

Special Darien Board of Education

Facilities Committee Meeting

Thursday, March 11, 2021

8:30 a.m.

Darien Public Schools' Administrative Offices

35 Leroy Avenue

Board of Education Meeting Room

AGENDA

1. Presentation and Discussion on Solar Panel Proposal from Advanced Energy
2. Public Comment*
3. Adjournment

Due to the current COVID-19 regulations and restrictions pertaining to public indoor gatherings, the Board of Education meeting will be available to the public via Zoom.

Those members of the community wishing to view only, should do so through the Darien Youtube link: <https://www.youtube.com/channel/UCUnnvYKBfFrTWQRuoB6OZA>

Those members of the community wishing to participate in public comment should join the meeting via Zoom:

<https://darienps.zoom.us/j/91478078534>

In order to reduce audio interference, members of the community are requested not to simultaneously view by Youtube while participating on Zoom

Town of Darien Board of Education Green Energy Program

Presented by:

Advanced Energy Efficiencies, LLC
March 11th, 2021

- Steadily move to smart and green energy practices
- Reduce steadily rising energy costs & lock in long-term savings
- Improve Darien's long-term sustainability & carbon footprint
- Avoid capital costs for new technology initiatives

Objectives

- Board of Education authorize AEE to submit ZREC submissions:
 - Hindley Elementary School
 - Royle Elementary School
 - Holmes Elementary School
 - Middlesex Middle School
 - BOE Central Office
- First Selectman signs non-binding MOU:
 - This locks in financing for Power Purchase Agreement (PPA) at fixed rate of \$0.085 for 25 years
 - No Maintenance Cost, No Money out-of-pocket

Advanced Energy Efficiencies (AEE)

- AEE has successfully worked with CT school systems to adopt renewable energy practices
- AEE can assume the role of project developer, or
- AEE can act as the BOE Owner's Representative
- AEE works closely with all Municipal and Board of Education officials
- AEE works with town's legal counsel on Solar RFQ/RFP to meet local requirements
- AEE has created a preliminary solar financing option – no capital requirement
- AEE will employ its expertise and experience to oversee the solar project's construction process

AEE's Role Helping other Municipalities

- Submit a Zero Emissions Renewable Energy Credit ("ZREC") application to the State of Connecticut for a ZREC award.
- Manage the purchase of all necessary materials for the Project including but not limited to solar panels, inverters, racking systems and other materials.
- Review with the municipal officials the proposals by the solar installation providers based on cost, experience and ability to perform the necessary work for the completion of Project.
- Determine the optimal size and configuration of said project to best conform to the Schools electric energy usage and to enable compliance with the goals of energy cost savings, carbon reduction and facility resilience during an emergency and/or electric grid outage
- Oversee the construction of the solar facilities
- Manage the interconnection process with Eversource
- Attend necessary Town/BOE, architectural, engineering meetings as well as meetings with necessary state agencies.
- Coordinate the energizing of the system with Eversource and School Facility's
- Register the solar systems with Eversource, State of Connecticut Public Utilities Regulatory Authority (PURA) and the Independent System Operator of New England (ISO).
- AEE assures that the solar project shall conform to State of Connecticut laws and regulations

Hindley Elementary School – 195 kW



Hindley Elementary School - Economics

System size in DC kW: 195 kW
 Initial system production in kWh: 253,630 kWh
 Percentage offset by solar: 78%

| <u>A</u> | <u>B</u> | <u>C</u> | <u>D</u> | <u>E</u> | <u>F</u> | <u>G</u> |
|----------|---------------------|--------------|---------------------|------------------------|----------|------------------|
| Year | Current Consumption | Utility Rate | Solar kWh generated | Solar Offset (\$)/ kWh | PPA Rate | Net Savings |
| 1 | 322,560 | \$0.1741 | 253,630 | \$0.104 | \$0.085 | \$4,819 |
| 2 | 322,560 | \$0.179 | 252,362 | \$0.107 | \$0.085 | \$5,582 |
| 3 | 322,560 | \$0.185 | 251,100 | \$0.110 | \$0.085 | \$6,361 |
| 4 | 322,560 | \$0.190 | 249,845 | \$0.114 | \$0.085 | \$7,156 |
| 5 | 322,560 | \$0.196 | 248,595 | \$0.117 | \$0.085 | \$7,968 |
| 6 | 322,560 | \$0.202 | 247,352 | \$0.121 | \$0.085 | \$8,797 |
| 7 | 322,560 | \$0.208 | 246,116 | \$0.124 | \$0.085 | \$9,643 |
| 8 | 322,560 | \$0.214 | 244,885 | \$0.128 | \$0.085 | \$10,507 |
| 9 | 322,560 | \$0.221 | 243,661 | \$0.132 | \$0.085 | \$11,390 |
| 10 | 322,560 | \$0.227 | 242,442 | \$0.136 | \$0.085 | \$12,291 |
| 11 | 322,560 | \$0.234 | 241,230 | \$0.140 | \$0.085 | \$13,212 |
| 12 | 322,560 | \$0.241 | 240,024 | \$0.144 | \$0.085 | \$14,152 |
| 13 | 322,560 | \$0.248 | 238,824 | \$0.148 | \$0.085 | \$15,113 |
| 14 | 322,560 | \$0.256 | 237,630 | \$0.153 | \$0.085 | \$16,094 |
| 15 | 322,560 | \$0.263 | 236,442 | \$0.157 | \$0.085 | \$17,097 |
| 16 | 322,560 | \$0.271 | 235,259 | \$0.162 | \$0.085 | \$18,122 |
| 17 | 322,560 | \$0.279 | 234,083 | \$0.167 | \$0.085 | \$19,169 |
| 18 | 322,560 | \$0.288 | 232,913 | \$0.172 | \$0.085 | \$20,239 |
| 19 | 322,560 | \$0.296 | 231,748 | \$0.177 | \$0.085 | \$21,333 |
| 20 | 322,560 | \$0.305 | 230,589 | \$0.182 | \$0.085 | \$22,451 |
| 21 | 322,560 | \$0.314 | 229,436 | \$0.188 | \$0.085 | \$23,594 |
| 22 | 322,560 | \$0.324 | 228,289 | \$0.193 | \$0.085 | \$24,763 |
| 23 | 322,560 | \$0.334 | 227,148 | \$0.199 | \$0.085 | \$25,957 |
| 24 | 322,560 | \$0.344 | 226,012 | \$0.205 | \$0.085 | \$27,179 |
| 25 | 322,560 | \$0.354 | 224,882 | \$0.211 | \$0.085 | \$28,427 |
| | | | | | | \$391,417 |

Royle Elementary School – 154 kW



Royle Elementary School – Economics

Financial Benefits of PPA

System size in DC kW: 154 kW
 Initial system production in kWh: 211,300 kWh
 Percentage offset by solar: 84%

| A | B | C | D | E | F | G |
|-------------|----------------------------|---------------------|----------------------------|-------------------------------|-----------------|--------------------|
| Year | Current Consumption | Utility Rate | Solar kWh generated | Solar Offset (\$)/ kWh | PPA Rate | Net Savings |
| 1 | 250,480 | \$0.184 | 211,300 | \$0.106 | \$0.085 | \$4,437 |
| 2 | 250,480 | \$0.190 | 210,244 | \$0.109 | \$0.085 | \$5,084 |
| 3 | 250,480 | \$0.195 | 209,192 | \$0.112 | \$0.085 | \$5,743 |
| 4 | 250,480 | \$0.201 | 208,146 | \$0.116 | \$0.085 | \$6,417 |
| 5 | 250,480 | \$0.207 | 207,106 | \$0.119 | \$0.085 | \$7,105 |
| 6 | 250,480 | \$0.213 | 206,070 | \$0.123 | \$0.085 | \$7,807 |
| 7 | 250,480 | \$0.220 | 205,040 | \$0.127 | \$0.085 | \$8,523 |
| 8 | 250,480 | \$0.226 | 204,015 | \$0.130 | \$0.085 | \$9,255 |
| 9 | 250,480 | \$0.233 | 202,994 | \$0.134 | \$0.085 | \$10,003 |
| 10 | 250,480 | \$0.240 | 201,979 | \$0.138 | \$0.085 | \$10,767 |
| 11 | 250,480 | \$0.247 | 200,970 | \$0.142 | \$0.085 | \$11,547 |
| 12 | 250,480 | \$0.255 | 199,965 | \$0.147 | \$0.085 | \$12,344 |
| 13 | 250,480 | \$0.262 | 198,965 | \$0.151 | \$0.085 | \$13,158 |
| 14 | 250,480 | \$0.270 | 197,970 | \$0.156 | \$0.085 | \$13,989 |
| 15 | 250,480 | \$0.278 | 196,980 | \$0.160 | \$0.085 | \$14,839 |
| 16 | 250,480 | \$0.287 | 195,995 | \$0.165 | \$0.085 | \$15,708 |
| 17 | 250,480 | \$0.295 | 195,015 | \$0.170 | \$0.085 | \$16,596 |
| 18 | 250,480 | \$0.304 | 194,040 | \$0.175 | \$0.085 | \$17,503 |
| 19 | 250,480 | \$0.313 | 193,070 | \$0.180 | \$0.085 | \$18,430 |
| 20 | 250,480 | \$0.323 | 192,105 | \$0.186 | \$0.085 | \$19,378 |
| 21 | 250,480 | \$0.332 | 191,144 | \$0.191 | \$0.085 | \$20,347 |
| 22 | 250,480 | \$0.342 | 190,188 | \$0.197 | \$0.085 | \$21,337 |
| 23 | 250,480 | \$0.353 | 189,238 | \$0.203 | \$0.085 | \$22,350 |
| 24 | 250,480 | \$0.363 | 188,291 | \$0.209 | \$0.085 | \$23,386 |
| 25 | 250,480 | \$0.374 | 187,350 | \$0.215 | \$0.085 | \$24,445 |

\$340,497

Holmes Elementary School – 159 kW



Holmes Elementary School – Economics

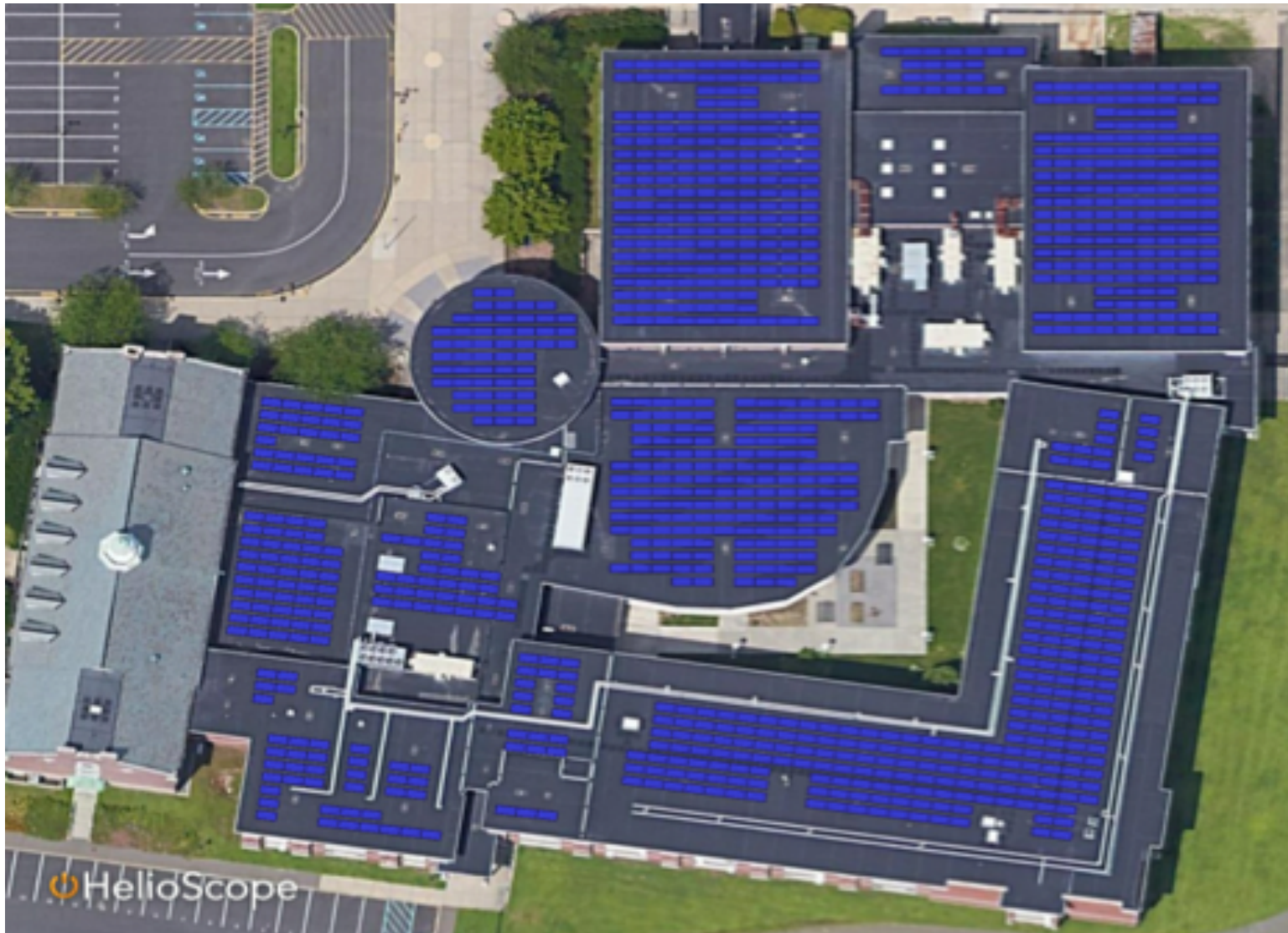
System size in DC kW: 159 kW

Initial system production in kWh: 206,050 kWh

Percentage offset by solar: 74%

| <u>A</u> | <u>B</u> | <u>C</u> | <u>D</u> | <u>E</u> | <u>F</u> | <u>G</u> |
|----------|---------------------|--------------|---------------------|------------------------|----------|------------------|
| Year | Current Consumption | Utility Rate | Solar kWh generated | Solar Offset (\$)/ kWh | PPA Rate | Net Savings |
| 1 | 280,000 | \$0.185 | 206,050 | \$0.106 | \$0.085 | \$4,368 |
| 2 | 280,000 | \$0.190 | 205,020 | \$0.109 | \$0.085 | \$5,000 |
| 3 | 280,000 | \$0.196 | 203,995 | \$0.113 | \$0.085 | \$5,644 |
| 4 | 280,000 | \$0.202 | 202,975 | \$0.116 | \$0.085 | \$6,302 |
| 5 | 280,000 | \$0.208 | 201,960 | \$0.120 | \$0.085 | \$6,973 |
| 6 | 280,000 | \$0.214 | 200,950 | \$0.123 | \$0.085 | \$7,659 |
| 7 | 280,000 | \$0.221 | 199,945 | \$0.127 | \$0.085 | \$8,359 |
| 8 | 280,000 | \$0.227 | 198,946 | \$0.131 | \$0.085 | \$9,074 |
| 9 | 280,000 | \$0.234 | 197,951 | \$0.135 | \$0.085 | \$9,805 |
| 10 | 280,000 | \$0.241 | 196,961 | \$0.139 | \$0.085 | \$10,551 |
| 11 | 280,000 | \$0.248 | 195,976 | \$0.143 | \$0.085 | \$11,313 |
| 12 | 280,000 | \$0.256 | 194,996 | \$0.147 | \$0.085 | \$12,091 |
| 13 | 280,000 | \$0.263 | 194,021 | \$0.151 | \$0.085 | \$12,886 |
| 14 | 280,000 | \$0.271 | 193,051 | \$0.156 | \$0.085 | \$13,699 |
| 15 | 280,000 | \$0.280 | 192,086 | \$0.161 | \$0.085 | \$14,529 |
| 16 | 280,000 | \$0.288 | 191,126 | \$0.165 | \$0.085 | \$15,377 |
| 17 | 280,000 | \$0.297 | 190,170 | \$0.170 | \$0.085 | \$16,244 |
| 18 | 280,000 | \$0.305 | 189,219 | \$0.176 | \$0.085 | \$17,130 |
| 19 | 280,000 | \$0.315 | 188,273 | \$0.181 | \$0.085 | \$18,036 |
| 20 | 280,000 | \$0.324 | 187,332 | \$0.186 | \$0.085 | \$18,962 |
| 21 | 280,000 | \$0.334 | 186,395 | \$0.192 | \$0.085 | \$19,909 |
| 22 | 280,000 | \$0.344 | 185,463 | \$0.198 | \$0.085 | \$20,876 |
| 23 | 280,000 | \$0.354 | 184,536 | \$0.203 | \$0.085 | \$21,866 |
| 24 | 280,000 | \$0.365 | 183,613 | \$0.210 | \$0.085 | \$22,877 |
| 25 | 280,000 | \$0.376 | 182,695 | \$0.216 | \$0.085 | \$23,912 |
| | | | | | | \$333,442 |

Middlesex Middle School – 425 kW



Middlesex Middle School – Economics

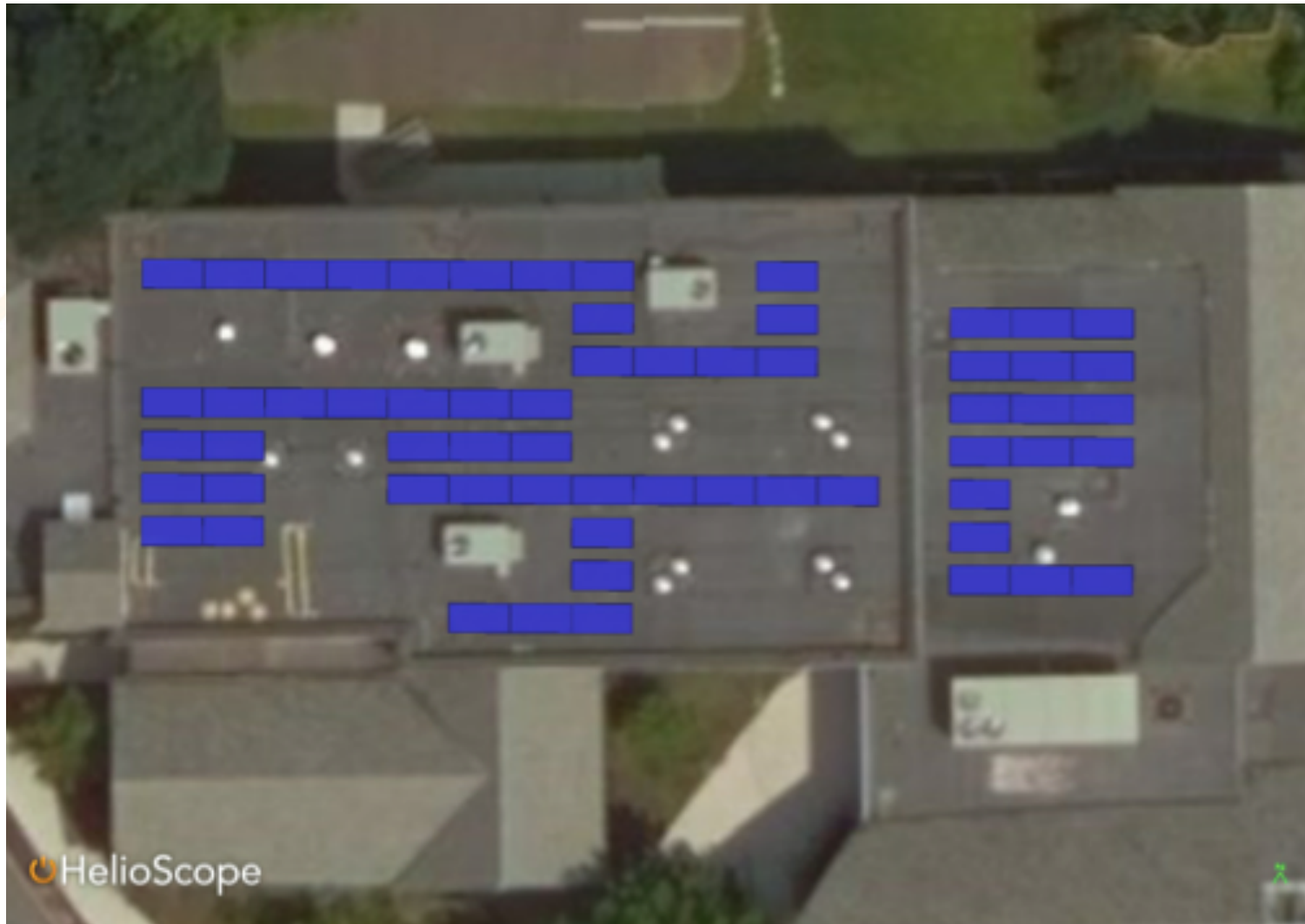
System size in DC kW: 425 kW

Initial system production in kWh: 552,500 kWh

Percentage offset by solar: 54%

| <u>A</u> | <u>B</u> | <u>C</u> | <u>D</u> | <u>E</u> | <u>F</u> | <u>G</u> |
|----------|---------------------|--------------|---------------------|------------------------|----------|------------------|
| Year | Current Consumption | Utility Rate | Solar kWh generated | Solar Offset (\$)/ kWh | PPA Rate | Net Savings |
| 1 | 1,033,280 | \$0.186 | 552,500 | \$0.106 | \$0.085 | \$11,824 |
| 2 | 1,033,280 | \$0.192 | 549,738 | \$0.110 | \$0.085 | \$13,519 |
| 3 | 1,033,280 | \$0.197 | 546,989 | \$0.113 | \$0.085 | \$15,250 |
| 4 | 1,033,280 | \$0.203 | 544,254 | \$0.116 | \$0.085 | \$17,017 |
| 5 | 1,033,280 | \$0.209 | 541,533 | \$0.120 | \$0.085 | \$18,820 |
| 6 | 1,033,280 | \$0.216 | 538,825 | \$0.123 | \$0.085 | \$20,662 |
| 7 | 1,033,280 | \$0.222 | 536,131 | \$0.127 | \$0.085 | \$22,543 |
| 8 | 1,033,280 | \$0.229 | 533,450 | \$0.131 | \$0.085 | \$24,463 |
| 9 | 1,033,280 | \$0.236 | 530,783 | \$0.135 | \$0.085 | \$26,425 |
| 10 | 1,033,280 | \$0.243 | 528,129 | \$0.139 | \$0.085 | \$28,428 |
| 11 | 1,033,280 | \$0.250 | 525,488 | \$0.143 | \$0.085 | \$30,474 |
| 12 | 1,033,280 | \$0.257 | 522,861 | \$0.147 | \$0.085 | \$32,565 |
| 13 | 1,033,280 | \$0.265 | 520,247 | \$0.152 | \$0.085 | \$34,701 |
| 14 | 1,033,280 | \$0.273 | 517,645 | \$0.156 | \$0.085 | \$36,883 |
| 15 | 1,033,280 | \$0.281 | 515,057 | \$0.161 | \$0.085 | \$39,113 |
| 16 | 1,033,280 | \$0.290 | 512,482 | \$0.166 | \$0.085 | \$41,392 |
| 17 | 1,033,280 | \$0.298 | 509,919 | \$0.171 | \$0.085 | \$43,721 |
| 18 | 1,033,280 | \$0.307 | 507,370 | \$0.176 | \$0.085 | \$46,101 |
| 19 | 1,033,280 | \$0.317 | 504,833 | \$0.181 | \$0.085 | \$48,534 |
| 20 | 1,033,280 | \$0.326 | 502,309 | \$0.187 | \$0.085 | \$51,021 |
| 21 | 1,033,280 | \$0.336 | 499,797 | \$0.192 | \$0.085 | \$53,563 |
| 22 | 1,033,280 | \$0.346 | 497,298 | \$0.198 | \$0.085 | \$56,163 |
| 23 | 1,033,280 | \$0.356 | 494,812 | \$0.204 | \$0.085 | \$58,820 |
| 24 | 1,033,280 | \$0.367 | 492,338 | \$0.210 | \$0.085 | \$61,537 |
| 25 | 1,033,280 | \$0.378 | 489,876 | \$0.216 | \$0.085 | \$64,315 |
| | | | | | | \$897,855 |

BOE Central Office – 26 kW



BOE Central Office – Economics

System size in DC kW: 26 kW
 Initial system production in kWh: 33,670 kWh
 Percentage offset by solar: 16%

| <u>A</u> | <u>B</u> | <u>C</u> | <u>D</u> | <u>E</u> | <u>F</u> | <u>G</u> |
|----------|---------------------|--------------|---------------------|------------------------|----------|-----------------|
| Year | Current Consumption | Utility Rate | Solar kWh generated | Solar Offset (\$)/ kWh | PPA Rate | Net Savings |
| 1 | 207,200 | \$0.179 | 33,670 | \$0.1050 | \$0.085 | \$673 |
| 2 | 207,200 | \$0.185 | 33,502 | \$0.1082 | \$0.085 | \$776 |
| 3 | 207,200 | \$0.190 | 33,334 | \$0.1114 | \$0.085 | \$880 |
| 4 | 207,200 | \$0.196 | 33,167 | \$0.1147 | \$0.085 | \$986 |
| 5 | 207,200 | \$0.202 | 33,002 | \$0.1182 | \$0.085 | \$1,095 |
| 6 | 207,200 | \$0.208 | 32,837 | \$0.1217 | \$0.085 | \$1,206 |
| 7 | 207,200 | \$0.214 | 32,672 | \$0.1254 | \$0.085 | \$1,319 |
| 8 | 207,200 | \$0.221 | 32,509 | \$0.1291 | \$0.085 | \$1,435 |
| 9 | 207,200 | \$0.227 | 32,347 | \$0.1330 | \$0.085 | \$1,553 |
| 10 | 207,200 | \$0.234 | 32,185 | \$0.1370 | \$0.085 | \$1,674 |
| 11 | 207,200 | \$0.241 | 32,024 | \$0.1411 | \$0.085 | \$1,797 |
| 12 | 207,200 | \$0.248 | 31,864 | \$0.1453 | \$0.085 | \$1,923 |
| 13 | 207,200 | \$0.256 | 31,704 | \$0.1497 | \$0.085 | \$2,051 |
| 14 | 207,200 | \$0.263 | 31,546 | \$0.1542 | \$0.085 | \$2,183 |
| 15 | 207,200 | \$0.271 | 31,388 | \$0.1588 | \$0.085 | \$2,317 |
| 16 | 207,200 | \$0.279 | 31,231 | \$0.1636 | \$0.085 | \$2,454 |
| 17 | 207,200 | \$0.288 | 31,075 | \$0.1685 | \$0.085 | \$2,595 |
| 18 | 207,200 | \$0.296 | 30,920 | \$0.1735 | \$0.085 | \$2,738 |
| 19 | 207,200 | \$0.305 | 30,765 | \$0.1788 | \$0.085 | \$2,884 |
| 20 | 207,200 | \$0.314 | 30,611 | \$0.1841 | \$0.085 | \$3,034 |
| 21 | 207,200 | \$0.324 | 30,458 | \$0.1896 | \$0.085 | \$3,187 |
| 22 | 207,200 | \$0.334 | 30,306 | \$0.1953 | \$0.085 | \$3,344 |
| 23 | 207,200 | \$0.344 | 30,154 | \$0.2012 | \$0.085 | \$3,504 |
| 24 | 207,200 | \$0.354 | 30,004 | \$0.2072 | \$0.085 | \$3,667 |
| 25 | 207,200 | \$0.364 | 29,854 | \$0.2134 | \$0.085 | \$3,835 |
| | | | | | | \$53,109 |

Summary

Darien Schools Green Energy Program BOE Savings

| | | |
|--|--|--------------------|
| | System size in DC kW: | 958.8 |
| | Initial system production in kWh: | 1,257,150 |
| | <u>PPA Rate (Fixed) 25 years:</u> | \$0.085 |
| Year 1 Total Net Savings of Darien School Green Energy Program: | | \$26,121 |
| Estimated Net Savings over 25 Years Across All Solar Sites: | | \$2,016,321 |
| | Green House Gas Impact: | 917 MT of CO2 |
| | Carbon Sequestered by acres of forest in 1 year: | 1,197 |

Financial Benefits to Town of Darien & BOE

- By creating this as a portfolio, AEE has secured very favorable 25 year PPA financing commitment for Town of Darien
- Darien schools reduce electric costs by approximately \$26,121 in Year One
- Lock in estimated \$2 million (at current supply rate \$0.0866) in energy savings over 25 years
- No upfront capital costs and no maintenance cost
- Should be noted that the CT ZREC program expires at end of 2021 – No announcement has been made about future program – If projects are awarded a ZREC, they have a 2 year window to be operational