

# Big Cypress & Brighton Projects

RURAL RESERVATION  
RESILIENCY INITIATIVE

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# Agenda

- ▶ Introduction
- ▶ Problems and Potential Solutions
- ▶ Big Cypress (BC) Project
  - ▶ Project Partners
  - ▶ BC Solar Project Overview
  - ▶ Material Costs Escalation & Delays
  - ▶ Lessons Learned
  - ▶ Status/Activities Yet to be Completed
- ▶ Brighton (BR) Project
  - ▶ Project Partners
  - ▶ BR Solar Project Overview
  - ▶ Activities Yet to be Completed



# Introduction



# Seminole Tribe of Florida Reservations

Seminole Tribe of Florida is a Federally Recognized Indian Tribe and is the only Tribe in America that never signed a peace treaty.

Approx. 4,240 Tribal members

Approx. 90,030 acres land base

- Big Cypress 52,338 acres
- Brighton 35,805 acres
- Fort Pierce 60 acres
- Hollywood 497 acres
- Immokalee 600 acres
- Lakeland 692 acres
- Tampa 39 acres





# Brief History

- Exercised sovereign authority over territories in Southeast US from time immemorial
- Resisted US political and military removal efforts throughout 19<sup>th</sup> Century
- Organized under Indian Reorganization Act in 1957
  - IRA Section 16: Tribal Council governs Seminole Tribe of Florida
  - IRA Section 17: Board of Directors manages business arm, Seminole Tribe of Florida, Inc. ("STOF, Inc.")
- Recognized for leadership in advancing sovereignty
  - First Smoke Shops (1976)
  - First High-Stakes Bingo (1979)
  - First Guitar Shaped Hotel (2019)



# Problems & Potential Solutions





# Dependence

- Tribe depends on outsiders for energy for governmental operations and economic development.
- Tribe has no authority over state-regulated utilities and are subject to rate increases and supply interruptions.
- Tribe's ability to plan long-term is impaired because of unknown future energy costs.



# Costs

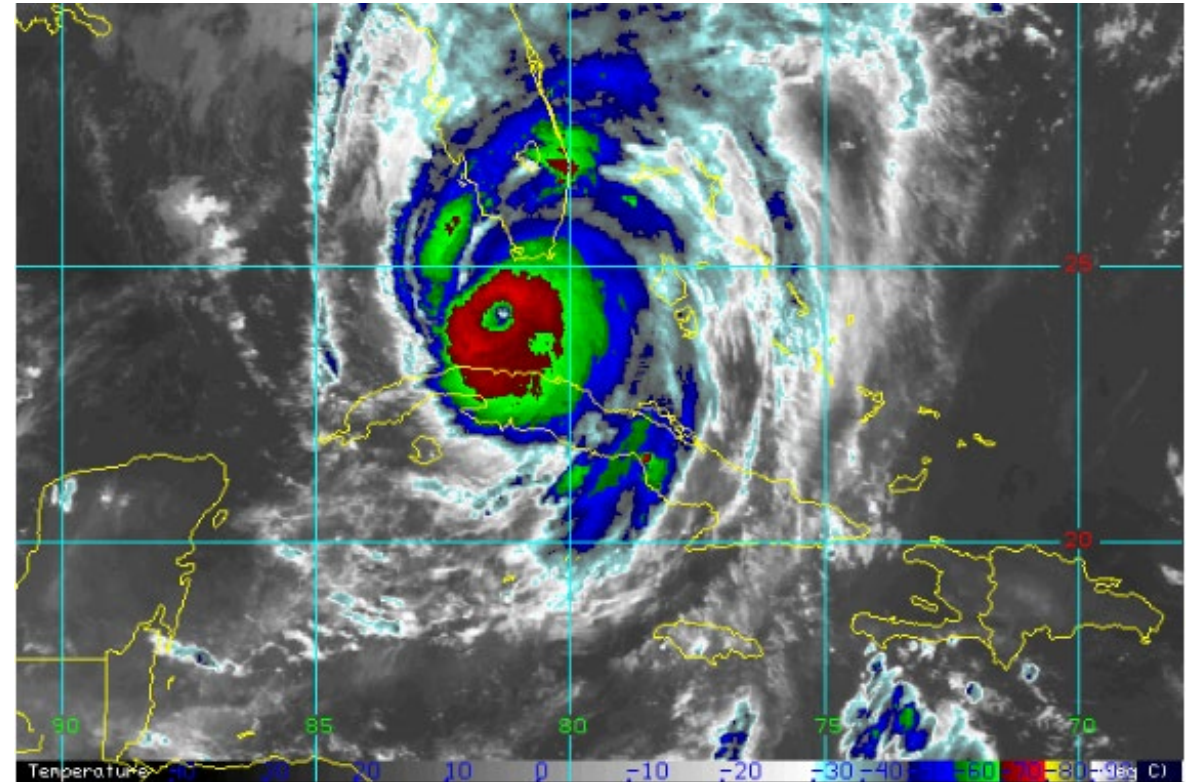
- Retail prices that utilities charge tribes are high and generally increasing.
- Even though natural gas has been cheaper, electric rates have generally continued to rise.
- Costs may rise as users leave utility system.





# Hurricanes

- Hurricane Irma was extremely powerful and catastrophic
- It made landfall in August 2017 and impacted the entire State of Florida
- Most of the Tribe's reservation communities, businesses and government operations were affected
- Several facilities across the Tribe's reservations sustained severe damage

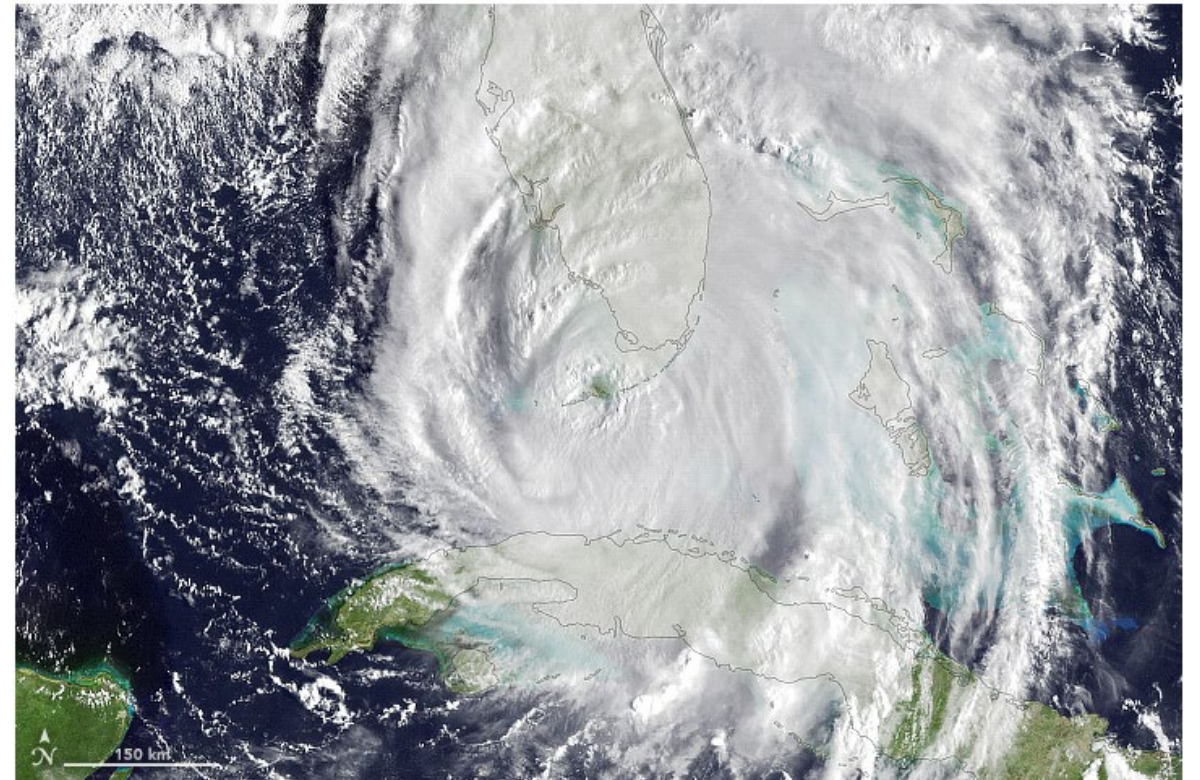


Source: [Hurricane Irma Local Report/Summary \(weather.gov\)](#)



# Hurricanes (Continued)

- The Tribe had to close and discontinue its government operations for several weeks and in some cases months until recovery
- There were approximately 680 Tribal members living in the Big Cypress (BC) Reservation, and 690 living in the Brighton (BR) reservation who were particularly impacted by grid resiliency issues and outages
- In the aftermath of Hurricane Irma, the Tribe was the largest purchaser of propane and diesel for generators in Florida
- Even commercial generators are not designed to run for weeks non-stop

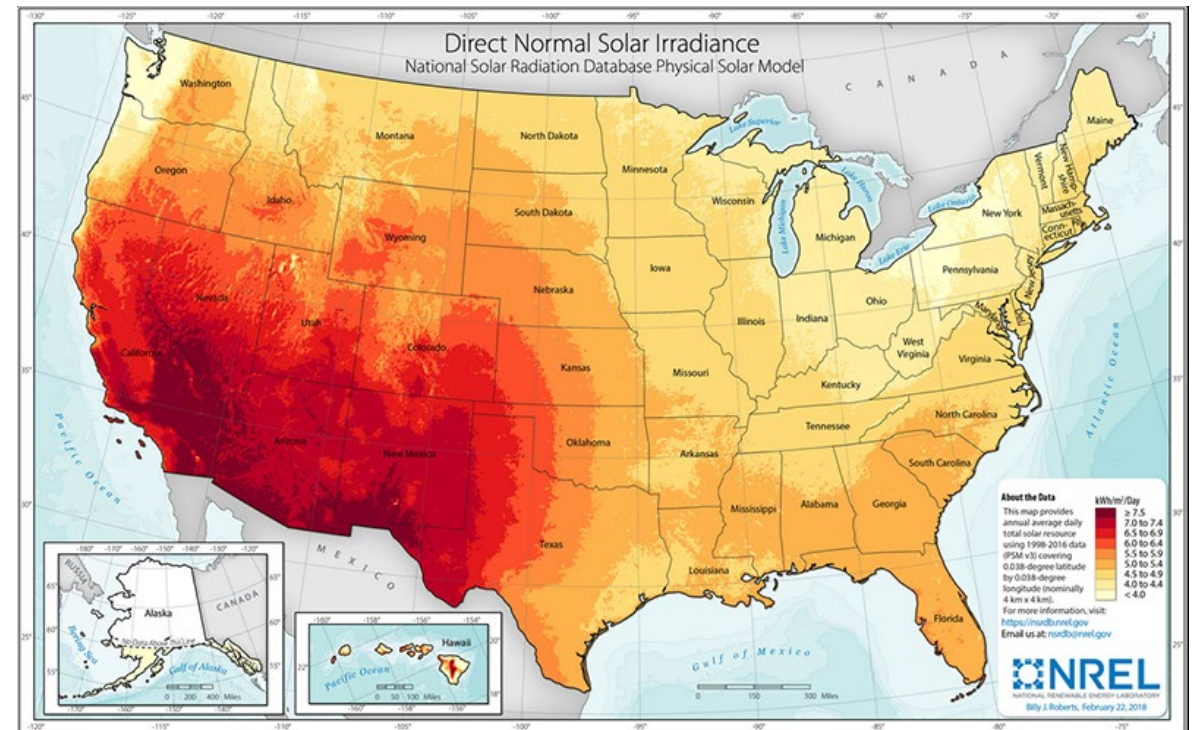


Source: <https://earthobservatory.nasa.gov/images/90948/hurricane-irma-strikes-florida>



# Potential Solutions

- In January 2018 the Chairman and the Tribal Council formed the Renewable Energy Committee with key people across the Tribe including a representative from the Chairman's office
- The Committee was charged with:
  - Ensuring power continuity across critical Tribal operations to the extent possible during and after a storm
  - Identifying solutions to mitigate and limit power outages as a result of a storm
  - Identifying opportunities that would allow the Tribe to be as self sufficient as possible in meeting its energy demands



Florida is the Sunshine State and has great potential for harnessing energy from the sun

# Big Cypress Solar Project





# Project Partners

- Seminole Tribe of Florida
- DOE Office of Indian Energy
- Consultants (Godfrey Kahn, Baker Tilly, Sandia Labs, Jacobs Engineering Group)
- Contractor (Advanced Green Technologies)
- Glades Electric



# BC Solar Project Overview

- The Seminole Tribe of Florida has designed and is building approximately 445 kW of solar facilities and 1,510 kWh battery energy storage system (BESS), with transfer switches and control systems that will serve 4 essential facilities in the Big Cypress Reservation.
- The systems will be interconnected to the grid and the backup generators
- During outage BESS will be able to run the facilities for approx. 3 hours before generator kicks in
- Generator runs facility and recharges BESS then cuts off and switches over to BESS during extended outages

<u>Big Cypress</u>	<u>kW Peak Demand</u>	<u>Battery Peak Power, kW</u>	<u>Battery Capacity, kWh</u>	<u>Type of Solar Mount</u>	<u>Solar Capacity, kW dc</u>	<u>Solar kWh, year 1 estimate</u>	<u>Percent of Building's annual kWh from Solar</u>
Big Cypress Frank Billie Field Office	138.9	180.0	320	Carport	100	159,600	32%
Big Cypress Senior Center	83.9	110.0	150	Carport	40	63,840	28%
Big Cypress Health Clinic	201.9	260.0	640	Roof	170	271,320	22%
Big Cypress Public Safety Complex	140.3	180.0	400	Ground & Carport	135	215,460	32%
<b>TOTALS</b>	<b>564.9 kW</b>	<b>730.0 kW</b>	<b>1510 kWh</b>		<b>445 kW</b>	<b>710,220 kWh</b>	









# BC Frank Billie Field Office Construction Photos



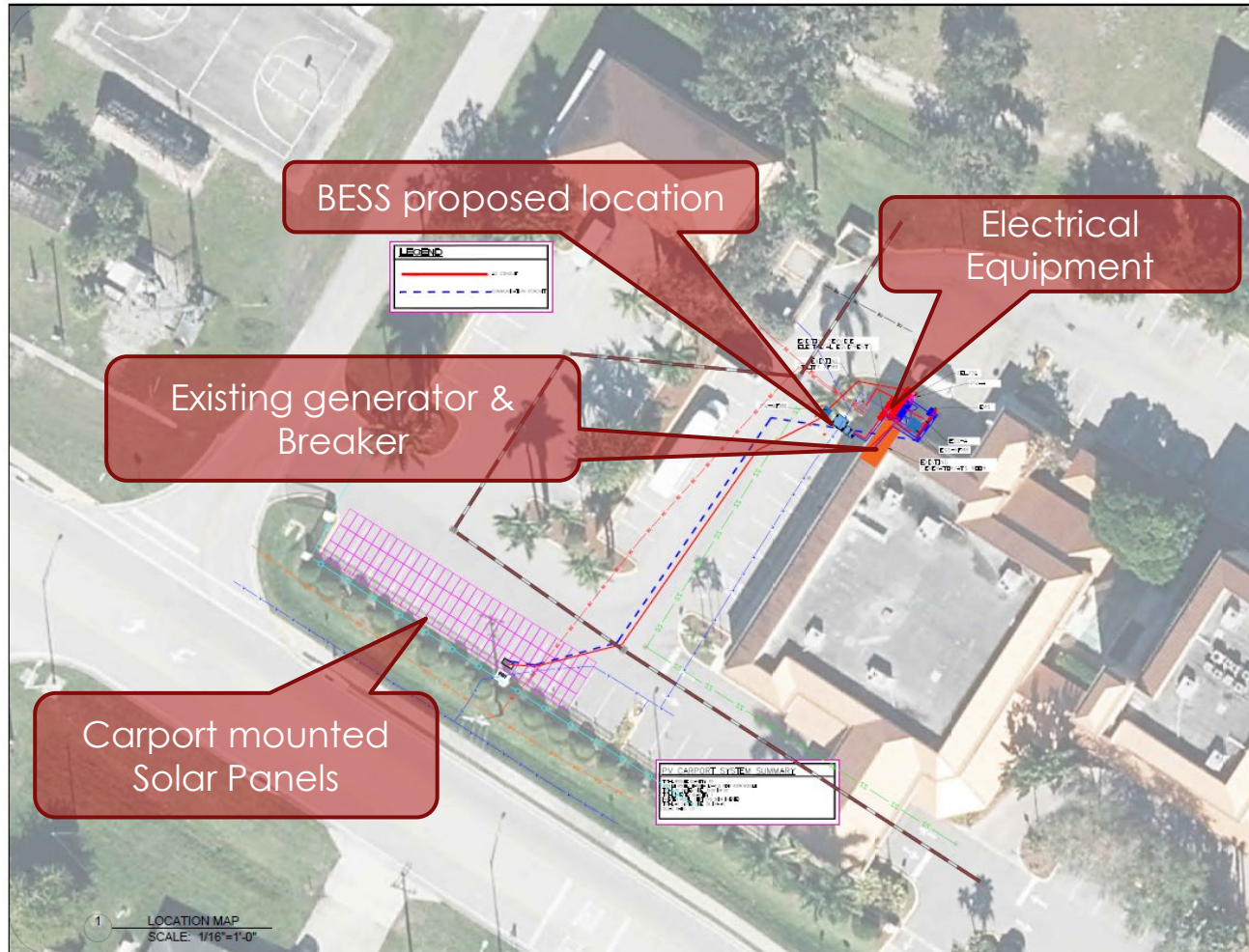


# BC Frank Billie Field Office Construction Photos





# BC Senior Center: Final Design



## EXHIBIT A: STORAGE INVERTER SPECIFICATION



## ENERGY STORAGE SOLUTION Power Conditioning System / PCSI

### Features

- Power capacity: 125 kW AC voltage: 480 VAC
- High efficiency: peak 97.8%, CEC 97.5%
- High power density: 147 W/3, 403 W/kg
- Quick power transfer time (<40 ms)
- Type 3R enclosure and IP65 for outdoor applications
- Black start capability for power backup and microgrid applications
- Scalable with multiple units in configuration

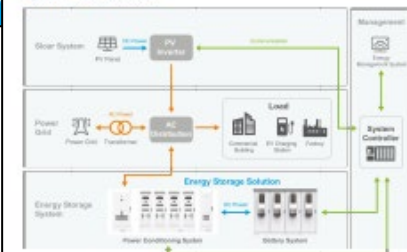


### The Leading Power for Energy Storage

Delta Power Conditioning System (PCS) is a bidirectional energy storage inverter for grid-tied and off-grid applications including power backup, peak shaving, load shifting, PV self-consumption, PV smoothing and etc. It demonstrates industry leading power performance with high power efficiency and low standby power loss. It is compact for space saving and offers scalability for various system configurations and integration with mainstream branded battery systems.



### System Architecture



### Applications

- Real and reactive power compensation to improve power quality
- Standalone operation for power backup
- Demand charge management / peak shaving
- Load shifting for time-of-use savings



# BC Senior Center Construction Photos



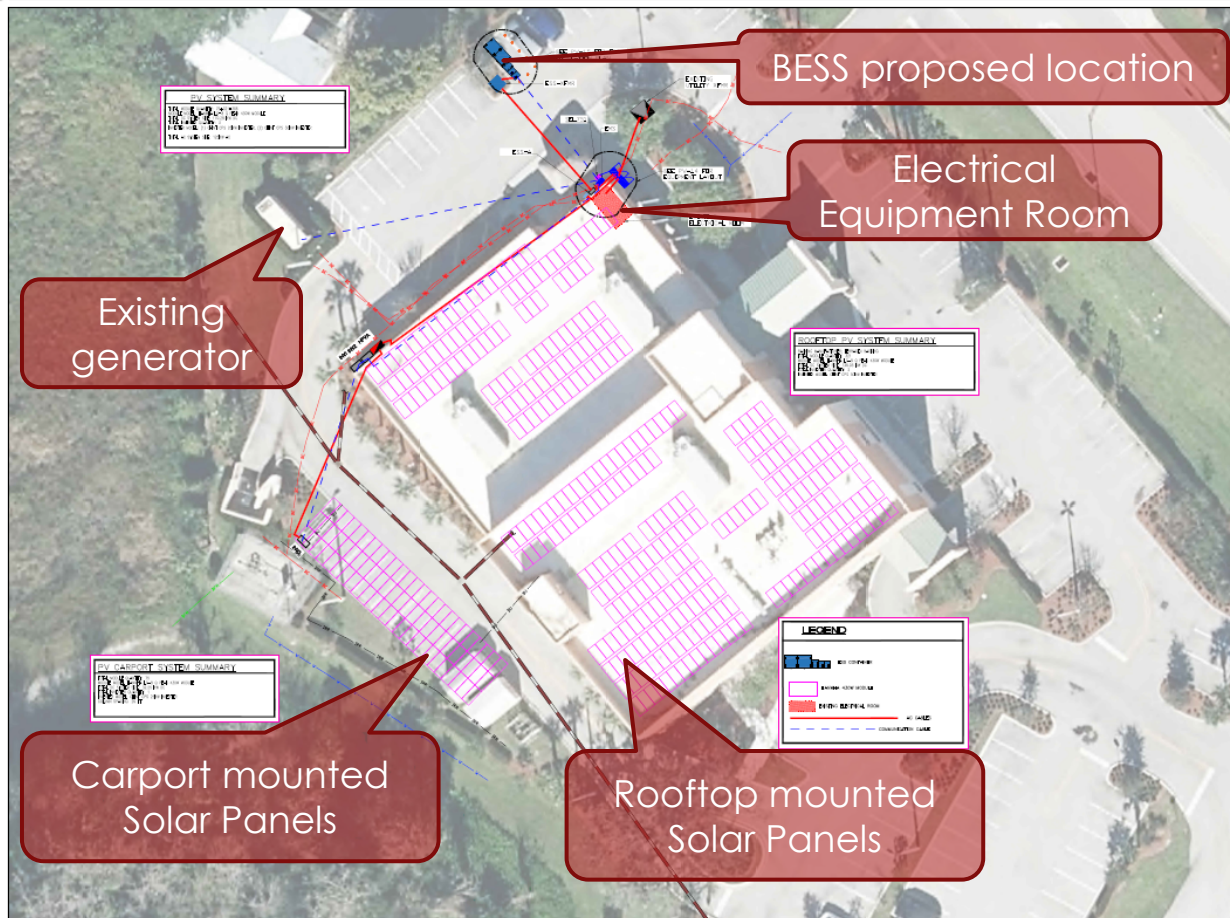


# BC Senior Center Construction Photos





# BC Health Clinic: Final Design



1 SITE PLAN SCALE: 1/16"=1'-0"

UET
   
  
 GORDON W. KREIS, P.E. # 26832
   
 ADVANCED ROOFING: CA NUMBER: 34378
   
**BIG CYPRESS HEALTH CLINIC**
  
 31055 JOSIE BLUE HWY, CLEMATON, FL
   
 PV MODULE LAYOUT
   
 DATE: 2/20/23
   
 AS SHOWN

Q-PEAK DUO L-G8.2
   
 420-435
   
 ENDURING HIGH PERFORMANCE

**Q-ANTUM TECHNOLOGY LOW LEVEL GRID OF ELECTRICITY**  
 Higher open-circuit voltages, lower IEC costs, higher power classes, and an efficiency loss of up to 0.31%.

**INNOVATIVE ALL-WEATHER TECHNOLOGY**  
 Optimal yields, whatever the weather, with excellent low-light and temperature tolerance.

**ENDURING HIGH PERFORMANCE**  
 Long-term yield security with Anti-SoD Technology, MWT, and Technology 100.

**EXTREME WEATHER**  
 High-tech aluminum high-strength 54000Pa.

**A RELIABLE INVERTER**  
 Includes 12-year on-line performance warranty.

**STATE OF THE ART**  
 Q-ANTUM DUO L-G8.2 and 144 cell modules maximize IEC/100 to 16.8% and increase to 12.4%.

**THE IDEAL SOLUTION FOR:**

- Commercial & Residential
- Industrial & Utility

Engineered in Germany

**CPS**
  
**50/60kW, 1000Vdc String Inverters for North America**

The 50 & 60kW (50 & 60kW) medium power CPS three phase string inverters are designed for ground mount, large rooftops and carport applications. The units are high performance, advanced and reliable inverters designed specifically for the North American environment and grid. High efficiency AC output, advanced MPPT, and advanced safety features make CPS inverters the ideal choice for high performance across many applications. The CPS 50/60kW products ship with either the Standard wire box or the Rapid Shutdown wire box, each fully integrated and compatible with touch safe busbar, monitoring, and AC and DC disconnect switches. The integrated AC disconnect, the Rapid Shutdown wire-free module, CPS 50/60kW inverters, and the CPS 50/60kW AC disconnect switches make CPS inverters the most compact and easy to install inverter solution available today. CPS 50/60kW inverters, CPS 50/60kW AC disconnect switches, and CPS 50/60kW AC disconnect switches are available in both 3-phase and 3-phase configurations.

**Key Features**

- IEC 61717 PVHS-Certified Rapid Shutdown
- 50 & 60kW string inverter maximum Active Power (40000 W)
- Selectable Max AC Apparent Power of 50/60kVA and 60/60kVA
- IEC 61717 Compliant & UL listed for fire circuit protection
- 15-40°C operating temperature for low profile applications
- Optional RAC Gateway enables remote FPL upgrades
- Integrated AC & DC disconnect switches
- 12 MPPT with 3 inputs each for maximum flexibility
- Copper and aluminum compatible DC connection
- Mini Type 40 outdoor rated, tough hot/cold/corrosion
- 60/100 GPa Cartridges CA-Box 21, including 60/100 FIP and 60/100 FIP
- Replaceable wire-free design for field service
- Standard 10 year warranty with extensions to 30 years
- Generous 1.8 and 1.3 DC/AC Inverter load ratios

CPS SC50R1-00/01-480  
 CPS SC60R1-00/01-480

Standard Wire Box

Rapid Shutdown Wire Box

CPS 50/60kW Inverters, CPS 50/60kW AC Disconnect Switches, CPS 50/60kW AC Disconnect Switches, CPS 50/60kW AC Disconnect Switches



# BC Health Clinic Construction Photos





# BC Health Clinic Construction Photos









# BC Public Safety Building Construction Photos





# BC Public Safety Building Construction Photos





# Material Costs Escalation & Delays

## ISSUES

- Project started in the midst of Supply Chain disruptions
- Materials prices increased dramatically
- Delivery times increased significantly
- Resulted in the need for a Change Order for Time and Money

## CHANGE ORDER 1

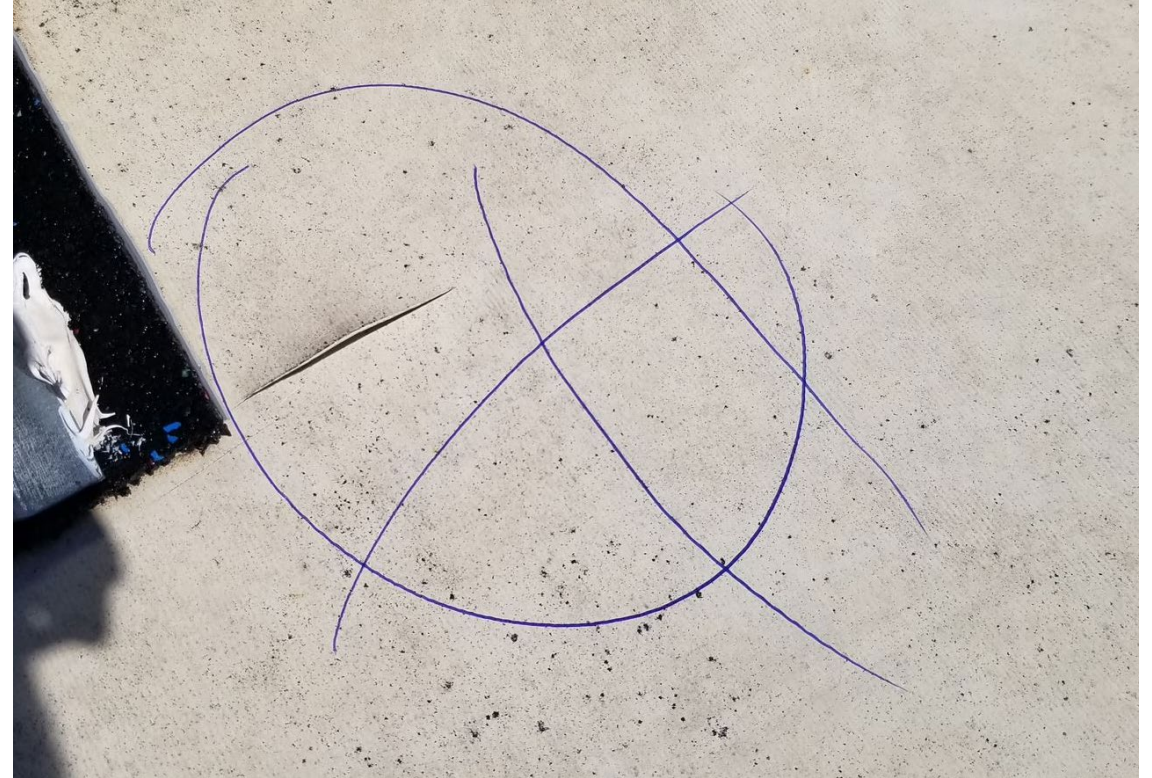
- Original Contract Amount: \$2,945,017
- Net Change Order: \$584,794.80
- New Contract Amount: \$3,529,811.80
- Original Contract Time: 184 days
- Net Time Change: 165 days
- New Contract Time: 349 days



# Unforeseen Circumstances



Unmarked sanitary sewer line conflict



Roof membrane damage that caused leak into BC Health Clinic

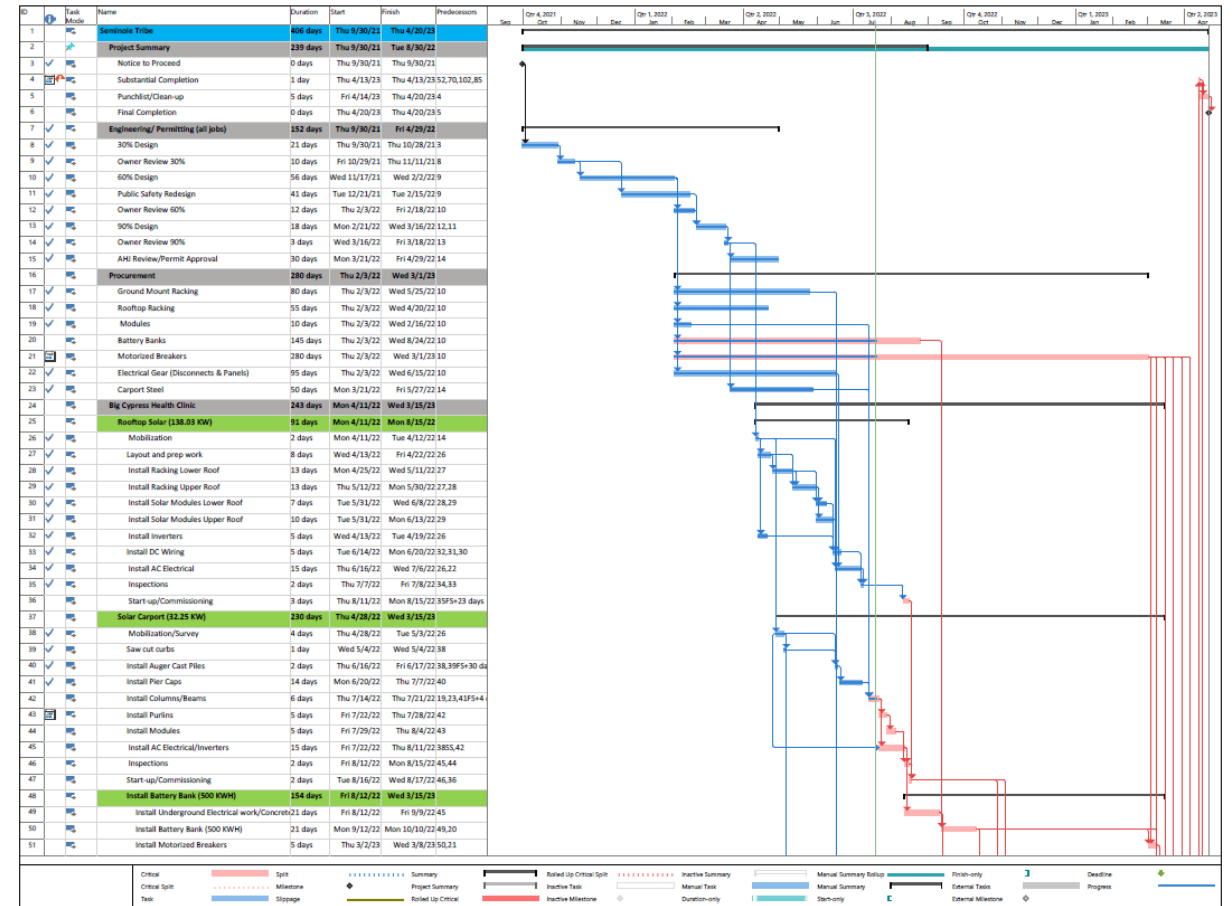


# Lessons Learned

- Double check PV and BESS Storage needs to provide desired resilience
- Balancing size of BESS to allow for desired duration of battery only energy without oversizing can be hard to explain
- Getting Design/Build contract award through Legal and Procurement is very time consuming
- Expect delays due to unforeseen circumstances and be flexible
  - Supply Chain Issues
  - Cost & Time Increase
- Keep DOE informed
- Underground locates are never 100% accurate
- Dry retention areas can be used for installation of Solar Panel Arrays
  - Try to time work before rainy season
  - Have alternative plan in place in case of pile refusals
- Roof can be damaged during installation
- Torque testing of connections is very important, especially with carports
- Start working on interconnection agreement early
- Expect resistance to service interruption for interconnection from facility users

# Activities Yet to be Completed

- Completion of Construction
  - Battery Delivery
  - Motorized Breaker Delivery
  - Interconnection
  - Commissioning
- Executed Interconnect Agreements
- Project Acceptance & Closeout
- First year production reporting





# Brighton 4 Solar Project





# Project Partners

- Seminole Tribe of Florida
- DOE Office of Indian Energy
- Consultants (Baker Tilly, Sandia Labs, Jacobs Engineering Group)
- Contractor (Advanced Green Technologies)
- Glades Electric



# BR 4 Solar Project Overview

- The Seminole Tribe of Florida has requested proposals for a contractor to design and build approximately 475 kW of solar facilities and 1,810 kWh battery energy storage system (BESS), with transfer switches and control systems that will serve 4 essential facilities in the Brighton Reservation.
- The systems will be interconnected to the grid and the backup generators
- During outage BESS will be able to run the facilities for approx. 3 hours before generator kicks in
- Generator runs facility and recharges BESS then cuts off and switches over to BESS during extended outages

<b>Brighton</b>	<b>kW Peak Demand</b>	<b>Battery Peak Power, kW</b>	<b>Battery Capacity, kWh</b>	<b>Type of Mount</b>	<b>Solar Capacity, kW dc</b>	<b>Solar kWh, year 1 estimate</b>	<b>Percent of Building's annual kWh from Solar</b>
Brighton Health Clinic	70.8	90.0	150	Ground	100	159,600	73%
Brighton Administration Building	179.6	230.0	570	Carport / Roof	125	199,500	29%
Brighton Public Safety Building	286.7	360.0	740	Carport / Roof	125	199,500	15%
Brighton Veterans Building	140.2	180.0	350	Carport	125	199,500	34%
<b>TOTALS</b>	<b>677 kW</b>	<b>860 kW</b>	<b>1810 kWh</b>		<b>475 kW</b>	<b>758,100 kWh</b>	<b>26%</b>



# BR Public Safety & Administration Buildings: Concept



## Brighton Public Safety and Administration Sites

600 E Harney Pond Road, Okeechobee, FL 34974  
 650 E Harney Pond Road, Okeechobee, FL 34974

### Public Safety

(goal dc)

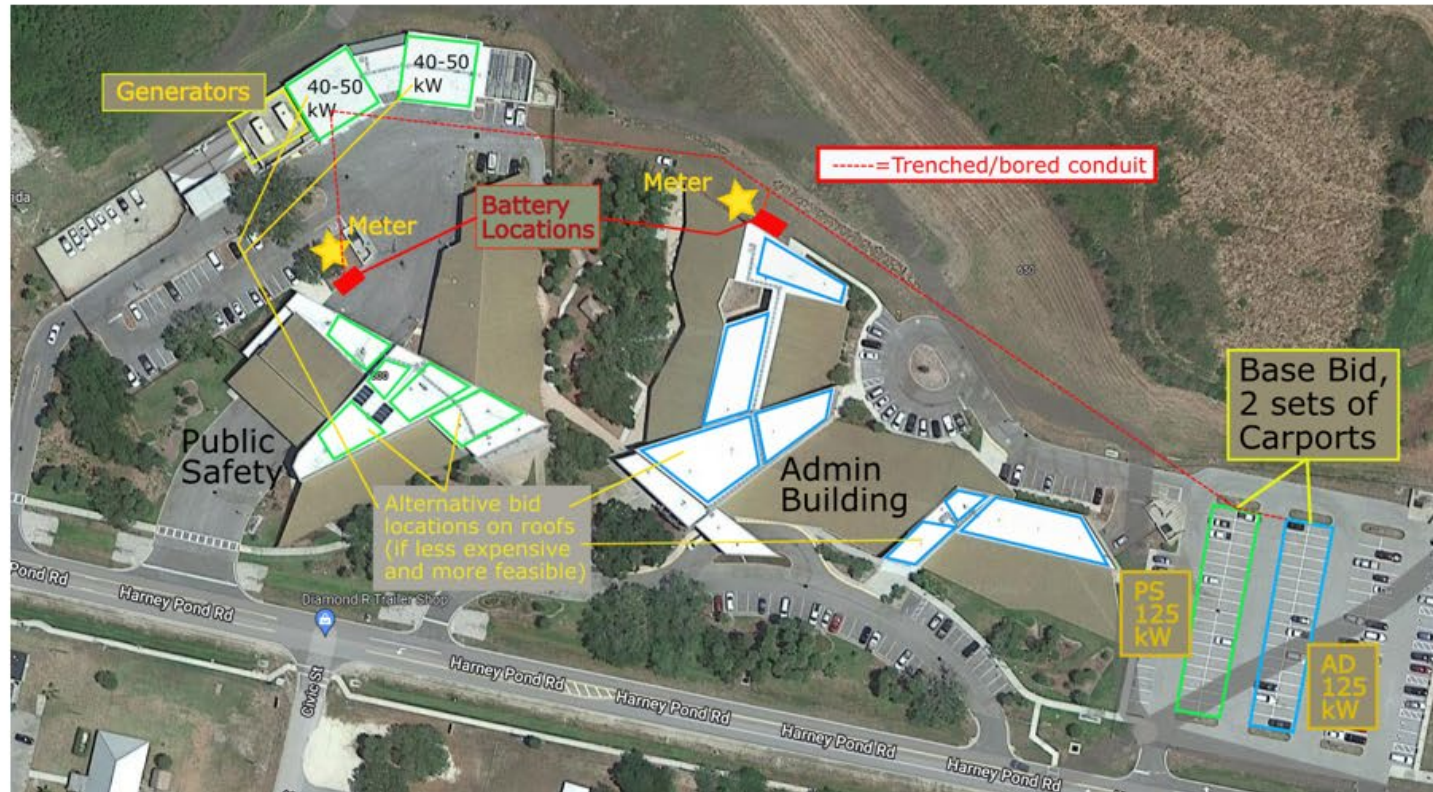
125 kW minimum  
 200 kW maximum

(estimated ac)

740 kWh Battery Capacity  
 360 kW Power Supply

Note:

Carport Solar is part of the Base Bid,  
 Rooftop Solar is an Alternate Bid



### Brighton Administration

(goal dc)

125 kW Minimum  
 150 kW Maximum

(estimated ac)

570 kWh Battery Capacity  
 230 kW Power Supply

Note:

Carport Solar is part of the Base Bid,  
 Rooftop Solar is an Alternate Bid



# BR Veterans Building: Concept

## Brighton Veterans Center

800 E Harney Pond Road, Okeechobee, FL 34974

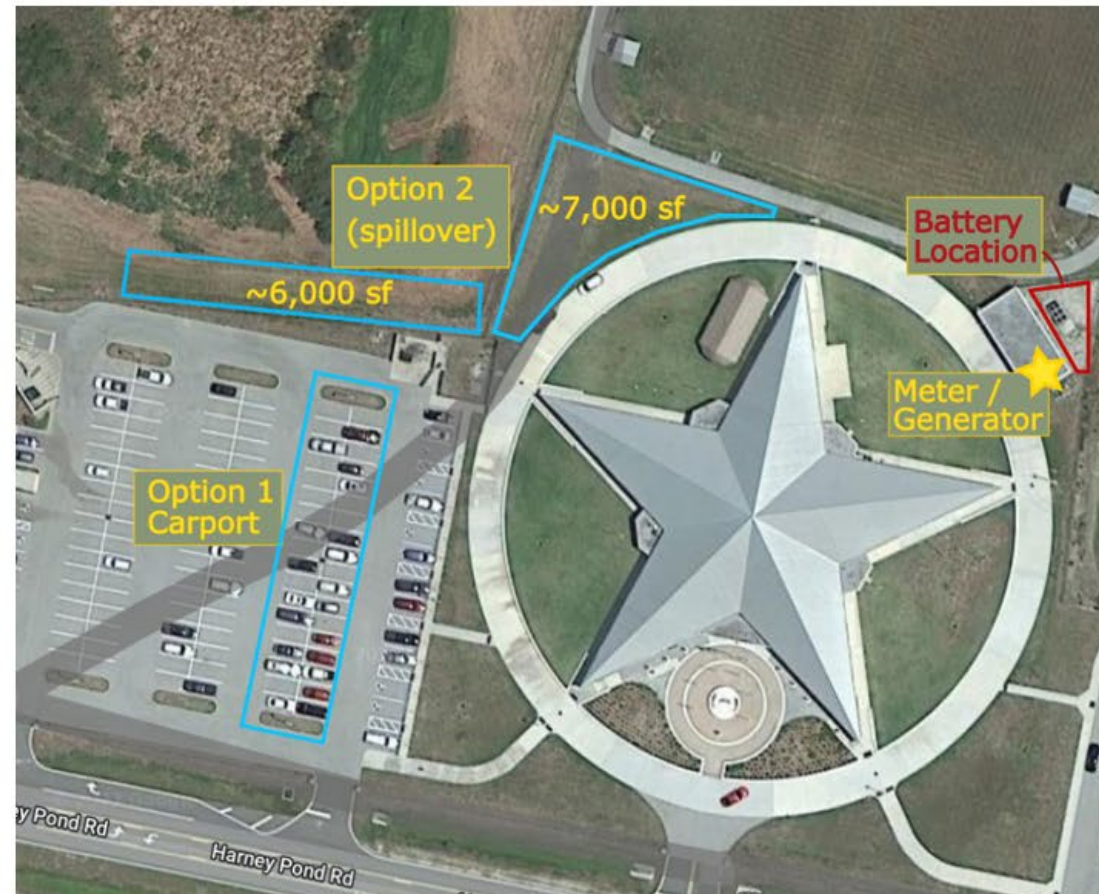
### BR Veterans Center

(goal dc)

100 kW minimum  
150 kW maximum

(estimated ac)

350 kWh Battery Capacity  
180 kW Power Supply



### Note:

Recommend to walk the site to verify best layout. It gets wet to the north the farther you move away from the parking lot.



# BR Health Clinic: Concept

## Brighton Health Clinic 17201 Civic Street, Okeechobee, FL 34974

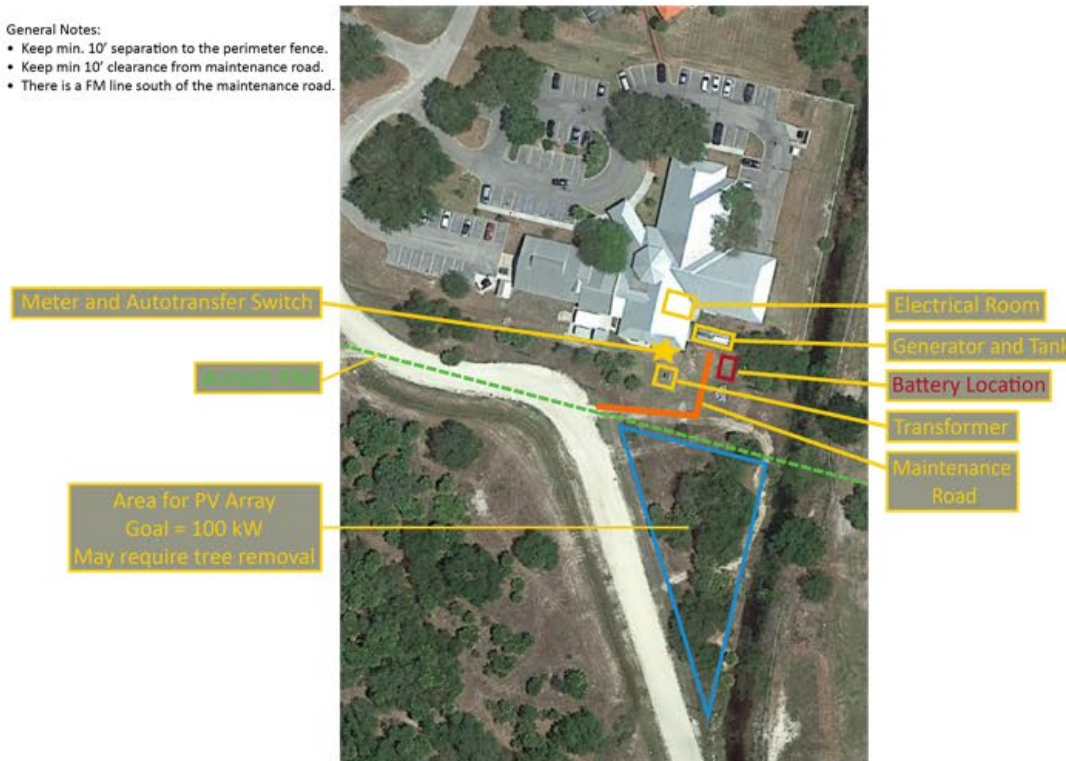
### BR Health Clinic

(goal dc)  
100 kW PV

(estimated ac)  
150 kWh Battery Capacity  
90 kW Power Supply

General Notes:

- Keep min. 10' separation to the perimeter fence.
- Keep min 10' clearance from maintenance road.
- There is a FM line south of the maintenance road.



Note:  
Recommend to walk the site to verify best layout. Indicate what trees (if any) need to be removed.

# Activities Yet to be Completed

- Execution of contract and issue NTP
- Completion of design
- Issuance of Building Permits
- Construction
- Commissioning
- Executed Interconnect Agreements
- Closeout
- Project Acceptance & Closeout
- First year production reporting

Milestone Summary Table							
Recipient Name:		Seminole Tribe of Florida					
Project Title		The Brighton 4					
Task No.	Task	Milestone Number	Milestone Description	Anticipated Months from Start	Anticipated Quarter from Start	Target Task Delivery Date	Revised Target Task Delivery Date
1	Request for Proposals for Contractor and Investor	M1	Issuance of request for proposals and selection of preferred installer.	3	1	3/17/2022	11/30/2022
2	Execute Design-Build ("D/B") Contract	M2	Tribe negotiates D-B contract with Installer and contract is executed.	4	2	<b>4/16/2022</b>	<b>12/30/2022</b>
3	Approval of Conceptual Site Drawings	M3	Installer will prepare the site layouts and drawings of solar facilities for the Tribe to review and approve, and the Tribe will review and approve.	5	2	5/16/2022	1/30/2023
3.1	Preparation of Site Drawings	M3.1	Installer prepares detailed system drawings and layouts.	6	2	6/15/2022	2/28/2023
3.2	Approval of Detailed Site Drawings	M3.2	Installer submits drawings and layouts to Tribe for review and approval and, once all Tribal concerns have been addressed, the drawings and layouts are approved.	7	3	7/15/2022	3/31/2023
4	Environmental/ Cultural Review	M4	The Tribe conducts environmental and cultural (E/C) review and issues E/C approval.	8	3	8/14/2022	4/30/2023
5	Building/Electrical Permitting	M5	Installer submits documents for building/electrical permits and receives such permits.	9	3	9/13/2022	5/31/2023
6	Interconnection Approval	M6	Installer applies for, and Project receives, interconnection approval.	10	4	<b>10/13/2022</b>	<b>6/30/2023</b>
7	Construction Start	M7	Installer mobilizes construction personnel, coordinates material delivery, and installs the Project.	10	4	10/13/2022	6/30/2023
7.1	Material Delivery	M7.1	Installer completes all shipping and delivery of materials and equipment.	13	5	1/13/2023	9/30/2023
7.2	Construct Project	M7.2	Construction personnel install integrated solar PV/battery storage Project.	16	6	4/13/2023	12/31/2023
8	Commissioning	M8	Utility on-site inspection.	17	6	<b>5/13/2023</b>	<b>1/31/2024</b>
9	Verification/ Closeout	M9	Monitoring of PV production and battery cycling.	18	6	<b>6/13/2023</b>	<b>2/28/2024</b>
10	Reporting	M10	Reporting to DOE regarding PV production and battery cycling	19	7	<b>7/6/2023</b>	<b>3/20/2024</b>
10.1	Reporting of First Quarter Production/Cycling	M11.1	Reporting of first quarter PV production and battery cycling.	22	8	10/6/2023	4/20/2024
10.2	Reporting of Second Quarter Production/Cycling	M11.2	Reporting of second quarter PV production and battery cycling.	25	9	1/6/2024	7/20/2024
10.3	Reporting of Third Quarter Production/Cycling	M11.3	Reporting of third quarter PV production and battery cycling.	28	10	4/6/2024	10/20/2024
10.4	Reporting of Fourth Quarter Production/Cycling	M11.4	Reporting of fourth quarter PV production and battery cycling.	31	11	7/6/2024	1/20/2025
11	Annual Reporting in Denver, Colorado	M12.0	Annual reporting at DOE Program Review in Denver, Colorado.	11	4	11/15/2021	11/15/2022
11.1	First Annual Reporting in Denver, Colorado	M12.1	First Annual reporting at DOE Program Review in Denver, Colorado.	23	8	11/15/2022	11/15/2023
11.2	Second Annual Reporting in Denver, Colorado	M12.2	Second Annual reporting at DOE Program Review in Denver, Colorado.	35	12	11/16/2023	11/16/2024



# Closing Thoughts

## GOING SOLAR

What you need to know about Solar Energy

Every second, our sun produces enough energy to sustain Earth's needs for 500,000 years.

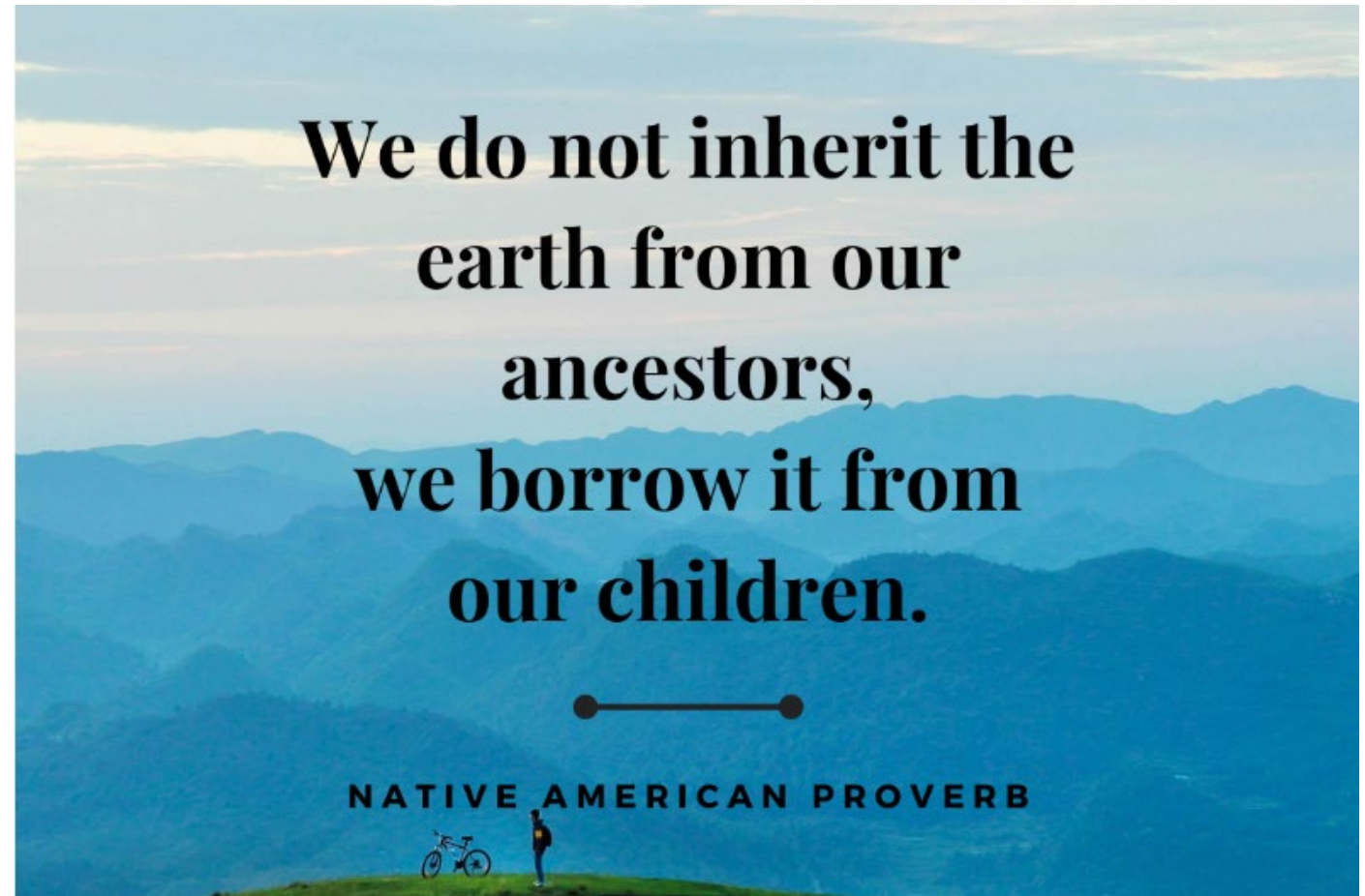
How do we harness this power?

### SOLARIZE IT

100 square miles of solar panels can supply enough energy to fuel the entire United States.



Charles Fritts invented the first solar cell. **1883** The first solar heated office building. **1955**



Source: <https://brandongaille.com/41-excellent-solar-energy-slogans-and-taglines/>

Source: <https://thedailyquotes.com/we-do-not-inherit-the-earth-from-our-ancestors-we-borrow-it-from-our-children/>

Thank you – Questions?

