

Career Pathways at Beutler Corporation/in HVAC: Importance of Communication

Subject Area: English Language Arts

Grade Level: 8

Date: August 4, 2014

❑ Abstract Lesson Overview

Students will learn 1) the importance of written and oral communication in the building and construction industry, 2) the importance of attending to details and deadlines, and 3) level of training necessary and overall job descriptions at varying levels of work for each step of a product.

Students will work in teams to create brochures for presentation at a job fair for Beutler Corporation in two of their four divisions; Home Technology and Solar. Students will become familiar with various positions in the industry, their job descriptions, the education/experience required for the positions and technical vocabulary associated with the HVAC (heating, ventilation, and air conditioning) industry to help establish a professional tone. Success requires clear communication with team members.

❑ Instructional Materials Needed

- Sample Solar Panel Proposal
- Sample Site Survey Form
- Sample SunEYE Binon Report
- Vocabulary Worksheet

❑ Instructional Materials Provided

- Sample Solar Panel Proposal
- Sample Site Survey Form
- Sample SunEYE Binon Report
- Vocabulary Worksheet

❑ Expected Student Outcomes

- Students will demonstrate written and oral communication skills and attention to detail.
- Students will write a combination of informational/explanatory texts that include language and tone appropriate to a specific audience.
- Students will learn to read and interpret a solar panel proposal as well as plans containing specifications, codes and wiring illustrations.
- Students will learn the level of education/training/experience necessary to perform duties of the various jobs along the way of product from introducing the product to the consumer to installation and maintenance.

Student Deliverables

- Career Pathways handouts
- Tri-fold marketing pamphlet
- PPT slides

Cost of Lesson: _____

Duration of Lesson: 10 Days

❑ **Culminating Activity and/or Assessment**

- The culminating activity/assessment is for each team to deliver one power point or prezi presentation and one tri-fold pamphlet with job descriptions and requirements for informational purposes. They will also as a team present what they have found and learned about the industry as a whole and working effectively in teams and all that goes with doing that successfully.

❑ **Additional Resources**

- <http://hiring.monster.com/hr/hr-best-practices/recruiting-hiring-advice/job-descriptions/sample-job-descriptions.aspx>
- <http://www.beutlercorp.com/solar-installation-service>
- <http://www.beutlercorp.com/digital-home>
- <http://www.beutlercorp.com/careers>

❑ **CTE Pathway Standards** (<http://www.cde.ca.gov/ci/ct/sf/ctemcstandards.asp>)

- *Building and Construction Trade 2.0 Communications*
Acquire and accurately use Building and Construction Trades sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats. (Direct alignment with LS 9-10, 11-12.6)
 - 2.1 Recognize the elements of communication using a sender–receiver model.
 - 2.3 Interpret verbal and nonverbal communications and respond appropriately.
 - 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.
 - 2.5 Communicate information and ideas effectively to multiple audiences using a variety of media and formats.
- *Building and Construction Trade 3.0 Career Planning and Management*
Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans. (Direct alignment with SLS 11-12.2)
 - 3.4 Research the scope of career opportunities available and the requirements for education, training, certification, and licensure.
- *Building and Construction Trade 4.0 Technology*
Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Building and Construction Trades sector workplace environment. (Direct alignment with WS 11-12.6)
 - 4.1 Use electronic reference materials to gather information and produce products and services.
- *Building and Construction Trade 7.0 Responsibility and Flexibility*

Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the Building and Construction Trades sector workplace environment and community settings. (Direct alignment with SLS 9-10, 11-12.1)

- 7.4 Practice time management and efficiency to fulfill responsibilities.

- *Building and Construction Trade 9.0 Leadership and Teamwork*

Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution as practices in the SkillsUSA career technical student organization, (Direct alignment with SLS 11-12.1b)

- 9.2 Identify the characteristics of successful teams, including leadership, cooperation, collaboration, and effective decision-making skills as applied in groups, teams, and career technical student organization activities.

□ **Lesson Plan Relevance to Externship**

This lesson attempts to capture in miniature a sample workflow from a business involved in the building industry. From entry-level workers, to field workers, to office managers and vice presidents, the key to maintain a presence in the building industry is clear, effective communication. We cannot underscore the importance of written and oral communication in making any business successful.

Description of Activities

☐ Activity Day One:

- Introduce unit – Review tone
Form teams/companies
Review positions/duties – project manager, writer, editor
Review generic pathways in construction handout
Review project timeline and deadlines
- Pass out student packets to each project manager, explaining to them *alone* the process and expectations. Teachers work directly and only with project managers during the passing out/turning in of team products.

☐ Activity Day Two:

- Project managers relay information to teams and the teams begin working.
- Teams review the various samples to understand flow of work from one level to the next.
- Teams complete activities associated with gathering necessary information to produce deliverables.

☐ Activity Day Three:

- Teams complete activities associated with gathering necessary information to produce deliverables. (continued from previous day)
- Teams begin working on first deliverable, Career Pathways handout.

☐ Activity Day Four:

- Teams complete the first deliverable, Career Pathways handout.
- Project manager turns in completed handout.

☐ Activity Day Five:

- Teacher returns handouts to project managers suggesting/requesting changes.
- Teams discuss and revise handout to meet suggested/requested changes, reviewing resources as necessary.

☐ Activity Day Six:

- Teams turn in revised handout.

☐ Activity Day Seven:

- Teams complete second deliverable, informational brochure about career opportunities at Beutler Corporation in HVAC industry.
- Project manager turns in completed brochure.

- **Activity Day Eight:**

- Teacher returns brochures to project managers suggesting/requesting changes.
- Teams discuss and revise brochures to meet suggested/requested changes, reviewing resources as necessary.

- **Activity Day Nine:**

- Team turns in revised brochure.

- **Activity Day Ten:**

- Students give oral presentation of their work, complete with Power Point or Prezi slides.
- Debrief lesson and complete written reflection activities.



Proposal prepared for [REDACTED]

Summary

Customer
[REDACTED]

Site Address
[REDACTED]
Roseville, CA 95661

Mailing Address
[REDACTED]
Roseville, CA 95661

Company Contact
Curtis Wylie
Solar Division Manager
Beutler Corporation
4700 Lang Ave.
McClellan, CA 95652

25 Year Financial Analysis

Utility Savings Over Initial Term	\$48,437 \$161 / mo (avg)
Payback Period	14-15 years
Total Life-Cycle Payback (Cash Flow compared to Net Cost)	167%
Rate of Return on Cash Invested	4.7%
Levelized Cost of Solar Energy	\$0.101 / kWh
System Resale Value	\$18,615

Cost Breakdown

Installer Contract Cost	\$34,573	(\$4.61/watt DC, \$5.27/watt AC)
SMUD - PV Residential Retrofit Buy-Down Step 7	(\$4,261)	
Federal Tax Credit/Tax Impact	(\$9,094)	
Net Cost (year of installation)	\$21,218	(\$2.83/watt DC, \$3.24/watt AC)

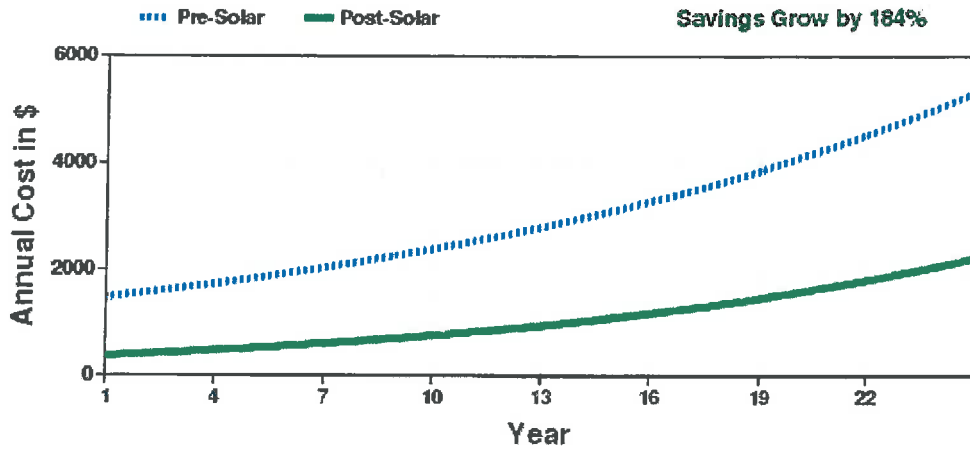
System Description

Total System Size	7.500 kW DC Power (STC) / 6.555 kW AC Power (CEC)
Estimated Annual Production	9,423 kWh
PV Panel Description	Qty. 30 - Canadian Solar Model: CS6P-250P
Inverters	Qty. 30 - Enphase Energy Model: M215-60-SIE-S2x-NA

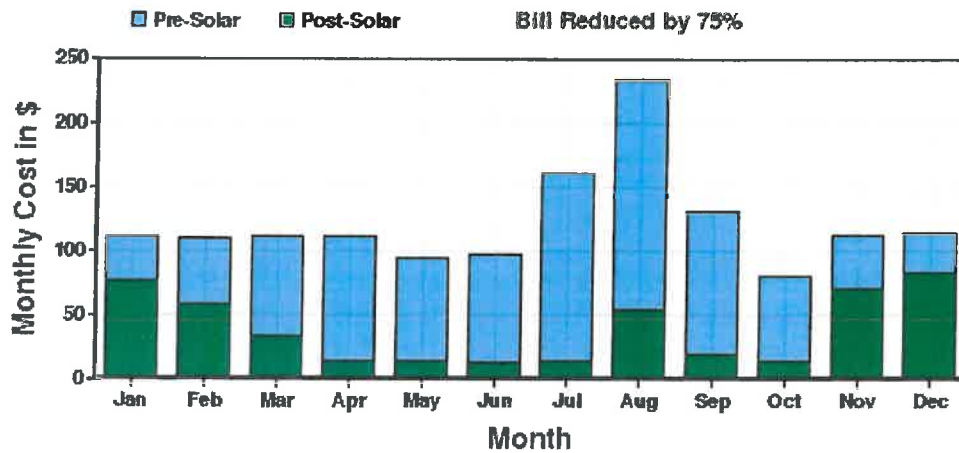
Energy Analysis

Your historical energy usage was used to help size your solar system. Based upon the system size suggested, the expected electricity bill savings over a 25 year period are provided. In addition, the first-year electricity bill savings you can expect are provided together with a chart of the monthly solar system output (PV production) you can expect.

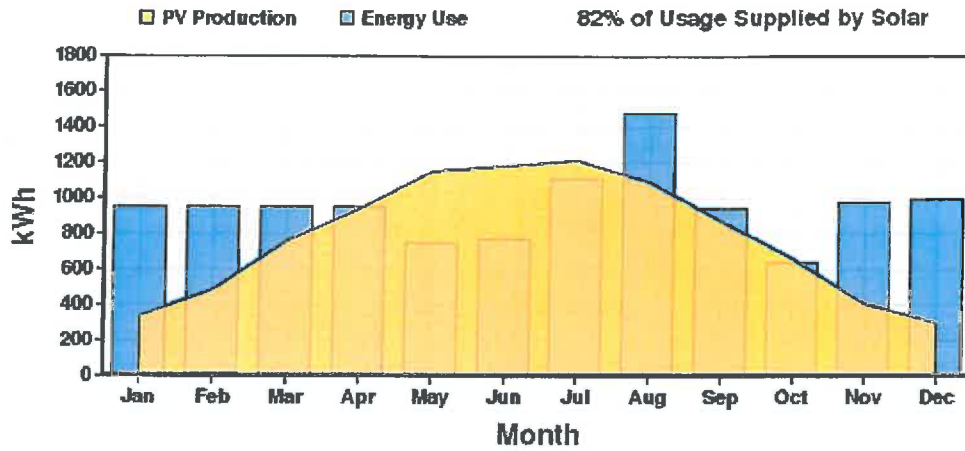
Annual Electricity Bill Savings Over Time



Monthly Electricity Bill Savings



Monthly Electricity Use and Amount Supplied by Solar



Assumptions: Post-Solar Electric Rate Schedule for Sacramento Municipal Util Dist (SMUD) is Residential - Standard Heat (Rate Code: R-SEH)
Annual utility inflation: 5.50% (assumed). Energy Bill Savings are actual, without any tax effects applied.



Energy Bill Estimate

The following energy bill estimate is without any tax effects applied.

(kWh)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Utility Usage without Solar	955	955	955	955	754	772	1,106	1,470	942	637	975	987	11.5k
Solar Production	344	494	760	944	1,146	1,178	1,207	1,093	875	664	411	305	9,423
Utility Usage with Solar	611	461	195	11	-392	-406	-101	377	67	-27	564	682	2,040

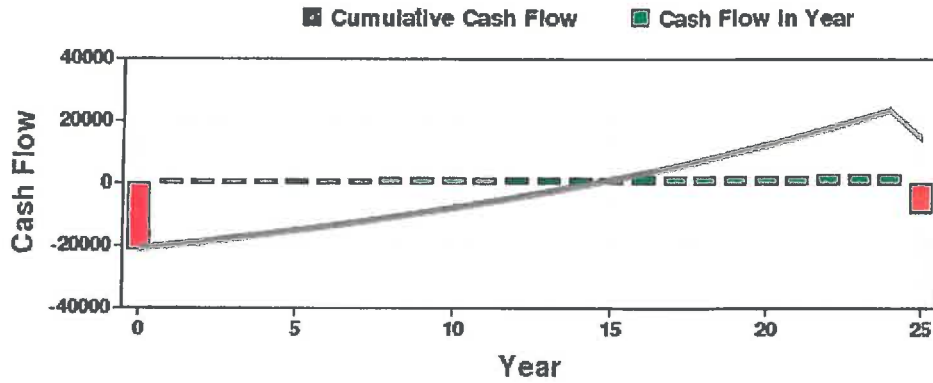
(Cost)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Utility Bill without Solar*	\$111	\$110	\$111	\$111	\$94	\$97	\$161	\$233	\$131	\$81	\$113	\$114	\$1,467
Utility Bill with Solar*	\$76	\$59	\$34	\$14	\$14	\$13	\$14	\$54	\$20	\$14	\$71	\$83	\$466
Annual Excess Credit	Credit for excess electricity generated (month of credit depends on interconnect date)											\$94	\$94
Utility Bill Savings	\$35	\$51	\$77	\$97	\$80	\$84	\$147	\$179	\$111	\$67	\$42	\$125	\$1,095

*Includes utility rate increase of 5.50%

NOTES ON Annual Excess Credit AND Energy Bill Savings:
 The Energy Bill Savings is your Pre-solar Bill minus the Post-solar Bill, plus the Annual Excess Credit (Utility True-up). The energy "Credit for excess electricity generated" cannot be greater than the energy charges incurred during the year.

Financial Analysis

The first chart summarizes the cash flow you can expect from the system quoted. Key financial measures are also provided.



Financial Summary	
Utility Savings Over Initial Term	\$48,437
Average Monthly Utility Savings	\$161 (over system life)
Net Cost (In year of installation)	\$21,218
Payback Period	14-15 years
Rate of Return on Cash Invested	4.7%
Total Life-Cycle Payback (Cash flow compared to Net Cost)	167%
Levelized Cost of Solar Energy (Net Cost / lifetime energy production)	\$0.101 / kWh

Environmental Impact Analysis

Your solar system will generate significant environmental benefits. These come primarily from avoided power plant emissions. Below is a summary of environmental benefits your solar system will provide.

Your New, Lower Carbon Footprint	
Your solar system will reduce Green House Gas emissions by 161 tons of CO2 (Over 25 years)	
Equivalent CO2 Reductions	
Small Car:	547,119 miles
Medium Car:	293,455 miles
SUV:	205,605 miles
Air Miles:	332,784 miles
Trees Planted:	6,456 trees planted
CO2 from Trash & Waste:	293 persons

Cash Flow by Year

The following table of estimated cash flows includes any tax effects, rate and cost inflation and other time-related cash flow factors. Refer to the Disclaimers & Assumptions section (below) for further clarification.

Year:	0	1	2	3	4
SMUD - PV Residential Retrofit Buy-Down Step 7	\$4,261	\$0	\$0	\$0	\$0
Federal Individual Tax Credit (30%)	\$9,094	\$0	\$0	\$0	\$0
Energy Bill Savings	\$0	\$1,095	\$1,144	\$1,195	\$1,248
Installation, Operation & Maintenance Costs	(\$34,573)	(\$34)	(\$35)	(\$35)	(\$35)
Total Annual Cash Flow	(\$21,218)	\$1,061	\$1,109	\$1,160	\$1,213
Cumulative Cash Flow	(\$21,218)	(\$20,157)	(\$19,048)	(\$17,888)	(\$16,675)

Year:	5	6	7	8	9
SMUD - PV Residential Retrofit Buy-Down Step 7	\$0	\$0	\$0	\$0	\$0
Federal Individual Tax Credit (30%)	\$0	\$0	\$0	\$0	\$0
Energy Bill Savings	\$1,303	\$1,361	\$1,422	\$1,485	\$1,550
Installation, Operation & Maintenance Costs	(\$36)	(\$36)	(\$37)	(\$37)	(\$37)
Total Annual Cash Flow	\$1,267	\$1,325	\$1,385	\$1,448	\$1,513
Cumulative Cash Flow	(\$15,408)	(\$14,083)	(\$12,698)	(\$11,250)	(\$9,737)

Year:	10	11	12	13	14
SMUD - PV Residential Retrofit Buy-Down Step 7	\$0	\$0	\$0	\$0	\$0
Federal Individual Tax Credit (30%)	\$0	\$0	\$0	\$0	\$0
Energy Bill Savings	\$1,619	\$1,692	\$1,767	\$1,845	\$1,927
Installation, Operation & Maintenance Costs	(\$38)	(\$38)	(\$38)	(\$39)	(\$39)
Total Annual Cash Flow	\$1,581	\$1,654	\$1,729	\$1,806	\$1,888
Cumulative Cash Flow	(\$8,156)	(\$6,502)	(\$4,773)	(\$2,967)	(\$1,079)



Proposal prepared for [REDACTED]

Year:	15	16	17	18	19
SMUD - PV Residential Retrofit Buy-Down Step 7	\$0	\$0	\$0	\$0	\$0
Federal Individual Tax Credit (30%)	\$0	\$0	\$0	\$0	\$0
Energy Bill Savings	\$2,013	\$2,102	\$2,196	\$2,293	\$2,396
Installation, Operation & Maintenance Costs	(\$40)	(\$40)	(\$40)	(\$41)	(\$41)
Total Annual Cash Flow	\$1,973	\$2,062	\$2,156	\$2,252	\$2,355
Cumulative Cash Flow	\$894	\$2,956	\$5,112	\$7,364	\$9,719

Year:	20	21	22	23	24	25
SMUD - PV Residential Retrofit Buy-Down Step 7	\$0	\$0	\$0	\$0	\$0	\$0
Federal Individual Tax Credit (30%)	\$0	\$0	\$0	\$0	\$0	\$0
Energy Bill Savings	\$2,502	\$2,613	\$2,730	\$2,851	\$2,977	\$3,110
Installation, Operation & Maintenance Costs	(\$42)	(\$42)	(\$43)	(\$43)	(\$43)	(\$12,135)
Total Annual Cash Flow	\$2,460	\$2,571	\$2,687	\$2,808	\$2,934	(\$9,025)
Cumulative Cash Flow	\$12,179	\$14,750	\$17,437	\$20,245	\$23,179	\$14,154



Proposal prepared for [REDACTED]

Quotation & Contract for a Renewable Energy Power System

Beutler Corporation
4700 Lang Ave.
McClellan, CA 95652

Sales Consultant
Curtis Wylie
Tel: 916-646-2700
Email: wyliec@beutler.com

Customer

[REDACTED]
[REDACTED]
[REDACTED]

Site Address

[REDACTED]
[REDACTED]
Roseville, CA 95661

Mailing Address:

[REDACTED]
[REDACTED]
Roseville, CA 95661

Project Description & Major Components

Major System Components

PV Panels:

Qty. 30 - Canadian Solar Model: CS6P-250P

Inverter(s):

Qty. 30 - Enphase Energy Model: M215-60-SIE-S2x-NA

System Size: 7.500 kW DC, STC (\$4.61/ DC watt)

System Size: 6.555 kW AC, CEC (\$5.27/ AC watt)

Standard Components

Racking and mounting components per Uniform Building Code. AC and DC disconnects per National Electric Code and Utility. Wiring, conduit and overcurrent protection per National Electric Code.

Standard Labor:

Design system and secure basic building or electrical permit (architectural, planning commission or other reviews are extra). Install specified system in good workman like manner. Complete and submit utility interconnection documents (if any). Coordinate building, electrical and utility inspections (as applicable).

Additional Components & Allowances:

Disclaimers & Assumptions

Operation, Maintenance, and Inflation Rates

This estimate assumes the following system operation, maintenance and inflation rates:

System Life:	25 years
Operation & Maintenance:	0.10% of system cost per annum
PV Degradation:	1.00% per annum
Estimated Inverter Life:	25 years
O&M Inflation Rate:	1.0% per annum
Inverter Replacement Inflation Rate:	1.0% per annum

System Size Ratings & Performance

There are three methods commonly used to rate PV system size: STC, PTC and CEC. The Standard Test Condition rating ("STC" also called "DC" or "nameplate") assumes a standard set of optimal operating conditions. The STC rating is most often used by manufacturers to classify the power output of PV modules. The PV-USA Test Condition ("PTC") and California Energy Commission ("CEC") ratings were designed to approximate system performance in more realistic operating conditions.

The Energy production for the first year is based on PVWatts Version 2. To calculate the system's energy production for any future year, the expected degradation in system performance is included (See "PV Degradation", in table above).

Tax Credits & Deductions

Income tax rate assumed: 42.00% (Federal 33.00% - State: 9.00%)

To calculate the estimated cash flow in this proposal, our analysis used these tax rates. We should stress that we cannot provide tax or investment guidance. You should consult your tax preparer or investment adviser for these services. This analysis calculates the cash flows based only on the assumptions entered into the proposal.

This analysis assumes Federal income Tax is not applied to any rebates. Therefore, the basis for the Federal ITC is the installation cost less 100% of any and all rebates.

Residential:

In calculating the cash flow for an individual, our analysis assumes that the homeowner can deduct the interest from financing the system. This will be true if the financing is secured by the real estate, such as with a second mortgage, home equity loan, or home equity line of credit.

(Net) Energy Bill Savings

For an individual, electric bills are not usually deductible against income taxes.

For a business, electric bills are usually deductible against income taxes. If an income tax rate is defined, the cash flow displays a "Net" Energy Bill Savings line item which is the Energy Bill Savings less the loss in tax deduction due to the PV system's lowering of the electric bill. Cost inflation for the utility rate and degradation of system performance are also taken into account.

Average Monthly Utility Savings

"Average Monthly Utility Savings" is the average monthly (Net) Energy Bill Savings expected over the system life. This takes into account utility rate inflation and any expected degradation in system performance. This estimate has not assumed any changes in the amount or timing in your building's energy use.

Rate of Return (IRR) on Cash Invested

"Rate of Return on Cash Invested" (also called "Internal Rate of Return" or "IRR") is the annual compounded rate of return that the cash flows (savings, incentives, tax benefits, etc.) bring based upon the net cash invested in the year of installation ("Year 0"). In financial math terms, IRR is the discount rate required to make the sum of the present values of each annual cash flow equal zero. If you financed your system 100%, IRR does not apply since you did not actually invest cash.

System Resale Value

"System Resale Value" is based upon research published in the Appraisal Journal which concluded that "The increase in appraisal value for a home is about twenty (20) times the annual reduction in operating costs due to energy efficiency measures." To calculate System Resale Value the first year annual utility savings is multiplied by twenty (20). Source: [Evidence of Rational Market Valuations for Home Energy Efficiency](#), Appraisal Journal, Nevin/Watson, October 1998

Total Life-Cycle Payback

"Total Life-Cycle Payback" is the total cash flows (savings, incentives, tax benefits, etc.) for all years after installation as a percentage of the net cash invested in the year of installation ("Year 0"). This ROI calculation is not adjusted for inflation or the time-value of money.

Levelized Cost of Energy

"Levelized Cost of Energy" (or LCOE) is an approximation of the average cost of energy from your solar system (\$/kWh). To determine LCOE, the system Net Cost (\$ in the installation year) is divided by the amount of energy produced (kWh) over the system life (years). For this calculation, energy produced over system life is limited to the annual energy consumption of the building times the system life in years. The Net Cost does not include incentives which may materialize in later years, such as tax credits or deductions or production rebates. This calculation is not adjusted for the time-value of money.

Environmental Analysis

CO₂ gas emissions avoided per passenger via various travel methods:

Travel Method	Emissions / mile
Small Car	.59 pounds
Medium Car	1.10 pounds
SUV/4 Wheel Drive	1.57 pounds
Airplane (Boeing 747)	0.97 pounds

Air travel average USA capacity.

Tree offset calculation is based on a tree planted in the humid tropics absorbing on average 50 pounds (22 kg) of carbon dioxide annually over 40 years - each tree will absorb 1 ton of CO₂ over its lifetime; but as trees grow, they compete for resources and some may die or be destroyed - not all will achieve their full carbon sequestration potential. This calculator assumes that 5 trees should be planted to ensure that at least one lives to 40 years or that their combined sequestration equals 1 ton.

General waste is based on the USA average carbon dioxide emission equivalent of 1,010 pounds per person per year.

Sources: [Sightline Institute](#), [Trees for the Future](#) and [USA Environmental Protection Agency](#)



Electric Utility Rates & Assumptions

Utility:	Sacramento Municipal Util Dist (SMUD)
Rate Name (Post Installation):	Residential - Standard Heat
Rate Code:	R-SEH
Annual Inflation:	5.5% (assumed)

About Utility Average Costs

Tiered Rates: Solar can reduce the average cost of electricity by reducing Tiered rate usage.

We assumed the daily amount (kWh) that defines the base quantity for your location and electric usage. The percentage of the base quantity that triggers higher Tiered rates were also used. To estimate tiered electricity use after a solar installation, your historical electricity usage was reduced by the estimated solar system output (kWh) for that month. Your utility may change these rates or the tiers applied.

Tiered rate charges can account for a large percentage of your utility bill and the assumptions used in these estimates may not be accurate for your particular situation.

Annual Electric Bill "True-Up" (Reconciliation): This analysis assumes you will receive a cumulative credit from your electric utility at the end of the year for each month your system produces more energy value to the grid than you consumed. Sometimes this is referred to as a utility bill "true up". This action balances your bill across the year: often in summer months your solar system may provide excess electricity ("spin the meter backwards"), compared to winter months. So you receive billing "credits" in summer for excess energy generated (aka Net Excess Generation). At the end of the year these credits may be applied to charges incurred in months where you purchased electricity (usually winter months) assuming your utility provides Net Metering. This analysis assumes your total annual utility bill will not be less than any minimum utility customer charges, as applicable.

Utility Electric Rate Inflation: Historical References

California Rates: In 2009, the average retail electric rate was 13.24 cents per kWh (14.74 cents residential). Investor-owned utilities averaged 14.15 cents per kWh. Since 1970, electric rates in California have increased 6.7% annually.

National Averages: In 2009, the average retail electricity price for all customers across the United States rose to 9.83 cents per kWh, a small increase over 2008. Over the two year period though, from 2007 to 2009, the average retail price rose 7.7 percent.

In 2009, residential retail prices nationally increased from 11.26 cents per kWh in 2008 to 11.51 cents per kWh.

See the following Dept of Energy source for more detail on regional and state inflation patterns.

Source: http://www.eia.doe.gov/cneaf/electricity/esr/esr_sum.html

Site Survey Form

Project Name: _____

Project Number: _____

Address: _____

Photo Checklist

- Front View
- Area of PV Array
- All Electrical Panels - MFG, Labels, Main Breaker
- Proposed Location for Inverter
- Eave Showing Rafter Spacing
- Roof Clarification
- Pre-existing damage
- SunEye shoots

- **Electrical Info**

EES

Location of Existing Electrical System (EES): _____

Panel Feed Location: _____

Utility Service Voltage (V): _____

Bus Bar Rating (A): _____

Main Breaker Rating (A): _____

Space for Additional Breaker: _____

Distance Between Array and EES: _____

Existing Sub-Panel

Location of Existing Sub-Panel: _____

Panel Feed Location: _____

Bus Bar Rating (A): _____

Feed Breaker Rating (A): _____

Space for Additional Breaker: _____

Notes:

- **Roof Info**

Roof Type: _____

Condition: _____

Height: 1 Story / 2 Story

Azimuth (deg): _____

Roof Tilt/Pitch (deg): _____

Rafter Spacing (in): _____

Notes:

- **Roof Info**

Height: 1 Story / 2 Story

Azimuth (deg): _____

Roof Tilt/Pitch (deg): _____

- Roof Sketch with Dimensions
- Feature Locations/Dimensions

Solar Access and Shade Report

6/4/2014

For:

Binon
9756 Swan Lake Dr
Granite Bay

By:

Jonathan M

Measurements made by **Solmetric SunEye™** -- www.solmetric.com

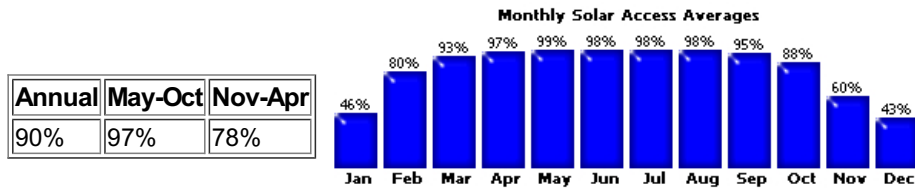


Session Properties

Name	Binon story 1
Creation Date	6/4/2014 22:16
Note	(none)
Location	38.8°N, 121.2°W Mag Dec: 13.9°E Time Zone: GMT-08:00

Solar access averages of 4 skylines in this session

Skylines Averaged: Sky01, Sky03, Sky04, Sky05



TSRF averages of 4 skylines in this session: 86%

Skylines

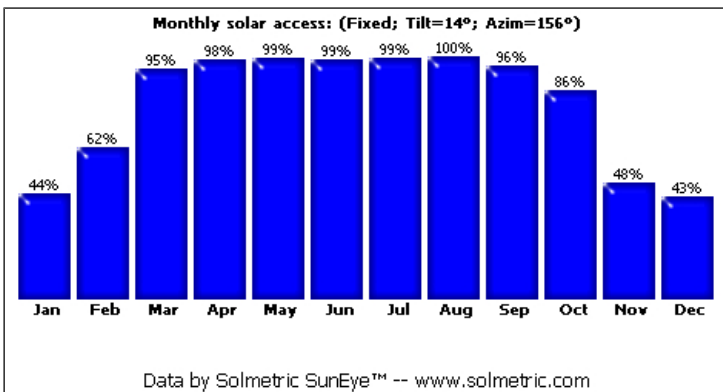
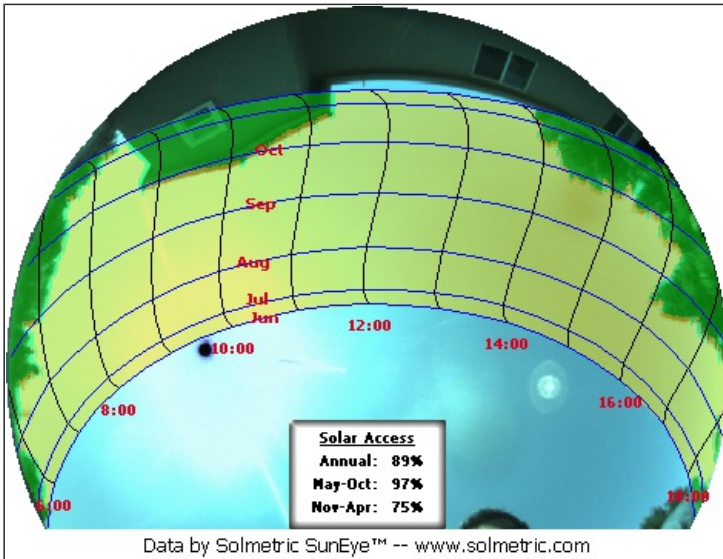
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- Sky03 - (no skyline note)
- Sky04 - (no skyline note)
- Sky05 - (no skyline note)

Sky01 -- 6/4/2014 22:18 -- (no skyline note)

Panel Orientation: Tilt=14° -- Azimuth=156° -- **Skyline Heading=180°**

Solar Access: Annual: 89% -- Summer (May-Oct): 97% -- Winter (Nov-Apr): 75%

TSRF: 85% -- **TOF:** 95%

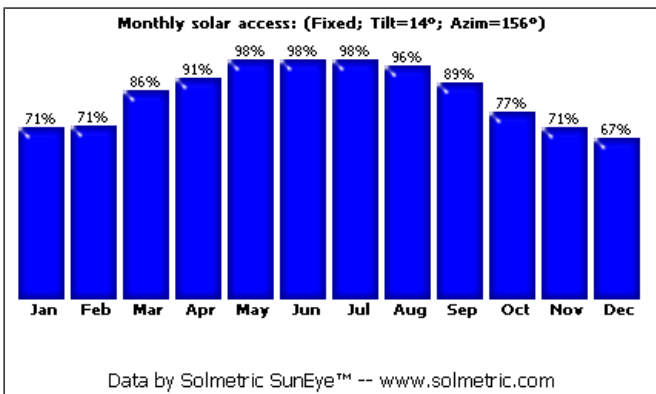
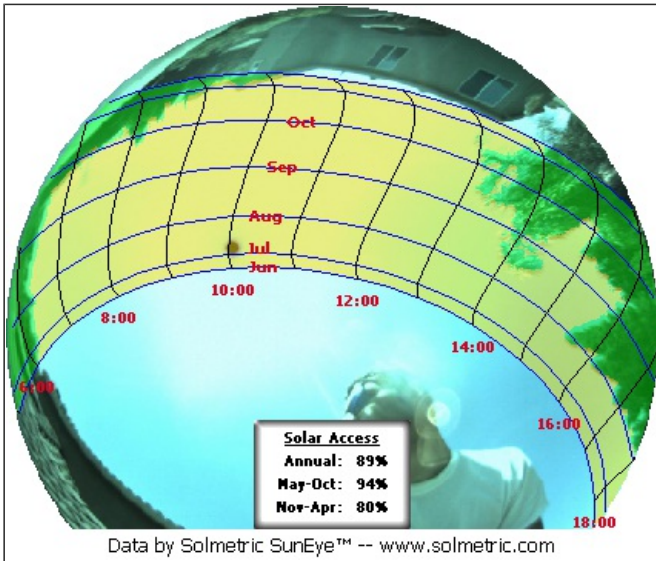


Sky03 -- 6/4/2014 22:19 -- (no skyline note)

Panel Orientation: Tilt=14° -- Azimuth=156° -- **Skyline Heading=166°**

Solar Access: Annual: 89% -- Summer (May-Oct): 94% -- Winter (Nov-Apr): 80%

TSRF: 85% -- **TOF:** 95%

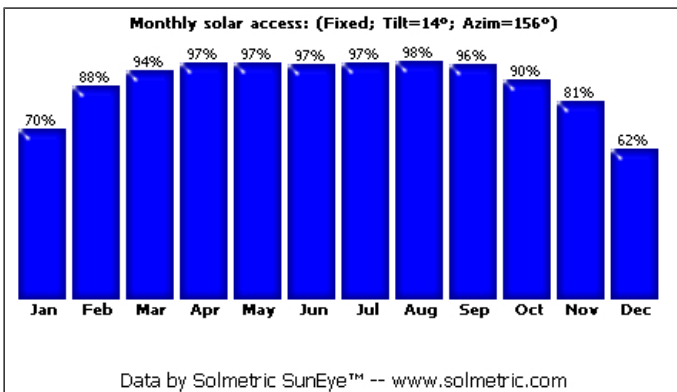
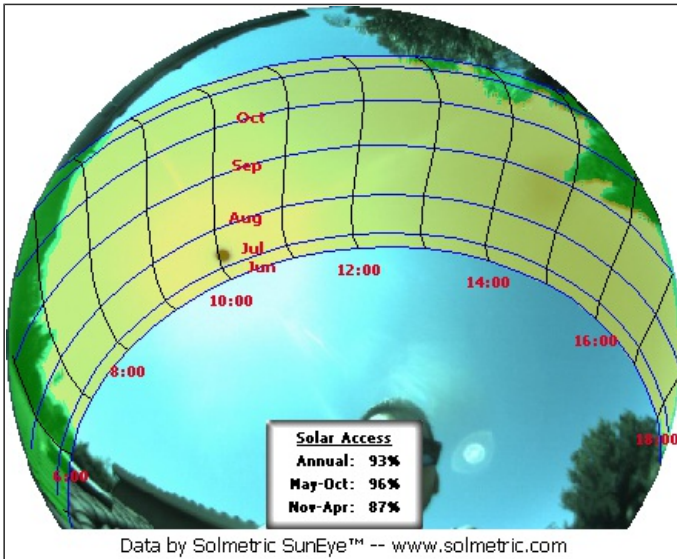


Sky04 -- 6/4/2014 22:20 -- (no skyline note)

Panel Orientation: Tilt=14° -- Azimuth=156° -- **Skyline Heading=183°**

Solar Access: Annual: 93% -- Summer (May-Oct): 96% -- Winter (Nov-Apr): 87%

TSRF: 89% -- **TOF:** 95%



Sky05 -- 6/4/2014 22:21 -- (no skyline note)

Panel Orientation: Tilt=14° -- Azimuth=156° -- **Skyline Heading=184°**

Solar Access: Annual: 89% -- Summer (May-Oct): 99% -- Winter (Nov-Apr): 71%

TSRF: 85% -- **TOF:** 95%

