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 acre 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
Seminole Tribe of Florida

- Exercised sovereign authority over territories in Southeast US from time immemorial
- Resisted US political and military removal efforts throughout 19th 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)
The Dependence Problem

- 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.
The Cost Problem

- 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.
Impact of Hurricane Irma

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

- The Tribe had to close and discontinue its government operations for several weeks and in some cases months until recovery.
- There are approximately 680 residents living in the BC Reservation, which 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.
Seminole Tribe of Florida Renewable Energy Committee

- 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
Potential for Solar Energy Generation

- This map shows U.S. average annual solar radiation in kilowatthours (kWh) per square meter per day (kWh/m²/d) for direct normal irradiance (DNI).

- Florida is the Sunshine State and has great potential for harnessing energy from the sun.
BC Solar Project Overview

- The Seminole Tribe of Florida will design and build approximately 445 kW of solar facilities and 1,510 kWh battery energy storage system (BESS), 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.
Project Participants

- DOE Office of Indian Energy
- Chairman & Tribal Council
- Executive & Senior Management Staff
- Consultants (Baker Tilly, Sandia Labs)
- Glades Electric
- Tribal Members
Project Status & Past Accomplishments

- **Status:**
  - Design Build contract executed and NTP issued 9/30/2021
  - Schematic Design received 10/22/2021 and being reviewed by STOF, Baker Tilly and Sandia

- **Past Accomplishments:**
  - Tribe awarded DOE Grant 2018
  - Reevaluated needs for each facility and modified scope of project with approval from DOE
  - Developed RFP and Design Build Contract Template for this project
  - Advertised RFP 2020 and selected contractor 2021
## Project Locations and Needs

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

- Ground mounted Solar Panels
- Existing generator & Breaker
- Existing Electrical Room
- BESS proposed location
BC Senior Center: Schematic Design

- Carport mounted Solar Panels
- BESS proposed location
- Existing Electrical Equipment
- Existing generator & Breaker
BC Public Safety Building: Schematic Design

- Ground mounted Solar Panels
- Existing generator & Breaker
- Existing Electrical Room
- Carport mounted Solar Panels
- BESS proposed location
BC Health Clinic: Schematic Design

- **Carport mounted Solar Panels**
- **Roof mounted Solar Panels**
- **Existing generator**
- **Existing Electrical Room**
- **BESS proposed location**
Design Logic

ATG Big Cypress Control Logic

- Grid Connected?
  - Yes: Set PV to Curtailment to zero
  - No: Battery has Capacity to Discharge?
    - Yes: Discharge with BESS to keep demand under Demand Limit Target
    - No: Battery SOC < Target SOC?
      - Yes: Charge Battery with PV
      - No: Load > PV + Demand Limit Target?
        - Yes: Loss of Utility?
        - No: Start and Connect Diesel
          - Yes: Start ESS in Grid Following
          - No: Start PV
            - Yes: Curtail PV if Battery Cannot Charge and PV + Load
            - No: Use ESS to keep Diesel between 25-80 percent load
            - No: Utility Back?
              - Yes: Shut down ESS
              - No: Shut down Diesel
        - No: Start ESS in Grid Forming Mode
          - Yes: Start PV
          - No: Remain in ESS Grid Forming
            - Yes: Curtail PV if Battery Cannot Charge and PV + Load
            - No: Utility Back?
              - Yes: Shut down ESS
              - No: Shut down Diesel
                - Yes: ATS switches to Grid
                - No: Utility Back?
                  - Yes: Shut down Diesel
                  - No: ATS switches to Grid

Note: This control logic assumes the following:
- ATS will not switch back to grid if microgrid has live
- The following must be read by EMS: PV Power, Load Power, Load Power cannot be measured the EMS must read Grid Power AND Diesel Power
- EMS can prevent diesel from auto starting when ATS switches to diesel side
- EMS must be able to read if Grid has returned
Activities Yet to be Completed

- Completion of design
- Executed Interconnect Agreements
- Issuance of Building Permits
- Construction
- Commissioning
- Closeout
Lessons Learned

- Double check PV and BESS Storage needs to provide desired resilience
- Balance sizing of BESS to allow for desired duration of battery only energy without oversizing
- Developing new Design Build Contract template can be very time consuming
- Expect delays due to unforeseen circumstances and be flexible
- Keep DOE informed
# Current Schedule

<table>
<thead>
<tr>
<th>Task Number</th>
<th>Title or Brief Task Description</th>
<th>Task Completion Date</th>
<th>Progress Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Re-Issuance of request for proposals and selection of preferred installer</td>
<td>Original Planned: 03/17/2019 Revised Planned: 10/14/2020 Actual: 100%</td>
<td>RFP Issued and Bids three bids received.</td>
</tr>
<tr>
<td>2</td>
<td>Tribe negotiates D-B contract with Installer and contract is executed.</td>
<td>Original Planned: 07/30/2019 Revised Planned: 08/28/2021 Actual: 100%</td>
<td>Contract executed 8/9/21 and NTP issued for 9/30/21</td>
</tr>
<tr>
<td>3</td>
<td>Approval of Detailed Site Drawings</td>
<td>Original Planned: 09/15/2019 Revised Planned: 1/14/2022 Actual: 100%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Environmental/ Cultural Review</td>
<td>Original Planned: 08/14/2019 Revised Planned: 12/30/2021 Actual: 100%</td>
<td>NEPA review for sites completed.</td>
</tr>
<tr>
<td>5</td>
<td>Building/Electrical Permitting</td>
<td>Original Planned: 09/13/2019 Revised Planned: 1/14/2022 Actual: 100%</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Interconnection Approval</td>
<td>Original Planned: 10/13/2019 Revised Planned: 12/30/2021 Actual: 100%</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Construction Start</td>
<td>Original Planned: 07/10/2020 Revised Planned: 03/21/2022 Actual: 100%</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Commissioning</td>
<td>Original Planned: 08/17/2020 Revised Planned: 08/01/2022 Actual: 100%</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Verification</td>
<td>Original Planned: 09/01/2020 Revised Planned: 08/22/2022 Actual: 100%</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Reporting to DOE regarding PV production and battery cycling</td>
<td>Original Planned: 10/20/2020 Revised Planned: 11/20/2022 Actual: 100%</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>First Annual Reporting in Denver, Colorado</td>
<td>Original Planned: 12/17/2019 Revised Planned: 11/20/2020 Actual: 100%</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Second Annual Reporting in Denver, Colorado</td>
<td>Original Planned: 12/16/2020 Revised Planned: 11/20/2021 Actual: 100%</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Third Annual Reporting in Denver, Colorado</td>
<td>Original Planned: 12/15/2020 Revised Planned: 11/20/2022 Actual: 100%</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Fourth Annual Reporting in Denver, Colorado</td>
<td>Original Planned: 11/20/2023 Revised Planned: 11/20/2023 Actual: 100%</td>
<td>First Full Year of Production Reporting</td>
</tr>
</tbody>
</table>
Brighton 4 Project Overview

- The Seminole Tribe of Florida will design and build approximately 475 kW of solar facilities and 1,810 kWh battery energy storage system (BESS), 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.
Project Participants

- DOE Office of Indian Energy
- Chairman & Tribal Council
- Executive & Senior Management Staff
- Consultants (Baker Tilly, Sandia Labs)
- Glades Electric
- Tribal Members
Project Status & Past Accomplishments

- **Status:**
  - RFP Development
  - Requested Proposal from Baker Tilly

- **Past Accomplishments:**
  - Tribe awarded DOE Grant 2021
Project Locations and Needs

- Project will add Photovoltaic Solar Panels (PV) and Battery Energy Storage Systems (BESS) to 4 facilities on Brighton Reservation:
  - Administration Building
  - Public Safety Building
  - Veterans Building
  - Health Clinic
- Will reduce energy needs by approx. 26%
Project Summary

- PV will be mainly Carport Mounted or Roof Mounted except for Health Clinic where it will be ground mounted.
- Will be interconnected to Grid, BESS, and Generator.
- When Grid is out, BESS will run buildings for approx. 3 hours before generator starts.
- Generator will run building and recharge BESS until BESS can take over during extended outages.

<table>
<thead>
<tr>
<th>Brighton</th>
<th>kW Peak Demand</th>
<th>kW Battery Peak Power</th>
<th>kWh Battery Capacity</th>
<th>Type of Mount</th>
<th>kWh dc Solar Capacity</th>
<th>kWh Solar kWh, year 1 estimate</th>
<th>Percent of Building's annual kWh from Solar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brighton Health Clinic</td>
<td>70.8</td>
<td>90.0</td>
<td>150</td>
<td>Ground</td>
<td>100</td>
<td>159,600</td>
<td>73%</td>
</tr>
<tr>
<td>Brighton Administration Building</td>
<td>179.6</td>
<td>230.0</td>
<td>570</td>
<td>Carport / Roof</td>
<td>125</td>
<td>199,500</td>
<td>29%</td>
</tr>
<tr>
<td>Brighton Public Safety Building</td>
<td>286.7</td>
<td>360.0</td>
<td>740</td>
<td>Carport / Roof</td>
<td>125</td>
<td>199,500</td>
<td>15%</td>
</tr>
<tr>
<td>Brighton Veterans Building</td>
<td>140.2</td>
<td>180.0</td>
<td>350</td>
<td>Carport</td>
<td>125</td>
<td>199,500</td>
<td>34%</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>677 kW</strong></td>
<td><strong>860 kW</strong></td>
<td><strong>1810 kWh</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Solar Sites Details
Brighton Public Safety and Administration Sites
600 and 650 Harney Pond Rd

Public Safety
(goal dc)
125 kW minimum
200 kW maximum

(estimated ac)
740 kWh Battery Capacity
360 kW Power Supply

Note:
Carport Solar is Base Bid
Rooftop Solar is 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 Base Bid
Rooftop Solar is Alternate Bid
Solar Sites Details
Brighton Veterans Center
800 Harney Rd

BR Veterans Center

(goal dc)
100 kW minimum
150 kW maximum

(estimated ac)
350 kWh Battery Capacity
180 kW Power Supply

Note:
Walk site to verify best layout. Gets wet the more north you go from parking lot.
Solar Sites Details
Brighton Health Clinic
17202 Civic St

BR Health Clinic

(goal dc)
100 kW max PV

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

Note:
Walk site to verify best layout. Indicate what trees (if any) need removing.
Design Logic

ATG Big Cypress Control Logic

- Grid Connected?
  - Yes
    - Loss of Utility
    - ATS switches to Gen
    - Max Load > ESS Capacity?
      - Yes
        - Start ESS in Grid Forming Mode
        - Start PV
      - No
        - Start and Connect Diesel
  - No
    - Battery has Capacity to Discharge?
      - Yes
        - Start ESS in Grid Forming
      - No
        - Load - PV > Demand Limit Target?
          - Yes
            - Start and Connect Diesel
          - No
            - Battery SOC < Target ESS
              - Yes
                - Discharge with BESS to keep demand under Demand Limit Target
              - No
                - Change Battery with PV
              - Battery SOC < Target SOC
                - Yes
                  - Charge Battery with PV
                - No
                  - Use ESS to keep Diesel between 25-80 percent load

Note: This control logic assumes the following:
- ATS will not switch back to grid if microgrid has live
- The following must be read by EMS: PV Power, Load Power. If load power cannot be measured the EMS must read Grid Power AND Diesel Power
- EMS can prevent diesel from auto starting when ATS switches to diesel side
- EMS must be able to read if grid has returned

Curtail PV if Battery Cannot Charge and PV>Load
Utility Back?
Yes
- Shut down ESS
- Shut down Diesel
- ATS switches to Grid
No
- ESS Fault?
  - Yes
    - Shut down ESS
    - Shut down Diesel
    - ATS switches to Grid
  - No
    - Use ESS to keep Diesel between 25-80 percent load
    - Utility Back?
      - Yes
        - Start and Connect Diesel
      - No
        - Start ESS in Grid Forming
    - Start PV
- Remain in ESS Grid Forming
- Curtail PV if Battery Cannot Charge and PV>Load
Activities Yet to be Completed

- Develop RFP for Design Build project
- Selection of contractor and award of contract
- Execution of contract and issue NTP
- Completion of design
- Executed Interconnect Agreements
- Issuance of Building Permits
- Construction
- Commissioning
- Closeout
Lessons Learned from BC Project

- Double check PV and BESS Storage needs to provide desired resilience
- Balance sizing of BESS to allow for desired duration of battery only energy without oversizing
- Developing new Design Build Contract template can be very time consuming
- Expect delays due to unforeseen circumstances and be flexible
- Keep DOE informed
## Revised Schedule

### Milestone Summary Table

**Recipient Name:** Seminole Tribe of Florida  
**Project Title:** The Brighton 4

<table>
<thead>
<tr>
<th>Task No.</th>
<th>Task Description</th>
<th>Milestone Number</th>
<th>Milestone Description</th>
<th>Anticipated Months from Start</th>
<th>Anticipated Quarter from Start</th>
<th>Target Task Delivery Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Request for Proposals for Contractor and Investor</td>
<td>M1</td>
<td>Issuance of request for proposals and selection of preferred installer.</td>
<td>3</td>
<td>1</td>
<td>3/17/2022</td>
</tr>
<tr>
<td>2</td>
<td>Execute Design-Build (&quot;D/B&quot;) Contract</td>
<td>M2</td>
<td>Tribe negotiates D-B contract with Installer and contract is executed.</td>
<td>4</td>
<td>2</td>
<td>4/16/2022</td>
</tr>
<tr>
<td>3</td>
<td>Approval of Detailed Site Drawings</td>
<td>M3</td>
<td>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.</td>
<td>5</td>
<td>2</td>
<td>5/16/2022</td>
</tr>
<tr>
<td>3.1</td>
<td>Preparation of Site Drawings</td>
<td>M3.1</td>
<td>Installer prepares detailed system drawings and layouts.</td>
<td>6</td>
<td>2</td>
<td>6/15/2022</td>
</tr>
<tr>
<td>3.2</td>
<td>Approval of Detailed Site Drawings</td>
<td>M3.2</td>
<td>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.</td>
<td>7</td>
<td>3</td>
<td>7/15/2022</td>
</tr>
<tr>
<td>4</td>
<td>Environmental/Cultural Review</td>
<td>M4</td>
<td>The Tribe conducts environmental and cultural (E/C) review and issues E/C approval.</td>
<td>8</td>
<td>3</td>
<td>8/14/2022</td>
</tr>
<tr>
<td>5</td>
<td>Building/Electrical Permitting</td>
<td>M5</td>
<td>Installer submits documents for building/electrical permits and receives such permits.</td>
<td>9</td>
<td>3</td>
<td>9/13/2022</td>
</tr>
<tr>
<td>6</td>
<td>Interconnection Approval</td>
<td>M6</td>
<td>Installer applies for, and Project receives, interconnection approval.</td>
<td>10</td>
<td>4</td>
<td>10/13/2022</td>
</tr>
<tr>
<td>7</td>
<td>Construction Start</td>
<td>M7</td>
<td>Installer mobilizes construction personnel, coordinates material delivery, and installs the Project.</td>
<td>13</td>
<td>5</td>
<td>1/13/2023</td>
</tr>
<tr>
<td>7.1</td>
<td>Material Delivery</td>
<td>M7.1</td>
<td>Installer completes all shipping and delivery of materials and equipment.</td>
<td>16</td>
<td>6</td>
<td>4/13/2023</td>
</tr>
<tr>
<td>7.2</td>
<td>Construct Project</td>
<td>M7.2</td>
<td>Construction personnel install integrated solar PV/battery storage Project.</td>
<td>17</td>
<td>6</td>
<td>5/13/2023</td>
</tr>
<tr>
<td>8</td>
<td>Commissioning</td>
<td>M8</td>
<td>Utility on-site inspection.</td>
<td>18</td>
<td>6</td>
<td>6/13/2023</td>
</tr>
<tr>
<td>9</td>
<td>Verification/Closeout</td>
<td>M9</td>
<td>Monitoring of PV production and battery cycling.</td>
<td>19</td>
<td>7</td>
<td>7/6/2023</td>
</tr>
<tr>
<td>10</td>
<td>Reporting</td>
<td>M10</td>
<td>Reporting to DOE regarding PV production and battery cycling.</td>
<td>22</td>
<td>8</td>
<td>10/6/2023</td>
</tr>
<tr>
<td>10.1</td>
<td>Reporting of First Quarter Production/Cycling</td>
<td>M11.1</td>
<td>Reporting of first quarter PV production and battery cycling.</td>
<td>23</td>
<td>9</td>
<td>11/6/2023</td>
</tr>
<tr>
<td>10.2</td>
<td>Reporting of Second Quarter Production/Cycling</td>
<td>M11.2</td>
<td>Reporting of second quarter PV production and battery cycling.</td>
<td>28</td>
<td>10</td>
<td>4/6/2024</td>
</tr>
<tr>
<td>10.3</td>
<td>Reporting of Third Quarter Production/Cycling</td>
<td>M11.3</td>
<td>Reporting of third quarter PV production and battery cycling.</td>
<td>31</td>
<td>11</td>
<td>7/6/2024</td>
</tr>
<tr>
<td>10.4</td>
<td>Reporting of Fourth Quarter Production/Cycling</td>
<td>M11.4</td>
<td>Reporting of fourth quarter PV production and battery cycling.</td>
<td>35</td>
<td>12</td>
<td>11/6/2023</td>
</tr>
<tr>
<td>11</td>
<td>Annual Reporting in Denver, Colorado</td>
<td>M12.0</td>
<td>Annual reporting at DOE Program Review in Denver, Colorado.</td>
<td>11</td>
<td>4</td>
<td>11/15/2021</td>
</tr>
<tr>
<td>11.1</td>
<td>First Annual Reporting in Denver, Colorado</td>
<td>M12.1</td>
<td>First Annual reporting at DOE Program Review in Denver, Colorado.</td>
<td>23</td>
<td>8</td>
<td>11/15/2022</td>
</tr>
<tr>
<td>11.2</td>
<td>Second Annual Reporting in Denver, Colorado</td>
<td>M12.2</td>
<td>Second Annual reporting at DOE Program Review in Denver, Colorado.</td>
<td>35</td>
<td>12</td>
<td>11/16/2023</td>
</tr>
</tbody>
</table>
We do NOT inherit the Earth from our ancestors, we borrow it from our Children

- Native American Proverb
Thank You

CHERYL GIACOBBE
HARVEY RAMBARATH