

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

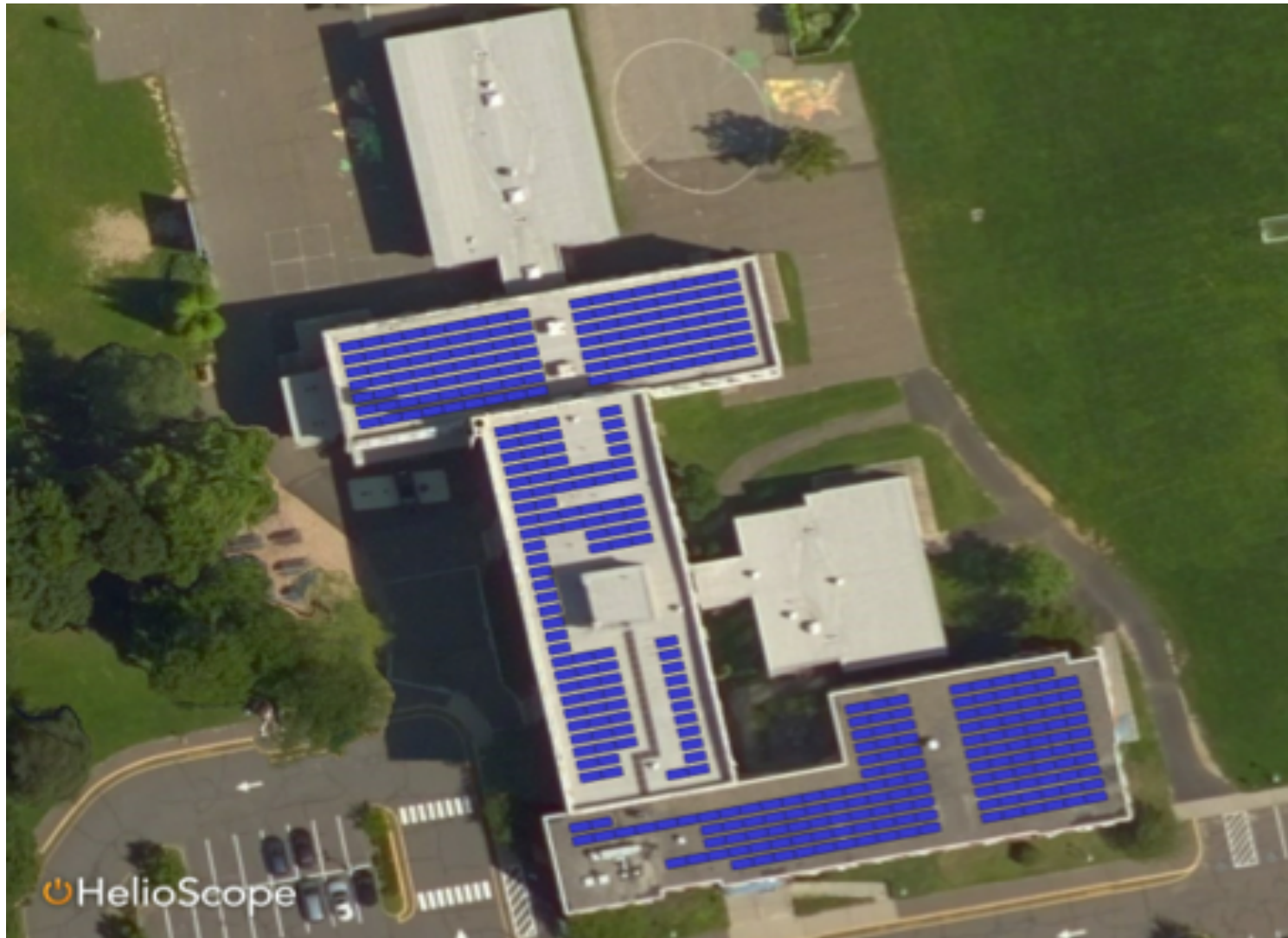


Hindley Elementary School - Economics

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

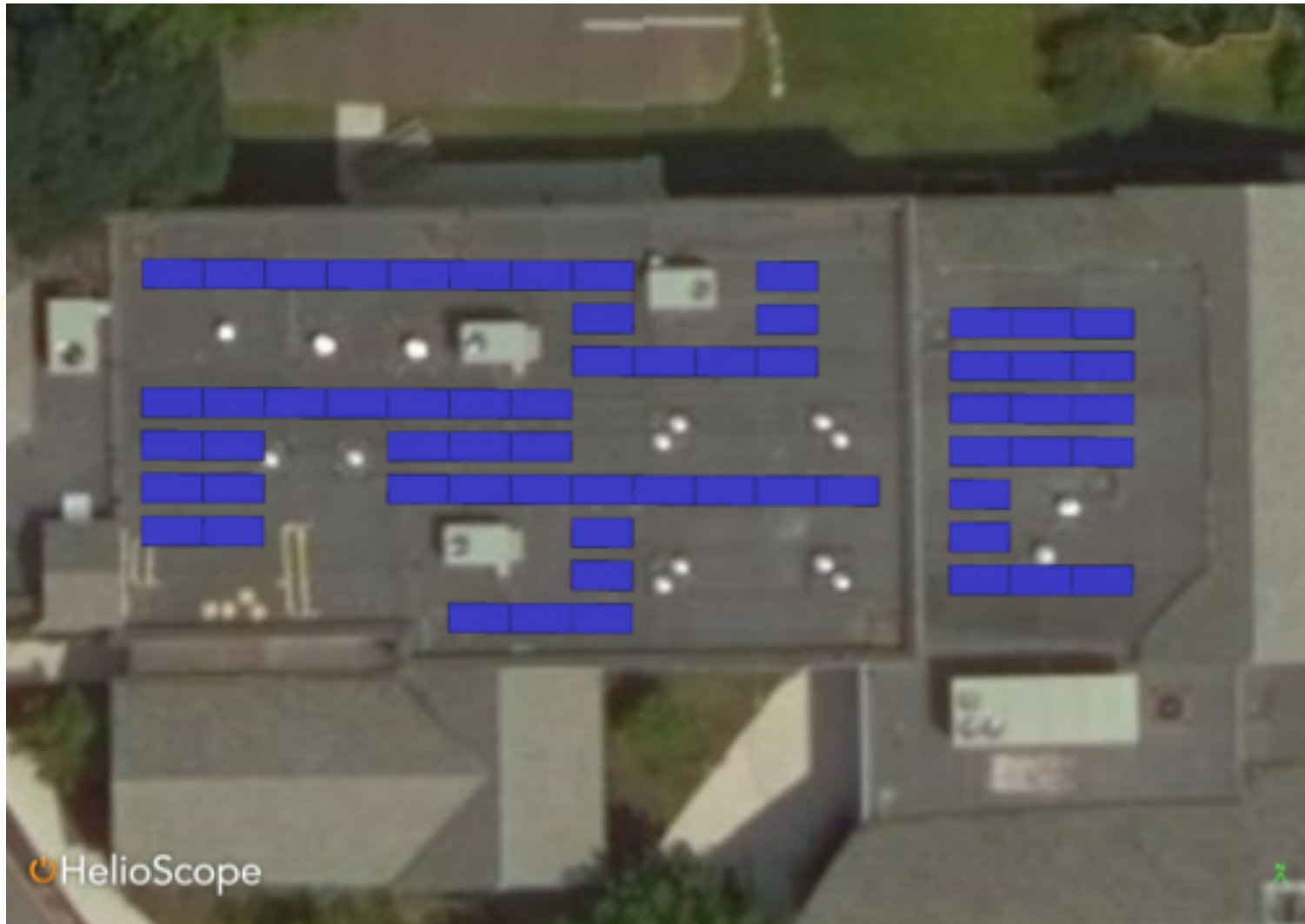
System size in DC kW: 425 kW

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