SMART AND CONNECTED KIDS FOR SUSTAINABLE ENERGY COMMUNITIES
1737565
Boudet, Oregon State University
IRG-2, FY2017

Principal Research Investigators	Community Partners
• *Hilary Boudet, Oregon State University* • *Ram Rajagopal, Stanford University* • *Mahnoosh Alizadeh, University of California – Santa Barbara*	• Narinder Bansal, Ohlone Community College • Rachel DiFranco, City of Fremont • Jean Fahy, Girl Scouts of Northern California • Ben Mothershead, Powerley • Raju Shreewastava, Big Data Trunk

Project Overview
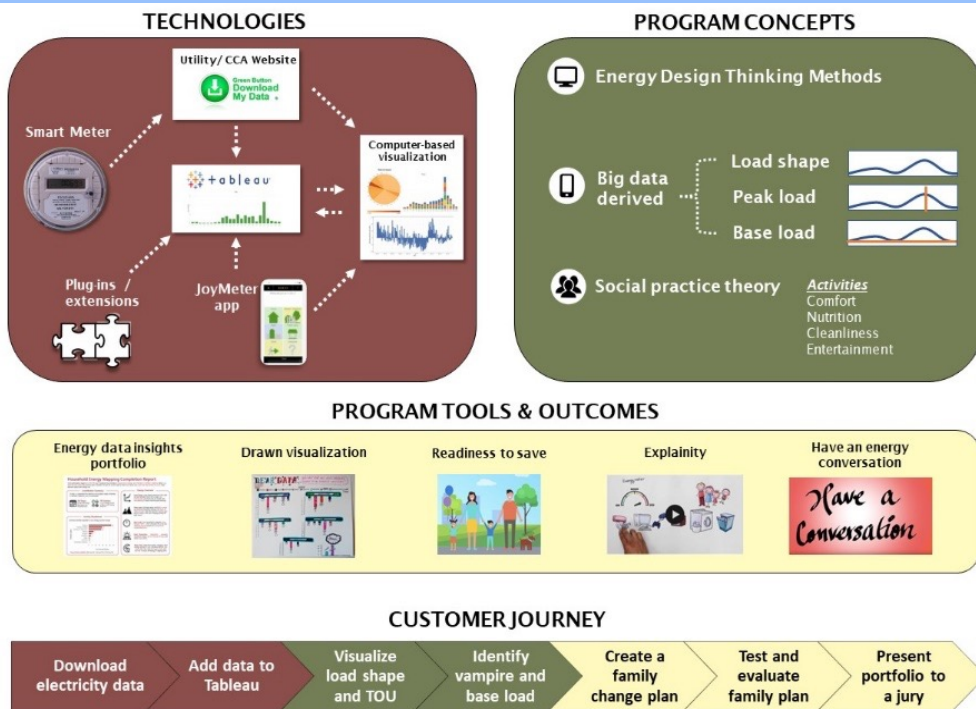
Visual Schematic

Figure 1: Designing Your Energy Lifestyle Program Components

Project Vision

- Missed in current explanations of widespread disengagement with energy use is the need to understand and address sociological and psychological factors in energy behavior.

- We have employed interviews, surveys and pilot interventions with youth in Fremont, California, to develop interventions that allow youth to practice data science, working with their household energy data to design pathways to savings and become motivators of change.

Project Overview

Use-Inspired Research

- Assumption that increased access to energy data will enable households to save and shift energy use, but this has not materialized
- Based on extensive feedback from Fremont city staff, community members and youth, our project works to improve energy data thinking and facilitate learning about energy data science

Fundamental Research Contributions

- Combines best practices of big data analytics and visualization from engineering with community-engaged intervention strategies from the behavioral sciences
- Enhances our knowledge of the potential pivotal role of big data, social science theory, and community-based methods in transforming local energy management and consumption

Project Evolution

Before COVID

In-person research program with real-time data hardware, activity app & family behavior change

In-person deliberative democracy with youth on community energy policy

During COVID

Online household energy data visualization program with youth advisors

Online surveys of community and California residents on pandemic's effects on electricity use, home activities & energy policy preferences

Building database of 200+ homes electricity and gas usage and reports on appliances, activities, and COVID effects
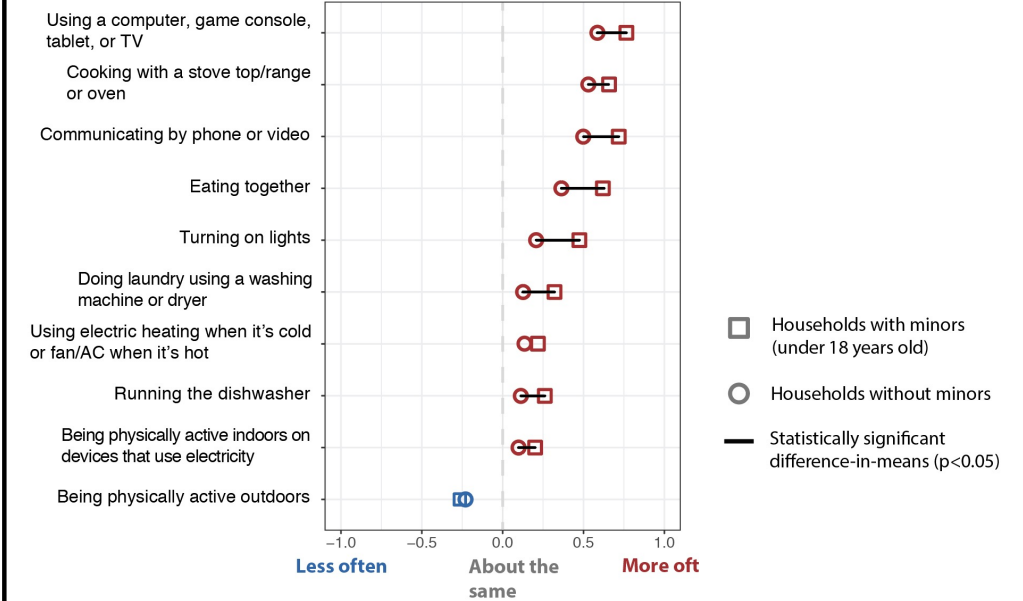
Investigation into global impacts of COVID on electricity demand
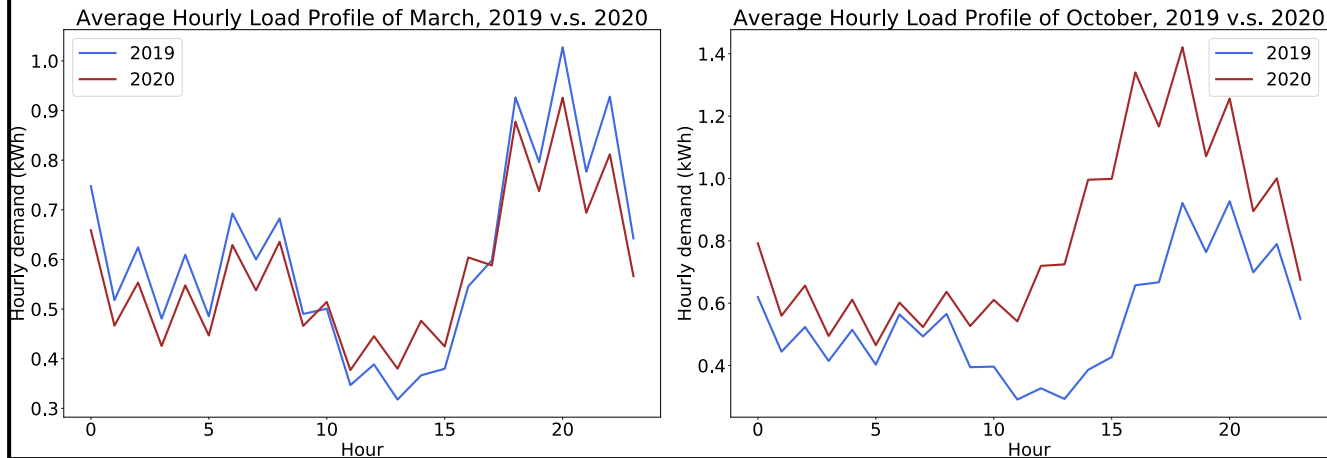
Project Update

Aggregate household activity reports and average household energy use from pilot programming
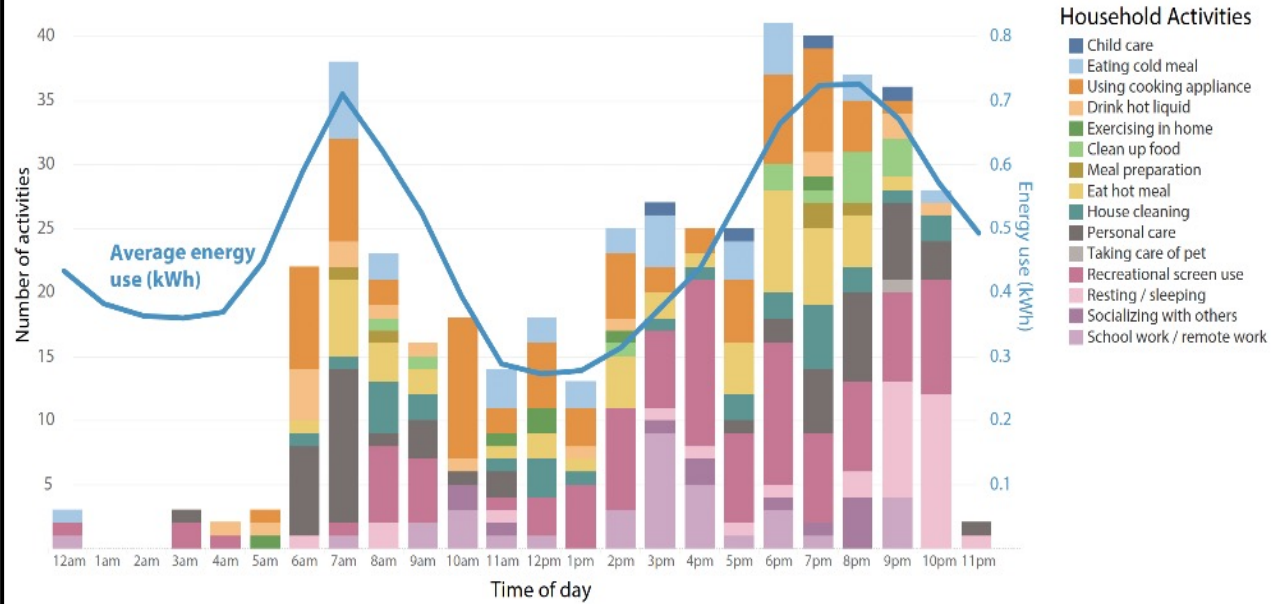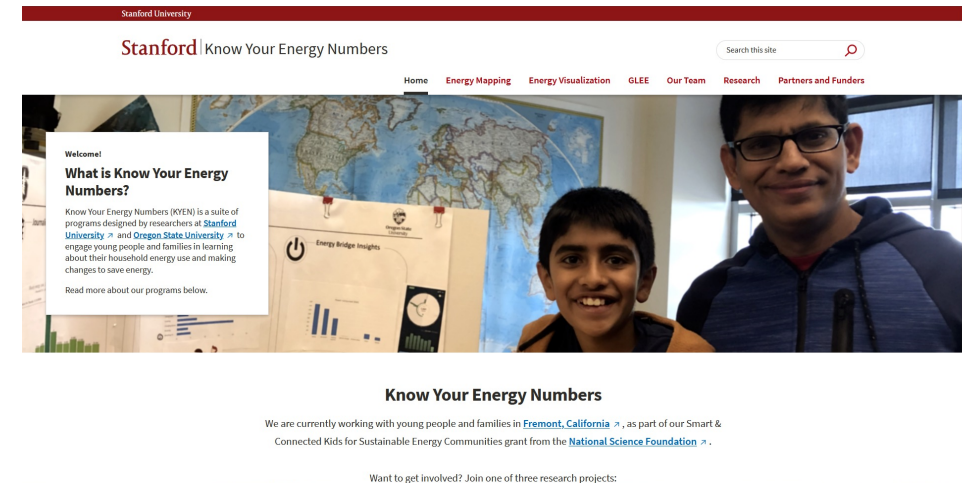
Reported change in activities during COVID for households with minors and households without minors.
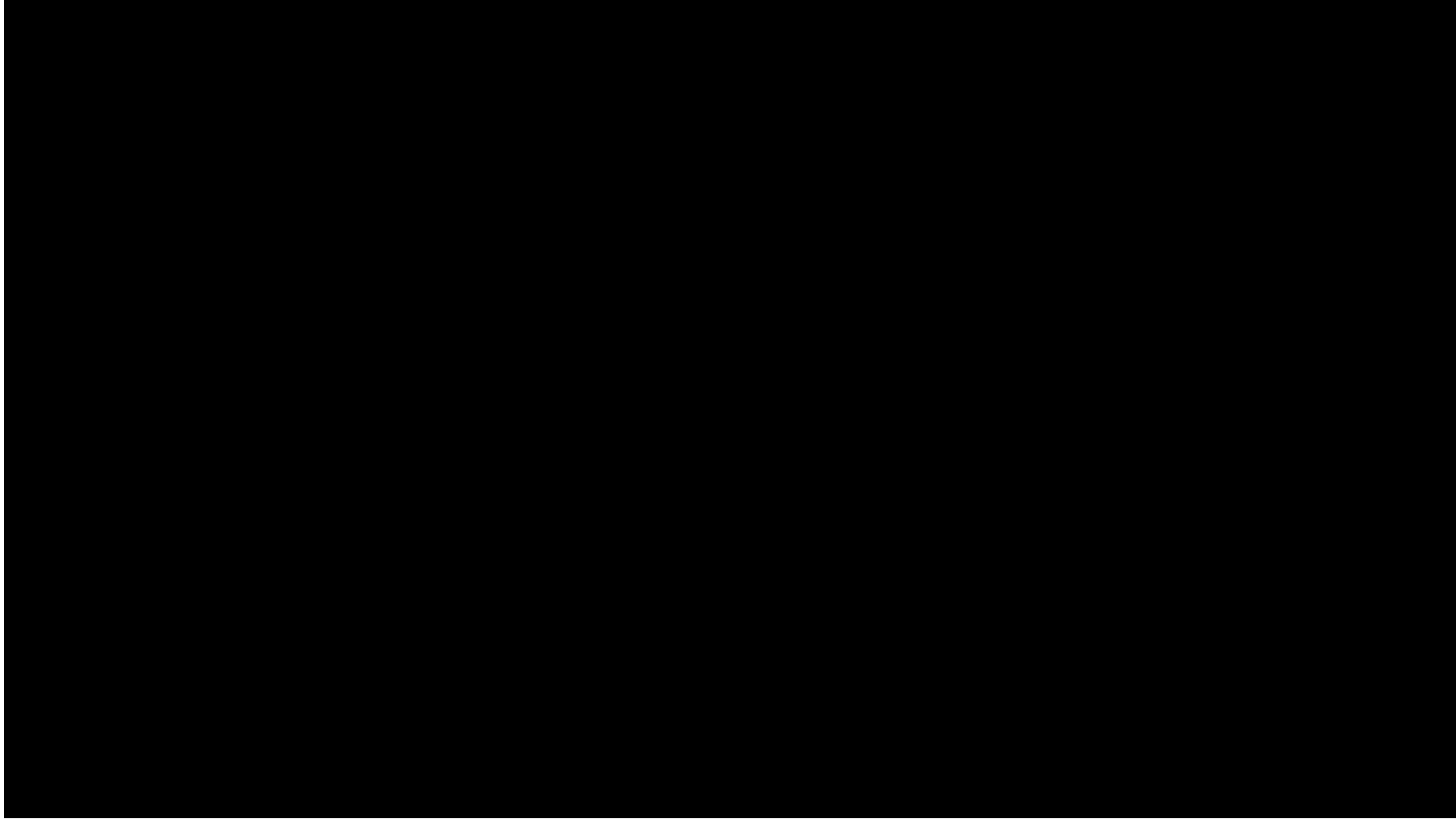
Change in Average Hourly Electricity Load Profile from 2019 to 2020 for sample of California residents, March and October.

New website and Canvas platform for remote learning program

Evaluating Project Impact on Communities

Anticipated outcomes & success measures

- Complete transition of in-person course to remote learning environment. Develop plug-ins/extensions for Tableau (and possibly other data visualization platforms) to facilitate remote learning course.
- Pilot remote learning course.
- Interview 20-30 potential project partners as part of recently awarded Oregon State University Accelerate Innovation Development funding award; participate in term-long Accelerate Program with support from business school students.
- Commercialize remote learning program with possible funding from NSF Partnerships for Innovation program.
- Continue to analyze global grid-level data on impacts of COVID-19 pandemic on energy demand.
- Continue to analyze survey and energy usage data collected from California residents to better understand impacts of COVID-19 pandemic on household energy use.
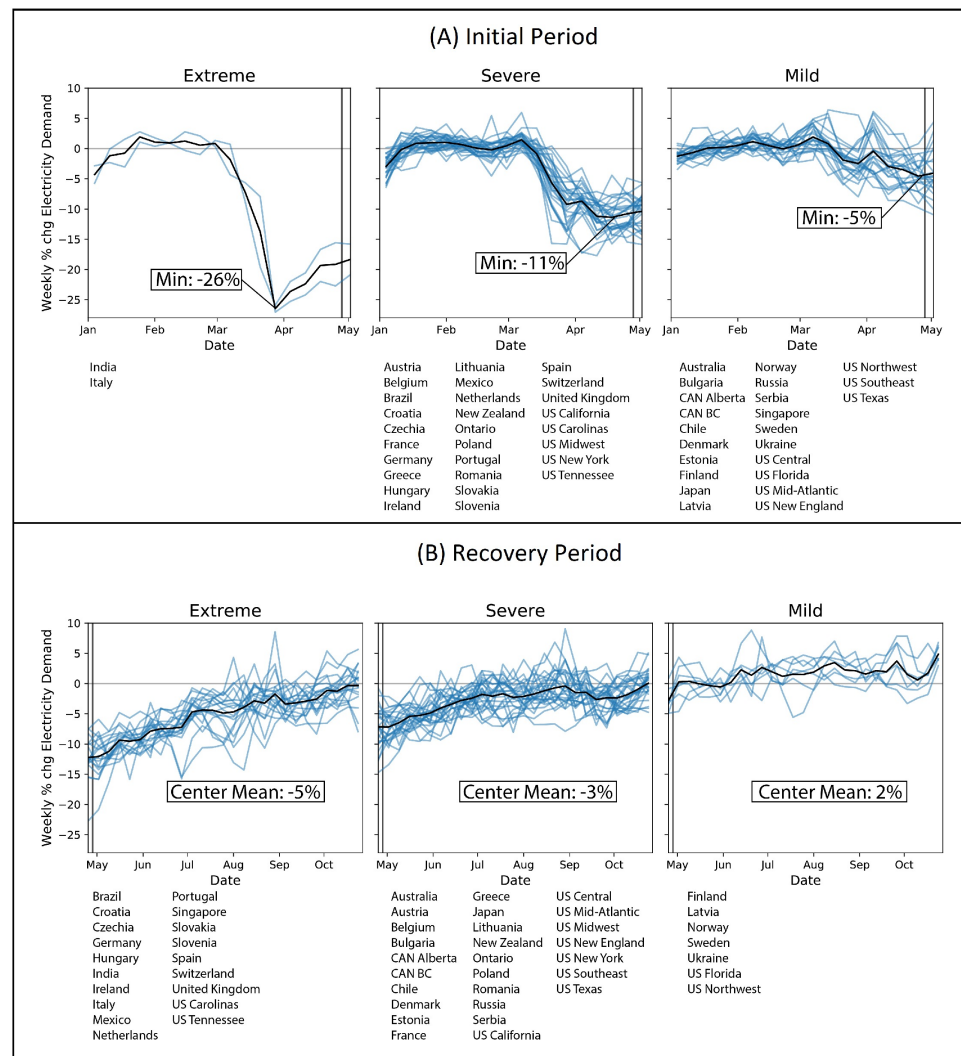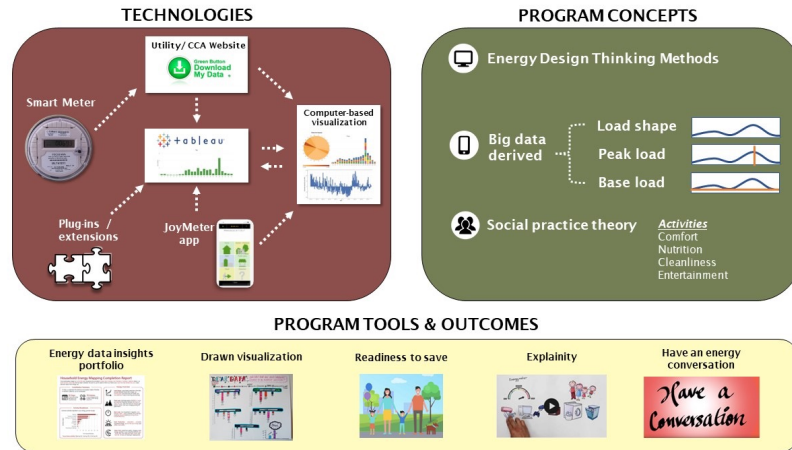

COVID-19 Electricity demand impact groups during initial phase (Jan-Apr 2020) and recovery phase (May-Nov 2020)

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