System Advisor Model Report

Photovoltaic System	32 DC kW Nameplate	Philadelphia, PA
Residential	$3.29/W Installed Cost	39.88 N, -75.25 E GMT -5

Performance Model

Modules	
Grape Solar GS-S-400-Platinum	
Cell material	Mono-c-Si
Module area	2.6 m²
Module capacity	400.2 DC Watts
Quantity	80
Total capacity	32 DC kW
Total area	205 m²

Inverters	
Satcon Technology Corporation: PVS-30 (240V) 240V	
Unit capacity	30 AC kW
Input voltage	305 - 600 VDC DC V
Quantity	1
Total capacity	30 AC kW
DC to AC Capacity Ratio	1.07
AC losses (%)	1.0

Array	
Strings	10
Modules per string	8
String voltage (DC V)	398.2
Tilt (deg from horizontal)	39
Azimuth (deg E of N)	180
Tracking	fixed
Backtracking	-
Rotation limit (deg)	-
Shading	yes
Soiling	yes
DC losses (%)	4.4

Performance Adjustments	
Availability/Curtailment	none
Degradation	0.5%/yr
Hourly factors or custom	none

Annual Results (in Year 1)	
GHI kW/m²/day	4.0
POA kW/m²/day	4.0
DC kWh from array	44,960
Net to inverter	42,970 DC kWh
Gross from inverter	40,090 AC kWh
Net to grid	39,690 AC kWh
Capacity factor	14.15
Performance ratio	0.74

Financial Model

Project Costs	
Total installed cost	$105,337
Salvage value	$0

Analysis Parameters	
Project life	25 years
Inflation rate	2.5%
Real discount rate	5.5%

Project Debt Parameters (Mortgage)	
Debt fraction	100%
Amount	$105,337
Term	25 years
Rate	5%

Tax and Insurance Rates	(% of installed cost)
Federal income tax	30%/year
State income tax	7%/year
Sales tax	5%
Insurance	1%/year
Property tax (% of assess. val.)	1%/year

Incentives	
Federal ITC	30%

Electricity Demand and Rate Summary
Annual peak demand 13.2 kW
Annual total demand 30,145 kWh
PECO Energy Co
Fixed fee: $296.62/month
Flat rate (buy = sell) $0.089/kWh
Monthly fixed TOU demand charge $0
Monthly fixed demand charge $0
Tiered rates with three or more rates

Results	
Nominal LCOE	16 cents/kWh
Net present value	$14,500
Payback period	16.1 years

Residential | Flat Plate PV | Simple Efficiency Module Model | Sandia Inverter Database

System Advisor Model Report, Page 2

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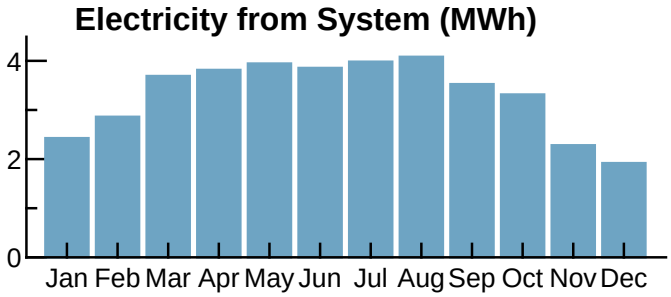
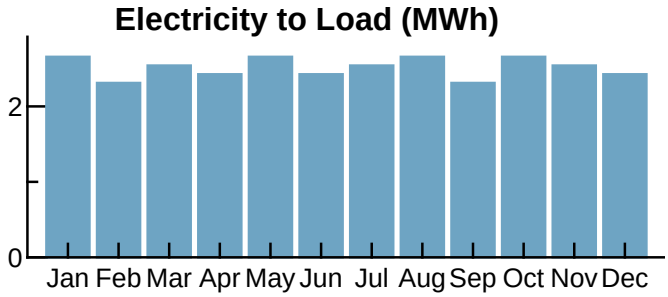
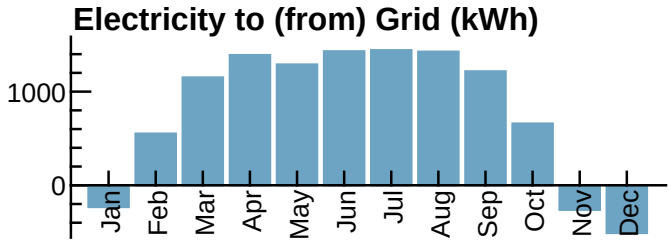
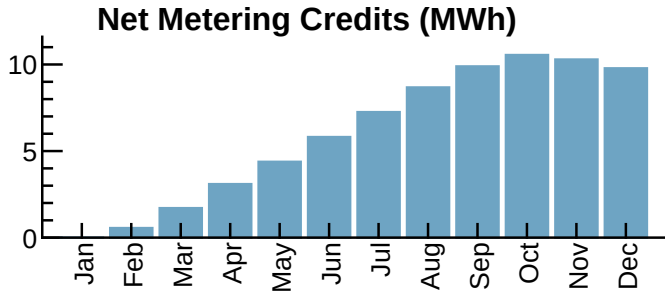








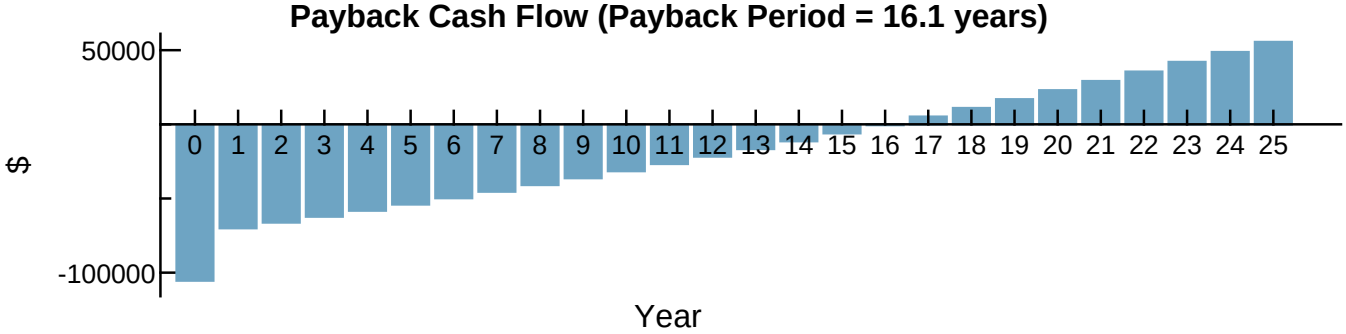
Monthly Electricity Purchases and Savings (Year 1 $)

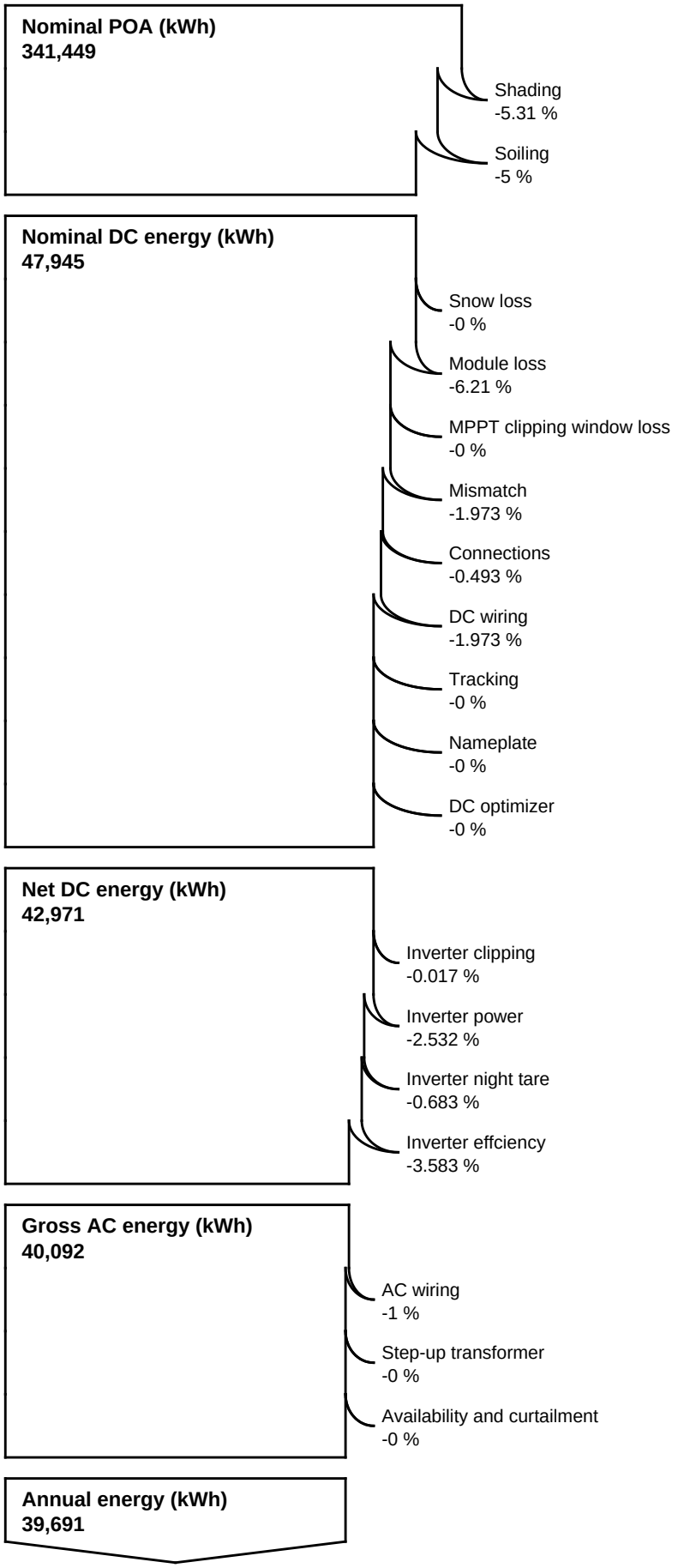
Month	Without System	With System	Savings
Jan	824	419	404
Feb	766	337	428
Mar	805	296	508
Apr	785	296	489
May	824	296	527
Jun	785	296	489
Jul	805	296	508
Aug	824	296	527
Sep	766	296	469
Oct	824	329	495
Nov	805	296	508
Dec	785	23	761
Annual	9,604	3,483	6,120

NPV Approximation using Annuities

Annuities, Capital Recovery Factor (CRF) = 0.0948		
Investment	$-19,700	Sum:
Expenses	$-100	$-19,400
Savings	$300	NPV = Sum / CRF:
Energy value	$0	$-205,000

Investment = Installed Cost - Debt Principal - IBI - CBI
Expenses = Operating Costs + Debt Payments
Savings = Tax Deductions + PBI
Energy value = Tax Adjusted Net Savings
Nominal discount rate = 813.75%




Nominal POA (kWh)
341,449
Shading
-5.31 %
Soiling
-5 %
Nominal DC energy (kWh)
47,945
Snow loss
-0 %
Module loss
-6.21 %
MPPT clipping window loss
-0 %
Mismatch
-1.973 %
Connections
-0.493 %
DC wiring
-1.973 %
Tracking
-0 %
Nameplate
-0 %
DC optimizer
-0 %
Net DC energy (kWh)
42,971
Inverter clipping
-0.017 %
Inverter power
-2.532 %
Inverter night tare
-0.683 %
Inverter effciency
-3.583 %
Gross AC energy (kWh)
40,092
AC wiring
-1 %
Step-up transformer
-0 %
Availability and curtailment
-0 %
Annual energy (kWh)
39,691