Smart Charging of Electric Vehicles

County of Alameda

Smart Charging for Alameda County

The Issue

- Electric cars are much better for the environment than gas cars, but they can cause spikes in power demand when they charge.
- These spikes are expensive as organizations are charged heavily when they cause an power spike.
- Utilities also may need to activate "peaker plants" to accommodate energy spikes, causing pollution.
- The expense of these energy spikes, known as "demand charges" is a barrier to mass-adoption of EVs.
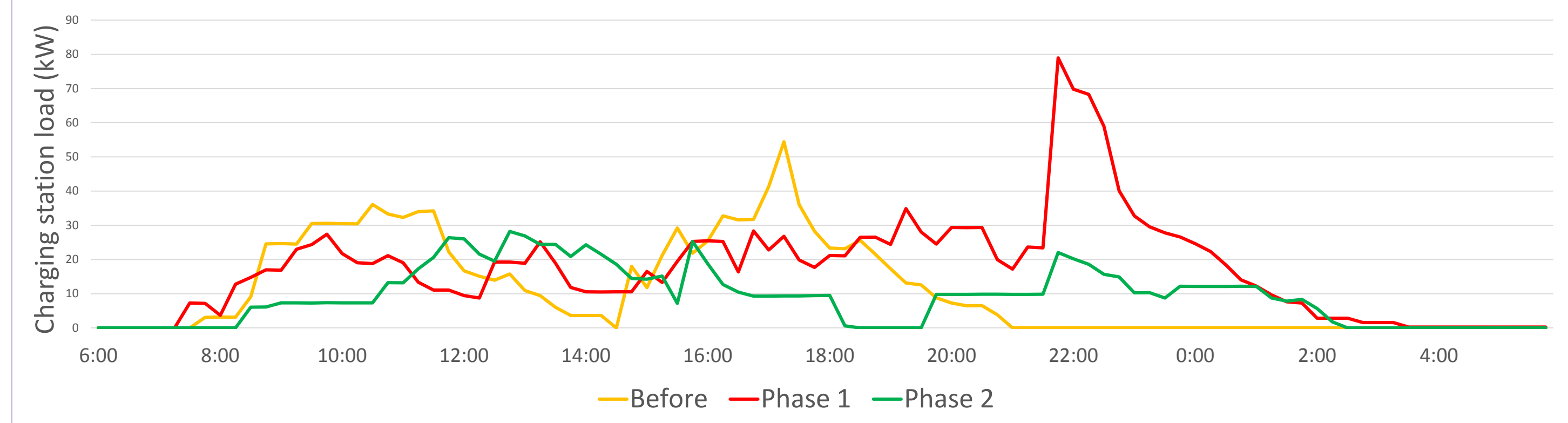
Our Approach

- Smart charging means taking energy when demand is lowest.
- We shifted some fleet stations to charge during off-peak hours.
- We set some public charging stations to dispense lower rates of power to decrease our power demand.

We set some stations to wait until power is cheapest before they start charging.

Charging Station Load Profile on Selected Days

At first, we set them to all start charging at 9:00 p.m. That created its own spike in demand, which worsened the problem. We solved that by staggering the start of charging.

Results

- Between September and May, AlcoPark's charging stations' energy increased **242%**.
- The building's peak power demand increased by **only 14%**.
- We are still working to manage demand at public stations.
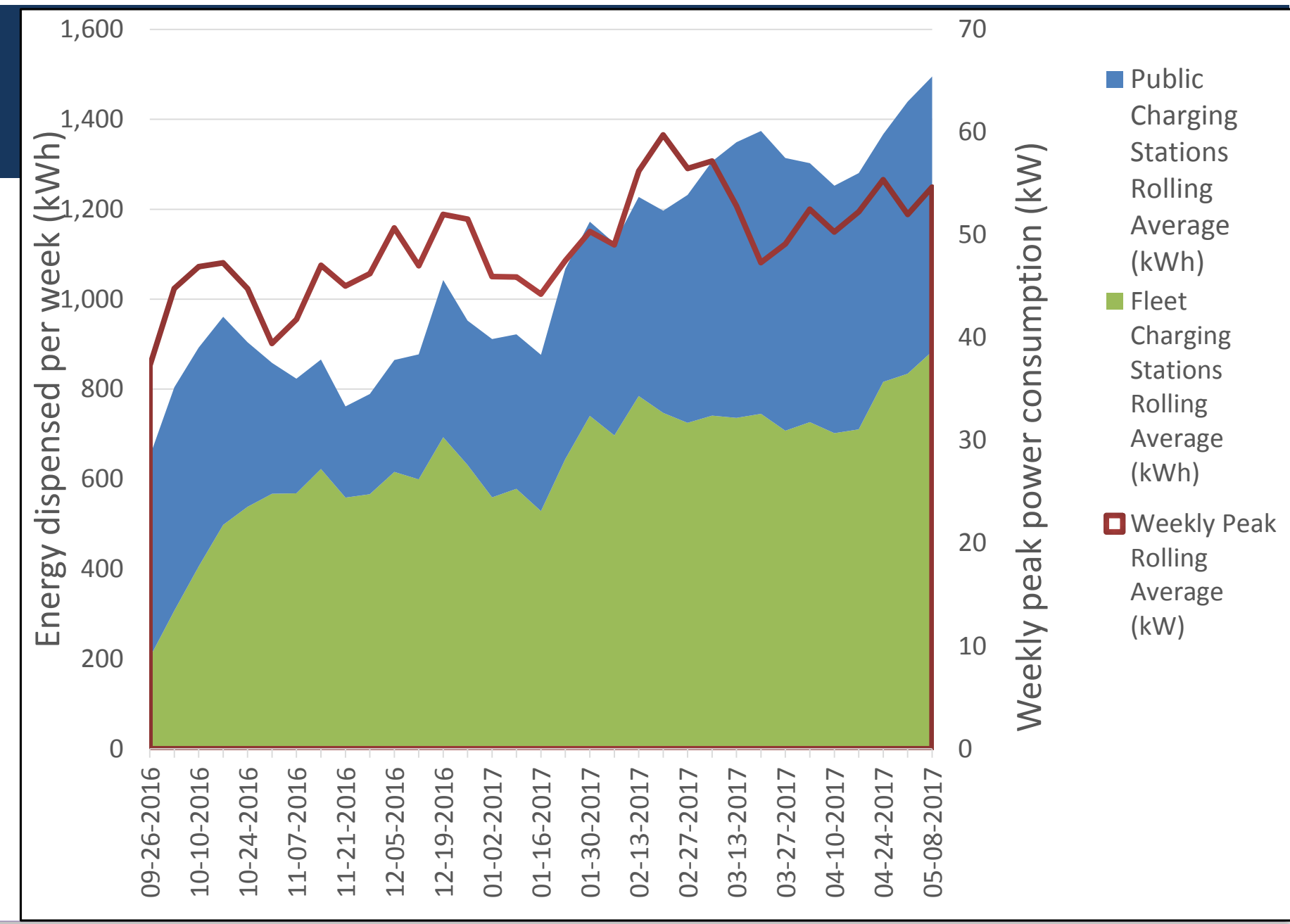
Lessons Learned

Successful Strategies:

1. It is important to coordinate carefully with all stakeholders involved in a project to ensure that everybody's needs are being met.
2. Invite continuous feedback and participation from all stakeholders.
3. Closely monitor data to ensure that interventions are having the intended effect.

Recommendations for Improvement

1. Cheapest times for the grid are not always the cleanest times. This can create a conflict for those businesses that want to reduce power bills and carbon emissions.
2. I recommend working to ensure that cars are charging at the times when electricity is least carbon-intensive, not just cheapest.

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I graduated from UC Berkeley in May 2016 with a B.S. in environmental economics and policy. I previously interned at the California Environmental Protection Agency and at Lawrence Berkeley National Laboratory. I am interested in pursuing a career in research to find smart solutions to climate change.

Acknowledgements

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