

Community-scale Bioenergy Generation and Use in Microgrids

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The vision

The Sierra Institute for Community and Environment is interested in incentivizing the removal of woody biomass from forests to reduce wildfire fuels by constructing community-scale bioenergy power plants in rural Sierra Nevada communities. These facilities could be used as part of microgrids, that would power local economies during planned safety power shut-offs (PSPS).

What is a microgrid?

It is an interconnected system of energy resources within a clearly defined electrical boundary that can act as a single, controllable entity, and can connect to, or disconnect from the regional electrical grid, and can be isolated to maintain local electrical supply.

What is community-scale bioenergy?

3-5 MW facilities that utilize forest biomass to generate energy for specified communities. These small power plants would qualify for the BioMAT program created by SB 1122 (2015).

Barriers to success

Community-scale biomass energy facilities and microgrids could be a viable solution to incentivize the removal of woody biomass from forest floors and provide a contingency option for rural communities during PSPS events, but there are multiple barriers that must be addressed for these goals to be achieved. Experts from public and private institutions have identified several barriers that are detailed below. In describing the barriers, we seek to provide an overview of challenges that must be addressed by those who support bioenergy and the benefits it will provide to rural communities. These barriers are not equally weighted but are nonetheless vital to overcome.



Addressing barriers

In order to achieve Sierra Institute's vision, the barriers to implementation must be addressed. By conducting literary research and holding informational interviews with professionals in the field of bioenergy, we have compiled a list of mechanisms by which to address the barriers discussed below. Although these recommendations are not exhaustive, they present possible steps to minimize the current challenges facing the development of small-scale bioenergy facilities and microgrids in California.

Barriers

High cost of energy

Energy from forest biomass is more expensive than other renewables such as wind and solar, making it unattractive for power purchasers.

Lack of private investment

Regulatory burdens and uncertainty around return on investment have limited private investment.

Difficult to secure power purchase agreements from utilities

The process of applying for and obtaining a purchase agreement from an electrical utility is complex and expensive.

Difficult to secure feedstock contracts

It is hard to obtain long-term (15-20yr) feedstock contracts from the US Forest Service due to perceived uncertainty of feedstock accessibility.

High cost of transporting feedstock

Hauling feedstock from the forest floor to a bioenergy facility can be prohibitively expensive.

Overlapping regulatory burdens

It is difficult to obtain permits for local emissions from bioenergy facilities. PG&E can also place unnecessary burdens on bioenergy development, and the CPUC has not held the utility accountable for delaying the process.

Opposition from environmental groups

Several environmental groups including Sierra Club, Greenpeace, and CA Environmental Justice Alliance have opposed bioenergy development.

Infrastructure connectivity

Outdated electrical infrastructure is difficult to connect to due to its design.

Liability

Community power generation companies may be at risk of financial ruin if microgrids are energized during PSPS events and an ignition occurs.

Solutions

State Mandate

The California Legislature has passed mandates for several renewables including wind and solar, forcing utilities to invest in these technologies. A state mandated inclusion of bioenergy in utility portfolios could spur development of community-scale bioenergy facilities.

SB 45: Wildfire Prevention, Safe Drinking Water, Drought Preparation, and Flood Protection

By providing \$2.2 billion for wildfire prevention, this bill presents an opportunity for funding fuel reduction efforts. Reducing the cost of forest management and restoration efforts could create an avenue for cheaper feedstock.

SB 1339: Microgrids

Passed in 2018, this bill required the California Public Utilities Commission (CPUC) to take specific actions to facilitate the commercialization of microgrids by December of 2020. CPUC is currently holding public rulemaking hearings that present an opportunity for including biomethane and biogas as eligible resources to meet the renewable portfolio standard.

SB 1215: Microgrids

If passed, SB 1215 would require CPUC to create a database of facilities, infrastructure, and related circuits that are critical to high fire-risk districts or areas with vulnerable transmission lines. Utilities will subsequently be required to make distribution system improvements necessary to allow for the installation of microgrids.

Carbon credits for avoided emissions

The California Air Resources Board could quantify the avoided emissions from severe wildfires and apply a carbon credit for fuel reduction and forest health management actions.

Extension of BioMAT

In 2015 SB 1122 launched the Bioenergy Market Adjusting Tariff (BioMAT) program, which incentivized investor-owned utilities to acquire bioenergy. The BioMAT program is set to expire in December of this year and is currently undergoing an extension and revisions process that is crucial for the economic incentivization of bioenergy.

Aggregated Technical Assistance

Many small bioenergy projects are initiated by the community, and there is a need for experts in the field who can assist with permitting and regulations. Staffing to support the permitting process is one way the state government could contribute to the process.