Our Client
Redwood Energy is an electrification company based out of Eureka, CA. They own and operate several multi-family zero-net-energy housing complexes that provide clean, affordable living spaces for many disadvantaged communities and low-income renters.

Project Significance
This design project is focused on extending the benefits of electrification to renters and non-homeowners both within Redwood Energy’s housing developments and in external communities. The goal is to design a retrofit ready induction stove that eliminates the need for a time intensive and costly cooktop conversion.

Project Team Objectives
The primary objective for the project team is to analyze cooking session data taken from a multifamily housing community owned by Redwood energy (Atascadero housing complex) and determine if 1800W induction cooktop is sufficient for most household use, and how these capabilities are affected by number of occupants and cooking duration.

Data Analysis Methodology

Assumptions
- Cooking session data from November to December (2019, pre-COVID) chosen to represent all sessions
- Lowest setting on electric cooktop is 100 W (used as minimum cutoff value)
- Any cooking sessions that drew more than 3000W and longer than 20 minutes is assumed to include oven operation (excluded)
- Only data for 1-6 occupant apartments was considered

Cooktop Efficiency
Induction stove efficiency = 78% (Induction Stove A average at full power)
Electric stove efficiency = 62% (Electric Coil range average at full power)

Table 2. Cooking efficiency results measured according to EPRI test procedure

<table>
<thead>
<tr>
<th></th>
<th>Large Vessel</th>
<th>Small Vessel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Half Power</td>
<td>Full Power</td>
</tr>
<tr>
<td>Induction Cooker A</td>
<td>74.9%</td>
<td>77.6%</td>
</tr>
<tr>
<td>Induction Cooker B</td>
<td>75.7%</td>
<td>77.2%</td>
</tr>
<tr>
<td>Electric Coil</td>
<td>81.6%</td>
<td>83.4%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>41.7%</td>
<td>35.2%</td>
</tr>
</tbody>
</table>

Average Power - All Cooking Sessions

Peak Power - All cooking Sessions

Percentage of Average Power Cooking Sessions met: Induction (IND) vs Electric Coil (EC)

Percentage of Peak Power Cooking Sessions met: Induction (IND) vs Electric Coil (EC)

Key Findings
- A 16% improvement in efficiency yields a 19% savings in energy (Wh)
- Approximately 85% of cooking sessions peak power usage is covered by an induction stove
- Approximately 95% of cooking sessions’ average power draw is covered by an induction stove
- As occupancy increases, power draw increases
- 67% of all cooking sessions fall between 1 and 20 minutes
- 15% of cooking sessions draw between 100 and 200 Watts