

# Wrestling with Electrification

A look at decision-making around all-electric housing



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**DBA's deep experience designing mid-rise urban housing puts the firm in a unique position to inform a growing conversation about electrification, greenhouse gas reduction, resilience, and equity, ensuring that emerging technologies—and the policies that support them—are not a cost-burden for non-profit housing developers and low-income families.**



# All-Electric Buildings

## Right Now:

- 18** projects in active SD-CD (6 market rate)
- 15** have considered or chosen all-electric
- 3** have bailed (2 in SF, 1 in San Jose)
- 5** are unconfirmed



Complete in 2018



On the boards in 2018-2019



On the boards in 2019



## **Where does decision-making get stuck?**

- 1) Familiarity
- 2) Cost
- 3) Electrical service planning

An aerial photograph of the San Francisco cityscape, showing a dense concentration of buildings, including skyscrapers and lower residential structures, along with parks and sports fields. The city is nestled in a bay area with hills in the background.

# 1. Familiarity

An aerial photograph of a coastal urban area. In the foreground, there are several multi-story residential buildings with solar panels on their roofs. A large industrial complex with numerous shipping containers and a long, curved building is visible to the left. In the middle ground, a residential neighborhood with smaller houses and trees is situated near a body of water. The background shows a hilly area with more buildings and a tall electrical transmission tower. A large ship is visible on the water in the distance.

**The Developer**

1. Title 24 compliance strategies are different.  
Preference for electric heat complicates things.
2. TCAC competitive points
3. The timing of funding application deadlines
4. Uncertain value of additional soft costs or scope
5. “Guinea pig” perception



# The Design Consultant



# The Contractor



## 2. Cost

<b>Building Location</b>	<b>Building Size</b>	<b>Eliminate Gas to Building</b>	<b>Transformer/ Switchgear impact</b>	<b>Central Plant cost delta</b>	<b>Renewables cost delta</b>
San Francisco	9 stories 108 apartments	didn't get to it	didn't get to it	+ \$3,100/unit (?!) (2018)	- \$1,760/unit ST didn't study PV
San Francisco	6 stories 146 studios 100% supportive	- \$123/unit	didn't get to it	+ \$822/unit (2019)	- \$164/unit PV vs ST, with equivalent load offsets
Oakland	6 stories 58 apartments	- \$551/unit	No impact	- \$850/unit (est. pricing was unclear)	didn't consider
Sunnyvale	4 stories 66 apartments	- \$75/unit	Cost neutral	+/- \$600/unit (est)	didn't consider

<b>Building Location</b>	<b>Building Size</b>	<b>Eliminate Gas to Building</b>	<b>Transformer/ Switchgear impact</b>	<b>Central Plant cost delta</b>	<b>Renewables cost delta</b>
Treasure Island	6 stories 105 apartments	<b>-1,031/unit</b>	No impact	<b>+ \$999/unit</b>	<b>- \$2323/unit ST</b> <b>+ \$4224/unit PV*</b>

# Maceo May Apartments

**MITHUN**

- Gas connection
- Gas trench, backfill, pipe, stub to building
- Flextend joints
- Gas meter room
- Gas piping to boiler room
- Gas to laundry
- Gas ventilation

- Delete Insulated copper pipe to solar thermal and tanks

\*Note PV cost add represents larger load offset compared to ST

Data from Mithun

## **Email from client for a 100% supportive, formerly homeless, master-metered housing project**

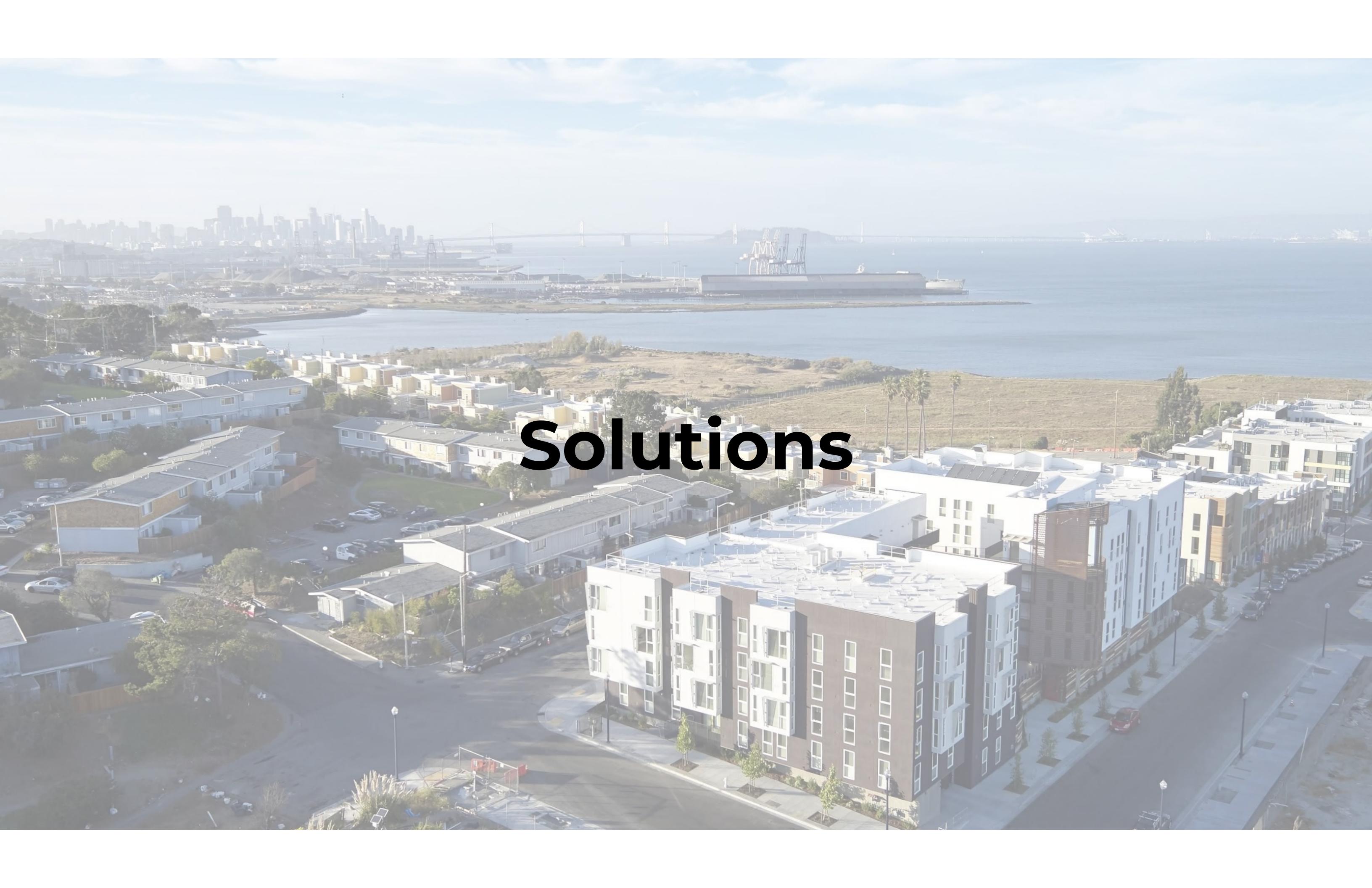
“I literally have no additional funds to improve energy efficiency or even to buy the solar equipment we show now. So if this results in any additional cost at all, it’s not achievable. I’m sorry but the focus of this project is 100% on first cost. And I really do not have the time or bandwidth to try to change the [funder’s] focus on 1<sup>st</sup> cost to savings over time.”

# Complications with cost studies

1. **Quality** of contractor and subcontractor estimating
2. **Baselines can wander.** What counts and what doesn't depends on what's taken for granted
3. Opportunity to consider **Life-cycle cost** varies widely  
Plus it's difficult to project future utility costs
4. **Cost vs Value:** conversation hard to connect to priorities around future outcomes

A photograph of a modern building's exterior. The building has a large glass door with a metal frame. To the right of the door is a silver fire hydrant. In the foreground, there is a small garden area with a wire mesh planter containing green plants. The building's facade is made of light-colored wood paneling. The sky is clear and blue.

### 3. Electrical Service Planning

An aerial photograph of a coastal urban area. In the foreground, there are several modern residential buildings, including townhouses and larger apartment complexes, arranged along streets. The middle ground shows a mix of residential and industrial areas, with a large bridge spanning a body of water. In the background, a city skyline is visible under a clear sky.

**Solutions**

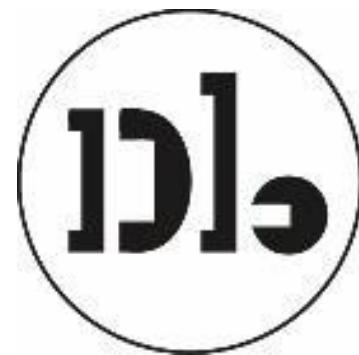
# Resources & Process

1. **Sharing cost information.** Sharing in general.
2. Education for designers: **rule of thumb** space planning for **electrical service** for massing stage
3. Resources for **talking about the future** (rates, trends)
4. **Feedback:** establish **priorities around value** to inform more complete life-cycle cost considerations

# Policy

1. Well-designed **pre-qualification programs, quality standards**
2. **Decarbonization vs. Electrification:** include PV, Storage, EVs in incentive structures.
3. Alternate calcs for EVs that allow for demand management strategies?
4. Careful near-term waiver policies addressing infrastructure barriers?

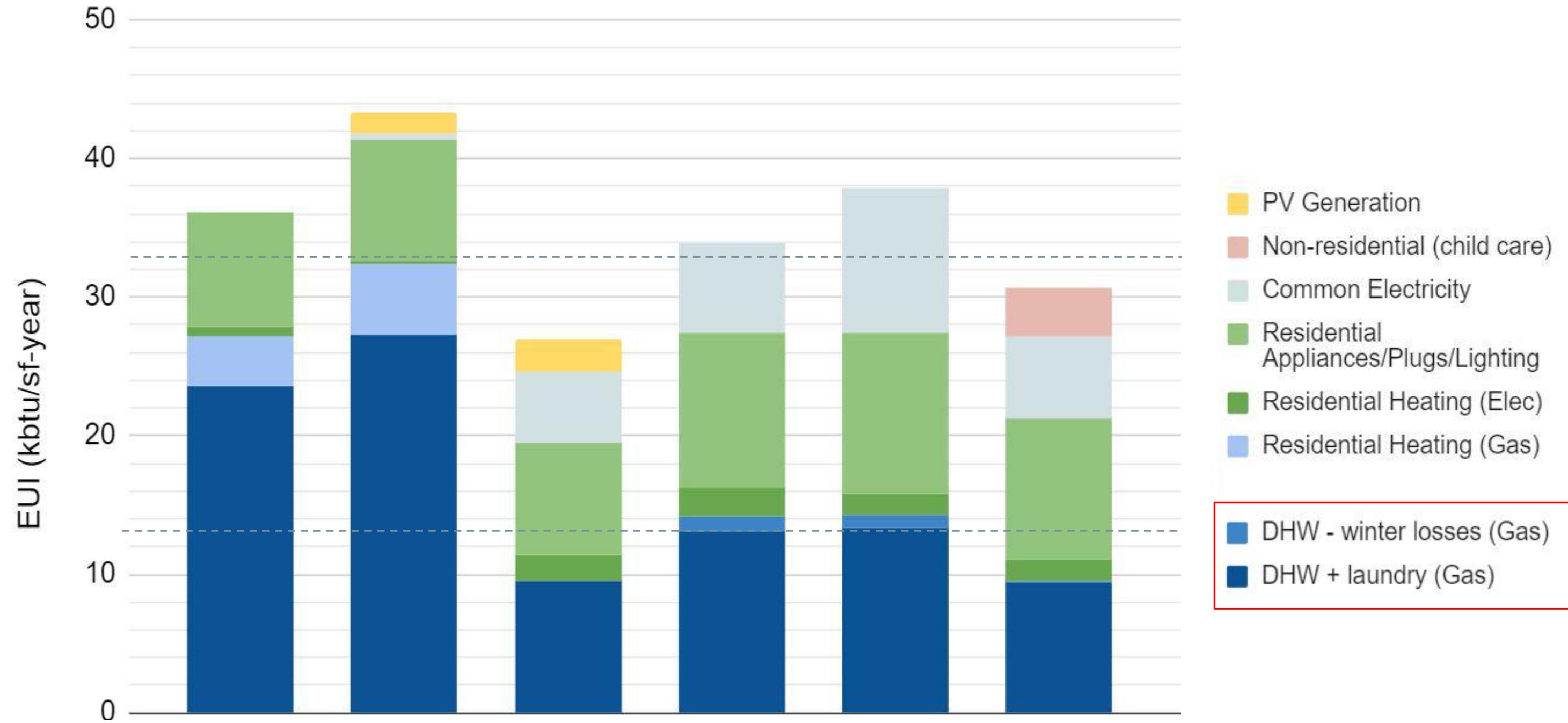
# Thank You!



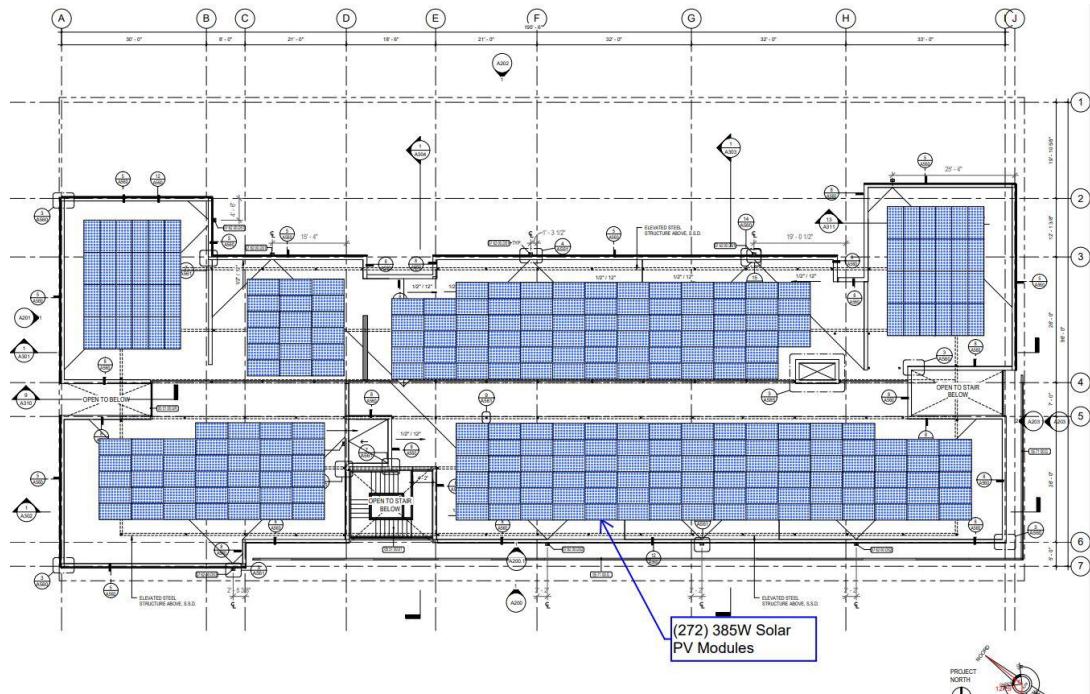
[www.dbarchitect.com](http://www.dbarchitect.com)



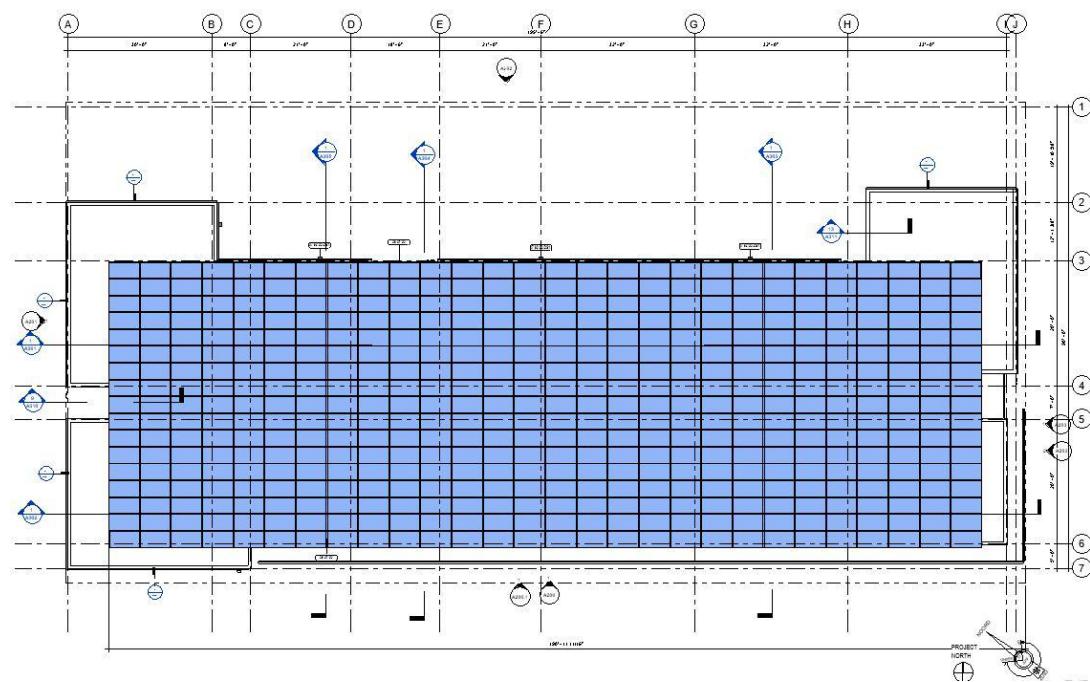
# Measured Energy Use Intensity from Six Buildings



# Net Zero Energy for a six-story housing project



Roof-mounted PV:  
**38% ZNE Offset**  
Meets AHSC commitment  
**\$336,000 Cost**  
**\$20,000 Annual Savings**  
Annual house utilities 100% covered



Elevated Canopy:  
**68% ZNE Offset**  
**\$939,000 Cost**  
**\$239,000 After Adjustments**  
\$700,000 comes back in federal tax credit and increased perm loan from CUAC  
**\$30,000 Annual Savings**  
Increased Annual Revenue from CUAC rent adjustments

