Renewable & Appropriate Energy Laboratory
RAEL

EPIC Policy + Innovation Coordination Group

Daniel Kammen

Energy and Resources Group (Chair)
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University of California, Berkeley

Former Science Envoy, United States Department of State

Engaging Communities in the Design of Sustainable Energy and Localized Futures (SELF) Models in California's San Joaquin Valley: EPC-17-048 (9/1/2019 – 4/30/22)

<u>UCB Research & Mgmt</u>:
Prof. Daniel Kammen (PI)
Dr. Shuba Raghavan

<u>Graduate Students</u>:
Kelsey Alford-Jones
Nia Jones

<u>Undergraduate students</u>: 5

Project Goals:

- Identify & partner with under-served communities in the Central Valley to address clean energy and water needs
- Use spatial data, energy models, surveys & engagement to develop capacity
- Leverage project & TAC team to enable home and mini-grid solution implement tation

Self-Help ENTERPRISES

<u>SHE Management</u>:
Paul Boyer (Co-lead)
Abigail Solis (Co-lead)

<u>Admin staff:</u>

<u>Survey team</u>: 6

Partnership with Self-Help Enterprises

Sustainable Energy Solutions

Affordable Energy

- SJV Affordable Energy Pilot Projects
- Leveraging IOU Discount Programs
- SJV Data Gathering Program

Clean Mobility

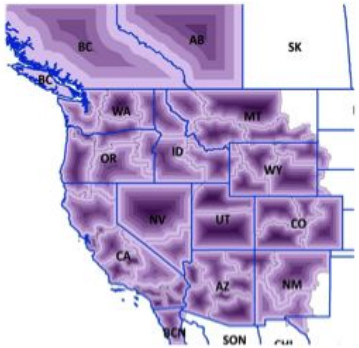
- Electric Vehicle Car Share Pilot
- ME&O EV in DAC

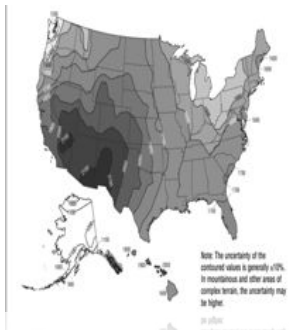
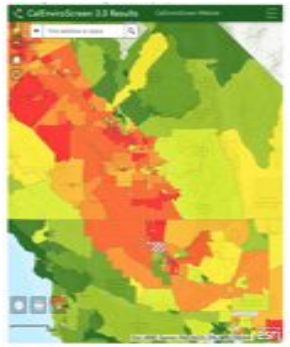
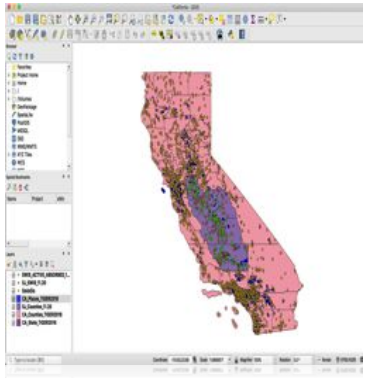
CPUC & CEC Initiatives

- Targeting Disadvantaged Communities
- Building de-carbonization

Affordable Energy Priorities

Self-Help ENTERPRISES



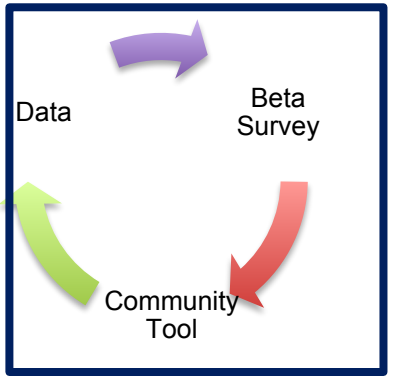




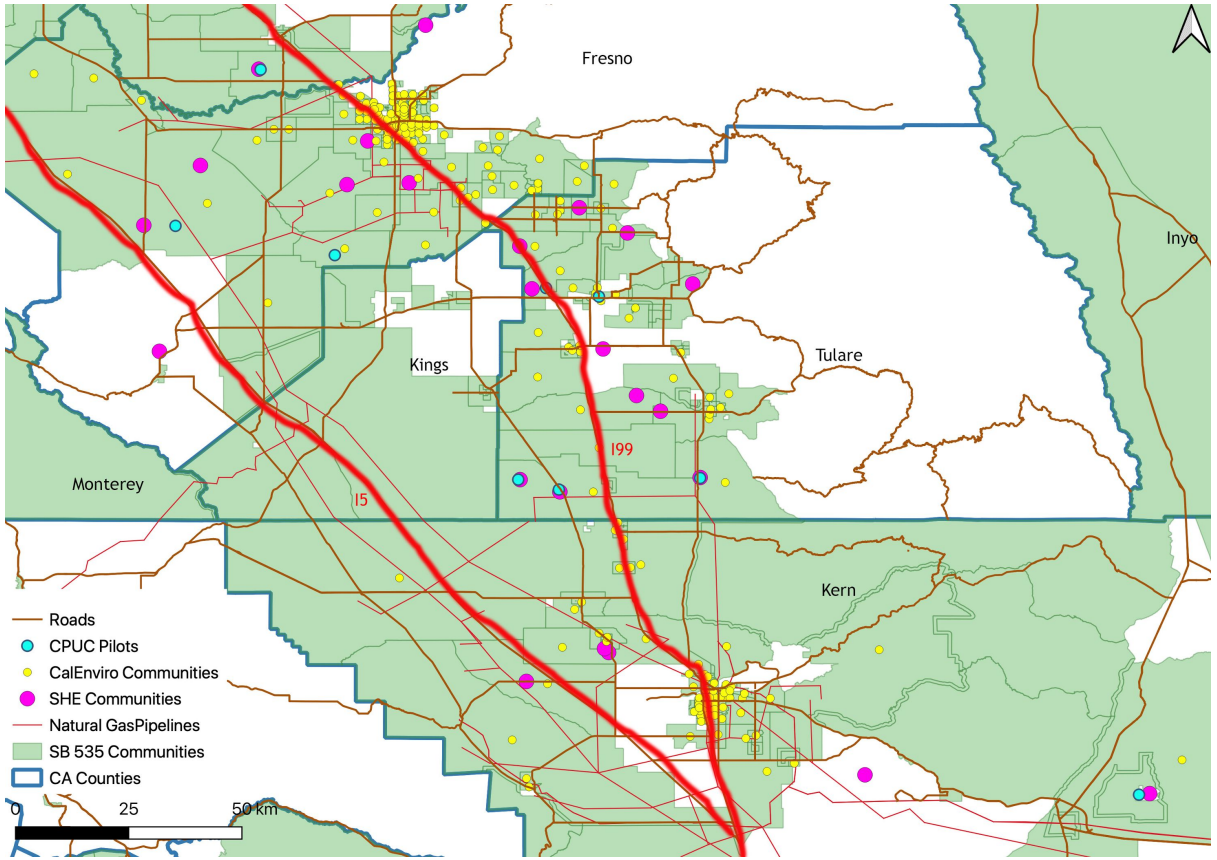

Step 1: Multi-disciplinary data development and sharing to assess energy resources

Step 2: Engage community (~ 1,000 surveys in 7 communities) in surveys and town-hall dialog(s)

Step 3: Develop community calculators and assessment tools for community decision-making over solar, biomass, energy storage, and energy-efficient device adoption at home or community scale

Step 4: Interface with *CalEnviroScore* and CPUC proceedings





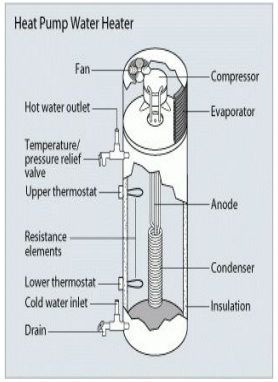
Understanding Household & community Priorities:

1. General Infrastructure
2. Fuel usage, appliance technologies & Cost
3. Indoor Air quality
4. Health & comfort

Self-Help ENTERPRISES

Sustainable Energy Solutions

Focusing on connecting disadvantaged communities to resources that provide access to affordable energy and clean transportation infrastructure.



Identify access challenges → **Community modeling** → **Survey & dialogs** → **Implementable solutions**

Technical education:

Deborah Sunter, Sergio Castellanos & Daniel M Kammen (2019) “Disparities in rooftop photovoltaics deployment in the United States by race and ethnicity,“ *Nature Sustainability*, **2**, 71 – 76. DOI.ORG/10.1038/s41893-018-0204

Community centered design:

- Home solutions and mini-grid proposals
- Expansion of CalEnviroScreen

Policy design and community assessments:

- PUC proceedings based on env. justice and long-term sustainable energy (SB32, SB100, Executive Order N-79-20)
- Holistic community planning approach

Self-Help ENTERPRISES

Extra Data Slides

Undergraduate Student Researchers (**EPC-17-048)**

Emma Tracy is a Sustainable Environmental Design with minor in Geographical Information Systems & Technology (GIST) and Energy and Resources Group (ERG) She is interested in applying geo-spatial data, land use histories, and climate risk analysis to building resiliency. In this project, she is interested in developing GIS based tools. Emma joined the SELF team in spring 2020

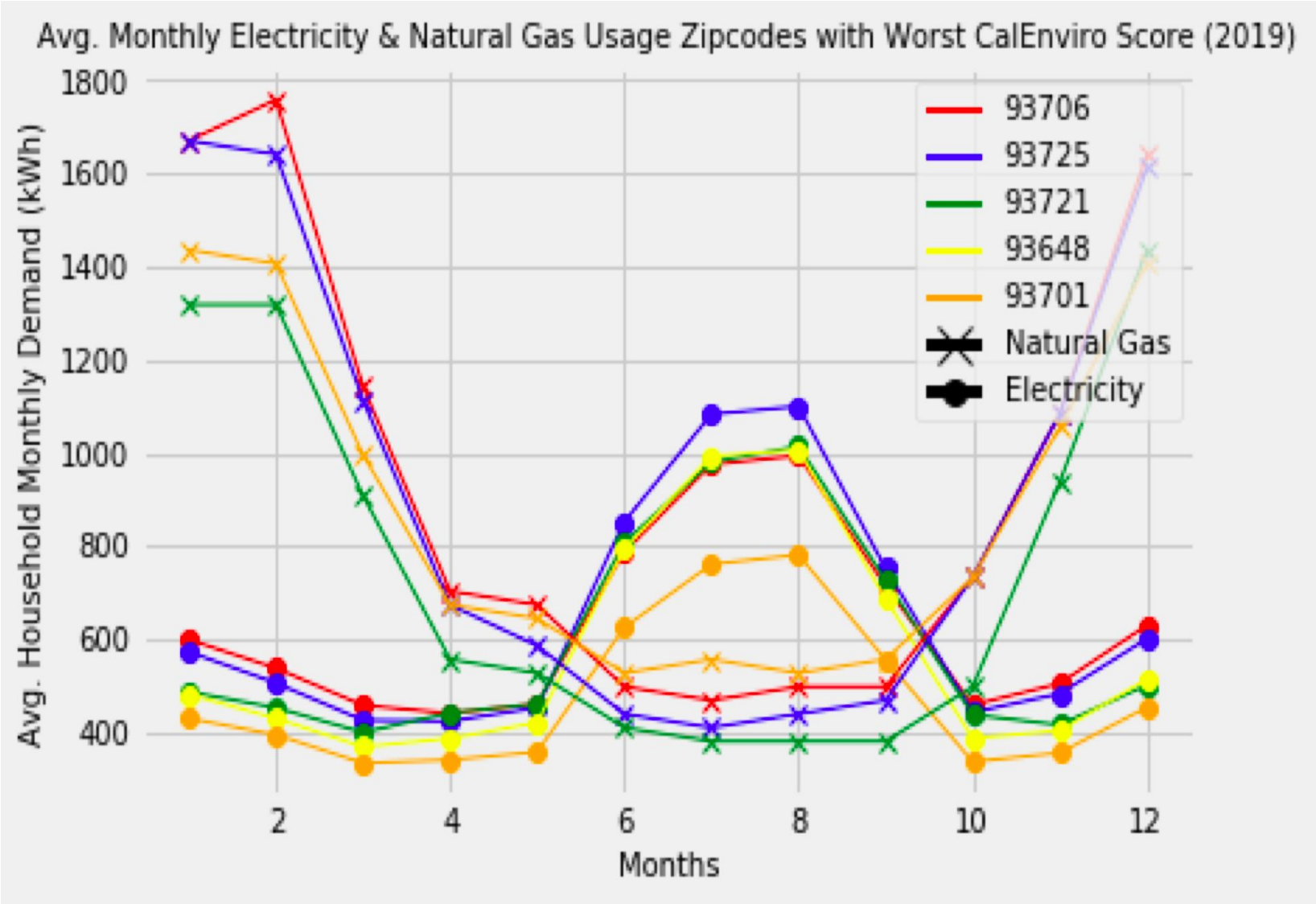
Natalie Fedorova is a fourth-year energy engineering undergraduate at UC Berkeley, and has experience in power systems and data science/programming. She joined RAEL in July 2019 working on the SWITCH-China project, analyzing optimal pathways towards decarbonization in China's transforming grid. She will join SELF project this summer and she will explore the nexus of storage, demand response, and distributed energy generation.

Daniel Sun is a 3rd year Computer science major. Daniel joined RAEL in Fall 2019, and has been working on mapping hourly demand profiles of water heating, space heating and cooling. He will be estimating the demand response potential, energy cost and reduction of GHG emissions from the adoption of heat pumps in residential sector.

Kelvin Ngo is a 2nd year Computer science major. Kelvin joined RAEL in the fall of 2019 has been working on mapping hourly demand profiles of heating and cooling. He will be working on estimating solar photovoltaic resource potential for rooftop to community size parcels. He will estimate technical potential, costs of a few types of PV technology.

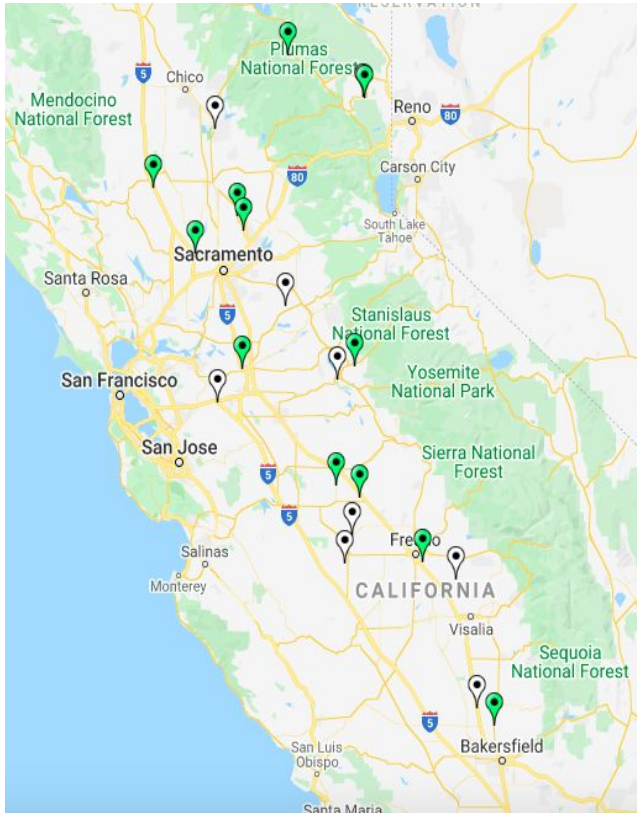
Vanya Srivastava is a 2nd year Architecture with Society & Environment student doing a minor in City Planning. Vanya will work with Emma Tracy on GIS mapping. Vanya is joining SELF this spring 2020

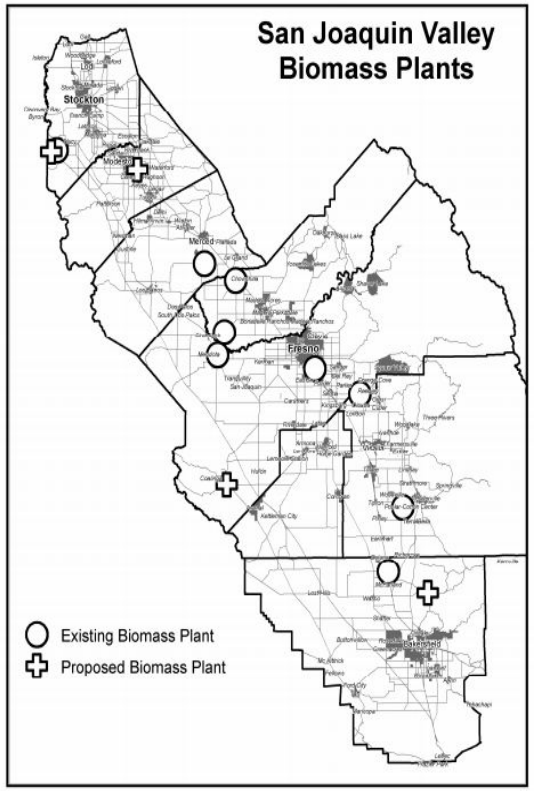
Ella Tyler is 2nd year Industrial Engineering & Operations Research. Ella worked last summer for a Colorado based company analyzing the impact of demand response. She will be working on estimating demand response potential for some of the high electrification scenarios in SELF. Ella just joined SELF project this spring 2020.

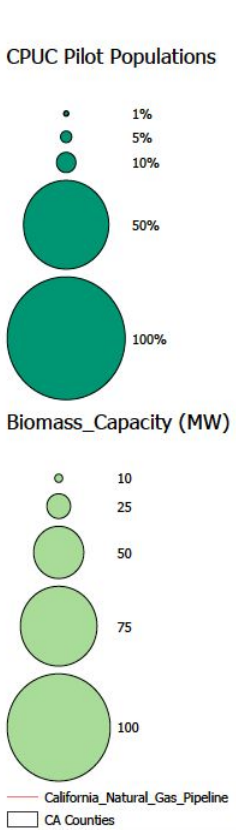


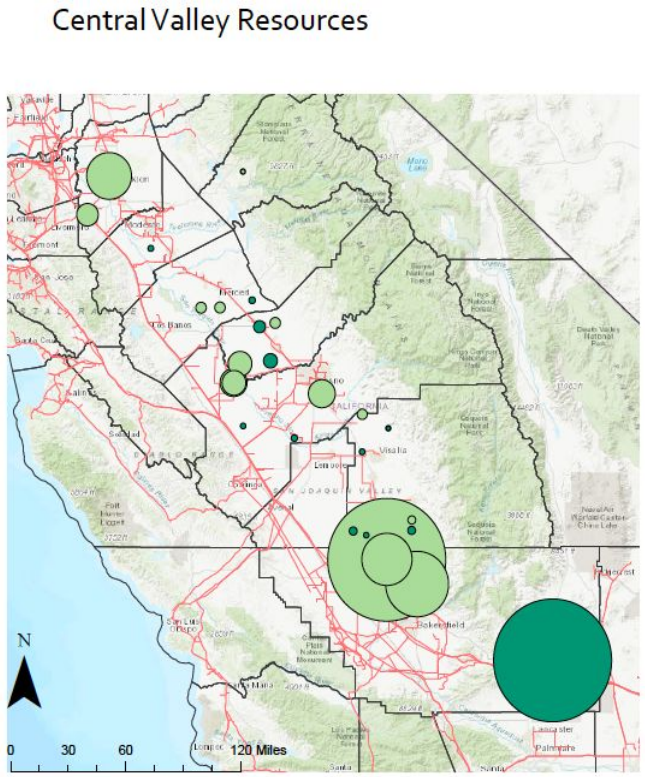
Underlying data from PG&E; Analysis by Shuba Raghavan, Ella Tyler & Jacquelin Yeung

Existing BioMass Facilities



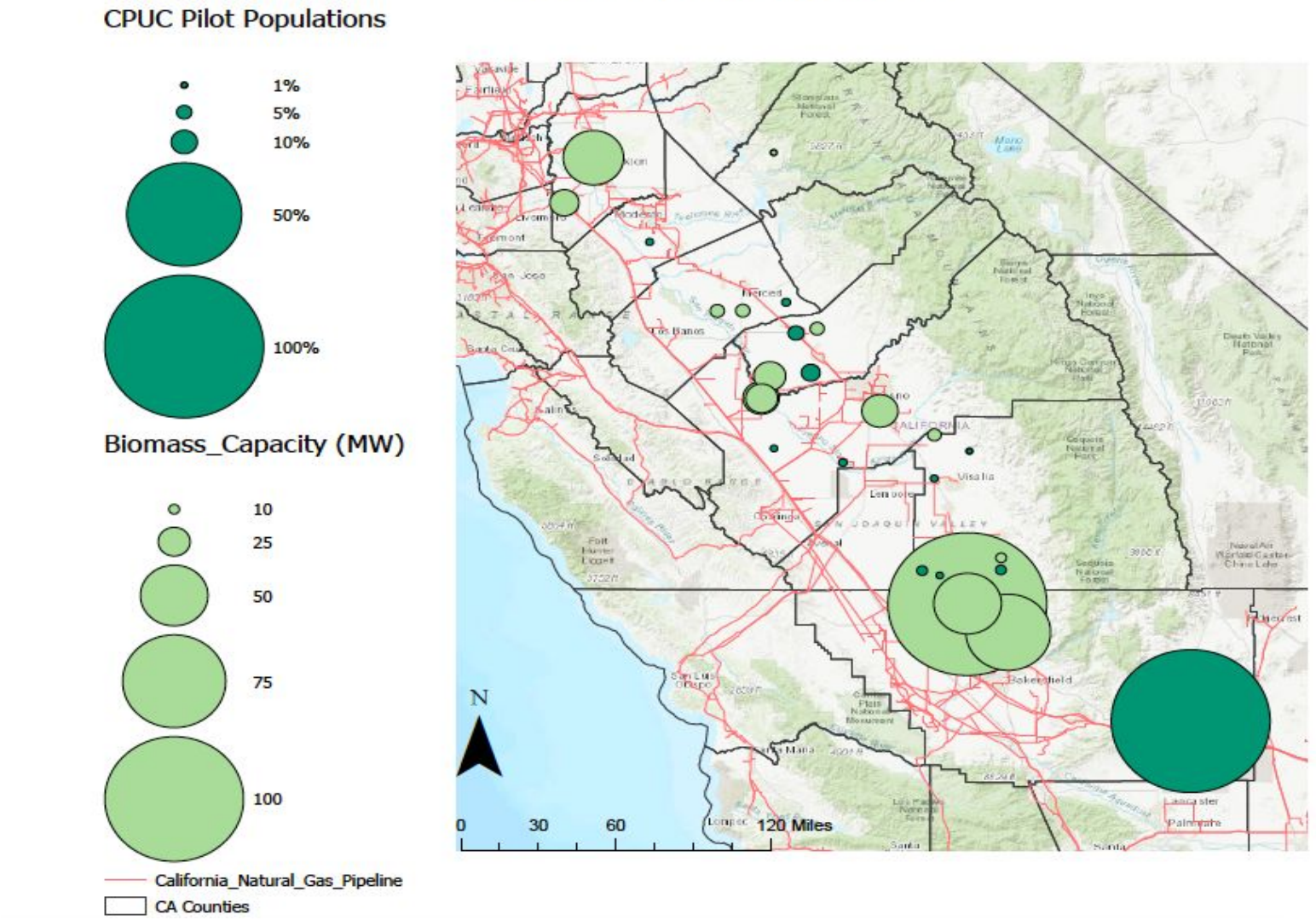






Mapped by Shuba Raghavan, Vanya Srivastva & Emma Tracy

Central Valley Resources



Mapped by Vanya Srivastva & Emma Tracy