Solar Energy for Your Farm

Tony Armor, *Solar Energy Contractor*

Joe Jordan, *Atmospheric Scientist*

Tony Armor (me)

How I got into Solar?

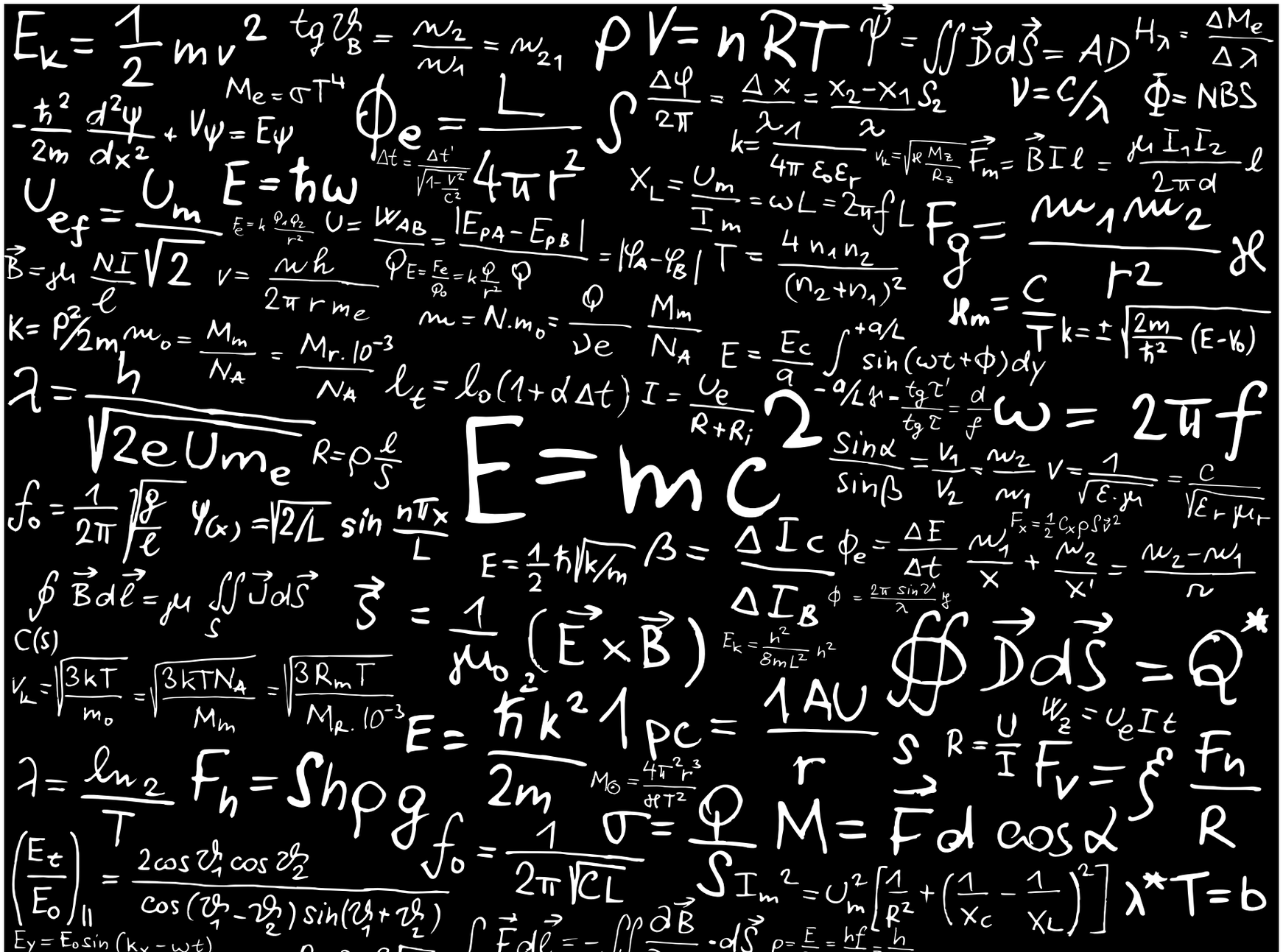

DayOne
solar energy now


TURN HANDLE
TOWARDS GARDEN
WHEN USING
'GREY WATER SAFE'
LAUNDRY SOAP
TURN HANDLE
DOWNWARD WHEN USING
BLEACH, FABRIC
SOFTENER OR LAUNDRY
SOAP THAT IS NOT GREY
WATER SAFE

Questions/Topics we should cover?

The Science behind Solar

With ‘Cosmic Joe’ Jordan



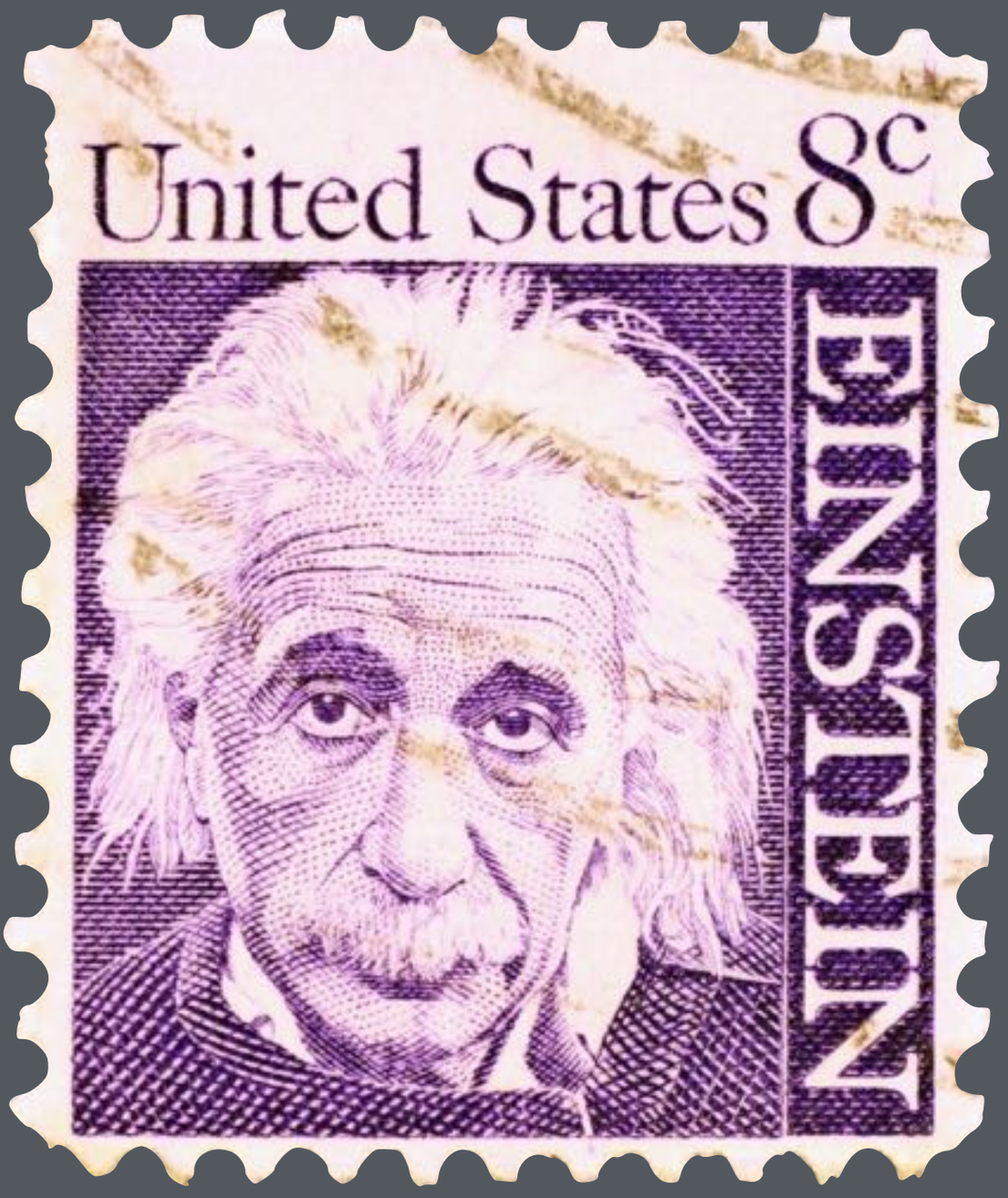
Earth's Power Plant: The Sun

How it Works

The Photoelectric Effect*:

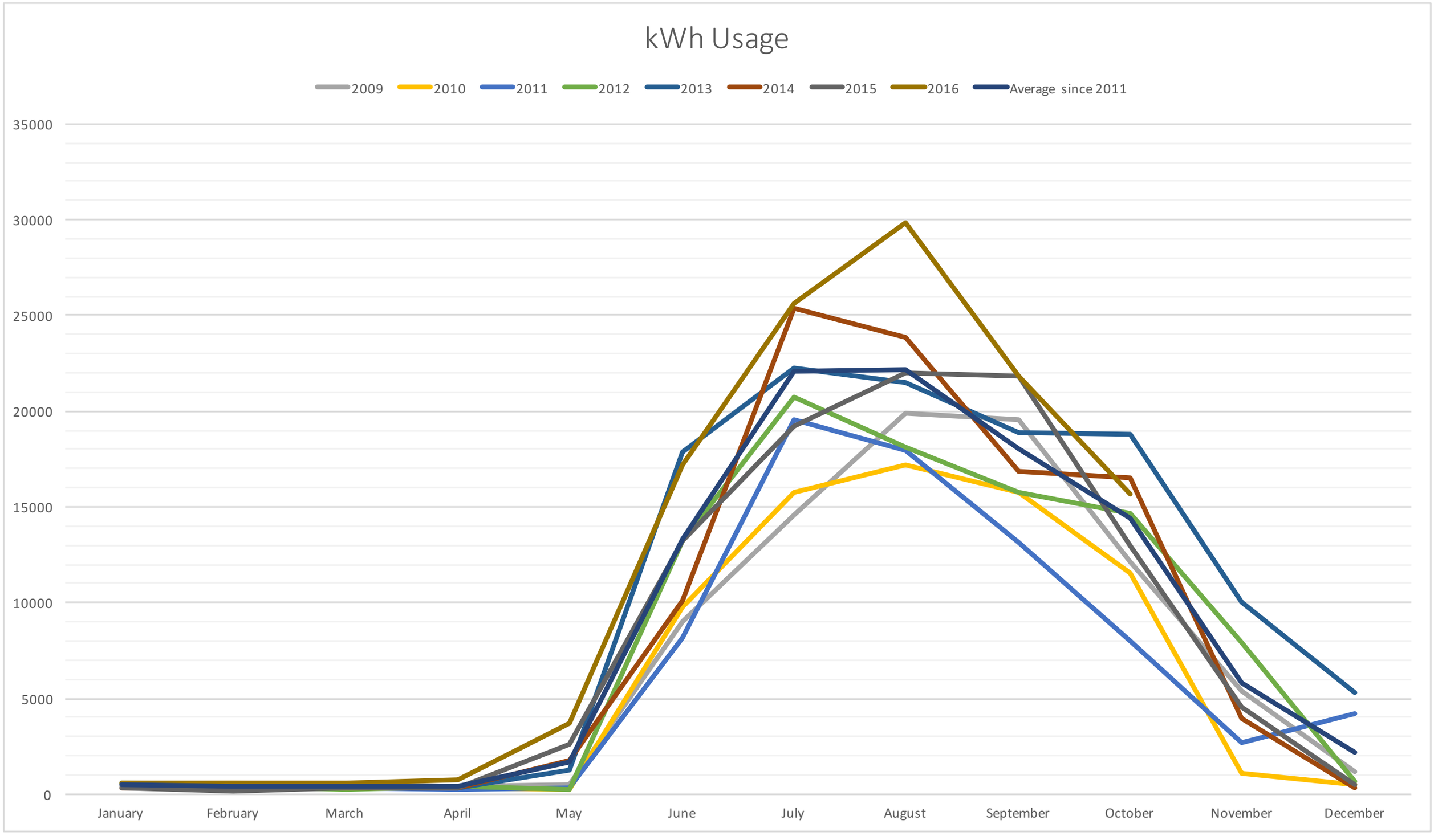
Solar panels use light energy from the sun to generate electricity through the Photoelectric Effect.

*Albert Einstein was awarded the Nobel Prize in 1921 for his discovery of this law of physics.



Case Study

Brussels Sprouts Farm



Sprouts Farm: Annual Usage of Electricity in kWh (2011-2016)
Average: 101,331 kWh/Year

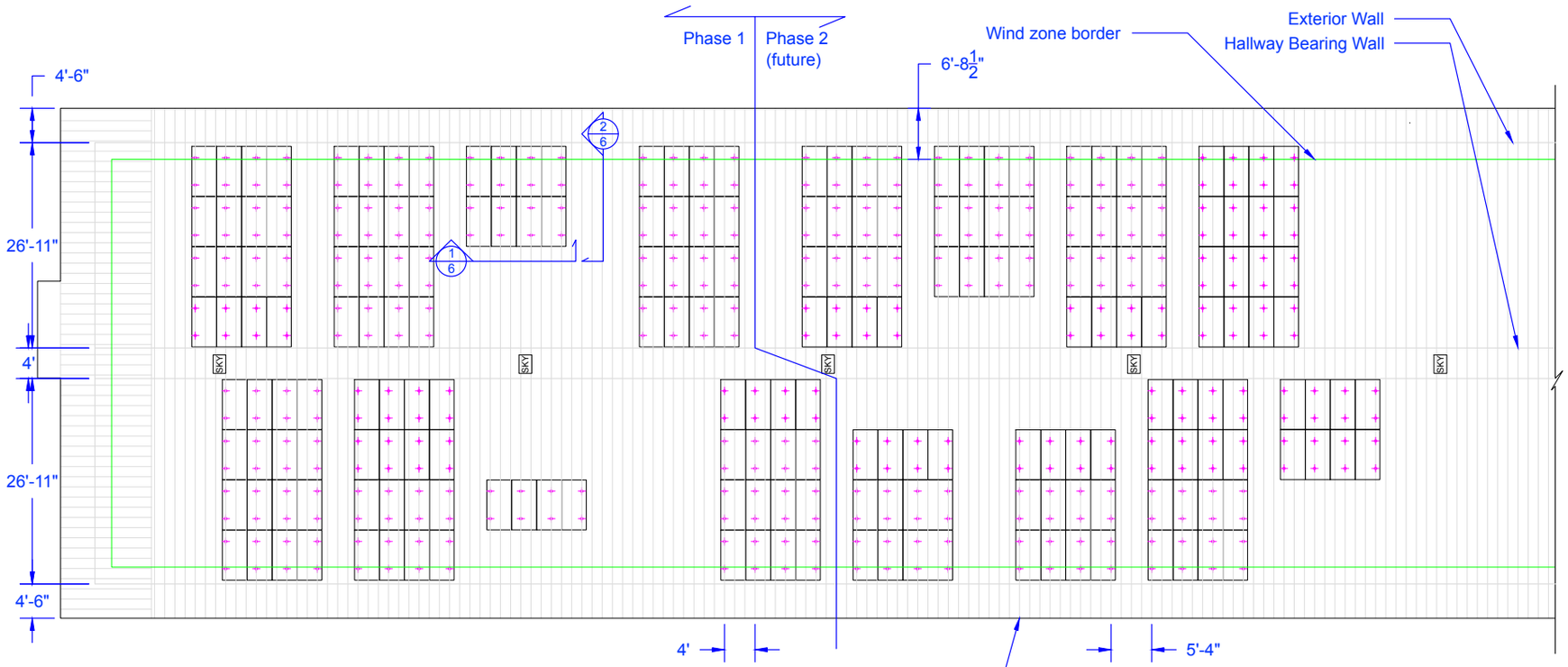
Site Survey

- Shading Analysis
- Roof Structures
- Electrical Service
- Ground Mount Potential

System Design

- Sized for annual electrical usage
- Can benefit several meters (NEMA)
- Roof or Ground mount

System Design



LAYOUT INCLUDES 1/2" SPACE BETWEEN MODULES ON ALL SIDES
FRAMING MEMBERS: 2x10 16" O.C.

1 Rack Plan

NOTES:
Layout includes posts for future expansion

Dimensions include 1/2" gap between columns

Manufacturer (SolarWorld) recommended rail connection zone: 15.4" ± 4.2" from long edge

Maximum Rail Spans and Overhangs

Wind Zone	Max. Span	Overhang
(1) Inside	110"	37.4"
(2) Edge	86"	29.2"
(3) Corner	24"	8.2"

Edge Zone Width: 6.7' (80.4")

Wind Zones
(1) All areas not zone 2 or 3
(2) Within 6' of ridge, valley, or edge
(3) Corners at overlap of 6' zones

DayOne
solar energy now
387 Coral St, Santa Cruz, CA
Email: info@day1solar.com
Phone: (831) 687-8097
License # 987896

We have reviewed the following plans and have found the major structural systems to be in general conformance with our structural engineering calculations.

DONALD C. URIER AND ASSOCIATES, INC.

By: _____

License No. 55056 Dated: 09/19/2016

Project

Linden Arms

37.26 kW Solar Photovoltaic System

950 Linden Ave, Sunnyvale, CA 94086

Sheet Title

Rack Plan

Revisions

0	9/2/16	For Engineering
1	9/12/16	Electrical Engineering Revisions
2	9/16/16	Structural Engineering Revisions, For Permitting

Drawn By: BV
Checked: MT
Approved: AA
Date: 9/16/16

Sheet 5

Scale 1/16" = 1'

System Specs:

65.2 kW Ground Mounted Solar PV System
(will generate 92% of usage in year 1)

- (192) SolarWorld 340 watt modules
- (6) SMA America SB 7.0-US Inverters
- (3) SMA America SB 3.8-US Inverters
- Complete System Monitoring
- SnapNRack Ground Mount Racking System
- Concrete Piers
- Engineering, Permit and Fees

System Financials:

Gross System Cost: $204,014 (Less 30% Federal Tax Credit)

Net System Cost: $142,810

Tax Credit: $61,204

MACRS

System Payback: 6 years

Cumulative Savings: $566,216. (at year 25)

IRR (Internal Rate of Return: 13.39%)

Warranties

- Solar Modules: 25 years
- Inverters: 10-25 years

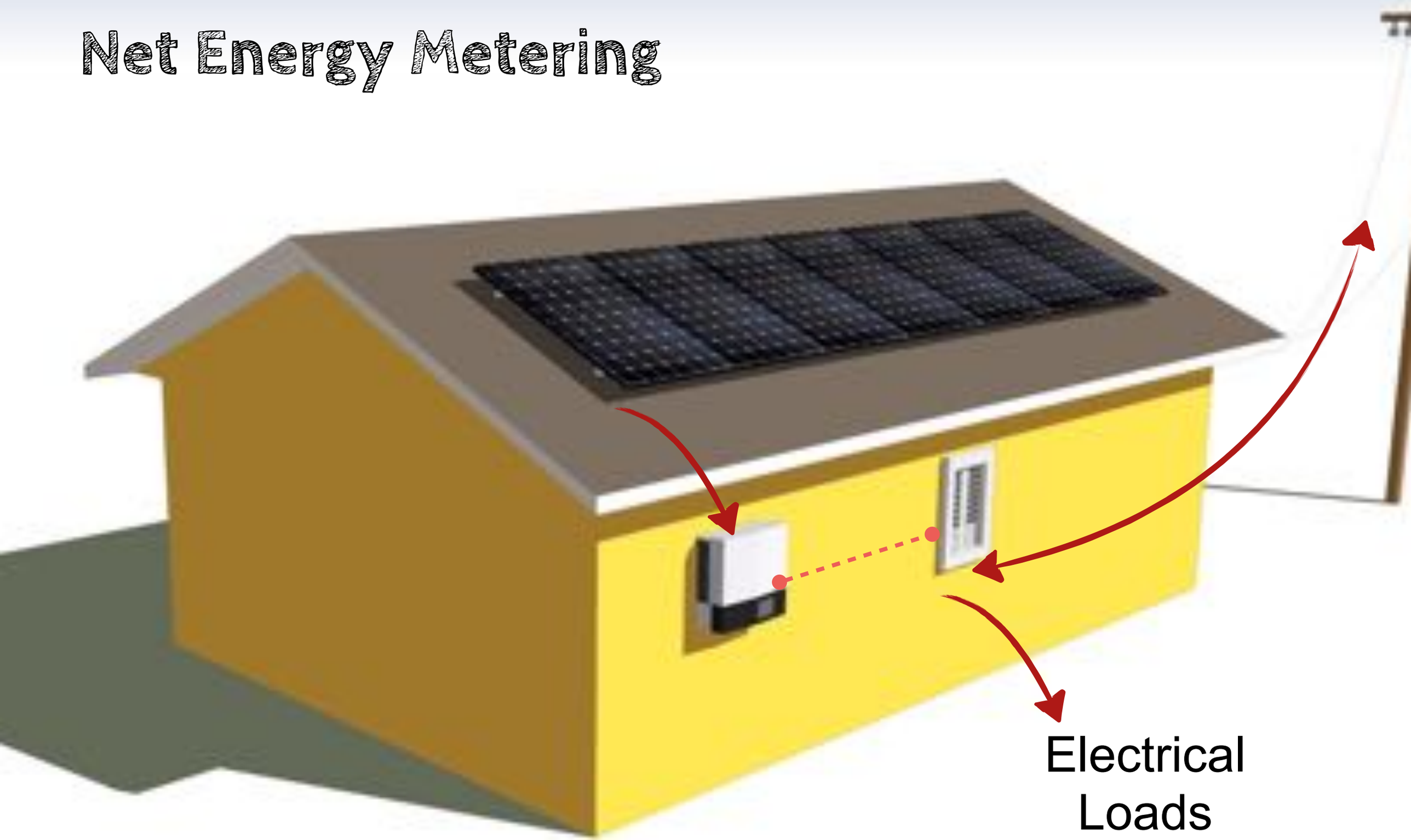
What's a Demand Charge?

A *Demand Charge* accounts for the *maximum* average rate of energy consumed by a utility customer over a 15 minute interval in a monthly billing period.

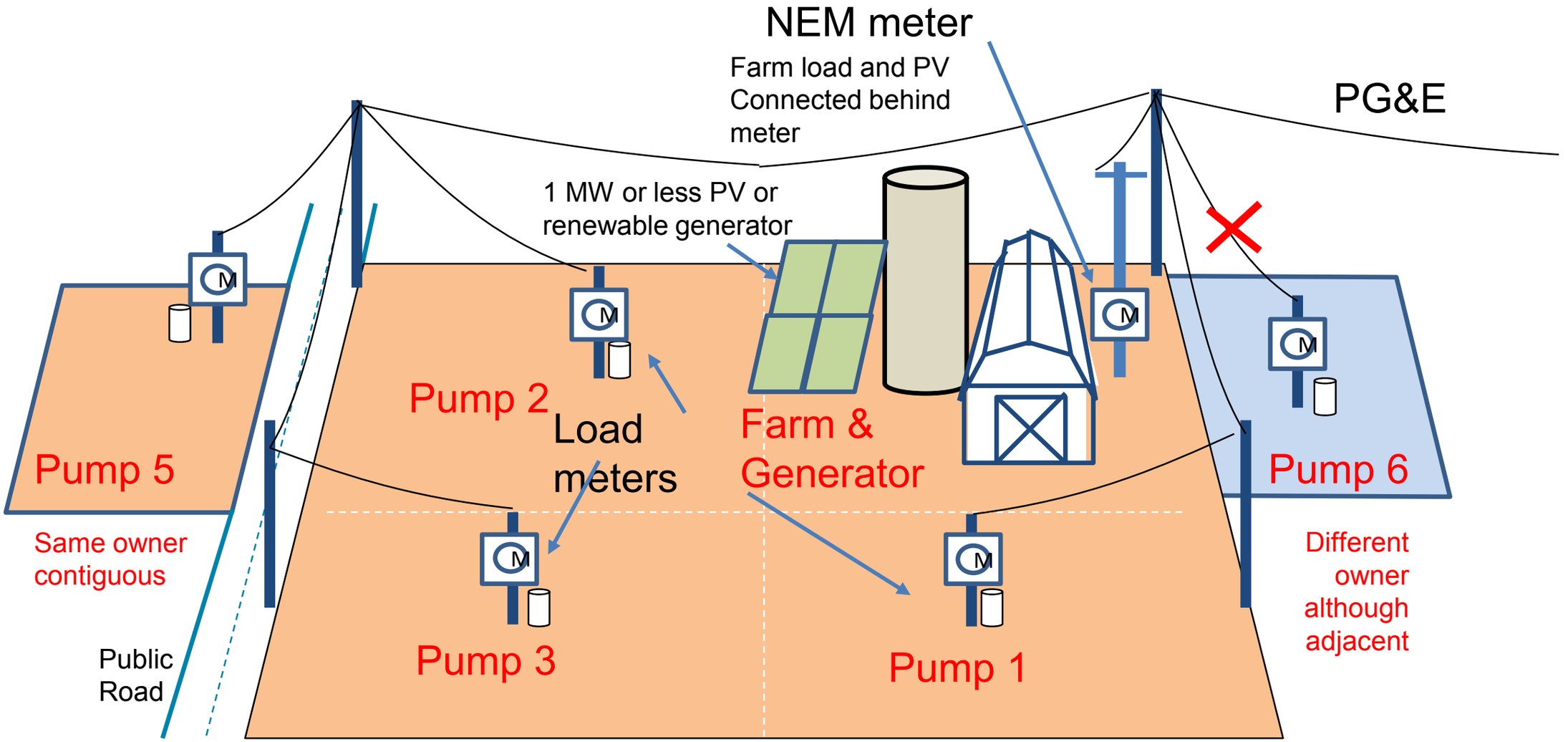
If this period occurs during your utility's peak-rate period, it can cost you Big Bucks!

If you have solar, you are generating your own power during peak-rate periods, avoiding costly demand charges.

Net Energy Metering



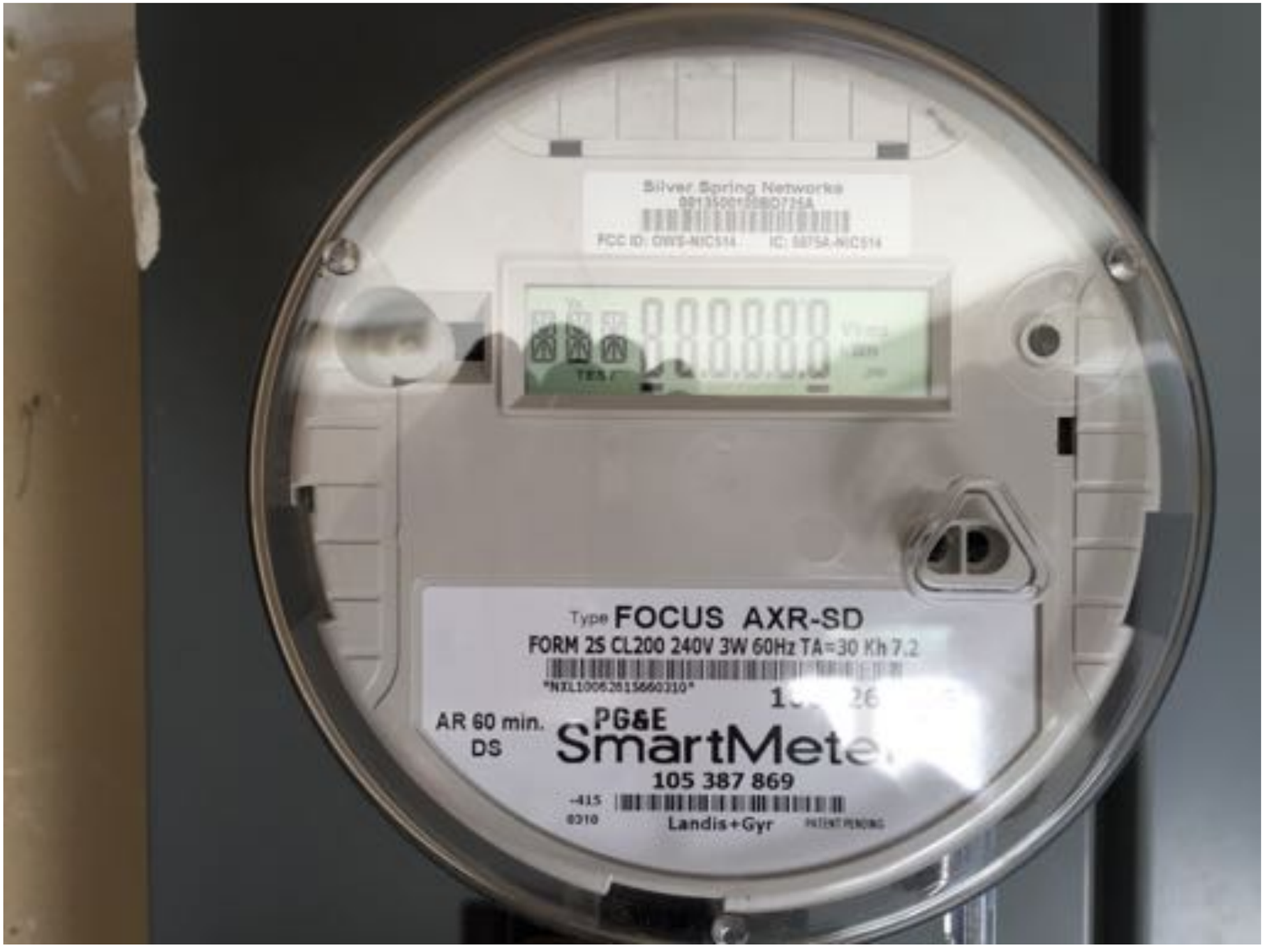
NEMA: Big Picture



(A) Aggregated accounts are located on the property where the Eligible Renewable Electrical Generation Facility is located or on property adjacent or contiguous to that property as long as those properties are solely owned, leased, or rented by the Eligible Renewable Customer-Generator.

(F) For purposes of this paragraph, parcels that are divided by a street, highway, or public thoroughfare are considered contiguous, provided they are otherwise contiguous and under the same ownership.

Annual True-Up



Grid Tied or.....Off-Grid?

DayOne™

solar energy now

- Locally Owned, Employing Local People
- Certified Monterey Bay Green Business

(831) 687-8097

www.day1solar.com

387 Coral Street, Santa Cruz, CA License #987896

Cosmic Joe Jordan

- NASA Scientist
- TED X Speaker
- Teacher
- Solar Guru

Thank you, Friends!

Q&A

[pictures of systems we've done, to talk to in response to questions]

Ag Rates (PG&E)

AG-1: A ‘non-time-of-use’ rate for analog metered customers.

- Very few still on this rate

AG-4: Customers are generally considered small to medium.

- Higher energy charge and lower demand charge than AG-5

AG-5: Customers are generally considered large, with high annual operating hours.

- Lower energy charge and higher demand charge than AG-4

Time-of use options:

- A and D options are billed on connected load demand
- B,C,E and F options are billed on actual demand as registered on the meter.

Solar Energy for Your Farm

1. **Case Study: Brussels Sprouts Farm**
2. **Solar and our utility (PG&E)**
3. **The Science Behind Solar, with ‘Cosmic Joe’ Jordan**
4. **Q&A**

Financing Options

- PACE
- Equity Line of Credit
- Cash

SANTA CRUZ COMMUNITY CREDIT UNION

SANTA CRUZ COUNTY BANK
Put your money where your life is.

Monterey Bay Community Power


DayOne


PMC
Day One
solar energy now
284
STOP
Day One