

# A COMMUNITY SOLAR PROJECT

## EASTERN BAND OF CHEROKEE INDIANS (EBCI)

2017 DOE OFFICE OF INDIAN ENERGY ANNUAL PROGRAM REVIEW

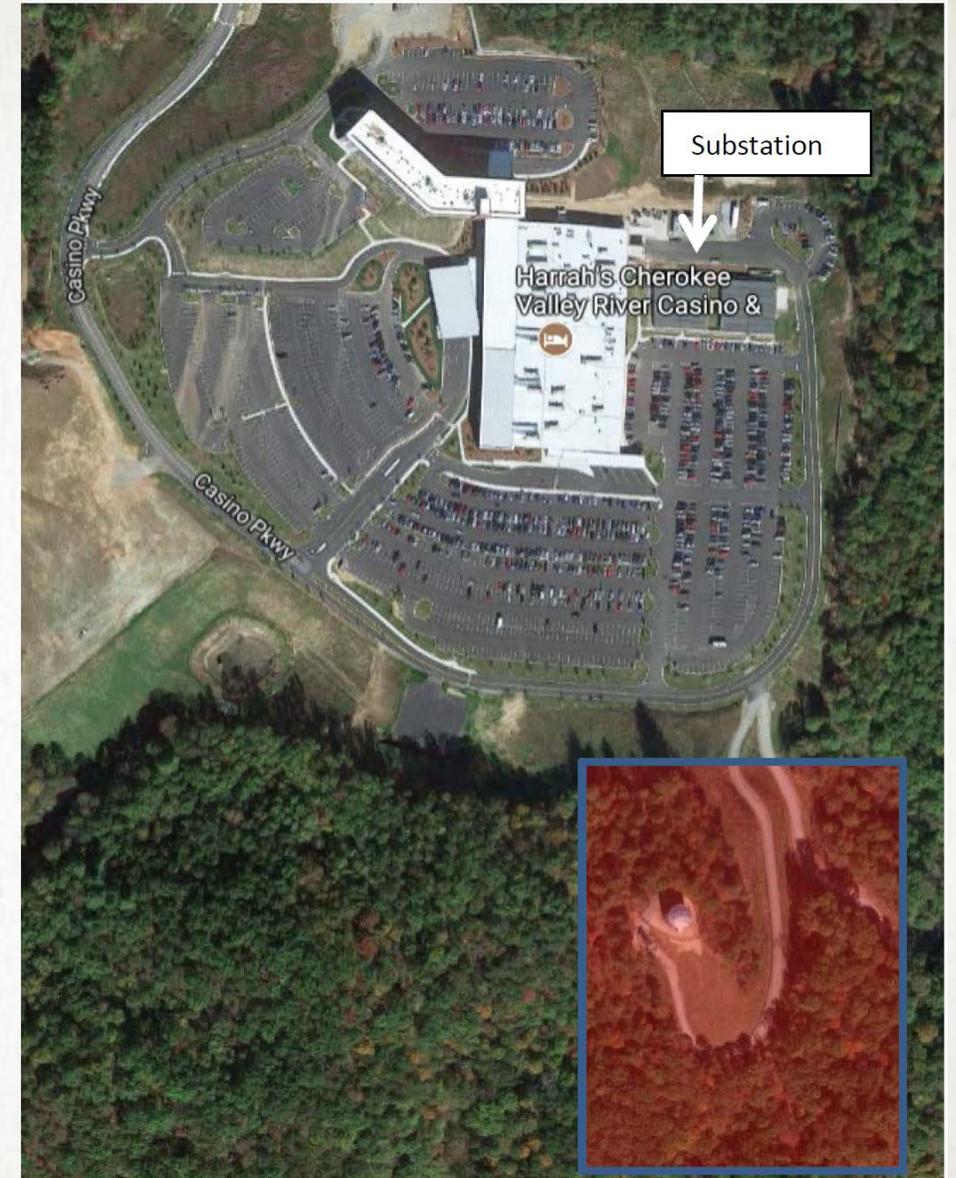


November 15<sup>th</sup>, 2017

**CHRIS GREENE**, PROJECT MANAGER  
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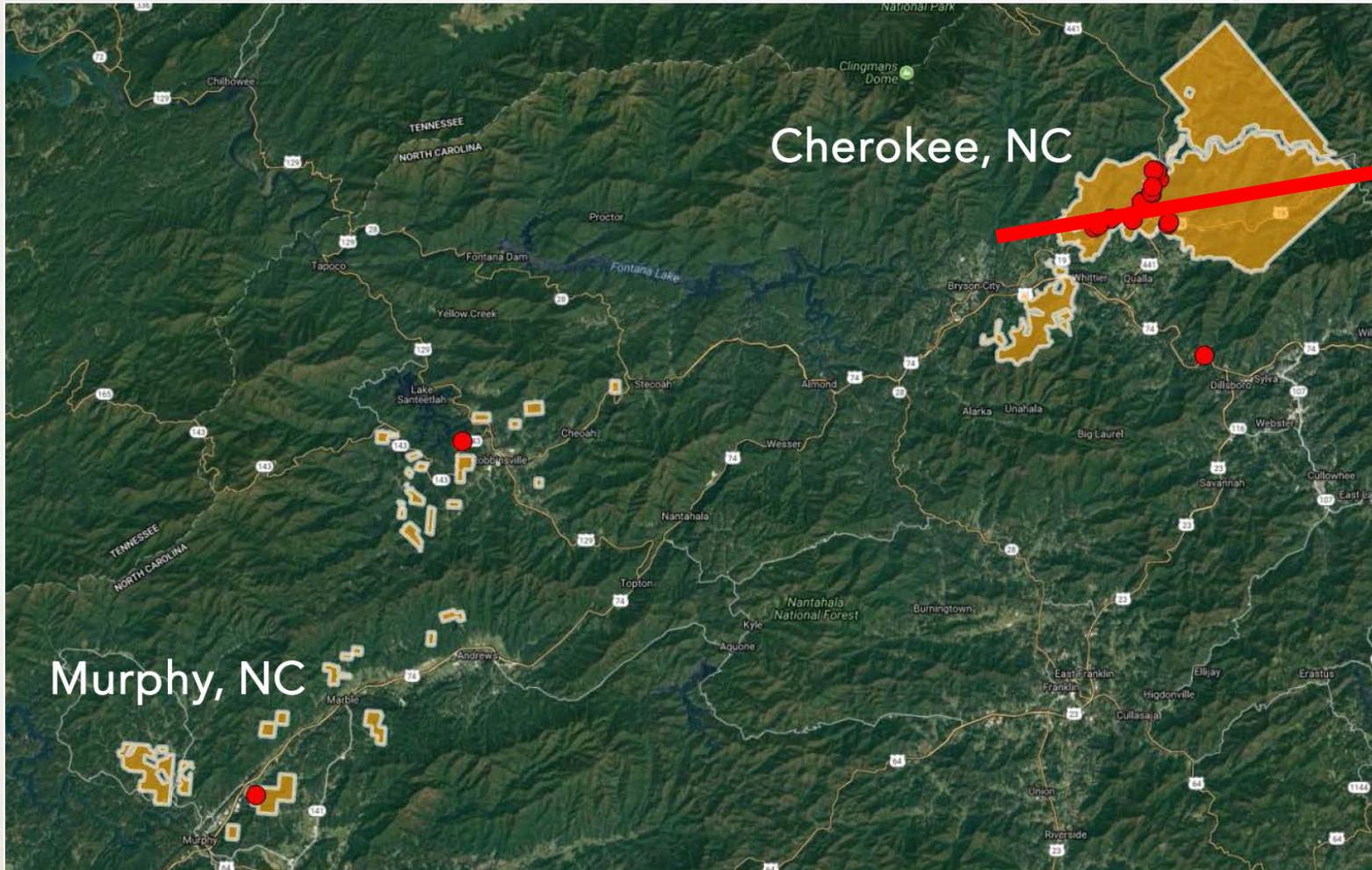
# OVERVIEW OF PRESENTATION

- About the Eastern Band of Cherokee Indians
- 2007 EBCI Energy Goals
- AVANT Baseline Electric Study
- Goal and Objectives
- Community Solar PV Project Details
- Advantages, Challenges, & Outlook
- Summary



# CHEROKEE, NC

- ❖ **QUALLA BOUNDARY IS COMPRISED OF ~ 56,000 ACRES IN WESTERN NORTH CAROLINA**
- ❖ **MUCH OF BOUNDARY IS NEXT TO GREAT SMOKY MOUNTAIN NATIONAL PARK (GSMNP)**
- ❖ **DEEDED AND TRUST PARCELS LOCATED IN SURROUNDING COUNTIES**
  - ❖ Additional ~4,000 acres
- ❖ **NEARING 16,000 ENROLLED MEMBERS; ROUGHLY 7 – 8,000 LIVE ON QUALLA BOUNDARY**





- To protect, preserve, and ensure the wise utilization of the limited natural resources located on Tribal Lands for the Cherokee people in the most efficient manner and in an effective way;
- That the natural beauty of Tribal lands and natural resources, which are the basis of our cultural and economic well-being, are preserved and protected;



## TRIBAL COUNCIL RESOLUTION 636 (2007)

- To identify opportunities for economic and community development for the Tribe that promote sustainable development;
- To identify energy cost savings opportunities for the Tribe.

- ❖ Established Tribal Energy Goals
- ❖ Award DoE Tribal Energy Program “First Steps” grant awarded in 2007
- ❖ Strategic Energy Plan was generated in 2009



# CURRENT RENEWABLE ENERGY ACTIVITY

- ❖ Funding was secured through the Cherokee Preservation Foundation to install solar trees and a wind turbine at two welcome centers
- ❖ Operational since 2012 / 2013?
- ❖ Each tree has production potential of ~ 10.5 kWh
- ❖ 20 solar PV panels on “horse shoe” welcome center @ ~600kH
  - ❖ 5 trees \* 10.5 kWh = 52.5 kWh
  - ❖ 20 panels \* 0.6 kWh = 12 kWh
- ❖ Lifetime power production of both systems to date is...

❖ **117 MWh**



# Proposed Next Steps

*Progress to Date*

## Phase 1

### Baseline Electric Report

- Analyze last 36 months electric usage and costs
- Review incumbent utilities
- Identify existing resources
- Present initial energy alternatives for EBCI

## Phase 2

### Utility Feasibility & Energy Alternatives Assessment

- Evaluate benefits, costs, and risks of energy alternatives
- Develop understanding of possible wholesale opportunities and infrastructure needs
- Identify organizational considerations for alternatives
- Provide recommendation of selected alternative with financial projections

## Phase 3

### Business Structure & Formation Plan

- Identify entity to support selected energy solution
- Develop overall governance structure
- Create preliminary plan
- Present a final business plan for EBCI tribal approval
- Tribe obtains leadership approval

# AVANT BASELINE ELECTRIC STUDY 2017

- ❖ This study was generated from the EBCI Division of Commerce from Mr. Cameron Cooper, Retail Development Specialist.
- ❖ Baseline Electric Report analyzes Tribe's energy usage and cost
  - ❖ First step in understanding opportunities for investment

- 1) Promote Indian Tribal energy development, efficiency and use.
  - ❖ Reduction of energy consumption through the deployment of this solar PV array
- 2) Reduce or stabilize energy costs
  - ❖ Murphy Electric Power Board nearing capacity and reduction of EBCI needs would benefit expanding community
- 3) Enhance and strengthen Tribal energy and economics infrastructure related to natural resource development
  - ❖ Partnership with Siemens will provide training to EBCI enrolled members for the operation of the solar PV array, increasing skills and capacity of the Tribe
- 4) Bring electrical power and service to Indians lands
  - ❖ Solar array fosters renewable energy and aligns energy investment with EBCI long-term vision of energy independence
- 5) Support and promote EBCI participation in strategic energy initiatives
  - ❖ EBCI is embarking on energy independence and self-reliance goals that will diversify revenues resources and increase skill competencies of EBCI enrolled members by providing new job market opportunities

# GOALS AND OBJECTIVES

# Cherokee River Valley Casino & Hotel

Opened in fall of 2015





# Deployment of Energy Efficiency and Clean Energy on Indian Lands-

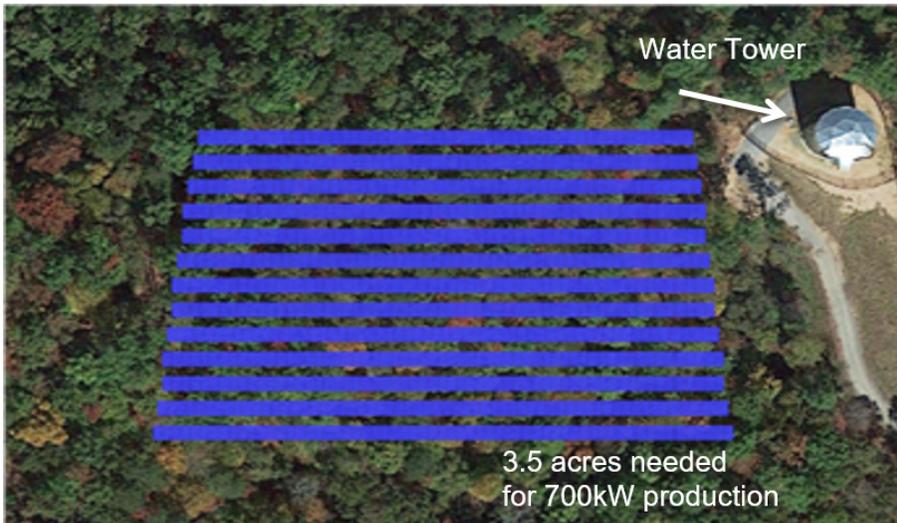
## A Community Solar Project

### Eastern Band of Cherokee Indians (EBCI)

Control Number: 1660-1525

#### Project Summary

Deploy a ground mounted solar PV array on the Murphy, NC reservation to generate 700 kilowatts of renewable energy. This community scale PV farm would supply power to four buildings totaling 155,352 sq. ft.: casino (110,400 sq. ft.), hotel (23,000 sq. ft.), and two administrative buildings (10,976 sq. ft. each). All power generated would be consumed onsite. Due to the site location's topography, civil work will be required to prepare the land for the PV panel installation. The rural utility company is nearing its generation capacity so this project will alleviate some of their electrical demand and will aid in their growth capabilities. More importantly, this green energy project will foster further economic, cultural and social opportunities and greater energy independence for the EBCI community, which aligns with the EBCI Strategic Energy Plan.



#### Key Personnel/Organizations

- Chris Greene - Technical POC
- Amanda Strohm & DeMakus Straton – Grants Office POCs
- Cameron Cooper – Commerce Division POC
- Siemens Government Technologies, Inc.- Partner for design and build, and training program

#### Budget and Timeline

Federal funds: \$1.0M Cost-share: \$1.0M Total: \$2.0M

#### Key Milestones & Deliverables

Year 1:	Siemens to Design/Build Solar PV array, and train tribal members to install, operate and maintain system
Year 2:	Savings begin to be captured and tracked, and results shared with the community and school.

#### Project Outcomes

This system is expected to cost \$2.0M and is projected to generate 1,007,340kWh with an annual savings of \$99,122, based on a blended electrical rate of \$0.0984/kWh. Assuming the \$1.0M DoE grant, the tribe's simple payback is anticipated to be 10.1 years. This project will also include a community awareness communication plan and school education program to further promote energy conservation and the use of renewable energies. Additionally, tribal members will be trained to install, operate and maintain the system, and leverage these skills for future solar projects on tribal land or within the community.

**A 700 kW solar PV project to foster economic, cultural and energy independence for the EBCI Tribe.**

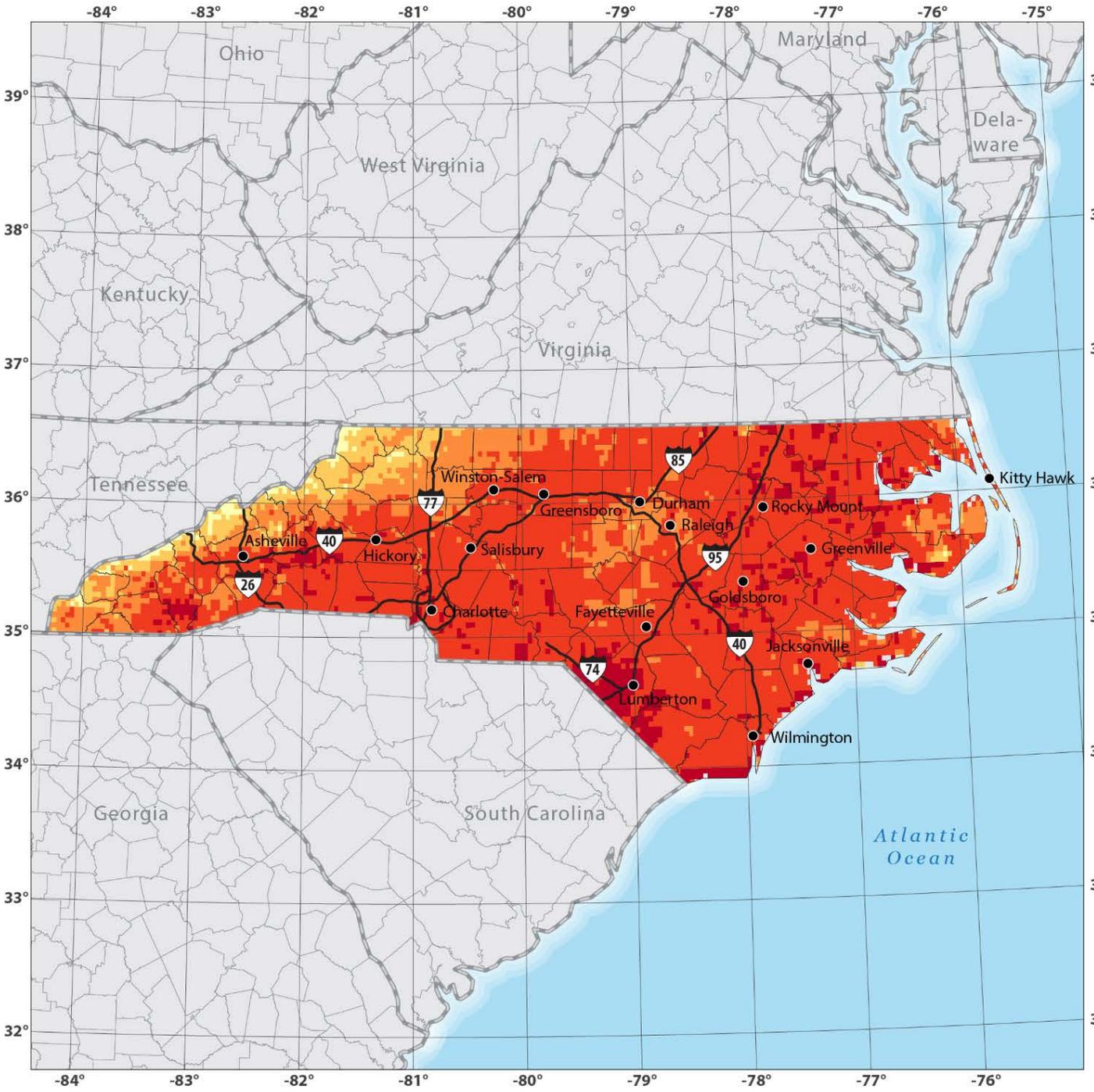
Figure 1: Solar Field Location



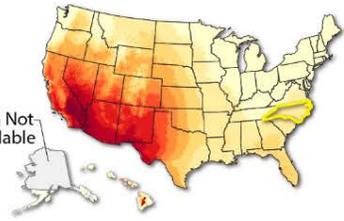
Figure 2: Solar Panel Array Layout

## SOLAR PV ARRAY LOCATION

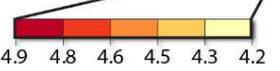
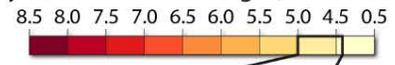
- ❖ Located on and adjacent to Tribally owned property
  - ❖ No ROW required
  - ❖ TCGE partner approval
  - ❖ Slight elevation change



# Direct Normal Solar Resource of North Carolina

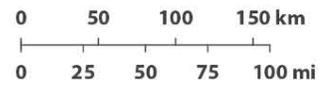


Fifty-state Resource Range (kWh/m<sup>2</sup>/Day)



North Carolina Resource Range

This data provides annual average daily total solar resource averaged over surface cells of 0.038 degrees in both latitude and longitude, or, nominally, 4 km in size. The insolation values represent the resource available to concentrating systems, and were created using the PATMOS-X algorithms for cloud identification and properties, the MMAC radiative transfer model for clear sky calculations, and the SASRAB model for cloud sky calculations. The data are averaged from hourly model output over 8 years (2005-2012).



This map was produced by the National Renewable Energy Laboratory for the U.S. Department of Energy. Nicholas Gilroy, April 4, 2017



## Baseline Energy

Siemens anticipates that no energy produced by the solar array will be consumed outside the campus. The energy baseline for the site is defined below in Table 2 and is based on the yearly electrical consumption of Harrah's Cherokee River Valley Casino Campus. The Casino's monthly demand averages 2,530 kW and has a daily average consumption of 31,391 kWh.

Table 2: Energy Baseline FY 2016

Usage Period	kWh Usage
Oct 01-31 2015	957,445
Nov 01-30 2015	861,914
Dec 01-31 2015	955,588
Jan 01-31 2016	872,910
Feb 01-29 2016	789,726
Mar 01-31 2016	843,732
Apr 01-30 2016	848,472
May 01-31 2016	953,865
Jun 01-30 2016	1,070,636
Jul 01-31 2016	1,167,548
Aug 01-31 2016	1,174,789
Sep 01-30, 2016	1,000,456
<b>Total</b>	<b>11,497,081</b>

Table 3: Summary of Baseline system size of 700 kW DC

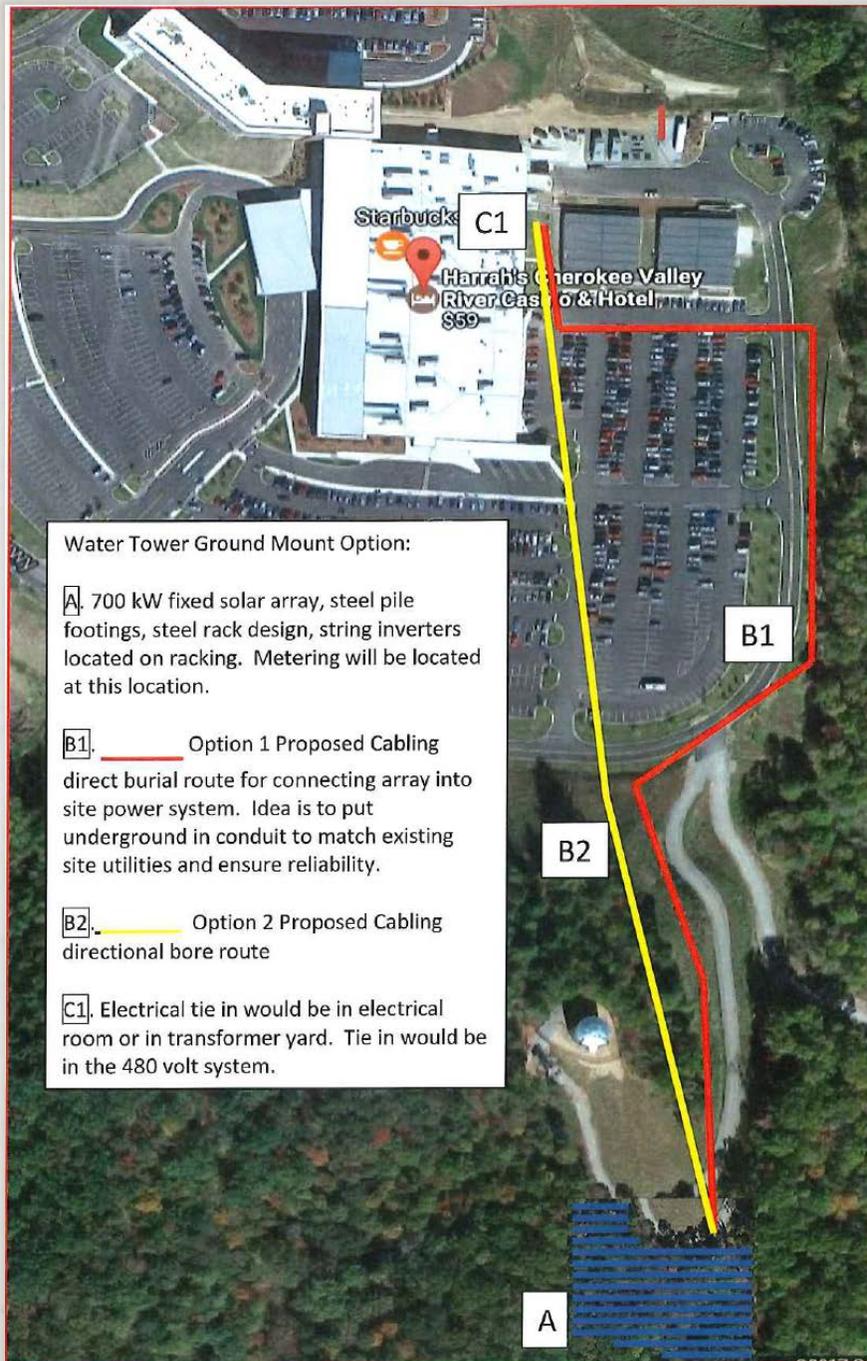
	Baseline Energy (kWh/yr)	Electricity Savings (kWh/yr)	Electricity Savings Yr 1 (\$/Yr)	Percentage Savings (%)
Solar Photovoltaic System	11,497,081 *	1,019,870**	\$100,355	8.9

\* Baseline of FY16 Utility Usage

\*\* Yearly production of solar array degrades at a 0.7% rate annually after year 1

# PROPOSED CABLING ROUTES TO SUBSTATION

- ❖ Exact route yet TBD
- ❖ Slight variance near site due shift in array location



# ADVANTAGES, CHALLENGES, & OUTLOOK

## ○ Advantages

- ✓ Executive and Tribal Council support
- ✓ Financial resources
- ✓ TCGE support
- ✓ Exceptional team work
- ✓ No public utility to negotiate with
- ✓ Grants compliance office
- ✓ Renewable Energy Manager position

## ○ Challenges

- ❖ Tribal politics
- ❖ Tribal Leadership turnover
- ❖ Lack of contingency funds appropriated

## ➤ Outlook

- Growing energy consumption from economic expansion and Tribal endeavors
- First large project of many!



- **Progress updates**

- Currently in contract negotiations
- TCGE approval for surveying area
  - Boundary survey and topo map underway
  - Per approval of survey by TCGE, will receive approval for construction
- NEPA restriction lifted
- THPO approval
- BIA Timber Permit has been applied for

- **Next steps**

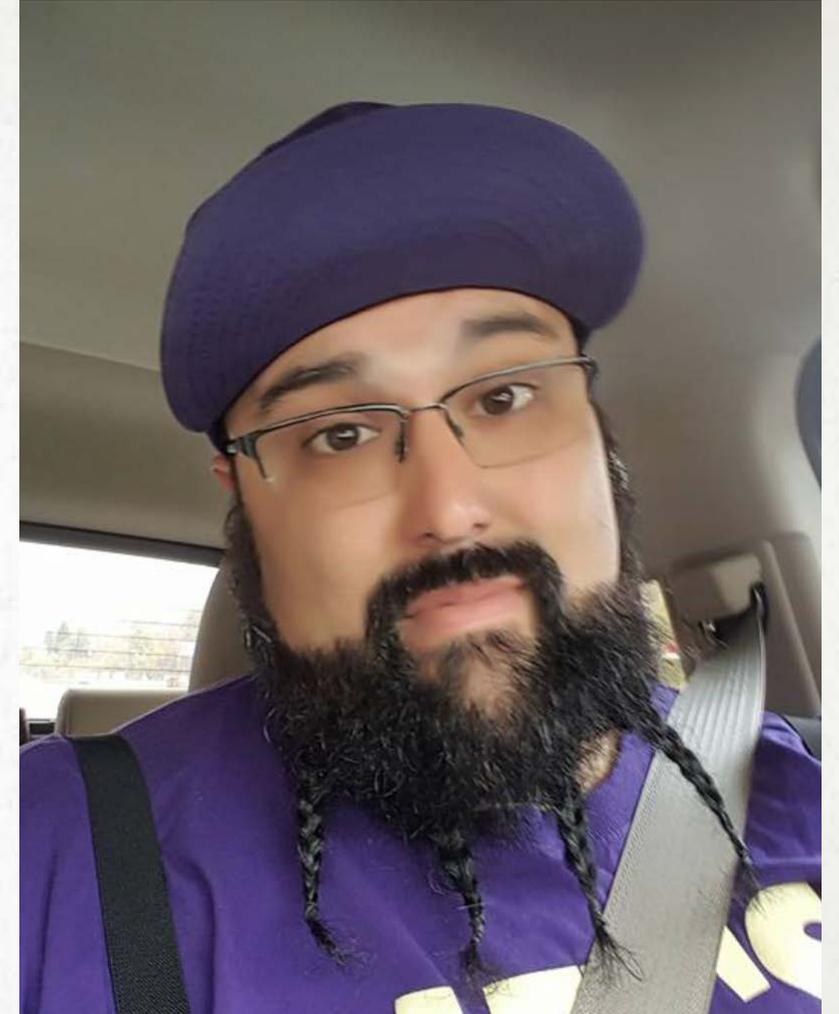
- Our goal is to be ready for contract execution in January 2018
- Site must be cleared prior to April 15<sup>th</sup> due to bat moratorium
- From groundbreaking to final product is about 6 – 7 months

# PROJECT SUMMARY



# THANK YOU TO... AND MANY MORE

- DoE, Office of Indian Energy
- EBCI Tribal Government
  - Chief, Vice Chief, Tribal Council
- Tribal Cherokee Gaming Commission (TCGE)
- EBCI Project Management Office
- EBCI Division of Finance: Grants Compliance Office
- EBCI Natural Resources Department
- Tribal Historical Preservation Office (THPO)
- Siemens Governmental Technologies
- AVANT Energy, Inc.
- Cameron Cooper



# QUESTIONS?

