FINAL SCIENTIFIC/TECHNICAL REPORT

Submitted to the US Department of Energy, Golden Field Office, February, 2016

DOE Award Number DE-EE0003582

Name of Recipient: **Orange County, Florida**

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Project Period of Performance: July 1, 2011 through October 31, 2015

Total Project Cost: **$**152,733.70
($14,400 Orange County/$138,333.70 DOE/GO)

Title:

Orange County Photovoltaic Project & Educational Component

Executive Summary

The purpose of this report is to discuss the projects implemented, utilizing Department of Energy grant funds, to support the use and understanding of renewable energy in Orange County, Florida and the Greater Orlando Area.

Orange County is located in the State of Florida and is most popularly referred to as Orlando. The greater Orlando area's current population is 1,225,267 and in 2015 was the first destination to surpass 60 million visitors.

Orange County utilized grant funds to add to the growing demand for access to charging stations by installing one level 2 dual NovaCharge CT4021 electric vehicle charging station at the Orange County/University of Florida Cooperative Extension Center. The charging station is considered a "smart" charger connected to a central network operated by a third party. Data collected includes the number of charging sessions, session start and end times, the electricity usage, greenhouse gases saved and other pertinent data used for reporting purposes. Orange County continues to support the use of electric vehicles in Metro Orlando and this project continues to bring awareness to our public regarding using alternative vehicles. Additionally, we offer all visitors to the Orange County/University of Florida Cooperative Extension Center free charges for their electric vehicles 24 hours a day. Since the operation of the charging station there have been 52 unique driver users, a total of 532.2258 kg of greenhouse gas savings and 159.03 gallons of gasoline savings. The installation of the additional electric vehicle charging station is part of a county-wide goal of promoting implementation of renewable energy technologies as well as supporting the use of electric vehicles including the Drive Electric Orlando & Florida programs. http://driveelectricorlando.com/ & ; http://www.driveelectricflorida.org/ .

Grant funds were also used for Outreach and Educational efforts. Educational efforts about renewable energy were accomplished through the continued support as well as a proposed expansion and potential relocation of the Climate Change Education Center. The growth of the Climate Change Education Center focused on 2 educational subsectors. The first educational sector focused on an apprenticeship with university students. The second sector Orange County partnered with a hospitality college that held seminars to educate students in sustainability best practices that would influence the industry as a whole as students take jobs around the U.S. and other parts of the world. Orange County completed five of the originally proposed six educational seminars. The first seminar focused on community based social marketing techniques for driving sustainable behavior changes. The second seminar held was a green team workshop. The third seminar focused on urban sustainability planning. The fourth and fifth seminars held were Florida Energy Code workshops for building inspectors. A sixth transit oriented development seminar in partnership with Rollins College was explored, but was not conducted because the proposed on campus venue was not accessible for an extended period of time due to renovations. Additionally, an ENERGY STAR training program was conducted with students from the University of Central Florida; three of the five buildings assessed received ENERGY STAR ratings; one student completed the training and received their certification as an ENERGY STAR Specialist.

Background:

Location: Orange County is located in the central region of the State of Florida and is most popularly known for including the City of Orlando. The greater Orlando area's current population is 1,225,267 and is home to large corporations such as Walt Disney World, Universal Studios Orlando, Ritz Carlton, Darden Restaurants, and the nation's second largest convention center.

Opportunities Identified:

- *Encouraging Sustainability in Major Sectors*: The Central Florida economy is largely dependent on the hospitality industry and in 2015 it was the first destination to surpass 60 million visitors. With over 60 million visitors each year, 120,000 hotel rooms, 4,000 restaurants, and 75 theme parks and attractions, the local hospitality industry provided a wealth of opportunity to reduce greenhouse gas emissions through building energy efficiency and renewable energy. Accordingly, Central Florida is an ideal training ground for teaching best practices for sustainability focused on the hospitality industry.

- *Meeting the Growing Demand for Electric Vehicle Infrastructure*: According to the 2014 U.S Clean Tech Leadership Index Report, nationwide electric vehicle ownership in the top 50 largest metro areas increased sharply in 2013; the Orlando Metro Area was ranked #5 in the nation in in terms of electric vehicle charging stations per one million people. Additionally, the Orange County 2014-2015 Annual Sustainable Orange County Report indicated there are 300 electric vehicle charging stations in Central Florida (roughly 300 charging stations within ~70 mile radius available to our residents of Orange County). By increasing and improving access to charging stations, Orange County supports the growing demand for renewable energy technologies.

Project Achievements/Accomplishments:

Installing an Electric Charging Station: Orange County utilized grant funds to install one level 2 dual NovaCharge CT4021 electric vehicle charging station at the Orange County/University of Florida Cooperative Extension Center. The charging station is considered a "smart" charger connected to a central network operated by a third party that monitors the number of charging sessions, session start and end times, the electricity usage, greenhouse gases saved and other pertinent data. During the six months of operation of the charging station there have been 52 unique driver users of the charging station; a total of 532.2258 kg of greenhouse gas savings and 159.03 gallons of gasoline savings.

Operation and Potential Relocation of the Orange County Climate Change Education Center: The Climate Change Education Center, originally located within the Orange County Convention Center, served as a central place to inform and educate commercial and residential sectors of environmental, health, and economic benefits of renewable energy, energy efficiency, and greenhouse gas emission reductions. Grant funds were used to pay for the rent required to maintain a lease at the Convention Center, conduct five educational workshops, and for planned upgrades to the Center displays highlighting a number of energy efficiency and renewable energy projects implemented at the Orange County Convention Center and Downtown Orange County. An initial design concept for an upgraded Climate Change Education Center

and educational displays was proposed. However, after the Convention Center determined the space occupied by the Climate Change Education Center; a feasibility study for relocation to the proposed area was conducted in October 2013.

In December 2013, it was determined that the desired location of the for the Climate Change Education Center at the Orange County Extension Education Center provided too many construction challenges for relocation with too many building retrofits and access problems, including lack of access for loading and unloading exhibits as well as roof drainage relocations and sewer service connection issues. Another suitable location for relocating the Climate Change Education Center could not be located so the project was terminated. The Climate Change Education Center is no longer in existence in Orange County and has been eliminated. Grant funds were used to pay for marketing services for a state wide marketing program including solar & other renewable energy technologies for rebranding and developing marketing materials including web site design and updating. A website was maintained and updated the www.PowerUpGreenEnergy.com website (no longer in service).

Sustainability Training for the Hospitality Industry and Major Sectors: To introduce energy efficiency and renewable energy concepts to the hospitality industry, Orange County partnered with a hospitality college that held seminars to educate students in sustainability best practices that would influence the industry as a whole as students take jobs around the U.S. and other parts of the world. Orange County completed five of the originally proposed six education seminars. Seminar topics included: driving sustainable behavior change through community based social marketing; green team programs; urban sustainability planning; and Florida Energy Code workshops for building inspectors. In partnership with Rollins College, a sixth seminar focused on transit-oriented development was explored, but was not conducted due to extended renovations at the proposed on-campus venue.

Green Job Training Development: To promote green industry development and on-the-job training in occupations that encourage energy efficiency and resource reduction, Orange County piloted an ENERGY STAR training and apprenticeship program with students from the University of Central Florida; three students applied for the program; one student completed the training and received their certification as an ENERGY STAR specialist; three of the five buildings assessed received ENERGY STAR Ratings.

Summary of Project Activities during Funding Period

Task 1 Overview: Request for Proposals, Design, Construction and Demonstration

The original project scope for Task 1 activity was authorized to construct and install 2 photovoltaic electric vehicle charging stations at the Orange County Convention Center. The electric vehicle charging stations were to be “dual-charging” stations, meaning the units would consist of two types of charging systems (100V and 240V). The systems were planned to be part of a county-wide goal of promoting implementation of renewable energy technologies as well as support the Solar City grant and the ChargePoint America Program. In 2013, Orange County was notified by the Orange County Convention Center sustainability coordinator that the Convention Center made a decision to not pursue the photovoltaic electrical charging stations project at the

Convention Center due to Convention Center operational and budget constraints as well as recent renovations at the Orange County Convention Center. Orange County evaluated the viability of modifying the location of the solar powered electric vehicle charging stations by partnering with Orange County Public School's Mid Florida Tech campus, they decided not to proceed with the project.

Orange County proposed modifications to the Statement of Project Objectives Task 1.0 activities to include installing one level 2 (240V) and/or one level 3 (480V) smart charging station designed to tie into a photovoltaic canopy charging station that was being planned for construction in Summer of 2014 at the Orange County/University of Florida Cooperative Extension Center. In July of 2014, DOE approved the revised Statement of Project Objectives and issued a modification to the grant and completed the activity in September 2015.

Summary of Task 1 project activities:

August 2011 - September 2011, DOE presented Orange County with the Grant Assistance Agreement DE-EE0003582 on August 23, 2011. The Orange County Board of County Commissioners approved the agreement on September 20, 2011.

October 2011 - December 2011, Orange County established the proposed locations of the photovoltaic electric vehicle charging stations on the Orange County Convention Center property and discussed with Orange County Convention Center staff. The scope of work for the stations was prepared.

January 2012 - March 2012, the proposed locations of the photovoltaic electric vehicle charging stations on the Orange County Convention Center property were discussed with the Orange County Convention Center staff. Orange County Convention Center staff contacted the local utility provider regarding any additional utility requirements such as a transformer. The scope of work was under review.

April 2012 - June 2012, prepared photovoltaic electric vehicle charging station design proposal.

July 2013 - Sept 2012, the design proposal came in higher than anticipated. A request for proposal (RFP) for the design was prepared.
October 2012 - June 2013, the Orange County Convention Center worked on obtaining a design and construction firm for the photovoltaic electric vehicle charging stations systems.

July 31, 2013, the Orange County Environmental Protection Division was notified by the Orange County Convention Center sustainability coordinator that the Convention Center made a decision to not pursue the photovoltaic electrical charging stations project at the Convention Center due to Convention Center operational and budget constraints as well as recent renovations at the Orange County Convention Center. Orange County evaluated the viability of modifying the location of the solar powered electric vehicle charging stations by partnering with Orange County Public School's Mid Florida Tech campus.

December 2013, Orange County was notified that Orange County Public School's Mid Florida Tech campus did not wish to proceed with the project.

January 2014, Orange County proposed modify and change the Statement of Project Objectives Task 1.0 activities to include installing one level 2 (240V) and/or one level 3 (480V) smart charging station designed to tie into a photovoltaic canopy charging station that was being planned for construction in Summer of 2014 at the Orange County/University of Florida Cooperative Extension Center.

February 2014, Orange County submitted the modification to the Statement of Project Objectives with a request for DOE to conduct a new NEPA review/determination for the new location change prior to incurring any DOE or County expenditures for Task 1.0 activities.

July 3, 2014, DOE approved the revised Statement of Project Objectives and issued a modification to the grant; NEPA eligibility review was completed and approved by DOE.

October 2014, under another DOE grant DE-EE0000309 Orange County commenced the installation of a 20kW photovoltaic solar canopy at Orange County/University of Florida Cooperative Extension Center. The solar energy harnessed by the array was planned to be used to power the building and provide solar energy for transportation purposes through the Electric Vehicle Supply Equipment and Charging Station to be installed under this grant award DE-EE0003582 for Task 1 activities.

December 2014, a scope of work was prepared and submitted to Orange County Capital Projects for preparation of bid documents. The scope of work included requesting the bid for installation of two level 2 (240 volt), or one duel (240v) electric vehicle supply equipment capable of recharging two electric vehicles.

January 2015, Orange County Contracts and Purchasing Department reviewed Orange County Environmental Protection Division and Capital Projects Division request for RFP & bid issuance. In order to maintain continuity in warranties with the existing 20 kW photovoltaic structure with the installation of the electric vehicle station and associated permits and wiring, it was decided by Contracts and Purchasing that an issuance of a RFP was not appropriate. Therefore, a quote was requested for submittal under existing contract Y14-784 - Co-Op Extension Carport Mounted Photovoltaic System between Orange County and Café Construction and Development Inc. under DOE Grant DE-EE0000309 was issues

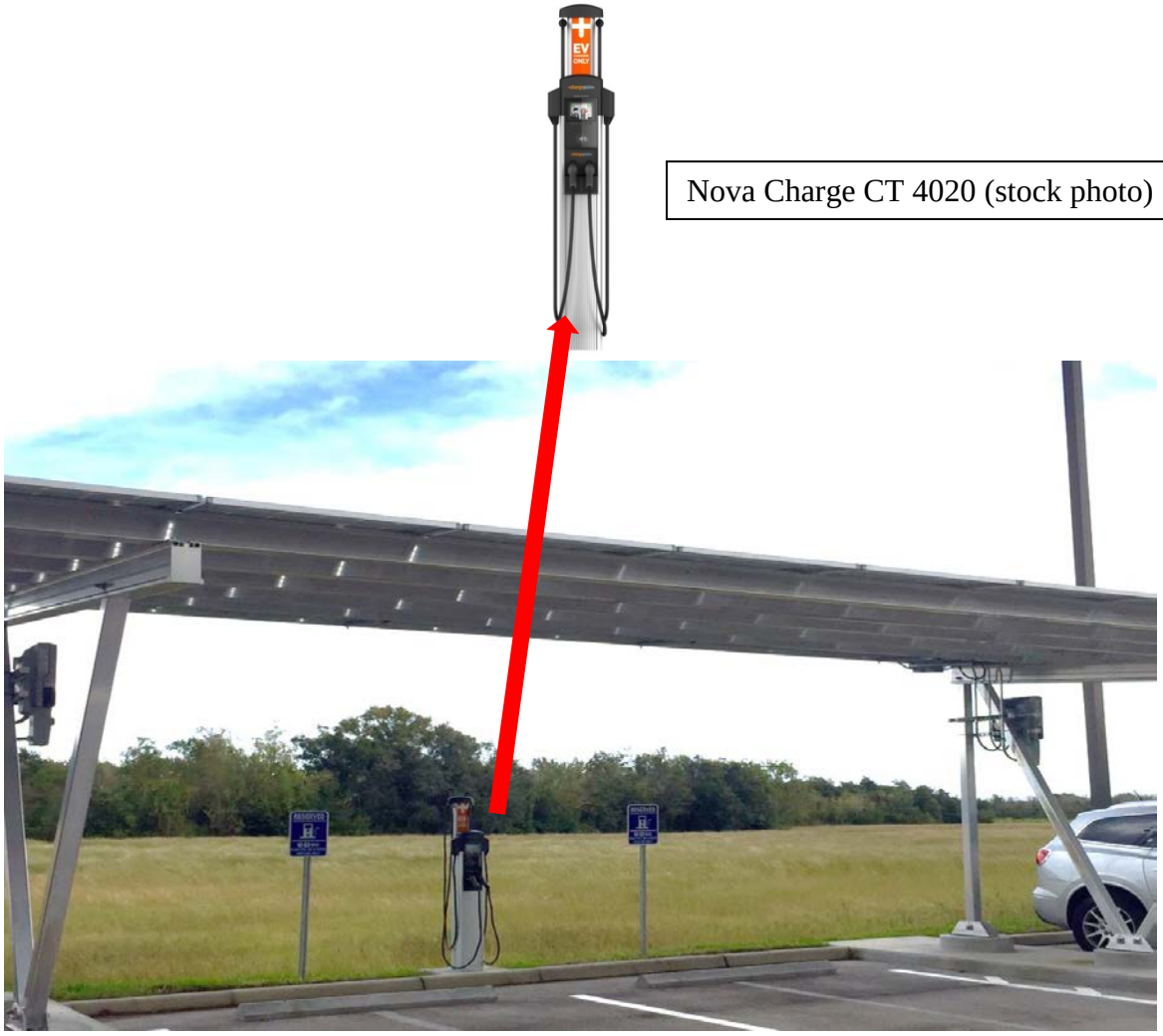
March 2015, Orange County received a quote for the install for one Electric Vehicle station for $28,800 which included the installation of one NovaCharge (Level 2 dual charger/single bollard) station and wiring for a future 25Kw DC fast charger.

June 2015, Orange County Purchasing and Contracts processed and executed change order to contract Y14-784 for performance of services for the install of the electric vehicle station for $28,800 which included the installation of one NovaCharge (Level 2 dual charger/single bollard) station and wiring for a future 25Kw DC fast charger. On June 22, the City of Orlando requested the Contractor resubmit information for the permits to install the Electric Vehicle charging

stations; therefore the permit was pending and required Orange County to request a time extension for the grant performance period to October 31, 2015.

August 2015 –September 2015, Orange County completed Task 1 activities for the installation of the Electric Vehicle (NovaCharge CT4021 dual charger/single bollard) charging station. The charging station installed is known as "smart" charger, which is connected to a central network operated by a third party. The network collects data on the electric vehicle supply equipment, such as the number of charging sessions, session start and end times, the electricity usage, greenhouse gases saved and other pertinent data used for reporting purposes. Since the operation of the charging Station there have been 52 unique driver users of the charging station; a total of 532.2258 kg of greenhouse gas savings and 159.03 gallons of gasoline savings.

Below is a picture of the installation of the Nova Charge CT4021 bollard Charging dual Charging station under existing 20kW PV Parking structure.



Nova Charge CT 4020 (stock photo)

Task 1 Conclusion:

According to the 2014 U.S Clean Tech Leadership Index Report, nationwide electric vehicle ownership in the top 50 largest metro areas increased sharply in 2013; the Orlando Metro Area was ranked #5 in the nation in in terms of Electric Vehicle charging stations per one million people. The Orange County 2014-2015 Annual Sustainable Orange County Report indicated there are 300 electric vehicle charging stations in Central Florida; roughly 300 charging stations within ~70 mile radius available to our residents of Orange County. Orange County utilized grant funds to add to the growing demand for access to charging stations by installing one bollard level 2 dual NovaCharge CT4021 electric vehicle charging station at the Orange County/University of Florida Cooperative Extension Center. The charging station is considered a "smart" charger, which is connected to a central network operated by a third party who is responsible for system maintenance and data collection. The data collected includes the number of charging sessions, session start and end times, the electricity usage, greenhouse gases saved and other pertinent data used for reporting purposes. Orange County continues to support the use of electric vehicles in Metro Orlando and this project helped to bring awareness to our public regarding using alternative vehicles; additionally, we offer all visitors to the Orange County/University of Florida Cooperative Extension Center free charges for their electric vehicles 24 hours a day. Since the operation of the charging station (six months) there have been 52 unique driver users of the charging station; a total of 532.2258 kg of greenhouse gas savings and 159.03 gallons of gasoline savings. During the 2014-2015 calendar year the Orange County/University of Florida Cooperative Extension Center held 2,396 educational events that were attended by 44,445 adults and youth; additionally there were 14,327 walk in visitors; Orange County expects the same numbers of visitors to the Center in 2015-2016 estimated at 59,000 persons will be exposed to education about the Nova Charge CT 4021 under the existing 20KW photovoltaic parking canopy. The installation of the electric vehicle charging station is part of a county-wide goal of promoting implementation of renewable energy technologies as well as supporting the use of electric vehicles including the Drive Electric Orlando & Florida programs. http://driveelectricorlando.com/ & ; http://www.driveelectricflorida.org/ .

Task 1 project costs:

Task 1 grant activities had a required cost share of 50% and were completed in September 2015; with a total Task 1 budget approved per the grant award authorized at $89,984 (DOE cost share $44,992 and Orange County Cost Share $44,992). The total Task 1 project costs encumbered was $28,800 in performance of Task 1 activities ($14,400 DOE / $14,400 Orange County). The remainder of the DOE funds for this task in the amount of $30,584 is proposed to be deobligated.

Task 2 Overview/Summary:

Task 2.0: Climate Change Education Center and Other Outreach Activities

The Central Florida economy is largely dependent on the hospitality industry. With large corporations such as Walt Disney World, Universal Studios, Ritz Carlton, Darden Restaurants, and the nation's second largest convention center, Central Florida is an ideal training ground for students focused on the hospitality industry. With over 60 million visitors each year, 120,000 hotel rooms, 4,000 restaurants, and 75 theme parks and attractions, the local hospitality industry provides a wealth of opportunity to reduce greenhouse gas emissions through building energy efficiency and renewable energy. To introduce energy efficiency and renewable energy concepts to the hospitality industry we partnered with a hospitality college that held seminars to educate students in sustainability best practices that would be expected to influence the industry as a whole as students take jobs around the U.S. and other parts of the world.

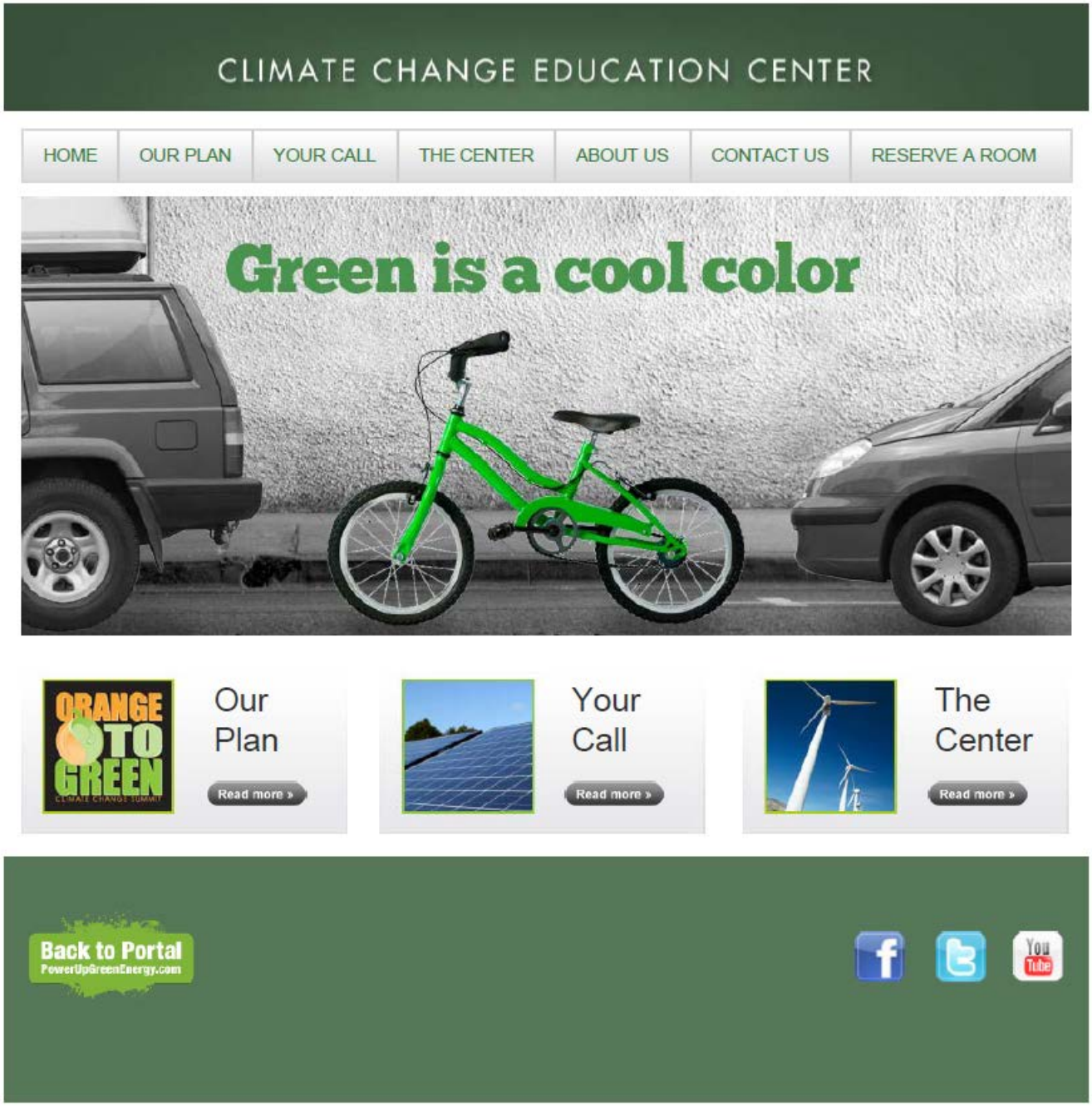
Originally the project scope for Task 2 activities included the continuation and potential expansion of the County's Climate Change Education Center's educational focus. The County's Climate Change Education Center's purpose was to provide citizens from all over the world information regarding greenhouse gas emission reduction strategies, solar energy, electric vehicles, other renewable energy technologies and energy efficiency. This task focused on the continuation of the Center's educational focus and the potential relocation of the Climate Change Education Center to the Orange County Agricultural Extension Facility. At the start of this grant funding the Climate Change Education Center was located at the Orange County Convention Center and project grant funding provided the necessary rent required to maintain the lease for the Climate Change Education Center at the Orange County Convention Center. The main goal of the Climate Change Education Center was to inform and educate the commercial and residential sectors of the environmental, health, and economic benefits of renewable energy and energy efficiency, as well as exemplify ways to reduce greenhouse gas emissions.

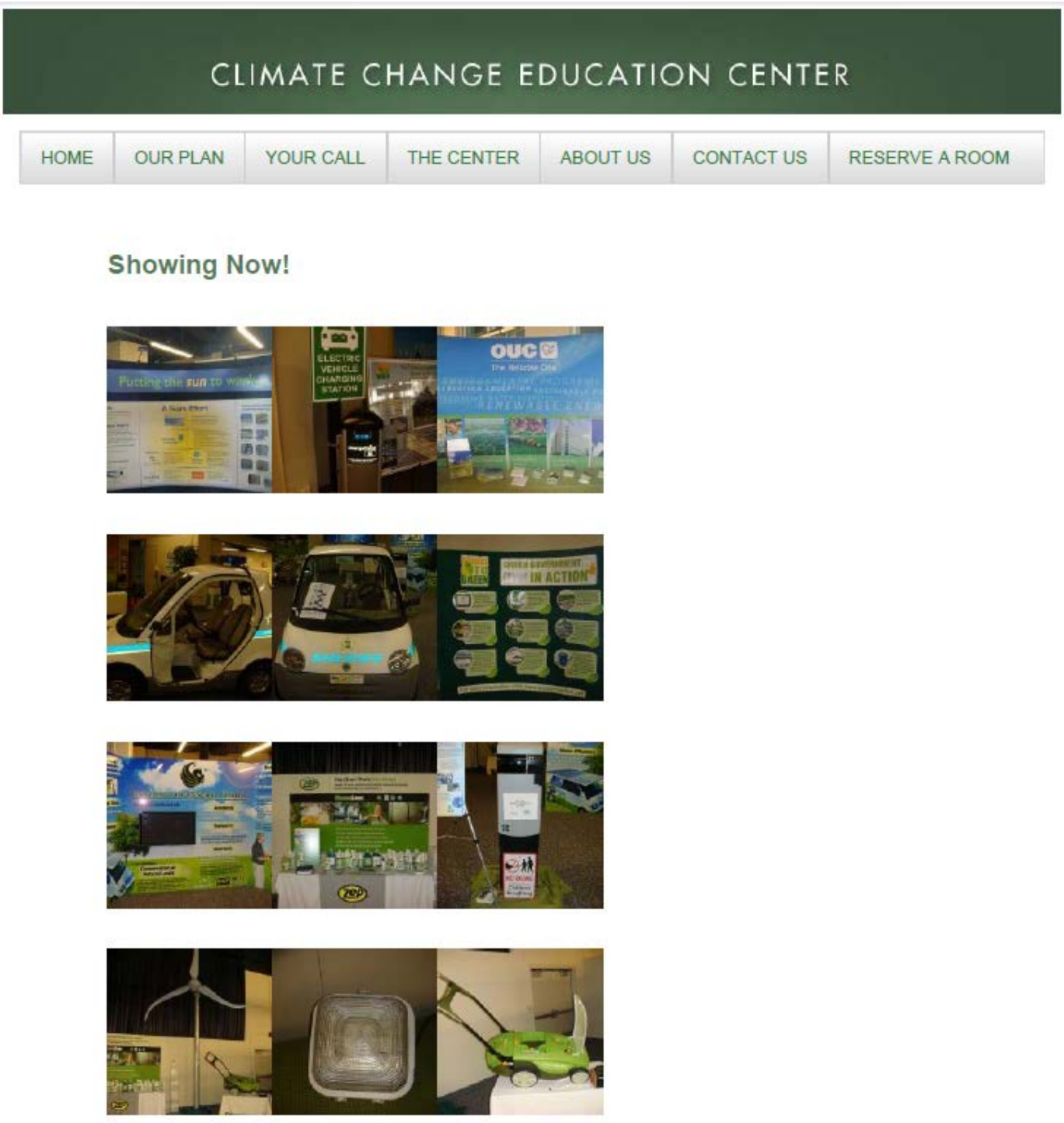
Sub-task 2.1 Expand the Climate Change Education Center's educational outreach

The Climate Change Educational Center provided a living laboratory for green energy exploration and was used to conduct outreach and educational efforts. In addition, to aid in the efforts of the Center, a website was developed http://www.occc.net/Community/solar_project.asp, however the website web-site is no longer functioning now that the Climate Change Education Center is no longer in existence. During the time that the Center was in operation, the website focused on: CleanTech, Solar Cities, Vehicle Electrification, and the Central Florida Energy Efficiency Alliance (an organization that promoted energy efficiency and sustainability for buildings in the commercial and governmental sectors). Educational displays provided the framework for an encounter with key technologies and concepts that focused on various green products to help illustrate the concepts. Visitors regularly interacted with products and displays and could get further information from a representative available to answer questions. Additional educational efforts included television/video programming to promote greenhouse gas reduction strategies,

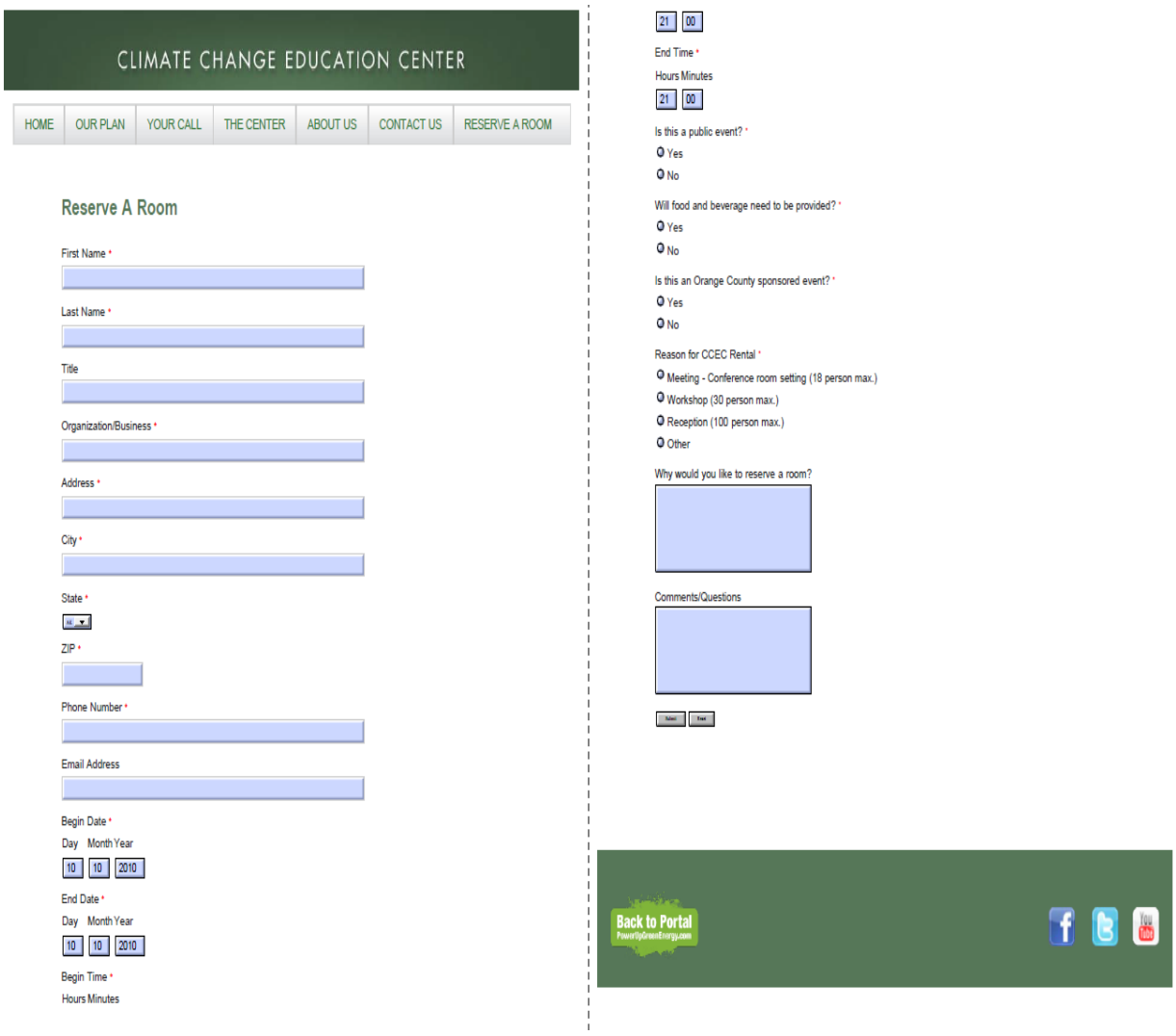
photovoltaics, alternative fuel vehicles, and other renewable energy technologies as well as promoting the education center as a family attraction with hands-on displays. As part of this task the Climate Change Education Center was upgraded with displays with an emphasis on hands on learning about energy efficiency and renewable energy that will be engaging for visitors of all ages. The displays provided the framework for an encounter with key technologies and concepts that focused on various green products to help illustrate the concepts. Additionally, the Center highlighted a number of energy efficiency and renewable energy projects implemented at the Convention Center and Downtown Orange County that visitors observed both virtually and in person during their stay. Grant funds were used to pay for marketing services for a state wide marketing program including solar & other renewable energy technologies for rebranding and developing marketing materials including web site design and updating. A website was maintained and updated the www.PowerUpGreenEnergy.com website (no longer in service). Below is a screen shot of the website:

Within the PowerUpGreen energy website was a link leading to the Climate Change Education Center was available to public and when they clicked on the link it brought them to another website www.greeniscaoolcolor.com where visitors could learn about the Orange County's Orange to Green plan as well as reserve the Climate Change Education Center for meetings or other seminars. A screen shot of the website when it was active is below:





Screen shot from website featuring what interactive displays were in the Center



Screen shot of website for the "Reserve a Room" at the Climate Change Education Center

During its operation, Climate Change Education Center provided a living laboratory for green energy exploration. The room was furnished with a home style viewing area, consisting of a couch, tables and a 32" digital television, where visitors could learn about sustainability products by watching educational DVD's from our library. The center was open to the public at various times, but primarily catered to convention center attendees. Orange County leased the space housing the Climate Change Education Center from the Convention Center. Below are pictures of the Climate Change Education Center and some of the interactive displays that were upgraded during the grant period of performance.

Entrance to the Climate Change Education Center

Conference & Meeting Rooms

Audio visual viewing area

Solar Water Heater Display

Solar Photovoltaic Panel & Inverter Display

Electric Vehicle Charging Station Displays

Electric Scooter Display

Electric Lawnmower Display

Sheriff electric Vehicle Display

UCF Energy Efficiency Display

Summary of Sub Task 2.1 project activities timeline:

August 23, 2011, DOE presented Orange County with the assistance agreement on August 23, 2011. The Orange County Board of County Commissioners approved the agreement on September 20, 2011.

September 2011 - December 2011, solicited and obtain quotes for the Climate Change Education Center and Outreach activities sub-tasks.

January 2012 - March 2012, the draft scope of work for the marketing component (website development & Climate Change Education Center) was developed into an invitation to bid. The bid document under review was planned for issuance in spring 2012. The Scope of Work was developed for the expansion of the Energy Specialist training program. A contractor developed a proposal for the work. The hospitality seminars were expanded to include the commercial, industrial and government sectors. The seminars, originally focusing on the students enrolled in the area university hospitality program, expanded to include interested parties throughout Central Florida.

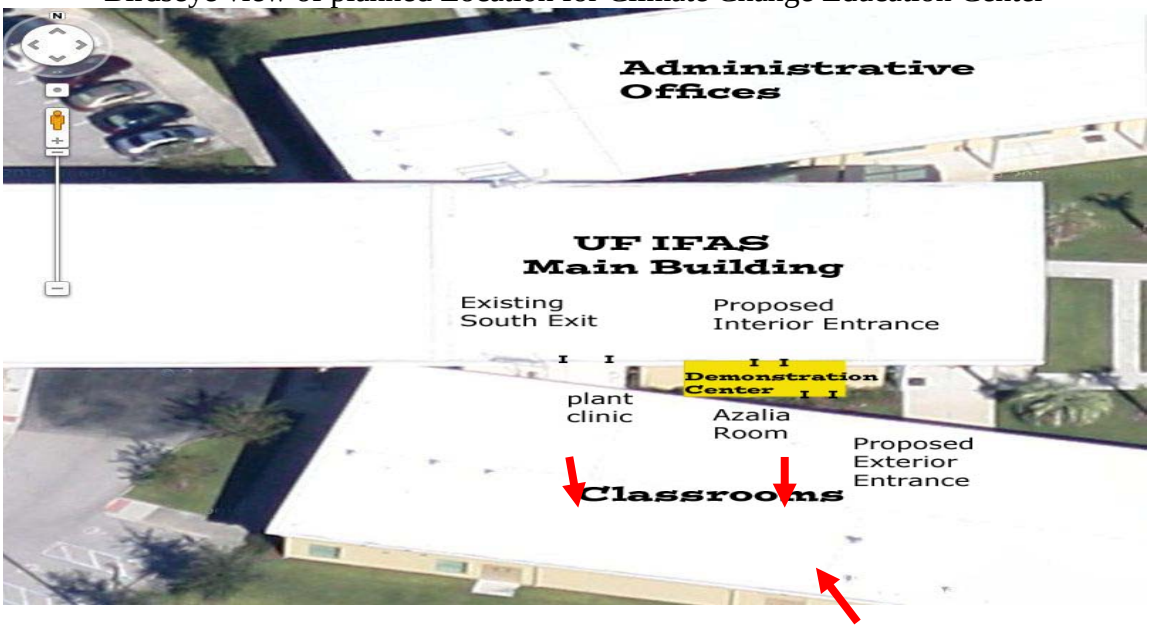
In late 2012, the Orange County Convention Center leadership determined that the Climate Change Education Center space was needed to support business operations and the lease was terminated in January 2013.

During mid-2013, Orange County re-evaluated and made initial plans to relocate and construct a new structure covering approximately 432 square feet of space for a new Climate Change Educational Center and connect it to the existing Orange County Ag Extension Facility Extension Center Atrium. This location would allow visitors attending education class's easy access to the center and provide additional access to the Atrium. The new Climate Change Educational Center initially was designed to be connected to the Extension Center Atrium's South wall with dimensions of approximately 18' x 24' - located immediately adjacent to the Azalea and Magnolia classrooms.

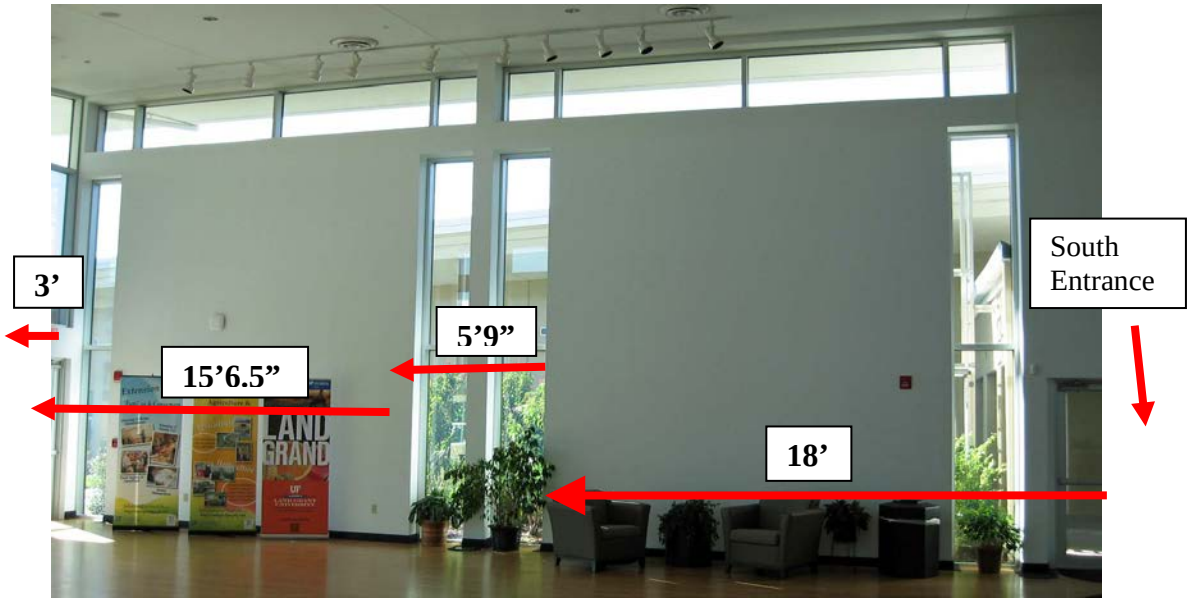
Below is the current view of the Orange County Agricultural Extension Facility South Wall

This was an ideal location as it would be readily available to all visitors attending classes or visiting the main atrium and provides a main corridor between the two locations. This Center was planned to support the County's Orange to Green initiative, by showcasing energy efficient building design, retrofits and appliances with information on approximate installation costs, energy savings achieved and returns on investment.

Birdseye view of planned Location for Climate Change Education Center



Ariel view of UF IFAS Building showing location of Sustainable Demonstration Center



Interior South Wall. Proposed Entrance to be located ~ 18’- 23’ East of Existing South Entrance

Exterior South wall of main building – garden depicts location where proposed Center was to be constructed. Interior entrance from the main building was proposed to be placed at double windows. The Center exterior door was to be constructed facing existing cement walkway (left of picture).

Exterior view facing west.

A covered walkway leading to south building's entrance is on the right. To the left is the Azalea classroom. Exterior entrance to Center was planned to be located on the Center south wall (once constructed), across from Azalea Classroom.

Construction costs were originally estimated to be less than $100,000. Orange County initially thought that most of the building materials and sustainability items could be donated to reduce costs. The bulk of the cost initially would be from installation and design build planning of the Climate Change Education Center. To reduce costs an internal Orange County Architect designed the initial project.

Throughout 2013 various interactive displays and concept ideas for the new Climate Change Education Center were being formulated and designed to be used to stimulate the market demand for energy efficiency renewable energy, water conservation, demonstrate HVAC equipment efficiencies (which would include duct work, SEER ration, air conditioning) and other design and operational features of a sustainable, healthy, and accessible home. Plans were made to design it as a "one stop shop" for business owners and residents interested in learning about ways to save on energy and water consumption as well as enhancing the livability of their homes. While touring the Center, learning would occur by seeing (through wall cut-outs and open ceilings) energy & water efficient plumbing, ducts, air conditioning, insulation, appliances, lighting, toilets, window, doors, solar panels, rooftop ventilation components, and a host of other products designed to reduce consumption and save on utility costs. Information to assist visitors in taking action would also be provided. In conjunction with the educational initiatives, the consultant aided in the redesign by providing ideas and concepts to make this center a unique attraction. Below are some of the ideas of interactive displays that were planned to showcase sustainability.

Interactive displays showcasing energy efficient insulation and lighting


Demonstrate water saving devices, solar power & building material improvements.

In October 2013, a feasibility study was required by Orange County to re-evaluate the probable construction costs and cursory design. The results of the feasibility study determined that the desired and planned location of the proposed Climate Change Education Center at the Orange County Extension Education Center provided too many construction challenges for relocation. Specifically, the location of the new Climate Change Education Center within the building footprint at the Orange County Agricultural Extension Facility allowed for construction of 500 to 600 square feet of exposition space presented numerous construction challenges and building retrofits and access problems including lack of access for loading and unloading exhibits as well as roof drainage relocations and sewer service connection issues.

In December 2013, it was determined that the desired location of the Climate Change Education Center at the Orange County Extension Education Center provided too many construction challenges for relocation. The project for finding another suitable location for relocating the Climate Change Education Center was then terminated. The Climate Change Education Center is no longer in existence in Orange County and has been eliminated.

Sub-task 2.2 Outreach Activities

This task commenced June 2012 and was completed July 2014. Grant program funds were used to complete seminar educational workshops to train students enrolled in the School of Hospitality Management at the University of Central Florida about sustainability best practices. It was anticipated that this training would ultimately influence the industry as a whole as students take jobs around the U.S. and other parts of the world. The seminars focused on sustainable practice such as energy efficiency, waste reduction, water conservation, renewable energy and energy conservation.

To introduce energy efficiency and renewable energy concepts to the hospitality industry, Orange County partnered with a hospitality college that held seminars to educate students in sustainability best practices Orange County completed five of the originally proposed six education seminars. Seminar topics included: driving sustainable behavior change through community based social marketing; green team programs; urban sustainability planning; and Florida Energy Code workshops for building inspectors. In partnership with Rollins College, a sixth seminar focused on transit-oriented development was explored, but was not conducted due to extended renovations at the proposed on-campus venue.

To promote green industry development and on-the-job training in occupations that encourage energy efficiency and resource reduction, Orange County piloted an Energy Star training and apprenticeship program with students from the University of Central Florida; three students applied for the program; four of the five buildings assessed received ENERGY STAR Ratings; one student completed the training and received their certification as an ENERGY STAR specialist.

Summary of Sub-Task 2.2 project activities:

Workshops/Seminar Education Activities:

Orange County completed five of the originally proposed six education seminars. The first seminar in June 2012 focused on community based social marketing techniques for driving sustainable behavior changes. The second seminar in August 2012 was a green team workshop. The third seminar in February 2013 focused on urban sustainability planning. The fourth and fifth seminars were Florida Energy Code workshops for building inspectors. A transit oriented development seminar in partnership with Rollins College was explored, but was not conducted because the proposed on campus venue was not accessible for an extended period of time due to renovations. Seminars and education workshops were not planned in this task for continuance; however the workshops and seminars assisted Orange County in the development of the Orange County Sustainability Plan in 2013, and approved by the Orange County Board of County Commissioners in May 2014 and in December 2015 we completed our first Orange County Annual Sustainability Report.

ENERGY STAR *Building rating Activities*:

1. The Orange County Public School East River High School received an ENERGY STAR rating of 91.
2. The Orange County Public School Edgewater High School received an ENERGY STAR rating of 86.
3. 100 Southpark Circle Property received an ENERGY STAR rating of 93.
4. 200 Southpark Center site visit was performed. The signed and sealed documentation could not be completed due to the building's data center could not be modeled properly in the ENERGY STAR Portfolio. The property owner also had an issue with getting their Data Center within the building modeled correctly in order to get a score.
5. Jambarco aka BankFirst Building site visit was performed; based on the current score the site was not eligible for ENERGY STAR Certification.

Subtask 2.2: Lessons learned

- One of the buildings selected to perform an ENERGY STAR assessment was not eligible to be ENERGY STAR rated;
- One building that was eligible for an ENERGY STAR rating had difficulties with the owner completion of the data entry and we found there was no ability to incentivize the owner in completing the ENERGY STAR Portfolio.
- The Energy Specialist Rater training program seemed in concept to be well received by interested students from University of Central Florida; unfortunately, only three students initially were interested in the program; only one of the three one students completed the training. Many students we solicited for the training program wanted to be paid to attend the training rather than obtain college credit for the program. Also we found that it was difficult to coordinate students with the timing of the consultants

scheduled appointment to conduct the energy surveys due to students changing college course schedule. In the future as a program suggestion we think the program would have been better received if coordinated with the university to offer this training program as a course class that students would register for attendance to ensure they would incorporate in to their class schedule while receiving college credit.

Task 2 project costs summary:

Vendor 1- EPR = Environmental PR Group Inc.
Total Approved by DOE: $ 29,000
Total Costs: $ 19,595.00

Provided Marketing Services for a State Wide Marketing Program- Solar & Other renewable Energy Technologies for the OCCC by rebranding and Developing Marketing Materials and web site Design and updating. The firm maintained and updated the www.PowerUpGreenEnergy.com website (no longer in service), along with its associated websites. The firm performed services of the redesign of the Sustainability Place (SP), formally known as the Climate Change Education Center (CCEC), educational outreach, including but not limited to website updates and printed information materials pertaining to Energy Efficiency and Renewable Energy activities within Orange County. Information was distributed to residential and commercial sectors, as well as municipalities and schools. In conjunction with the educational initiatives, the consultant aided in the redesign of the SP by providing ideas and concepts to make the SP a unique attraction. The consultant solicited outside companies for contributions to the SP such as displays or other educational attractions. Examples included energy usage in light bulbs, white roofs, how solar works and other energy efficient or renewable energy displays. Additional educational efforts included television/video programming to promote greenhouse gas reduction strategies, photovoltaics, alternative fuel vehicles, and other renewable energy technologies as well as promoting the center as an attraction for schools, families, and organizations of various types.

Vendor 2- Le Huu Partners:
Total Approved by DOE: $53,258; Total Costs: $ 46,771.69

Performed ENERGY STAR Building Label verification services and taught university students how to verify and qualify buildings for Energy Star certification.

Vendor 3- LMG:.
Total Approved by DOE $466.20; Total Costs: $ 466.20

Subcontractor to Orange County Convention Center (OCCC). Used for equipment rental for audio visual (AV), laptop and laptop interfacing equipment, and LCD support, VGA cables etc. with 2 VC technicians for the One Day Community Based Social Marketing (CBSM) workshop held on June 12, 2012.

Vendor 4: Pacific Agenda Inc.:
Total Approved by DOE $6,010.00; Total Costs: $ 6,010.00

Payment for speaker Dr. Doug McKenzie-Mohrat the One Day Community Based Social Marketing (CBSM) workshop held on June 12, 2012.

Vendor 5- H2 Ecodesign:
Total Approved by DOE $2,542.63; Total Costs: $ 2,542.63

Conducted Seminar on Sustainability/Green Champion Workshop; focused on where green is at today, LEED 2012, Integrative design, Kick-starting and gaining momentum in your green process, checks and balances for continuous improvement and ended with participants creating their own Green Champion Action Plan. H2 Ecodesign, Inc. was uniquely qualified to present the Sustainability/Green Champion Workshop that focused on providing sustainability champions and "green team" members of local businesses and government entities with knowledge and resources that will make them more effective. H2 Ecodesign's major objective was to work with audiences in an interactive fashion to learn best practices for breaking down sustainability barriers within their own organizations. H2 Ecodesign provided specific case studies and proven techniques during seminar to teach and implement Green Champion Action Plans.

Vendor 6- Clean Edison:
Total Approved by DOE $13,030.00; Total Costs: $ 13,030.00

Provided Florida Energy Code Workshops. Classes covered the basic overview of residential energy code, changes to residential codes and commercial codes and recent updates and energy basics of lightning systems for energy compliance for residential and commercial energy conservation. Conducted Course classes: Changes to the Florida Energy Code 2010 (conducted March 2013) & Enforcing the 2010 Florida Building Code (conducted March 2013)

Vendor 7- Harcourt Enterprises: Total Approved by DOE $6,500;Total Costs: $ 6,500.00

Provided Community Sustainability Planning seminar on February 19, 2013. General overview of the County's desire and met with the consulting team that helped work through the details of the Sustainability Plan process

Vendor 8- Magnolia Press: Total Approved by DOE $3,595.00; Total Costs: $ 3,595.00

Printing of 2014 Outreach Pollution Prevention Calendars highlighting "Envision Sustainability" as the theme. Used for education and outreach to residential and commercial sectors, as well as municipalities and schools.

Recommendations:

- The installation of the electric vehicle charging station effectively contributed to the county-wide goal of promoting implementation of renewable energy technologies as well as supporting the use of electric vehicles bring awareness to our public regarding using alternative vehicles.

- The Climate Change Education Center relocation feasibility study eventually confirmed that the new proposed location provided too many construction challenges; a suitable location to construct a new facility to house a new Climate Change Education Center could not be found and the project was terminated. As of today, the Climate Change Education Center is no longer in existence and has been eliminated and the website is no longer functioning or obtains updates. However, the technologies and techniques showcased and presented at the Center initiated a systemic transformation in Orange County operations and personnel behaviors that contributed to a focus on sustainable operations at several numerous facilities.
- Hospitality industry and sector-specific trainings and workshops provided valuable knowledge in development and application of effective techniques that would serve to inspire institutional change within the hospitality sector and within Orange County Government operations. The lessons learned from the workshops and seminars would kick start the development of the Orange County Community Sustainability Plan, which includes specific goals and implementation steps for municipal, commercial, and residential sectors to improve energy efficiency, and increase market demand and adoption for renewable energy projects.
- In the ENERGY STAR training and apprenticeship program, one student completed the training and received certification as an Energy Star Specialist Rater and three of the five buildings assessed received ENERGY STAR Ratings. The program in concept was well received by interested students; however, interest fell as students valued payment as an incentive instead of college credit given academic time constraints. We suggest the program would have been better received if coordinated with the university to offer the training program as a course class that students would register for attendance to ensure they would incorporate in to their class schedule while receiving college credit.

Project Results & Outcomes*:*

Grant funds were used for the following projects:

- Completed the installation of an electric vehicle charging station, offering all visitors to the Orange County/University of Florida Cooperative Extension Center receive free charges for their electric vehicles 24 hours a day.
- Supported the operation and growth of the Orange County Climate Change Education Center; completed a feasibility study to potentially relocate to a more permanent location.
- Hosted a series of educational sustainability webinars and trainings focused on two educational subsectors.
- Developed an Energy Specialist apprenticeship program with university students, culminating in participants conducting ENERGY STAR rating assessments on five facilities.
- Held a series of workshops/seminars to educate hospitality students on sustainable industry practices, in an effort to encourage global change in the industry as students graduate into the workforce and implement best practices.
- Seminars and education workshops were not planned in this task for continuance; however the workshops and seminars assisted Orange County in the development of its

Orange County Sustainability Plan in 2013; approved by the Orange County Board of County Commissioners in May 2014. In December 2015, Orange County completed our first Orange County Annual Sustainability Report.

Total Grant Project Costs

The project period performance date for this grant was October 1, 2009 through October 31, 2015. The Final Project costs to complete the all tasks as reported in the FINAL SF 425 were $152,733.70. (138,333.7 DOE including indirect costs $10,423.18 / $14,400 Orange County). The remainder of unobligated DOE grant funds of amount of $161,666.30 are requested to be deobligated.

Future Directions

The workshops and educational sessions conducted under this grant spearheaded kickoff meetings to assist Orange County in preparing and Orange County Sustainability Implementation Plan in 2013 which was approved by our Board of County Commissioners in 2014. Since the plan was developed Orange County has made substantial progress toward a more sustainable future and many exciting developments are in the planning stages or underway. In July of 2015 the Orlando was selected for a City Energy Project and a 12 megawatt solar array of clean renewable energy at its Curtis H. Stanton Energy Center in East Orange County. The new solar arrays will consist of more than 41,000 solar panels blanketing more than 31 acres of land. The new solar array will provide enough electricity to power about 1,500 homes.

Additionally Orange County launched the Central Florida Workplace Challenge http://orangecountyfl.municipalchallenge.com/. The Central Florida Workplace challenge program was designed to be a friendly competition that will help local businesses save money, create healthier workplaces, reduce their environmental impact and enhance our community through volunteer service. the six-month long challenge will provide businesses with the opportunity to earn awards, enjoy educational and networking socials, and compete to be the best in one or more of the three categories: Green, Healthy and Involved The “Green Workplaces” category will recognize workplaces moving towards a greener future, with a focus on employee involvement, community outreach, energy and water conservation, waste and consumption, as well as transportation. The goals for the “Healthy Workplaces” category are to reduce environmental impacts of operations and buildings by engaging property owners, managers and tenants alike. Participants will be following a “Prescription for a Healthier Workplace,” which focuses specifically on physical activity, healthy foods, active transportation, lactation support and tobacco free workplaces. Finally, the “Involved Workplaces” category will focus on improving the level of community engagement, creating a culture of service at the workplace, developing volunteer programs, as well as promoting community and volunteer projects and awarding outstanding volunteers.