

SUFFOLK COUNTY

Roof Analysis and Smart Roof Recommendation

Chen, David
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Terminology:

1. Roofs are identified by the floor number. For example, the 5th floor roof means the roof above the 5th floor.
2. Calculate terms that relates to energy, cost and GHG production are all operational. For energy, it means the energy needed to offset the heat loss/gain from **only** the roof. Cost is based on the cost of energy to offset the heat loss/gain from **only** the roof. GHG production is based GHG produced from offsetting the heat loss/gain from **only** the roof.

Note:

1. If a black roof area is relatively small for PV installation or green roof, then a cool roof is suggested as a default recommendation. Cool roofs are easier to implement and more cost-beneficial than black roofs.
2. If a black roof is ballasted (anchored with white stones) and is relatively small, then filling any noticeable black exposed surface with ballasted is a default alternative recommendation. The roof itself is already white from the ballasted which is more cost- beneficial than a black roof. White-colored ballast has a higher albedo than EPDM black membranes and offers the UV protection from the sun. Filling in black spaces with ballast increases the roof thermal performance.
3. A cool roof with PV array enhances the energy/cost savings and GHG reductions. PV operates at maximum efficiency at cooler temperature. A cool roof will provide a cooler local air temperature for PV. Therefore PV operation is better with a cool roof than a black roof or green roof.

Recommendation & Calculation:

1. -If the **whole** roof is black, then the default recommendation is a **cool roof**. A **PV** array is also recommended if the roof conditions are suitable.

-The “Annual Heating/Cooling Energy Consumption with...[kWh]” , “Annual Cost for Heating/Cooling with ...[\$]” , “Annual Equivalent CO₂e from...[lbs]” and “Payback Period Compared to Black Roof [years]” calculations were based on the **whole** black roof area entered in the calculator.

-The “Annual Overall Energy Savings compared with Black Roofs w/ Recommended Roofs [kWh]”, “Annual Overall Cost Saving compared with Black Roofs w/ Recommended Roofs”, and “Annual Overall CO₂e Reduction compared with Black Roofs w/ Recommended Roofs [lbs]” calculations were **based on the difference between black roof values and cool roof values**.

2. -If the **whole** roof is white, then the default recommendation is a **PV** roof if the roof conditions are suitable. If the roof is ballasted, the alternative recommendation is to fill the uncovered space with more ballast. Slate roof is considered a white roof even though it looks grey.

-The “Annual Heating/Cooling Energy Consumption with...[kWh]” , “Annual Cost for Heating/Cooling with ...[\$]” , “Annual Equivalent CO2e from...[lbs]” and “Payback Period Compared to Black Roof [years]” calculations were based on the **whole** white roof area entered in the calculator.

-The “Annual Overall Energy Savings compared with Black Roofs w/ Recommended Roofs [kWh]”, “Annual Overall Cost Saving compared with Black Roofs w/ Recommended Roofs”, and “Annual Overall CO2e Reduction compared with Black Roofs w/ Recommended Roofs [lbs]” calculations were **not done** since roof is already white and PV system size is not suggested. If a PV system is suggest, the system size can be entered in the calculator to yield savings/ reductions and payback period.

3. -If a roof is partially white and non-white (black/grey), then the default recommendation is a **cool roof replacement on non-white sections of the roof**. A **PV** array is also recommended if the roof conditions are suitable.

-The “Annual Heating/Cooling Energy Consumption with...[kWh]” , “Annual Cost for Heating/Cooling with ...[\$]” , “Annual Equivalent CO2e from...[lbs]” and “Payback Period Compared to Black Roof [years]” calculations were based on the **non-white** roof area entered in the calculator.

- The “Annual Overall Energy Savings compared with Black Roofs w/ Recommended Roofs [kWh]”, “Annual Overall Cost Saving compared with Black Roofs w/ Recommended Roofs”, and “Annual Overall CO2e Reduction compared with Black Roofs w/ Recommended Roofs [lbs]” calculations were **based on the difference between black(non-white) roof values and cool roof values of the non-white area**.

Visited Roofs

Building No: C0010
Name: Department of Public Works
Location: 335Yaphank Ave, Yaphank NY 11980

Total Roof Area: 49,729 Sq Ft
Total Flat Roof Area: 26,380 Sq Ft
Total Pitch 4: 12 Roof Area: 23,349 Sq Ft

Cool Roof Recommendation

Total Energy Savings: 38,304.4 kWh
Total Cost Savings: \$8,598.35
Total GHG Reduction: 54,367.7 lbs CO2 e

- **Penthouse (3rd Flr) (1)**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM-Fully Adhere
 - **Area:** 2,304 Sq Ft
 - **Applicable** for Smart Roof. Nothing occupying the roof.
 - **Roof Conditions:** Did not inspect this roof section.
 - **Recommend Cool Roof.** Refer to Note 1.

- **2nd Flr (2)**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM- Fully Adhere
 - **Area:** 15,552 Sq Ft
 - **Applicable** for Smart Roof. Equipment and other machinery do not occupy the majority space of the roof. Units are not scattered which provides an ample amount of clear roof area. This area is the second largest section of DPW.
 - **Roof Conditions:** **Some** ponding. Ponding is relatively small. Repair is not imperative.
 - **Recommend Cool Roof** due to black colored roof. Green roof is not viable because of public access is through a machinery room. **PV** is possible due large area.

- **1st Flr-**
 - Under the 2nd Flr- **Flat Roof (3)**
 - **Color:** Mostly White (Ballasted)/ Black (EPDM)
 - **Material:** EPDM Ballasted
 - **Area:** 8,064 Sq Ft
 - **Applicable** for Smart Roof. Only ballast occupies this section.



Figure 1: Roof of Department of Public Works with possible PV array arrangement.

- **Roof Conditions: Difficult to Inspect Conditions** because ballasted covered roof. Some moss and ponding which doesn't seem to cause much damage to roof.
 - **Recommend** nothing because limitation to implement green or PV roofs and roof is already white –colored ballast.
 - **Alterative Recommendations:** Refer to Note 2.

- Small Portion of South West Side - **Flat Roof (4)**
 - **Color:** White
 - **Material:** Asphalt shingles
 - **Area: 460 Sq Ft**
 - **Applicable** for Smart Roof. Empty space.
 - **Roof Conditions:** Did not consider due to small area.
 - **Recommend** nothing because area is very small and already white.

- Rest of the Roof – **Pitch 4:12 (5)**
 - **Color:** White
 - **Material:** Asphalt shingles
 - **Area: 23,349 Sq Ft**
 - **Applicable** for Smart Roof. Empty space.
 - **Roof Conditions:** Did not directly conduct inspection on the roof due to potential hazards of moving on a pitched roof. This section of roof was observed at a distance from 2nd floor flat roof. Roof seems to be in good condition.
 - **Recommend PV** Roof. The pitched surface that faces south will have PV panels attached. The remaining sections are left alone because they are already white.

Building No: C0140
Name: H. Lee Dennison Building
Location: 100 Veterans Memorial Hwy,
Hauppauge NY 11788

Total Roof Area: 31,922 Sq Ft (All Flat Roof)

- **Penthouse (13th Flr) (1)**

- **Flat Roof**

- **Color:** Mostly White (Ballasted)/ Black (EPDM & Bitumen)
- **Material:** Bitumen, EPDM-fully adhere, Ballasted
- **Area: 1,931 Sq Ft**
- **Not Applicable** for Smart Roof due to vast amount of equipment, electronics and thick wires that occupy the roof. Except for cool roof when roof replacement is needed.

- **Roof Conditions: Difficult to Inspect Conditions** because ballasted covered roof. Some moss.
- **Alterative Recommendations:** Refer to Note 2.

- **12th Flr (2)**

- **Flat Roof**

- **Color:** Mostly White (Ballasted)/ Black (EPDM & Bitumen)
- **Material:** Bitumen, EPDM-fully adhere, Ballasted
- **Area: 5,778 Sq Ft**
- **Not Applicable** for Smart Roof due to vast amount of equipment, electronics and wires that occupy the roof. Very large units occupy more than 40% of the roof that causes difficult mobility for someone to navigate across the roof. Except for cool roof when roof replacement is needed.
- **Roof Conditions: Difficult to Inspect Conditions** because ballasted covered roof. Some moss.
- **Alterative Recommendations:** Refer to Note 2.

- **3rd Flr (3)**

- **Flat Roof**

- **Color:** Mostly White (Ballasted)/ Black (EPDM & Bitumen)
- **Material:** Bitumen, EPDM-fully adhere, Ballasted
- **Area: 24,213 Sq Ft**

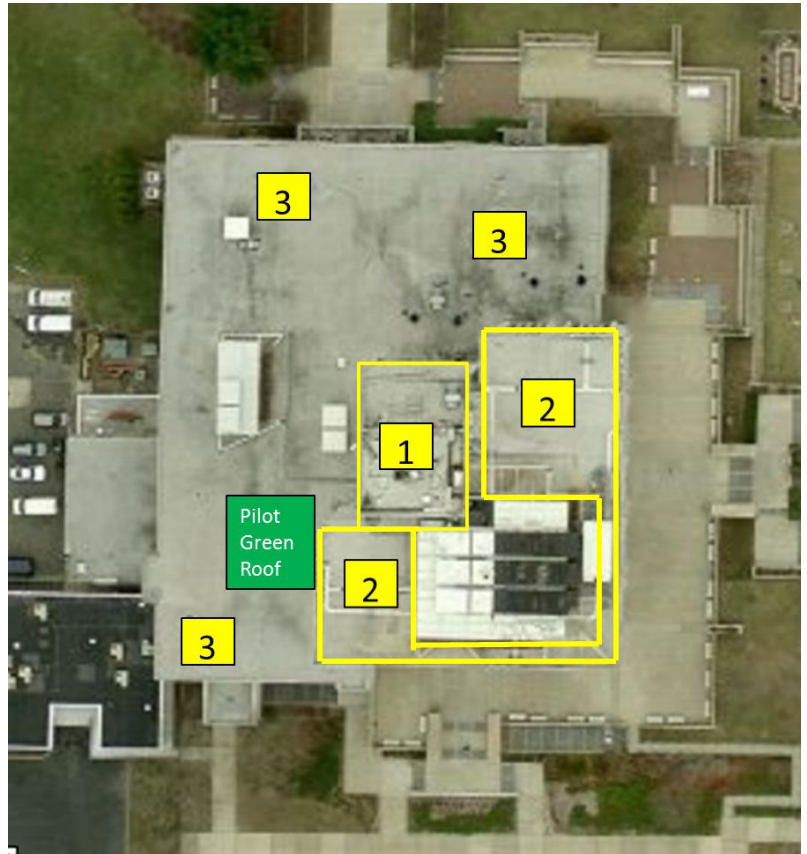


Figure 2: Roof of H. Lee Dennison Building with pilot green roof.

- **Applicable** for Smart Roof. Equipment and other machinery do not occupy the majority of the roof. Only condenser unit/ warehouse is the largest unit to occupy the roof.
- **Roof Conditions: Difficult to Inspect Conditions** because ballasted covered roof. Some moss.
- **Recommend Green Roof as pilot project** due to large area. Green Roof may not necessary be cost effective, but it will bring good publicity for the building.
- **Alterantive Recommendations:** Add additional ballast to exposed black surfaces.

Building No: C0873
Name: Day Care Center
Location: 100 Veterans Memorial Hwy, Hauppauge NY
11788

Total Area: 4,462 Sq Ft

Cool Roof Recommendation

Total Energy Savings: 9,043.0 kWh

Total Cost Savings: \$2,027.36

Total GHG Reduction: 12,827.1 lbs CO2 e



Figure 3: Roof of Day Care Center

- **Top Floor**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM-Fully Adhered
 - **Area:** 4,462 Sq Ft
 - **Applicable** for Smart Roof. Equipment and other machinery do not occupy the majority of the roof. Only HVAC fans occupy roof.
 - **Roof Conditions:** Some ponding from HVAC units. Check whether liquid from HVAC is condensation or refrigerant.
 - **Recommend Cool Roof.** Refer to Note 1.

Building No: C0338
Name: Criminal Courts Building
Location: Center Dr., Riverhead NY, 11901

Total Area: 65,417 Sq Ft (All Flat Roof)

Cool Roof Recommendation

Total Energy Savings: 120,805.8 kWh
Total Cost Savings: \$27,112.05
Total GHG Reduction: 153,562.1 lbs CO2 e

- **6th Flr- 4 Penthouses (1)**
 - Flat Roof
 - **Color:** Black
 - **Material:** EPDM-Fully Adhered
 - **Area:** 4,496 Sq Ft
 - **Applicable** for Smart Roof. Empty space.
 - **Roof Conditions:** Did not inspect.
 - **Recommend Cool Roof.** Refer to Note 1.

- **6th Flr (2)**
 - Flat Roof
 - **Color:** Black
 - **Material:** EPDM-Fully Adhered
 - **Area:** 10,825 Sq Ft
 - **Applicable** for Smart Roof. Equipment and other machinery do not occupy the majority space of the roof.
 - **Roof Conditions:** Significant number of small ponding.
 - **Recommend Cool Roof.** Green roof is not viable because of public access through a machinery room. A PV array can be difficult to install due to the scattered HVAC units and traffic pads. The original roof is black; therefore a cool roof would be more cost effective for the building.

- **6th Flr- 5th Flr Extension Roof (3)**
 - Flat Roof
 - **Color:** Black
 - **Material:** EPDM-Fully Adhered
 - **Area:** 5,640 Sq Ft
 - **Applicable** for Smart Roof. Nothing occupying these roofs.
 - **Roof Conditions:** Significant number of small ponding.
 - **Recommend Cool Roof.** Refer to Note 1.

- **5th Flr- 4 Penthouses (4)**
 - Flat Roof

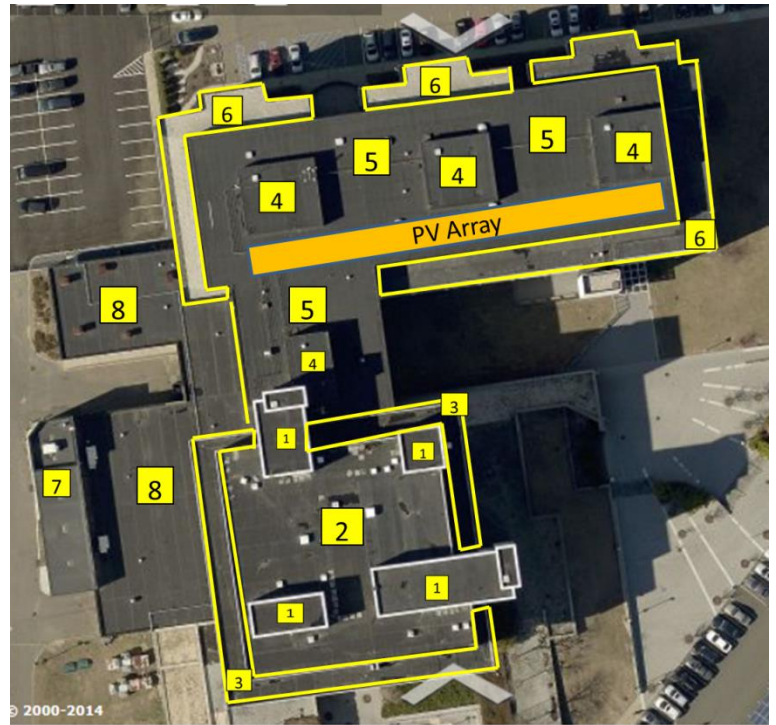


Figure 4: Roof of Criminal Courts Building with possible PV array arrangement.

- **Color:** Black
 - **Material:** EPDM-Fully Adhered
 - **Area:** 5,311 Sq Ft
 - **Applicable** for Smart Roof. Empty space.
 - **Roof Conditions:** Did not inspect.
 - **Recommend Cool Roof.** Refer to Note 1.

- **5th Flr (5)**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM-Fully Adhered/ Mech. Attached
 - **Area:** 20,019 Sq Ft
 - **Applicable** for Smart Roof. Ample amount of empty space. Very few occupying units.
 - **Roof Conditions:** Large ponding near the south penthouse.
 - **Recommend Cool Roof.** Green roof is not viable because of public access through a machinery room. A PV array can be installed along the South end of 3 larger penthouses. Refer to figure 4.

- **5th Flr- 4th Flr Extension Roof (6)**
 - **Flat Roof**
 - **Color:** Mostly White (Ballasted)/ Black (EPDM)
 - **Material:** Majority is EPDM-Ballasted and some portions is just EPDM
 - **Area:** 8,490 Sq Ft
 - **Applicable** for Smart Roof. Only ballast occupies this section.
 - **Roof Conditions:** **Difficult to Inspect Conditions** because ballasted covered roof. No moss is found.
 - **Recommend** nothing because limitation to implement green or PV roofs and roof is already white –colored ballast.
 - **Alternative Recommendations:** Refer to Note 2.

- **1st Floor – 1 Penthouse (7)**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM-Mech. Attached
 - **Area:** 1,656 Sq Ft
 - **Applicable** for Smart Roof. Empty space.
 - **Roof Conditions:** Did not inspect.
 - **Recommend Cool Roof.** Refer to Note 1.

- **1st Floor – (8)**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM- Mech. Attached
 - **Area:** 8,980 Sq Ft
 - **Applicable** for Smart Roof. A few units and a long gas pipe that runs along the roof.
 - **Roof Conditions:** Few ponding.

- **Recommend Cool Roof.** PV and a green roof are not feasible to install because a long gas pipe runs along the roof. In addition, during certain times during the day, the roof is shaded by the rest of the building.

Building No: C0001
Name: Riverhead County Center
Location: Center Dr., Riverhead NY, 11901

Total Area: 112,047 Sq Ft (All Flat Roof)

- 4th Flr-
 - Flat Roof
 - **Color:** White/Black
 - **Material:** EPDM-Ballasted & Mech. Attached
 - **Area:** 96,966 Sq Ft White Ballasted/ 15,081 Sq Ft Black
 - **Applicable** for Smart Roof. Ample of clear space.
 - **Roof Conditions:**
Difficult to Inspect
Conditions because ballasted covered roof. EPDM-Mech Attached is recently installed. Roof is still under warranty.
 - **Recommend Cool Roof** or **PV** array when roof needs to be replace. This building has one of the largest roof areas in the county which means implementing Smart Roof will yield major savings. Refer to Sun Edison's PV proposal.



Figure 5: Roof of Riverhead County Center

Building No: C0802
Name: Cohalan Court Complex
Location: 400 Carleton Ave,
 Central Islip NY, 11722

Didn't find saving and reduction by switching to Cool Roof because original roof is not black.

Total Area: 79,296 Sq Ft (All Flat Roof)

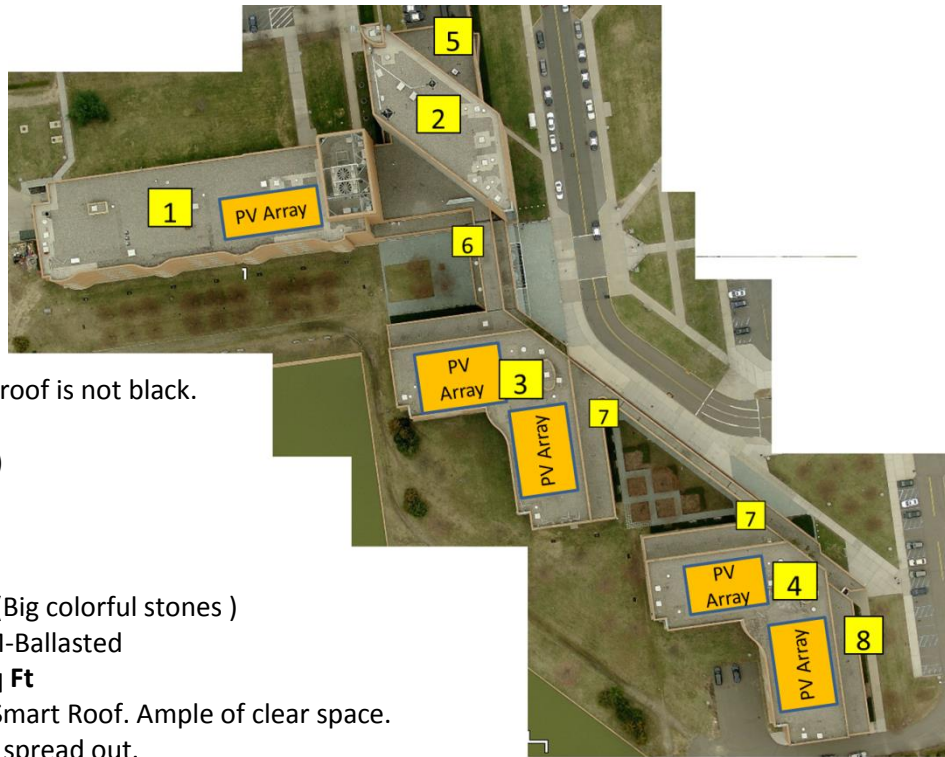


Figure 6: Roof of Cohalan Courts Complex with possible PV array arrangement.

- **North West- (1)**
 - **Flat Roof**
 - **Color:** Colorful (Big colorful stones)
 - **Material:** EPDM-Ballasted
 - **Area:** 20,047 Sq Ft
 - **Applicable** for Smart Roof. Ample of clear space. Units are nicely spread out.
 - **Roof Conditions: Difficult to Inspect Conditions** because ballasted covered roof. Roof is 24 years old. Many cracks on walkways and edges. Roof replacement is strongly recommended.
 - **Recommend Cool Roof** and **PV** array because roof needs to be replaced. A PV array on roof 1 is not as favorable as roof 3 and roof 4 because there are more units on roof 1 than roof 3 & 4. Cool roof and PV combination will yield greater savings. Refer to Note 3.

- **North- (2)**
 - **Flat Roof**
 - **Color:** Colorful (Big colorful stones)
 - **Material:** EPDM-Ballasted
 - **Area:** 9,111 Sq Ft
 - **Not Applicable** for Green Roof due to vast amount of equipment, electronics and wires that occupy the roof. Except for cool roof when roof replacement is needed.
 - **Roof Conditions: Difficult to Inspect Conditions** because ballasted covered roof. Roof is 24 years old. Many cracks on walkways and edges. Roof replacement is strongly recommended.
 - **Recommend Cool Roof** because roof needs replacement.

- **Middle- (3)**
 - **Flat Roof**
 - **Color:** Colorful (Big colorful stones)
 - **Material:** EPDM-Ballasted
 - **Area:** 16,213 Sq Ft
 - **Applicable** for Smart Roof. Ample of clear space. Units are nicely spread out.
 - **Roof Conditions: Difficult to Inspect Conditions** because ballasted covered roof. Roof is 24 years old. Many cracks on walkways and edges. Roof replacement

- is strongly recommended.
 - **Recommend Cool Roof** and **PV** array because roof needs to be replaced. Cool roof and PV combination will yield greater savings. Refer to Note 3
- **South- (4)**
 - **Flat Roof**
 - **Color:** Colorful (Big colorful stones)
 - **Material:** EPDM-Ballasted
 - **Area: 16,121 Sq Ft**
 - **Applicable** for Smart Roof. Ample of clear space. Units are nicely spread out.
 - **Roof Conditions: Difficult to Inspect Conditions** because ballasted covered roof. Roof is 24 years old. Many cracks on walkways and edges. Roof replacement is strongly recommended.
 - **Recommend Cool Roof** and **PV** array because roof needs to be replaced. Cool roof and PV combination will yield greater savings. Refer to Note 3
- **North Lower Roof- (5)**
 - **Flat Roof**
 - **Color:** Colorful (Big colorful stones)
 - **Material:** EPDM-Ballasted
 - **Area: 2,710 Sq Ft**
 - **Applicable** for Smart Roof. No units.
 - **Roof Conditions: Difficult to Inspect Conditions** because ballasted covered roof. Roof is 24 years old. Many cracks on walkways and edges. Roof replacement is strongly recommended.
 - **Recommend Cool Roof.** Roof needs replacement. PV is not recommended because higher roofs might shade this lower roof and roof is very small.
- **Connection between North and Middle- (6)**
 - **Flat Roof**
 - **Color:** Colorful (Big colorful stones)
 - **Material:** EPDM-Ballasted
 - **Area: 5,409 Sq Ft**
 - **Applicable** for Smart Roof. No units.
 - **Roof Conditions: Difficult to Inspect Conditions** because ballasted covered roof. Roof is 24 years old. Many cracks on walkways and edges. Roof replacement is strongly recommended.
 - **Recommend Cool Roof.** Roof needs replacement. PV is not recommended because higher roofs might shade this lower roof and roof is very narrow.
- **Connection between Middle and South- (7)**
 - **Flat Roof**
 - **Color:** Colorful (Big colorful stones)
 - **Material:** EPDM-Ballasted
 - **Area: 7,449 Sq Ft**
 - **Applicable** for Smart Roof. No units.
 - **Roof Conditions: Difficult to Inspect Conditions** because ballasted covered roof. Roof is 24 years old. Many cracks on walkways and edges. Roof replacement is strongly recommended.

- **Recommend Cool Roof.** Roof needs replacement. PV is not recommended because higher roofs might shade this lower roof and roof is very narrow.
- **South Lower Roof- (9)**
 - **Flat Roof**
 - **Color:** Colorful (Big colorful stones)
 - **Material:** EPDM-Ballasted
 - **Area: 2,236 Sq Ft**
 - **Applicable** for Smart Roof. No units.
 - **Roof Conditions: Difficult to Inspect Conditions** because ballasted covered roof. Roof is 24 years old. Many cracks on walkways and edges. Roof replacement is strongly recommended.
 - **Recommend Cool Roof.** Roof needs replacement. PV is not recommended because higher roofs might shade this lower roof and roof is very small.

Suffolk County Community College- Ammerman Campus

Location: 533 College Road, Selden NY, 11784

Note: The large parking area is a great candidate for solar car ports.

Building No: C1404

Name: Babylon Student Center

Total Area: 25,308 Sq Ft (All Flat Roof)

Cool Roof Recommendation

Total Energy Savings: 18,892.4 kWh

Total Cost Savings: \$4,239.39

Total GHG Reduction: 26,810.4 lbs CO₂ e

- 2nd Flr/ 1st Flr-
 - Flat Roof
 - **Color:** White/Black
 - **Material:** EPDM and ---
 - **Area:** 21,157 Sq Ft Black / 4,151 Sq Ft White
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof** in place of black roofs. PV array is possible along the East side. See figure 6.



Figure 7: Roof of Ammerman Building with possible PV array arrangement.

Building No: C1406
Name: Huntington Library

Cool Roof Recommendation

Total Energy Savings: 73,977.3 kWh
Total Cost Savings: \$16,624.90
Total GHG Reduction: 105,060.7 lbs CO2 e

- **1st Flr-**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM
 - **Area:** 32,569 Sq Ft
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof** in place of black roofs. **PV** array is possible along the lower roof since the building is facing South. See figure 7.



Figure 8: Roof of Huntington Library with possible PV array arrangement.

Building No: C1409
Name: Riverhead Technology Building

Cool Roof Recommendation

Total Energy Savings: 85,306.9 kWh
Total Cost Savings: \$19,173.85
Total GHG Reduction: 121,159.8 lbs CO2 e

- **3rd Flr/ 2nd Flr-**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM
 - **Area:** 37,246 Sq Ft
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof** in place of black roofs. **PV** array is possible along the top roof and the lower roof facing South. See figure 8.

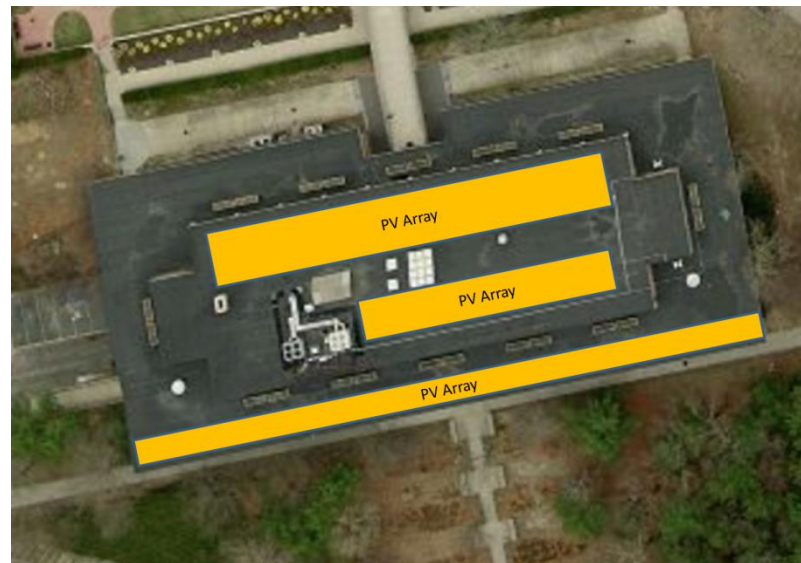


Figure 9: Roof of Riverhead Technology Building with possible PV array arrangement.

Building No: C1408
Name: Kreiling Hall

Cool Roof Recommendation

Total Energy Savings: 18,426.1 kWh
Total Cost Savings: \$4,134.64
Total GHG Reduction: 26,148.3 lbs CO2 e

- **3rd Flr -**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM
 - **Area:** 8,770 Sq Ft
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof.** Refer to Note 1. PV array seems more difficult to install than the previous roofs due to its odd shape.



Figure 10: Roof of Kreiling Hall.

Building No: C1407
Name: Islip Arts/Shea Theater

- **3rd Flr/ 2nd Flr -**
 - **Flat Roof**
 - **Color:** White
 - **Material:** --
 - **Area:** 54,618 Sq Ft
 - **Applicable** for Smart Roof. Ample of clear space.
 - **Roof Conditions:** ---
 - **Recommend PV.** The roof is flat, not occupied by many units and not shaded which makes it favorable for PV installation.



Figure 11: Roof of Islip Arts/ Shea Theater with possible PV array arrangement.

Building No: C1405
Name: Brookhaven Gym

- **1st Flr -**
 - **Flat Roof**
 - **Color:** White
 - **Material:** --
 - **Area:** 22,583 Sq Ft
 - **Applicable** for Smart Roof. Ample of clear space.
 - **Roof Conditions:** ---
 - **Recommend PV.** The roof is flat, not occupied by many units and not shaded which makes it favorable for PV installation.

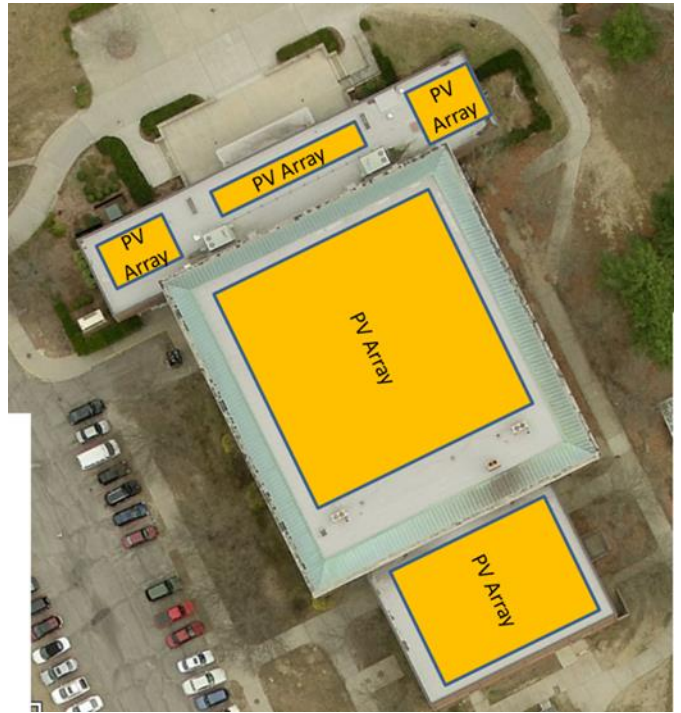


Figure 12: Roof of Brookhaven Gym with possible PV array arrangement.

Building No: C1410
Name: Ammerman Building

Cool Roof Recommendation

Total Energy Savings: 25,079.7 kWh
Total Cost Savings: \$5,629.61
Total GHG Reduction: 35,596.7 lbs CO₂ e

- **3rd Flr -**
 - **Flat Roof**
 - **Color:**White/Black
 - **Material:** --
 - **Area:** 11,740 Sq Ft
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof.** A section of the roof is black which can be replace by a cool roof. The roof is flat, not occupied by many units and not shaded which makes it favorable for PV installation.



Figure 13: Roof of Ammerman Building with possible PV array arrangement.

Building No: C1416
Name: NF Lechtrecker

- **1st Flr -**
 - **Low Pitch**
 - **Color:** White
 - **Material:** --
 - **Area:** 11,740 Sq Ft
 - **Applicable** for Smart Roof. Ample of clear space.
 - **Roof Conditions:** ---
 - **Recommend PV.** There is a tree at the north of the building which may shade any PV panels underneath.

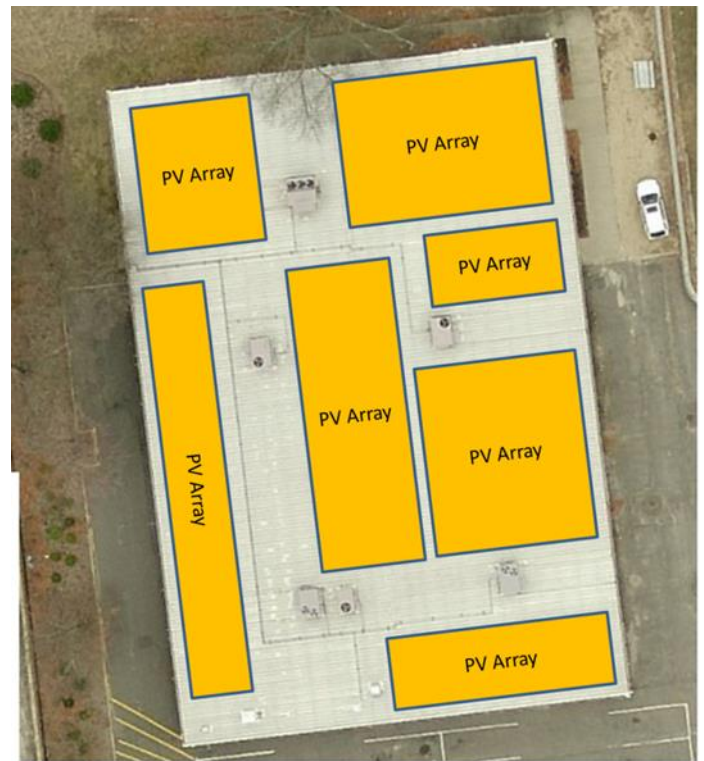


Figure 14: Roof of Lechtrecker Building with possible PV array arrangement.

Building No: C1412
Name: Smithtown Science Center

Cool Roof Recommendation (Assuming roof is black)

Total Energy Savings: 55,004.3 kWh
Total Cost Savings: \$12,357.25
Total GHG Reduction: 78,103.4 lbs CO₂ e

- **3rd Flr -**
 - **Flat Roof**
 - **Color:** Grey
 - **Material:** --
 - **Area:** 24,635 Sq Ft
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof.** The building doesn't seem as white as other buildings. There are some PV panels on this roof. Addition PV panels seems possible. Installing PV array at the lower roof is not viable because the higher roof can shadow over the lower roof.

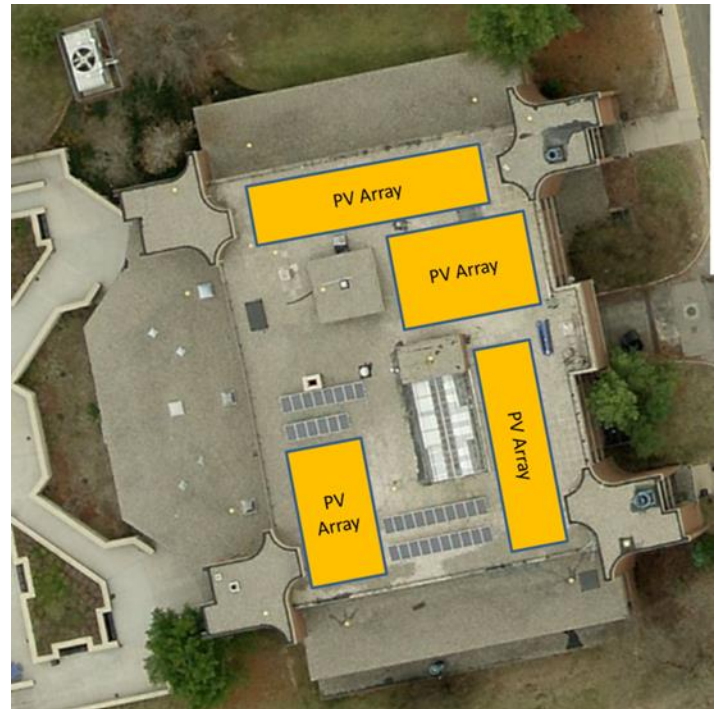


Figure 15: Roof of Smithtown Science Center with possible PV array arrangement.

Building No: C1414

Name: Southampton Building

- **2nd Flr -**

- **Flat Roof**

- **Color:** White/Black

- **Material:** --

- **Area:** 26,973 Sq Ft

- **Not Applicable** for Smart Roof. Many units occupying roof.

- Roof is already white, therefore white roof does not need to be implemented.

- **Roof Conditions:** ---

- **Recommend** Nothing. PV installation seems difficult because the roof contains many units such as air ducts that that occupy some of the area.



Figure 16: Roof of Southampton Building.

Name: Bergen Point Waste Disposal

Location: 600 Bergen Ave, West Babylon NY, 11704

- **All Flat Roof**
 - **Color:** White
 - **Material:** EPDM-Ballasted
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend PV.** The buildings at Bergen Point are flat, over 10,000 square feet, not occupied by many units and not shaded which makes it favorable for PV installation. This will allow additional electricity for this utility facility which will reduce the electricity demand to further cost savings.

These are the following building pictures with corresponding roof area and possible PV array arrangement:

South Eastern Building

Area: 15,190 Sq Ft

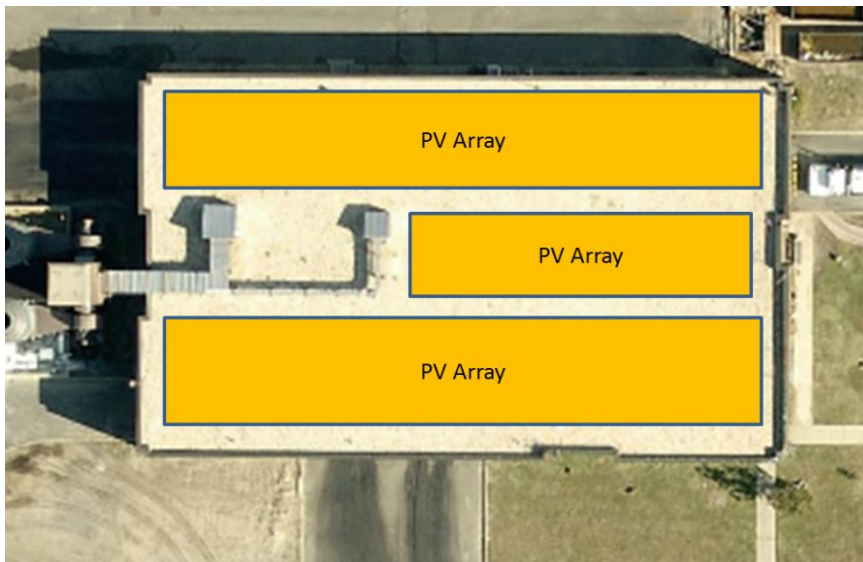


Figure 17: Roof of South Eastern building with possible PV array arrangement.

South Western Building, to the left of the previous building
Area: 9,475 Sq Ft

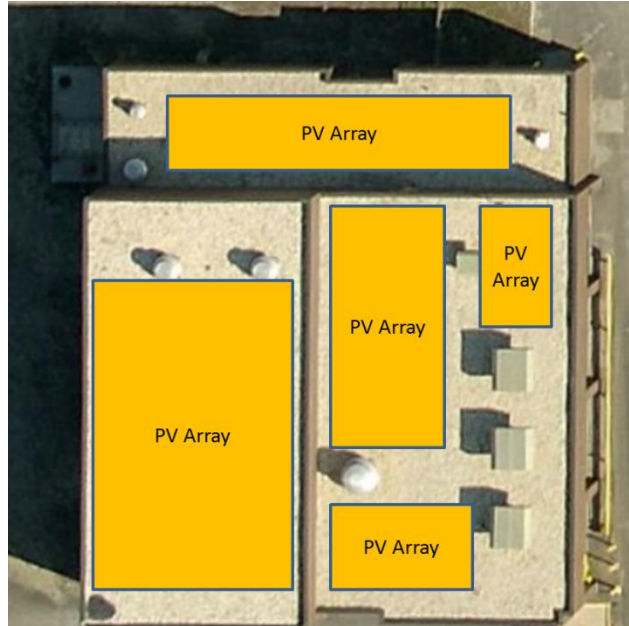


Figure 18: Roof of South Western building with possible PV array arrangement.

Western Building
Area: 6,220 Sq Ft

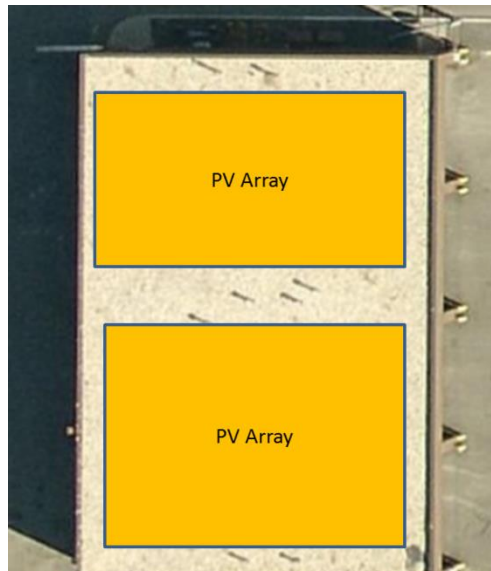


Figure 19: Roof of Western building with possible PV array arrangement.

North County Complex Hauppauge

Building No: C0020

Name: Legislature Building

Total Area: 21,291 Sq Ft

Cool Roof Recommendation

Total Energy Savings: 31,761.3 kWh

Total Cost Savings: \$7,131.30

Total GHG Reduction: 45,086.1 lbs CO₂ e

- **2nd Flr/ 1st Flr -**

- **Flat Roof**

- **Color:** Black/ White
- **Material:** EPDM
- **Area:** 14,675 Sq Ft
Black/ 6,616 Sq Ft
White
- **Applicable** for Smart Roof. Some clear space.
- **Roof Conditions:** ---
- **Recommend Cool Roof.** A section of the roof is white which can be left alone. The roof is flat, not occupied by many units and not shaded which makes it favorable for PV installation. The PV panels that surround the 2nd floor roof (in white) might get shaded.

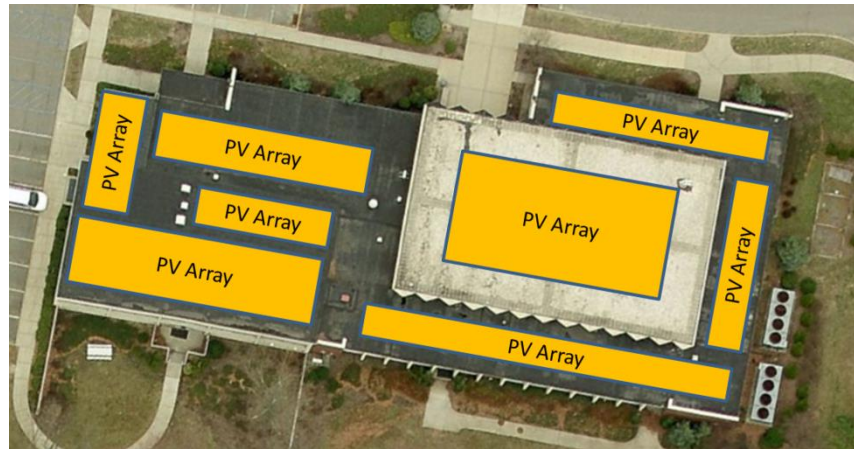


Figure 20: Roof of Legislature Building with possible PV array arrangement.

Building No: C0928
Name: Modular Building-Health

Cool Roof Recommendation

Total Energy Savings: 37,993.5 kWh
Total Cost Savings: \$8,532.25
Total GHG Reduction: 53,938.2 lbs CO2 e

- 1st Flr -
 - Flat Roof
 - **Color:** Black
 - **Material:** EPDM
 - **Area:** 17,379 Sq Ft
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof.** HVAC units are placed along the south edge of the building. The roof is flat, not occupied by many units and not shaded which makes it favorable for PV installation.

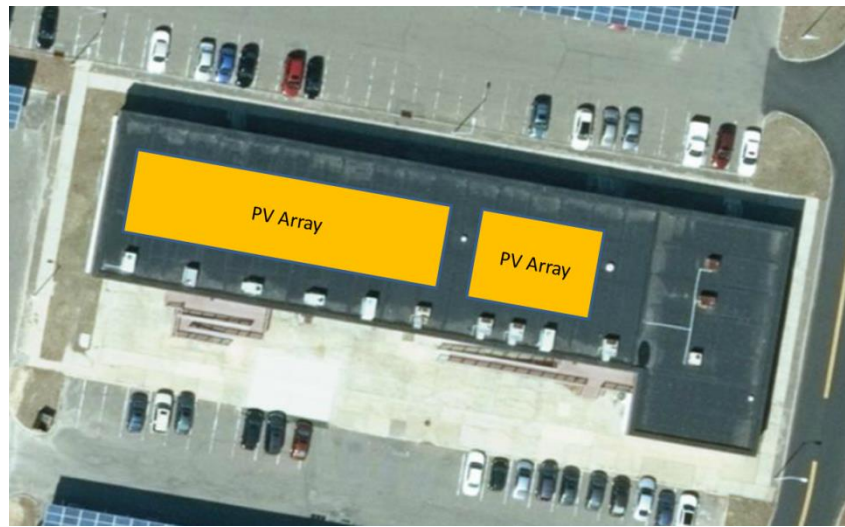


Figure 21: Roof of Modular Building- Heath with possible PV array arrangement.

Building No: C0016
Name: Children Shelter

Total Area: 21,413 Sq Ft

Cool Roof Recommendation

Total Energy Savings: 32,144.23 kWh
Total Cost Savings: \$7,217.36
Total GHG Reduction: 45,630.0 lbs CO2 e

- 1st Flr -
 - Flat Roof/ Pitch
 - **Color:** Black (Flat)/ Grey (Pitch Slate)
 - **Material:** EPDM & Slate
 - **Area:** 14,842 Sq Ft Black/ 6,571 Sq Ft Grey
 - **Applicable** for Smart Roof. Limited clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof.** Black roof is replaced by a cool roof. Slate is left alone because it has good thermal performance. PV installation is very limited because the roof area is narrow.



Figure 22: Roof of Children Shelter with possible PV array arrangement.

Building No: C0077
Name: District Attorney

Cool Roof Recommendation

Total Energy Savings: 40,214.5 kWh
Total Cost Savings: \$9,031.59
Total GHG Reduction: 57,093.1 lbs CO2 e

- **2nd Flr -**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM
 - **Area:** 18,336 Sq Ft
 - **Applicable** for Smart Roof. Limited clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof.** PV installation is very limited because the roof area is occupy by many units.



Figure 23: Roof of District Attorney Roof.

Building No: C0487
Name: Medical Examiner/ Forensic

Cool Roof Recommendation

Total Energy Savings: 70,160.7 kWh
Total Cost Savings: \$15,766.31
Total GHG Reduction: 99,637.6 lbs CO2 e

- **Penthouse/ 2nd Flr -**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM
 - **Area:** 30,984 Sq Ft
 - **Applicable** for Smart Roof. Limited clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof.** PV installation is very limited because the roof area is occupied by many units. PV would reduce the refrigeration energy cost.



Figure 24: Roof of Medical Examiner/ Forensic.

Building No: C0015
Name: Labor Department

Total Area: 10,719 Sq Ft

Cool Roof Recommendation

Total Energy Savings: 6,890.2 kWh

Total Cost Savings: \$1,544.14

Total GHG Reduction: 9,771.6 lbs CO2 e

- **1st Flr -**
 - **Flat Roof**
 - **Color:** Grey (Pitch) /Black (Flat)
 - **Material:** EPDM & Slate
 - **Area:** 3,443 Sq Ft (Black)/ 7,276 Sq Ft (Grey)
 - **Applicable** for Smart Roof. Limited clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof.** Black roof is replaced by a cool roof. Slate is left alone because it has good thermal performance. **PV** installation is very limited because the roof area is narrow.



Figure 25: Roof of Labor Department.

Building No: C0803
Name: Labor/Social Services Child Care

Cool Roof Recommendation

Total Energy Savings: 35,556.3 kWh

Total Cost Savings: \$7,984.36

Total GHG Reduction: 50,476.4 lbs CO2 e

- **1st Flr -**
 - **Flat Roof**
 - **Color:** Black & White
 - **Material:** EPDM?
 - **Area:** 16,325 Sq Ft
 - **Applicable** for Smart Roof. Limited clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof.** **PV** installation is very limited because the roof area is occupied by HVAC units



Figure 26: Roof of Labor/Social Services Child Care.

Building No: C0017

Name: Labor Department Data Processing

Total Area: 27,862 Sq Ft

Cool Roof Recommendation

Total Energy Savings: 42,102.6 kWh

Total Cost Savings: \$9,456.08

Total GHG Reduction: 59,775.1 lbs CO₂ e

- **1st Flr -**

- **Flat Roof**

- **Color:** Black/White/ Grey (Slate)
 - **Material:** EPDM & Slate
 - **Area:**
15,242 Sq Ft (Black)/
8,715 Sq Ft (White)/
3,905 Sq Ft (Grey)
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof.** A section of the roof is white which can be left alone. Black roof is replaced by a cool roof. Slate is left alone because it has good thermal performance. The roof is flat, not occupied by many units and not shaded which makes it favorable for PV installation. On the pitch roof, a PV array can be placed on the south facing side. See figure.

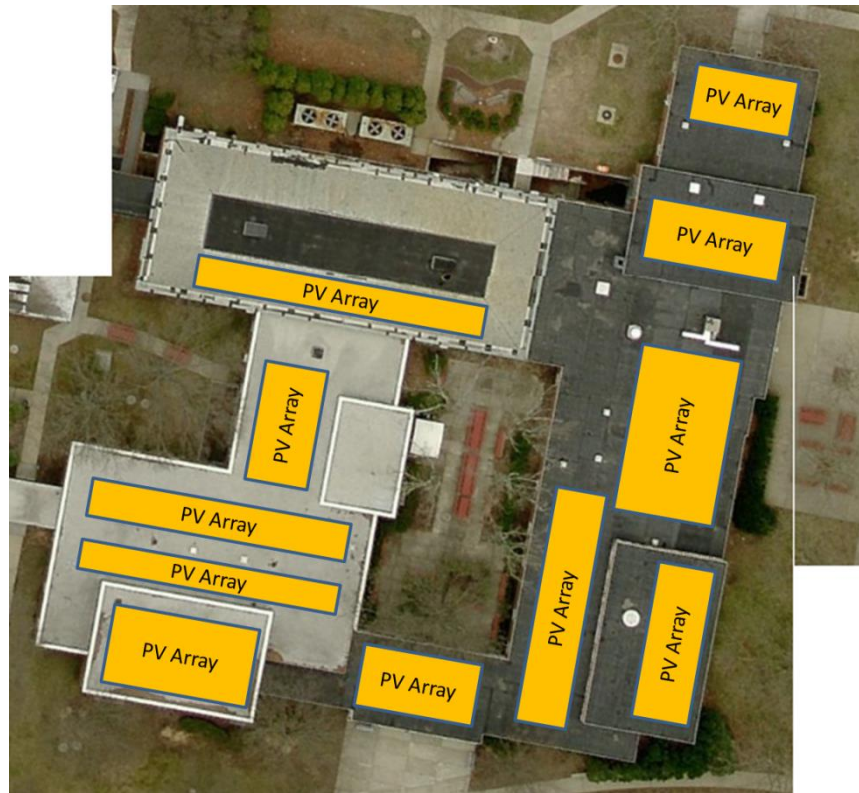


Figure 27: Roof of Labor Dept. Data Processing with possible PV arrangement.

Building No: C0158
Name: Civil Service & Fourth District Court

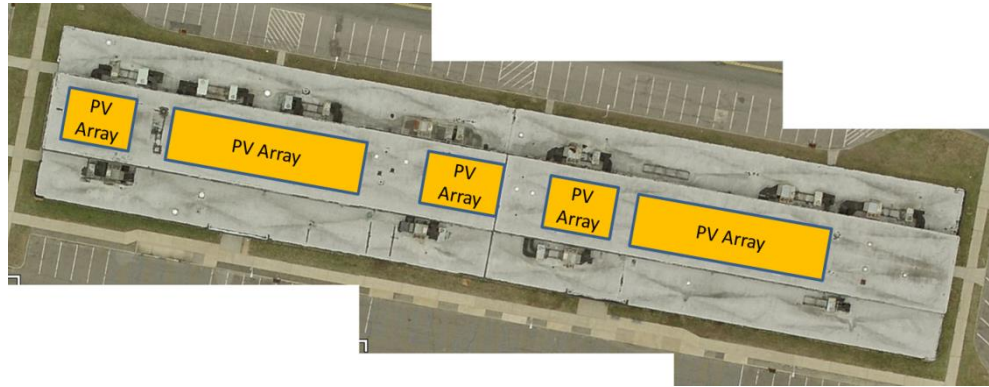


Figure 28: Roof of Civil Services & 4th District Court with possible PV array arrangement.

- 1st Flr -
 - Flat Roof
 - **Color:** White
 - **Material:** EPDM-Ballasted
 - **Area:** 43,619 Sq Ft
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend** nothing. The higher roof is flat, not occupied by many units and not shaded which makes it favorable for PV installation
 - **Alterative Recommendations:** Add additional ballast to exposed black surfaces.

Building No: C0318
Name: Trade Shop

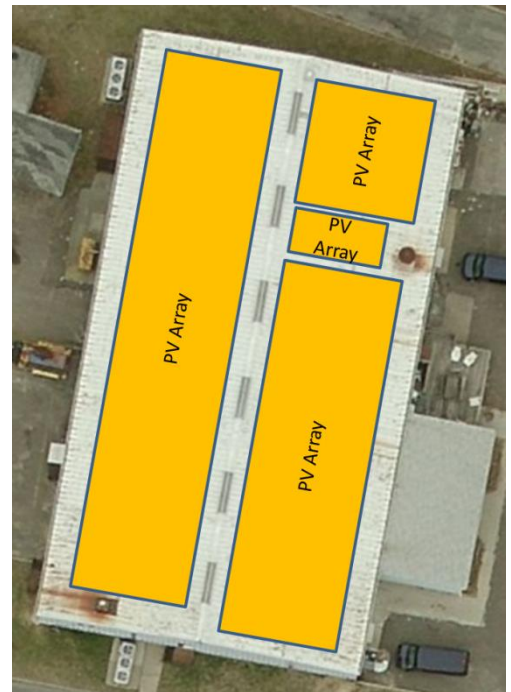


Figure 29: Roof of Trade Shop with possible PV array arrangement.

- 1st Flr -
 - Pitch
 - **Color:** White
 - **Material:** Metal
 - **Area:** 12,143 Sq Ft
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend PV.** The roof is not occupied by many units and not shaded which makes it favorable for PV installation.

Building No: C0137

Name: Custodial Warehouse

- **1st Flr -**

- **Pitch**

- **Color:** White
 - **Material:** Metal
 - **Area:** 18,512 Sq Ft
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend PV.** The roof is not occupied by many units and not shaded which makes it favorable for PV installation.



Figure 30: Roof of Custodial Warehouse with possible PV array arrangement.

Yaphank County Complex

Note: Not many large office buildings in Yaphank Complex. Mostly storages and garages in this complex.

Building No: C0014

Name: Old Home Infirmary

Location: 360 Yaphank Ave, Yaphank NY, 11980

- 3rd Flr
 - Pitch
 - **Color:** Grey
 - **Material:** ---
 - **Area:** 30,813 Sq Ft
 - **Applicable** for Smart Roof. Empty space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof and PV Roof.** Grey roofs aren't as cost effective as white roofs. The pitched surface that faces south will have PV panels attached. The remaining sections are left alone.

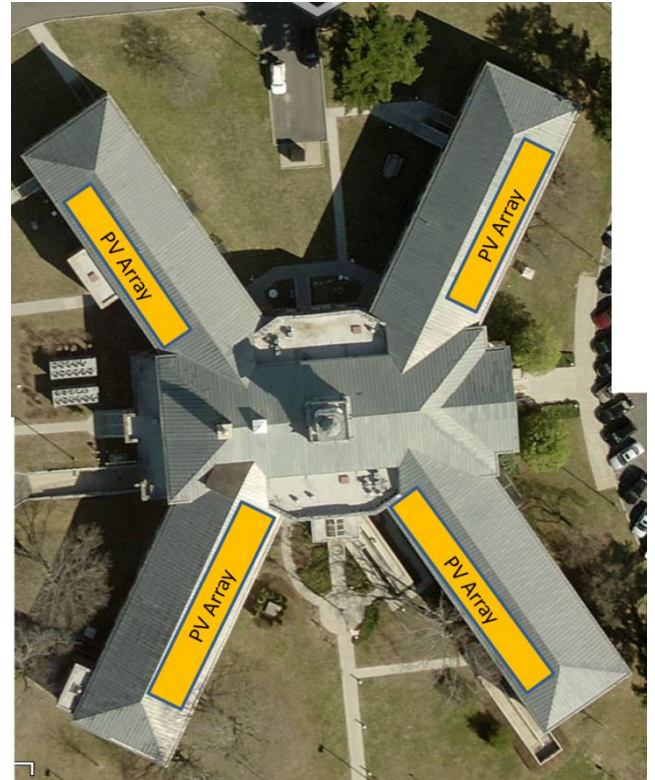


Figure 31: Roof of Old Home Infirmary with possible PV array arrangement.

Building No: C0110
Name: Probation/Fres
Location: 100 E Yaphank Ave, Yaphank NY, 11980

Total Area: 30,210 Sq Ft

Cool Roof Recommendation

Total Energy Savings: 42,102.6 kWh
Total Cost Savings: \$9,456.08
Total GHG Reduction: 59,775.1 lbs CO2 e

- 1st Flr -
 - Flat Roof/ Pitch
 - **Color:** Black (Flat)/ Grey (Pitch Slate)
 - **Material:** EPDM & Slate
 - **Area:** 22,286 Sq Ft Black/ 7,924 Sq Ft Grey
 - **Applicable** for Smart Roof.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof.** Black roof is replaced by a cool roof. Slate is left alone because it has good thermal performance. PV installation is very limited due to little board spaces.



Figure 32: Roof of Probation with possible PV array arrangement.

Griffing Ave Complex

Building No: C0981

Name: Civil/ Supreme Court

Location: 1 Court St, Riverhead NY, 11901

Cool Roof Recommendation

Total Energy Savings: 49,873.6 kWh

Total Cost Savings: \$27,112.05

Total GHG Reduction: 70,814.4 lbs CO₂ e

- **4th/ 3rd Flr -**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM
 - **Area:** 22,463 Sq Ft
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof.** PV installation is limited due to some units occupying roof space.



Figure 33: Roof of Civil/ Supreme Court with possible PV array arrangement.

Building No: C0002

Name: Courthouse

Location: # Griffing Ave, Riverhead NY, 11901

Cool Roof Recommendation

Total Energy Savings: 15,448.0kWh

Total Cost Savings: \$3,465.67

Total GHG Reduction: 21,919.9lbs CO₂ e

- **3rd Flr -**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM
 - **Area:** 13,315 Sq Ft
 - **Not Applicable** for Smart Roof due to many units occupying the roof. Except for cool roof.
 - **Roof Conditions:** --
 - **Recommend Cool Roof.** PV and Green roof are not viable due to limited space.



Figure 33: Roof of Civil/ Supreme Court with possible PV array arrangement.

Building No: C0003
Name: Commissioner of Jurors
Location: 1 Court St , Riverhead NY, 11901

Cool Roof Recommendation (Assuming roof is Black)

Total Energy Savings: 12,154.7 kWh
Total Cost Savings: \$2,726.03
Total GHG Reduction: 17,244.3 lbs CO2 e

- 2nd Flr -
 - Pitch
 - **Color:** Grey
 - **Material:** Asphalt?
 - **Area:** 5,911 Sq Ft
 - **Applicable** for Smart Roof. No units on roof.
 - **Roof Conditions:** --
 - **Recommend Cool Roof.** PV is possible along the south pitch roof.



Figure 34: Roof of Commissioner of Jurors with possible PV array arrangement.

Building No: C0004
Name: Supreme Court Building
Location: 243 Griffing Ave, Riverhead NY, 11901

Cool Roof Recommendation (Assuming roof is Black)

Total Energy Savings: 10,204.9 kWh
Total Cost Savings: \$2,288.22
Total GHG Reduction: 14,476.4 lbs CO2 e

- 2nd Flr -
 - Pitch
 - **Color:** Grey
 - **Material:** Asphalt?
 - **Area:** 5,006 Sq Ft
 - **Applicable** for Smart Roof. No units on roof.
 - **Roof Conditions:** --
 - **Recommend Cool Roof.** PV is possible along south pitch roof.



Figure 35: Roof of Supreme Court Building with possible PV array arrangement.

Building No: C0008
Name: Courthouse Annex
Location: # Griffing Ave, Riverhead NY, 11901

- **2nd Flr -**
 - **Flat Roof**
 - **Color:** White
 - **Material:** TPO?
 - **Area:** 9,281 Sq Ft
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend PV.** Refer to Note 3.



Figure 36: Roof of Courthouse Annex with possible PV array arrangement.

Building No: C0958
Name: Cornell Coop. Ext.
Location: 423 Griffing Ave, Riverhead NY, 11901

Cool Roof Recommendation

Total Energy Savings: 28,653.5kWh
Total Cost Savings: \$6,432.79
Total GHG Reduction: 40,672.2lbs CO2 e

- **3rd Flr -**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM
 - **Area:** 7,421 Sq Ft
 - **Not Applicable** for Smart Roof due to many units occupying the roof. Except for cool roof.
 - **Roof Conditions:** --
 - **Recommend Cool Roof.** PV and Green roof are not viable due to limited space.



Figure 37: Roof of Cornell Coop. Ext.

Miscellaneous

Building No: P2254

Name: Pavillion

Location: Smith Point County Park, Shirley NY, 11967

Cool Roof Recommendation (Assuming roof is Black)

Total Energy Savings: 55,459.3 kWh

Total Cost Savings: \$12,459.58

Total GHG Reduction: 44,373.5 lbs CO2 e

- **1st Flr**

- **Pitch**

- **Color:** Grey
- **Material:** Asphalt Shingles?
- **Area:** 24,827 Sq Ft
- **Applicable** for Smart Roof. Empty space.
- **Roof Conditions:** ---
- **Recommend Cool** Roof. Cool roofs are more cost saving than grey asphalt roofs. PV is not recommended because the roof is prone to hazardous shore elements such as high speed wind, salt water and flood.



Figure 38: Roof of Pavillion.

Building No: P2120

Name: Coindre Hall (in the back)

Cool Roof Recommendation

Total Energy Savings: 31,259.6 kWh

Total Cost Savings: \$7,018.52

Total GHG Reduction: 44,373.5lbs CO2 e

- **1st Flr-**
 - **Flat Roof**
 - **Color:** Black
 - **Material:** EPDM
 - **Area:**14,456 Sq Ft
 - **Applicable** for Smart Roof. Some clear space.
 - **Roof Conditions:** ---
 - **Recommend Cool Roof.**
PV array is possible.
Wires and fan units occupy the roof.



Figure 8: Roof of Coindre Hall with possible PV array arrangement.