Bishop O'Dowd High School | Oakland, CA *Credit: David Wakely Photography*

Financing Approaches for Getting to Zero Schools

January 9, 2020

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New Buildings Institute

Driving energy and carbon emissions reductions in the built environment.

Program areas include:

1. Advanced buildings
2. Getting to zero leadership
3. Code and policy innovation

Learning Objectives

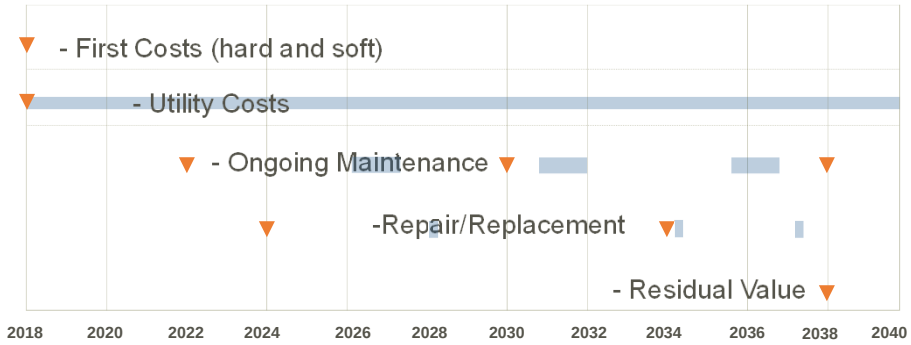
1. Participants will understand how addition of energy storage to a solar project impacts energy savings, long-term project value and financing decisions
2. Participants will understand key issues when evaluating financing options for solar-plus-storage installations including tax-exempt leases, sale-leaseback, partnership-flip, and cash purchase.
3. Participants will learn about cost effective methods to improve energy efficiency, cost-saving methods to procure renewable energy and evaluating life cycle costs in buildings.
4. Participants will learn about the 'state of the shelf' technology concepts being implemented to delivering cost-effective energy efficiency in school retrofits.

Cost of Getting to Zero

Life Cycle Cost Analysis

- What is the real cost of a building?

Life Cycle Cost = Net Present Value of:



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Cost of Zero Studies

- California Technical Feasibility
- District of Columbia
- Efficiency Vermont
- PG&E Case Studies, Volumes 1-3
- Rocky Mountain Institute
- USGBC Massachusetts

FIGURE 3

ZE Studies in the US

Multiple studies have been conducted around the county on the upfront cost premium of ZE buildings.

USGBC Massachusetts - *Zero Energy Buildings in MA: Saving Money from the Start*

Change the Conversation

"The prevailing industry perception is that zero energy is cost prohibitive and suitable only for showcase projects with atypical, large budgets; however, ***there is mounting evidence that zero energy can, in many cases, be achieved within typical construction budgets****."*

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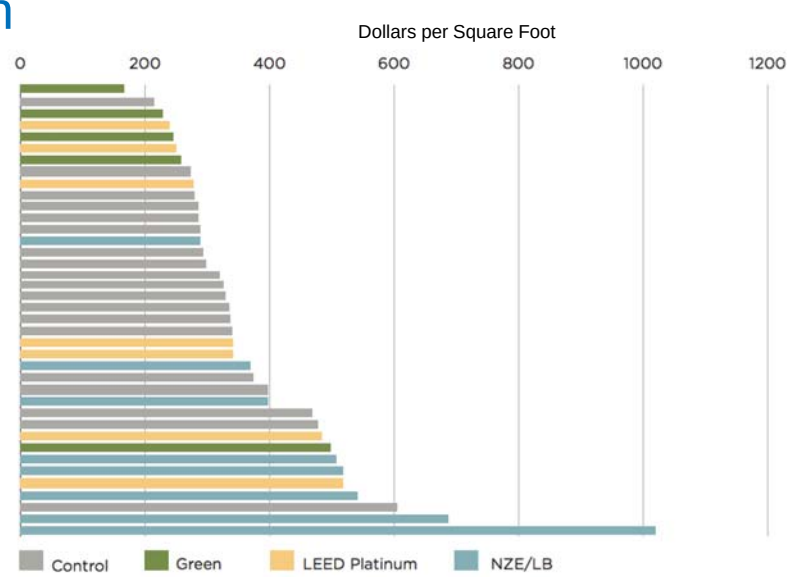
Power of Zero: Optimizing Value For Next Generation Green

- Cost for "next generation green" projects are approaching those of conventional buildings
- Values and determination are a key differentiator



2013: BNIM, Integral Group, Davis Langdon, AIA COTE

Todays Presenters

David McIlhenny

Managing Director – Project Finance
Sunpower Corporation

Nik Kaestner

Director of Sustainability
San Francisco Unified School District

AT A GLANCE

Dense/Urban

7th Largest

55K Students

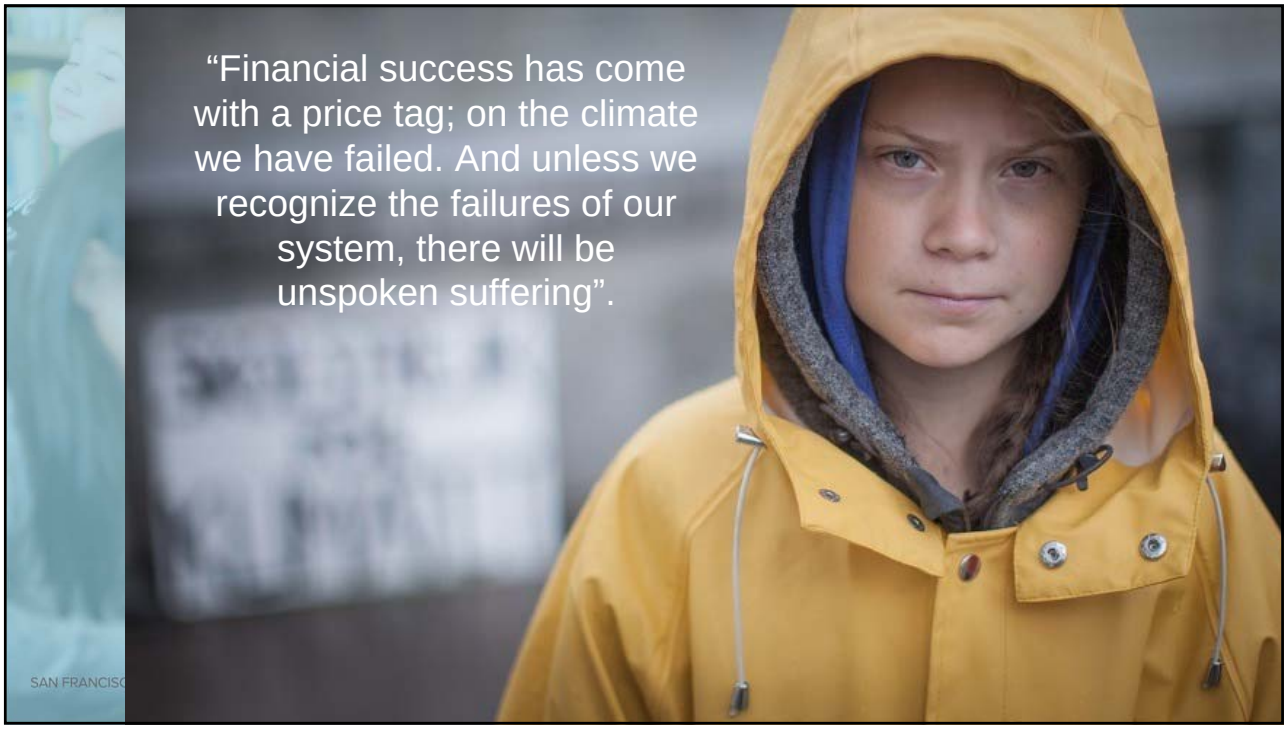
Diverse

Low-Income

Voters

Private

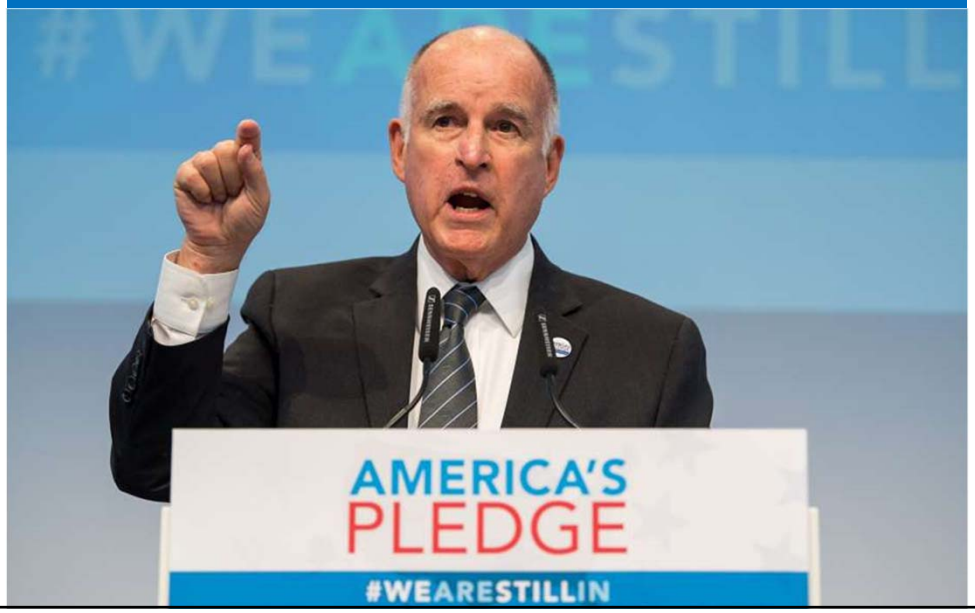
THEIR SCHOOL


"Financial success has come with a price tag; on the climate we have failed. And unless we recognize the failures of our system, there will be unspoken suffering".

Oh, SH%T!


TO PROTECT OUR FUTURE
#CLIMATESTRIKE

BOLD LEADERSHIP



California's ZNE Building Goals

- *All new residential construction and all new commercial construction in California will be zero net energy by 2020 and 2030, respectively*
- *50% of existing commercial buildings will be retrofit to ZNE by 2030*
- *All new state buildings and major renovations shall be ZNE (2025)*
- *50% of existing state-owned building area by 2025 shall be ZNE*
- *IOUs shall launch and ramp a ZNE K-12 Schools and Community College Pilot Program in 2015-18*

DPR Construction San Diego Corporate Office , Chip Fox, DG&E, renovation

IBEW ZNE Center, San Leandro, renovation

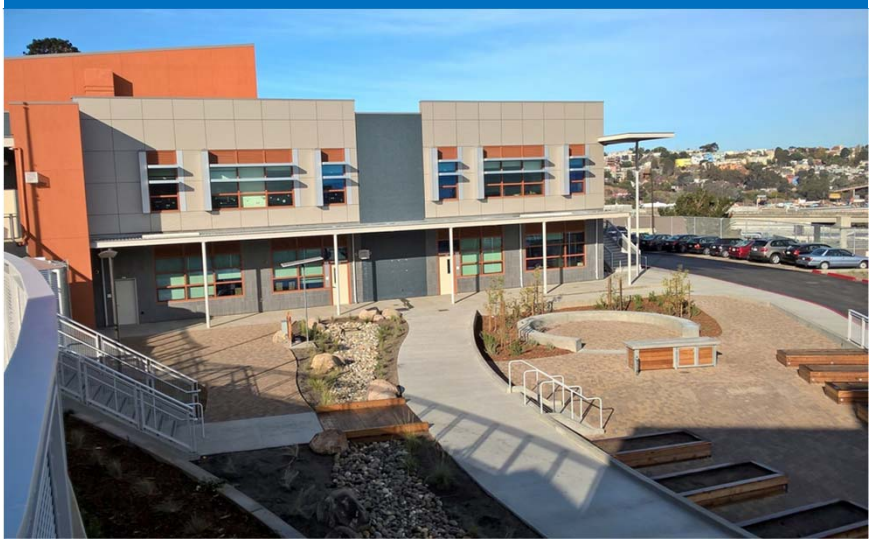
Source: CPUC

2

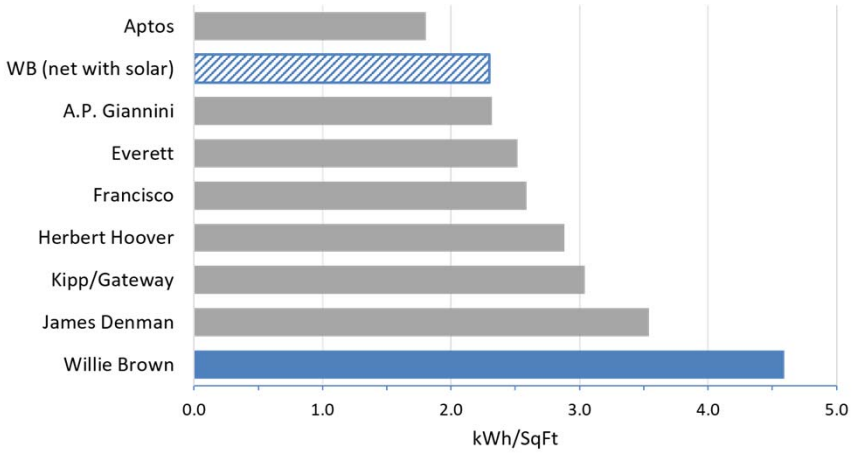
THEIR SCHOOL

Source: SOM

OUR SCHOOL



…OR NOT!



BEATING CODE IS NOT ENOUGH

OUR NORM

California's ZNE Building Goals

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DPR Construction San Diego Corporate Office , Chip Fox, DG&E, renovation

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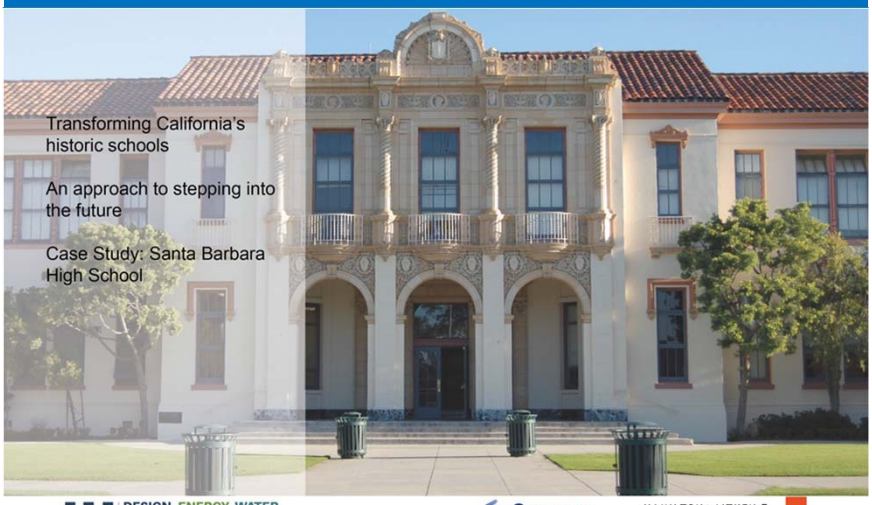
Source: CPUC

2

DOABLE!



Transforming California's historic schools

An approach to stepping into the future

Case Study: Santa Barbara High School

7x7x7 DESIGN ENERGY WATER 7 ARCHITECTS 7 SCHOOLS 7 INNOVATIONS

CAPITAL ENGINEERING CONSULTANTS, INC.

HAMILTON+AITKEN Architects

EUI GOAL

Table 29. Energy Intensity Values for Zero Energy Schools

Climate Zone	Representative City	Primary School		Secondary School	
		Site Energy (kBtu/ft²·yr)	Source Energy (kBtu/ft²·yr)	Site Energy (kBtu/ft²·yr)	Source Energy (kBtu/ft²·yr)
1A	Miami, FL	25.9	76.4	23.1	68.5
2A	Houston, TX	24.3	71.1	21.7	63.5
2B	Phoenix, AZ	24.7	72.5	21.9	64.3
3A	Memphis, TN	23.8	69.0	21.2	61.6
3B	El Paso, TX	23.4	67.8	20.7	60.2
3C	San Francisco, CA	21.6	61.9	19.0	54.3
4A	Baltimore, MD	23.5	67.6	20.9	60.1
4B	Albuquerque, NM	23.1	66.6	20.4	58.8
4C	Salem, OR	22.4	64.2	19.7	56.4
5A	Chicago, IL	24.3	69.9	21.6	62.2
5B	Boise, ID	23.2	66.7	20.4	58.4
6A	Burlington, VT	24.5	70.1	21.6	61.9
6B	Helena, MT	23.5	66.9	20.5	58.4
7	Duluth, MN	25.9	74.1	22.8	65.1
8	Fairbanks, AL	28.7	82.5	25.0	71.5

Source: DOE

THE ONLY WAY

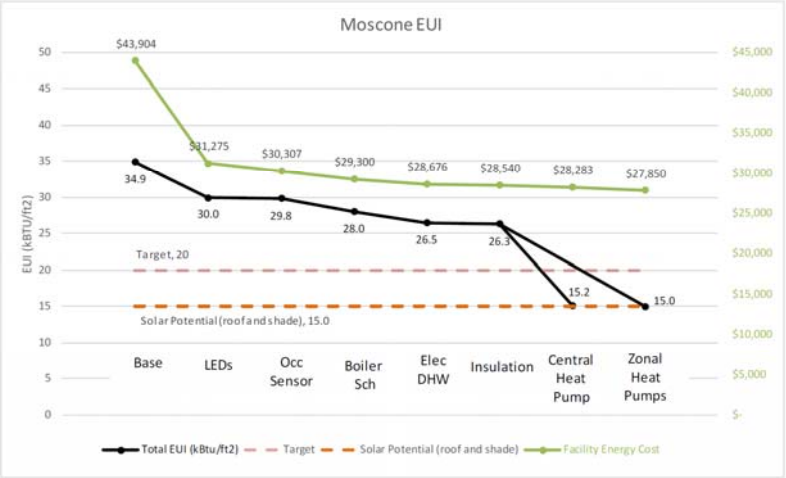
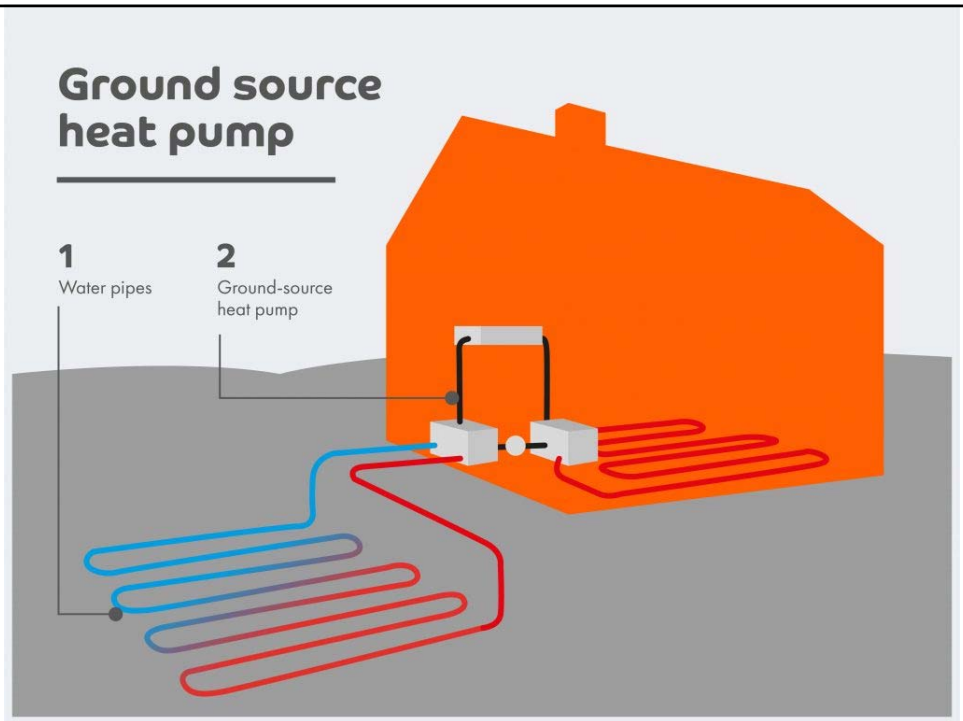


Figure 5.1: EUI and Total Energy Cost for Moscone ES

HEAT PUMPS

Source: Sanyo



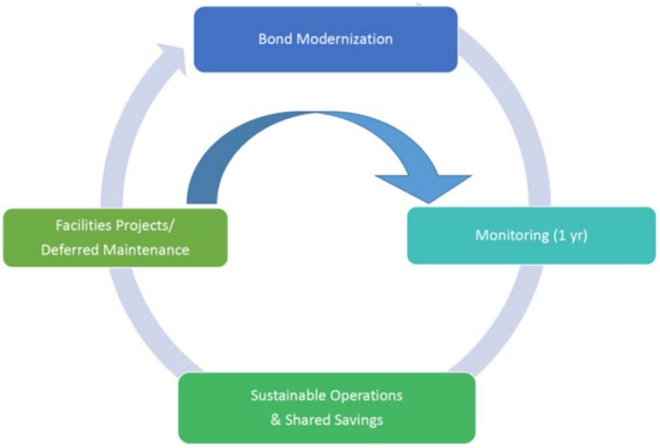
HOW TO PAY FOR THEM?

- ➔ Bonds
- ➔ Deferred Maintenance
- ➔ Developer Fees
- ➔ Prop 39
- ➔ Utility Company
- ➔ ECAA Loans
- ➔ PPAs

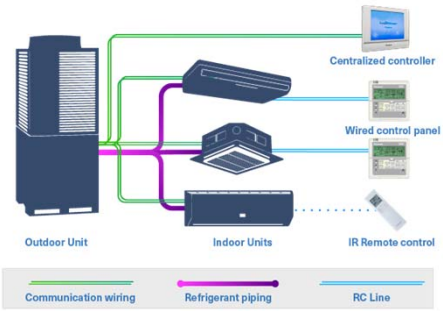
Source: UC Berkeley

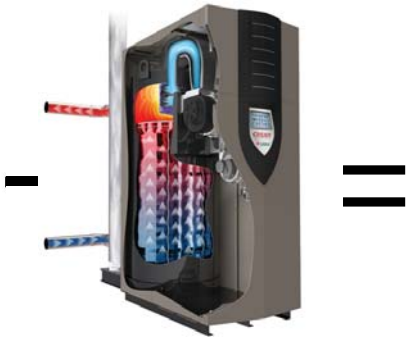
CONSTANT BATTLE

MODERNIZATIONS MAKE SENSE



MINIMIZE THE DELTA





BUILDING STRATEGY

NEW SCHOOLS

→ ZNE Ready

MODERNIZATION

→ System Replacements

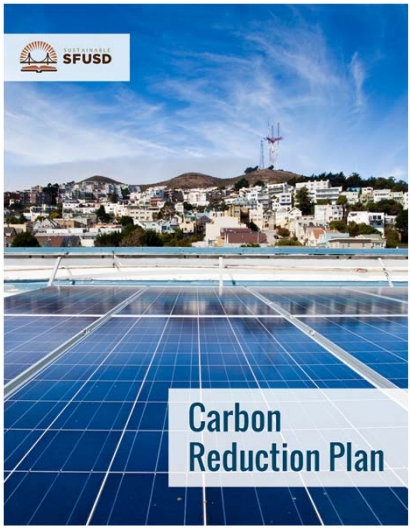
RENEWABLES

→ In Due Time

EXECUTION IS EVERYTHING

Source: Pinterest

PUBLIC & INTERNAL

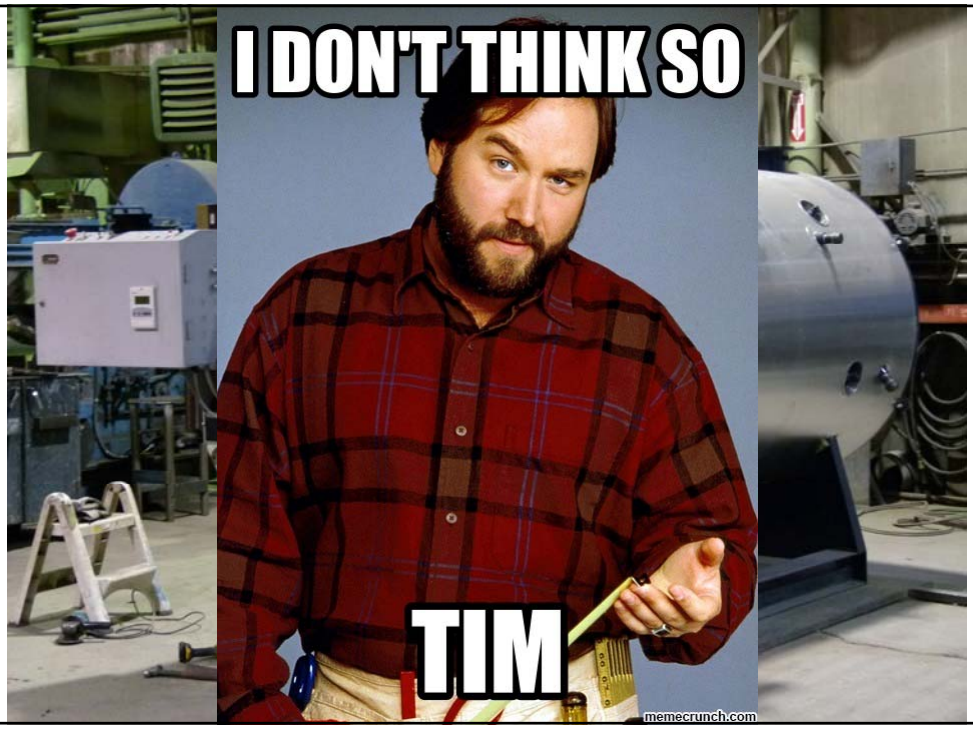


SAN FRANCISCO UNIFIED SCHOOL DISTRICT

DISTRICT DESIGN STANDARDS + GUIDELINES

2016 PROPOSITION A BOND PROGRAM

SFUSD FACILITIES DESIGN + CONSTRUCTION


I DON'T THINK SO
TIM
memecrunch.com


COMMISSIONING
"How could somebody have missed this?"
"Darn! I forgot my glasses."
"Have I registered for the Design-Build conference yet?"
"The lawyers are going to love this!"
"I don't recall seeing *that* in the plans?"
"Nobody said anything about a front door!"
"#*@$*&*!"

NEW ZNC BUILDINGS

ZNC RETROFITS

NO EXCUSES

PROS:

- Carbon Free Power
  → Fuel Switch
- Low Electric Rate
  → Minimal Cost
- Supportive Voters
  → Facility Bonds

CONS:

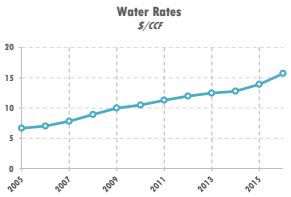
- No A/C
  → Electric Upgrades
  → Additional System
- Low Electric Rate
  → No Solar
- No Demand & TOU
  → No Batteries

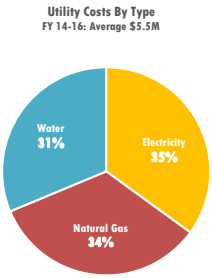
CAN YOU PASS BONDS?

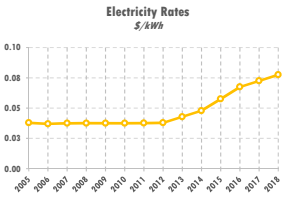
HOW GREEN IS YOUR POWER?

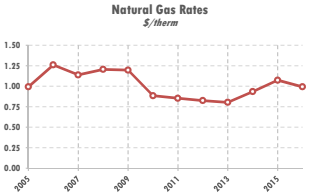
DO YOU AIR CONDITION?

HOW ARE YOUR UTILITY RATES?

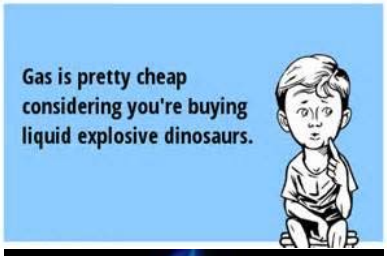






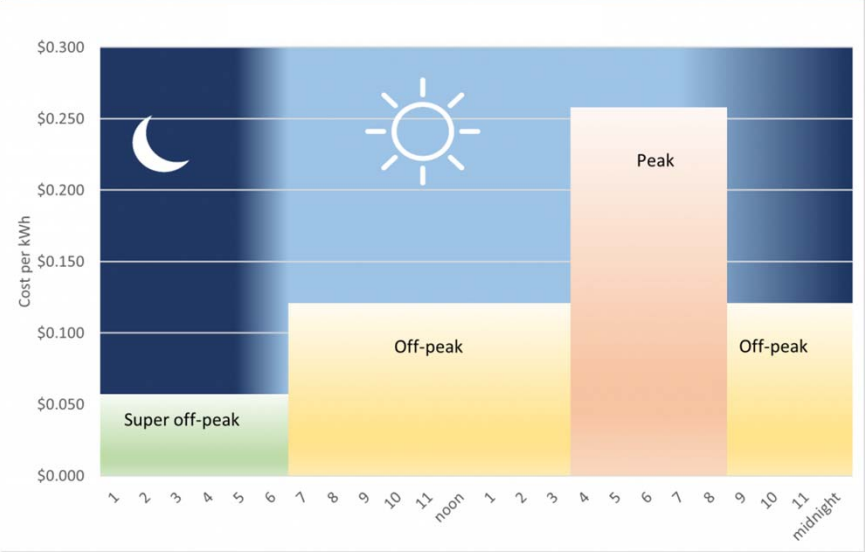


PRETTY CHEAP UNLESS…

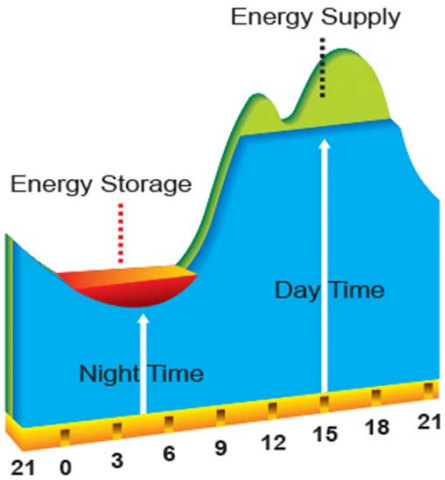


…YOU HAVE SOLAR

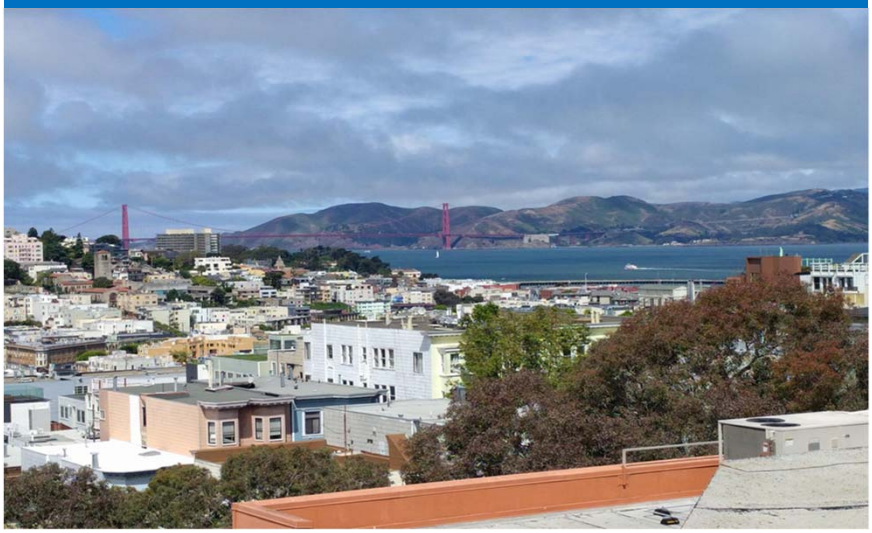
DO YOU HAVE TOU CHARGES?



DO YOU PAY DEMAND CHARGES?



QUESTIONS?



LINKS

- https://gettingtozeroforum.org/zero-energy-schools-resources/
- https://www.egauge.net/
- https://www.mvixusa.com/
- https://docs.google.com/document/d/1xRj7-Of1DkZ5XAqmFciqRZgVvIEoGV6g6ojfPso89wo/edit?usp=sharing

- Contact: kaestnern@sfusd.edu

SUNPOWER®

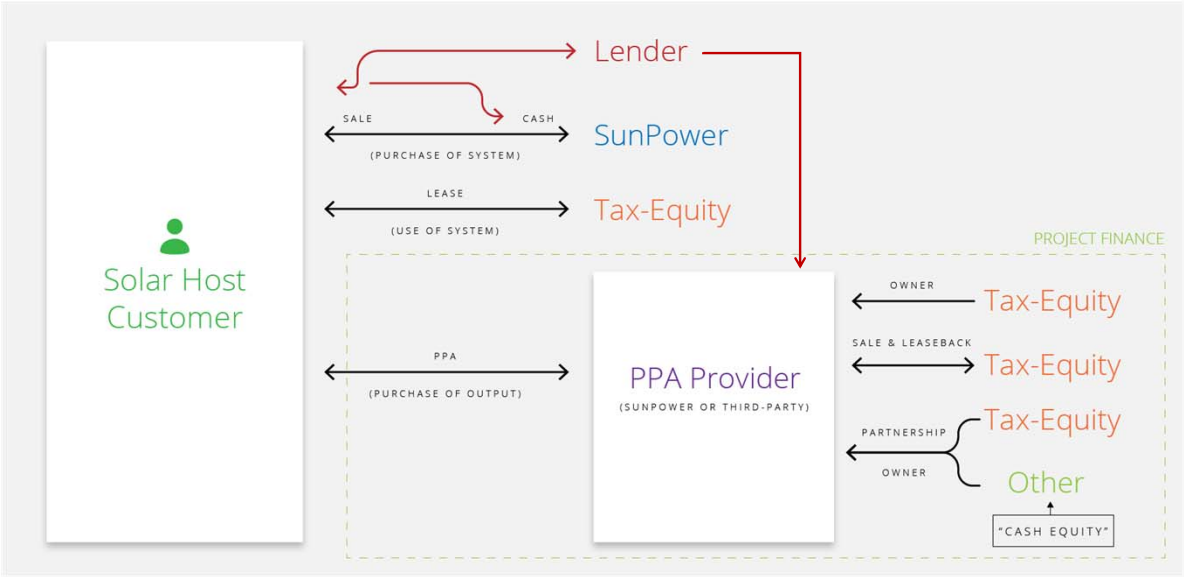
Solar Energy Finance Considerations

for

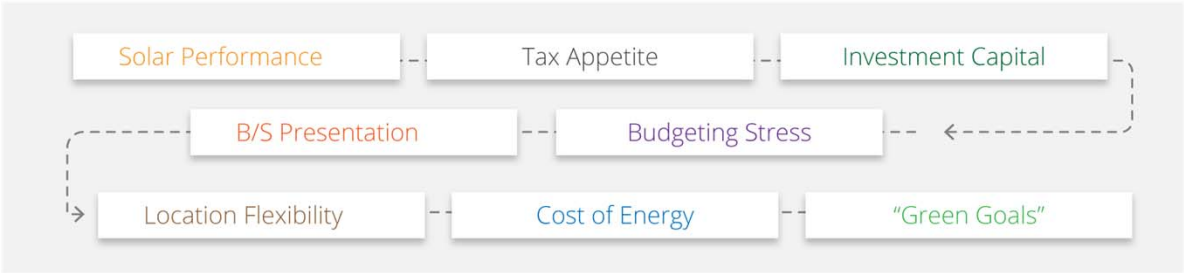
Getting to Zero Energy Schools

Webinar

Methods of Solar Acquisition



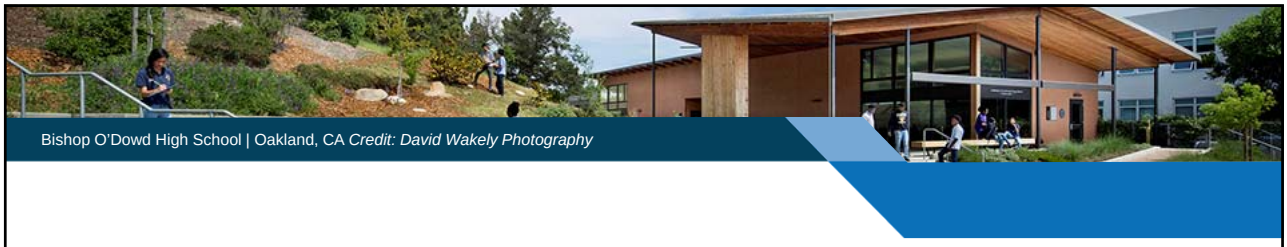
Solar Energy Acquisitions Considerations



SOLAR ACQUITISION OPTIONS	REQUIREMENTS/CONSEQUENCES
I. Ownership: "Green", at potentially Lowest Cost	Performance Risk, Tax Appetite, Investment Capital **or Debt**, on B/S
II. Direct Tax Lease: Low Cost without Tax Appetite [but not applicable for tax-exempt offtakers]	Performance Risk, on B/S
III. PPA: Avoids Performance Risk, Capital Lite, Off B/S	More Expensive

Thank You

SUNPOWER®



Bishop O'Dowd High School | Oakland, CA *Credit: David Wakely Photography*

Thank you for joining us!

Questions?

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