Financing Approaches for Getting to Zero Schools

January 9, 2020

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.
Life Cycle Cost Analysis

• What is the real cost of a building?

Life Cycle Cost = Net Present Value of:

- First Costs (hard and soft)
- Ongoing Maintenance
- Repair/Replacement
- Utility Costs
- Residual Value

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 country on the upfront cost premium of ZE buildings.
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.”

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

NOW THE HARD PART
Saying Goodbye to Fossil Fuels
AT A GLANCE

Dense/Urban
7th Largest
55K Students

Diverse
Low-Income

Voters
Private

THEIR SCHOOL

NO MONEY DOWN
“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!
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.
THEIR SCHOOL

Source: SOM

OUR SCHOOL
BEATING CODE IS NOT ENOUGH
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

Source: CPUC
DOABLE!

Transforming California’s historic schools
An approach to stepping into the future
Case Study: Santa Barbara High School

EUI GOAL

Table 29. Energy Intensity Values for Zero Energy Schools

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>Representative City</th>
<th>Primary School</th>
<th>Secondary School</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Site Energy (kBtu/ft²-yr)</td>
<td>Source Energy (kBtu/ft²-yr)</td>
</tr>
<tr>
<td>1A</td>
<td>Miami, FL</td>
<td>25.9</td>
<td>76.4</td>
</tr>
<tr>
<td>2A</td>
<td>Houston, TX</td>
<td>24.3</td>
<td>71.1</td>
</tr>
<tr>
<td>2B</td>
<td>Phoenix, AZ</td>
<td>24.7</td>
<td>72.5</td>
</tr>
<tr>
<td>3A</td>
<td>Memphis, TN</td>
<td>23.8</td>
<td>69.9</td>
</tr>
<tr>
<td>3B</td>
<td>El Paso, TX</td>
<td>23.4</td>
<td>67.8</td>
</tr>
<tr>
<td>3C</td>
<td>San Francisco, CA</td>
<td>21.6</td>
<td>61.9</td>
</tr>
<tr>
<td>4A</td>
<td>Baltimore, MD</td>
<td>20.8</td>
<td>67.6</td>
</tr>
<tr>
<td>4B</td>
<td>Albuquerque, NM</td>
<td>23.2</td>
<td>66.6</td>
</tr>
<tr>
<td>4C</td>
<td>Salem, OR</td>
<td>23.5</td>
<td>64.2</td>
</tr>
<tr>
<td>5A</td>
<td>Chicago, IL</td>
<td>21.9</td>
<td>69.9</td>
</tr>
<tr>
<td>5B</td>
<td>Boise, ID</td>
<td>23.2</td>
<td>66.7</td>
</tr>
<tr>
<td>6A</td>
<td>Burlington, VT</td>
<td>24.5</td>
<td>70.1</td>
</tr>
<tr>
<td>6B</td>
<td>Helena, MT</td>
<td>23.5</td>
<td>66.9</td>
</tr>
<tr>
<td>7</td>
<td>Duluth, MN</td>
<td>25.9</td>
<td>74.1</td>
</tr>
<tr>
<td>8</td>
<td>Fairbanks, AL</td>
<td>28.7</td>
<td>82.5</td>
</tr>
</tbody>
</table>

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

PUBLIC & INTERNAL

SFUSD PROJECT REQUIREMENTS
Carbon Reduction Plan
July 1, 2017
I DON'T THINK SO

COMMISSIONING

"Have I registered for the Design-Build conference yet?"

"I don't recall seeing that in the plans?"

"Damn! I forgot my glasses."

"The lawyers are going to love that!"

"How could somebody have missed this?"

"Nobody said anything about a front door!"

"F@$%^!"
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?

Utility Costs By Type
FY 14-16: Average $5.5M

Electricity 35%
Water 31%
Natural Gas 34%

Electricity Rates 
$/kWh

0.00
0.03
0.05
0.08
0.10

Natural Gas Rates
$/therm

0
5
10
15
20

Water Rates
$/CCF

0
5
10
15
20

PRETTY CHEAP UNLESS...

Gas is pretty cheap considering you’re buying liquid explosive dinosaurs.

ONE FUEL TO RULE THEM ALL?

NATURAL GAS
...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
Methods of Solar Acquisition

Solar Host Customer → Lender

SunPower → Tax-Equity

PPA Provider (SunPower or Third-Party) → Tax-Equity

Owner → Tax-Equity

Tax-Equity → Other

Solar Energy Acquisitions Considerations

Solar Performance - Tax Appetite - Investment Capital

B/S Presentation - Budgeting Stress

Location Flexibility - Cost of Energy - "Green Goals"

Solar Acquisition Options

I. Ownership: "Green", at potentially Lowest Cost
   Requirements/Consequences: 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 off-takers]
   Performance Risk, on B/S

III. PPA: Avoids Performance Risk, Capital Lite, Off B/S
   More Expensive
Thank You

SUNPOWER®

Thank you for joining us!
Questions?

© New Buildings Institute 2019