Brightergy

CLEAN ENERGY. CLEAR CHOICE.

Independence Power and Light

Solar Energy Proposal

Brightergy
CLEAN ENERGY. CLEAR CHOICE.

November 19, 2014

Independence Power & Light
21500 East Truman Road
Independence, MO 64056

To Whom It May Concern,

Thank you for the opportunity to provide this solar feasibility study for the City of Independence.

With more than 1,200 energy projects installed, we have proven our leadership. Our team knows how to design, engineer, install, finance, and service energy systems, and we do it with minimal disruption for you, the client.

We have narrowed down the number of facilities we believe to be ideal for a solar installation. In the pages to follow we will outline 12 different facilities that are the strongest candidates for a solar installation. Included in the information will be each building's current electrical consumption, along with the amount that will be offset by installing a solar array. There will also be a three dimensional rendering with the pricing and payback period included.

Custom finance options are available for each facility, and can be evaluated on a case by case basis.

Sincerely,

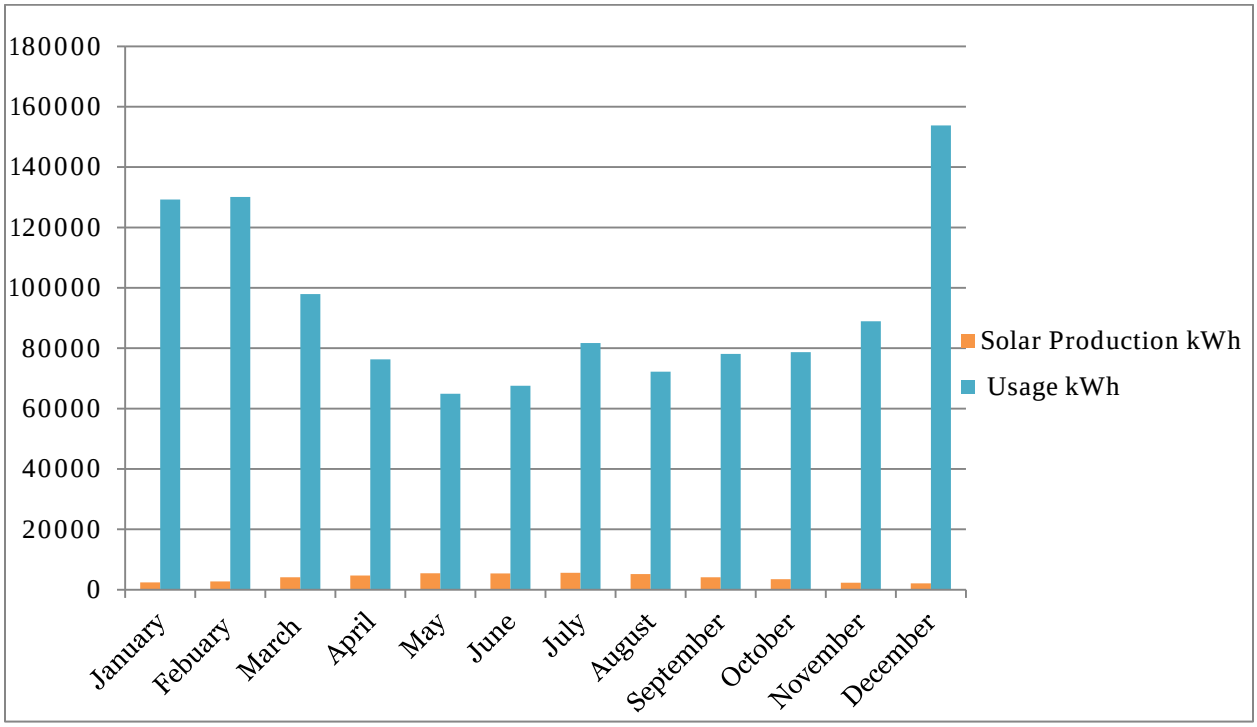
John Germano
Commercial Energy Advisor

Brightergy
CLEAN ENERGY. CLEAR CHOICE.

Table of Contents

1. City Hall Graph Page 1
2. City Hall OnGrid Page 2
3. City Hall SketchUp Page 3
4. Events Center Graph Page 4
5. Events Center OnGrid Page 5
6. Events Center SketchUp Page 6
7. Fire Station 2 Graph Page 7
8. Fire Station 2 OnGrid Page 8
9. Fire Station 2 SketchUp Page 9
10. Fire Station 3 Graph Page 10
11. Fire Station 3 OnGrid Page 11
12. Fire Station 3 SketchUp Page 12
13. Fire Station 4 Graph Page 13
14. Fire Station 4 OnGrid Page 14
15. Fire Station 4 SketchUp Page 15
16. Fire Station 7 Graph Page 16
17. Fire Station 7 OnGrid Page 17
18. Fire Station 7 SketchUp Page 18
19. Health Department Graph Page 19
20. Health Department OnGrid Page 20
21. Health Department SketchUp Page 21
22. National Frontiers Museum Graph Page 22
23. National Frontiers Museum OnGrid Page 23
24. National Frontiers Museum SketchUp Page 24
25. Police Building Graph Page 25
26. Police Building OnGrid Page 26
27. Police Building SketchUp Page 27
28. Rock Creek Graph Page 28
29. Rock Creek OnGrid Page 29
30. Rock Creek SketchUp Page 30
31. Service Center Graph Page 31
32. Service Center OnGrid Page 32
33. Service Center SketchUp Page 33
34. Sewer Maintenance Graph Page 34
35. Sewer Maintenance OnGrid Page 35
36. Sewer Maintenance SketchUp Page 36
37. Technical Information Page 37

City Hall



System Size: 38.735 kW

Production: 49,000 kWh

Consumption: 1,119,560 kWh

Offset: 4.4%

Price Per Watt: $2.95

Gross Capital Cost: $114,268

John Germano
Brightergy

Solar Electric Investment, Incentive and Energy Savings Analysis

Proposal for:
City Of Independence

November 21, 2014

Site Location:
111 East Maple Ave
Independence, MO 64050

Utility: General Utility
Current Rate Schedule: DirectUD -- Flat Annual Rate

Historical Usage: 1,119,552 kWh/yr

System Information		Cost Information	
Proposed System DC Size	**38.7 kW STC DC**	Proposed System Cost per rated Watt	**$2.95 per STC DC Watt**
		Estimated Federal Tax Bracket	**39.0%**
127 Renesola America JC305M-24/Ax-b modules and 8 SMA America SB3800U (240V) inverters		Current Utility Rate are as high as	**10.0 ¢/kWh**
Location's Avg Sun Hours	**4.8 Sun Hours**		
Estimated Annual Production	**49,000 kWh/yr**	**Estimated First Year Utility Savings**	**$4,900 per year**

Gross System Cost with Sales Tax	**$114,268**
	$0
	$0
	$0
	$0
	$0
	$0
PBI Incentive	**$1**
Net System Cost with Tax Benefits & Incentives	**$114,268**

Payback / Return on Investment — 19.0 Years

Year	Average Utility Rate ¢/kWh	Utility Savings $/year	Net Utility Savings, sRECs, PBIs, etc, after tax & maintenance	Tax & Rebate Incentives	Cost / Payback Schedule (Cumulative Cash Position)
0				$0	($114,268)
1	10.0	$4,900	$4,900		($109,368)
2	10.3	$5,022	$5,022		($104,346)
3	10.6	$5,148	$5,148		($99,198)
4	10.9	$5,277	$5,277		($93,921)
5	11.3	$5,409	$5,409		($88,512)
6	11.6	$5,544	$5,544		($82,968)
7	11.9	$5,682	$5,682		($77,286)
8	12.3	$5,825	$5,825		($71,461)
9	12.7	$5,970	$5,970		($65,491)
10	13.0	$6,119	$6,119		($59,372)
11	13.4	$6,272	$6,272		($53,099)
12	13.8	$6,429	$6,429		($46,670)
13	14.3	$6,590	$6,590		($40,080)
14	14.7	$6,755	$6,755		($33,325)
15	15.1	$6,924	$4,212		($29,113)
16	15.6	$7,097	$7,097		($22,017)
17	16.0	$7,274	$7,274		($14,743)
18	16.5	$7,456	$7,456		($7,287)
19	17.0	$7,642	$7,642		$356
20	17.5	$7,833	$7,833		$8,189
21	18.1	$8,029	$8,029		$16,218
22	18.6	$8,230	$8,230		$24,448
23	19.2	$8,436	$8,436		$32,884
24	19.7	$8,647	$8,647		$41,531
25	20.3	$8,863	$8,863		$50,393

MACRS Depreciation Schedule

Fed Depr Basis (Fed ITC Basis minus 1/2 Fed ITC)	$0
Federal Depreciation	$0
State Net Depreciation (factoring state rebate)	$0

Year	State Net Depreciation	Federal Depreciation
1	$0	$0
2	$0	$0
3	$0	$0
4	$0	$0
5	$0	$0
6	$0	$0
7	$0	$0
8	$0	$0
9	$0	$0
10	$0	$0
11	$0	$0
12	$0	$0
TOTALS	$0	$0

Results

Old Monthly Electric Bill	**$9,330**
Estimated New Electric Bill	**$8,921**
% Bill Offset	**4.4%**

$-25,598 Net Present Value with 5% Discount Rate
The IRR over 25 years is 2.7%
Over 25 years it will provide total savings of: $164,662
including bill savings, sRECs, maintenance, & inverter replacement (net after-tax values)
It will pay for itself in 19 years
With a Cap Rate of 6%, the building's value will increase by: $81,830

Carbon Dioxide and Environmental Benefits

Based on estimated production, this system will reduce emissions by:
961 tons of CO2 over 25 years
It's the environmental equivalent of:
3,126,729 miles not driven
or 16.5 acres of trees planted

Incentives and energy savings depend upon several factors that may not be represented in this analysis.
A trusted tax professional should verify the figures provided.
Brightergy provides assistance with applications for incentives and rebates.
Brightergy does not take responsibility for any future changes in tax law or other incentives.

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INDEPENDENCE CITY HALL

111 E Maple Ave, Independence, MO 64050

38.735 kW PV Solar Array

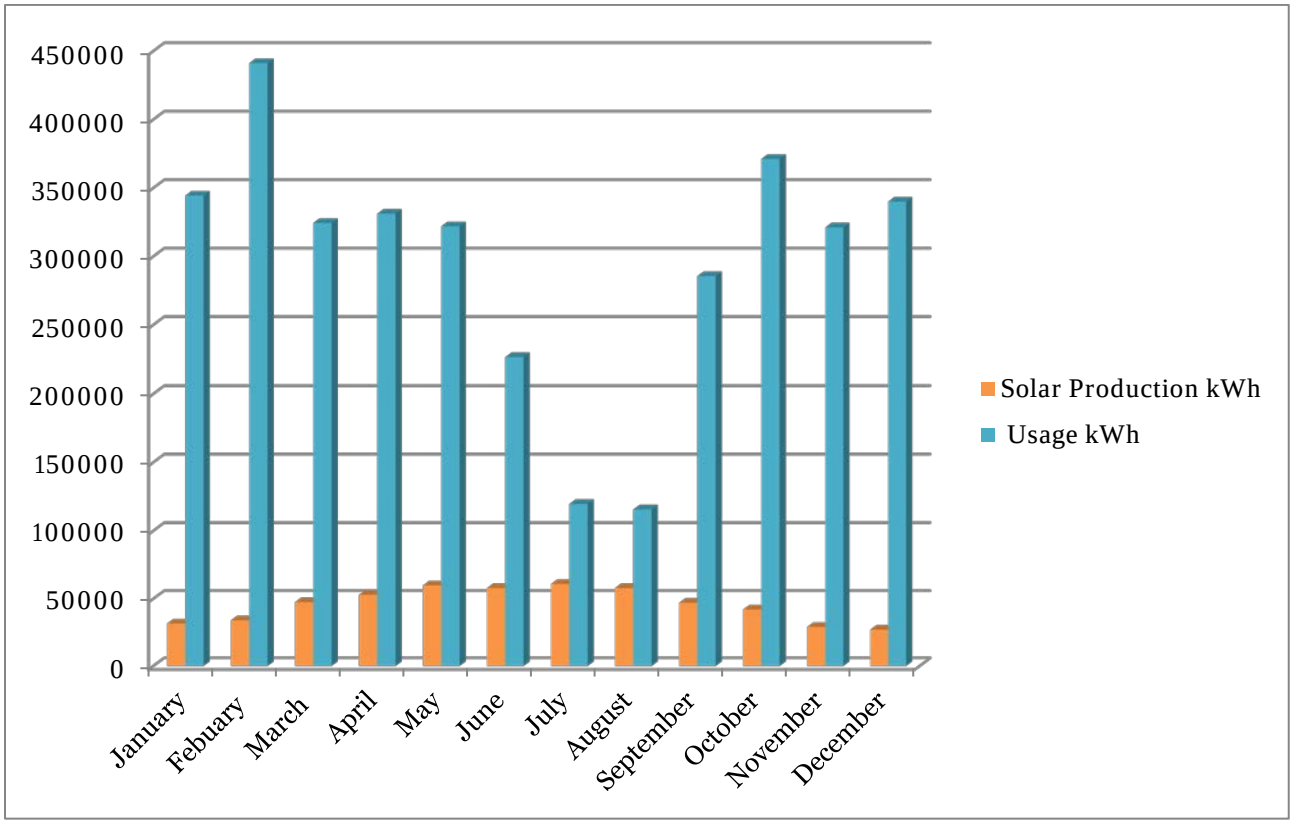
System Information

Azimuth	183 Degrees
Module	127 x Hanwha 305W
Estimated Annual Production	+/- 49,000 kWh

Notes

- *Array layout based on aerial photograph. Exact layout to be determined based on local AHJ codes and standards.*
- *Existing pipe runs need to be identified (gas/electric).*
- *Minimum 4' setback from roof ridge.*
- *Production estimates assume a 82% AC to DC derate factor*

Events Center



System Size: 434.93 kW

Production: 548,000 kWh

Consumption: 3,542,800 kWh

Offset: 15.5%

Price Per Watt: $2.40

Gross Capital Cost: $1,043,832

John Germano
Brightergy

Solar Electric Investment, Incentive and Energy Savings Analysis

Proposal for:
City Of Independence

November 21, 2014

Site Location:
19100 East Valley View Parkway
Independence, MO 64055

Utility: General Utility
Current Rate Schedule: DirectUD -- Flat Annual Rate

Historical Usage: 3,542,796 kWh/yr

System Information		Cost Information	
Proposed System DC Size	**435 kW STC DC**	Proposed System Cost per rated Watt	**$2.40 per STC DC Watt**
		Estimated Federal Tax Bracket	**39.0%**
1426 Renesola America JC305M-24/Ax-b modules and 79 SMA America SB3800U (240V) inverters		Current Utility Rate are as high as	**12.3 ¢/kWh**
Location's Avg Sun Hours	**4.8 Sun Hours**		
Estimated Annual Production	**548,000 kWh/yr**	**Estimated First Year Utility Savings**	**$67,130 per year**

Gross System Cost with Sales Tax	**$1,043,832**
	$0
	$0
	$0
	$0
	$0
	$0
PBI Incentive	**$1**
Net System Cost with Tax Benefits & Incentives	**$1,043,832**

Payback / Return on Investment **13.3 Years**

Year	Average Utility Rate ¢/kWh	Utility Savings $/year	Net Utility Savings, sRECs, PBIs, etc, after tax & maintenance	Tax & Rebate Incentives	Cost / Payback Schedule (Cumulative Cash Position)
0				$0	($1,043,832)
1	12.3	$67,130	$67,130		($976,702)
2	12.6	$68,808	$68,808		($907,894)
3	13.0	$70,528	$70,528		($837,365)
4	13.4	$72,292	$72,292		($765,074)
5	13.8	$74,099	$74,099		($690,975)
6	14.2	$75,951	$75,951		($615,023)
7	14.6	$77,850	$77,850		($537,173)
8	15.1	$79,796	$79,796		($457,377)
9	15.5	$81,791	$81,791		($375,585)
10	16.0	$83,836	$83,836		($291,749)
11	16.5	$85,932	$85,932		($205,817)
12	17.0	$88,080	$88,080		($117,737)
13	17.5	$90,282	$90,282		($27,454)
14	18.0	$92,539	$92,539		$65,085
15	18.5	$94,853	$64,408		$129,493
16	19.1	$97,224	$97,224		$226,717
17	19.7	$99,655	$99,655		$326,372
18	20.2	$102,146	$102,146		$428,519
19	20.9	$104,700	$104,700		$533,218
20	21.5	$107,317	$107,317		$640,536
21	22.1	$110,000	$110,000		$750,536
22	22.8	$112,750	$112,750		$863,286
23	23.5	$115,569	$115,569		$978,856
24	24.2	$118,458	$118,458		$1,097,314
25	24.9	$121,420	$121,420		$1,218,734

MACRS Depreciation Schedule

Fed Depr Basis (Fed ITC Basis minus 1/2 Fed ITC)	$0
Federal Depreciation	$0
State Net Depreciation (factoring state rebate)	$0

Year	State Net Depreciation	Federal Depreciation
1	$0	$0
2	$0	$0
3	$0	$0
4	$0	$0
5	$0	$0
6	$0	$0
7	$0	$0
8	$0	$0
9	$0	$0
10	$0	$0
11	$0	$0
12	$0	$0
TOTALS	$0	$0

Results

Old Monthly Electric Bill	**$36,166**
Estimated New Electric Bill	**$30,572**
% Bill Offset	**15.5%**

$149,185 Net Present Value with 5% Discount Rate
The IRR over 25 years is 6.3%
Over 25 years it will provide total savings of: $2,262,566
including bill savings, sRECs, maintenance, & inverter replacement (net after-tax values)
It will pay for itself in 13 years
With a Cap Rate of 6%, the building's value will increase by: $1,121,071

Carbon Dioxide and Environmental Benefits

Based on estimated production, this system will reduce emissions by:
10746 tons of CO2 over 25 years
It's the environmental equivalent of:
34,968,333 miles not driven
or 184.1 acres of trees planted

Incentives and energy savings depend upon several factors that may not be represented in this analysis.
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INDEPENDENCE EVENT CENTER

19100 E Valley View Pkwy, Independence, MO 64055

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434.93 kW PV Solar Array

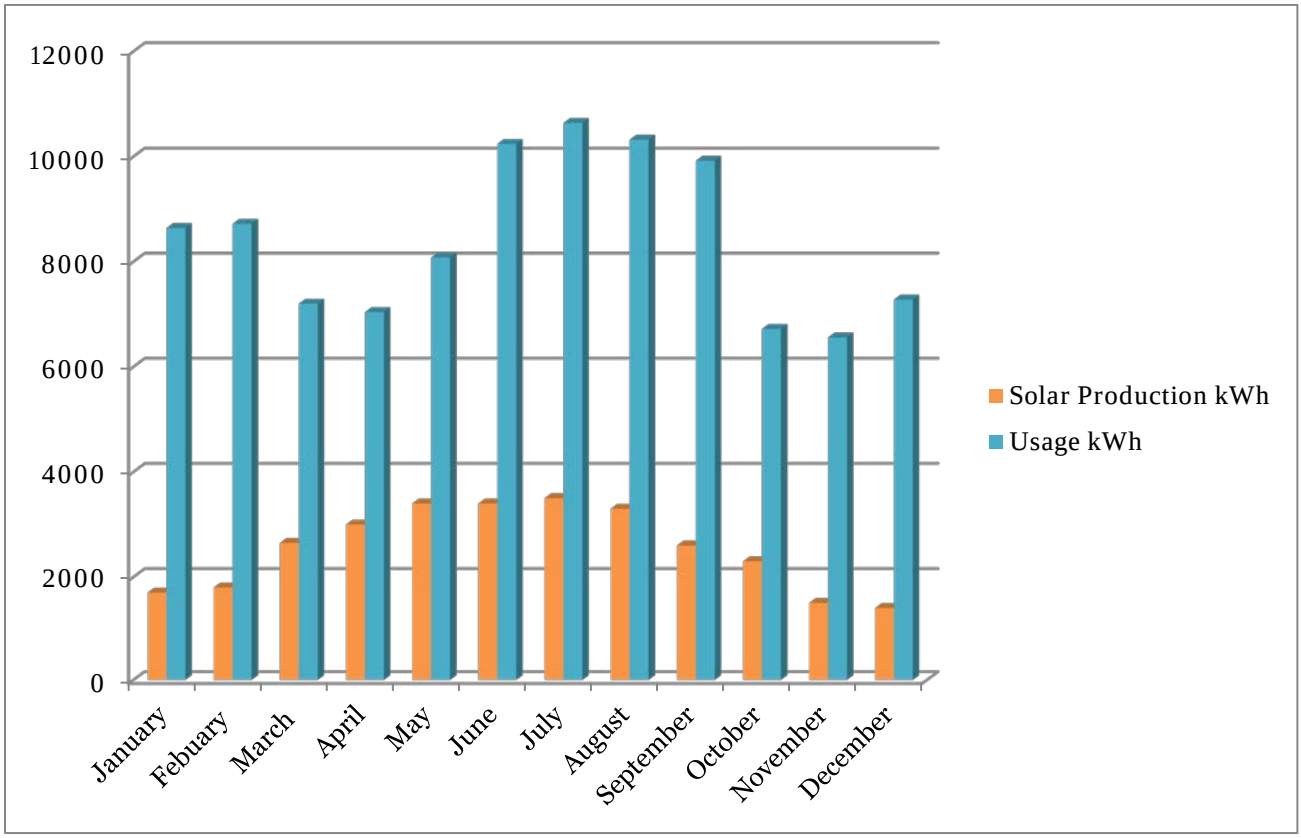
System Information

Azimuth	164/176 Degrees
Module	1426 x Hanwha 305W
Estimated Annual Production	+/- 548,000 kWh

Notes

- *Array layout based on aerial photograph. Exact layout to be determined based on local AHJ codes and standards.*
- *Existing pipe runs need to be identified (gas/electric).*
- *Minimum 6' setback from roof ridge.*
- *Production estimates assume a 82% AC to DC derate factor*

Fire Station 2



System Size: 24.705 kW

Production: 30,000 kWh

Consumption: 101,364 kWh

Offset: 29.6%

Price Per Watt: $3.00

Gross Capital Cost: $74,115

John Germano
Brightergy

Solar Electric Investment, Incentive and Energy Savings Analysis

Proposal for:
City Of Independence

November 21, 2014

Site Location:
14510 East 39th Street
Independence, MO 64055

Utility: General Utility
Current Rate Schedule: DirectUD -- Flat Annual Rate

Historical Usage: 101,364 kWh/yr

System Information		Cost Information	
Proposed System DC Size	**24.7 kW STC DC**	Proposed System Cost per rated Watt	**$3.00 per STC DC Watt**
		Estimated Federal Tax Bracket	**39.0%**
81 Renesola America JC305M-24/Ax-b modules and 5 SMA America SB3800U (240V) inverters		Current Utility Rate are as high as	**12.3 ¢/kWh**
Location's Avg Sun Hours	**4.8 Sun Hours**		
Estimated Annual Production	**30,000 kWh/yr**	**Estimated First Year Utility Savings**	**$3,675 per year**

Gross System Cost with Sales Tax	**$74,115**
	$0
	$0
	$0
	$0
	$0
	$0
PBI Incentive	**$1**
Net System Cost with Tax Benefits & Incentives	**$74,115**

Payback / Return on Investment — 16.8 Years

Year	Average Utility Rate ¢/kWh	Utility Savings $/year	Net Utility Savings, sRECs, PBIs, etc, after tax & maintenance	Tax & Rebate Incentives	Cost / Payback Schedule (Cumulative Cash Position)
0				$0	($74,115)
1	12.3	$3,675	$3,675		($70,440)
2	12.6	$3,767	$3,767		($66,673)
3	13.0	$3,861	$3,861		($62,812)
4	13.4	$3,958	$3,958		($58,854)
5	13.8	$4,057	$4,057		($54,798)
6	14.2	$4,158	$4,158		($50,640)
7	14.6	$4,262	$4,262		($46,378)
8	15.1	$4,368	$4,368		($42,010)
9	15.5	$4,478	$4,478		($37,532)
10	16.0	$4,590	$4,590		($32,942)
11	16.5	$4,704	$4,704		($28,238)
12	17.0	$4,822	$4,822		($23,416)
13	17.5	$4,942	$4,942		($18,474)
14	18.0	$5,066	$5,066		($13,408)
15	18.5	$5,193	$3,463		($9,944)
16	19.1	$5,323	$5,323		($4,622)
17	19.7	$5,456	$5,456		$834
18	20.2	$5,592	$5,592		$6,426
19	20.9	$5,732	$5,732		$12,158
20	21.5	$5,875	$5,875		$18,033
21	22.1	$6,022	$6,022		$24,055
22	22.8	$6,172	$6,172		$30,227
23	23.5	$6,327	$6,327		$36,554
24	24.2	$6,485	$6,485		$43,039
25	24.9	$6,647	$6,647		$49,686

MACRS Depreciation Schedule		
Fed Depr Basis (Fed ITC Basis minus 1/2 Fed ITC)		$0
Federal Depreciation		$0
State Net Depreciation (factoring state rebate)		$0
Year	State Net Depreciation	Federal Depreciation
1	$0	$0
2	$0	$0
3	$0	$0
4	$0	$0
5	$0	$0
6	$0	$0
7	$0	$0
8	$0	$0
9	$0	$0
10	$0	$0
11	$0	$0
12	$0	$0
TOTALS	$0	$0

Results

Old Monthly Electric Bill	**$1,035**
Estimated New Electric Bill	**$729**
% Bill Offset	**29.6%**

$-8,024 Net Present Value with 5% Discount Rate
The IRR over 25 years is 3.9%
Over 25 years it will provide total savings of: $123,801
including bill savings, sRECs, maintenance, & inverter replacement (net after-tax values)
It will pay for itself in 17 years
With a Cap Rate of 6%, the building's value will increase by: $61,373

Carbon Dioxide and Environmental Benefits

Based on estimated production, this system will reduce emissions by:
588 tons of CO2 over 25 years
It's the environmental equivalent of:
1,914,334 miles not driven
or 10.1 acres of trees planted

Incentives and energy savings depend upon several factors that may not be represented in this analysis.
A trusted tax professional should verify the figures provided.
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INDEPENDENCE FIRE STATION #2

14510 E. 39th St S, Independence, MO 64055

24.705 kW PV Solar Array

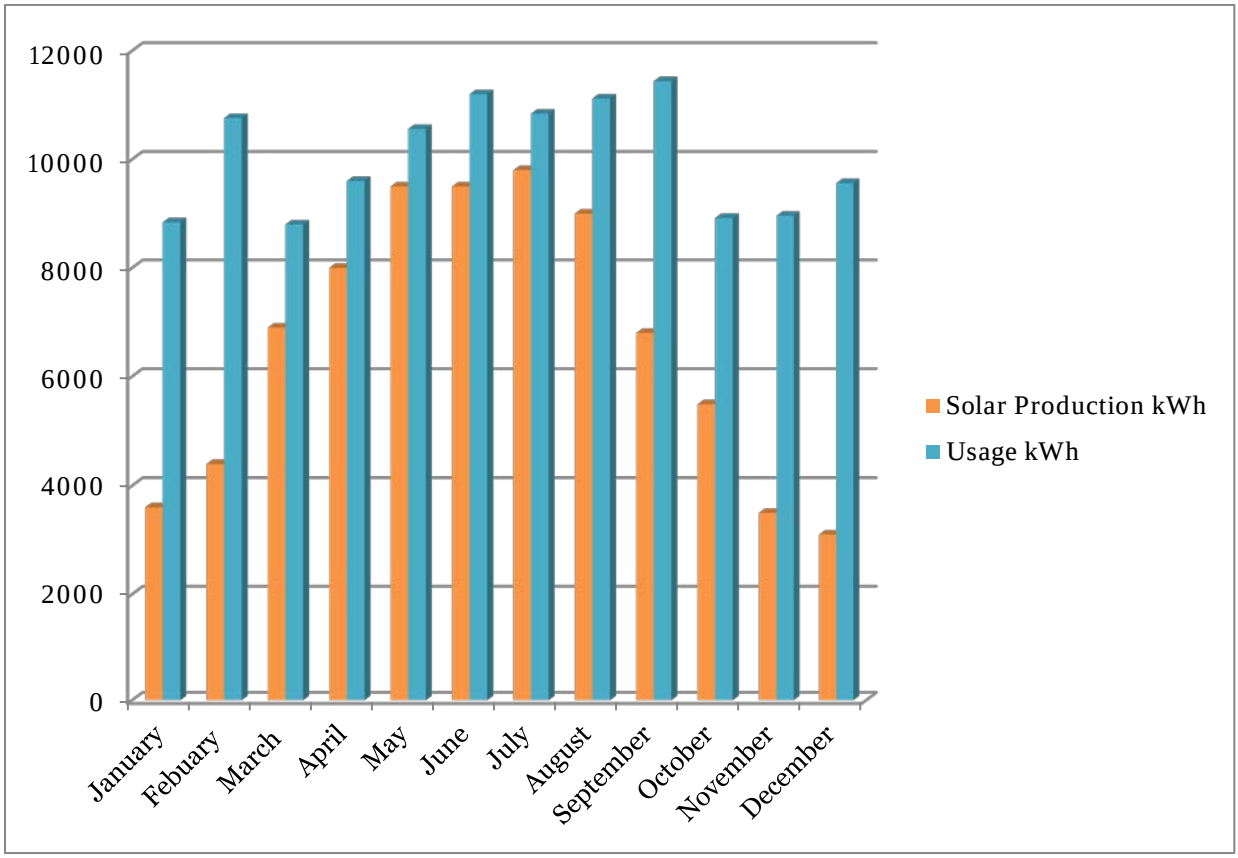
System Information

Azimuth	155 Degrees
Module	81 x Hanwha 305W
Estimated Annual Production	+/- 30,000 kWh

Notes

- *Array layout based on aerial photograph. Exact layout to be determined based on local AHJ codes and standards.*
- *Existing pipe runs need to be identified (gas/electric).*
- *Minimum 4' setback from roof ridge.*
- *Production estimates assume a 82% AC to DC derate factor*

Fire Station 3



System Size: 69.54 kW

Production: 78,000 kWh

Consumption: 120,600 kWh

Offset: 64.7%

Price Per Watt: $3.00

Gross Capital Cost: $208,620

John Germano
Brightergy

Solar Electric Investment, Incentive and Energy Savings Analysis

Proposal for:
City Of Independence

November 21, 2014

Site Location:
10219 East Winner Road
Independence, MO 64052

Utility: General Utility
Current Rate Schedule: DirectUD -- Flat Annual Rate

Historical Usage: 120,600 kWh/yr

System Information		Cost Information	
Proposed System DC Size	**69.5 kW STC DC**	Proposed System Cost per rated Watt	**$3.00 per STC DC Watt**
		Estimated Federal Tax Bracket	**39.0%**
228 Renesola America JC305M-24/Ax-b modules and 13 SMA America SB3800U (240V) inverters		Current Utility Rate are as high as	**12.3 ¢/kWh**
Location's Avg Sun Hours	**4.8 Sun Hours**		
Estimated Annual Production	**78,000 kWh/yr**	**Estimated First Year Utility Savings**	**$9,555 per year**

Gross System Cost with Sales Tax	**$208,620**
	$0
	$0
	$0
	$0
	$0
	$0
PBI Incentive	**$1**
Net System Cost with Tax Benefits & Incentives	**$208,620**

Payback / Return on Investment — 18.0 Years

Year	Average Utility Rate ¢/kWh	Utility Savings $/year	Net Utility Savings, sRECs, PBIs, etc, after tax & maintenance	Tax & Rebate Incentives	Cost / Payback Schedule (Cumulative Cash Position)
0				$0	($208,620)
1	12.3	$9,555	$9,555		($199,065)
2	12.6	$9,794	$9,794		($189,271)
3	13.0	$10,039	$10,039		($179,232)
4	13.4	$10,290	$10,290		($168,943)
5	13.8	$10,547	$10,547		($158,396)
6	14.2	$10,811	$10,811		($147,585)
7	14.6	$11,081	$11,081		($136,504)
8	15.1	$11,358	$11,358		($125,147)
9	15.5	$11,642	$11,642		($113,505)
10	16.0	$11,933	$11,933		($101,572)
11	16.5	$12,231	$12,231		($89,341)
12	17.0	$12,537	$12,537		($76,804)
13	17.5	$12,850	$12,850		($63,953)
14	18.0	$13,172	$13,172		($50,782)
15	18.5	$13,501	$8,633		($42,149)
16	19.1	$13,838	$13,838		($28,310)
17	19.7	$14,184	$14,184		($14,126)
18	20.2	$14,539	$14,539		$413
19	20.9	$14,903	$14,903		$15,316
20	21.5	$15,275	$15,275		$30,591
21	22.1	$15,657	$15,657		$46,248
22	22.8	$16,048	$16,048		$62,296
23	23.5	$16,450	$16,450		$78,746
24	24.2	$16,861	$16,861		$95,607
25	24.9	$17,282	$17,282		$112,889

MACRS Depreciation Schedule		
Fed Depr Basis (Fed ITC Basis minus 1/2 Fed ITC)		$0
Federal Depreciation		$0
State Net Depreciation (factoring state rebate)		$0
Year	State Net Depreciation	Federal Depreciation
1	$0	$0
2	$0	$0
3	$0	$0
4	$0	$0
5	$0	$0
6	$0	$0
7	$0	$0
8	$0	$0
9	$0	$0
10	$0	$0
11	$0	$0
12	$0	$0
TOTALS	$0	$0

Results

Old Monthly Electric Bill	**$1,231**
Estimated New Electric Bill	**$435**
% Bill Offset	**64.7%**

$-36,197 Net Present Value with 5% Discount Rate
The IRR over 25 years is 3.3%
Over 25 years it will provide total savings of: $321,509
including bill savings, sRECs, maintenance, & inverter replacement (net after-tax values)
It will pay for itself in 18 years
With a Cap Rate of 6%, the building's value will increase by: $159,568

Carbon Dioxide and Environmental Benefits

Based on estimated production, this system will reduce emissions by:
1529 tons of CO2 over 25 years
It's the environmental equivalent of:
4,977,234 miles not driven
or 26.2 acres of trees planted

Incentives and energy savings depend upon several factors that may not be represented in this analysis.
A trusted tax professional should verify the figures provided.
Brightergy provides assistance with applications for incentives and rebates.
Brightergy does not take responsibility for any future changes in tax law or other incentives.

OnGrid Tool v5.46

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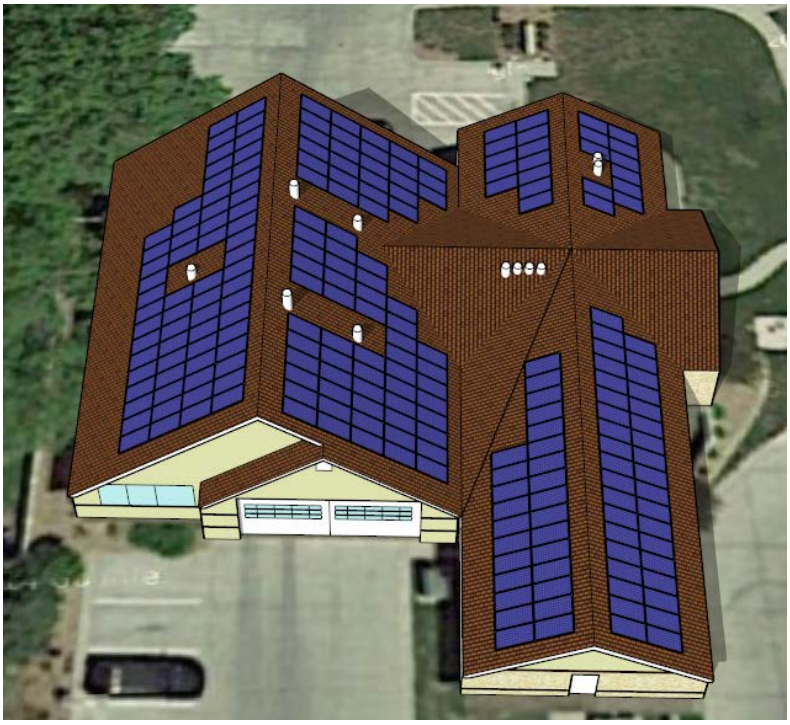
INDEPENDENCE FIRE STATION #3

10219 E Winner Rd, Independence, MO 64052

Brightergy
CLEAN ENERGY. CLEAR CHOICE.

69.54 kW PV Solar Array



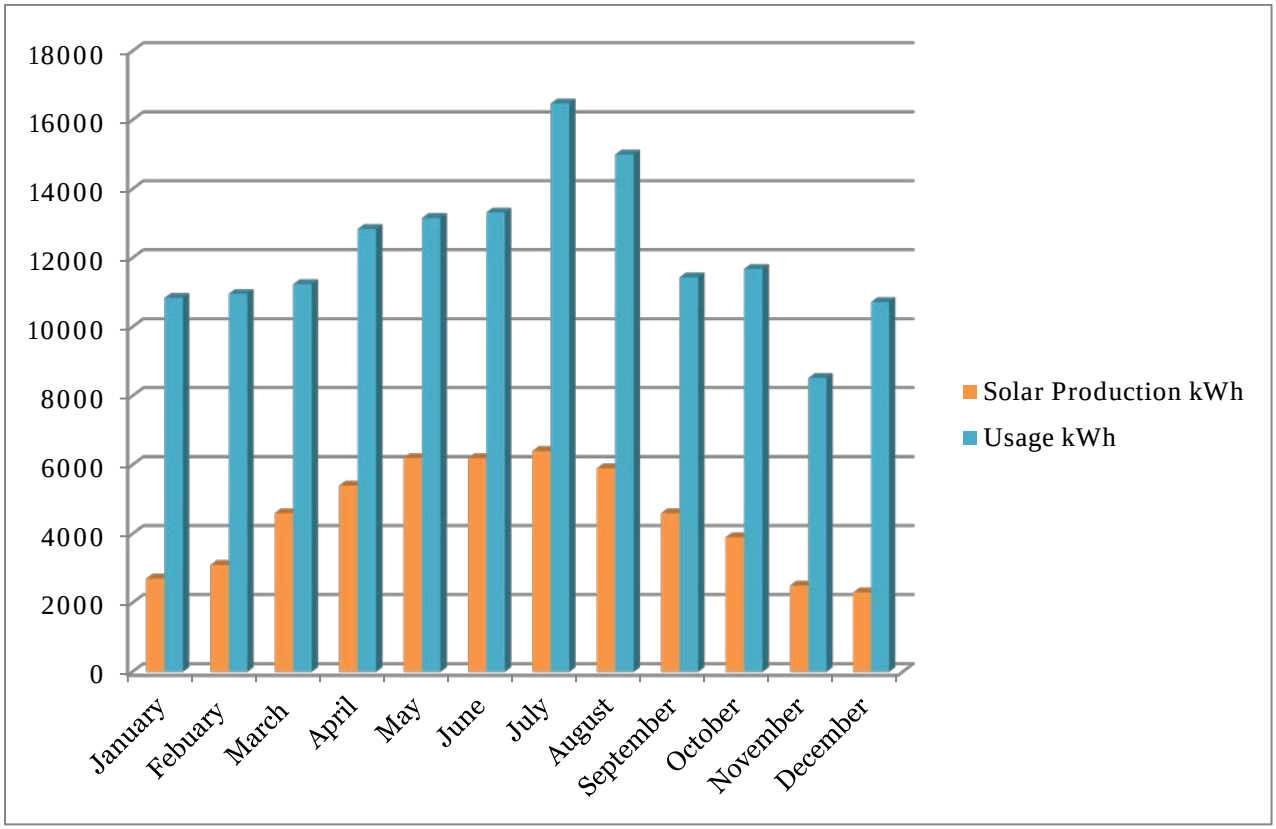
System Information

Azimuth	274/94 Degrees
Module	228 x Hanwha 305W
Estimated Annual Production	+/- 78,000 kWh

Notes

- *Array layout based on aerial photograph. Exact layout to be determined based on local AHJ codes and standards.*
- *Existing pipe runs need to be identified (gas/electric).*
- *Minimum 4' setback from roof ridge.*
- *Production estimates assume a 82% AC to DC derate factor*

Fire Station 4



System Size: 47.58 kW

Production: 55,000 kWh

Consumption: 146,196 kWh

Offset: 37.6%

Price Per Watt: $3.10

Gross Capital Cost: $147,498

John Germano
Brightergy

Solar Electric Investment, Incentive and Energy Savings Analysis

Proposal for:
City Of Independence

November 21, 2014

Site Location:
202 West 23rd Street
Independence, MO 64050

Utility: General Utility
Current Rate Schedule: DirectUD -- Flat Annual Rate

Historical Usage: 146,196 kWh/yr

System Information		Cost Information	
Proposed System DC Size	**47.6 kW STC DC**	Proposed System Cost per rated Watt	**$3.10 per STC DC Watt**
		Estimated Federal Tax Bracket	**39.0%**
156 Renesola America JC305M-24/Ax-b modules and 9 SMA America SB3800U (240V) inverters		Current Utility Rate are as high as	**12.3 ¢/kWh**
Location's Avg Sun Hours	**4.8 Sun Hours**		
Estimated Annual Production	**55,000 kWh/yr**	**Estimated First Year Utility Savings**	**$6,738 per year**

Gross System Cost with Sales Tax	**$147,498**
	$0
	$0
	$0
	$0
	$0
	$0
PBI Incentive	**$1**
Net System Cost with Tax Benefits & Incentives	**$147,498**

Payback / Return on Investment **18.0 Years**

Year	Average Utility Rate ¢/kWh	Utility Savings $/year	Net Utility Savings, sRECs, PBIs, etc, after tax & maintenance	Tax & Rebate Incentives	Cost / Payback Schedule (Cumulative Cash Position)
0				$0	($147,498)
1	12.3	$6,738	$6,738		($140,760)
2	12.6	$6,906	$6,906		($133,854)
3	13.0	$7,079	$7,079		($126,776)
4	13.4	$7,256	$7,256		($119,520)
5	13.8	$7,437	$7,437		($112,083)
6	14.2	$7,623	$7,623		($104,460)
7	14.6	$7,813	$7,813		($96,647)
8	15.1	$8,009	$8,009		($88,638)
9	15.5	$8,209	$8,209		($80,429)
10	16.0	$8,414	$8,414		($72,015)
11	16.5	$8,625	$8,625		($63,390)
12	17.0	$8,840	$8,840		($54,550)
13	17.5	$9,061	$9,061		($45,489)
14	18.0	$9,288	$9,288		($36,201)
15	18.5	$9,520	$6,189		($30,012)
16	19.1	$9,758	$9,758		($20,254)
17	19.7	$10,002	$10,002		($10,252)
18	20.2	$10,252	$10,252		$0
19	20.9	$10,508	$10,508		$10,509
20	21.5	$10,771	$10,771		$21,280
21	22.1	$11,040	$11,040		$32,320
22	22.8	$11,316	$11,316		$43,636
23	23.5	$11,599	$11,599		$55,235
24	24.2	$11,889	$11,889		$67,124
25	24.9	$12,186	$12,186		$79,311

MACRS Depreciation Schedule		
Fed Depr Basis (Fed ITC Basis minus 1/2 Fed ITC)		$0
Federal Depreciation		$0
State Net Depreciation (factoring state rebate)		$0
Year	State Net Depreciation	Federal Depreciation
1	$0	$0
2	$0	$0
3	$0	$0
4	$0	$0
5	$0	$0
6	$0	$0
7	$0	$0
8	$0	$0
9	$0	$0
10	$0	$0
11	$0	$0
12	$0	$0
TOTALS	$0	$0

Results

Old Monthly Electric Bill	**$1,492**
Estimated New Electric Bill	**$931**
% Bill Offset	**37.6%**

$-25,851 Net Present Value with 5% Discount Rate
The IRR over 25 years is 3.3%
Over 25 years it will provide total savings of: $226,809
including bill savings, sRECs, maintenance, & inverter replacement (net after-tax values)
It will pay for itself in 18 years
With a Cap Rate of 6%, the building's value will increase by: $112,517

Carbon Dioxide and Environmental Benefits

Based on estimated production, this system will reduce emissions by:
1078 tons of CO_2 over 25 years
It's the environmental equivalent of:
3,509,616 miles not driven
or 18.5 acres of trees planted

Incentives and energy savings depend upon several factors that may not be represented in this analysis.
A trusted tax professional should verify the figures provided.
Brightergy provides assistance with applications for incentives and rebates.
Brightergy does not take responsibility for any future changes in tax law or other incentives.

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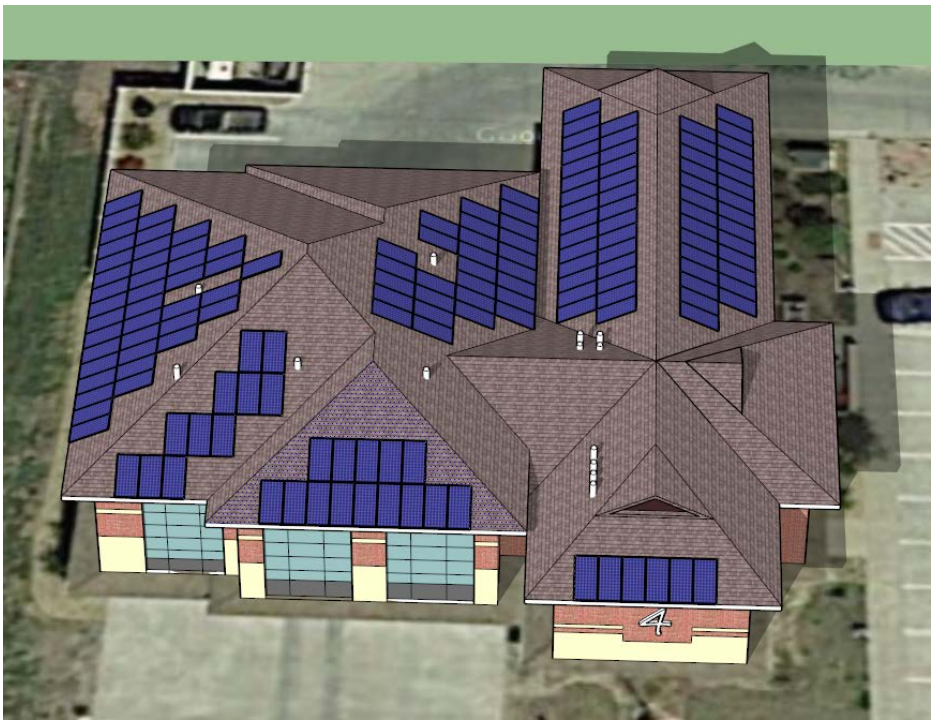
INDEPENDENCE FIRE STATION #4

202 West 23rd St. S, Independence, MO 64050

47.58 kW PV Solar Array



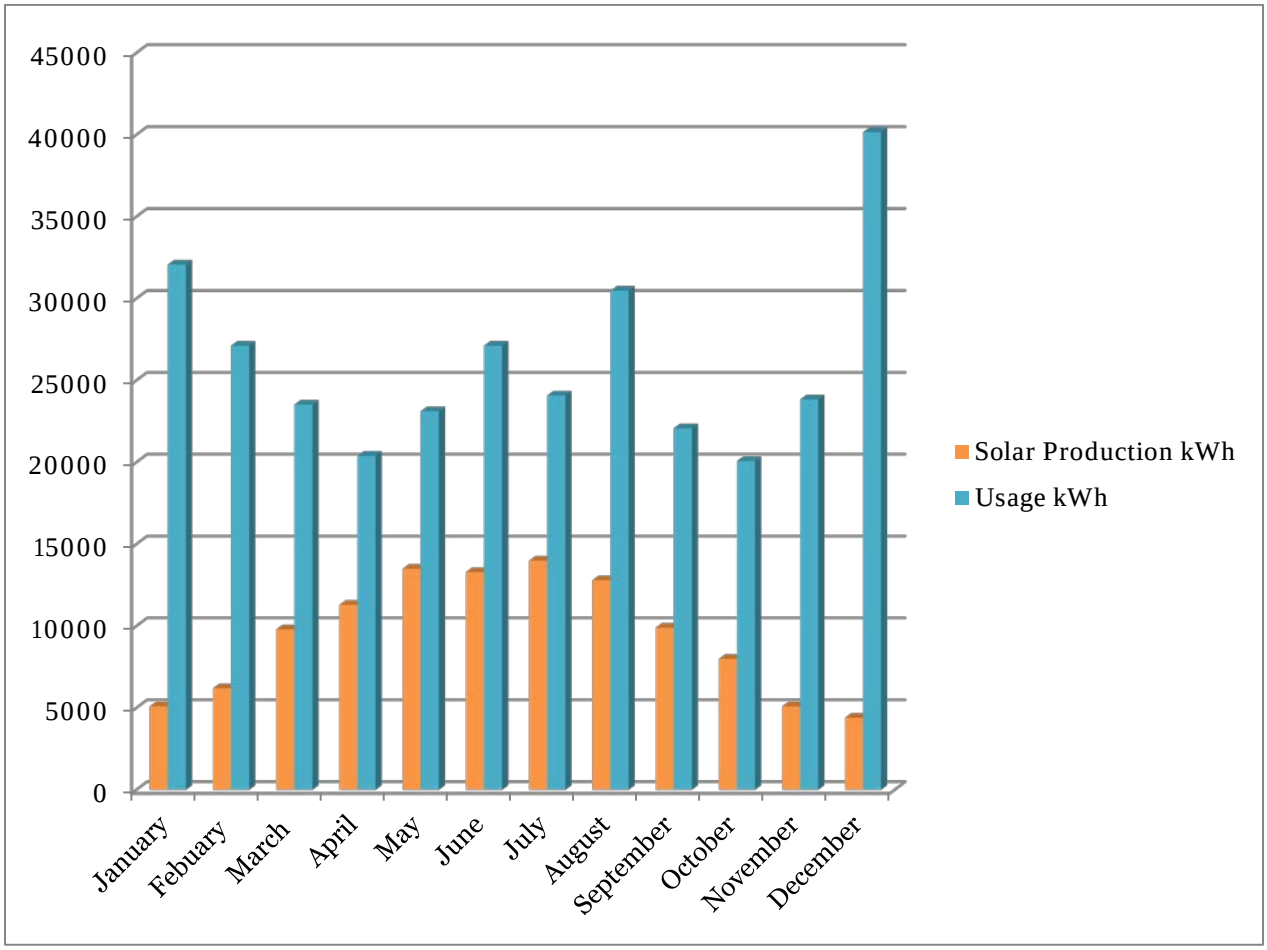
System Information

Azimuth	90/180/270 Degrees
Module	156x Hanwha 305W
Estimated Annual Production	+/- 55,000 kWh

Notes

- *Array layout based on aerial photograph. Exact layout to be determined based on local AHJ codes and standards.*
- *Existing pipe runs need to be identified (gas/electric).*
- *Minimum 4' setback from roof ridge.*
- *Production estimates assume a 82% AC to DC derate factor*

Fire Station 7



System Size: 99.735 kW

Production: 116,000 kWh

Consumption: 314,076 kWh

Offset: 36.9%

Price Per Watt: $2.75

Gross Capital Cost: $274,271

John Germano
Brightergy

Solar Electric Investment, Incentive and Energy Savings Analysis

Proposal for:
City Of Independence

November 21, 2014

Site Location:
2206 Hub Drive
Independence, MO 64050

Utility: General Utility
Current Rate Schedule: DirectUD -- Flat Annual Rate

Historical Usage: 314,076 kWh/yr

System Information		Cost Information	
Proposed System DC Size	**99.7 kW STC DC**	Proposed System Cost per rated Watt	**$2.75 per STC DC Watt**
		Estimated Federal Tax Bracket	**39.0%**
327 Renesola America JC305M-24/Ax-b modules and 19 SMA America SB3800U (240V) inverters		Current Utility Rate are as high as	**12.3 ¢/kWh**
Location's Avg Sun Hours	**4.8 Sun Hours**		
Estimated Annual Production	**116,000 kWh/yr**	**Estimated First Year Utility Savings**	**$14,210 per year**

Gross System Cost with Sales Tax	**$274,271**
	$0
	$0
	$0
	$0
	$0
	$0
PBI Incentive	**$1**
Net System Cost with Tax Benefits & Incentives	**$274,271**

Payback / Return on Investment **16.3 Years**

Year	Average Utility Rate ¢/kWh	Utility Savings $/year	Net Utility Savings, sRECs, PBIs, etc, after tax & maintenance	Tax & Rebate Incentives	Cost / Payback Schedule (Cumulative Cash Position)
0				$0	($274,271)
1	12.3	$14,210	$14,210		($260,061)
2	12.6	$14,565	$14,565		($245,496)
3	13.0	$14,929	$14,929		($230,567)
4	13.4	$15,303	$15,303		($215,264)
5	13.8	$15,685	$15,685		($199,579)
6	14.2	$16,077	$16,077		($183,501)
7	14.6	$16,479	$16,479		($167,022)
8	15.1	$16,891	$16,891		($150,131)
9	15.5	$17,314	$17,314		($132,817)
10	16.0	$17,746	$17,746		($115,071)
11	16.5	$18,190	$18,190		($96,881)
12	17.0	$18,645	$18,645		($78,236)
13	17.5	$19,111	$19,111		($59,125)
14	18.0	$19,589	$19,589		($39,537)
15	18.5	$20,078	$13,097		($26,440)
16	19.1	$20,580	$20,580		($5,859)
17	19.7	$21,095	$21,095		$15,236
18	20.2	$21,622	$21,622		$36,858
19	20.9	$22,163	$22,163		$59,021
20	21.5	$22,717	$22,717		$81,737
21	22.1	$23,285	$23,285		$105,022
22	22.8	$23,867	$23,867		$128,889
23	23.5	$24,464	$24,464		$153,353
24	24.2	$25,075	$25,075		$178,428
25	24.9	$25,702	$25,702		$204,130

MACRS Depreciation Schedule		
Fed Depr Basis (Fed ITC Basis minus 1/2 Fed ITC)		$0
Federal Depreciation		$0
State Net Depreciation (factoring state rebate)		$0
Year	State Net Depreciation	Federal Depreciation
1	$0	$0
2	$0	$0
3	$0	$0
4	$0	$0
5	$0	$0
6	$0	$0
7	$0	$0
8	$0	$0
9	$0	$0
10	$0	$0
11	$0	$0
12	$0	$0
TOTALS	$0	$0

Results

Old Monthly Electric Bill	**$3,206**
Estimated New Electric Bill	**$2,022**
% Bill Offset	**36.9%**

$-19,442 Net Present Value with 5% Discount Rate
The IRR over 25 years is 4.3%
Over 25 years it will provide total savings of: $478,401
including bill savings, sRECs, maintenance, & inverter replacement (net after-tax values)
It will pay for itself in 16 years
With a Cap Rate of 6%, the building's value will increase by: $237,307

Carbon Dioxide and Environmental Benefits

Based on estimated production, this system will reduce emissions by:
2275 tons of CO2 over 25 years
It's the environmental equivalent of:
7,402,067 miles not driven
or 39.0 acres of trees planted

Incentives and energy savings depend upon several factors that may not be represented in this analysis.
A trusted tax professional should verify the figures provided.
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INDEPENDENCE FIRE STATION #7

2206 Hub Dr, Independence, MO 64050

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99.735 kW PV Solar Array

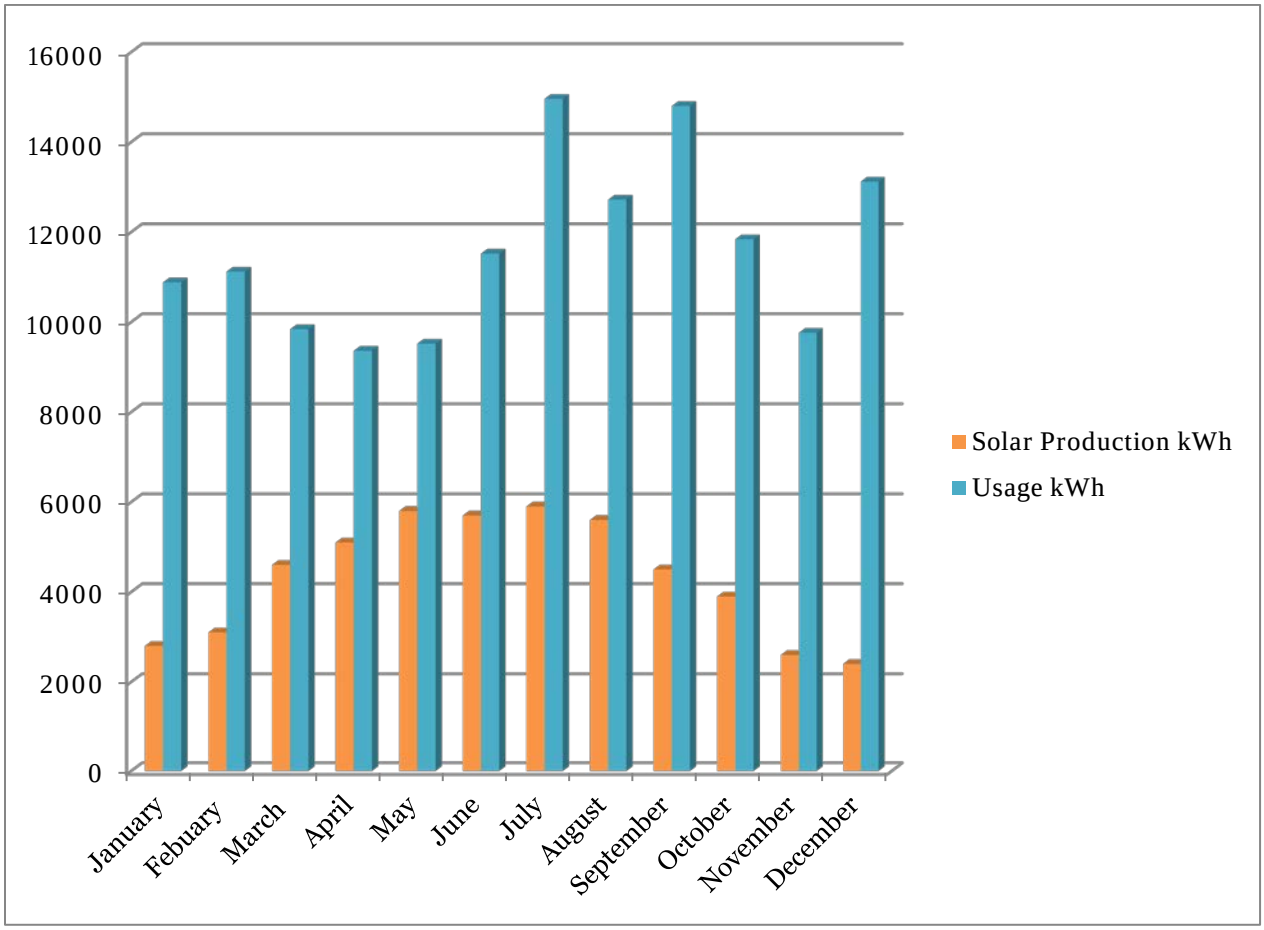
System Information

Azimuth	270 Degrees
Module	327x Hanwha 305W
Estimated Annual Production	+/- 116,000 kWh

Notes

- *Array layout based on aerial photograph. Exact layout to be determined based on local AHJ codes and standards.*
- *Existing pipe runs need to be identified (gas/electric).*
- *Minimum 4' setback from roof ridge.*
- *Production estimates assume a 82% AC to DC derate factor*

Health Department



System Size: 42.09 kW

Production: 52,000 kWh

Consumption: 139,440 kWh

Offset: 37.3%

Price Per Watt: $2.90

Gross Capital Cost: $122,061

John Germano
Brightergy

Solar Electric Investment, Incentive and Energy Savings Analysis

Proposal for:
City Of Independence

November 21, 2014

Site Location:
515 S. Liberty
Independence, MO 64050

Utility: General Utility
Current Rate Schedule: DirectUD -- Flat Annual Rate

Historical Usage: 139,440 kWh/yr

System Information		Cost Information	
Proposed System DC Size	**42.1 kW STC DC**	Proposed System Cost per rated Watt	**$2.90 per STC DC Watt**
		Estimated Federal Tax Bracket	**39.0%**
138 Renesola America JC305M-24/Ax-b modules and 8 SMA America SB3800U (240V) inverters		Current Utility Rate are as high as	**12.3 ¢/kWh**
Location's Avg Sun Hours	**4.8 Sun Hours**		
Estimated Annual Production	**52,000 kWh/yr**	**Estimated First Year Utility Savings**	**$6,370 per year**

Gross System Cost with Sales Tax	**$122,061**
	$0
	$0
	$0
	$0
	$0
	$0
PBI Incentive	**$1**
Net System Cost with Tax Benefits & Incentives	**$122,061**

Payback / Return on Investment — 16.2 Years

Year	Average Utility Rate ¢/kWh	Utility Savings $/year	Net Utility Savings, sRECs, PBIs, etc, after tax & maintenance	Tax & Rebate Incentives	Cost / Payback Schedule (Cumulative Cash Position)
0				$0	($122,061)
1	12.3	$6,370	$6,370		($115,691)
2	12.6	$6,529	$6,529		($109,162)
3	13.0	$6,692	$6,692		($102,469)
4	13.4	$6,860	$6,860		($95,609)
5	13.8	$7,031	$7,031		($88,578)
6	14.2	$7,207	$7,207		($81,371)
7	14.6	$7,387	$7,387		($73,984)
8	15.1	$7,572	$7,572		($66,412)
9	15.5	$7,761	$7,761		($58,651)
10	16.0	$7,955	$7,955		($50,695)
11	16.5	$8,154	$8,154		($42,541)
12	17.0	$8,358	$8,358		($34,183)
13	17.5	$8,567	$8,567		($25,616)
14	18.0	$8,781	$8,781		($16,835)
15	18.5	$9,001	$6,054		($10,781)
16	19.1	$9,226	$9,226		($1,555)
17	19.7	$9,456	$9,456		$7,901
18	20.2	$9,693	$9,693		$17,594
19	20.9	$9,935	$9,935		$27,529
20	21.5	$10,183	$10,183		$37,712
21	22.1	$10,438	$10,438		$48,150
22	22.8	$10,699	$10,699		$58,849
23	23.5	$10,966	$10,966		$69,815
24	24.2	$11,241	$11,241		$81,056
25	24.9	$11,522	$11,522		$92,578

MACRS Depreciation Schedule

Fed Depr Basis (Fed ITC Basis minus 1/2 Fed ITC)	$0
Federal Depreciation	$0
State Net Depreciation (factoring state rebate)	$0

Year	State Net Depreciation	Federal Depreciation
1	$0	$0
2	$0	$0
3	$0	$0
4	$0	$0
5	$0	$0
6	$0	$0
7	$0	$0
8	$0	$0
9	$0	$0
10	$0	$0
11	$0	$0
12	$0	$0
TOTALS	$0	$0

Results

Old Monthly Electric Bill	**$1,423**
Estimated New Electric Bill	**$893**
% Bill Offset	**37.3%**

$-7,786 Net Present Value with 5% Discount Rate
The IRR over 25 years is 4.4%
Over 25 years it will provide total savings of: $214,639
including bill savings, sRECs, maintenance, & inverter replacement (net after-tax values)
It will pay for itself in 16 years
With a Cap Rate of 6%, the building's value will increase by: $106,379

Carbon Dioxide and Environmental Benefits

Based on estimated production, this system will reduce emissions by:
1020 tons of CO2 over 25 years
It's the environmental equivalent of:
3,318,163 miles not driven
or 17.5 acres of trees planted

Incentives and energy savings depend upon several factors that may not be represented in this analysis.
A trusted tax professional should verify the figures provided.
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HEALTH DEPARTMENT

515 S. Liberty St, Independence, MO 64050

42.09 kW PV Solar Array

System Information

Azimuth	180 Degrees
Module	138 x Hanwha 305W
Estimated Annual Production	+/- 52,000 kWh

Notes

- *Array layout based on aerial photograph. Exact layout to be determined based on local AHJ codes and standards.*
- *Existing pipe runs need to be identified (gas/electric).*
- *Minimum 4' setback from roof ridge.*
- *Production estimates assume a 82% AC to DC derate factor*

Brightergy
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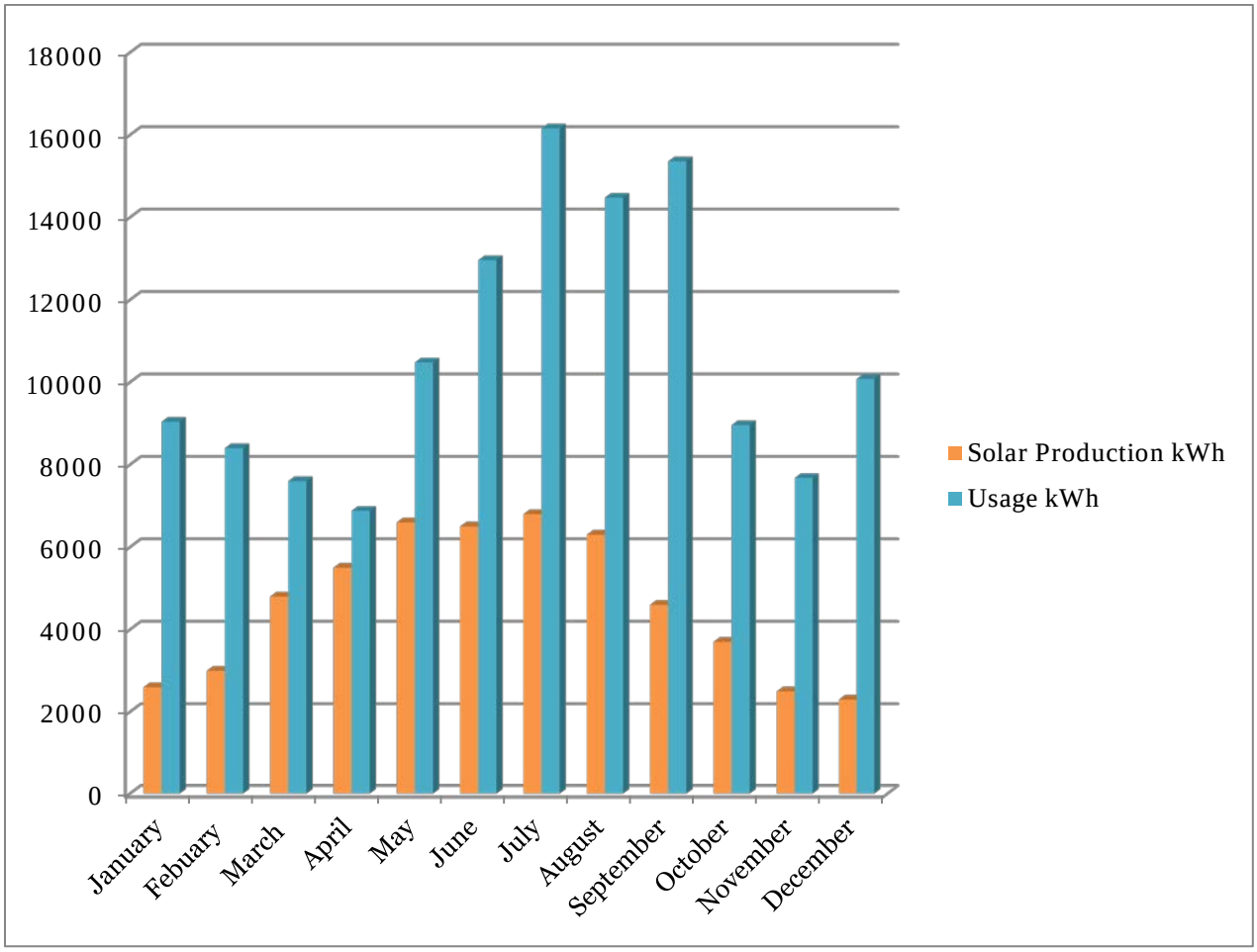
National Frontier Trails Museum



System Size: 49.105 kW

Production: 53,000 kWh

Consumption: 128,076 kWh

Offset: 41.4%

Price Per Watt: $3.00

Gross Capital Cost: $147,315

John Germano
Brightergy

Solar Electric Investment, Incentive and Energy Savings Analysis

Proposal for:
City Of Independence

November 21, 2014

Site Location:
318 West Pacific
Independence, MO 64050

Utility: General Utility
Current Rate Schedule: DirectUD -- Flat Annual Rate

Historical Usage: 128,076 kWh/yr

System Information		Cost Information	
Proposed System DC Size	**49.1 kW STC DC**	Proposed System Cost per rated Watt	**$3.00 per STC DC Watt**
		Estimated Federal Tax Bracket	**39.0%**
161 Renesola America JC305M-24/Ax-b modules and 9 SMA America SB3800U (240V) inverters		Current Utility Rate are as high as	**12.3 ¢/kWh**
Location's Avg Sun Hours	**4.8 Sun Hours**		
Estimated Annual Production	**53,000 kWh/yr**	**Estimated First Year Utility Savings**	**$6,493 per year**

Gross System Cost with Sales Tax	**$147,315**
	$0
	$0
	$0
	$0
	$0
	$0
PBI Incentive	**$1**
Net System Cost with Tax Benefits & Incentives	**$147,315**

Payback / Return on Investment **18.5 Years**

Year	Average Utility Rate ¢/kWh	Utility Savings $/year	Net Utility Savings, sRECs, PBIs, etc, after tax & maintenance	Tax & Rebate Incentives	Cost / Payback Schedule (Cumulative Cash Position)
0				$0	($147,315)
1	12.3	$6,493	$6,493		($140,822)
2	12.6	$6,655	$6,655		($134,168)
3	13.0	$6,821	$6,821		($127,346)
4	13.4	$6,992	$6,992		($120,355)
5	13.8	$7,167	$7,167		($113,188)
6	14.2	$7,346	$7,346		($105,843)
7	14.6	$7,529	$7,529		($98,313)
8	15.1	$7,718	$7,718		($90,596)
9	15.5	$7,910	$7,910		($82,685)
10	16.0	$8,108	$8,108		($74,577)
11	16.5	$8,311	$8,311		($66,266)
12	17.0	$8,519	$8,519		($57,747)
13	17.5	$8,732	$8,732		($49,016)
14	18.0	$8,950	$8,950		($40,066)
15	18.5	$9,174	$5,736		($34,329)
16	19.1	$9,403	$9,403		($24,926)
17	19.7	$9,638	$9,638		($15,288)
18	20.2	$9,879	$9,879		($5,409)
19	20.9	$10,126	$10,126		$4,717
20	21.5	$10,379	$10,379		$15,096
21	22.1	$10,639	$10,639		$25,735
22	22.8	$10,905	$10,905		$36,640
23	23.5	$11,177	$11,177		$47,817
24	24.2	$11,457	$11,457		$59,274
25	24.9	$11,743	$11,743		$71,017

MACRS Depreciation Schedule		
Fed Depr Basis (Fed ITC Basis minus 1/2 Fed ITC)		$0
Federal Depreciation		$0
State Net Depreciation (factoring state rebate)		$0
Year	State Net Depreciation	Federal Depreciation
1	$0	$0
2	$0	$0
3	$0	$0
4	$0	$0
5	$0	$0
6	$0	$0
7	$0	$0
8	$0	$0
9	$0	$0
10	$0	$0
11	$0	$0
12	$0	$0
TOTALS	$0	$0

Results

Old Monthly Electric Bill	**$1,307**
Estimated New Electric Bill	**$766**
% Bill Offset	**41.4%**

$-29,950 Net Present Value with 5% Discount Rate
The IRR over 25 years is 3.0%
Over 25 years it will provide total savings of: $218,332
including bill savings, sRECs, maintenance, & inverter replacement (net after-tax values)
It will pay for itself in 19 years
With a Cap Rate of 6%, the building's value will increase by: $108,425

Carbon Dioxide and Environmental Benefits

Based on estimated production, this system will reduce emissions by:
1039 tons of CO_2 over 25 years
It's the environmental equivalent of:
3,381,977 miles not driven
or 17.8 acres of trees planted

Incentives and energy savings depend upon several factors that may not be represented in this analysis.
A trusted tax professional should verify the figures provided.
Brightergy provides assistance with applications for incentives and rebates.
Brightergy does not take responsibility for any future changes in tax law or other incentives.

OnGrid Tool v5.46

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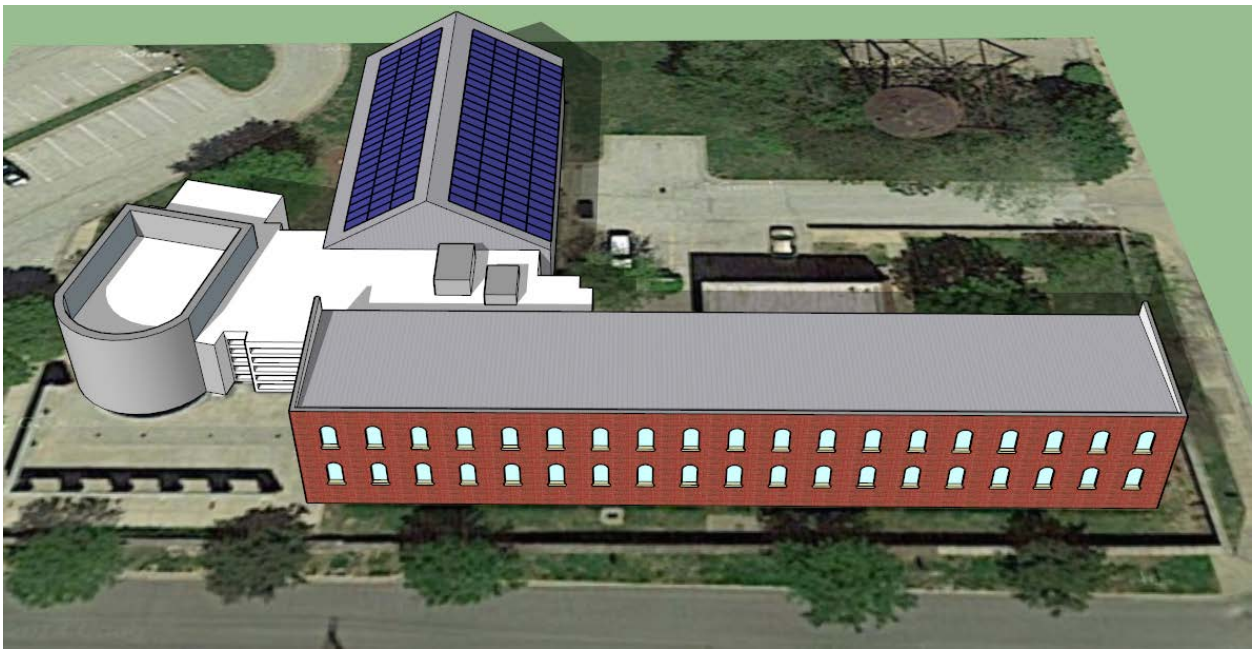
NATIONAL FRONTIER TRAILS MUSEUM

318 W Pacific Ave, Independence, MO 64050

Brightergy
CLEAN ENERGY. CLEAR CHOICE.

49.105 kW PV Solar Array



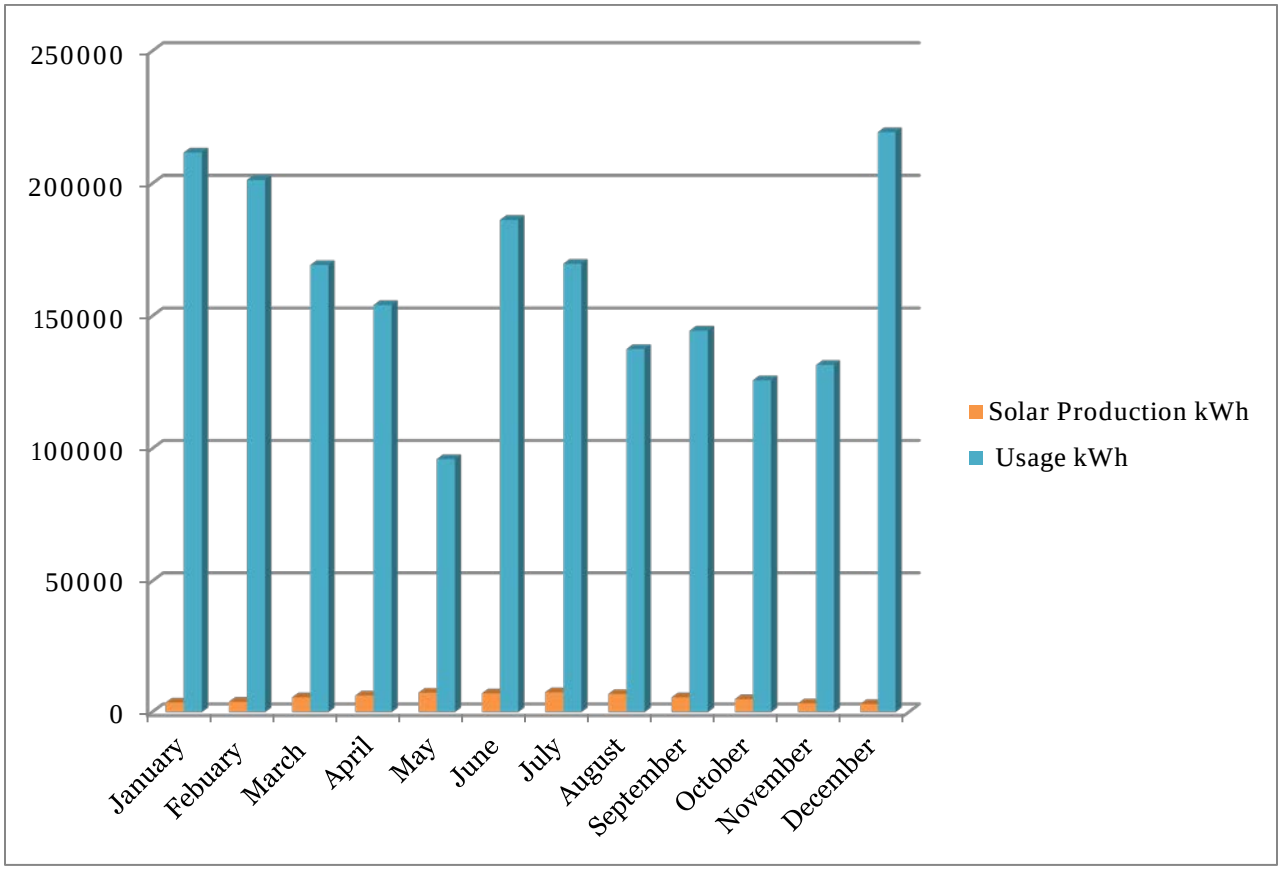
System Information

Azimuth	90/270 Degrees
Module	161 x Hanwha 305W
Estimated Annual Production	+/- 53,000 kWh

Notes

- *Array layout based on aerial photograph. Exact layout to be determined based on local AHJ codes and standards.*
- *Existing pipe runs need to be identified (gas/electric).*
- *Minimum 4' setback from roof ridge.*
- *Production estimates assume a 82% AC to DC derate factor*

Police Building



System Size: 52.765 kW

Production: 68,000 kWh

Consumption: 1,946,880 kWh

Offset: 3.5%

Price Per Watt: $2.90

Gross Capital Cost: $153,019

John Germano
Brightergy

Solar Electric Investment, Incentive and Energy Savings Analysis

Proposal for:
City Of Independence

November 21, 2014

Site Location:
223 North Memorial Drive
Independence, MO 64050

Utility: General Utility
Current Rate Schedule: DirectUD -- Flat Annual Rate

Historical Usage: 1,946,880 kWh/yr

System Information		Cost Information	
Proposed System DC Size	**52.8 kW STC DC**	Proposed System Cost per rated Watt	**$2.90 per STC DC Watt**
		Estimated Federal Tax Bracket	**39.0%**
173 Renesola America JC305M-24/Ax-b modules and 10 SMA America SB3800U (240V) inverters		Current Utility Rate are as high as	**12.3 ¢/kWh**
Location's Avg Sun Hours	**4.8 Sun Hours**		
Estimated Annual Production	**68,000 kWh/yr**	**Estimated First Year Utility Savings**	**$8,330 per year**

Gross System Cost with Sales Tax	**$153,019**
	$0
	$0
	$0
	$0
	$0
	$0
PBI Incentive	**$1**
Net System Cost with Tax Benefits & Incentives	**$153,019**

Payback / Return on Investment **15.6 Years**

Year	Average Utility Rate ¢/kWh	Utility Savings $/year	Net Utility Savings, sRECs, PBIs, etc, after tax & maintenance	Tax & Rebate Incentives	Cost / Payback Schedule (Cumulative Cash Position)
0				$0	($153,019)
1	12.3	$8,330	$8,330		($144,688)
2	12.6	$8,538	$8,538		($136,150)
3	13.0	$8,752	$8,752		($127,398)
4	13.4	$8,971	$8,971		($118,428)
5	13.8	$9,195	$9,195		($109,233)
6	14.2	$9,425	$9,425		($99,808)
7	14.6	$9,660	$9,660		($90,148)
8	15.1	$9,902	$9,902		($80,246)
9	15.5	$10,149	$10,149		($70,097)
10	16.0	$10,403	$10,403		($59,694)
11	16.5	$10,663	$10,663		($49,031)
12	17.0	$10,930	$10,930		($38,101)
13	17.5	$11,203	$11,203		($26,898)
14	18.0	$11,483	$11,483		($15,415)
15	18.5	$11,770	$8,077		($7,338)
16	19.1	$12,064	$12,064		$4,726
17	19.7	$12,366	$12,366		$17,092
18	20.2	$12,675	$12,675		$29,767
19	20.9	$12,992	$12,992		$42,759
20	21.5	$13,317	$13,317		$56,076
21	22.1	$13,650	$13,650		$69,726
22	22.8	$13,991	$13,991		$83,717
23	23.5	$14,341	$14,341		$98,057
24	24.2	$14,699	$14,699		$112,757
25	24.9	$15,067	$15,067		$127,823

MACRS Depreciation Schedule		
Fed Depr Basis (Fed ITC Basis minus 1/2 Fed ITC)		$0
Federal Depreciation		$0
State Net Depreciation (factoring state rebate)		$0
Year	State Net Depreciation	Federal Depreciation
1	$0	$0
2	$0	$0
3	$0	$0
4	$0	$0
5	$0	$0
6	$0	$0
7	$0	$0
8	$0	$0
9	$0	$0
10	$0	$0
11	$0	$0
12	$0	$0
TOTALS	$0	$0

Results

Old Monthly Electric Bill	**$19,874**
Estimated New Electric Bill	**$19,180**
% Bill Offset	**3.5%**

$-3,822 Net Present Value with 5% Discount Rate
The IRR over 25 years is 4.8%
Over 25 years it will provide total savings of: $280,842
including bill savings, sRECs, maintenance, & inverter replacement (net after-tax values)
It will pay for itself in 16 years
With a Cap Rate of 6%, the building's value will increase by: $139,112

Carbon Dioxide and Environmental Benefits

Based on estimated production, this system will reduce emissions by:
1333 tons of CO2 over 25 years
It's the environmental equivalent of:
4,339,154 miles not driven
or 22.8 acres of trees planted

Incentives and energy savings depend upon several factors that may not be represented in this analysis.
A trusted tax professional should verify the figures provided.
Brightergy provides assistance with applications for incentives and rebates.
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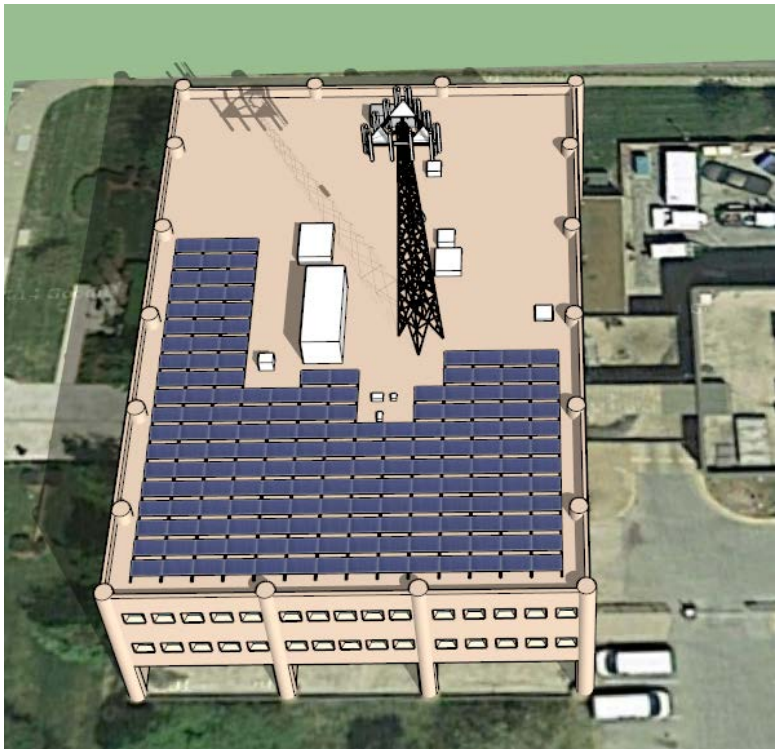
INDEPENDENCE POLICE BUILDING

223 N Memorial Dr, Independence, MO 64050

52.765 kW PV Solar Array



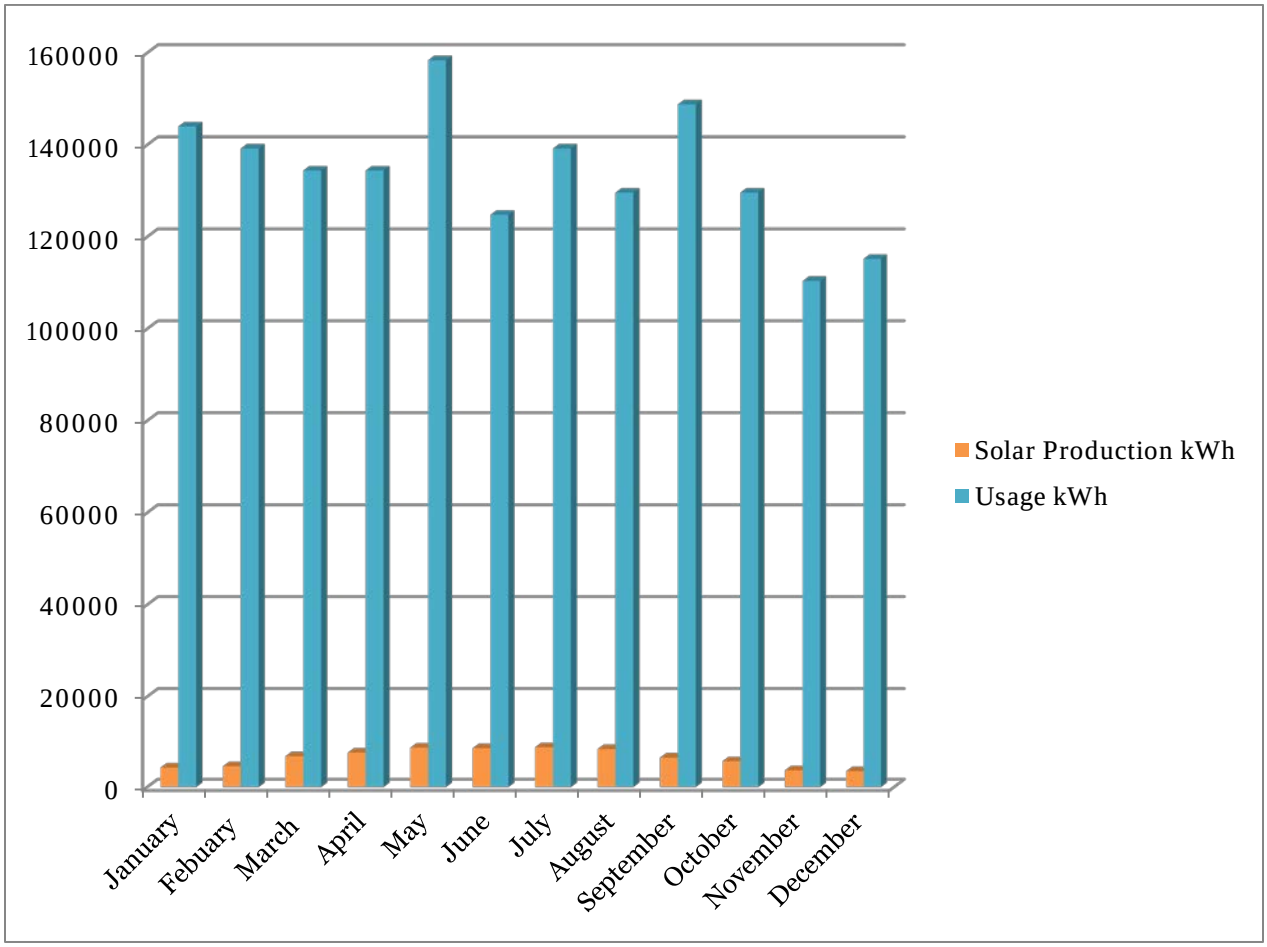
System Information

Azimuth	180 Degrees
Module	173 x Hanwha 305W
Estimated Annual Production	+/- 68,000 kWh

Notes

- *Array layout based on aerial photograph. Exact layout to be determined based on local AHJ codes and standards.*
- *Existing pipe runs need to be identified (gas/electric).*
- *Minimum 4' setback from roof ridge.*
- *Production estimates assume a 82% AC to DC derate factor*

Rock Creek



System Size: 64.66 kW

Production: 80,000 kWh

Consumption: 1,608,000 kWh

Offset: 4.98%

Price Per Watt: $2.90

Gross Capital Cost: $187,514

John Germano
Brightergy

Solar Electric Investment, Incentive and Energy Savings Analysis

Proposal for:
City Of Independence

November 21, 2014

Site Location:
9600 East Norledge Ave
Independence, MO 64053

Utility: General Utility
Current Rate Schedule: DirectUD -- Flat Annual Rate

Historical Usage: 1,608,000 kWh/yr

System Information		Cost Information	
Proposed System DC Size	**64.7 kW STC DC**	Proposed System Cost per rated Watt	**$2.90 per STC DC Watt**
		Estimated Federal Tax Bracket	**39.0%**
212 Renesola America JC305M-24/Ax-b modules and 12 SMA America SB3800U (240V) inverters		Current Utility Rate are as high as	**12.3 ¢/kWh**
Location's Avg Sun Hours	**4.8 Sun Hours**		
Estimated Annual Production	**80,000 kWh/yr**	**Estimated First Year Utility Savings**	**$9,800 per year**

Gross System Cost with Sales Tax	**$187,514**
	$0
	$0
	$0
	$0
	$0
	$0
PBI Incentive	**$1**
Net System Cost with Tax Benefits & Incentives	**$187,514**

Payback / Return on Investment — 16.1 Years

Year	Average Utility Rate ¢/kWh	Utility Savings $/year	Net Utility Savings, sRECs, PBIs, etc, after tax & maintenance	Tax & Rebate Incentives	Cost / Payback Schedule (Cumulative Cash Position)
0				$0	($187,514)
1	12.3	$9,800	$9,800		($177,714)
2	12.6	$10,045	$10,045		($167,669)
3	13.0	$10,296	$10,296		($157,373)
4	13.4	$10,554	$10,554		($146,819)
5	13.8	$10,817	$10,817		($136,002)
6	14.2	$11,088	$11,088		($124,914)
7	14.6	$11,365	$11,365		($113,549)
8	15.1	$11,649	$11,649		($101,900)
9	15.5	$11,940	$11,940		($89,959)
10	16.0	$12,239	$12,239		($77,720)
11	16.5	$12,545	$12,545		($65,175)
12	17.0	$12,859	$12,859		($52,317)
13	17.5	$13,180	$13,180		($39,137)
14	18.0	$13,509	$13,509		($25,627)
15	18.5	$13,847	$9,321		($16,306)
16	19.1	$14,193	$14,193		($2,113)
17	19.7	$14,548	$14,548		$12,435
18	20.2	$14,912	$14,912		$27,347
19	20.9	$15,285	$15,285		$42,632
20	21.5	$15,667	$15,667		$58,299
21	22.1	$16,059	$16,059		$74,357
22	22.8	$16,460	$16,460		$90,817
23	23.5	$16,872	$16,872		$107,689
24	24.2	$17,293	$17,293		$124,982
25	24.9	$17,726	$17,726		$142,708

MACRS Depreciation Schedule		
Fed Depr Basis (Fed ITC Basis minus 1/2 Fed ITC)		$0
Federal Depreciation		$0
State Net Depreciation (factoring state rebate)		$0
Year	State Net Depreciation	Federal Depreciation
1	$0	$0
2	$0	$0
3	$0	$0
4	$0	$0
5	$0	$0
6	$0	$0
7	$0	$0
8	$0	$0
9	$0	$0
10	$0	$0
11	$0	$0
12	$0	$0
TOTALS	$0	$0

Results

Old Monthly Electric Bill	**$16,415**
Estimated New Electric Bill	**$15,598**
% Bill Offset	**5.0%**

$-11,715 Net Present Value with 5% Discount Rate
The IRR over 25 years is 4.4%
Over 25 years it will provide total savings of: $330,222
including bill savings, sRECs, maintenance, & inverter replacement (net after-tax values)
It will pay for itself in 16 years
With a Cap Rate of 6%, the building's value will increase by: $163,661

Carbon Dioxide and Environmental Benefits

Based on estimated production, this system will reduce emissions by:
1569 tons of CO2 over 25 years
It's the environmental equivalent of:
5,104,897 miles not driven
or 26.9 acres of trees planted

Incentives and energy savings depend upon several factors that may not be represented in this analysis.
A trusted tax professional should verify the figures provided.
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ROCK CREEK

9600 E Norledge Ave, Independence, MO 64053

64.66 kW PV Solar Array

System Information

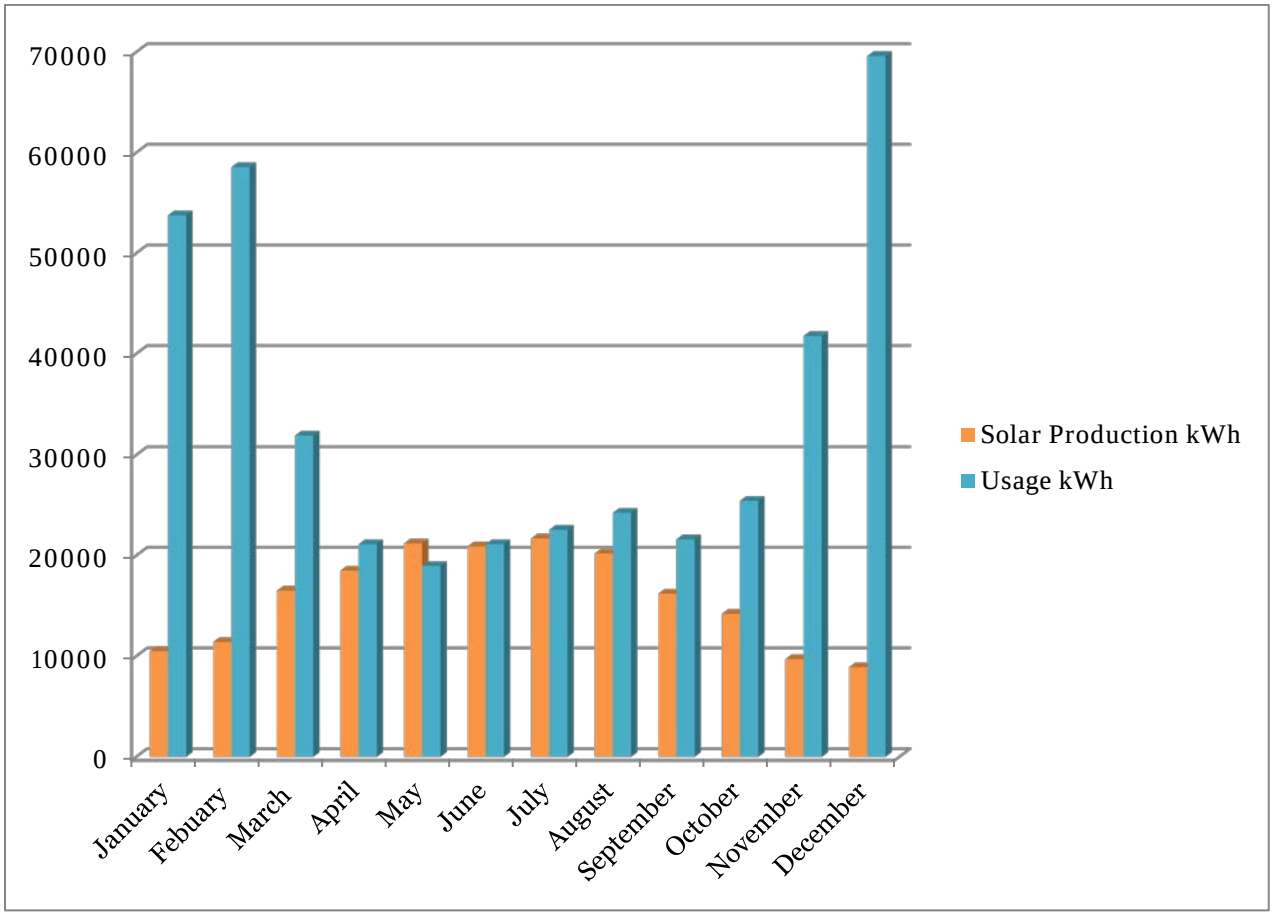
Azimuth	153 Degrees
Module	212 x Hanwha 305W
Estimated Annual Production	+/- 80,000 kWh

Notes

- *Array layout based on aerial photograph. Exact layout to be determined based on local AHJ codes and standards.*
- *Existing pipe runs need to be identified (gas/electric).*
- *Minimum 4' setback from roof ridge.*
- *Production estimates assume a 82% AC to DC derate factor*

Brightergy
CLEAN ENERGY. CLEAR CHOICE.

Service Center



System Size: 149.45 kW

Production: 190,000 kWh

Consumption: 410,640 kWh

Offset: 46.3%

Price Per Watt: $2.65

Gross Capital Cost: $396,042

John Germano
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Solar Electric Investment, Incentive and Energy Savings Analysis

Proposal for:
City Of Independence

November 21, 2014

Site Location:
21500 East Truman Road
Independence, MO 64056

Utility: General Utility
Current Rate Schedule: DirectUD -- Flat Annual Rate

Historical Usage: 410,640 kWh/yr

System Information		Cost Information	
Proposed System DC Size	**149 kW STC DC**	Proposed System Cost per rated Watt	**$2.65 per STC DC Watt**
		Estimated Federal Tax Bracket	**39.0%**
490 Renesola America JC305M-24/Ax-b modules and 28 SMA America SB3800U (240V) inverters		Current Utility Rate are as high as	**12.3 ¢/kWh**
Location's Avg Sun Hours	**4.8 Sun Hours**		
Estimated Annual Production	**190,000 kWh/yr**	**Estimated First Year Utility Savings**	**$23,275 per year**

Gross System Cost with Sales Tax	**$396,043**
	$0
	$0
	$0
	$0
	$0
	$0
PBI Incentive	**$1**
Net System Cost with Tax Benefits & Incentives	**$396,043**

Payback / Return on Investment — 14.5 Years

Year	Average Utility Rate ¢/kWh	Utility Savings $/year	Net Utility Savings, sRECs, PBIs, etc, after tax & maintenance	Tax & Rebate Incentives	Cost / Payback Schedule (Cumulative Cash Position)
0				$0	($396,043)
1	12.3	$23,275	$23,275		($372,768)
2	12.6	$23,857	$23,857		($348,911)
3	13.0	$24,453	$24,453		($324,458)
4	13.4	$25,065	$25,065		($299,393)
5	13.8	$25,691	$25,691		($273,702)
6	14.2	$26,333	$26,333		($247,368)
7	14.6	$26,992	$26,992		($220,376)
8	15.1	$27,667	$27,667		($192,710)
9	15.5	$28,358	$28,358		($164,352)
10	16.0	$29,067	$29,067		($135,284)
11	16.5	$29,794	$29,794		($105,491)
12	17.0	$30,539	$30,539		($74,952)
13	17.5	$31,302	$31,302		($43,650)
14	18.0	$32,085	$32,085		($11,565)
15	18.5	$32,887	$22,425		$10,861
16	19.1	$33,709	$33,709		$44,570
17	19.7	$34,552	$34,552		$79,121
18	20.2	$35,416	$35,416		$114,537
19	20.9	$36,301	$36,301		$150,838
20	21.5	$37,208	$37,208		$188,046
21	22.1	$38,139	$38,139		$226,185
22	22.8	$39,092	$39,092		$265,277
23	23.5	$40,069	$40,069		$305,347
24	24.2	$41,071	$41,071		$346,418
25	24.9	$42,098	$42,098		$388,516

MACRS Depreciation Schedule		
Fed Depr Basis (Fed ITC Basis minus 1/2 Fed ITC)		$0
Federal Depreciation		$0
State Net Depreciation (factoring state rebate)		$0
Year	State Net Depreciation	Federal Depreciation
1	$0	$0
2	$0	$0
3	$0	$0
4	$0	$0
5	$0	$0
6	$0	$0
7	$0	$0
8	$0	$0
9	$0	$0
10	$0	$0
11	$0	$0
12	$0	$0
TOTALS	$0	$0

Results

Old Monthly Electric Bill	**$4,192**
Estimated New Electric Bill	**$2,252**
% Bill Offset	**46.3%**

$19,262 Net Present Value with 5% Discount Rate
The IRR over 25 years is 5.5%
Over 25 years it will provide total savings of: $784,559
including bill savings, sRECs, maintenance, & inverter replacement (net after-tax values)
It will pay for itself in 15 years
With a Cap Rate of 6%, the building's value will increase by: $388,692

Carbon Dioxide and Environmental Benefits

Based on estimated production, this system will reduce emissions by:
3726 tons of CO2 over 25 years
It's the environmental equivalent of:
12,124,027 miles not driven
or 63.8 acres of trees planted

Incentives and energy savings depend upon several factors that may not be represented in this analysis.
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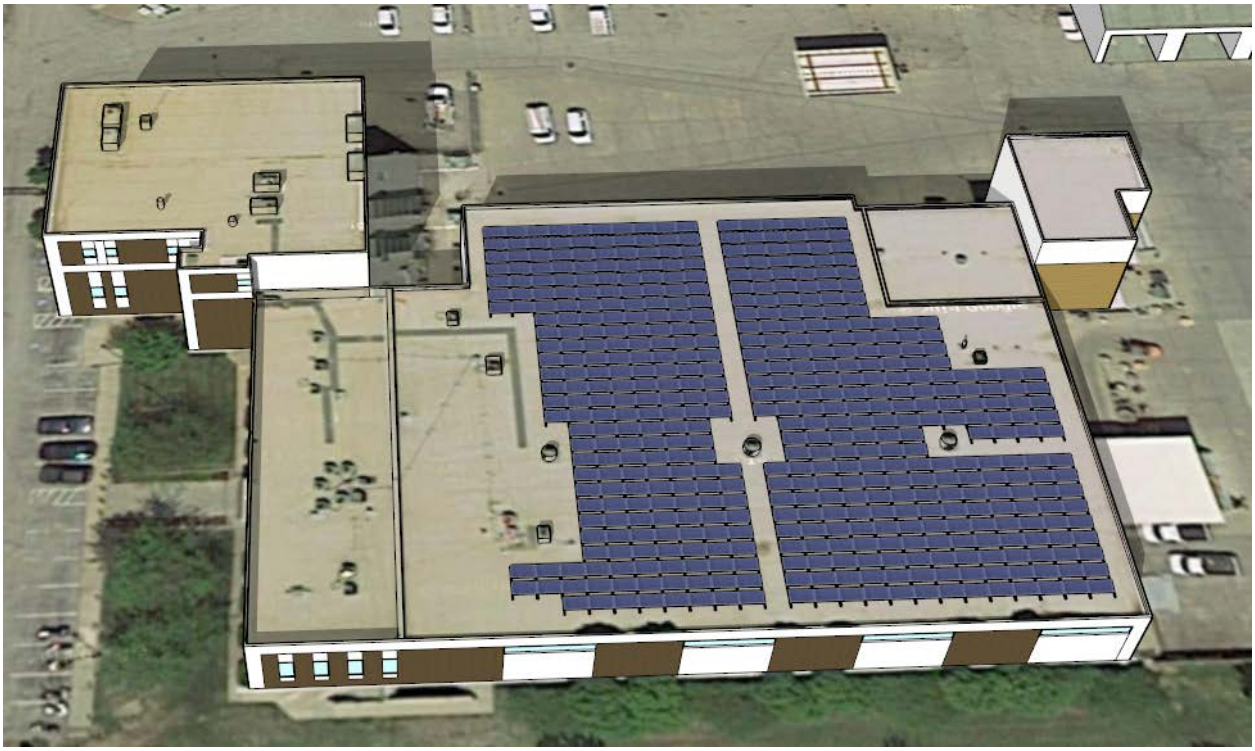
P&L SERVICE CENTER

21500 E Truman Rd, Independence, MO 64056

Brightergy
CLEAN ENERGY. CLEAR CHOICE.

149.45 kW PV Solar Array



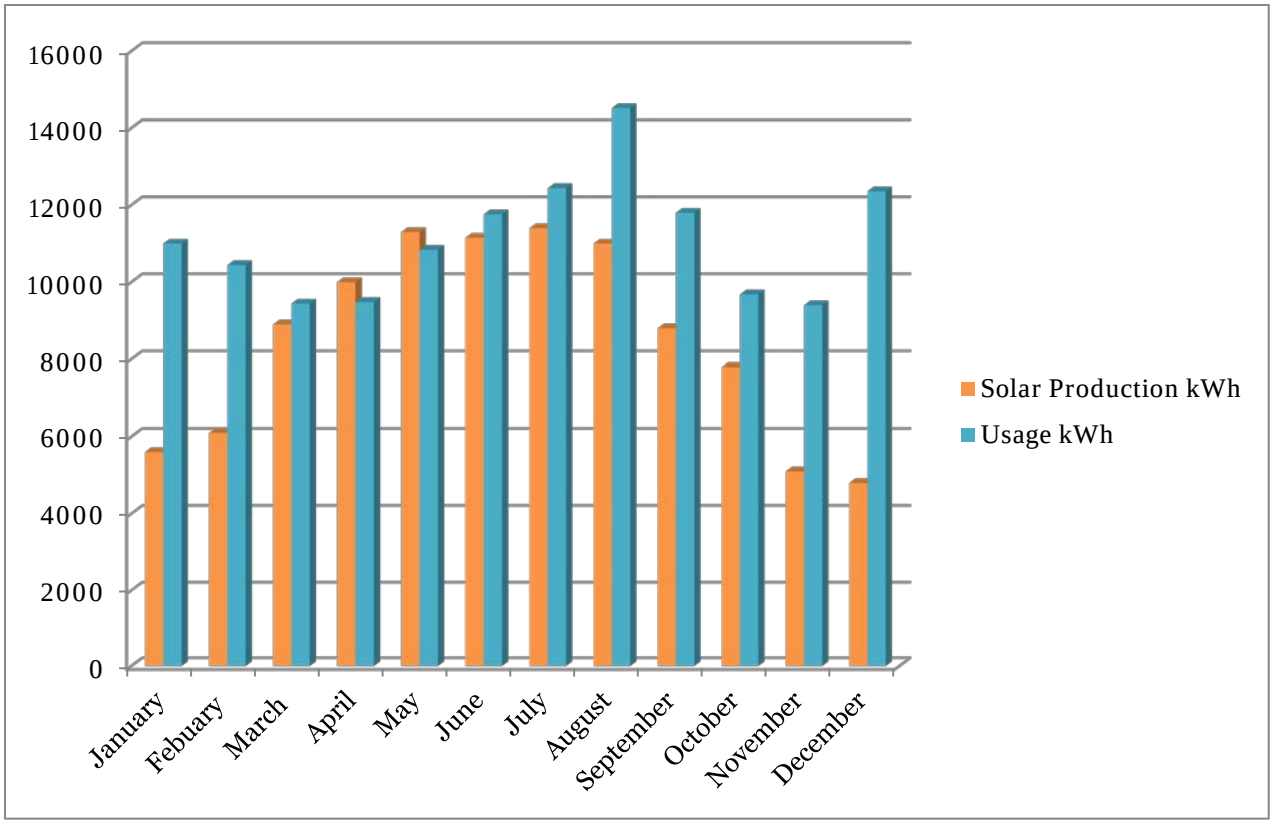
System Information

Azimuth	183 Degrees
Module	490 x Hanwha 305W
Estimated Annual Production	+/- 190,000 kWh

Notes

- *Array layout based on aerial photograph. Exact layout to be determined based on local AHJ codes and standards.*
- *Existing pipe runs need to be identified (gas/electric).*
- *Minimum 4' setback from roof ridge.*
- *Production estimates assume a 82% AC to DC derate factor*

Sewer Maintenance



System Size: 81.435 kW

Production: 102,000 kWh

Consumption: 133,164 kWh

Offset: 76.6%

Price Per Watt: $2.85

Gross Capital Cost: $232,090

John Germano
Brightergy

Solar Electric Investment, Incentive and Energy Savings Analysis

Proposal for:
City Of Independence

November 21, 2014

Site Location:
14909 East Truman Road
Independence, MO 64050

Utility: General Utility
Current Rate Schedule: DirectUD -- Flat Annual Rate

Historical Usage: 133,164 kWh/yr

System Information		Cost Information	
Proposed System DC Size	**81.4 kW STC DC**	Proposed System Cost per rated Watt	**$2.85 per STC DC Watt**
		Estimated Federal Tax Bracket	**39.0%**
267 Renesola America JC305M-24/Ax-b modules and 15 SMA America SB3800U (240V) inverters		Current Utility Rate are as high as	**12.3 ¢/kWh**
Location's Avg Sun Hours	**4.8 Sun Hours**		
Estimated Annual Production	**102,000 kWh/yr**	**Estimated First Year Utility Savings**	**$12,495 per year**

Gross System Cost with Sales Tax	**$232,090**
	$0
	$0
	$0
	$0
	$0
	$0
PBI Incentive	**$1**
Net System Cost with Tax Benefits & Incentives	**$232,090**

Payback / Return on Investment **15.8 Years**

Year	Average Utility Rate ¢/kWh	Utility Savings $/year	Net Utility Savings, sRECs, PBIs, etc, after tax & maintenance	Tax & Rebate Incentives	Cost / Payback Schedule (Cumulative Cash Position)
0				$0	($232,090)
1	12.3	$12,495	$12,495		($219,595)
2	12.6	$12,807	$12,807		($206,787)
3	13.0	$13,128	$13,128		($193,660)
4	13.4	$13,456	$13,456		($180,204)
5	13.8	$13,792	$13,792		($166,412)
6	14.2	$14,137	$14,137		($152,275)
7	14.6	$14,490	$14,490		($137,785)
8	15.1	$14,853	$14,853		($122,932)
9	15.5	$15,224	$15,224		($107,709)
10	16.0	$15,604	$15,604		($92,104)
11	16.5	$15,995	$15,995		($76,109)
12	17.0	$16,394	$16,394		($59,715)
13	17.5	$16,804	$16,804		($42,911)
14	18.0	$17,224	$17,224		($25,686)
15	18.5	$17,655	$11,955		($13,732)
16	19.1	$18,096	$18,096		$4,365
17	19.7	$18,549	$18,549		$22,914
18	20.2	$19,013	$19,013		$41,926
19	20.9	$19,488	$19,488		$61,414
20	21.5	$19,975	$19,975		$81,389
21	22.1	$20,474	$20,474		$101,863
22	22.8	$20,986	$20,986		$122,850
23	23.5	$21,511	$21,511		$144,361
24	24.2	$22,049	$22,049		$166,409
25	24.9	$22,600	$22,600		$189,009

MACRS Depreciation Schedule		
Fed Depr Basis (Fed ITC Basis minus 1/2 Fed ITC)		$0
Federal Depreciation		$0
State Net Depreciation (factoring state rebate)		$0
Year	State Net Depreciation	Federal Depreciation
1	$0	$0
2	$0	$0
3	$0	$0
4	$0	$0
5	$0	$0
6	$0	$0
7	$0	$0
8	$0	$0
9	$0	$0
10	$0	$0
11	$0	$0
12	$0	$0
TOTALS	$0	$0

Results

Old Monthly Electric Bill	**$1,359**
Estimated New Electric Bill	**$318**
% Bill Offset	**76.6%**

$-8,248 Net Present Value with 5% Discount Rate
The IRR over 25 years is 4.7%
Over 25 years it will provide total savings of: $421,099
including bill savings, sRECs, maintenance, & inverter replacement (net after-tax values)
It will pay for itself in 16 years
With a Cap Rate of 6%, the building's value will increase by: $208,666

Carbon Dioxide and Environmental Benefits

Based on estimated production, this system will reduce emissions by:
2000 tons of CO2 over 25 years
It's the environmental equivalent of:
6,508,677 miles not driven
or 34.3 acres of trees planted

Incentives and energy savings depend upon several factors that may not be represented in this analysis.
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OnGrid Tool v5.46

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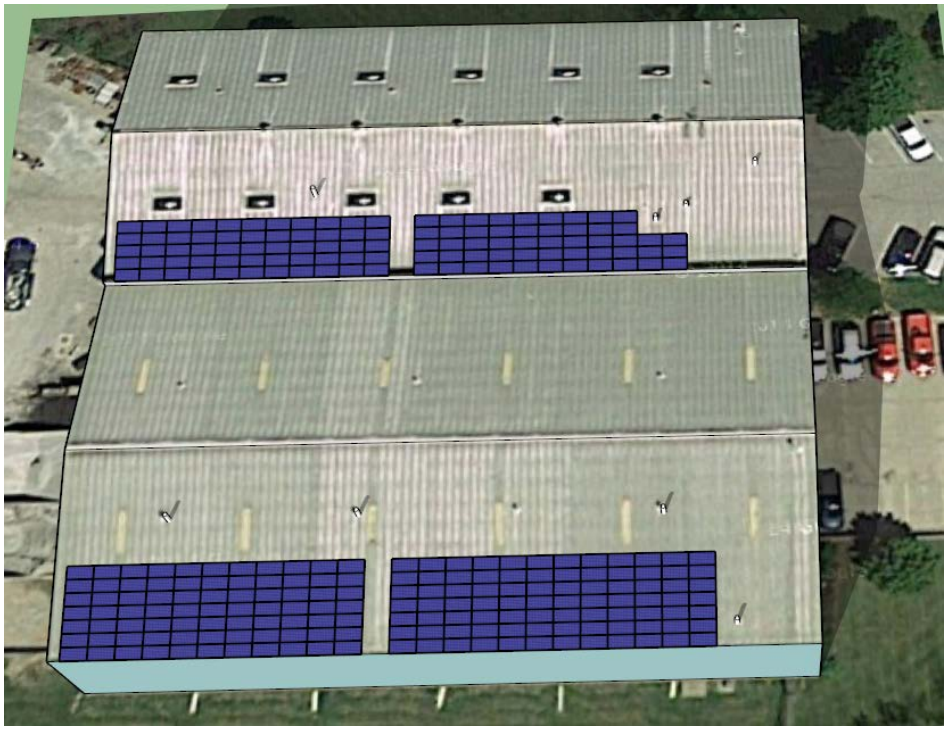
SEWER MAINTENACNE

14909 East Truman Rd, Independence, MO 64050

81.435kW PV Solar Array



System Information

Azimuth	183 Degrees
Module	267 x Hanwha 305W
Estimated Annual Production	+/- 102,000 kWh

Notes

- *Array layout based on aerial photograph. Exact layout to be determined based on local AHJ codes and standards.*
- *Existing pipe runs need to be identified (gas/electric).*
- *Minimum 4' setback from roof ridge.*
- *Production estimates assume a 82% AC to DC derate factor*

Polar Bear III

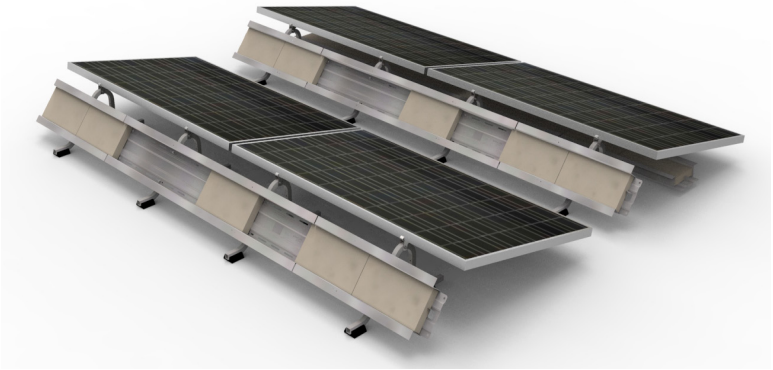
Flat Roof Mounting System

PRODUCT AND COST EVOLUTION

System Level Approach

Low-cost mounting components provide savings early in the project development process. However, when you are looking to lower the total installed cost, from delivery to a fully wired system, details make the difference. Polar Bear® III combines critical system features, A-to-Z project support, and long-term product reliability into a single low-cost platform. The system components, delivery, and installation procedures have been jointly designed to deliver a lower total cost and better service experience.

The new Polar Bear® takes the best features, service, and reliability from PanelClaw's earlier flat roof systems and combines them into a single platform.

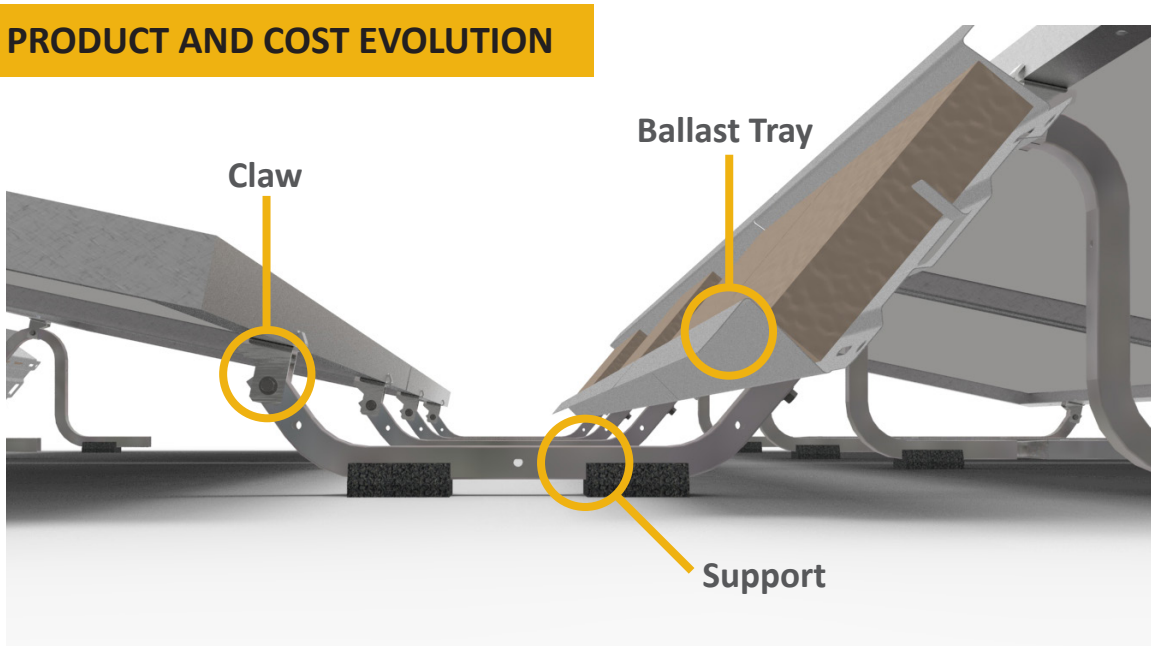


panelclaw®

panelclaw.com

Polar Bear III Flat Roof Mounting System
10 Degree

PRODUCT AND COST EVOLUTION



Trusted Roof Integrity

Polar Bear® III reduces potential long-term roof damage with fully captured ballast, integrated roof protection pads and a system design that allows for free water flow.

Accelerated Construction

The engineered design emphasizes built-in features to improve construction efficiencies:

- Three major components, light-weight and easy to move
- Pre-installed bolts to quickly mount Ballast Trays
- Single-module tilt-up to facilitate must-have access to roof, wiring and maintenance

Safety and Reliability

Polar Bear III is the product of PanelClaw's data-driven test program to improve PV reliability. Polar Bear III is proven technology based on hundreds of megawatts of project experience.

Three Components

Support

- Easy-to-handle components that weigh less than 2.5 pounds
- Integrated recycled rubber roof protection pads
- Pre-drilled holes for wire management cabling options

Ballast Tray

- Angled fit with locking end-tab to fully capture ballast blocks
- Hemmed edges and chamfered corners prevent wiring from coming into contact with sharp edges

Claw

- Attachment to module using standard module mounting holes
- UL 2703 certified for electric bonding and grounding

Specifications

Applications
Flat roof
(max slope 5°)
Fully ballasted or mechanically attached

Module Tilt Angle
10° nominal

Module Orientation
Landscape

Module Attachment
Standard module mounting holes

Basic Wind Speed
Up to 120 mph
(>120 mph by approval)

Wind Exposure Category
B and C
(D by approval)

Seismic Compatibility
C, D, E and F

Shading Ratio
2.3:1 and 2.7:1

Platform Load
~1.9 - 8 psf

Warranty and Certifications
25 year warranty
UL 2703 certification

Made in USA

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Printed on recycled paper

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Design flexibility

- 1000 V DC or 600 V DC
- Two independent DC inputs
- 15° to 90° mounting angle range
- Detachable DC Connection Unit

System efficiency

- 98% CEC, 98.5% Peak
- 1000 V DC increases system efficiency
- OptiTrac advanced MPPT
- OptiTrac Global Peak MPPT

Enhanced safety

- Integrated DC AFCI
- Floating system with all-pole sensitive ground fault protection
- Reverse polarity indicator

Future-proof

- Cluster Controller, WebConnect/ Speedwire
- Bi-directional Ethernet communications
- Complete grid management feature set
- Ability to satisfy future utility requirements

SUNNY TRIPOWER
12000TL-US / 15000TL-US / 20000TL-US / 24000TL-US

The ultimate solution for decentralized PV plants

SMA's new Sunny Tripower TL-US is raising the level of performance for decentralized commercial PV plants. This three-phase transformerless inverter is UL listed for up to 1000 V DC maximum system voltage and has peak efficiency above 98 percent, while OptiTrac Global Peak minimizes the effects of shade for maximum energy production. The Sunny Tripower delivers a future-proof solution with full grid management, and communications and monitoring features. The Sunny Tripower is also equipped with all-pole ground fault protection and integrated AFCI for a safe, reliable solution. It offers unmatched flexibility with a wide input voltage range and two independent MPP trackers. Suitable for both 600 V DC and 1,000 V DC applications, the Sunny Tripower allows for flexible design and a lower levelized cost of energy.

ENGINEERED IN GERMANY
ASSEMBLED IN THE USA

THE TOTAL PACKAGE

The Sunny Tripower TL-US is engineered to optimize design, production, and reliability—reducing a project's levelized cost of energy and improving its financial returns.

Unmatched flexibility
Available in four power classes, the Sunny Tripower TL-US features a wide operating window, two MPP trackers, and 600 V DC or 1,000 V DC operation, making it ideal for any decentralized project. System engineering is made simple and repeatable, resulting in a shortened design cycle.

Easy to transport and install, the Sunny Tripower can be mounted in a variety of ways from vertical to nearly horizontal. Concrete pads usually required by central inverters are unnecessary, preserving site real estate.

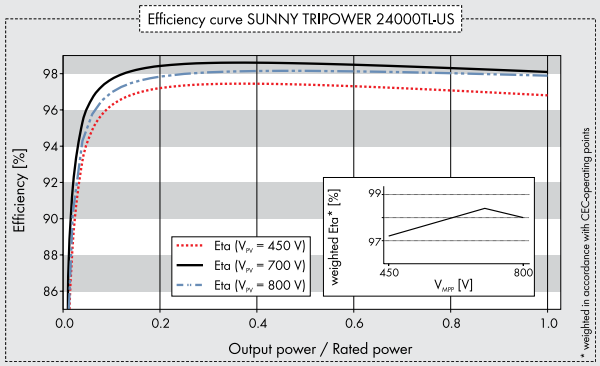
Enhanced power production
Leading efficiency and SMA's proprietary OptiTrac Global Peak MPP tracking means owners benefit from superior power production and improved economics. When operated at 1,000 V DC, balance of system costs can also be significantly reduced.

The Sunny Tripower TL-US also features advanced diagnostics, including a reverse polarity indicator via the Connection Unit 1000-US.

Future proof
The Sunny Tripower TL-US includes a number of technologies designed to meet tomorrow's requirements. Full grid management functionality is available, as are cutting edge communication options like SMA's Cluster Controller and Speedwire.

SMA Service can also simplify long-term planning with comprehensive packages covering inverters through plant-wide operations and maintenance (O&M). And, as a decentralized technology, inverter-level O&M is reduced from the beginning compared to centralized architecture.

Optimized cost
The Sunny Tripower TL-US allows integrators to optimally use real estate, shorten design and installation time, and produce more power. Inverter-level O&M is reduced through string technology and long-term support is made simple through SMA's service organization, making the Sunny Tripower TL-US the ultimate solution for decentralized PV.



Accessories

RS485 interface
DM-485CB-US-10

SMA Cluster Controller
CLCON-10

● Standard features ○ Optional features – Not available
Data at nominal conditions

Technical data	Sunny Tripower 12000TL-US	Sunny Tripower 15000TL-US	Sunny Tripower 20000TL-US	Sunny Tripower 24000TL-US
Input (DC)				
Max. recommended PV power (@ module STC)	15000 W	18750 W	25000 W	30000 W
Max. DC power (@ cos φ = 1)	12250 W	15300 W	20400 W	24500 W
Max. DC voltage*	1000 V	1000 V	1000 V	1000 V
Rated MPPT voltage range	300 V...800 V	300 V...800 V	380 V...800 V	450 V...800 V
MPPT operating voltage range	150 V...1000 V	150 V...1000 V	150 V...1000 V	150 V...1000 V
Min. DC voltage / start voltage	150 V / 188 V	150 V / 188 V	150 V / 188 V	150 V / 188 V
Number of MPP tracker inputs	2	2	2	2
Max. input current / per MPP tracker input	66 A / 33 A	66 A / 33 A	66 A / 33 A	66 A / 33 A
Output (AC)				
AC nominal power	12000 W	15000 W	20000 W	24000 W
Max. AC apparent power	12000 VA	15000 VA	20000 VA	24000 VA
Output phases / line connections	3 / 3-N-PE			
Nominal AC voltage	480 / 277 V WYE			
AC voltage range	244 V...305 V			
Rated AC grid frequency	60 Hz			
AC grid frequency / range	50 Hz, 60 Hz / -6 Hz...+5 Hz			
Max. output current	14.4 A	18 A	24 A	29 A
Power factor at rated power / adjustable displacement	1 / 0.8 leading...0.8 lagging			
Harmonics	< 3 %			
Efficiency				
Max. efficiency	98.2 %	98.2 %	98.5 %	98.5 %
CEC efficiency	97.5%	97.5%	97.5%	98.0%
Protection devices				
DC reverse polarity protection	●	●	●	●
Ground fault monitoring / Grid monitoring	●	●	●	●
All-pole sensitive residual current monitoring unit	●	●	●	●
DC AFCI compliant to UL 1699B	●	●	●	●
AC short circuit protection	●	●	●	●
Protection class / overvoltage category	I / IV	I / IV	I / IV	I / IV
General data				
Dimensions (W / H / D) in mm (in)	665 / 690 / 265 (26.1 / 27.1 / 10.4)			
Packing dimensions (W / H / D) in mm (in)	780 / 790 / 380 (30.7 / 31.1 / 15.0)			
Weight	55 kg (121 lbs)			
Packing weight	61 kg (134.5 lbs)			
Operating temperature range	-25°C...+60°C			
Noise emission (typical)	51 dB(A)			
Internal consumption at night	1 W			
Topology	Transformerless			
Cooling concept	OptiCool			
Electronics protection rating	NEMA 3R			
Features				
Display / LED indicators (Status / Fault / Communication)	– / ●	– / ●	– / ●	– / ●
Interfaces: Speedwire / RS485	●/○	●/○	●/○	●/○
Mounting angle range	15°...90°	15°...90°	15°...90°	15°...90°
Warranty: 10 / 15 / 20 years	●/○/○	●/○/○	●/○/○	●/○/○
Certifications and approvals	UL 1741, UL 1998, UL 1699B, IEEE 1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1			
NOTE: US inverters ship with gray lids				
*Suitable for 600 V DC max. systems				
Type designation	STP 12000TL-US-10	STP 15000TL-US-10	STP 20000TL-US-10	STP 24000TL-US-10

CONNECTION UNIT 1000-US

The Connection Unit is an optional system component of the Sunny Tripower TL-US series and includes combiner box and disconnect functionality in one convenient housing. Its integrated reverse polarity indicator supports safe installation.

Technical data	Connection Unit 1000 V	
Input (DC)		
Max. DC voltage	1000 V	
Number of input source circuits (strings)	8 (4 + 4)	
Input conductor size	#12 to #6 AWG	
Max. fuse size	20 A	
Output (DC)		
Output circuits	2	
Output conductor size	#8 to #2 AWG	
Max. rated continuous current / per output circuit	66 A / 33 A	
Protection devices		
Touchsafe fuse holders	●	
Reverse polarity indicator	●	
Load-break rated output disconnect	●	
General data		
Dimensions (W / H / D) in mm (in)	466 / 398 / 136 (18.4 / 15.7 / 5.4)	
Packing dimensions (W / H / D) in mm (in)	563 / 543 / 240 (22.2 / 21.4 / 9.5)	
Weight	10 kg (22 lbs)	
Packing weight	11 kg (24 lbs)	
Protection rating	NEMA 3R	
Features		
Certificates and permits	UL 1741, CAN/CSA C22.2 107.1-1	
● Standard features ○ Optional features – Not available		
Type designation	CU 1000-US-10	

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