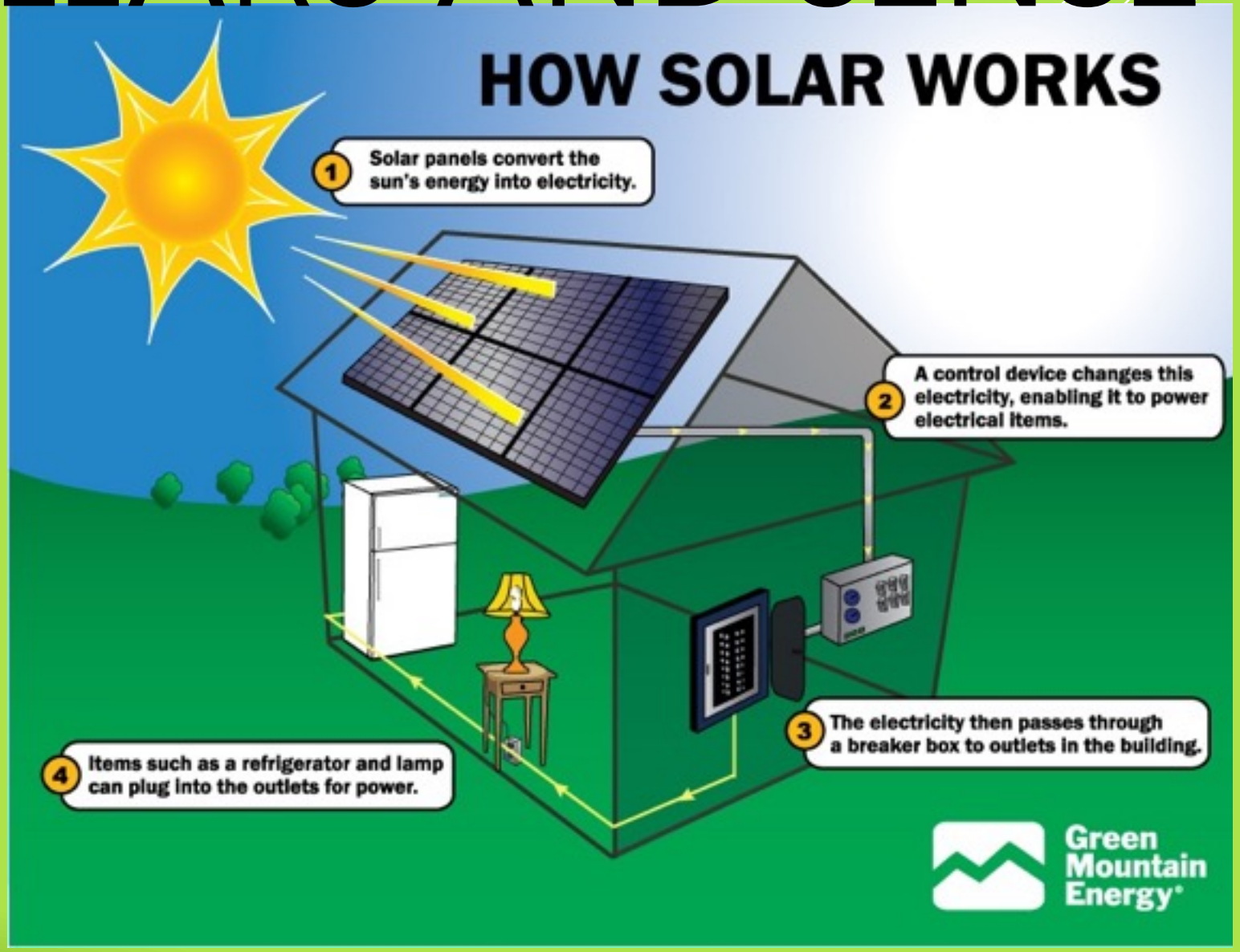
SOLAR DOLLARS AND SENSE

If you believe in climate change and don't have solar you are a charlatan!



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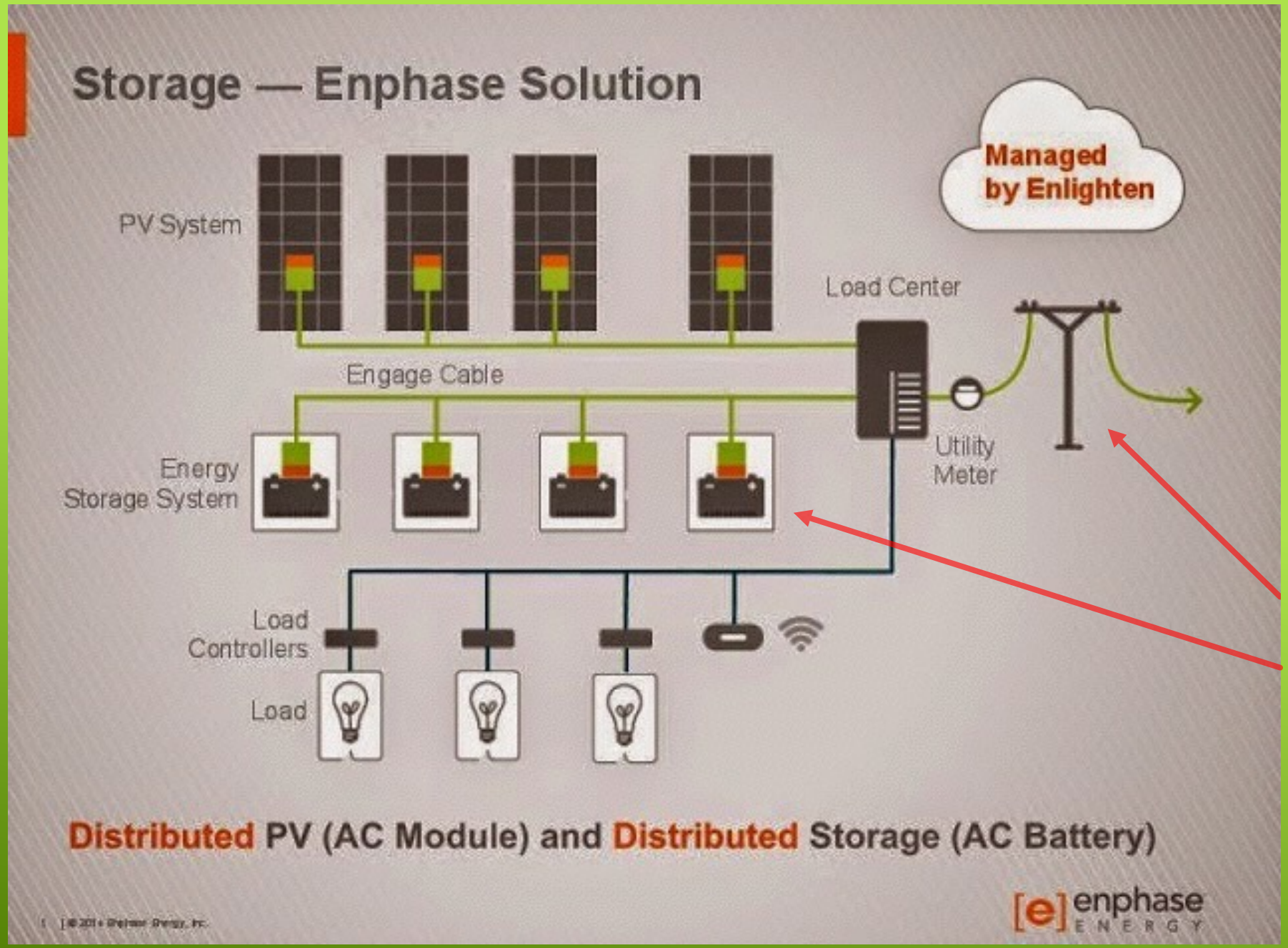
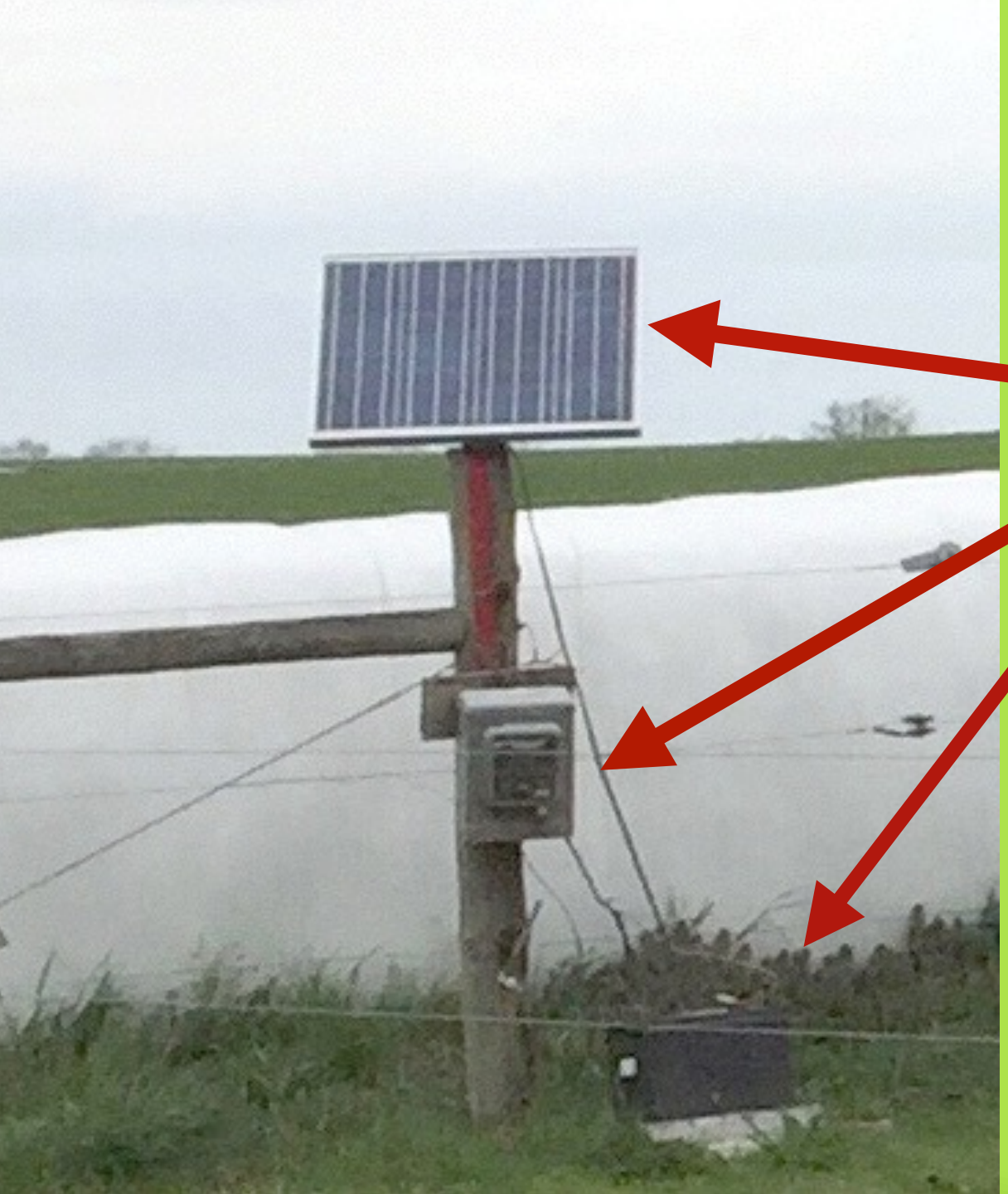


Simplified Schematic

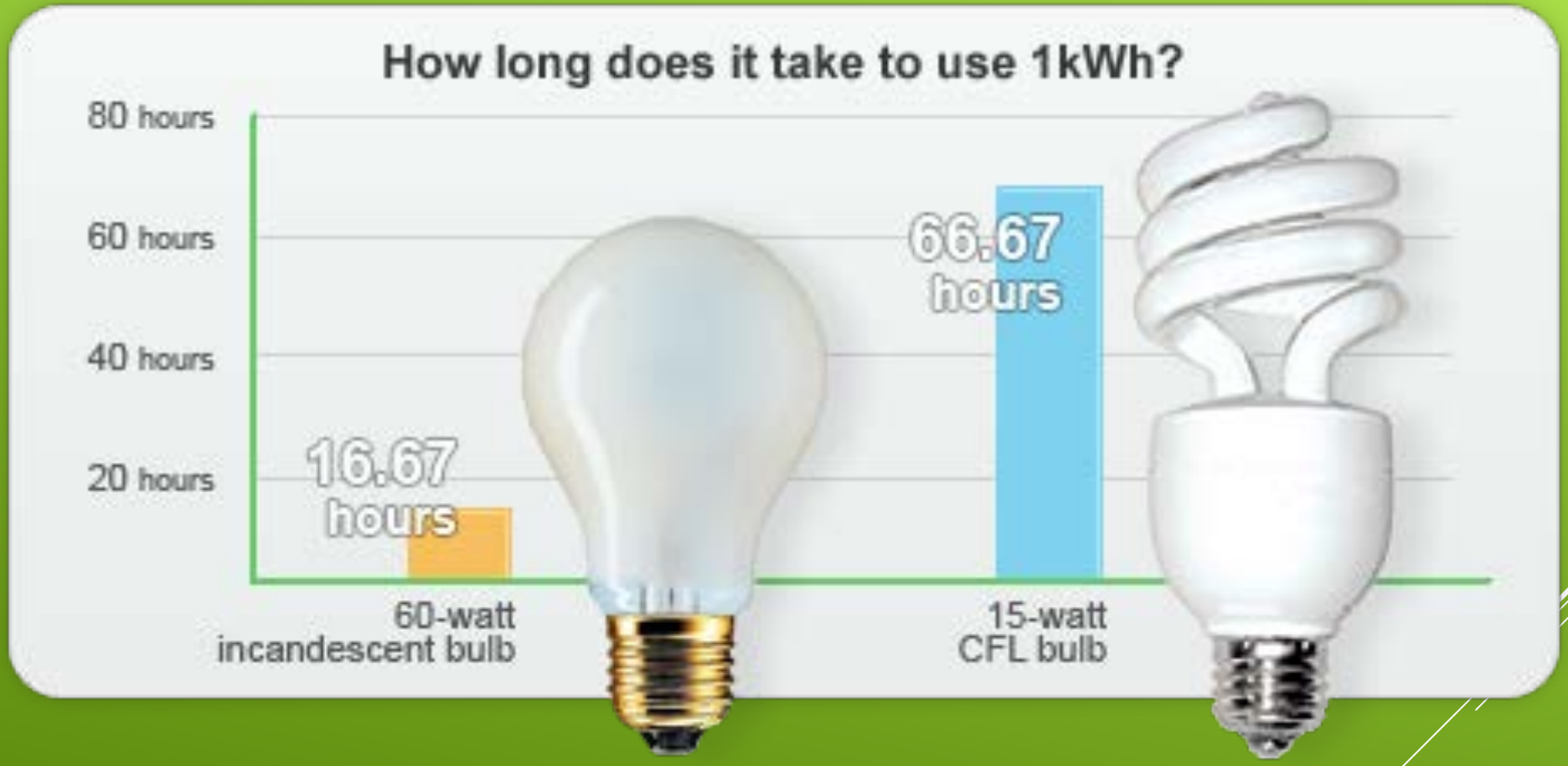
- Solar Panels
- Micro Inverter
- Load Center
- Lights

- Grid System
- Batteries

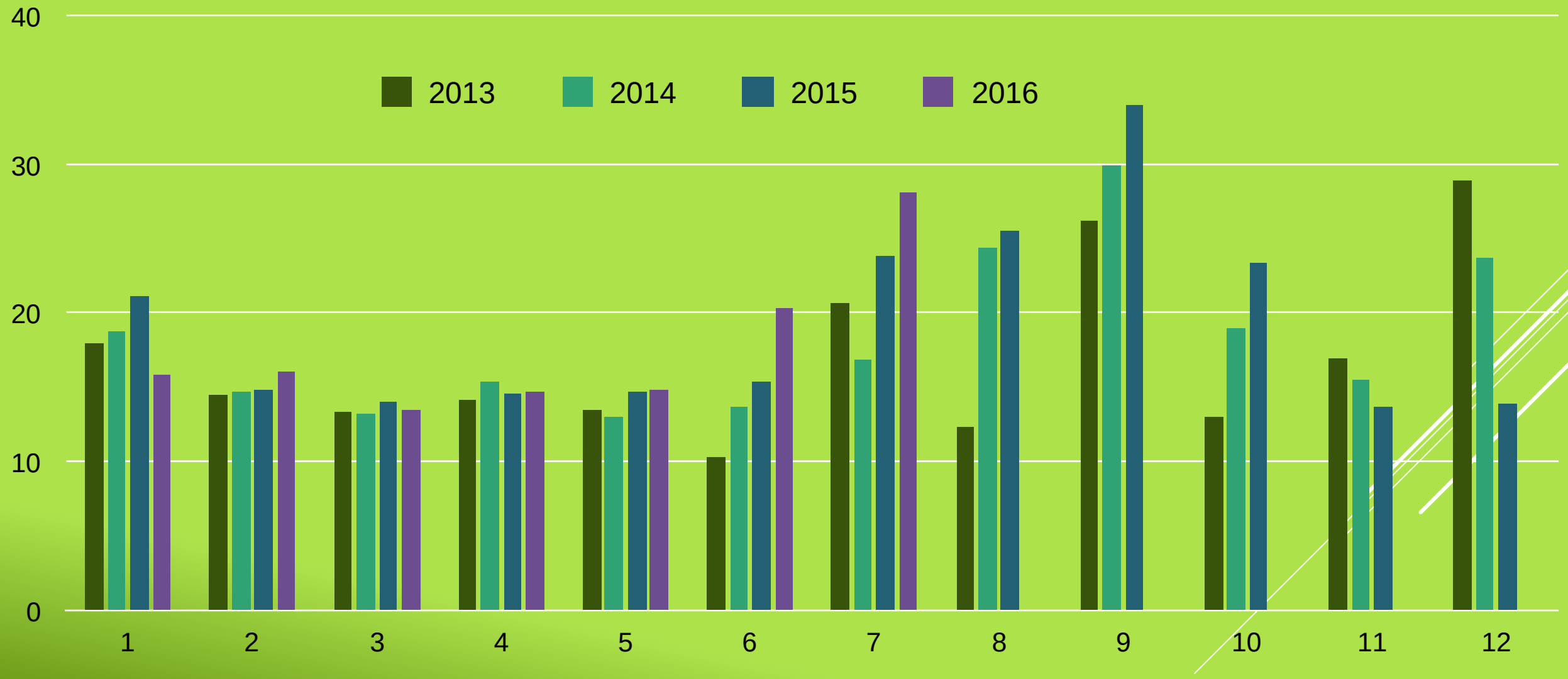


OFF GRID SYSTEM

SOLAR PANEL
CONTROLLER
BATTERY
LOAD (FENCE WIRE)


How long does it take to use 1kWh?
80 hours
60 hours
40 hours
20 hours
16.67 hours
66.67 hours
60-watt incandescent bulb
15-watt CFL bulb

Daily Ave. Energy Usage Last 4 Years in KWh



Effective June 2016		SCE Charge			
Tier	1	2	3		
Charge	16¢	23	29	Per KWh	
KWh	Up to 304	Up to 608	Over 608	Monthly	
	100%	200%	over 200%	Tier Level	
Prior to June 2016		SCE Charge			
Tier	1	2	3	4	
Charge	16¢	22¢	28¢	30¢	Per KWh
KWh	Up to 304	Up to 394	Up to 608	Over 608	Monthly
	100%	130%	200%	over 200%	Tier Level
Region 8	KWh/day	KWh/mo	Temperature	Based	Fullerton, CA
Summer	10.1	304	Hotter	Tier Level	
Winter	9.2	279	Cooler	Tier Level	

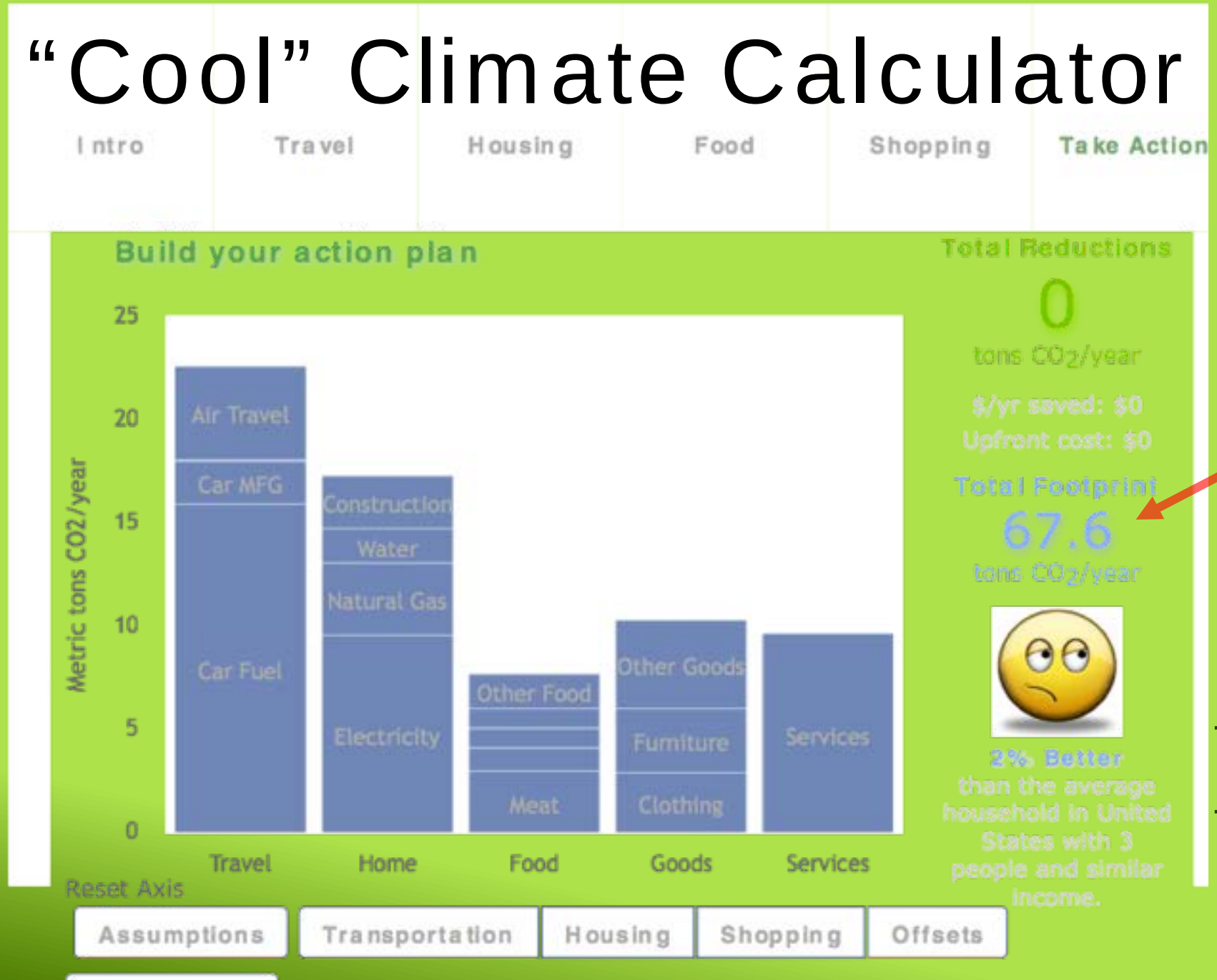
2019 SCE CHARGE WILL BE BASED UPON TIME OF USE

Actions Taken to Reduce Energy Use:

- Lights- fluorescent or LED installed 2012/13
  - Double Pane Windows installed 2012
- Appliances-Latest Energy Star installed 2013
- Air Conditioning-Energy Star installed 2013
- Exhaust fans in attic, garage installed 2014
- Insulation in Roof installed 2002
- Shut off lights, computer when not in use
- Artificial Grass (reduce water) installed 2014

Oops-Increased Energy Use—Grandson October, 2014

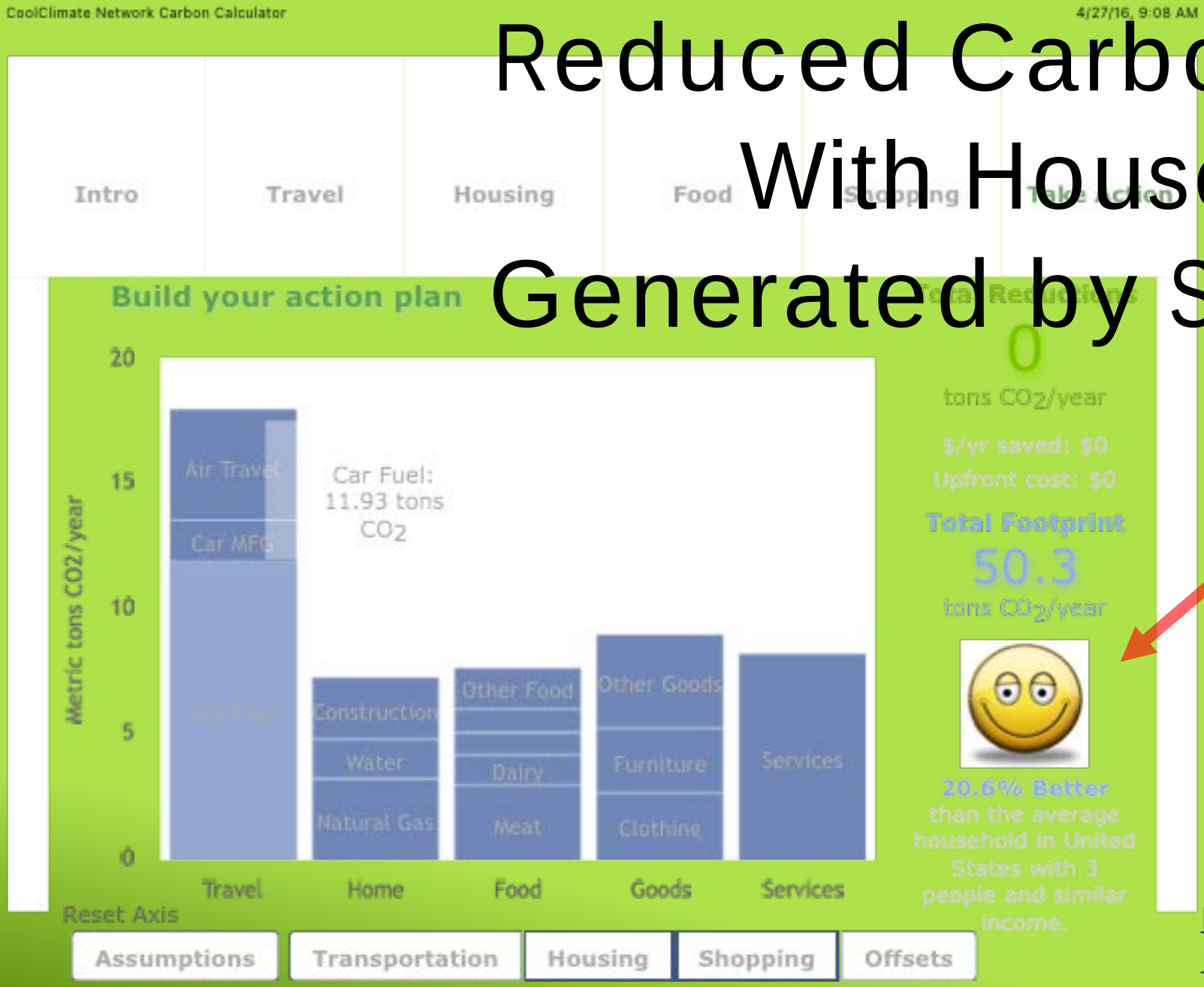
“Cool” Climate Calculator



Carbon Footprint

COOL CLIMATE CALCULATOR

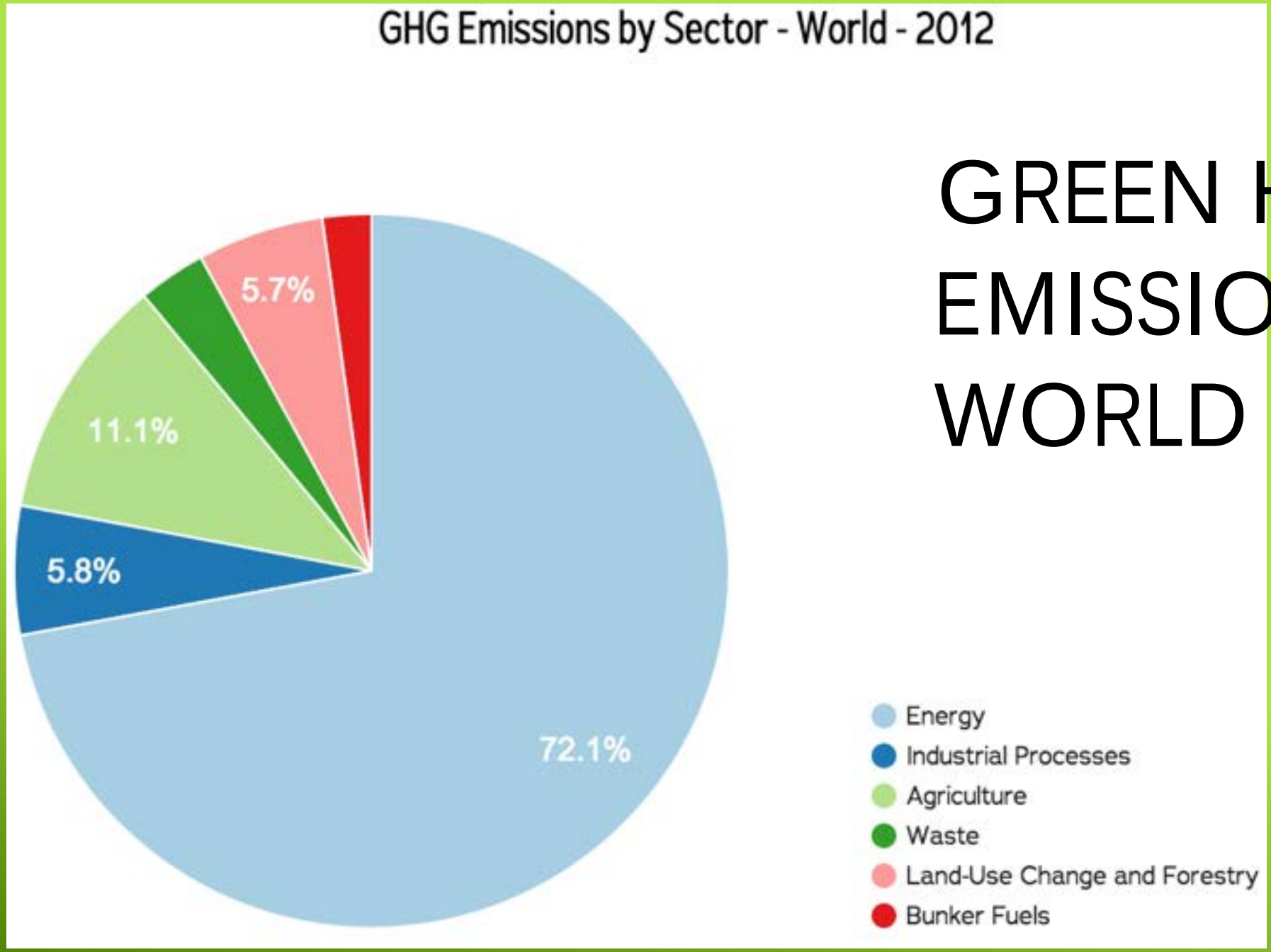
Reduced Carbon Footprint With House Electricity Generated by Solar Panels

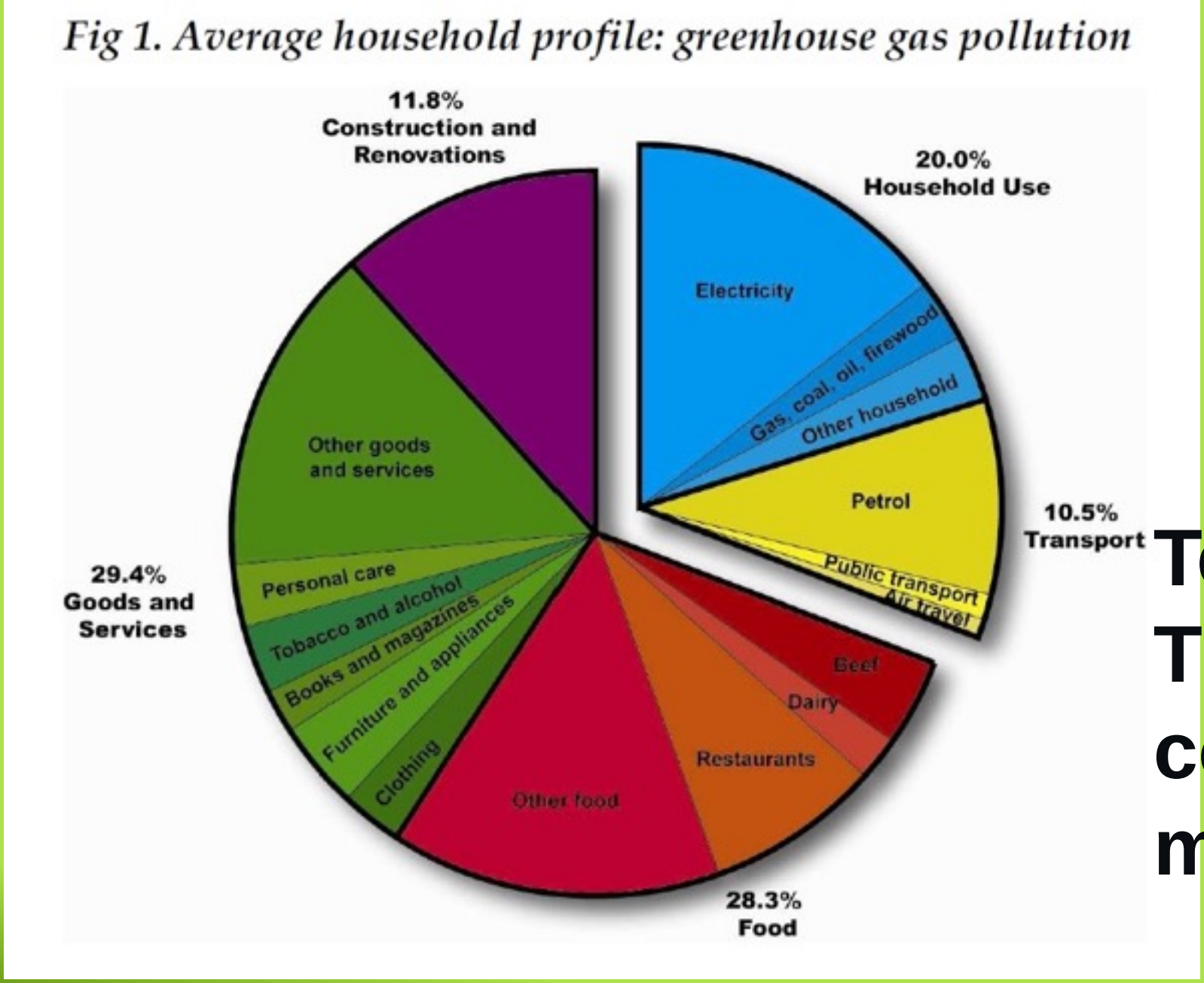


Smiling Face

HTTP://COOLCLIMATE.BERKELEY.EDU/CALCULATOR

GREEN HOUSE GAS EMISSIONS WORLD WIDE





Household 20%
Auto 10.5%

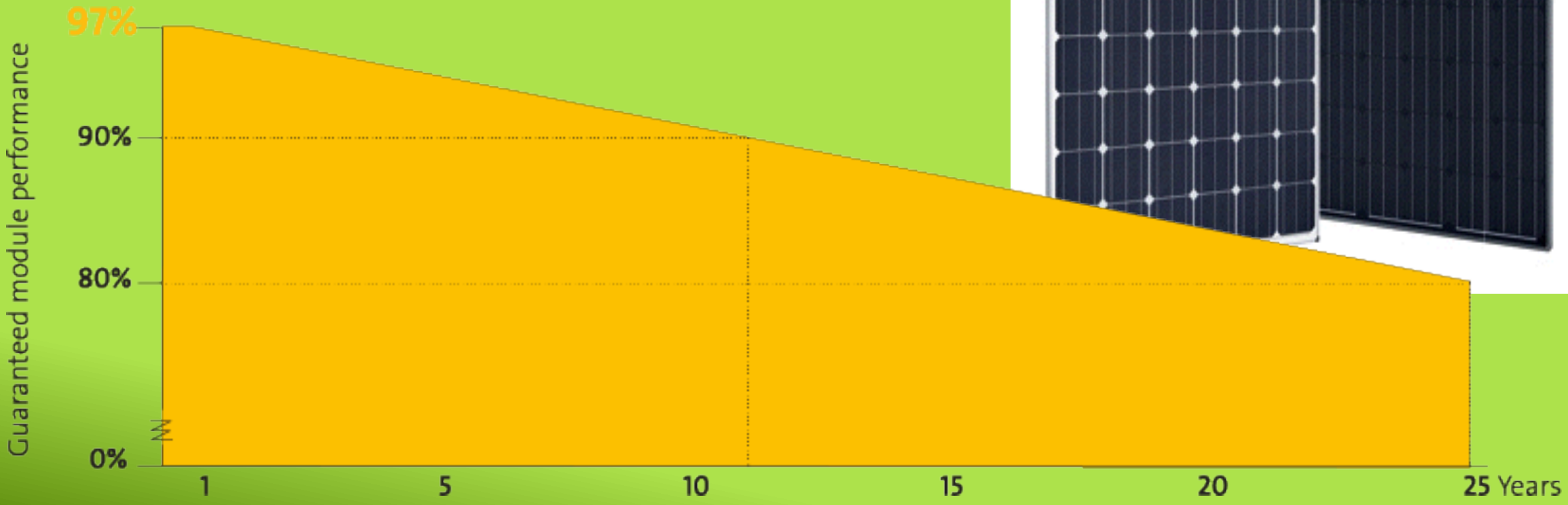
Tesla Model S: The finest coal-powered car money can buy

SACRIFICES TO REDUCE CARBON FOOTPRINT

Don’t Fly—a 737 burns 1 gallon of gas per 1 ½ miles
Don’t Cruise-the Queen Mary burns
2 gallons of bunker fuel per foot traveled
Walk everywhere and save gasoline,
natural gas, coal, diesel, etc.
Don’t eat meat, the flatulence will get you
Don’t use a toilet and save 1 or more gallons of water
Don’t buy on line, UPS or Fed Ex
burns extra fuel to your door
Don’t …
Don’t….

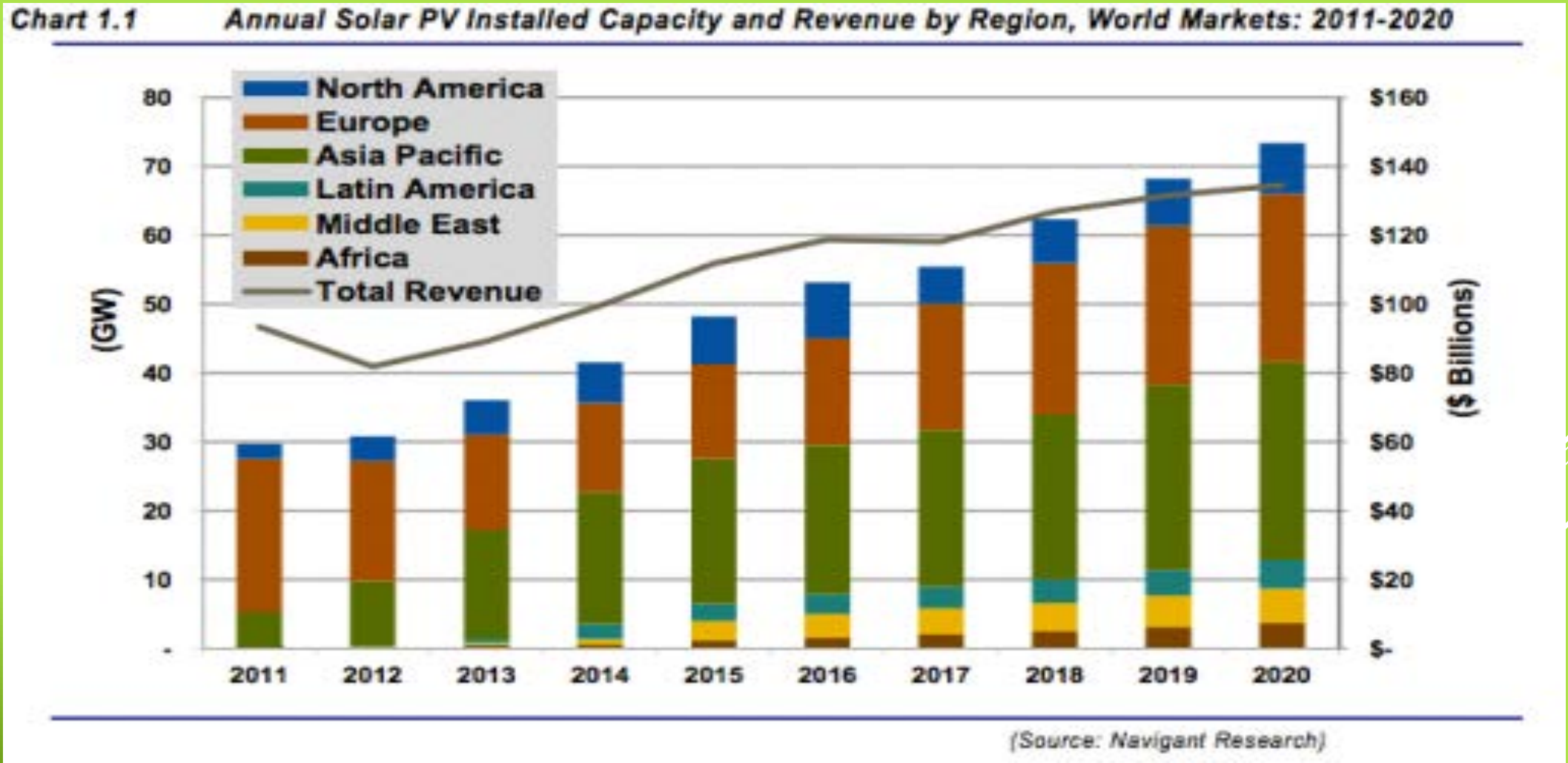
WHY INSTALL SOLAR PANELS ON YOUR HOME?

?

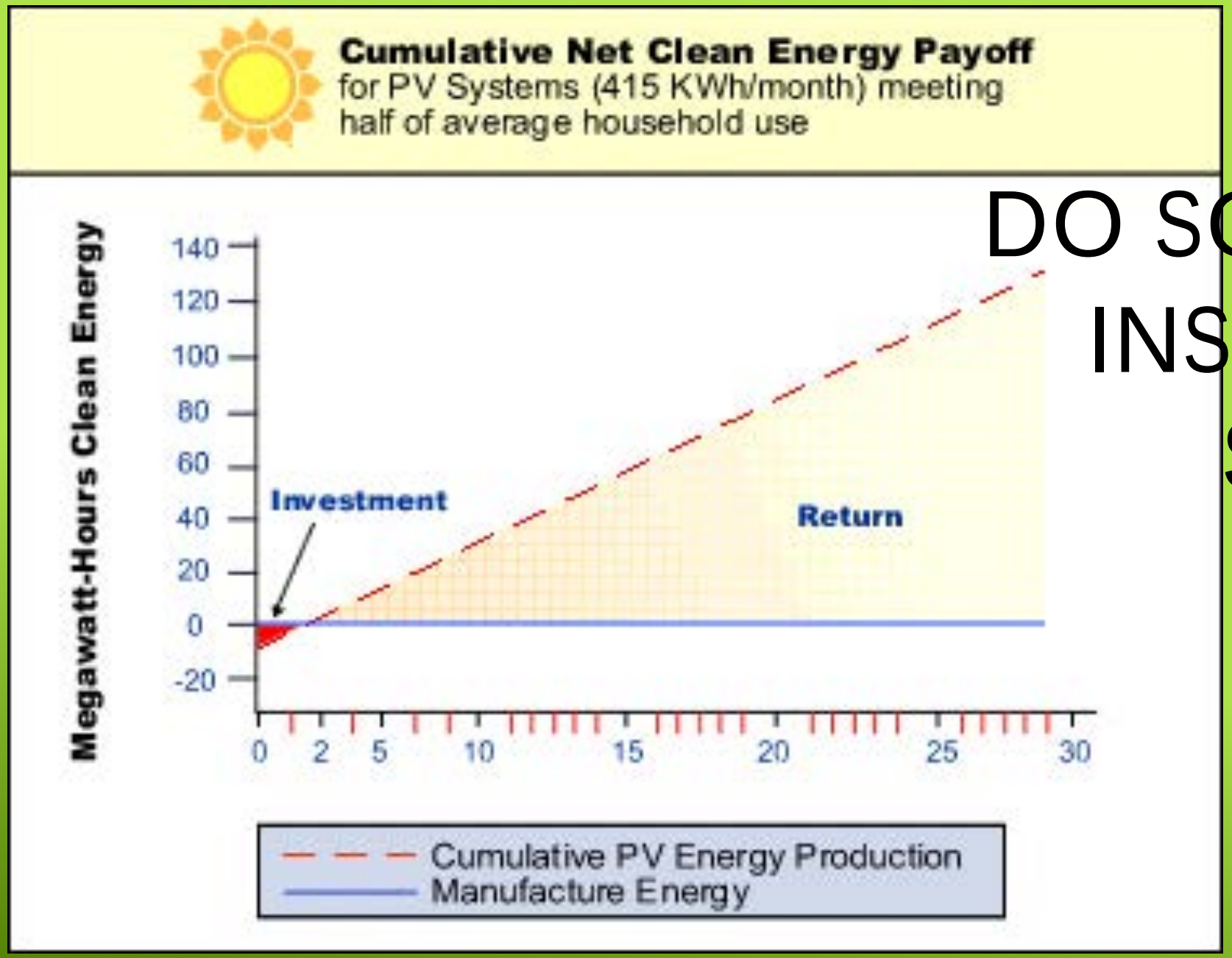


- 1: Solar panels require more energy to manufacture than they produce in their lifetime.
- 2: Solar manufacturing results in more pollution.
- 3: Solar is too expensive for widespread usage.
- 4: I will store the excess energy I generate in batteries.
- 5: When power goes out, my home is still powered by solar
- 6: My solar panels won't work in the cold winter weather.
- 7: Solar panels require maintenance.
- 8: The payback is far too long.
- 9: A solar electric system will raise my property taxes.
- 10: Solar panels make my roof to leak, deteriorate, or collapse.

SOLAR PANEL INSTALLATIONS WORLD WIDE



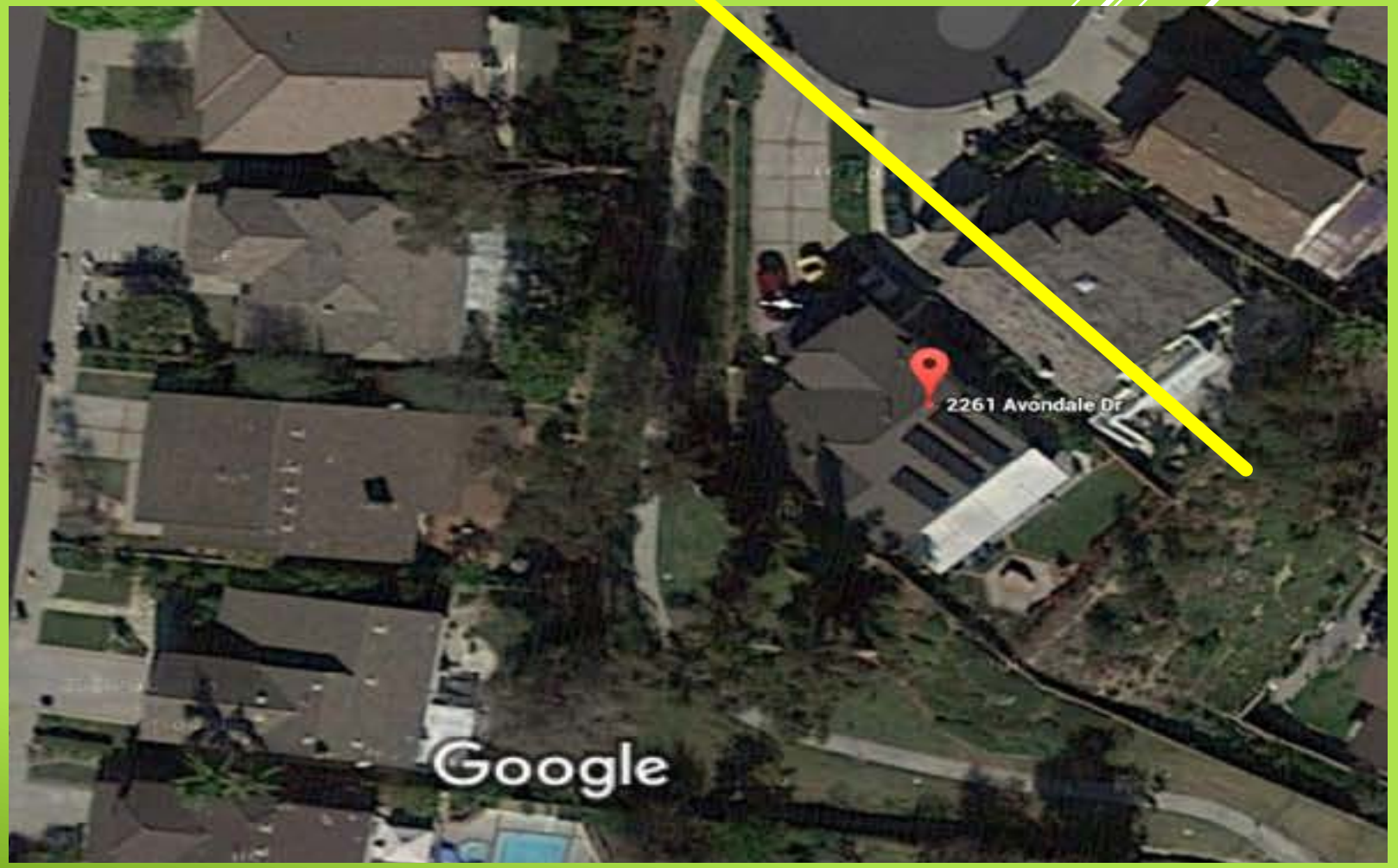
DO SOLAR PANEL INSTALLATIONS SAVE GHG?



INSTALLATION

Reasoning:

- Environment
- Return on Investment
- Rebate Ending
- Electric Car?
- Long Term
- Off Grid?



GO solar CALIFORNIA

Incentive Calculator - CSI Standard PV

The CSI-EPBB calculator is a tool available to participants of the CSI Program to determine the EPBB Design Factor and calculate an appropriate incentive level based on a reasonable expectation of performance for an individual system. The CSI-EPBB Calculator has also been created for consumer's to educate themselves on the differences of solar system design and how changes to the PV system's specifications will produce different kilowatt hour results over the course of a year. Please be aware that actual performance of an installed PV system is based on numerous factors, including some factors that may not be considered in the CSI-EPBB Calculator. While this calculator relies on industry-standard assumptions, and is driven by NREL's PVWatts v. 2 calculator, there may be other factors that affect the output of your PV System.

	Proposed	Reference
Site Specifications:		
Project Name	Fritz von Coelln	
ZIP Code	92833	92867
City	Fullerton	Orange
Utility	SCE	
Customer Type	Residential	
Incentive Type	EPBB	
PV System Specifications:		
PV Module	SolarWorld SW165 mono 165.000 STC, 147.400 PTC, 150.100 PTC_{adj} [1]	
Number of Modules	16	
Mounting Method	>6" average standoff	
DC Rating (kW STC)	2.6400	
DC Rating (kW PTC)	2.3584	
Inverter	Enphase Energy M250-60-2LL-S23 (-ZC) (-NA) (240V) This inverter requires the addition of a meter/display to qualify for the CSI program. The CSI program requires that all EPBB customers install a +/-5% or better meter. Please refer to section 5.3.8 of the CSI Handbook or the California Energy Commission's List of Eligible System Performance Meters.	
Number of Inverters	16	
Inverter Efficiency (%)	96.50 %	
Shading	**Shading Derate Factors (%)**	
January	80	100
February	80	100
March	80	100
April	80	100
May	80	100
June	80	100
July	80	100
August	80	100
September	80	100
October	80	100
November	80	100
December	80	100
Array Tilt (degrees)	17	
Array Azimuth (degrees)	135 **True North 0°**	
Optimal Tilt (proposed azimuth)	17	
Optimal Tilt (facing South)	17	17

Estimated Monthly Production

	Proposed	Reference
Results		
Annual kWh	3,193 (a)	
at optimal tilt	4,084 (b)	
facing south at optimal tilt	4,084 (c)	4,050 (d)
Summer Months	May-October	May-October
Summer kWh	1,823 (e)	
at optimal tilt	2,377 (f)	
facing south at optimal tilt	2,377 (g)	2,345 (h)
CEC-AC Rating	2.276 kW	
Design Correction[2]	76.693%	
Geographic Correction[3]	100.000%	
Installation Correction[4]	100.000%	
Design Factor[5]	76.693%	
CSI Rating[6]	1.746 kW	
Incentive Rate	$0.20/Watt	
Incentive[7]	$349	
Report Generated on	5/4/2016 6:41:18 AM	

Notes:

1. PTC_{adj}: The adjusted PTC rating is calculated based on the installation method and panel specifications. See the User Guide Appendix A for details on the adjusted PTC calculation.
2. **Design Correction**: This is the ratio of the summer output of the proposed system (e) and the summer output of the summer optimal system at the proposed location (f).
3. **Geographic Correction**: This is the ratio of the annual output of the summer optimal south facing system at the proposed location (c) and the annual output of the summer optimal south facing system at the reference location (d).
4. **Installation Correction**: This is the ratio of the adjusted PTC rating and the unadjusted PTC rating.
5. **Design Factor**: This is the product of the Design Correction, Geographic Correction, and Installation Correction.
6. **CSI Rating**: This is the product of the Design Factor and the CEC-AC Rating.
7. **Incentive**: This is the total incentive for the proposed system. It is the product of the CSI Rating and the Incentive Rate.
   Please be aware that the final CSI incentive rate that is reserved for you will be determined by your CSI Program Administrator at the time your reservation request (RR) application is approved, and may be lower than the current incentive rate shown in the CSI Statewide Trigger Point Tracker. Please note that final incentive amounts are subject to change based upon the configuration of the as-built system. (Per the CSI Handbook, no projects or applications are reserved CSI funding until all required information has been submitted and approved in writing by the Program Administrator.)
8. As of 6/29/08, the CSI-EPBB calculator performs rounding as follows:
   - Estimated kWh production is rounded to the kWh
   - CEC-AC rating is rounded to the watt
   - CSI rating is rounded to the watt
   - Design factor is rounded to 5 significant digits
   - Incentive is rounded to the dollar

E-mail csi-epbb@aesc-inc.com with questions or comments.

GENERATION CALCULATION

Installing Brackets
Under Shingles

Rails Up,
First Panel To Go In

Panels In First Two Rows
Tilted for Best Sun Angle

Shows 15 degree +
Angle of Panels

Looks like my house is flying away looking Northwest

Cindy's Trees shade at 3 pm

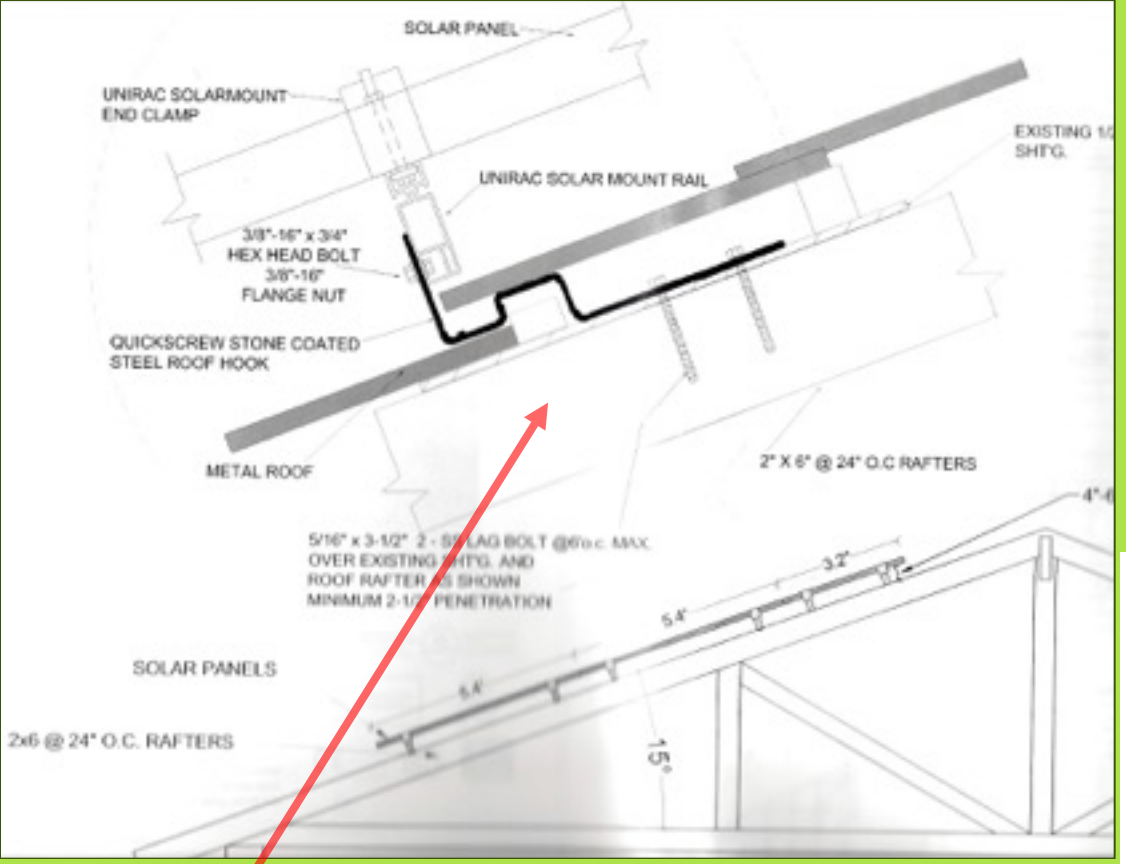
Roof is full of pipes, skylights, etc.

Meter/Load Center
Cut off switch is to disconnect solar

Enphase Envoy
Brains of System

Solar City Installation down the street

Pipes on Side of house



NON-PIERCING ROOF BRACKET

Process: (Due Diligence a must!)

- Establish Specifications-What do you want?
  - Research What is Available
  - Everything in Writing
- Check With Roofing Company OK to Install Solar Panels
- Solicit and Evaluate Contractors
  - Competent Contractors
  - Contractor License, Insurance, BBB complaints
- Evaluate Bids,
  - Equivalent Design, Conditions, Warranties, Materials
  - Price (Turn Key include all taxes, permits, licenses, etc.
  - What sets one company apart from others?

- Contract Negotiations and Award Everything in Writing
- Drawings and Specifications
  - Review Drawings To Be Sure Meet Contract
- Permit (City, Fire Department, HOA)
- Application to Utility (SCE)
- Installation (3 Days)
  - Plan to be there to oversee materials, work being done
  - Don’t be afraid to ask questions
- Inspections and Approvals
  - City Inspector Your Friend-be with him during inspection
- Connect System –Permission by Edison to Connect

- Notify Insurance Company that panels are installed
- Installer Provides Warranties, Lien Releases, Manual
- Monitor System (Computer App)
  - Compare System Production vs. Design
  - Generation Daily and Monthly Basis (SCE/App)
  - Savings
- Enjoy Meter Going Backwards and $10 SCE Monthly Bill
- File for Rebate With President Obama on your Taxes
- Check For Problems-Discuss with Installer
  - Leaks in roof
  - Questions you may have

Turnkey Installation including permits and approvals

Contract: $23,000 (special roof connectors, MI,batt. con)

Rebate: $7,000 (will apply w/ 2016 taxes)

Total Capital: $16,000 Net Cost

Anticipated Savings: $1,200 first year

Monthly Electrical Bill: $9.54 for grid distribution (May go up)

25 year guarantee on panels and micro-inverters

10 year guarantee on installation

Current metal roof has 35 year guarantee remaining

Help

2261 Avondale Dr Fullerton CA 92833

Real Estate Parcel Type:	Residential
System Type:	Solar PV
System Leased:	No
System Capacity:	4000.00 Watts *
Annual Energy Output:	6,491.16 kWh
Interconnection Date:	7/23/2015*
Utility:	Southern California Edison
Climate Zone:	8

ESTIMATED ENERGY USAGE RATE	Low	Avg.	High	Custom *
PRESENT VALUE	$21,495.43	$32,243.14	$42,990.86	N /A
Utility Rate (per kWh)	$0.15000	$0.22500	$0.30000	N/A
2016 Energy Cost Savings	$973.67	$1,460.51	$1,947.35	N/A

Solar Capacity Factor:	18.53 %
Age:	0 Years *
System Remaining Lifetime:	25 Years *
System Expected Lifetime:	25 Years *
Annual Discount Rate:	3.00 %
Annual Energy Escalation Rate:	2.00 %
Annual Solar System Degradation Rate:	1.00 %

Asterisks (*) denote operator specified values and cannot be verified for accuracy by the California Energy Commission

Program Source: Real Estate Parcel Owner

Based upon $100 monthly electricity bill Calculator

Solar Estimate Results | EnergySage 4/29/16, 11:59 A

Buy

LEASE

PAY CASH	$0-DOWN LOAN	$0-DOWN LEASE/PPA
Own the system; maximize savings	Own the system; no up-front cost	Rent the system; no up-front cost
$20,000 20 Year Net Savings	$13,000 20 Year Net Savings	$8,200 20 Year Net Savings
$12,000 Net Cost	$0 Out-of-Pocket Cost	$0 Out-of-Pocket Cost
8.9 Years Payback	Immediate Payback	Immediate Payback
3% or more Increase in	3% or more Increase in	0% Increase in

STEP 2: Get competing solar quotes online, no phone calls required.

Compare Solar Quotes

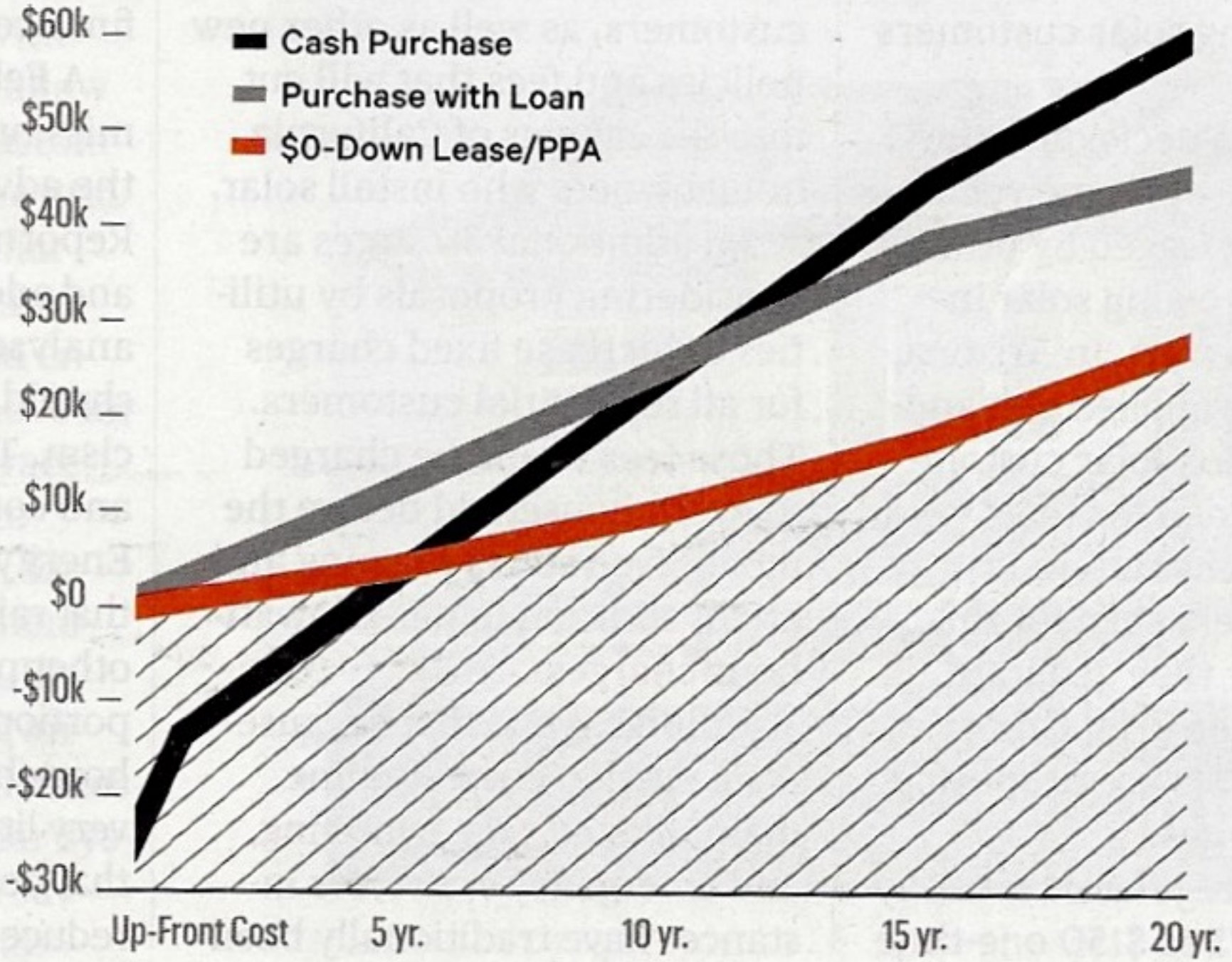
Your Estimated Savings Your Estimated Savings Your Estimated Savings

Based upon $100 per month electricity bill

Calcu

A LOOK AT WHAT YOU LOSE BY LEASING

A comparison of how much a residential solar system could save a New Jersey homeowner, depending on whether it was bought up front, bought with a loan, or leased



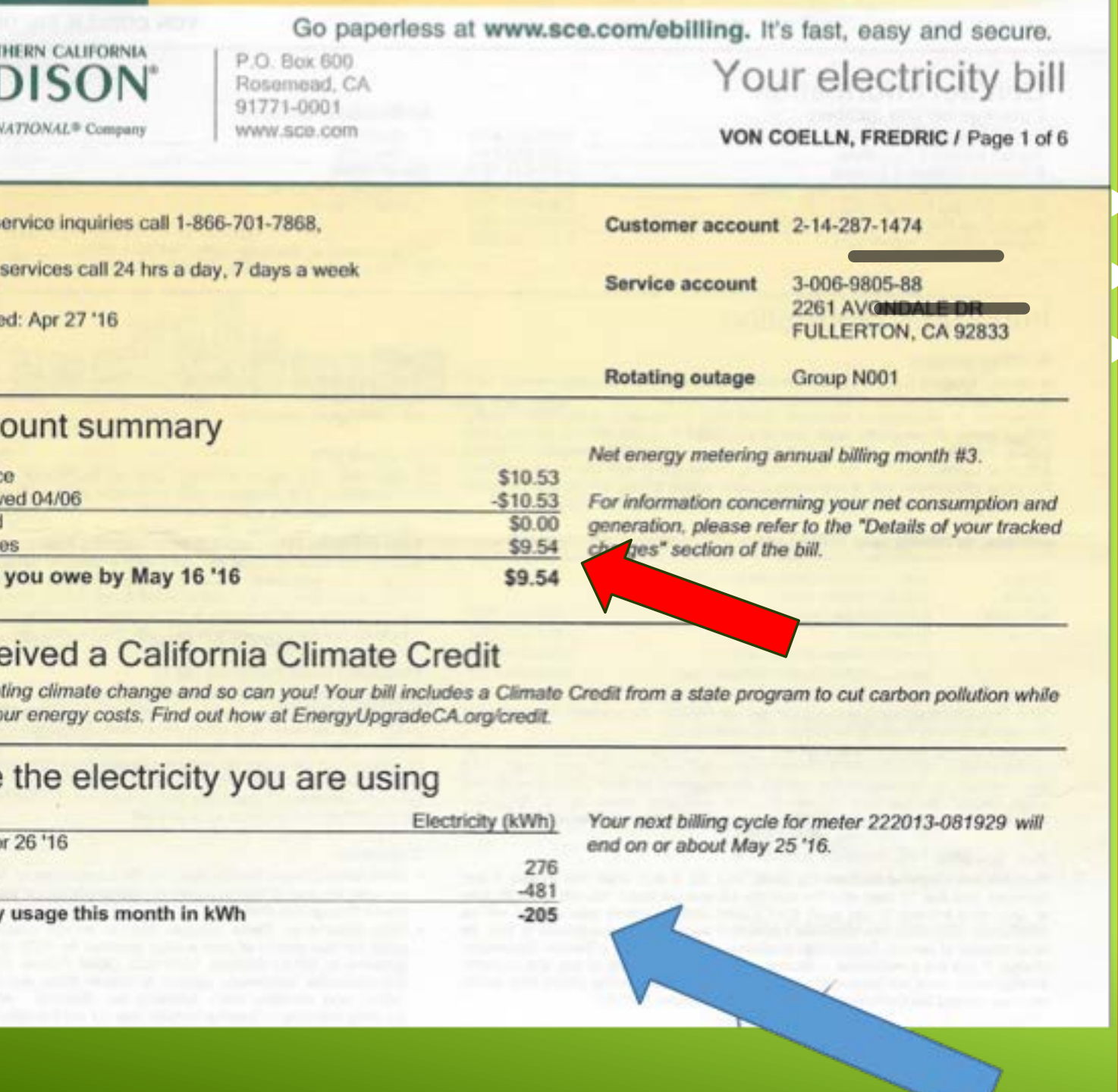
- Solar City Lease Contract (free for similar sized system)
  - Basic Charge about $80/month
  - Tax about $7.50/month
  - Surcharge $ 7.50/month
  - Total about $95/month
  - Annual increase 2.9%
  - Very happy with negotiations, contract, installation, operation and savings

- Alternatives buy vs “free”
  - Buying is preferred
    - More $ savings
    - Risks in possible maintenance costs
  - “Free”-apparently problems
    - Monthly charge--some complaints little or no savings
    - When sell home may be contractual problem
    - 2.9% increase/year so $75 yr 1 goes to $128 in 20 yrs
    - Remove at end of lease, or renew lease

- Problems with my roof:
  - Metal shingles need special brackets to assure integrity of roof
  - Must know how to walk on roof so won't dent shingles

- 5 contractors (contract cost before rebate)
  - Solar City—no bid due to of roof-some negatives on leasing- free!
  - Freedom-$17,000 low bid, not impressed with sales person or co
  - Pederson Dean-highly recommended but no bid because of roof
  - Infinity solar-$20,000 mid-price, impressed, could not handle roof
  - Vasco-$23,000 good company, highest price, could handle roof

- Composite roof which is on most houses
  - Remove shingles then built up roof
  - 10 year warranty on built up roof but 25 warranty on panels
- Rebate
  - IRS 30% changes in future years unless congress extends it
  - California rebate program discontinued –I did not get it
  - Net Metering program with SCE
    - I have 20 year agreement with SCE for current pricing
    - A future program may not be as lucrative



Go paperless at **www.sce.com/ebilling.** It's fast, easy and secure.

HERN CALIFORNIA
DISON
NATIONAL® Company

P.O. Box 600
Rosemead, CA
91771-0001
www.sce.com

Your electricity bill

VON COELLN, FREDRIC / Page 1 of 6

ervice inquiries call 1-866-701-7868,

services call 24 hrs a day, 7 days a week

ed: Apr 27 '16

Customer account 2-14-287-1474

Service account 3-006-9805-88
2261 AV[redacted]NDALE DR
FULLERTON, CA 92833

Rotating outage Group N001

ount summary

ce	$10.53
ved 04/06	-$10.53
	$0.00
es	$9.54
you owe by May 16 '16	**$9.54**

Net energy metering annual billing month #3.

For information concerning your net consumption and generation, please refer to the "Details of your tracked ch[redacted]es" section of the bill.

eived a California Climate Credit

ting climate change and so can you! Your bill includes a Climate Credit from a state program to cut carbon pollution while ur energy costs. Find out how at EnergyUpgradeCA.org/credit.

e the electricity you are using

	Electricity (kWh)
r 26 '16	
	276
	-481
y usage this month in kWh	**-205**

Your next billing cycle for meter 222013-081929 will end on or about May 25 '16.

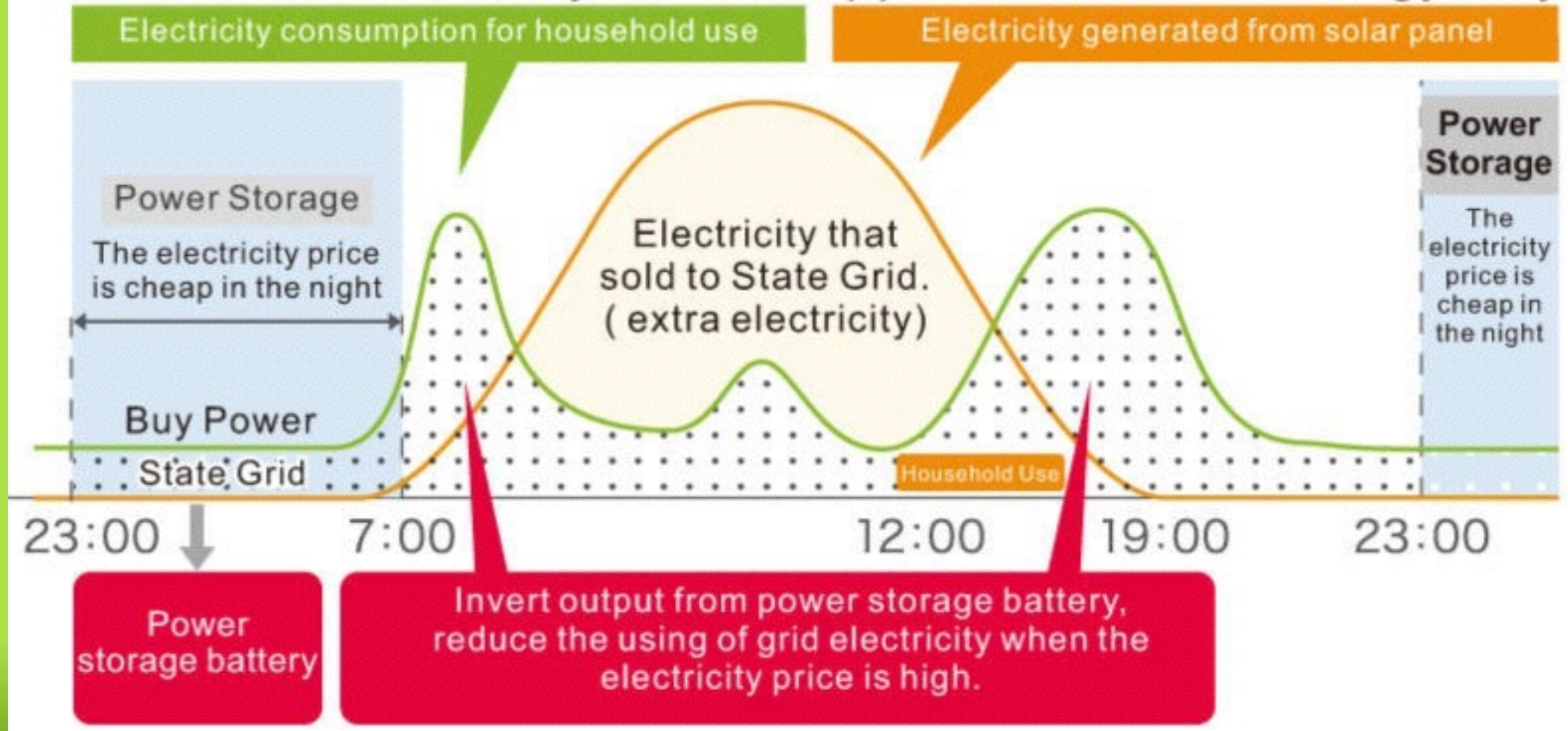
- Monthly Charge $9.54
- Calculation of Usage
- April 2016 kWh
  - Enphase Generation 646
  - Transmitted to SCE 481
  - Used during day 165
  - Used at night 276
  - Total used 441
  - Excess “sold” to SCE 205

SCE Account

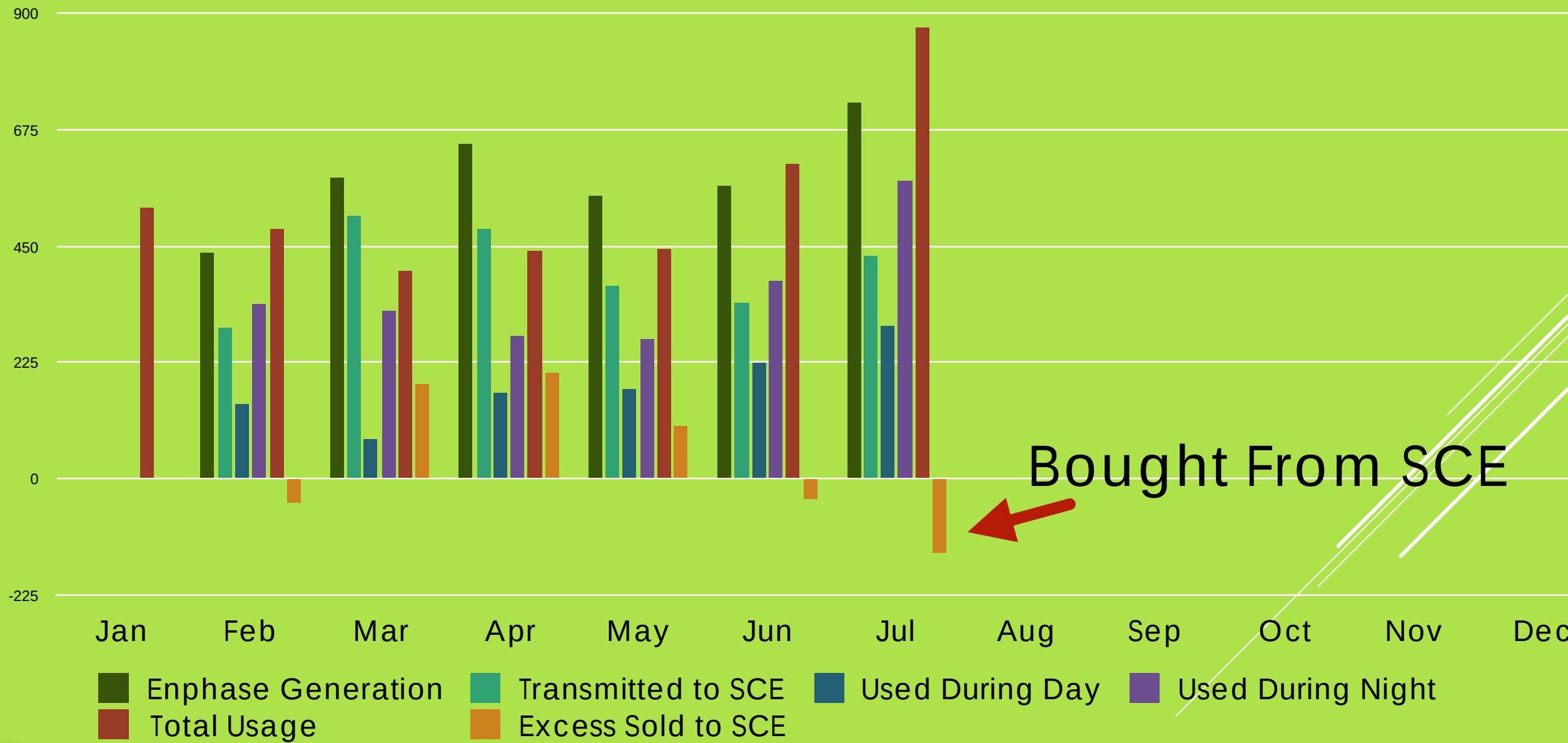
ENPHASE ENLIGHTEN

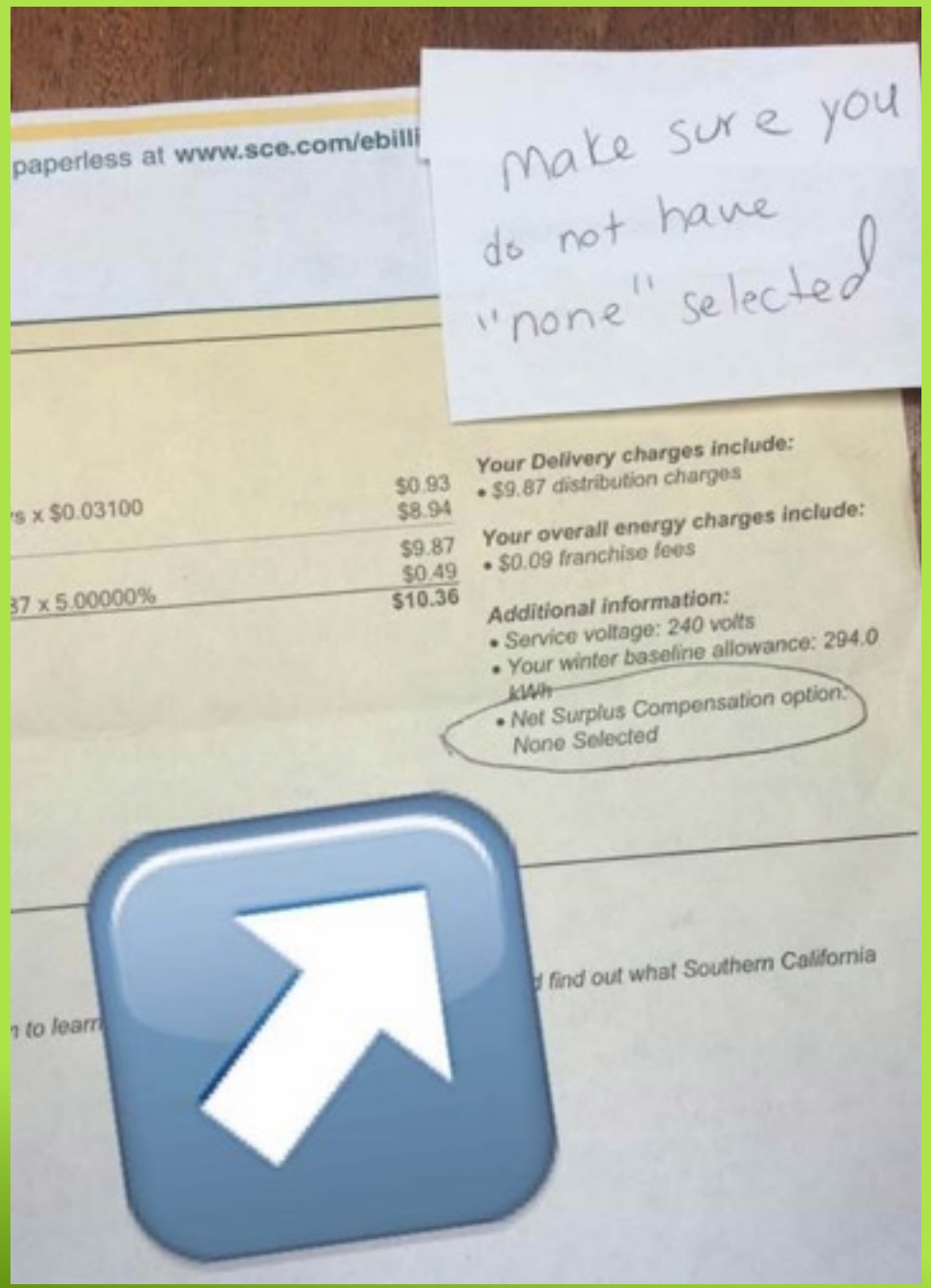
Multiplication effect = Increase selling power

In the case that the power of the solar panel is big enough , household electricity can be supplied from solar energy only.



2016 Monthly KWh With Solar Panel





SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

SCHEDULES NEM,MASH,VNM,NEM-V

NET SURPLUS COMPENSATION RATE AND RENEWABLE ENERGY CREDITS COMPENSATION SELECTION FORM

Customer Information (as it appears on your monthly SCE statement):	
Customer or Business Name	
Street Address	
City, State, Zip	
Phone	
Service Account #	

Net Surplus Compensation (NSC):

☐ I am interested in receiving compensation for the Net Surplus Energy I generate during my 12-month relevant period. The NSCR will be posted on a monthly basis at: http://www.sce.com/wps/portal/home/regulatory/tariff-books/rates-pricing-choices/net-surplus-compensation; or, (T)

☐ I am not interested in participating in the program and elect not to receive compensation.

☐ In order to receive Net Surplus Compensation (NSC), I certify under penalty of perjury that my generating facility is a Qualifying Facility pursuant to the Public Utility Regulatory Policies Act of 1978 that is exempt from certification filing at the Federal Energy Regulatory Commission (FERC); or,

☐ In order to receive NSC, I certify under penalty of perjury that my generating facility is a Qualifying Facility pursuant to the Public Utility Regulatory Policies Act of 1978 and that I have self-certified as a Qualifying Facility with the FERC by properly completing and filing FERC Form No. 556, *Certification of Qualifying Facility (QF) Status for a Small Power Production or Cogeneration Facility*. A copy of my completed FERC Form No. 556 is attached hereto. **NOTE:** this option is applicable only to the California Department of Corrections and Rehabilitation when installing a Renewable Electrical Generating Facility sized greater than one megawatt (1 MW) pursuant to Public Utilities Code Section 2827 and Schedule NEM.

Net Surplus Compensation and Renewable Energy Credits (REC) Compensation: (please check one box below): (T)

☐ I elect to receive a check for my NSC and REC at the end of my relevant period. SCE will perform a normal reconciliation and will zero out my account.

☐ I elect to roll over any credit for my NSC and REC to my next relevant period. SCE will perform a normal reconciliation and will zero out my account. Any NSC credit and REC credit will be carried over into the next relevant period and will be applied to my future electricity bills.

NOTE: To receive compensation for RECs associated with your Net Surplus Energy, Form 14-935 must additionally be completed and submitted to SCE. (N) (N)

By completing and returning this form to SCE, I confirm the above NSC and REC payment selections. I understand that the terms of my selections are subject to any future changes directed by legislature, the California Public Utilities Commission, or applicable law. I understand that I can change my compensation selection once every 12 months.

Solar Maid

Cleaning
Dirty Panels

ConsumerReports

August 2016

1. Do it now! costs for panels low, competition reduces costs
2. Go for the lowest per KWh cost (from reputable company)
3. Contractor should be member of NABCEP
4. Federal Credits 30% thru 2019, 26% thru 2020, 22% thru 2021
5. Lease not as lucrative as buying
6. Warranty based upon output reduction about 0.5% per year
7. Energy generators trying to reduce incentive of Net Metering
8. Be sure roof in good condition
    1. Don't allow roof penetrating brackets
    2. Replace roof first if in poor condition

What To Know About Rotating Outages

This year, the SoCal Gas Aliso Canyon facility (a major storage facility of natural gas) has restricted operations and is unable to provide natural gas to power plants as in prior years. While SCE is doing everything it can to minimize this impact to our customers, the California Independent System Operator (CAISO) may call for rotating outages.

A rotating outage is a temporary and controlled electric outage that lasts approximately one hour, depending on circumstances. A utility manages and rotates the outages to protect the integrity of the overall electric system. Controlled, rotating outages can become necessary when the CAISO declares a Stage 3 Emergency. Under these circumstances, without controlled, rotating power outages on a relatively small scale, a widespread disturbance to the electric grid could occur, which would lead to uncontrolled, large-scale outages. Find out more about at the CAISO Flex Alerts and Stage 3 emergencies at **flexalert.org**.

Prepare Before a Rotating Outage

- Conserve Energy: go to **on.sce.com/tips**
- Know your Rotating Outage Group number. This information is located on your bill or log in to My Account. You can also call us at **1-800-611-1911** and use the voice response system to get
- Go to **www.sce.com/outage** to see which Rotating Outage Groups are likely to be affected if needed.
- Be ready in case of power outage - Have emergency supplies in a place where you can easily find them – on.sce.com/outagetips

During a Rotating Outage

- Be aware of your surroundings and be safe.
- Turn off all appliances, machinery and equipment that were in use when the power went out.
- Switch off light switches (except one). Leaving a light on will let you know when electricity has been restored.
- Minimize driving in an outage area. If traffic lights are not functioning, treat as four-way stops.

After a Rotating Outage

- Continue to conserve energy. Energy conservation, both electricity and natural gas, is critical to help maintain grid reliability and service.
- To learn more about energy conservation, visit SCE's website: **on.sce.com/tips**, or follow us on Twitter: **twitter.com/SCE** and on Facebook at: **facebook.com/SCE**.

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WHEN DOES AGE ENTER IN TO YOUR DECISION?

- Making electricity with solar panels, entails 91% less CO_2 pollution than using natural gas, and 96% less CO_2 than coal. Not to mention the sun won't run out of fuel for another 5 to 7 billion years.

- Going solar is the simplest and biggest action a home or organization can take to reduce its carbon footprint.

- If you believe in global warming/climate change and don't have solar panels generating electricity for your house and car you are a charlatan!
- "Keep it in the Ground" Government policies will increase KWh costs
- If you can't afford solar panels-let someone else do it and at least know you have reduced your carbon footprint by 20%.
- Do it Now!

- 1: Solar panels require more energy to manufacture than they produce in their lifetime.
- 2: Solar manufacturing results in more pollution than is saved
- 3: Solar is too expensive for widespread usage.
- 4: I will store the excess energy I generate in batteries.
- 5: When the power goes out, my home is still powered by solar.
- 6: My solar panels won't work in the cold winter weather.
- 7: Solar panels require maintenance.
- 8: The payback is far too long.
- 9: A solar electric system will raise my property taxes.
- 10: Solar panels cause my roof to leak, deteriorate, or collapse.

SOLAR DOLLARS AND SENSE

If you believe in climate change and don't have solar you are a charlatan!