

Wrestling with Electrification

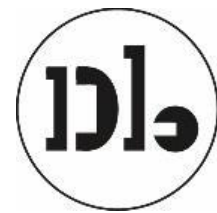
A look at decision-making around all-electric housing



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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



1. Familiarity



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

Building Location	Building Size	Eliminate Gas to Building	Transformer/ Switchgear impact	Central Plant cost delta	Renewables cost delta
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

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



- 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

Maceo May
Apartments

MITHŪN

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 1st 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

3. Electrical Service Planning



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

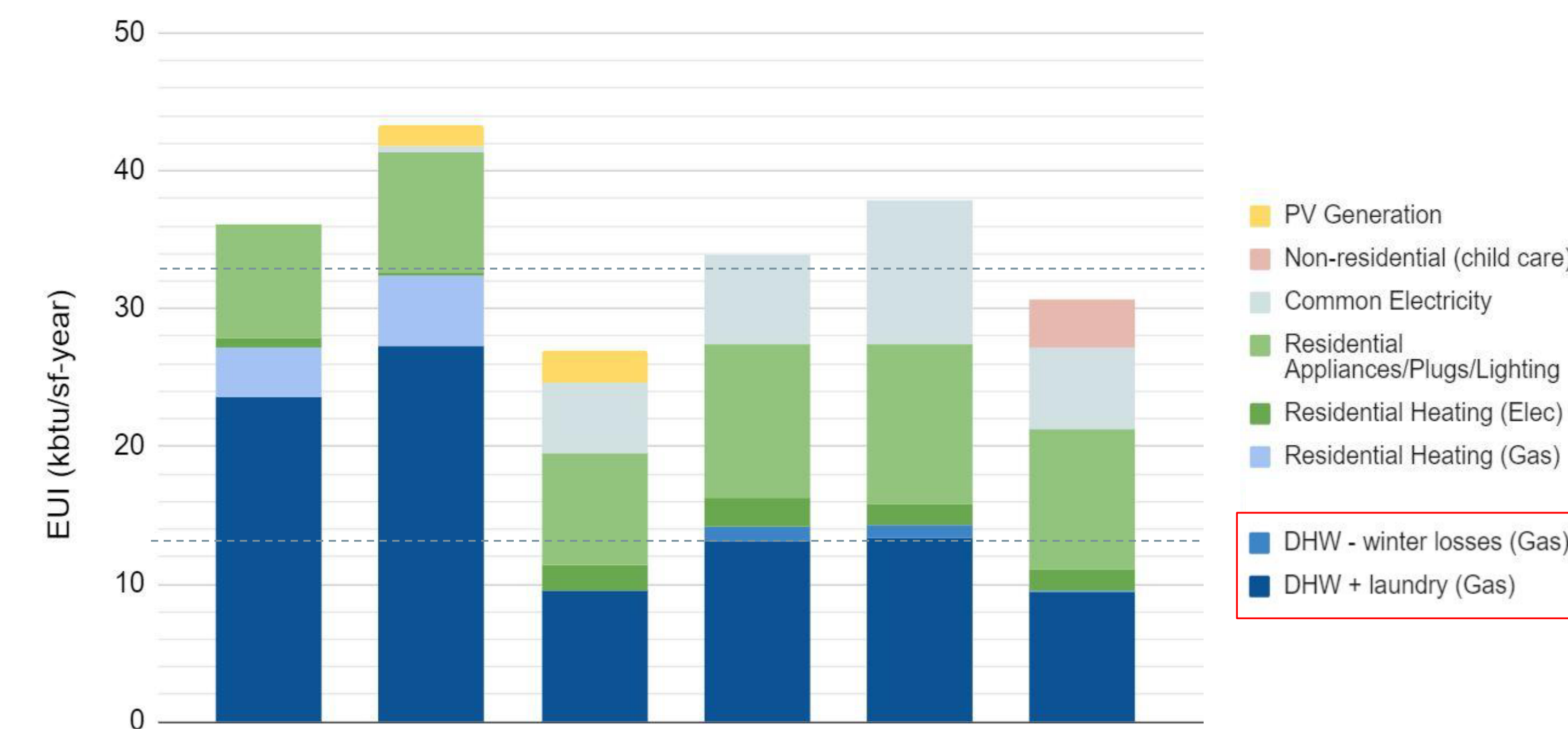
1. Well-designed **pre-qualification programs, quality standards**
2. **Decarbonization vs. Electrification:** include PV, Storage, EVs in incentive structures.
3. Alternate calcs for EVs that allow for demand management strategies?
4. Careful near-term waiver policies addressing infrastructure barriers?

Thank You!

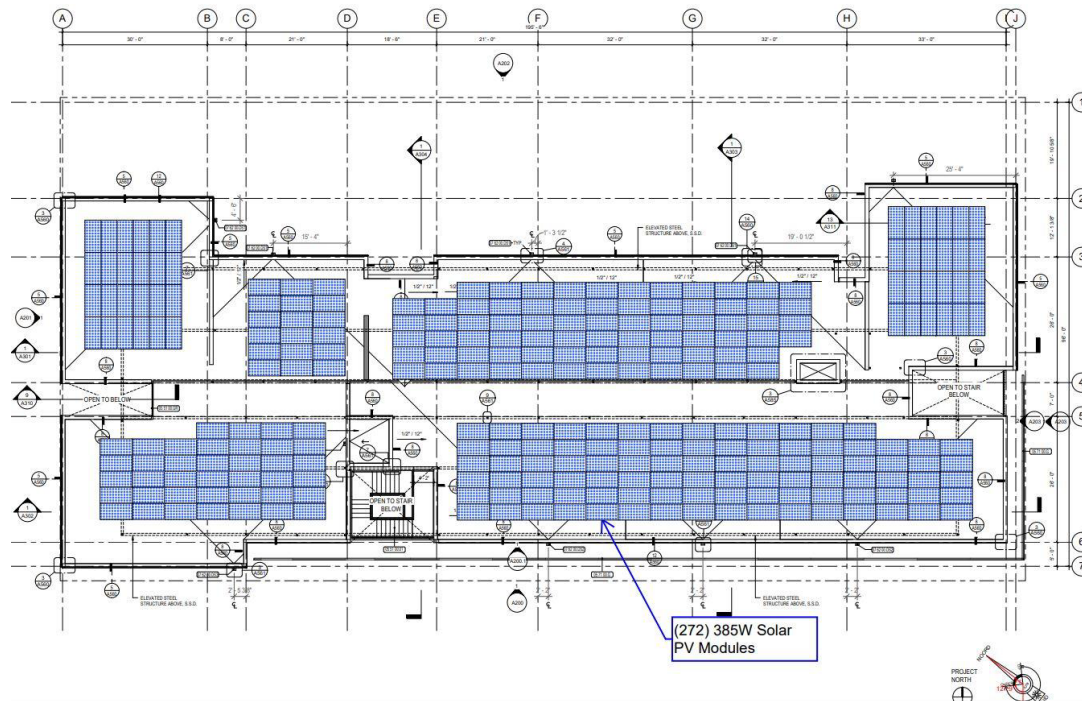


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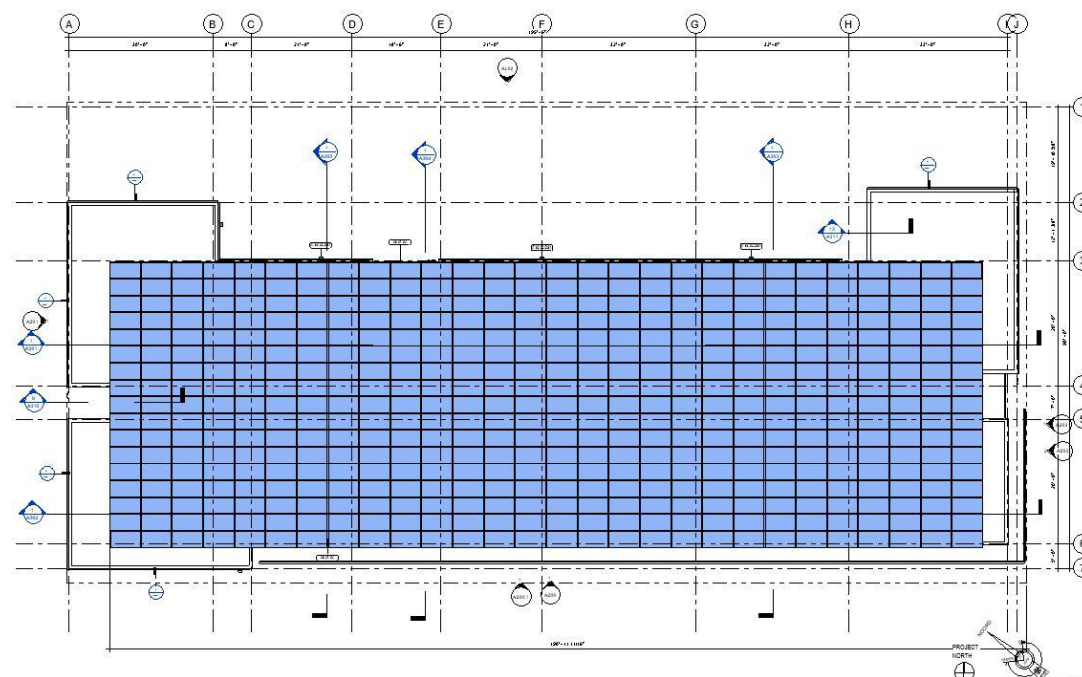
Measured Energy Use Intensity from Six Buildings



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

