

Assess. Advise. Achieve.

# City of Kent

## Fire Station

### Onsite Solar Assessment

12/10/2024



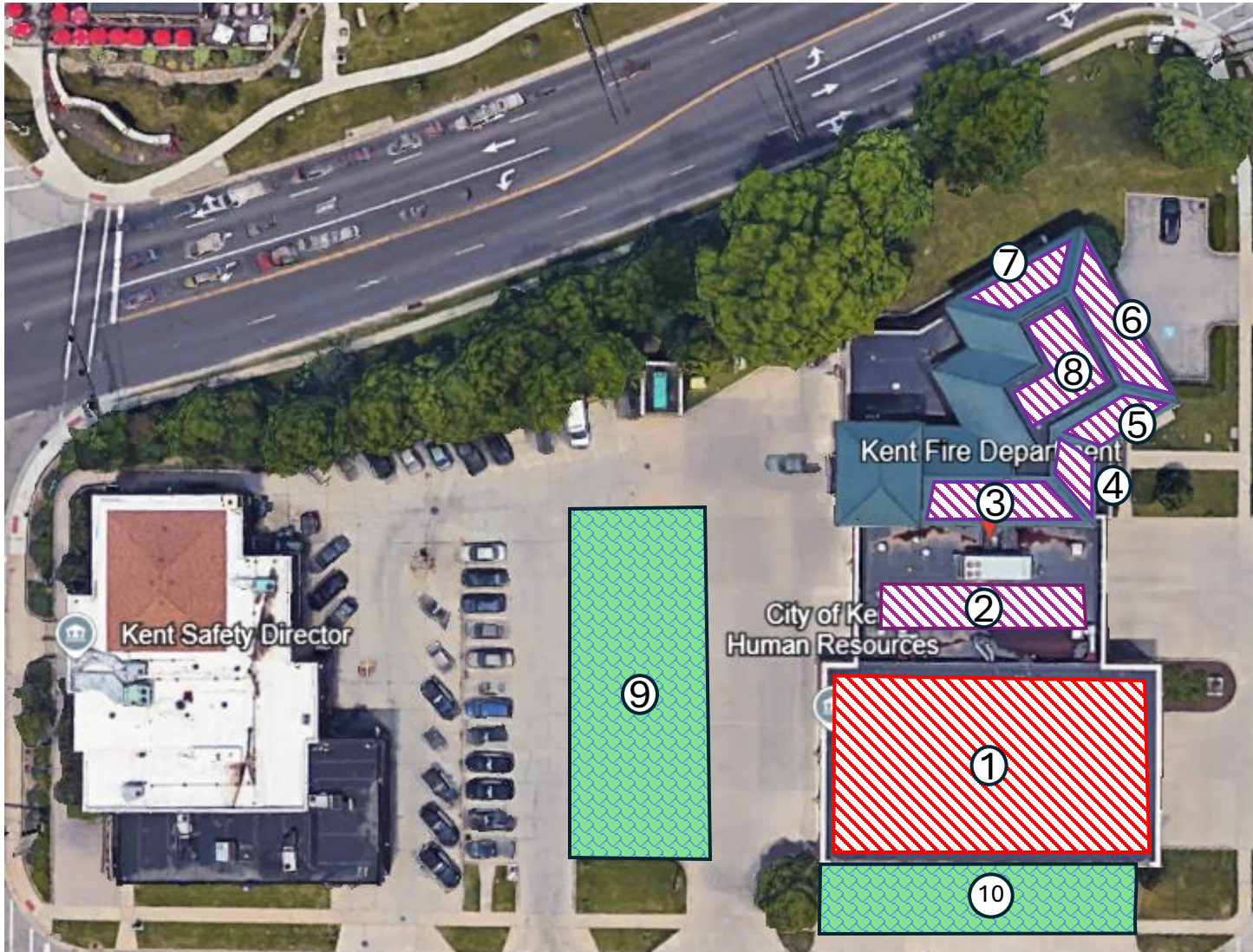
Assess. Advise. Achieve.

# Welcome

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# Site Feasibility - NOPEC Fire Station, 320 S Depeyster St, Kent, OH 44240



In collaboration with site personnel and facility data, the following considerations were reviewed to determine feasible solar siting locations:

- Segment 1 was suggested by the client as a potential solar siting location.
- To maximize system size, we added additional segments (2-8).
- Segments 9 and 10 could be feasible as carport locations; however, they were not initially considered for solar installations.
- The client noted that the roof is old, but we did not include any roof replacement costs in this analysis.



# Policy Details

Parameter	Details
<b>Utility</b>	Ohio Edison
<b>Tariff</b>	General Service - Secondary
<b>Excess Solar Policy</b>	Value of excess solar is based on coincident market rates and paid by the third party supplier.
<b>Other Applicable Incentives</b>	<ul style="list-style-type: none"> <li>&gt; Direct Pay Investment Tax Credit @ 30%</li> <li>&gt; Energy Community Bonus @ 10%</li> </ul>
<b>Renewable Energy Credits (RECs)</b>	<ul style="list-style-type: none"> <li>&gt; Renewable Energy Credits (RECs) represent the environmental and non-power attributes generated by renewable energy. One MWh represents one REC.</li> <li>&gt; Ohio RECs can be traded on the PJM Tier 1 REC market, commanding premium prices. Less expensive alternatives, such as Green E certificates, can then be used as a replacement creating a REC Arbitrage opportunity.</li> <li>&gt; We have assumed REC arbitrage for 10 years, followed by 5 years of REC avoided costs: \$24.1/REC for the first 5 years, \$19.1/REC for the next 5 years, and \$5/REC for the next 5 years.</li> </ul>



# Proposed System

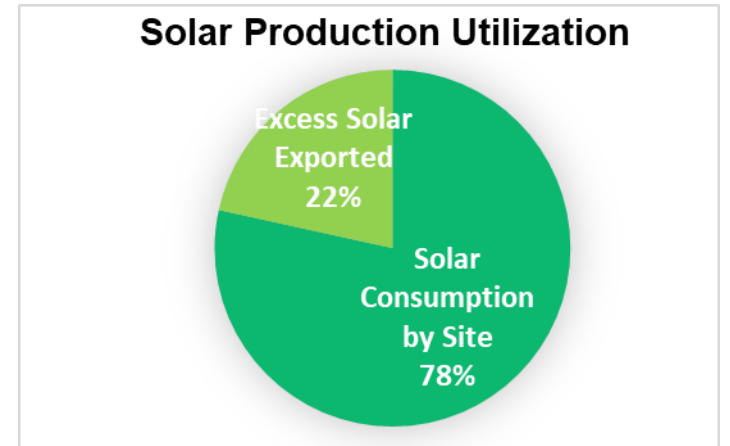
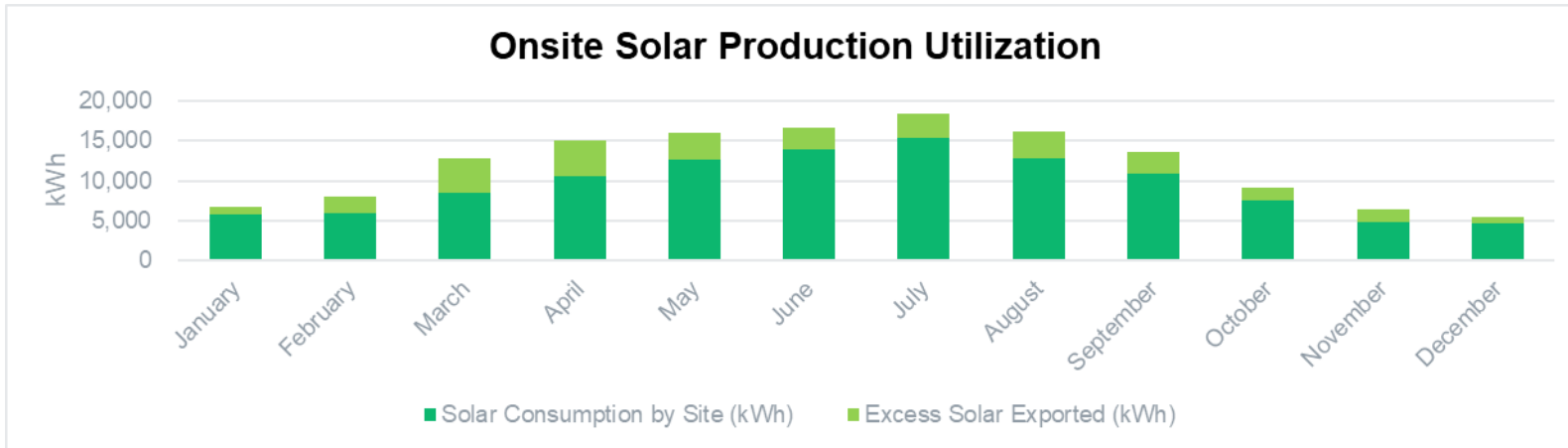
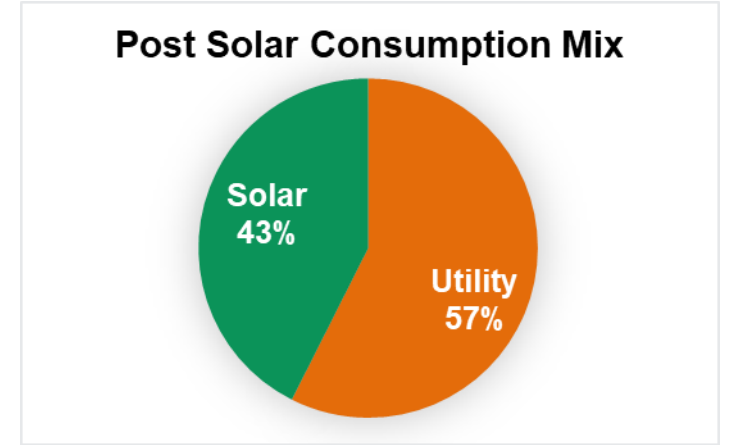
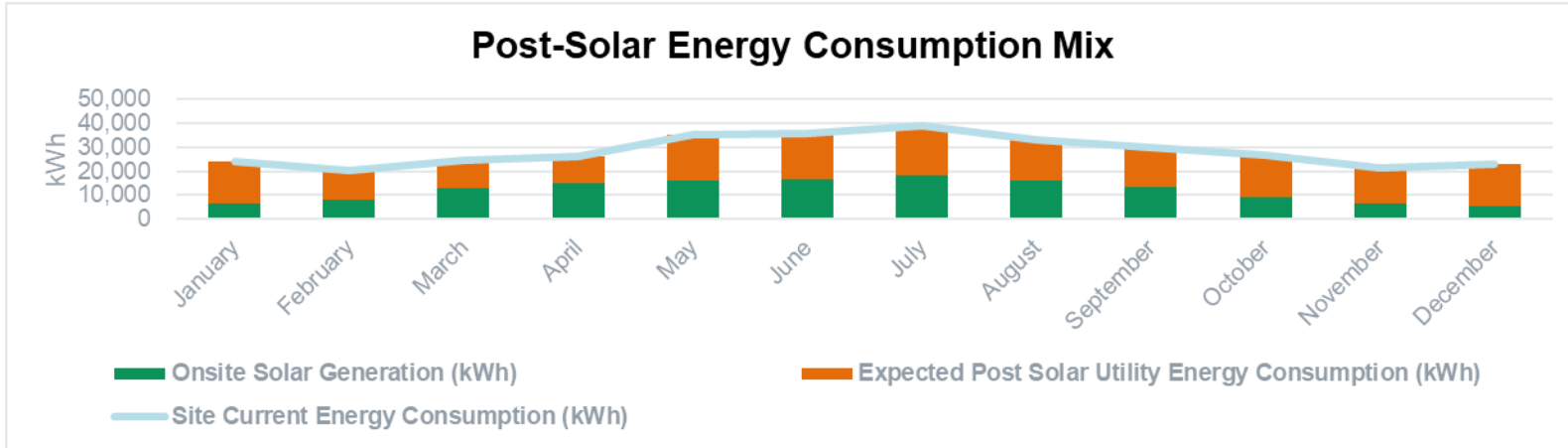


<b>Site Address</b>	320 S Depeyster St, Kent, OH 44240
<b>Meter Details</b>	Account# 110 133 635 117

Parameter	Details
<b>Annual Site Energy Consumption</b>	340,000 kWh
<b>Site Peak demand</b>	89 kW
<b>Solar Capacity (DC)</b>	115 kW
<b>Solar Capacity (AC)</b>	99.9 kW
<b>Year 1 Solar Generation</b>	145,000 kWh
<b>Solar % of Current Consumption</b>	43%
<b>Carbon Offset (Year 1) (Baseline Year 2021)</b>	73 Metric Tonnes CO <sub>2</sub> e



# Energy Consumption Impacts



# Cash Purchase - Transaction Summary

Solar PV Cost Details	
Gross Solar PV System Cost	\$285,000
Direct ITC	(\$114,000)
<b>Net Solar PV System Cost</b>	<b>\$171,000</b>

Parameter	Results
25 Year Operating Costs	(\$61,000)
Year 1 Bill Savings	\$13,000
25 Year Bill Savings	\$410,000
REC Value	\$34,000
NPV	(\$16,000)
IRR	7.0%
Payback Period	11 years



# Cash Purchase - Cash Flow Analysis

Years	PV Generation	Project Costs	O&M	Inverter Replacement	Insurance	REC Value	Electric Bill Savings	Direct ITC	Total Cash Flow	Cumulative Cash Flow
Upfront	-	\$(285,000)	-	-	-	-	-	-	\$(285,000)	\$(285,000)
Year 1	144,600	-	\$(1,200)	-	\$(500)	\$3,500	\$13,500	\$114,000	\$129,300	\$(155,700)
Year 2	143,800	-	\$(1,200)	-	\$(500)	\$3,500	\$13,700	-	\$15,500	\$(140,200)
Year 3	143,100	-	\$(1,200)	-	\$(500)	\$3,400	\$13,900	-	\$15,600	\$(124,600)
Year 4	142,400	-	\$(1,200)	-	\$(600)	\$3,400	\$14,100	-	\$15,700	\$(108,900)
Year 5	141,700	-	\$(1,200)	-	\$(600)	\$3,400	\$14,300	-	\$15,900	\$(93,000)
Year 6	141,000	-	\$(1,300)	-	\$(600)	\$2,700	\$14,600	-	\$15,400	\$(77,600)
Year 7	140,200	-	\$(1,300)	-	\$(600)	\$2,700	\$14,800	-	\$15,600	\$(62,000)
Year 8	139,500	-	\$(1,300)	-	\$(600)	\$2,700	\$15,100	-	\$15,900	\$(46,100)
Year 9	138,800	-	\$(1,400)	-	\$(600)	\$2,700	\$15,300	-	\$16,000	\$(30,100)
Year 10	138,100	-	\$(1,400)	-	\$(600)	\$2,600	\$15,500	-	\$16,100	\$(14,000)
Year 11	137,300	-	\$(1,400)	-	\$(600)	\$700	\$15,800	-	\$14,500	\$500
Year 12	136,600	-	\$(1,400)	-	\$(600)	\$700	\$16,000	-	\$14,700	\$15,200
Year 13	135,900	-	\$(1,500)	-	\$(700)	\$700	\$16,300	-	\$14,800	\$30,000
Year 14	135,200	-	\$(1,500)	-	\$(700)	\$700	\$16,600	-	\$15,100	\$45,100
Year 15	134,400	-	\$(1,500)	\$(6,900)	\$(700)	\$700	\$16,800	-	\$8,400	\$53,500
Year 16	133,700	-	\$(1,600)	-	\$(700)	-	\$17,100	-	\$14,800	\$68,300
Year 17	133,000	-	\$(1,600)	-	\$(700)	-	\$17,400	-	\$15,100	\$83,400
Year 18	132,300	-	\$(1,600)	-	\$(700)	-	\$17,600	-	\$15,300	\$98,700
Year 19	131,600	-	\$(1,600)	-	\$(700)	-	\$17,900	-	\$15,600	\$114,300
Year 20	130,800	-	\$(1,700)	-	\$(800)	-	\$18,200	-	\$15,700	\$130,000
Year 21	130,100	-	\$(1,700)	-	\$(800)	-	\$18,500	-	\$16,000	\$146,000
Year 22	129,400	-	\$(1,700)	-	\$(800)	-	\$18,800	-	\$16,300	\$162,300
Year 23	128,700	-	\$(1,800)	-	\$(800)	-	\$19,100	-	\$16,500	\$178,800
Year 24	127,900	-	\$(1,800)	-	\$(800)	-	\$19,400	-	\$16,800	\$195,600
Year 25	127,200	-	\$(1,900)	-	\$(800)	-	\$19,700	-	\$17,000	\$212,600
<b>Totals</b>	<b>3,397,300</b>	<b>\$(285,000)</b>	<b>\$(37,000)</b>	<b>\$(6,900)</b>	<b>\$(16,600)</b>	<b>\$34,100</b>	<b>\$410,000</b>	<b>\$114,000</b>	<b>\$212,600</b>	



# PPA - Transaction Summary

Parameter	PPA without escalator	PPA with 2% escalation
Year 1 Net Bill Savings	(\$6,000)	(\$3,000)
25 Year Net Bill Savings	(\$52,000)	(\$92,000)
REC Value	\$9,000	\$9,000
25 Year PPA Payments	(\$462,000)	(\$502,000)
25 Year Net Cash Flow	(\$43,000)	(\$83,000)
NPV	(\$31,000)	(\$33,000)



# PPA without Escalation- Cash Flow Analysis

Years	PV Generation	PPA Payments	REC Value	Electric Bill Savings	Total Cash Flow	Cumulative Cash Flow
Upfront	-	-	-	-	-	-
Year 1	144,600	\$(19,700)	\$600	\$13,500	\$(5,600)	\$(5,600)
Year 2	143,800	\$(19,600)	\$600	\$13,700	\$(5,300)	\$(11,000)
Year 3	143,100	\$(19,500)	\$600	\$13,900	\$(5,000)	\$(16,000)
Year 4	142,400	\$(19,400)	\$600	\$14,100	\$(4,700)	\$(20,600)
Year 5	141,700	\$(19,300)	\$600	\$14,300	\$(4,400)	\$(25,000)
Year 6	141,000	\$(19,200)	\$600	\$14,600	\$(4,000)	\$(28,900)
Year 7	140,200	\$(19,100)	\$600	\$14,800	\$(3,600)	\$(32,600)
Year 8	139,500	\$(19,000)	\$600	\$15,100	\$(3,300)	\$(35,900)
Year 9	138,800	\$(18,900)	\$600	\$15,300	\$(3,000)	\$(38,800)
Year 10	138,100	\$(18,800)	\$600	\$15,500	\$(2,600)	\$(41,400)
Year 11	137,300	\$(18,700)	\$700	\$15,800	\$(2,200)	\$(43,600)
Year 12	136,600	\$(18,600)	\$700	\$16,000	\$(1,900)	\$(45,500)
Year 13	135,900	\$(18,500)	\$700	\$16,300	\$(1,500)	\$(47,000)
Year 14	135,200	\$(18,400)	\$700	\$16,600	\$(1,100)	\$(48,100)
Year 15	134,400	\$(18,300)	\$700	\$16,800	\$(800)	\$(48,900)
Year 16	133,700	\$(18,200)	-	\$17,100	\$(1,100)	\$(50,000)
Year 17	133,000	\$(18,100)	-	\$17,400	\$(700)	\$(50,700)
Year 18	132,300	\$(18,000)	-	\$17,600	\$(400)	\$(51,100)
Year 19	131,600	\$(17,900)	-	\$17,900	-	\$(51,100)
Year 20	130,800	\$(17,800)	-	\$18,200	\$400	\$(50,700)
Year 21	130,100	\$(17,700)	-	\$18,500	\$800	\$(49,900)
Year 22	129,400	\$(17,600)	-	\$18,800	\$1,200	\$(48,700)
Year 23	128,700	\$(17,500)	-	\$19,100	\$1,600	\$(47,100)
Year 24	127,900	\$(17,400)	-	\$19,400	\$2,000	\$(45,100)
Year 25	127,200	\$(17,300)	-	\$19,700	\$2,400	\$(42,800)
<b>Totals</b>	<b>3,397,300</b>	<b>\$(462,000)</b>	<b>\$9,400</b>	<b>\$409,900</b>	<b>\$(42,800)</b>	<b>-</b>



# PPA with Escalation- Cash Flow Analysis

Years	PV Generation	PPA Payments	REC Value	Electric Bill Savings	Total Cash Flow	Cumulative Cash Flow
Upfront	-	-	-	-	-	-
Year 1	144,600	\$(16,800)	\$600	\$13,500	\$(2,700)	\$(2,700)
Year 2	143,800	\$(17,000)	\$600	\$13,700	\$(2,800)	\$(5,500)
Year 3	143,100	\$(17,300)	\$600	\$13,900	\$(2,800)	\$(8,300)
Year 4	142,400	\$(17,500)	\$600	\$14,100	\$(2,800)	\$(11,200)
Year 5	141,700	\$(17,800)	\$600	\$14,300	\$(2,900)	\$(14,000)
Year 6	141,000	\$(18,100)	\$600	\$14,600	\$(2,800)	\$(16,900)
Year 7	140,200	\$(18,300)	\$600	\$14,800	\$(2,900)	\$(19,800)
Year 8	139,500	\$(18,600)	\$600	\$15,100	\$(2,900)	\$(22,700)
Year 9	138,800	\$(18,900)	\$600	\$15,300	\$(2,900)	\$(25,600)
Year 10	138,100	\$(19,100)	\$600	\$15,500	\$(3,000)	\$(28,600)
Year 11	137,300	\$(19,400)	\$700	\$15,800	\$(2,900)	\$(31,500)
Year 12	136,600	\$(19,700)	\$700	\$16,000	\$(3,000)	\$(34,500)
Year 13	135,900	\$(20,000)	\$700	\$16,300	\$(3,000)	\$(37,500)
Year 14	135,200	\$(20,300)	\$700	\$16,600	\$(3,000)	\$(40,600)
Year 15	134,400	\$(20,600)	\$700	\$16,800	\$(3,100)	\$(43,700)
Year 16	133,700	\$(20,900)	-	\$17,100	\$(3,800)	\$(47,400)
Year 17	133,000	\$(21,200)	-	\$17,400	\$(3,800)	\$(51,300)
Year 18	132,300	\$(21,500)	-	\$17,600	\$(3,800)	\$(55,100)
Year 19	131,600	\$(21,800)	-	\$17,900	\$(3,900)	\$(59,000)
Year 20	130,800	\$(22,100)	-	\$18,200	\$(3,900)	\$(62,900)
Year 21	130,100	\$(22,400)	-	\$18,500	\$(3,900)	\$(66,800)
Year 22	129,400	\$(22,700)	-	\$18,800	\$(4,000)	\$(70,800)
Year 23	128,700	\$(23,100)	-	\$19,100	\$(4,000)	\$(74,800)
Year 24	127,900	\$(23,400)	-	\$19,400	\$(4,000)	\$(78,800)
Year 25	127,200	\$(23,700)	-	\$19,700	\$(4,100)	\$(82,900)
<b>Totals</b>	<b>3,397,300</b>	<b>\$(502,200)</b>	<b>\$9,400</b>	<b>\$409,900</b>	<b>\$(82,900)</b>	<b>-</b>



# Summary

Payment Option	Cash Purchase	PPA without escalator	PPA with 2% Escalation
<b>Year 1 Solar Generation</b>	145,000 kWh		
<b>Marginal Solar Value</b>	\$0.093/kWh		
<b>Starting PPA Rate</b>	-	\$0.136/kWh	\$0.116/kWh
<b>Term</b>	25 years		
<b>Total Capex</b>	\$285,000	\$0	\$0
<b>Total Incentives</b>	\$114,000	\$0	\$0
<b>REC Value</b>	\$34,000	\$9,000	\$9,000
<b>25 Year Operating Costs</b>	(\$61,000)	\$0	\$0
<b>Year 1 Net Bill Savings</b>	\$13,000	(\$6,000)	(\$3,000)
<b>25 Year Net Bill Savings</b>	\$410,000	(\$52,000)	(\$92,000)
<b>NPV</b>	(\$16,000)	(\$31,000)	(\$33,000)
<b>IRR</b>	7.0%	-	-
<b>Payback Period</b>	11 years	-	-





# Q&A



A blurred crowd of people walking through a modern hallway with yellow walls and arched windows. The image is used as a background for a thank-you message.

# THANK YOU.

Helping you move decarbonization from **Strategy to Sustainable Action**



# Appendix - Modeling Assumptions

Project Parameter	Base Assumption
Projected COD	2025
Capacity DC	115 kW
Capacity AC	99.9 kW
Production Efficiency Year 1	1253 kWh/kW
Annual Capacity Factor DC	14.3%
Capex (\$/W-DC)	\$2.47
O&M (\$/W-DC)	\$0.01
O&M Annual Escalation Rate	2.00%
Insurance (\$/W-DC)	\$0.0045
Insurance Annual Escalation Rate	2.00%
Inverter Replacement Cost (\$/W-DC)	\$0.06
Inverter Replacement Year	Year 15
Purchased Power Cost Escalation	2.14%
Federal Tax Rate	21%
State Tax Rate	0%
Discount Rate	8%



# Appendix - Cash Purchase Sensitivity Analysis

Base Case IRR	7.00%
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Parameter	New IRR	Difference
Additional 10% Bonus Adder	8.70%	1.70%
Tariff Escalation by +1%	8.00%	1.00%
Tariff Escalation by -1%	6.00%	-1.00%
Decrease in Capex by 10%	8.20%	1.20%
Increase in Capex by 10%	6.00%	-1.00%
Increase in Solar generation by 5%	7.40%	0.40%
Decrease in Solar generation by 5%	6.60%	-0.40%



# Appendix - Current Electric Bill

Time Periods	Current Energy Usage (kWh)	Current Max Demand (kW)	Current Charges (\$)			
Bill	Total	NC / Max	Other	Energy	Demand	Total
Jan-24	24,237	58	\$21	\$2,117	\$701	\$2,838
Feb-24	21,651	64	\$21	\$1,892	\$775	\$2,688
Mar-24	23,499	56	\$21	\$2,053	\$676	\$2,749
Apr-24	28,942	68	\$21	\$2,526	\$825	\$3,372
May-24	27,914	76	\$17	\$2,437	\$745	\$3,199
Jun-24	7,423	80	\$4	\$651	\$188	\$843
Jun-24	36,585	89	\$21	\$3,191	\$1,085	\$4,297
Jul-24	37,953	82	\$21	\$3,310	\$998	\$4,329
Aug-24	31,876	77	\$21	\$2,781	\$936	\$3,738
Sep-24	24,133	68	\$16	\$2,108	\$660	\$2,784
Oct-24	5,637	59	\$4	\$494	\$143	\$641
Oct-23	25,747	71	\$21	\$2,248	\$862	\$3,131
Nov-23	21,274	57	\$21	\$1,859	\$688	\$2,568
Dec-23	23,136	59	\$21	\$2,021	\$713	\$2,755
<b>Total</b>	<b>340,007</b>	<b>89</b>	<b>\$247</b>	<b>\$29,689</b>	<b>\$9,996</b>	<b>\$39,932</b>



# Appendix - Estimated Post Solar Electric Bill

Time Periods	Post Solar Energy Usage (kWh)	Post Solar Max Demand (kW)	Post Solar Charges (\$)			
Bill	Total	NC / Max	Other	Energy	Demand	Total
Jan-24	17,012	56	\$21	\$1,432	\$676	\$2,128
Feb-24	13,502	54	\$21	\$1,188	\$651	\$1,860
Mar-24	10,258	56	\$21	\$1,049	\$676	\$1,745
Apr-24	12,009	62	\$21	\$1,198	\$750	\$1,969
May-24	15,899	65	\$17	\$1,397	\$635	\$2,049
Jun-24	4,370	69	\$4	\$374	\$162	\$540
Jun-24	19,410	84	\$21	\$1,697	\$1,023	\$2,741
Jul-24	19,747	79	\$21	\$1,742	\$961	\$2,724
Aug-24	15,987	65	\$21	\$1,453	\$788	\$2,262
Sep-24	13,519	59	\$16	\$1,194	\$570	\$1,781
Oct-24	3,731	50	\$4	\$317	\$120	\$441
Oct-23	16,738	61	\$21	\$1,433	\$738	\$2,191
Nov-23	15,723	52	\$21	\$1,328	\$626	\$1,975
Dec-23	17,534	50	\$21	\$1,455	\$601	\$2,077
<b>Total</b>	<b>195,439</b>	<b>84</b>	<b>\$247</b>	<b>\$17,256</b>	<b>\$8,978</b>	<b>\$26,482</b>
<b>Reduction</b>	<b>144,568</b>	<b>5</b>	<b>\$0</b>	<b>\$12,433</b>	<b>\$1,017</b>	<b>\$13,450</b>



# About Us



- **World Kinect** is a division of **World Kinect Corporation**
- Publicly-traded company (NYSE Stock Symbol: *WKC*), compliant with regulatory standards and best practices
- Strong financial counterparty (external auditors: PWC), with global banking relationships & the ability to participate in financing programs to maximize your working capital
- IMS Operating Standards, CFTC Series 3 Certified, ISO 14001, 27001, 37001, 45001, and 9001 Certified
- Global reach with local expertise. Access to competitively-priced fuel in nearly all markets worldwide
- Member of the UN's Global Compact initiative since 2019, publicly committed to a targeted set of the Sustainable Development Goals
- In addition to delivering our core energy and fuel solutions, we are advancing the energy transition by increasing access to renewable energy, lower-carbon fuels, and sustainability advisory services.



**39**

YEARS IN BUSINESS



**\$59B**

TOTAL REVENUE



**5K+**

GLOBAL PROFESSIONALS



**2019**

MEMBERSHIP INITIATED



**70**

FORTUNE COMPANY



**8B**

TOTAL ASSETS



**50M+**

FUEL GALLONS DELIVERED PER DAY



**219**

TWH ENERGY MANAGED

## Marine

**1,700+** Customers

**900+** Seaports

## Land

**140,000+** Customers

**50+** Energy Products

## Aviation

**15,900+** Customers

**3,950+** Airports

