental justice. Executive Order 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 members of the nearby community; therefore, DOE feels there would be no adverse and disproportional impacts to minority or low-income populations.

- Socioeconomics. The project would not change socioeconomic factors such as employment, housing, or income in the surrounding area. The project would not place a demand on municipal services such as police and fire departments, hospitals, or schools. A small beneficial increase in employment during construction of the solar farm could be realized, and there would be minor economic benefit to the areas where the equipment would be manufactured.

- Occupational health and safety. There would be no unique risks to occupational health and safety during installation and operation of the solar panel array and storage battery. Minor electrical safety concerns would be present, but CCET foresees no special hazards or risks. Occupational health and safety requirements would be similar to those for other small construction and renewable energy projects.

- Transportation and traffic. There would be short-term increased traffic during construction. However, since the entire development is under construction and traffic would be mostly related to that activity, the increase would not disrupt conditions in the vicinity of the solar farm. Once complete, traffic could increase because of public interest in the Texas Future Program. Current plans are to include a visitor kiosk and parking area to accommodate such visitors, and impacts to residents should be minor to none.

- Utilities, energy, and materials. Production of 500 kilowatts 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 Spring, Texas, area. There are no unique materials required to manufacture, install, or operate the solar panel array or storage battery.

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

2. DOE PROPOSED ACTION AND ALTERNATIVES

This chapter describes DOE's proposed action (Section 2.1), CCET's proposed project (Section 2.2), the bases 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 $13.5 of financial assistance, under a cooperative agreement, to CCET through the Recovery Act to facilitate CCET's proposed project in Spring, Texas, and at 13 different electrical substations throughout Texas. The total cost of the project is estimated to be $27.4 million.

2.2 CCET's Proposed Project

CCET is a consortium of 21 Texas electric and high-tech companies and five universities with a goal to modernize the Texas electric system (CCET 2010). The CCET proposed project would demonstrate a multi-faceted approach for managing fluctuations in renewable energy sources, primarily wind power, in the electrical transmission grid.

In 2008, Texas wind power generating capacity was at 8,500 megawatts, which represented roughly 8 percent of the state's generating capacity (DOE 2010), and by 2020 it is expected that wind capacity will increase by an additional 10,000 megawatts (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 equipment within the regional transmission grid to better monitor operating status and margins, and (2) use of advanced integrated technology in a smart grid community, the Texas Future Community. These two project components are addressed further in the sections that follow.

A third component to managing fluctuating energy sources as envisioned by CCET is the Smart Meter Texas Portal. This Portal will eventually provide electrical transmission system operators with the capacity to shed large-scale blocks of electrical demand by linking to hundreds of thousands of participants with demand response capabilities or capacity. Thus reductions in wind power generation could trigger reductions in electrical demand on the grid by triggering a reaction in the way electricity is used by customers throughout the system. Reduction in customer demand would range from large industrial facilities that already respond to electricity price signals to individual residences with home area network devices integrated into components such as home battery systems, PV systems, and demand response appliances. The Smart Meter Texas Portal is being developed outside the current project (that is, it is not included in the project being proposed for DOE grant) and will not be described further.

2.2.1 MONITORING EQUIPMENT IN THE REGIONAL TRANSMISSION GRID

This regional portion of the CCET project would improve management of fluctuations in wind power within the Electric Reliability Council of Texas (ERCOT) transmission grid by providing operators with improved monitoring tools. Monitoring devices installed in the system would take rapid measurements of the voltage, current, and frequency of the electricity at a specific location and time in the grid and convert each data point into a phase vector or "phasor" representation. These measurements can be tagged with a time, likely using Global Positioning System time, so they are identified with a precise location and time when they are transmitted to a data processing center. The monitoring devices are called phasor measurement units and when the data are time-synchronized they are referred to as synchrophasors. The phasor measurement units typically sample at speeds of 30 observations per second and are connected to transmitters that continuously send the data to processing centers. At the processing centers, computers evaluate synchrophasers from around the system, matched by their timestamps, to provide a real-time and evolving status of the transmission system. The data can be interpreted to show where demands are highest, where the system is being stressed, and what adjustments are necessary to accommodate fluctuations in power sources or unexpected transmission line outages. Overall, this technology supports a more reliable and stable transmission grid.

As suggested by the technology description, this portion of CCET's proposed project would be limited to the installation of equipment at strategic locations within the existing transmission system of Texas. Specifically, this would be done by putting new equipment in 11 existing substations and at two proposed substations currently undergoing construction approval by the Public Utility Commission of Texas. These substations are (or will be) built-up areas where the new equipment would be indistinguishable from existing equipment. That is, possibly with the exception of three of the substations where new microwave towers would be required for the new transmitters. The new towers would be installed within the substation, but they potentially would represent a component with a slightly different appearance than the existing equipment. Substation locations (all within the Oncor Electric Delivery Company's transmission system) where it is expected that new microwave towers would be needed, each with a height of about 30 feet, are identified as follows:

- Odessa Station – in Ector County, near Odessa.
- Longshore Station – in Howard County (along southern border), near Forsan.
- Tonkawa Station – in Scurry County (near the southeast corner), southeast of Hermleigh.

2.2.2 THE TEXAS FUTURE COMMUNITY

The objectives of the Texas Future Community component of the CCET project are to demonstrate how demand response programs, coupled with energy efficient building shells, solar PV systems, and nocturnal PHEV charging and battery storage can reshape demand loads and increase energy efficiency. The CCET project proposes to use the Discovery at Spring Trails master planned community to demonstrate the smart grid community component of its overall approach to managing fluctuations in the electrical transmission grid. This housing community,

being developed by Land Tejas Companies, is located approximately 25 miles north of downtown Houston, in Montgomery County, Texas (Figures 2-1 and 2-2). Ultimately, it will be the location of up to about 3,000 new homes. The surrounding area is being developed primarily as residential, but with some light commercial activities (for example, offices).

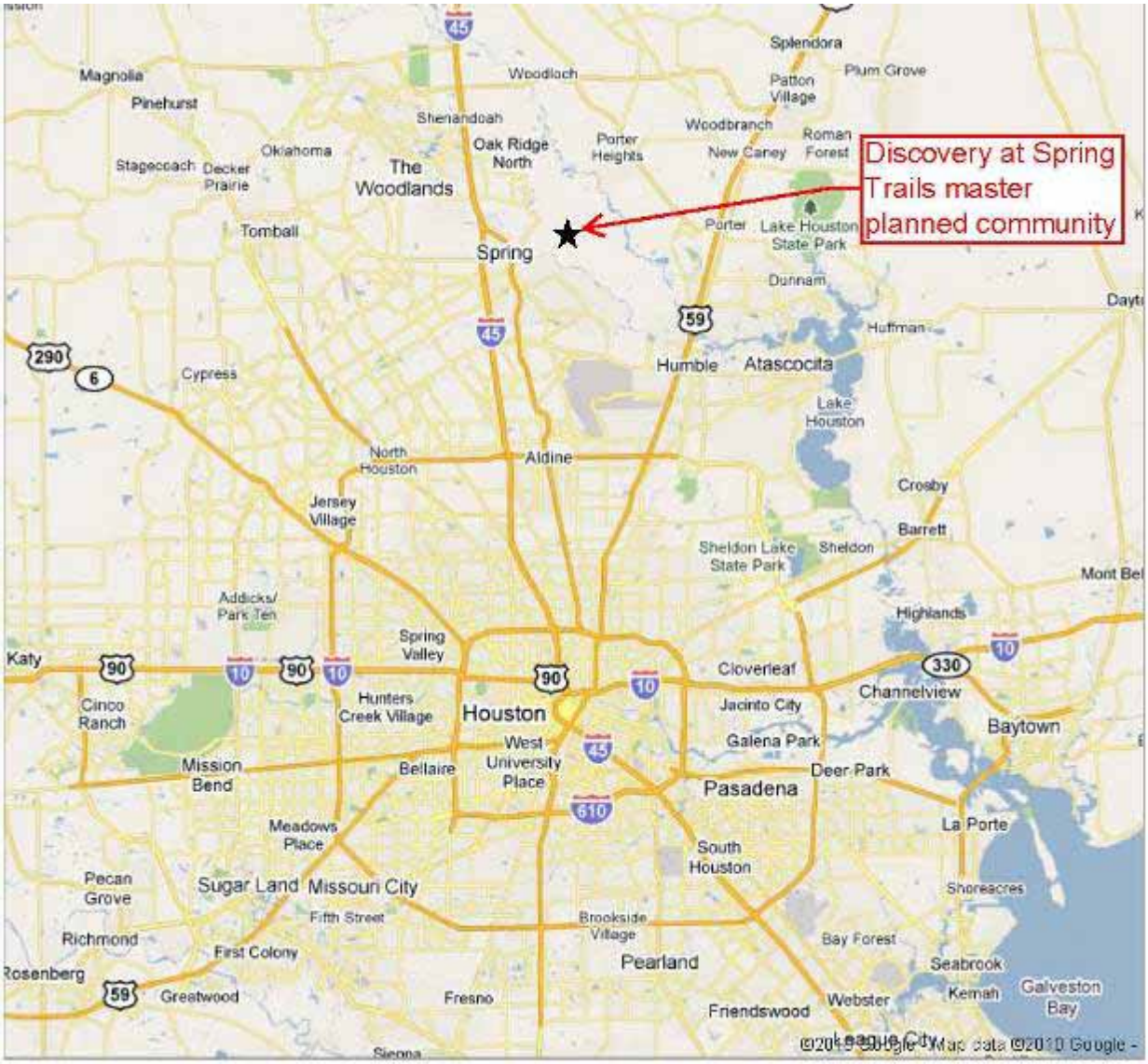

Figure 2-1. Regional map showing approximate location of the Discovery at Spring Trails community in relation to Houston.

The Discovery at Spring Trails community is being promoted as "Houston's first solar-powered hybrid community" with "green homes" having high performance, extremely efficient building envelope and lighting packages, a minimum of 1 kilowatt of solar PV rooftop (or trellis) panels, and a General Electric home energy dashboard and smart thermostat. Under the proposed

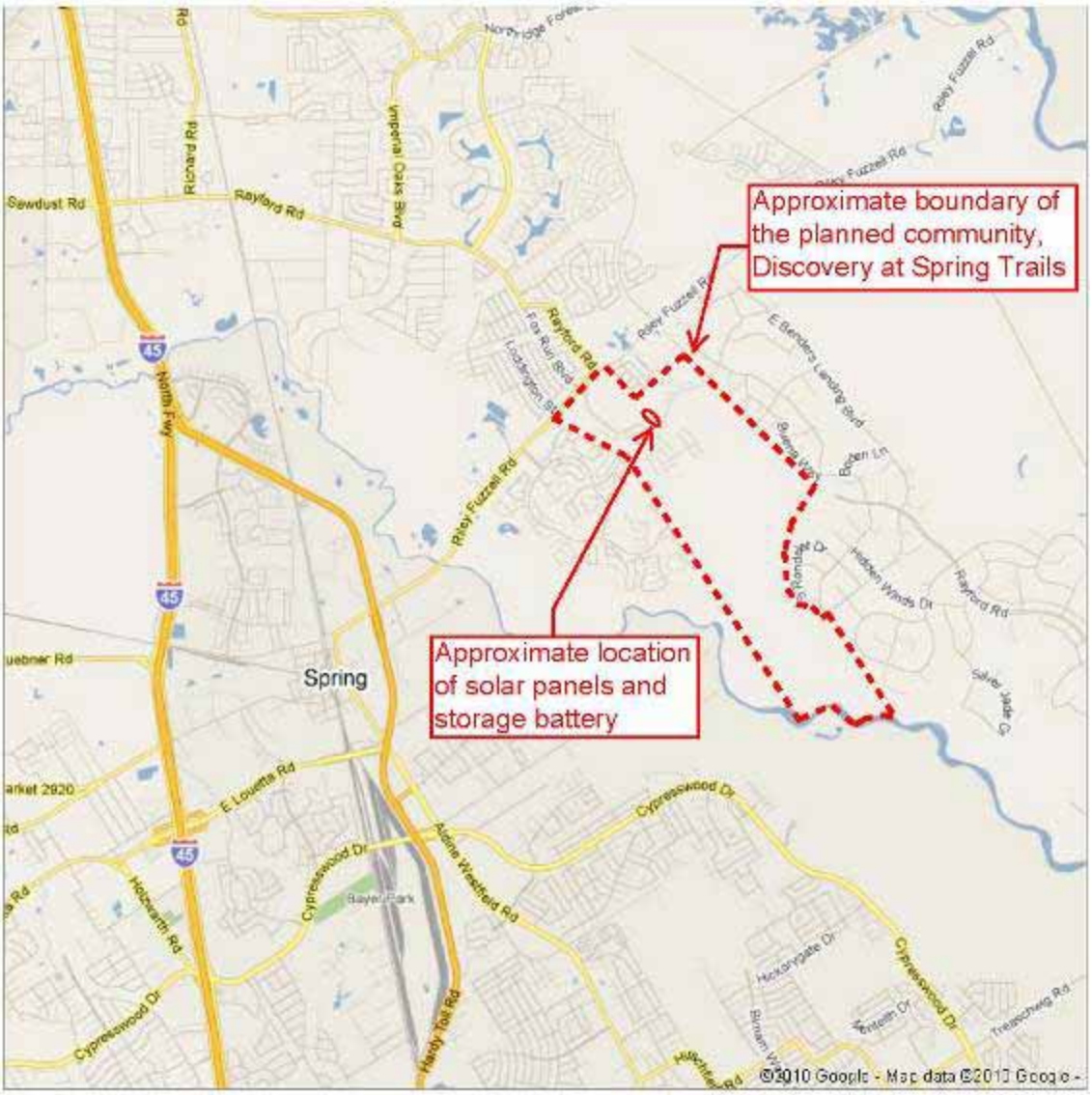

Figure 2-2. Vicinity map showing general location of the Discovery at Spring Trails community and the location of the community solar farm and storage battery facility.

project, 10 of the houses would be “deep green homes” with the same building envelop and lighting packages as the green homes, but also with a minimum of a 3-kilowatt PV system, a PHEV charging system in the garage (along with PHEVs for the occupants), a household energy storage system (each consisting of a battery system with 10 lithium iron magnesium phosphate modules) capable of several hours of discharge at the 2-kilowatt level, and a home energy management system. The management system would allow for interface with the battery and PHEV charging systems, and allow the electric utility to manage loads remotely through broadband internet and easy-to-install in-home devices (CCET 2009). Under the demonstration project, energy consumption would be tracked in the green and deep green homes. For comparison, consumption would also be tracked in conventional code-built homes of similar size and appearance in an adjacent community.

Much of DOE-funded activity under the Texas Future Community component of the CCET project would occur within homes and via monitoring and control equipment throughout Discovery at Spring Trails. Construction of the planned community, utilities, and other infrastructure are not being considered under DOE's proposed action, as they are already planned and ongoing efforts. The equipment that would be added to homes and otherwise existing utilities by the CCET project would cause no change in the environmental consequences associated with those ongoing efforts and, as a result, are not considered to be part of the evaluated project. CCET's proposed project that DOE is considering for evaluation is the 4-acre solar farm and storage battery planned for installation within the boundaries of the planned community. Specifically, the project would include construction of a 500-kilowatt solar array, placement of a 250-kilowatt storage battery, placement of a community PHEV charging station, and a public information kiosk. The general location of the proposed project is shown in Figure 2-2; Figure 2-3 provides a detailed view.

The solar farm would be located adjacent to a community water park. The parking area would serve both the water park and provide public parking and public viewing of the solar farm. The informational kiosk and PHEV station would be located on or near the parking area. The kiosk would serve to educate the public on the various energy conserving and renewable generation features onsite as well as explain what is occurring elsewhere in the community as part of the Texas Future Project.

Current plans call for the 500-kilowatt solar farm to be located between a landscaped impounded portion of Discovery Creek to the south and the already operational Discovery at Spring Trails water treatment plant to the north (Figure 2-3). Two Conroe Independent School District schools are located to the north of the water treatment plant. The area designated for the solar farm is approximately 4 acres and, with the adjacent recreation facilities, represents a total of about 10 acres of common, community ground and associated facilities. The solar farm would provide power to the water treatment plant and would be built in two phases: an initial 250 kilowatts on the south portion of the 4-acre parcel (on the southern side of the planned road into the housing area) and a second phase of 250 kilowatts to be built to the north of the first phase. Both areas would consist of multiple arrays of PV panels with each array consisting of solar modules mounted on a metal framework anchored to the ground with concrete piers. The metal framework would be designed to allow the panels to be sloped toward the south for optimal exposure to the sun. The top edge of the modules would be 10 to 11 feet above the ground and the bottom edge would be about 2 feet above the ground. The 250-kilowatt battery would also be located within this 4-acre complex. The battery would be housed in a 20-foot container, positioned adjacent to the water treatment facility. The solar farm and storage battery would be enclosed by a brick fence, similar to that surrounding the water treatment facility.

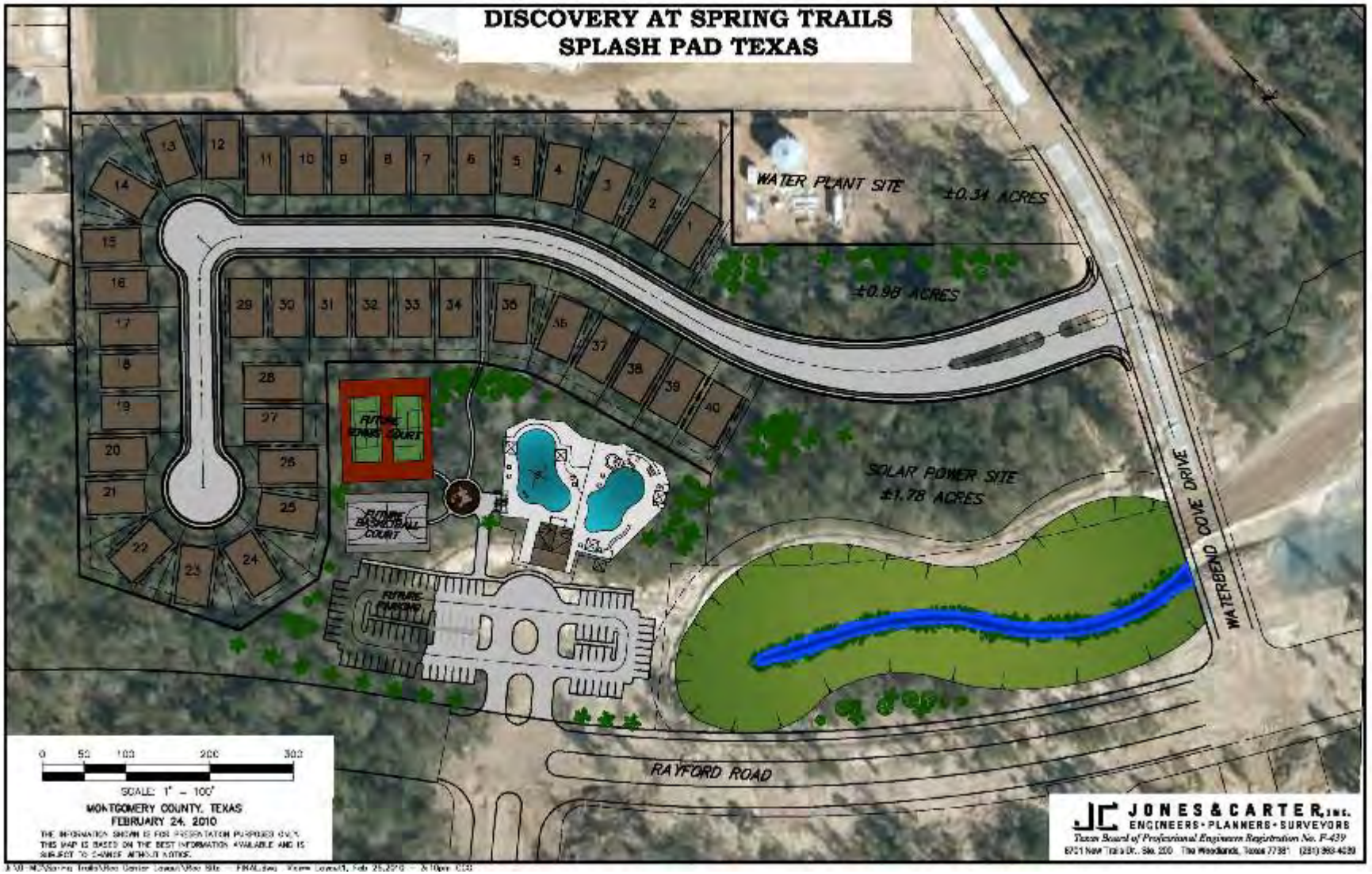

Figure 2-3. Detailed view (artist's rendering) of the location where the solar farm and battery would be constructed, which is adjacent to the community recreation area. (From the center of the figure, north is toward the upper left corner.)

The land cover prior to development is primarily second growth pine with some hardwoods. The land would be partially cleared of pines. Some reshaping of the surface would occur so as to provide drainage and aesthetics. There would be underground cables, conduits, water lines, wastewater lines (for a possible public bathroom) to support these demonstration facilities as well as the recreational facilities. A drawing card for this master planned community is the integration of residences with the natural surroundings. With or without DOE funded activities, the developer indicates all construction sites will be revegetated. In addition, construction will occur with all required storm water runoff requirements (for example, silt fences) to avoid the temporary impacts of construction. All areas not covered by paving and facility footprints will be either landscaped or left in their original condition. Without DOE funding, the 4-acre area set aside for the solar farm and battery facility would be used for additional home lots.

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, modernizing the electrical grid, enhancing security and reliability of the energy infrastructure, and facilitating recovery from disruptions to energy supply 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 in southeastern Texas. The average annual maximum temperature ranges from 75 to 80 degrees; average annual precipitation is 40 to 45 inches. Relative humidity varies throughout the state, depending on rainfall and evaporation rates, but generally decreases from east to west. The Gulf of Mexico is a dominant influence on the state's climate, moderating its temperature and precipitation. The El Niño Southern Oscillation also affects the state's moisture patterns and is responsible for long-term changes in Texas precipitation (TWDB 2007).

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.

Table 3-1 lists the primary National Ambient Air Quality Standards for each of the criteria pollutants. Regions that are not in compliance with these standards are designated as nonattainment areas. Montgomery County is in the Houston-Galveston-Brazoria, TX nonattainment area for 8-hour ozone (EPA 2010) and is in attainment for the other criteria pollutants. Table 3-1 also provides air quality data for Montgomery County for the last 4 years

of record available from EPA. As can be seen in the table, not all criteria air pollutants were monitored during the four years, but the pollutant of most concern (that is, ozone) was tracked for all four years. Italicized text indicates levels higher than the national standards. The County has had past violations of ozone levels, particularly compared with the 8-hour standard. In 2008, the 8-hour standard was met, but the larger area of Houston-Galveston-Brazoria is still designated a nonattainment area and the Texas State Implementation Plan addresses the measures required to achieve attainment for this criteria by June 2019 (TCEQ 2010).

Table 3-1. National ambient air quality primary standards and air quality data for Montgomery County, Texas, from 2005 through 2008.

Pollutant	Averaging period	Primary standard	Units	Montgomery County by Year			
				2005	2006	2007	2008
Carbon monoxide	8 hours	9	ppm	ND	ND	ND	ND
	1 hour	35	ppm	ND	ND	ND	ND
Lead	Quarterly	1.5	$\mu g/m^3$	ND	ND	ND	ND
Nitrogen dioxide	Annual	0.053	ppm	0.007	0.006	0.006	0.005
Ozone	1 hour	0.12	ppm	0.124	***0.130***	0.094	0.098
	8 hours	0.075	ppm	***0.084***	***0.093***	***0.076***	0.073
PM_{10}	24 hours	150	$\mu g/m^3$	ND	ND	ND	ND
$PM_{2.5}$	Annual	15.0	$\mu g/m^3$	12.26	ND	ND	ND
	24 hour	35	$\mu g/m^3$	24.5	ND	ND	ND
Sulfur dioxide	Annual	0.03	ppm	ND	ND	ND	ND
	24 hours	0.14	ppm	ND	ND	ND	ND

Sources: 40 CFR 50.4 through 50.13, EPA 2009.
$\mu g/m^3$ = micrograms per cubic meter.
ND = data not available.
ppm = parts per million.

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.

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 Montgomery 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. Neither the solar array nor storage battery would generate criteria pollutants or carbon dioxide. The proposed project is located in an area of nonattainment for ozone; however, the project would not be a major source of this pollutant or its precursors.

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 significant reduction in the amount of fossil fuel needed for generation of electricity with a corresponding reduction in greenhouse gases. The proposed project would also produce a quantity of electricity via the solar farm that would therefore not need to be produced from the burning of fossil fuels via conventional electricity generation. The proposed project would slightly reduce regional greenhouse gas emissions.

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 general conformity regulations (40 CFR 93, Subpart B) contain guidance for determining whether a proposed federal action would cause emissions to be above specified levels in nonattainment or maintenance areas.

CCET's proposed project would occur in an area that is in nonattainment for ozone, and according to the State Implementation Plan the area is considered to be in "severe nonattainment." For an area of severe nonattainment of ozone standards, a conformity determination is not required if project emissions of nitrogen oxides (NOx) and volatile organic compounds (VOCs), which are ozone precursors, are each less than 25 tons per year [40 CFR 93.153(b)(1)]. 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 NOx and 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 be run for 8 hours a day during the short construction period. It is clear that the proposed project would not involve either NOx or VOC emissions that approach the 25-ton threshold and, as a result, a conformity determination is not necessary.

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 project site would be located within a residential development called Discovery at Spring Trails. The solar farm and storage battery would be east and adjacent to a community water park and southeast of the residential units. The closest residence would be within 50 feet to the northwest of the solar array.

The primary source of noise in the area is residential traffic from Waterbend Cove Road to the east of the project site and Rayford Road to the south. Hardy Toll Road and Interstate 45 are to the west of the project site, approximately 2.5 miles and 3 to 4 miles away, respectively.

There is some construction activity, with associated noise, in the area; specifically, that related to developing residential subdivisions to the northeast and southwest of the Discovery at Spring Trails community, as well as within the Discovery at Spring Trails development itself.

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 new solar array and battery system. Construction would occur before the

closest residence was occupied; therefore, potential receptors would be farther away and any effects from construction noise would be diminished by the distance.

Operation of the solar panel array and PHEV charging station would not generate noise. Any associated noise from operation of the 250-kilowatt storage battery would be very similar to, or less than that generated by the adjacent water treatment facility, which is about 35 to 45 A-weighted decibels, comparable to a whispered conversation in a library (GCA 2010).

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 a future planned community called Discovery at Spring Trails. This housing community, being developed by Land Tejas Companies, will eventually comprise up to about 3,000 single- and two-story new homes. The surrounding area is being developed primarily as residential, but with some light commercial activities (for example, offices).

The solar farm would be installed in the northwestern portion of the housing development, accessible from Waterbend Cove Road, which continues through the development to the area schools and beyond. The area is mostly heavily wooded with trees and brush. Figures 3-1 and 3-2 show views of the project area. In both photographs, the area that would be used for the solar array and storage battery is in the wooded area beyond the cleared area in the foreground.

Figure 3-1. View from Rayford Road, looking eastward at the proposed project site (wooded area).

Figure 3-2. Looking west across Waterbend Cove Road at site of proposed solar farm (wooded area).

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 installing the solar array, storage battery, and PHEV charging station. CCET currently plans to install the solar farm and associated systems in two phases during the first year of the project implementation. Once construction was completed, reclamation of disturbed areas would remove these visual impacts.

In the long term, the aesthetics of the area would change with the installation of the solar array and storage battery. Figure 2-3 identifies where in the Discovery at Spring Trails community the solar farm would be located. The solar farm would consist of multiple arrays of solar panels with each array consisting of solar modules mounted on a metal framework anchored to the ground with concrete piers. The metal framework would be designed to allow the panels to slope toward the south for optimal exposure to the sun. The top edge of the modules would be 10 to 11 feet above the ground and the bottom edge would be about 2 feet above the ground (Figure 3-3).

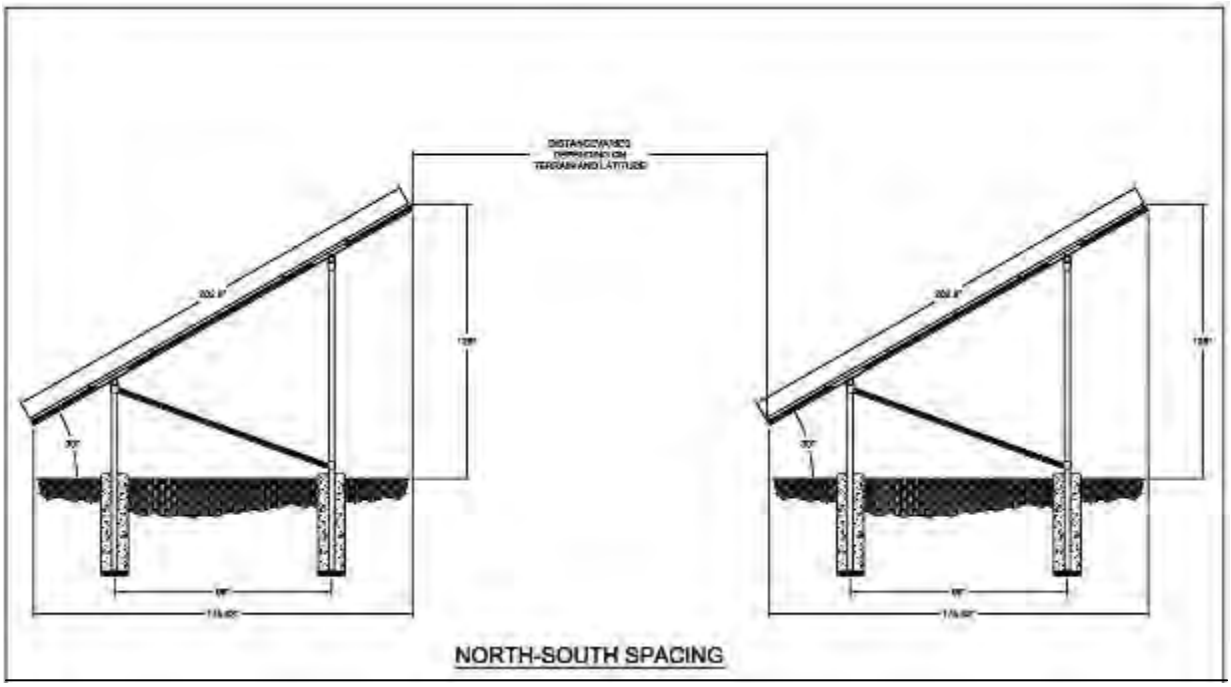

Figure 3-3. Illustration of solar array.

The solar panels would be visible from Waterbend Cove and Rayford roads and the areas adjacent to the solar farm (parking lot, recreation center, and nearby residences). Because the community is being developed as a “green” community, prospective homeowners would be

aware of the planned solar farm and would likely either welcome the facility as a symbol of environmental stewardship or choose to live elsewhere.

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 in 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 760-square-mile Spring Creek basin or watershed, as designated by the USGS's mapping of the country's surface water drainage areas (Seaber et al. 1987). Spring Creek is the primary stream draining the basin, but it also includes Cypress Creek to the south of Spring Creek. This basin is within the larger San Jacinto River Basin, which is 3,980 square miles in size and includes drainage areas to the north and south of Spring Creek. Spring Creek, itself, runs eastward from its origin in Weller County to its confluence with the West Fork of the San Jacinto River along the southeastern boundary of Montgomery County. For its entire reach east of Weller County, Spring Creek marks the boundary between Montgomery County on the north and Harris County on the south. Waters reaching the West Fork of the San Jacinto River merge with those of the East Fork of the San Jacinto River in the headwaters of Lake Houston. From Lake Houston, the San Jacinto River flows 20 miles to the southeast to the Houston Ship Channel, then another 10 miles to Galveston Bay (TCEQ 2004).

As can be seen in Figure 2-2, Spring Creek lies to the southwest of most of the Discovery at Spring Trails development, but to the southeast it forms the boundary for the development. At its closest, the proposed project site is slightly more than 1 mile from Spring Creek. Figure 2-3 shows a recessed drainage channel immediately to the south of the proposed area of the solar array. This channel, designated Discovery Creek, can also be seen in the photograph that is Figure 3-1. It is an artificial drainage feature, designed to be part of the overall development to provide drainage and beautification, and is advertised as an ecological waterway and parkland corridor. When complete, Discovery Creek will extend several miles to the southeast, through the development, and connect to Spring Creek via a protected greenbelt area called the Spring Creek Greenway. The Greenway is being developed by local governments and private

foundations to preserve up to about 12,000 acres along Spring Creek. This will connect several existing parks and nature preserve already located along the creek to form a long, linear nature park, centered on the creek. The southeast boundary of the Discovery at Spring Trails would be part of the nature park.

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; conduct 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 National Wetland Inventory, there are wetlands labeled "freshwater emergent" adjacent to the project site (USFWS 2010); one immediately to the east and another farther away to the west. However, these wetlands do not extend to the location of the solar farm, and it is envisioned that no Section 404 permitting will be required through the Army Corps of Engineers.

3.4.1.3 Floodplains

Executive Order 11988, *Flood Plain Management*, requires that development in floodplains be avoided if practicable. Flood Insurance Rate Maps published by the Federal Emergency Management Agency show that portions of the southeastern section of the Discovery at Spring Trails development are within the 500-year floodplain and, closer to Spring Creek, are within the 100-year floodplain of Spring Creek. However, the portion of the development where the solar array and storage battery would be located is shown as being outside of either floodplain. This was verified on a final 1996 map (FEMA 1996) and on a 2008 map labeled "Preliminary" (FEMA 2008) that was posted on the Montgomery County web site. The more recent map appeared to show 500-year flood zones being closer to the proposed project site than the older map, but the project site was still well outside the flood zone.

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 drains to Discovery Creek, an artificial drainage channel that runs toward Spring Creek. The solar array, battery storage, and PHEV station 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 pads for the solar arrays and storage battery; 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 solar farm would involve no discharge of liquids or wastes of any type to the ground. Operations and maintenance would not impact surface water.

The solar arrays, battery storage, and PHEV station would not encroach on the areas adjacent to the project site that are shown as wetlands on the National Wetland Inventory. The project site is not within areas designated by the Federal Emergency Management Agency as being either 100- or 500-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 EPA, the U.S. Department of Agriculture, and the USGS). In Texas, Montgomery County lies in the Level III ecoregion designated as the South Central Plains (Griffith et al. 2007). At a lower level of resolution, the southeastern portion of Montgomery County, where the Discovery at Spring Trails development is located, is designated as being within the Level IV Flatwoods ecoregion of the larger South Central Plains. For ease of discussion, the Flatwoods designation is referred to in this document as a subregion of the South Central Plains ecoregion.

3.5.1.1 Vegetation

The South Central Plains ecoregion, often termed the "piney woods," consists of irregular plains at the western edge of the southern coniferous forest belt. The region is now primarily loblolly and shortleaf pine plantations, but once contained large forests of mixed pine and hardwoods. The Flatwoods subregion runs along the southern portion of the South Central Plains and is warmer, wetter, flatter, less dissected, and lower in elevation than the sub regions to the north. Historically (presettlement), the Flatwoods area may have had higher fire frequency than the

northern sub regions. Since settlement, the area has a history of modification as a result of lumber industry, railroad construction, and oil and gas industry (Griffith et al. 2007).

Longleaf pine (a member of the group commonly termed Southern Yellow Pine) flatwoods and savannas were once typical of the Flatwood subregion. The subregion also had a diversity of mixed pine-hardwood forest types, including longleaf pine, loblolly pine, sweetgum, white oak, southern red oak, willow oak, swamp chestnut oak, blackgum, hickory, and southern magnolia. Understory vegetation included holly, yaupon, sweetbay, wax myrtle, sumac, wild grape, and American beautyberry. As noted above, these areas have seen significant modifications as a result of land use and development and now consist largely of loblolly and shortleaf pine coverage.

3.5.1.2 Wildlife

The area now designated as Discovery at Spring Trails was identified as being heavily forested before the development was started (AEC 2006). Much of the area, including the land where the solar array and storage battery would be located, is still forested. This land area is likely habitat for numerous species of wildlife as supported by the fact that several different nature preserves have been established in areas along Spring Creek in this general portion of Montgomery and Harris counties. It is also likely that some of the wildlife has moved out of the Discovery at Spring Trails area as its development continues. Much of the land area around Discovery at Spring Trails has already been developed, which also encroached on wildlife and resulted in loss of wildlife habitat. Because the proposed project would be only a minor element (about 4 acres or less than 1 percent) of the area's overall development, only the most sensitive species that could frequent the area are being considered in this EA.

3.5.1.3 Sensitive Species

The U.S. Fish and Wildlife Service administer 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.

One species classified as threatened, endangered, proposed, or candidate under the *Endangered Species Act* occurs in Montgomery County, the red-cockaded woodpecker (*Picoides Borealis*), which is classified endangered (USFWS 2009).

The listings provided by the U.S. Fish and Wildlife Service also show the bald eagle (*Haliaeetus leucocephalus*) as a delisted species occurring in this area. Forest habitat in the vicinity is second growth due to prior uses of the vicinity and the urban growth and development of the area, thus the potential occurrence of the bald eagle or red-cockaded woodpecker is low.

On August 27, 2010, DOE sent a consultation letter to the U.S. Fish and Wildlife Service requesting input into the flora and fauna of the area. DOE's letter is provided in Appendix B of this EA. The U.S. Fish and Wildlife Service response is forthcoming.

The State of Texas, Parks and Wildlife Department, also classifies species it considers rare, threatened, or endangered within the state. Table 3-2 lists the species of concern identified as having a potential or known presence within Montgomery County. Two fishes and the alligator snapping turtle were also identified on the Parks and Wildlife's listing for Montgomery County, but they are not shown in Table 3-2 because the proposed installation of the solar array and storage battery would not affect any stream habitat. Similarly, nine different mollusks identified as being of potential concern in Montgomery County are not included in the table because they are associated with aquatic habitat.

Table 3-2. Montgomery County rare, threatened, or endangered species as identified by the Texas Parks and Wildlife Department.

Common name	Scientific name	State Status	Federal Status	Habitat
Birds				
Henslow's Sparrow	*Ammodramus henslowii*	R		Wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking.
Piping Plover	*Charadrius melodus*	T	LT	Wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats.
Peregrine Falcon	*Falco peregrinus*	T	DL	Both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat..
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	R	DL	Migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Table 3-2. Montgomery County rare, threatened, or endangered species as identified by the Texas Parks and Wildlife Department (continued)**.**

Common name	Scientific name	State Status	Federal Status	Habitat
American Peregrine Falcon	*Falco peregrinus anatum*	T	DL	Year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.
Whooping Crane	*Grus americana*	E	LE	Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties
bald eagle	*Haliaeetus leucocephalus*	T	DL	Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds
wood stork	*Mycteria americana*	T		Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.
red-cockaded woodpecker	*Picoides borealis*	E	LE	Cavity nests in older pine (60 years); forages in younger pine (30 years); prefers longleaf, shortleaf, and loblolly
white-faced ibis	*Plegadis chihi*	T		Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.
Insects				
Gulf Coast clubtail	*Gomphus modestus*	R		Medium river, moderate gradient, and streams with silty sand or rocky bottoms; adults forage in trees, males perch near riffles to wait for females, larvae overwinter; flight season late April to late June.

Table 3-2. Montgomery County rare, threatened, or endangered species as identified by the Texas Parks and Wildlife Department (continued)**.**

Common name	Scientific name	State Status	Federal Status	Habitat
A mayfly	*Plauditus gloveri*	R		NY, SC, TX; mayflies distinguished by aquatic larval stage; adult stage generally found in bank-side vegetation.
Texas emerald dragonfly	*Somatochlora margarita*	R		East Texas piney woods; springfed creeks and bogs; small sandy forested streams with moderate current.
A mayfly	*Tricorythodes curvatus*	R		AR, OK, TX; mayflies distinguished by aquatic larval stage; adult stage generally found in bank-side vegetation.
Mammals				
red wolf	*Canis rufus*	E	LE	Extirpated; formerly known throughout eastern half of Texas in brushy and forested areas as well as coastal prairies.
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	T		Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned manmade structures.
Southeastern myotis bat	*Myotis austroriparius*	R		Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned manmade structures.
Plains spotted skunk	*Spilogale putorius interrupta*	R		Catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas, and tallgrass prairie.
Louisiana black bear	*Ursus americanus luteolus*	T	LT	Possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas.
Plants				
Correll's false dragon-head	*Physostegia correllii*	R		Wet, silty clay loams on streamsides, in creek beds, irrigation channels and roadside drainage ditches; or seepy, mucky, sometimes gravelly soils along riverbanks or small islands in the Rio Grande; or underlain by Austin Chalk limestone along gently flowing spring-fed creek in central Texas; flowering May to September.
Reptiles				
timber/canebrake rattlesnake	*Crotalus horridus*	T		Swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto.

Table 3-2. Montgomery County rare, threatened, or endangered species as identified by the Texas Parks and Wildlife Department (continued)**.**

Common name	Scientific name	State Status	Federal Status	Habitat
Texas horned lizard	*Phrynosoma cornutum*	T		Open, arid, and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March to September.
Louisiana pine snake	*Pituophis ruthveni*	T	C	Mixed deciduous-longleaf pine woodlands; breeds April to September.

Source: TPWD 2010.

Status Key:

LE, LT	Federally listed endangered/threatened
C	Federal candidate for listing
DL	Federally delisted
E, T	State listed endangered/threatened
R	State identified as rare, but with no regulatory listing status

3.5.2 ENVIRONMENTAL CONSEQUENCES

3.5.2.1 Proposed Project

Construction and installation of the solar arrays, storage battery, and PHEV station at Discovery at Spring Trails would result in disturbance of about 4 acres of woody habitat for plants and animals. The currently wooded area would be cleared of vegetation for installation of the project equipment. As indicated previously in the EA, the master plan for Discovery at Spring Trails includes an objective of integrating new construction with the natural surroundings and describes all construction sites as being revegetated. However, trees and tall vegetation would have to be kept far enough away from the solar arrays that there would be no shadows or leaf litter that would hinder their performance. The loss of habitat would have only a small direct adverse impact on populations of common plant or animal species in the area because the proposed project site is small and located in an area already undergoing disturbance and which will continue to be disturbed as it is transformed into a residential area.

Montgomery County is within the range of the red-cockaded woodpecker, which is federally listed as endangered. This species prefers old-growth trees (60 years or older) for nesting and roosting cavities (TPWD 2009; USFWS 1992). Habitat requirements for this species are described in the *Red-cockaded Woodpecker Recovery Plan* (USFWS 2003) as follows.

> Red-cockaded woodpeckers require open pine woodlands and savannahs with large old pines for nesting and roosting habitat (clusters). Large old pines are required as cavity trees because the cavities are excavated completely within inactive heartwood, so that the cavity interior remains free from resin that can

> entrap the birds. Also, old pines are preferred as cavity trees, because of the high incidence of the heartwood decay that greatly facilitates cavity excavation. Cavity trees must be in open stands with little or no hardwood midstory and few or no overstory hardwoods. Hardwood encroachment resulting from fire suppression is a well-known cause of cluster abandonment. Red-cockaded woodpeckers also require abundant foraging habitat. Suitable foraging habitat consists of mature pines with an open canopy, low densities of small pines, little or no hardwood or pine midstory, few or now overstory hardwoods, and abundant native bunchgrass or forb groundcovers.

The project site is not suitable habitat for red-cockaded woodpeckers. It is vegetated with second-growth forest having a mixed overstory of hardwoods and pines and a dense understory. The stand of woods on and surrounding the site is small and is surrounded by a developed residential area. DOE therefore concludes that the likelihood of red-cockaded woodpeckers using the project site is discountable and that the proposed project would not adversely affect the species.

Clearing vegetation from the project site would result in the loss of 4 acres of habitat for some species classified as rare, threatened, or endangered by the Texas Parks and Wildlife Department (Table 3-2). Those species listed in Table 3-2 that would most likely to be affected by this project include the bats, spotted skunk, timber/canebrake rattlesnake, and the Louisiana pine snake. This project, by itself, would have only a small effect on populations of those and other species in the area, as the project site is small and surrounded by residential developments. However, as stated in Section 4.2.3, this project would contribute to the cumulative loss of habitat in the area surrounding the project site as undeveloped lands are converted to residential and other urban land uses. Furthermore, it should be noted that these losses might still occur without CCET's proposed project

3.5.2.2 No-Action Alternative

Under the No-Action Alternative, DOE would not provide funding to CCET for the proposed project, and for purposes of this analysis, DOE assumes that the solar arrays, storage battery, and PHEV station at Discovery at Spring Trails would not be built. However, even if federal funding was not provided for the proposed project, current plans are to develop the project site, which would cause the same direct and cumulative impacts to biological resources as DOE's proposed action.

3.6 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 solar farm and storage battery 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 solar system and storage battery, 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 solar panels and battery storage, the land and facilities occupied by those systems could be used for other industrial purposes, residential purposes, or the land could be reclaimed and revegetated to resemble pre-disturbance conditions.

3.7 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 the Discovery at Spring Trail, and the materials that would be committed under the proposed project would support the "green" technology of the Texas Future Community.

3.8 Unavoidable Adverse Impacts

Installation and operation of the solar farm would cause unavoidable visual impacts to the immediate area. DOE anticipates such impacts would be minimized by adherence to the City's and County's permitting stipulations, as well as the general acceptance of solar energy resources within the community. Unavoidable adverse impacts to wildlife could occur from developing an area within an area that is currently wooded and undeveloped. However, impacts would be minor because of the relatively small amount of land associated with the proposed project.

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 Discovery at Spring Trails community.

The vicinity in and around the project site has been part of the urbanization of the greater Houston area. Recent past activities include development of a high-end residential community called Benders Landing, which is adjacent to the northeast of Discovery at Spring Trails, and an easement on 208 acres of land to the south of Discovery at Spring Trails that was recently granted for another 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 solar farm and storage battery (Section 4.2).

4.1 Reasonably Foreseeable Actions

To identify reasonably foreseeable actions in and around the project site, DOE primarily considered information from CCET on the Discovery at Spring Trails community and from the Montgomery County Commission Precinct 3 on future planned projects in the vicinity. Reasonably foreseeable actions are summarized below.

- The Discovery at Spring Trails will eventually comprise 3,000 new homes. The surrounding area is being developed primarily as residential, but with some light commercial activities. Planned development includes a community water park/splash pad, recreation center, clubhouse and playground, lakes, fountains, parks, and trail systems. Construction on the community began in 2008 and is expected to continue through 2015, given market conditions.

- Grand Parkway is a proposed 180-plus-mile loop scenic highway traversing seven counties and encircling the Greater Houston region. The project has been shown on governmental planning documents since the early 1960s. The Parkway is being constructed in 11 segments; Segment G is the closest segment to the Discovery at Spring Trails community, about 1 mile to the south. Current plans are for the two-year construction period of this segment to begin in 2012 (GPA 2010).

- As deployment of widespread Smart Grid technologies expand, improvements in the management of the power grid will occur, thereby reducing the need for base load power plants as will consumption of fossil energy and reduction of greenhouse gas emissions.

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 solar farm and storage battery. 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 solar farm would be limited to the Discovery at Spring Trails community.

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, with CCET's proposed project being the shortest in duration. Installation of the solar array and storage battery would have a very small incremental adverse impact for the few weeks that heavy equipment would be required. The proposed project might be completed before the road project is started, but the Discovery at Spring Trails development 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 annoyance air emissions for a longer duration.

Operation of the solar farm and storage battery, as well as the proposed improvements to the electrical grid, 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 solar farm at Discovery at Spring Trails 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 solar farm to noise in the area would be very minor in comparison with the much larger construction of Segment G of the Grand Parkway and even the closer construction within the Discovery at Spring Trails development. 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 proposed project and the reasonably foreseeable projects listed in Section 4.1 are actions that will result in the spread of urban areas into undeveloped, or less developed, lands. These actions are accompanied by a loss of habitat for plants and animals. This spread of the urban landscape can include efforts to protect some habitat as is being done along Spring Creek in the general project area, but overall, loss of habitat cannot be avoided. This conversion of undeveloped lands to residential and other urban uses will cause a decline in the abundance of

native plant and animal species in the region, including some listed as rare, threatened, or endangered by the Texas Department of Parks and Wildlife (Table 3-2). The CCET proposed project would contribute to that cumulative effect by removing vegetation from 4 acres of wooded land.

5. CONCLUSIONS

DOE's proposed action would provide CCET with $13.5 million in financial assistance in a cost-sharing arrangement to facilitate the purchase, installation, and demonstration of the Texas Future Community (Discovery at Spring Trails) and the installation of monitoring equipment in 13 electrical system substations in Texas, including installation of microwave radio towers at three of the substations. CCET would purchase and install a solar panel array, a storage battery and pad, a supervisory control and data acquisition, or SCADA, system, electronic equipment for select homes, monitoring equipment for 13 substations, and three microwave radio towers. The proposed project is a multi-faceted, synergistic approach to managing fluctuations in wind power within the Electric Reliability Council of Texas transmission grid. DOE concludes the following about the potential environmental impacts of its proposed action and CCET's proposed project.

- Installation and operation of monitoring equipment and, as applicable, microwave radio towers inside existing substations of the Texas electrical transmission system grid would involve no potential for significant environmental impacts. Similarly, installation of electronic components in selected homes, already under construction, would involve no adverse environmental consequences.

- Installation and operation of the proposed solar arrays, battery storage, and PHEV station 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.

- Operation of the new solar array and storage battery would not generate criteria pollutants or carbon dioxide, but construction actions would result in air emissions. The proposed project is located in Montgomery County, Texas, which is a nonattainment area for the 8-hour ozone standard. A conformity review was performed in accordance with Subpart B of 40 CFR Part 93, and it was determined that emissions of ozone precursors during construction would be sufficiently small that a conformity determination would not be required. Therefore, the proposed project would meet the conformity requirements of the *Clean Air Act*.

- The proposed project would produce a quantity of electricity via solar 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 solar arrays would not cause an increase in sound levels. Any associated noise from operation of 250-kilowatt storage battery would be similar to or less than the adjacent water treatment facility, which has sound levels of about 35 to 45 A-weighted decibels, comparable to a whispered conversation in a library.

- The aesthetics of the area would change with the addition of the solar arrays, which would stand 10 to 11 feet above the ground. The solar panels would be visible from Waterbend Cove and Rayford roads and the areas adjacent to the solar farm (parking lot, recreation center, and nearby residences). However, because the community is being developed as a "green" community, prospective homeowners would be aware of the planned solar farm and likely would either welcome the facility as a symbol of environmental stewardship or choose to live elsewhere.

- Construction actions would be performed with necessary controls on runoff to ensure there would be no erosion or sedimentation issues. The project location does not involve wetlands or floodplains. No impacts to surface water are expected.

- Developing 4 acres on a currently wooded 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 wetlands are not located on the project site and project activities would not encroach on the adjacent wetlands.

- DOE does not expect CCET's proposed project to directly impact cultural resources or historic properties. DOE will complete consultation with the Texas State Historic Preservation Officer prior to issuing the Final EA.

- 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 solar array and storage battery at the Discovery at Spring Trails community 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 the region's air quality by reducing air emissions, including carbon dioxide emissions.

- Under the No-Action Alternative, DOE would not provide funding to CCET and the solar array and storage battery 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. However, plans for the Discovery at the Spring Trails development show the proposed project site being used for residential lots if the solar array and storage battery are not installed.

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APPENDIX A

DISTRIBUTION LIST

The Honorable Rick Perry
Governor of Texas
Office of the Governor
PO Box 12428
Austin, TX 78711-2428

Ms. Denise Stines Francis
State Single Point of Contact
Governor's Office of Budget, Planning,
and Policy; State Grants Team
PO Box 12428
Austin, TX 78711

Mr. Toby Baker
Governor's Advisor – Natural Resources
and Agriculture
PO Box 12428
Austin, TX 78711

Mr. Terry Zrubek
Governor's Advisor – Water
PO Box 12428
Austin, TX 78711

Mr. Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission
PO Box 12276
Austin, TX 78711

Mr. Michael P. Jansky
Regional Environmental Review
Coordinator
Office of Planning and Coordination
U.S. Environmental Protection Agency
1445 Ross Avenue, Mail Code 6EN-XP
Dallas, TX 75202-2733

Edith Erfling, Acting Field Supervisor
U.S. Fish and Wildlife Service
Clean Lake Ecological Services Field Office
17629 El Camino Real #211
Houston, TX 77058

Mr. Carlos Bullock, Chairman
Alabama-Coushatta Tribe of Texas
571 State Park Road 56
Livingston, TX 77351

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

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

Craig Lobel
EcoEdge Consulting
9993 Fox Valley Way
San Diego, CA 92127

Ms. Elaine Taylor, Assistant Manager
Montgomery County Memorial Library
South Regional Library
2101 Lake Robbins Drive
The Woodlands, TX 77380

Robert Collins
Montgomery County Commission
Precinct 3
1130 Pruitt Rd
Spring, Texas 77380

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*.

NETL NATIONAL ENERGY TECHNOLOGY LABORATORY
Albany, OR • Morgantown, WV • Pittsburgh, PA
U.S. DEPARTMENT OF ENERGY

August 27, 2010

Edith Erfling, Acting Field Supervisor
U.S. Fish and Wildlife Service
Clear Lake Ecological Services Field Office
17629 El Camino real, Ste 211
Houston, TX 77058-3051

RE: U.S. Department of Energy Request for Informal Consultation and comment for the Proposed Center for Commercialization of Energy Technology project located in Montgomery County, Texas

Dear Ms. Erfling:

The U.S. Department of Energy (DOE) is proposing to provide a financial assistance grant to the Center for Commercialization of Energy Technology (CCET) as part of the Smart Grid Demonstration Program, funded through the *American Recovery and Reinvestment Act of 2009* (Recovery Act). If funded, CCET would develop and demonstrate a multi-faceted, synergistic approach to managing electrical energy within the Electric Reliability Council of Texas transmission grid. The project would result in two general areas of physical construction activities. One element, the Texas Future Community, would demonstrate the use of advanced integrated technology in a smart grid community that combines household and community energy production, storage, and management. The second element would improve system monitoring on a regional scale, so that instabilities in the grid from fluctuating power sources such as wind energy can be better managed in conjunction with other power sources and varying demand.

The first project activity site would be the Texas Future Community component located at Discovery at Spring Trails. This residential development is a planned community currently under construction, about 25 miles north of Houston. Adjoining this development is where CCET would clear an approximate 4-acre wooded site enabling the installation of a 500-kilowatt solar farm, trailer-mounted 250-kilowatt storage battery units, and other green energy technologies. The community site is located in southern Montgomery County, approximately 30 degrees north latitude and a longitude of 95.4 degrees west. It can be accessed from downtown Houston by traveling approximately 23 miles north on the Hardy Toll Road and then taking Riley Fuzzel Road for about 2 miles to the northeast. The nearest incorporated area is Spring, Texas, in Harris County. In addition to the community solar farm and battery system on the 4-acre site, the CCET

3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507

project would also include installation of small photovoltaic systems on individual homes along with items such as smart meters, load interruptible demand response appliances, receptacles for plug-in hybrid electric vehicles, and other power management instruments. The project elements planned for individual homes would be indistinguishable from the normal construction process, which has already received necessary approvals and permits. Attachment 1 provides several maps and figures showing the location of Discovery at Spring Trails and the proposed community solar facility within the development.

The second project activity would be limited to the installation of equipment at strategic locations within the existing transmission system of Texas. Specifically, this would be done by putting new equipment in 11 existing transmission substations and at two proposed substations currently undergoing construction approval by the Public Utility Commission of Texas. These substations, which are dispersed over south and central Texas, are (or will be) built-up areas where most of the new equipment would be indistinguishable from existing substation equipment. A more noticeable exception would be at three of the substation locations where microwave radio towers also would be constructed to communicate power distribution system data (specifically, synchrophasor data) to a central location. These towers, each planned to be approximately 30 feet in height, would be installed within three existing Oncor Electric switching stations in west, central Texas. The stations are located in Ector, Howard, and Scurry Counties. Attachment 2 provides several figures and maps (primarily clips from U.S. Geological Survey topographic maps) showing the locations of the existing electrical distribution system stations where the three new towers would be installed. Since the other locations would involve only placement of new equipment within the already built-up areas of the stations, only the three locations that would require new microwave radio towers are identified.

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/EndangeredSpecies/lists) that are known to occur in the four Texas counties where construction-type activities would be involved as part of the CCET project. 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 areas. It is recognized that only one of the four project areas is within your area of responsibility, that is, within the Clear Lake Ecological Services Field Office (ESFO), and the other three are in the Arlington and Austin ESFOs. However, the site with the most potential for concern would appear to be the Montgomery County site, which is within your area of responsibility. In order to avoid a disjointed consultation process, please coordinate with your other field offices as you feel necessary in responding to this letter; however, if your recommendation is to make individual contacts, we will do so.

Table 1. Listed species in the affected counties

Group	Species	Status	Texas Counties[a]			
			Mo	Ec	Ho	Sc
Bird	bald eagle (*Haliaeetus leucocephalus*)	Delisted	X	X	X	X
	red-cockaded woodpecker (*Picoides borealis*)	Endangered	X			
No other groups identified with threatened or endangered species						

a. Texas Counties where the listed species are known to occur.
Mo – Montgomery County, where the Discovery at Spring Trails planned community is located.
Ec – Ector County, where one of the new microwave towers would be located at an existing substation near Odessa.
Ho – Howard County, where one of the new microwave towers would be located at an existing substation near Forsan.
Sc – Scurry County, where one of the new microwave towers would be located at an existing substation near Hermleigh.

DOE's National Energy Technology Laboratory (NETL) is preparing an environmental assessment for this project to meet the requirements of the *National Environmental Policy Act* (NEPA). DOE will include correspondence with your office in an appendix to the environmental assessment and will send a copy of the draft environmental assessment to your office, where you may again respond to any specific comments or concerns you might have. DOE anticipates the Draft Environmental Assessment will be out for public comment in mid-September. At this time, we anticipate implementing a 21-day public comment period for this proposed project. As will be described in the assessment, DOE recognizes the potential for de minimus impacts to avian and bat species from the microwave towers; specifically, an increased risk of collision. In this regard and for your information, DOE has been informed that Oncor Electric currently has a depredation permit (MB164403-0) from the USFWS for operation of their power distribution system and it is assumed the new microwave towers would also fall under that permit, as well as, any mitigation measures that may be required.

Please forward the results of your review and any requests for additional information to DOE's NETL using the contact information provided below:

Mr. Fred Pozzuto
U.S. Department of Energy
National Energy Technology Laboratory
3610 Collins Ferry Road
Bldg. 1, MS B07
Morgantown, WV 26507-0880
Telephone: (304) 285-5219
Fax: (304) 285-4403
Email: Fred.Pozzuto@netl.doe.gov

We believe that there are no threatened or endangered species, or species of special concern in the project area. After your review of the information available, if you concur, would you please indicate on the concurrence line below at your earliest convenience and return your finding to me.

Because this is a Recovery Act project, we would appreciate a quick response to our request for consultation. If you have any questions or require clarification, please contact me as noted above.

Thank you in advance for your consideration.

Sincerely,

Fred Pozzuto
Environmental Manager,
NEPA Compliance Officer

Attachments

5

Attachment 1 – Maps and figures of the Discovery at Spring Trails community

Figure 1-1. Clip from USGS 7.5 minute quadrangle map, Spring TX, showing the approximate location of the proposed community solar farm and battery facility at Discovery at Spring Trails.

Figure 1-2. Regional map showing general location of the Discovery at Spring Trails community and the location of the community solar farm and battery facility.

Figure 1-3. Artist's rendition (conceptual) of the community recreation area where the solar farm (shown here as an array of black rectangles) and battery facility would be located.

Attachment 2 – Maps of the four radio tower locations

Figure 2-1. Map of Texas showing locations where microwave towers would be installed.

Figure 2-2. Clip from USGS 7.5 minute quadrangle map, Odessa SE, Tex., showing the existing substation in Ector County where a new microwave tower would be installed under the CCET project.

Figure 2-3. Clip from USGS 7.5 minute quadrangle map, Lees, Tex., showing the location in Howard County where there is now a substation and where a new microwave tower would be installed under the CCET project.

Figure 2-4. Clip from USGS 7.5 minute quadrangle map, Inadale, Tex., showing the location in Scurry County where there is now a substation and where a new microwave tower would be installed under the CCET project.

USF&WS Concurrence:

I concur with the finding of no species affected for the proposed solar farm and battery storage site, or substation modifications located in Montgomery County and Ector County, Texas:

Signed:_____ Date:_____

Edith Erfling, Acting Field Supervisor
U.S. Fish and Wildlife Service
Clear Lake Ecological Services Field Office

Attachment 1 - Maps and figures of the Discovery at Spring Trails community

Figure 1-1. Clip from USGS 7.5 minute quadrangle map, Spring Texas, showing the approximate location of the proposed community solar farm and battery facility at Discovery at Spring Trails.

Figure 1-2. Regional map showing general location of the Discovery at Spring Trails community and the location of the community solar farm and battery facility.

Figure 1-3. Artist's rendition (conceptual) of the community recreation area where the solar farm (shown here as an array of black rectangles) and battery facility would be located.

1 SPLASH PAD SITE LAYOUT

Attachment 2 - Maps of the four radio tower locations (alphabetically by county)

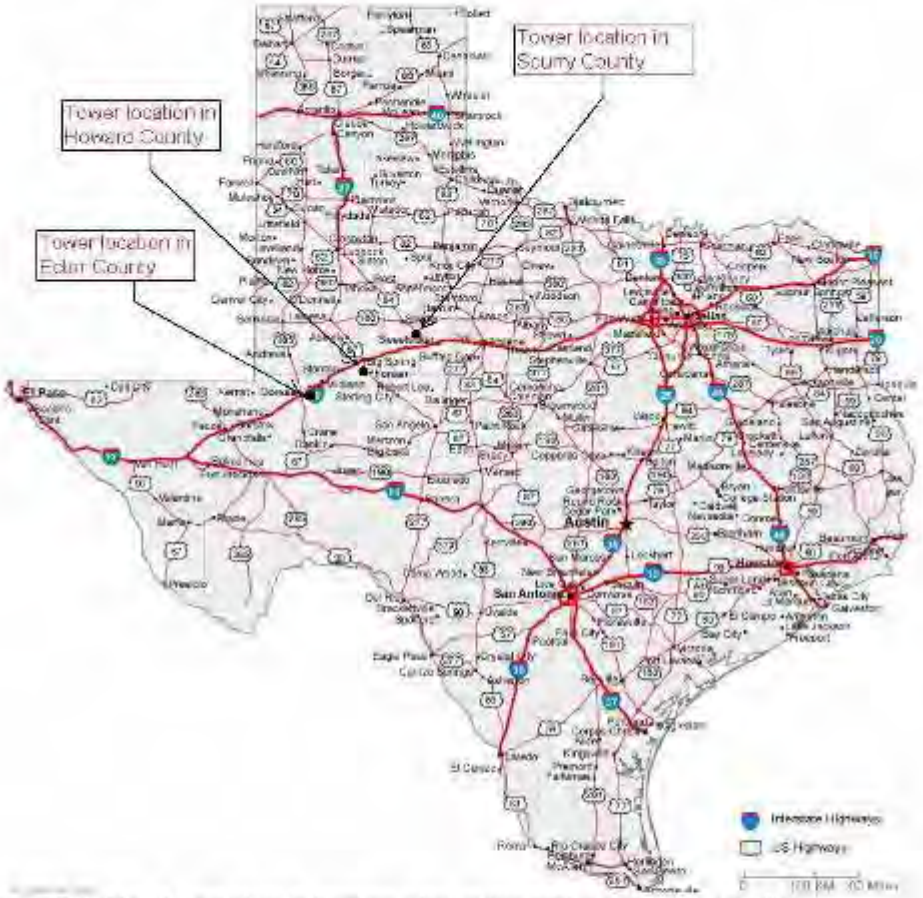

Figure 2-1. Map of Texas showing locations where microwave towers would be installed.

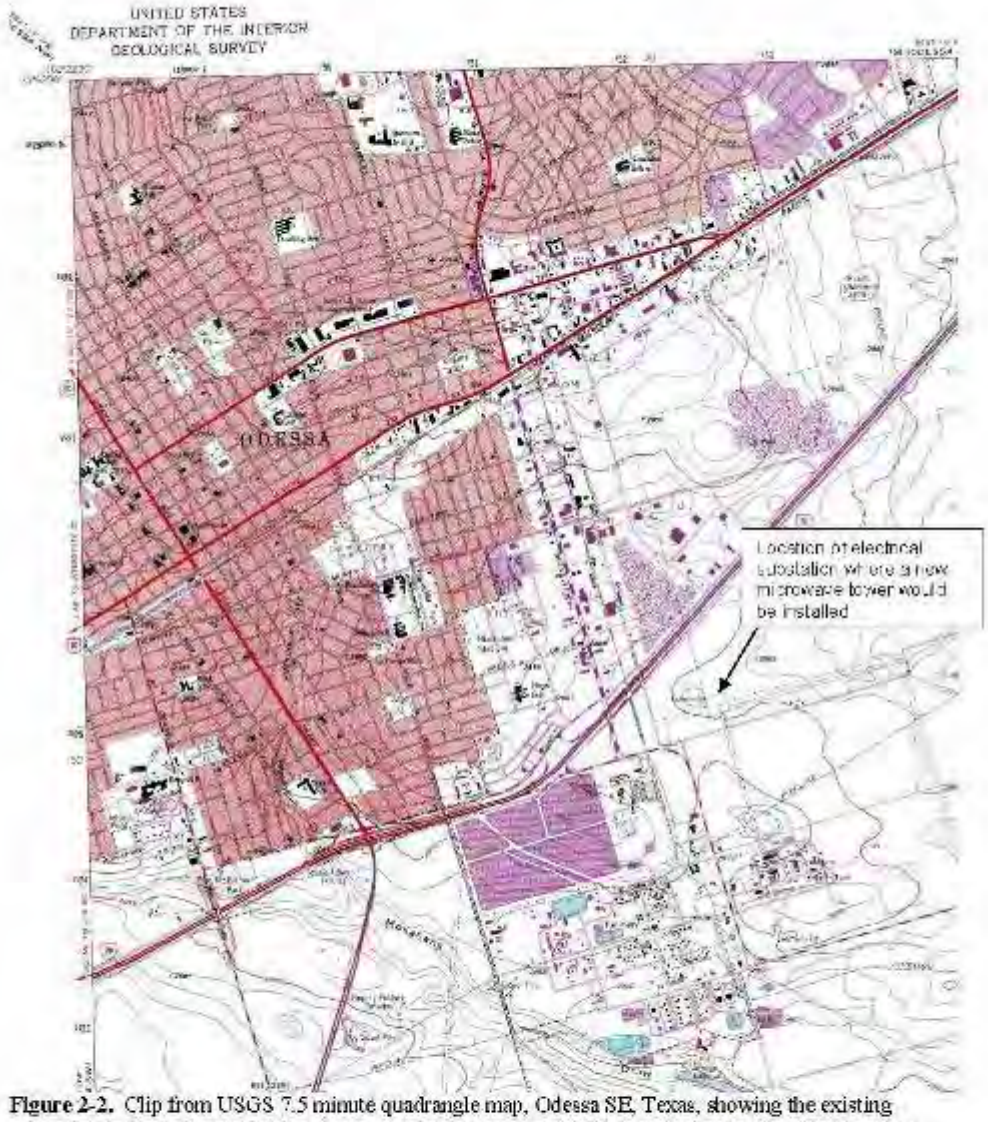

Figure 2-2. Clip from USGS 7.5 minute quadrangle map, Odessa SE, Texas, showing the existing substation in Ector County where a new microwave tower would be installed under the CCET project.

Figure 2-3. Clip from USGS 7.5 minute quadrangle map, Lees, Texas, showing the location in Howard County where there is now a substation and where a new microwave tower would be installed under the CCET project.

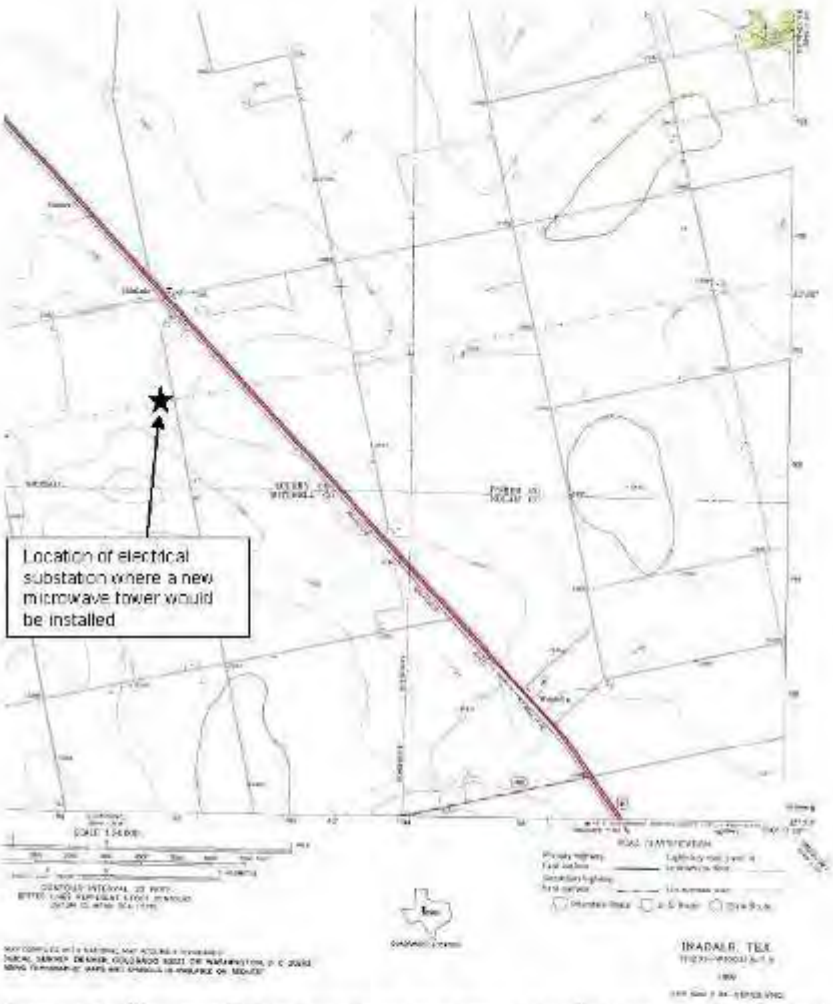

Figure 2-4. Clip from USGS 7.5 minute quadrangle map, Inadale, Texas, showing the location in Scurry County where there is now a substation and where a new microwave tower would be installed under the CCET project.

NETL NATIONAL ENERGY TECHNOLOGY LABORATORY
Albany, OR • Morgantown, WV • Pittsburgh, PA
U.S. DEPARTMENT OF ENERGY

August 27, 2010

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

RE: U.S. Department of Energy Request for Informal Consultation and comment for the Proposed Center for Commercialization of Energy Technology project located in Montgomery County, Texas

Dear Mr. Wolfe:

The U.S. Department of Energy (DOE) is proposing to provide a financial assistance grant to the Center for Commercialization of Energy Technology (CCET) as part of the Smart Grid Demonstration Program, funded through the *American Recovery and Reinvestment Act of 2009* (Recovery Act). If funded, CCET would develop and demonstrate a multi-faceted, synergistic approach to managing electrical energy within the Electric Reliability Council of Texas transmission grid. The project would result in two general areas of physical construction activities. One element, the Texas Future Community, would demonstrate the use of advanced integrated technology in a smart grid community that combines household and community energy production, storage, and management. The second element would improve system monitoring on a regional scale, so that instabilities in the grid from fluctuating power sources such as wind energy can be better managed in conjunction with other power sources and varying demand. Because a portion of the project would be funded by an appropriation through DOE, this project must meet requirements for federal actions under Section 106 of the *National Historic Preservation Act*.

Attached to this letter is a completed "Request for SHPO Consultation" form obtained from the State of Texas web site. A detail project description, maps, and other information requested in the form are provided. The information in the attachment focuses on the solar farm and storage battery components because of the low-impact nature of the other project elements. However, as indicated in the attachment, please let us know if you would like more information on the substations where equipment would be installed.

DOE has no reason to believe the project would cause any effects to historic or archaeological resources in the project area in southern Montgomery County; the site is currently vacant, wooded land. Other portions of the project are within previously disturbed areas, closely adjoining active electric substations.

3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507

DOE's National Energy Technology Laboratory (NETL) is currently preparing an environmental assessment for this project to meet the requirements of the *National Environmental Policy Act*. DOE estimates this Draft Environmental Assessment to be sent out for public comment by mid-September. At this time we anticipate a 21-day public comment period for this proposed project. A copy of the assessment will be sent to your office, where you may again respond to any specific comments or concerns.

To aid in the preparation of this environmental assessment and to meet obligations under Section 106 of the *National Historic Preservation Act* to take into account the effects of undertakings by federal agencies on historic properties, DOE is requesting any additional information your office has on historic properties that are present within 1 mile of the proposed project site. Please respond to the DOE's National Energy Technology Laboratory using the contact information provided below:

Mr. Fred Pozzuto
U.S. Department of Energy
National Energy Technology Laboratory
3610 Collins Ferry Road
Bldg. 1, MS B07
Morgantown, WV 26507-0880
Telephone: (304) 285-5219
Fax: (304) 285-4403
Email: Fred.Pozzuto@netl.doe.gov

Because this is a Recovery Act project, we would appreciate a quick response to our request for consultation. If you have any questions or require clarification, please contact me as noted above.

Thank you in advance for your consideration.

Sincerely,

Fred Pozzuto
Environmental Manager/NEPA Compliance Officer

Attachment – Completed "Request for SHPO Consultation" Form

TEXAS HISTORICAL COMMISSION

REQUEST FOR SHPO CONSULTATION:
Projects Subject to Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas

Submission of this form only initiates consultation with the Texas Historical Commission, the State Historic Preservation Officer (SHPO) for Texas. The SHPO may require additional information to complete the review for some projects.

FCC projects: this form should not be completed when submitting Form 620 or 621 for communications towers.

Section 106 of the National Historic Preservation Act of 1966, as amended, requires federal agencies to consider the effects of their undertakings on historic properties and to consult with the State Historic Preservation Officer (SHPO) regarding the undertaking. An undertaking is any action by or on behalf of a federal agency that has the potential to affect historic properties and includes funding, permit, or other approvals. Federal agencies are required to identify historic resources that may be affected and to avoid, minimize, or mitigate any adverse effects. The Section 106 regulations are codified in 36 CFR 800 and are available from the Advisory Council on Historic Preservation website at www.achp.gov. Regulations allow 30 days upon receipt for SHPO review.

The Antiquities Code of Texas (Title 9, Chapter 191 of the Texas Natural Resources Code) is intended to protect historic and archeological landmarks and is applicable to public lands owned by the state of Texas or a political subdivision of the state, including state agencies, counties, cities, school districts, and public colleges and universities, as well as other public authorities. Notification of the Texas Historical Commission is required before breaking ground on a project located on state or local public land.

☒ This is a new submission
Complete all pages of this form and include required attachments.

☐ This is additional information relating to original submission made on or about ______________
Complete only the first page of this form and add any new information, including attachments.

1. Project Information

PROJECT NAME
Center for Commercialization of Electric Technology (CCET)

PROJECT ADDRESS	PROJECT CITY	PROJECT ZIP CODE(S)
Discovery at Spring Trails	Northeast of Spring	77386

PROJECT COUNTY OR COUNTIES
Montgomery

PROJECT TYPE (Check all that apply)

- ☐ Road/Highway Construction or Improvement
- ☐ Site Excavation
- ☐ Utilities & Infrastructure
- ☒ New Construction
- ☐ Repair, Rehabilitation or Renovation of Structure(s)
- ☐ Addition to Existing Structure(s)
- ☐ Demolition or Relocation of Existing Structure(s)
- ☐ None of these

BRIEF PROJECT SUMMARY: Please provide a one- or two-sentence description to explain the project. More detail can be provided separately in Part 5, the Project Work Description Attachment.

DOE is proposing financial support for renewable energy and energy conservation elements of the Discovery at Spring Trails planned community now under development. Funded elements include a community solar farm and battery facility to be located adjacent to the community's recreational area.

2. Project Contact Information

PROJECT CONTACT NAME	TITLE	ORGANIZATION
Fred Pozzuto	NEPA Document Manager	U.S. Department of Energy

ADDRESS	CITY	STATE	ZIP
3610 Collins Ferry Road, Bldg. 1, MS B07	Morgantown	West Virginia	26507-0880

PHONE	EMAIL
304-285-5219	Fred.Pozzuto@netl.doe.gov

For SHPO Use Only **Date Stamp Below:**

Track Review to:

☐ Archeology Division Reviewer:

☐ History Programs Division Reviewer:

☐ Architecture Division Reviewer:

3. Federal Involvement

Does this project involve approval, permit, license, or funding from a federal agency?
☒ Yes (Please complete this section) ☐ No (Skip to next box)

FEDERAL AGENCY
U.S. Department of Energy

FEDERAL PROGRAM, FUNDING, OR PERMIT TYPE:
Smart Grid Demonstration Program - American Recovery and Reinvestment Act

FEDERAL AGENCY CONTACT PERSON
Fred Pozzuto

PHONE
304-285-5219

ADDRESS
National Energy Technology Laboratory
3610 Collins Ferry Road, Bldg. 1, MS B07
Morgantown, WV 26507-0880

EMAIL
Fred.Pozzuto@netl.doe.gov

Has the federal agency (if other than HUD) formally delegated authority to consult with SHPO on the agency's behalf? ☐ Yes (Please attach delegation letter) ☒ No

4. State Involvement

Does this project involve approval, permit, license, or funding from a state agency?
☐ Yes (Please complete this section) ☒ No (Skip to next box)

STATE AGENCY

STATE PROGRAM, FUNDING, OR PERMIT TYPE:

STATE AGENCY CONTACT PERSON

PHONE

ADDRESS

EMAIL

Will this project involve public land owned by the State of Texas or a political subdivision of the state? (State Agency, County, City, School District, Public Authority, Public College or University, etc.)
☐ Yes ☒ No

CURRENT OR FUTURE OWNER OF THE PUBLIC LAND

5. Project Work Description

Attach a detailed written description of the project that fully explains what will be constructed, altered, or demolished. Include architectural or engineering plans, site plans, specifications, or NEPA documents, as necessary, to illustrate the project.

6. Identification of Project Location and Area of Potential Effect (APE)

The APE includes the entire area within which historic properties could be affected by the project. This includes all areas of construction, demolition, and ground disturbance (direct effects) and the broader surrounding area that might experience visual or other effects from the project (indirect effects).

1. **Attach** map(s) indicating the location and specific boundaries of the project. Road names must be included and legible. Identify the project location, boundaries, and APE on the map(s) as precisely as possible. Suggested maps may include USGS 7.5 minute quadrangle maps (or relevant portions thereof), tax maps, satellite images, etc. The number and types of map(s) will depend on the nature and complexity of the project as well as the extent of the APE. **Projects involving ground disturbance must include the appropriate 7.5 minute USGS quadrangle.**
2. **Attach** a brief written description of the APE, including a discussion of the potential for direct and indirect effects that might result from the project and the justification for the boundaries chosen for the APE.

PROJECT NAME
Center for Commercialization of Electric Technology (CCET)

VER 01.10

7. Identification of Historic Properties within the APE (Attach additional materials as necessary)

A. Archeological Resources

Does this project involve ground-disturbing activity?

☑ Yes (Please complete this section) ☐ No (Skip to Structures section)

Describe the nature, width, length, and depth of the proposed ground-disturbing activity.

The 350' by 450' area where the solar array and storage battery would be located is about 4 acres of the roughly 1,200-acre Discovery at Spring Trails development. Footings for the solar panel framework would be about 4' deep.

Describe previous land use and disturbances.

Before the Discovery at Spring Trails development, the property was a wooded area consisting primarily of second growth pine with some hardwoods.

Describe the current land use and conditions.

Discovery at Spring Trails is a master planned community currently under development that will eventually have about 3,000 residences. Surrounding area is being developed primarily as residential with some light commercial (e.g., offices).

B. Structures

Are there any structures, buildings, or designed landscape features (park, cemetery, etc.) 45 years old or older within the project area or APE?

☐ Yes ☑ No

Is the project located within or adjacent to a district that is listed in or eligible for the National Register of Historic Places? Eligible districts may include locally designated districts or areas identified in historic resource surveys.

☐ Yes, name of district: _____ ☑ No ☐ Do not know

If the Texas Historic Sites Atlas (http://atlas.thc.state.tx.us) has been consulted, were previously identified architectural resources identified within the project area or APE?

☐ Yes ☑ No ☐ Did not consult Atlas

If the answer to any of the above questions is yes, use the space below or provide an attachment identifying each structure, building, designed landscape feature, or district within the APE that is 45 years old or older. Include an actual or estimated date of construction and the location of each of the features.

The Texas Historic Sites Atlas was consulted and no sites were identified on the map. Sites were also reviewed and no sites with well defined locations were in the APE. However, there were cemeteries and pawmills on the Montgomery County list that did not have sufficient location information for verification.

Does the project involve the rehabilitation, alteration, removal, or demolition of any structure, building, designed landscape feature, or district that is 45 years old or older?

☐ Yes ☑ No

If yes, include information with the attachments for Part 5: Project Work Description and Part 8: Photographs.

8. Photographs

Attach clear, high-resolution color photographs that illustrate the project area and APE as defined in Section 6. Images from the internet are not acceptable due to low resolution. Photography should document the project area and properties within the APE, including clear views of any buildings or structures. Please number and label all photographs, and include a map or site plan labeled to show the location and direction of each view. Where applicable, include photographs of the surrounding area from the project site and streetscape images. Should your project entail the alteration of existing structures, please also provide photographs of the existing conditions of sites, buildings, and exterior and interior areas to be affected.

9. Consulting Parties/Public Notification (Section 106 only)

Attach a description of the actions taken to notify the public or invite consultation with parties other than SHPO. Provide a summary of any consultation and comments received from consulting parties or the public.

The SHPO is only one consulting party under Section 106. Refer to 36 CFR 800.2 for information about other participants who are entitled to comment on the Section 106 process, including Native American tribes, interested parties, and the public. Consultation with the SHPO is not a substitution for consultation with Native American tribes. When identifying historic resources within the APE and determining the effect of an undertaking, applicants should consider consulting with the county historical commission and the local historic preservation officer, if any.

PROJECT NAME: Center for Commercialization of Electric Technology (CCET)

10. Applicant's Determination of Effect (Section 106 only)

An effect occurs when an action alters the characteristics of a property that qualify it for listing in the National Register of Historic Places, including changes to the property's location, design, setting, materials, workmanship, feeling, and association. Effects can be direct or indirect, and can be physical, visual, audible, or economic. They may include a change in ownership or change in use.

- ■ **No Historic Properties Affected** based on 36 CFR 800.4(d)(1). Please provide the basis for this determination.
- ☐ **No Adverse Effect** on historic properties based on 36 CFR 800.5(b). Please explain why the criteria of adverse effect at 36 CFR 800.5(a)(1) were not found to be applicable for your project.
- ☐ **Adverse Effect** on historic properties based on 36 CFR 800.5(d)(2). Please explain why the criteria of adverse effect at 36 CFR 800.5(a)(1) were found to be applicable to your project. You may also wish to include an explanation of how these adverse effects might be avoided, minimized, or mitigated.

In the space below or as an attachment, please explain the effect of the project on historic properties.

Per the Texas Historic Sites Atlas, there are no historic properties within a 1-mile APE of the solar panel and storage battery site. The actual APE is not expected to extend beyond the boundaries of the Discovery at Springs Trails development, which are less than 1-mile in most directions. The extended development (that is, the Discovery at Spring Trails community) is not part of the U.S. Department of Energy proposed action and will continue without or without the DOE's funding action.

Submit Completed Form and Attachments to:

Via mail:
Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission
PO Box 12276
Austin, TX 78711

Via hand delivery or private express delivery:
Mark Wolfe
State Historic Preservation Officer
Texas Historical Commission
108 West 16th St.
Austin, TX 78701

Faxes and email are not acceptable.

For SHPO Use Only

PROJECT NAME		
Center for Commercialization of Electric Technology (CCET)		
PROJECT ADDRESS	PROJECT CITY	PROJECT ZIP CODE(S)
Discovery at Spring Trails	Northeast of Spring	77389
PROJECT COUNTY OR COUNTIES		
Montgomery		

PROJECT CONTACT NAME	TITLE	ORGANIZATION	
Fred Pozzuto	NEPA Document Manager	U.S. Department of Energy	
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Attachment to
REQUEST FOR SHPO CONSULTATION

Project Name: Center for Commercialization of Electric Technology (CCET)
Submitted By: U.S. Department of Energy (DOE), National Energy Technology Laboratory (NETL)

Information is presented in accordance with the section numbers in the Request form.

5. Project Work Description

The Center for Commercialization of Electric Technologies (CCET) is a consortium of 21 Texas electric and high tech companies and five universities with a goal to modernize the Texas electric system. The CCET proposed project would demonstrate a multi-faceted approach for managing fluctuations in renewable energy sources, primarily wind power, in the electric transmission grid.

In 2008, Texas wind power generating capacity was at 8,500 megawatts, which represented roughly 8 percent of the state's generating capacity, and by 2020 it is expected that wind capacity will increase by an additional 10,000 megawatts. 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 country 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 equipment within the regional transmission grid to better monitor operating status and margins, and (2) use of advanced integrated technology in a smart grid community, the Texas Future Community. These two project components are addressed further in the sections that follow.

A third component to management of fluctuating energy sources as envisioned by CCET is the Smart Meter Texas Portal, which will eventually provide transmission system operators with the capacity to shed large-scale blocks of electrical demand by being linked to hundreds of thousands of participants with demand response capabilities or capacity. Thus reductions in wind power could trigger reductions in electrical demand on the grid by triggering a reaction in the way electricity is used by customers throughout the system. Reduction in customer demand would range from large industrial facilities that already respond to electricity price signals to individual residences with home area network devices integrated into components such as home battery systems, photovoltaic systems, and demand response appliances. The Smart Meter Texas Portal is being developed outside the current project (that is, it is not included in the project being proposed for DOE grant) and will not be described further.

5.1 Monitoring Equipment in the Regional Transmission Grid

This regional portion of the CCET project would improve management of fluctuations in wind power within the Electric Reliability Council of Texas (ERCOT) transmission grid by providing operators an improved tool to monitor the system's status. Monitoring devices would be installed in the system that take rapid measurements of the voltage, current, and frequency of the electricity at a specific location and time in the grid and convert each data point into a phase vector or "phasor" representation. With the advances in Global Positioning System technology,

these measurements can be identified with a precise location and time when they are transmitted to a data processing center. The monitoring devices are called phasor measurement units and when the data are time-synchronized they are referred to as synchrophasors. The phasor measurement units typically sample at speeds of 30 observations per second and are connected to transmitters that continuously send the data to processing centers. At the processing centers, computers evaluate synchrophasers from around the system, matched by their time stamps, to provide a real-time and evolving status of the transmission system. The data can be interpreted to show where demands are highest, where the system is being stressed, and what adjustments are necessary to accommodate fluctuations in power sources or unexpected transmission line outages. Overall, this technology supports a more reliable and stable transmission grid.

As suggested by the technology description, this portion of CCET's proposed project would be limited to the installation of equipment at strategic locations within the existing transmission system of Texas. Specifically, this would be done by putting new equipment in 11 existing substations and at two proposed substations currently undergoing construction approval by the Public Utility Commission of Texas. These substations are (or will be) built-up areas where the new equipment basically would be indistinguishable from existing equipment. That is, possibly with the exception of three of the substations where new microwave towers would be required for the new transmitters. If needed, the new towers would be installed within the substation, but they potentially would represent a component with a slightly different appearance than the existing equipment. Substation locations (all within the Oncor Electric Delivery Company's transmission system) where it is expected that new microwave towers would be needed, each with a height of about 30 feet, are identified as follows:

- Odessa Station – In Ector County, near Odessa.
- Longshore Station - In Howard County (along southern border), near Forsan.
- Tonkawa Station – In Scurry County (near the southeast corner), southeast of Hermleigh.

[Note: Since this element of the proposed project involves minimal earth disturbance (all work is within existing substations), the locations are not addressed in further detail in this document. Should the SHPO disagree with that position, additional information will be provided upon request.]

5.2 The Texas Future Community

The objectives of the Texas Future Community component of the CCET project are to demonstrate how demand response programs, coupled with energy efficient building shells, solar photovoltaic (PV) systems, nocturnal plug-in hybrid electric vehicle (PHEV) charging and, battery storage can reshape demand loads and increase energy efficiency. The CCET project proposes to use the Discovery at Spring Trails master planned community to demonstrate the smart grid community component of its overall approach to managing fluctuations in the electric transmission grid. This housing community, being developed by Land Tejas Companies, is

located approximately 25 miles north of downtown Houston, in Montgomery County Texas (Figures 1 and 2). Ultimately, it will be the location of up to about 3,000 new homes. The surrounding area is being developed primarily as residential, but with some light commercial activities (for example, offices).

The Discovery at Spring Trails community is being promoted as "Houston's first solar-powered hybrid community" with "green homes" having high performance, extremely efficient building envelope and lighting packages, a minimum of 1 kilowatt of solar PV rooftop (or trellis) panels, and a General Electric home energy dashboard and smart thermostat. Under the proposed project, 10 of the houses would be "deep green homes" with the same building envelop and lighting packages as the green homes, but also with a minimum of a 3-kilowatt PV system, a PHEV charging system in the garage (along with PHEVs for the occupants), a household energy storage system (each consisting of a battery system with 10 lithium iron magnesium phosphate modules) capable of several hours of discharge at the 2-kilowatt level, and a home energy management system. The management system would allow for interface with the battery and PHEV charging systems, and allow the electric utility to manage loads remotely through broadband internet and easy-to-install in-home devices. Under the demonstration project, energy consumption would be tracked in the green and deep green homes. For comparison, consumption would also be tracked in conventional code-built homes of similar size and appearance in an adjacent community.

Much of DOE-funded activity under the Texas Future Community component of the CCET project would occur within homes and via monitoring and control equipment throughout Discovery at Spring Trails. Construction of the planned community, utilities, and other infrastructure considerations are not identified as being part of this proposed project, as they are already planned and on-going efforts. The exception to this and the most visible element of the proposed project would be a four-acre community solar and battery facility. Specifically, the activities planned at this site are the construction of a 500-kilowatt solar PV farm, placement of a 250-kilowatt storage battery, placement of a two-stall community PHEV charging station, and a public information kiosk. The general location of this element of Discovery at Spring Trails is shown in Figure 2. Figure 3 provides a detailed view of the location where the solar farm and battery would be constructed.

To enhance visibility of the project, the solar farm and battery complex would be located adjacent to a community water park. The parking area would serve both the water park and provide public parking and public viewing of the solar farm. The informational kiosk and electric PHEV community charging station would be located on or near the parking area. The kiosk would serve to educate the general public on the various energy conserving and renewable generation features on-site as well as explain what is occurring elsewhere in the community as part of the demonstration project.

Figure 1. Regional map showing approximate location of the Discovery at Spring Trails community in relation to Houston.

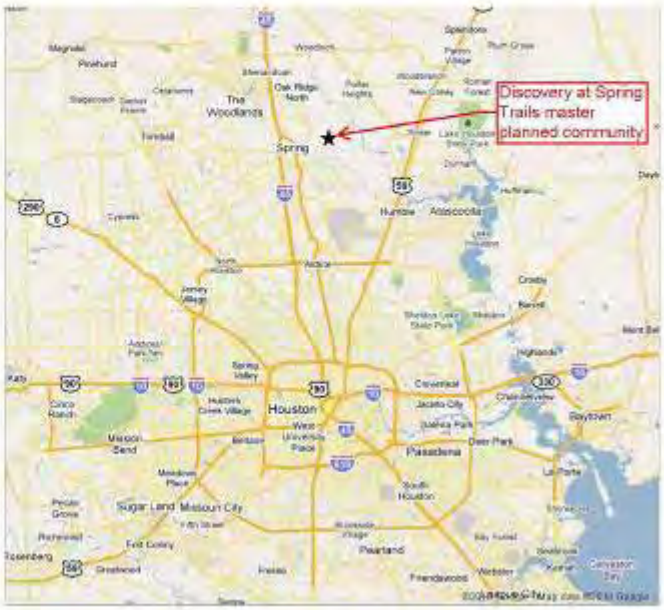

Figure 2. Vicinity map showing general location of the Discovery at Spring Trails community and the location of the community solar farm and battery facility

Figure 3. Detailed view (artist's rendering) of the location where the solar farm and battery would be located, which is adjacent to the community recreation area. (From the center of the figure, north is toward the upper left corner.)

Current plans call for the 500-kilowatt solar farm to be located between a landscaped impounded portion of Discovery Creek to the south and the already operational Discovery at Spring Trails water treatment plant to the north (Figure 3). Two Conroe Independent School District schools are located to the north of the water treatment plant. The area designated for the solar farm is approximately four acres in size and with the adjacent recreation facilities, represents a total of about 10 acres of common, community ground and associated facilities. The solar farm would provide power to the water treatment plant and would be built in two phases: an initial 250 kilowatts on the south portion of the four-acre parcel (on the southern side of the planned road into the housing area) and a second phase of 250 kilowatts to be built to the north of the first phase. Both areas would consist of multiple arrays of photovoltaic panels with each array consisting of solar modules mounted on a metal framework anchored to the ground with concrete piers. The metal framework would be designed to allow the panels to be sloped toward the south for optimal exposure to the sun. The top edge of the modules would be 10 to 11 feet above the ground and the bottom edge would be about 2 feet above the ground. The 250-kilowatt community battery would also be located within this four acre complex. The battery would be trailer-mounted and the facility would include a supervisory control and data acquisition (SCADA) system. The solar farm and battery would be separated by a fence from the adjacent water park and recreational area.

The land cover prior to development is primarily second growth pine with some hardwoods. The land would be partially cleared of pines. Some reshaping of the surface would occur so as to provide drainage and aesthetics. There would be underground cables, conduits, water lines, wastewater lines (for a possible public bathroom) to support these demonstration facilities as well as the recreational facilities. A drawing card for this master planned community is the integration of residences with the natural surroundings. With or without DOE funded activities, the developer indicates all construction sites will be re-vegetated. In addition, construction will occur with all required storm water runoff requirements (e.g., silt fences) so as to avoid the temporary impacts of construction. All areas not covered by paving and facility footprints will be either landscaped or left in its original condition. Without DOE funding, the 4-acre area set aside for the solar farm and battery facility would be used for additional home lots.

6. Identification of Project Location and Area of Potential Effect (APE)

6.1 Maps

Figure 4 is a clip from the USGS 7.5 minute quadrangle map (Spring TX) where the proposed community solar farm and battery facility would be located within Discovery at Spring Trails.

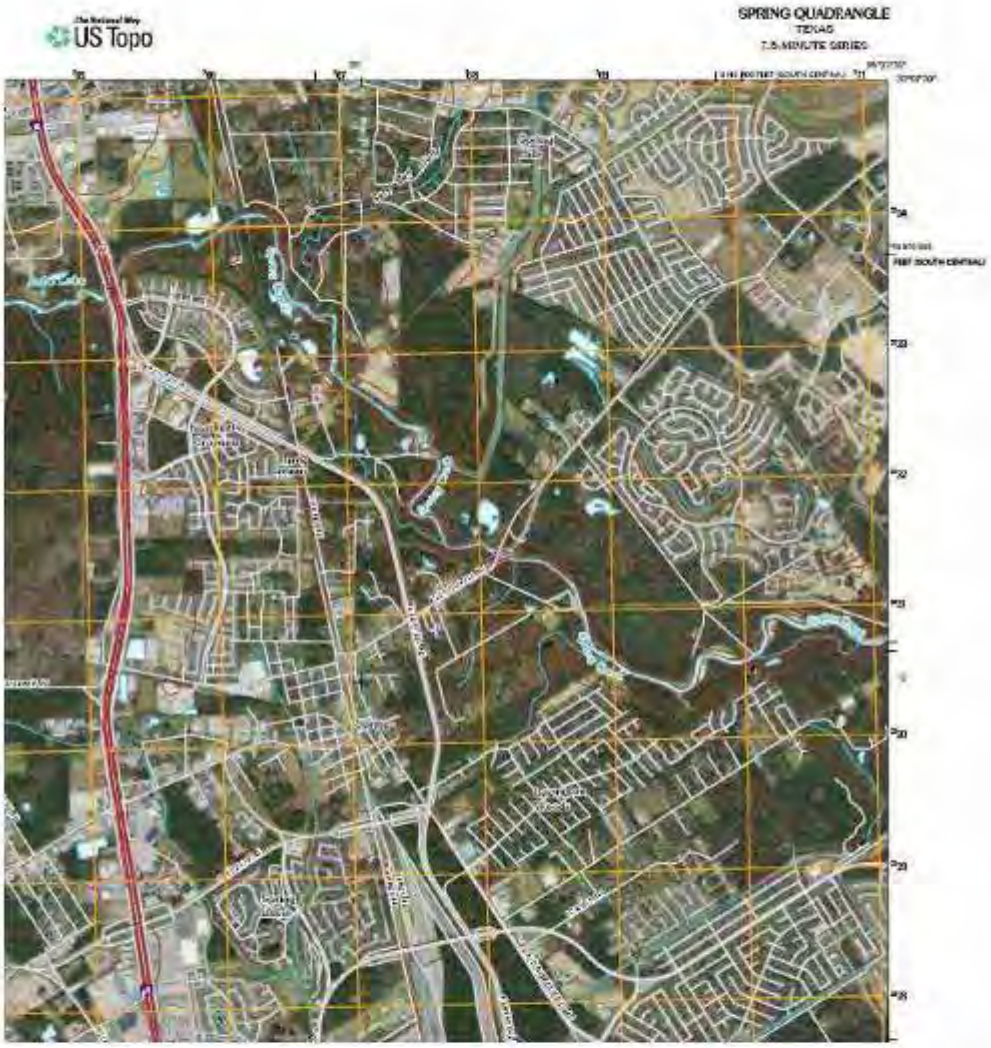

Figure 4. Clip from USGS 7.5 minute quadrangle map, Spring TX, showing the approximate location of the proposed community solar farm and battery facility at Discovery at Spring Trails.

Figure 5 provides an aerial view of the project site and a circle that is about 1 mile from the outside boundaries of the solar farm and storage battery area; that is the circle radius is slightly more than 1-mile.

Figure 5. Aerial view of the project site and a circle that is about 1 mile from the outside boundaries of the solar farm and storage battery area.

6.2 Written Description of Area of Potential Effect (APE)

As a conservative measure, a circle centered on the solar farm and storage battery site (Figure 5) and with a radius of slightly more than 1 mile was considered as the APE for review of historic properties. This is conservative because it is very unlikely that the project activities would have any effect beyond the boundaries of the Discovery at Spring Trails development. Construction and earth disturbing actions associated with the solar farm and storage battery site would consist primarily of clearing the area and performing some earthwork for contour development plus some digging for utility trenches and footings for the metal framework that will hold the solar panels. This work is less than would normally be associated with the residential lot development and home building that is on-going around the site. Plus the solar panels, once mounted in the framework, are not expected to be higher than 10 or 11 feet, so their visual impact, in terms of the distance from which they could be seen, would be less than the houses. Once the surrounding lots are built-up, it is expected that the solar farm and storage battery area would not be visible from areas outside the Discovery at Springs Trails development, with the possible exception of the from the housing area and the Conroe Independent School District schools on the north side of the project area.

8. Photographs

Figure 6 is an aerial view of the solar farm and storage battery area. Figures 7 and 8 are ground-level views of the existing roadways and landcover.

Figure 6. Aerial view of the solar farm and storage battery area. Point A is shown in Figure 7 and Point B is shown in Figure 8.

Figure 7 is from Rayford Road, looking eastward at the project area (Point A on Figure 6). The solar farm would be installed within the wooded area (near top of photo) just beyond the depression (middle of photo). Figure 8 is looking to the north from the intersection of Rayford Road and Waterbend Cove Road (Point B on Figure 6), the project site on the left side within the wooded area.

Figure 7. Looking eastward from Rayford Road.

Figure 8. Looking northward at Waterbend Cove Road.

9. Consulting Parties/Public Notification

DOE will be notifying the Alabama-Coushatta Tribe of the proposed action and requesting any comments they might have on the action or the proposed project site. Should the SHPO know of other Native American tribes that might be interested in the proposed action, the name(s) and contact information would be greatly appreciated.

Also, an environmental assessment (EA) is currently being prepared for DOE's proposed action of providing a grant for the CCET. The draft EA will be made available to interested parties and to the public.

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

U.S. DEPARTMENT OF ENERGY

August 26, 2010

Mr. Carlos Bullock, Chairman
Alabama-Coushatta Tribe of Texas
571 State Park Road 56
Livingston, TX 77351

RE: U.S. Department of Energy Request for Informal Consultation and comment for the Proposed Center for Commercialization of Energy Technology project located in Montgomery County, Texas

Dear Mr. Bullock:

The U.S. Department of Energy (DOE) is proposing to provide a financial assistance grant to the Center for Commercialization of Energy Technology (CCET) as part of the Smart Grid Demonstration Program, funded through the *American Recovery and Reinvestment Act of 2009* (Recovery Act). If funded, CCET would develop and demonstrate a multi-faceted, synergistic approach to managing electrical energy within the Electric Reliability Council of Texas transmission grid. The project would result in two general areas of physical construction activities. One element, the Texas Future Community, would demonstrate the use of advanced integrated technology in a smart grid community that combines household and community energy production, storage, and management. The second element would improve system monitoring on a regional scale, so that instabilities in the grid from fluctuating power sources such as wind energy can be better managed in conjunction with other power sources and varying demand.

The first project activity site would be the Texas Future Community component located at Discovery at Spring Trails. This residential development is a planned community currently under construction, about 25 miles north of Houston. Adjoining this development is where CCET would clear an approximate 4-acre wooded site enabling the installation of a 500-kilowatt solar farm, trailer-mounted 250-kilowatt storage battery units, and other green energy technologies. The community site is located in southern Montgomery County, approximately 30 degrees north latitude and a longitude of 95.4 degrees west. It can be accessed from downtown Houston by traveling approximately 23 miles north on the Hardy Toll Road and then taking Riley Fuzzel Road for about 2 miles to the northeast. The nearest incorporated area is Spring, Texas, in Harris County. In addition to the community solar farm and battery system on the 4-acre site, the CCET project would also include installation of small photovoltaic systems on individual homes along with items such as smart meters, load interruptible demand response appliances, receptacles for plug-in hybrid electric vehicles, and other power management instruments. The project elements planned for individual homes would be indistinguishable from the normal construction process, which has already received necessary approvals and permits. Attachment 1 provides several maps

3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507

and figures showing the location of Discovery at Spring Trails and the proposed community solar facility within the development.

The second element of CCET's proposed project would be limited to the installation of equipment at strategic locations within the existing transmission system of Texas. Specifically, this would be done by putting new equipment in 11 existing transmission substations and at two proposed substations currently undergoing construction approval by the Public Utility Commission of Texas. These substations, which are dispersed over south and central Texas, are (or will be) built-up areas where the new equipment basically would be indistinguishable from existing equipment. A more noticeable exception would be at three of the substation locations where 30' microwave radio towers would likely be required for communication of power distribution data. If needed, the new towers would be installed within the substation, but they potentially would represent a component with a slightly different appearance than the existing equipment. Specific locations of the substations are not further described in this letter because of the low impact nature of the actions that would take place at those locations. However, please let us know if you would like more information on the substations.

DOE's National Energy Technology Laboratory (NETL) is currently preparing an environmental assessment for this project to meet the requirements of the *National Environmental Policy Act*. DOE estimates this Draft Environmental Assessment to be sent out for public comment by mid-September. At this time we anticipate a 21-day public comment period for this proposed project. A copy of the assessment will be sent to your office, where you may again respond to any specific comments or concerns.

DOE is initiating informal consultation and requesting information your tribe may have on properties of traditional religious and cultural significance within the vicinity of the CCET project and any comments or concerns you have on the potential for this project to affect these properties. This information is being requested to aid in the preparation of the environmental assessment and to meet DOE's obligations under Section 106 of the *National Historic Preservation Act* and the *Native American Graves Protection and Repatriation Act of 1990*. If you have any such information, require additional information, or have any questions or comments about the CCET project, please contact DOE's NETL using the contact information provided below:

Mr. Fred Pozzuto
U.S. Department of Energy
National Energy Technology Laboratory
3610 Collins Ferry Road, Bldg. 1, MS B07
Morgantown, WV 26507-0880
Telephone: (304) 285-5219
Fax: (304) 285-4403
Email: Fred.Pozzuto@netl.doe.gov

Because this is a Recovery Act project, we would appreciate a quick response to our request for consultation. If you have any questions or require clarification, please contact me as noted above.

Thank you in advance for your consideration.

Sincerely,

Fred Pozzuto
Environmental Manager,
NEPA Compliance Officer

Attachment – Maps and figures of the Discovery at Spring Trails community

Figure 1. Clip from USGS 7.5 minute quadrangle map, Spring TX, showing the approximate location of the proposed community solar farm and battery facility at Discovery at Spring Trails.
Figure 2. Regional map showing general location of the Discovery at Spring Trails community and the location of the community solar farm and battery facility.
Figure 3. Artist's rendition (conceptual) of the community recreation area where the solar farm (shown here as an array of black rectangles) and battery facility would be located.

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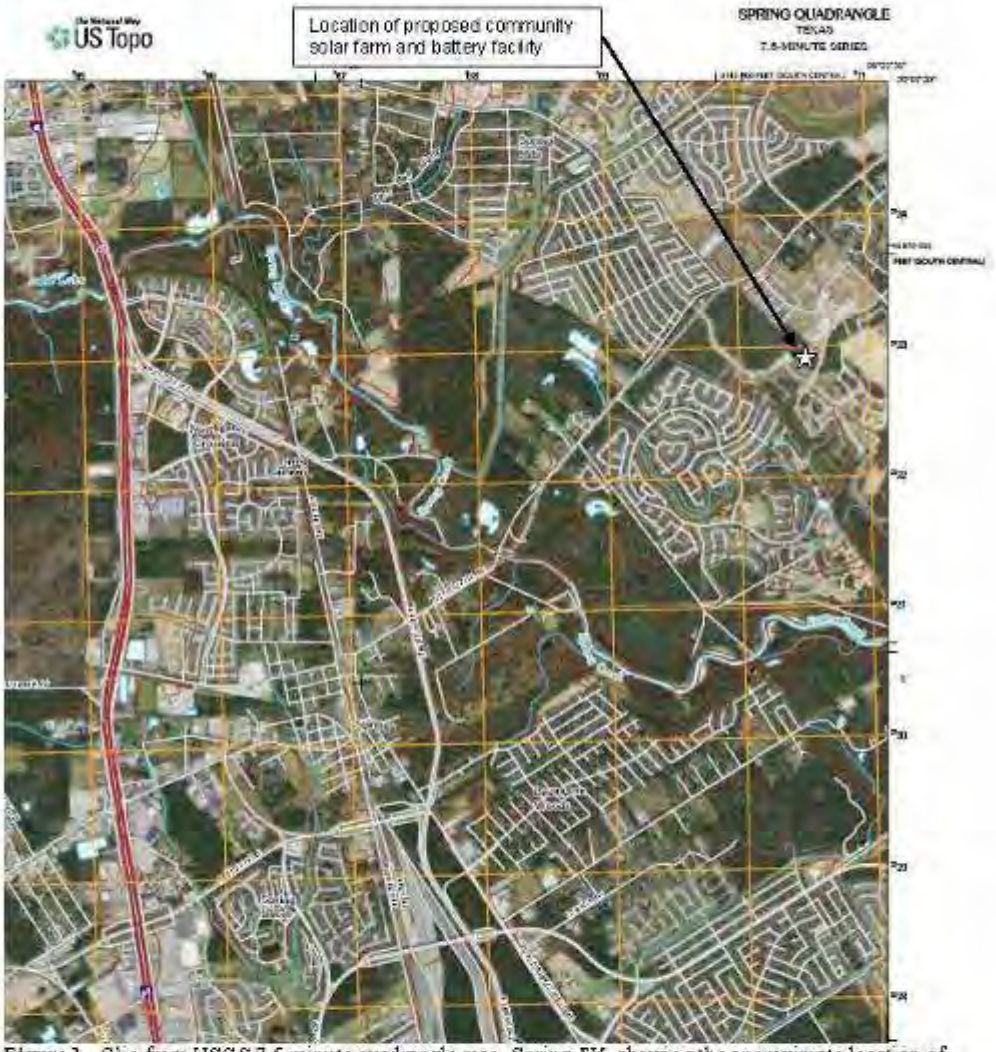

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1 SPLASH PAD SITE LAYOUT

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.