Building Electrification
Lessons from Affordable Multifamily Housing

What is Building Electrification?
Electrification - replacing direct fossil fuel use (e.g., propane, heating oil, gasoline) with electricity (use) in a way that reduces overall emissions and potentially energy costs while lowering other air pollutants.
(Source: Pathways to 2050: Decarbonization in a High Renewables Future (presentation), April 2019.)

Why Electrify?
Building electrification is important because:
- Create Safer and healthier buildings
- Reduces greenhouse gas emissions and air quality degradation
- Results in potential cost stabilization and savings

More broadly, building stock electrification is a critical pathway to achieve statewide climate goals to help avoid the worst-case scenario impacts of Climate Change.

The electricity grid in CA is getting cleaner—100% carbon-free electricity by 2045 (SB 206, 2019)
The cost of maintaining gas infrastructure will fall on fewer and fewer customers and therefore become a greater and greater cost burden.

Results: Show Me the Data

How to Electrify Your Building?

1. Design: How to Do It
What are the design considerations pre-construction or -retrofit that lead to successful building electrification?
- It is not that different!
1. Early in design
2. Confirm enough electrical capacity
3. Reduce load
4. Analyze electricity rates
5. Optimize with renewables

2. Value Proposition: Getting to Yes!
What is the value proposition to building owners?
- Cost-effective
1. Electricity can be offset by renewables
2. Eliminate gas infrastructure, infrastructure and service costs, and upkeep
3. Buildings are always going to have electricity
- Health and Safety
- Long-term maintenance

3. Installation Considerations: How to Achieve Success
What is needed to ensure contractor engagement and successful installation?
- Correct sizing and settings
- Familiarity with equipment
- Sizing for thermal storage and load shifting/demand response
- Re-piping or wiring, and need for more electrical capacity
- Changes to familiar O&M and training delivery
- Engagement is key!

Case Study: Edwina Benner Plaza
- Sunnyvale, CA
- 66 Affordable Units
- All-electric
- Central Heat Pump Water Heating System
- Site lighting, central laundry (with electric dryers)

Promote Health and Safety
- Fossil fuel-powered appliances use combustion to run and emit Carbon Monoxide (CO) and Nitrous Oxide (NOx).
- Heating, water heating, laundry, and cooking are all large in-home uses that can endanger users when fueled with gas.

Josef Kral, E3, April 2019.

Stabilize (and offset) Costs

Results:

- Cost savings follow similar curve as energy savings
- Gas savings of 64% (89% gas, 33% electric)
- Electric savings of 36% (90% gas, 25% electric)

- Eliminate gas infrastructure, infrastructure and service costs, and upkeep

Conclusion: It Works
Electrification is already being done in Affordable Multifamily, both new construction and retrofit. It is tangible and achievable!

It is imperative that we electrify our building stock—both new construction and retrofit—to achieve our climate goals.

Source: E3, Residential Building Electrification in California, April 2019.