

Emerging Markets for Forest and Rangeland Products and Services Methodology

This chapter includes two GIS analyses that examine the potential benefits from making proposed and idle biomass facilities operational, in terms of treating priority landscapes derived in other chapters.

Data Layers

Biomass Facilities

Initially, we had to identify the location of existing biomass energy facilities, particularly those with the potential to utilize material derived from forest and rangelands. Thus, we did not attempt to develop a comprehensive dataset of all facilities; those fed primarily by urban and agricultural waste were excluded.

Several data sources were used to develop a preliminary dataset of biomass facilities:

- The California Biomass Collaborative's [California Biomass Facilities Reporting System](#)
- [The California Biomass Energy Alliance website](#)
- The California Energy Commission's [California Power Plant Database](#)

Unfortunately, these sources were not in agreement, especially for determining which plants were operational or idle, since this is a dynamic process. In addition, we needed to identify proposed facilities, those where it seems there is a better than average chance that the facility will eventually become operational.

To develop the final dataset, we conducted a comprehensive internet search. This search identified facilities that were closed and dismantled, plants that had recently become idle but could reopen in the future, and proposed plants. In addition, we called nearly every air quality district in the state. The latter proved to be an extremely useful resource, especially for identifying proposed facilities.

Biomass Availability

Areas that are not technically available or that have too little biomass to be considered for a viable biomass project are excluded from the maps and results tables. The process of estimating available biomass and determining technical availability was conducted as part of a 2005 California Biomass Collaborative/California Energy Commission/CAL FIRE project, and is described in the report [Biomass Resource Assessment in California](#).

Analytical Framework

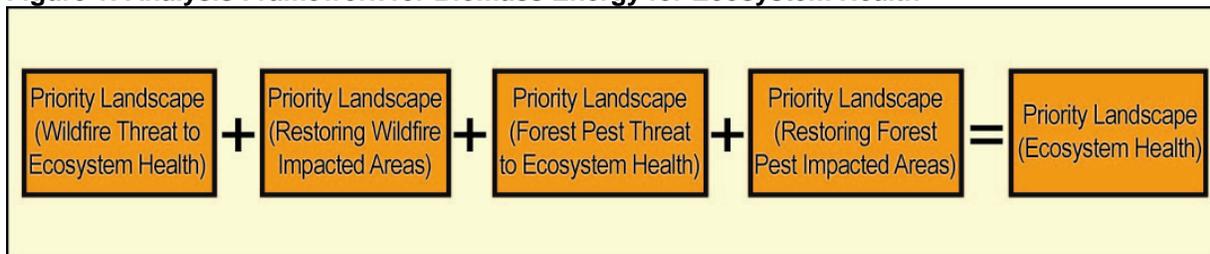
This chapter includes two unique analyses. Each analysis utilizes priority landscapes developed in the previous chapters 2.1, *Wildfire Threat to Ecosystem Health and Community Safety*, and 2.2, *Forest Pests and Other Threats to Ecosystem Health and Community Safety*. Refer to the methodology documents for these chapters for details on how these priority landscapes were generated

Both analyses examined which areas in the priority landscapes could potentially be treated using the biomass projects tool, if idle and proposed facilities become operational. This required first buffering operational facilities 25 miles to represent an approximate viable travel distance, doing the same for the combination of idle and proposed plants, and then extracting the area that could potentially be served only by adding the new facilities.

Analysis #1: Biomass Energy for Ecosystem Health

As shown in the figure below, this analysis utilizes four priority landscapes developed in previous chapters.

Figure 1: Analysis Framework for Biomass Energy for Ecosystem Health



The priority landscapes used in this analysis are:

1. Wildfire Threat to Ecosystem Health (developed in chapter 2.1)
2. Restoring Wildfire-Impacted Areas (developed in chapter 2.1)
3. Forest Pest Threats to Ecosystem Health (developed in 2.2)
4. Restoring Forest Pest-Impacted Areas (developed in 2.2)

Each of these Priority Landscapes contains priority areas where the biomass projects tool could potentially be applied to create a desired future landscape condition.

In this analysis, the four priority landscapes were combined into a single priority landscape using the MAX function in GIS. This function assesses each 30mx30m pixel in each priority landscape and assigns the maximum of the four priority landscapes' rankings to a unique 30mx30m pixel in the resulting priority landscape. This ensures that if an area is a high priority landscape for either reducing wildfire threat, reducing forest pest threat, restoring wildfire impacted areas, or restoring forest pest impact areas, it will be a high priority landscape for this analysis.

The last step in this analysis involved an overlay of the combined priority landscape with the area potentially served only by idle or proposed biomass facilities. The resulting dataset adjusted to remove areas that are not technically available or that have less than 50,000 lbs/ha of biomass, is used to generate the maps and data tables.

Data Used in the Analysis

The datasets used in this analysis are available at http://frap.fire.ca.gov/assessment2010/3.4_emerging_markets.html. These are provided to document the analysis, and to provide the potential to replicate results. Updated versions of these datasets may be available from the various data providers.

Table 1: Data Used for Analysis 1

ANALYSIS: Biomass Energy for Ecosystem Health		
Data Theme	Dataset name	Purpose
Input Priority Landscapes		
PL: Preventing Wildfire Threats to Maintain Ecosystem Health	pl_t21_a109_2.gdb	Priority landscape for preventing wildfire threats to maintain ecosystem health
PL: Restoring Wildfire-Impacted Areas to Maintain Ecosystem Health	pl_t21_a209_2.gdb	Priority landscape for restoring wildfire-impacted areas to maintain ecosystem health
PL: Restoring Forest Pest-Impacted Areas to Maintain Ecosystem Health	pl_t22a209_2.gdb	Priority landscape for restoring forest pest-impacted areas to maintain ecosystem health
PL: Preventing Forest Pest Outbreaks to Maintain Ecosystem Health	pl_t22a109_2.gdb	Priority landscape for Preventing Forest Pest Outbreaks to Maintain Ecosystem Health
Biomass facilities	biofacility09_1.gdb	Point locations of operational, idle, and proposed biomass facilities
Operational biomass facilities buffered 25 miles	biobuf_oper09_1.gdb	Used to determine which priority landscapes are already potentially serviced by an operational biomass facility
Idle and proposed biomass facilities buffered 25 miles	biobuf_future09_1.gdb	Used to determine which priority landscapes are potentially serviced by making idle and proposed biomass facilities operational
Priority Landscape		
PL: Biomass Energy for Ecosystem Health	pl_t34_a109_1.gdb	Priority landscape for biomass energy for ecosystem health
Other Data		
County boundaries	cnty24k09_1.gdb	Reporting unit for summarizing results
Bioregions	INACCBioreg04_1.gdb	Reporting unit for summarizing results

Analysis #2: Biomass Energy for Community Safety

In the previous chapters *Wildfire Threat to Ecosystem Health and Community Safety*, and *Forest Pests and Other Threats to Ecosystem Health and Community Safety*, 66 priority communities were identified where public safety is an issue due to wildfire and/or forest pests (figure 2).

Figure 2: Analysis Framework for Biomass Energy for Community Safety



The analysis in this chapter determines which of these communities are currently within 25 miles of an operational biomass facility, and for those that are not, which are within 25 miles of an idle or proposed facility. This involved examining a screen display of communities, and 25 mile buffers around operational, idle, and proposed biomass facilities. For the relatively small number of priority communities within these buffers, it was possible to use this method to determine which communities are potentially serviced by operational, idle, or proposed facilities. Thus, this simple analysis did not generate a priority landscape dataset.

Data Used in the Analysis

The datasets used in this analysis are available at http://frap.fire.ca.gov/assessment2010/3.4_emerging_markets.html. These are provided to document the analysis, and to provide the potential to replicate results. Updated versions of these datasets may be available from the various data providers.

Table 2: Data Used for Analysis 2

ANALYSIS: Biomass Energy for Community Safety		
Data theme	Dataset name	Purpose
Other data		
Priority Communities	community09_3.gdb ¹	66 priority communities for wildfire and forest pests
Operational biomass facilities buffered 25 miles	biobuf_oper09_1.gdb	Used to determine which priority communities are already potentially serviced by an operational biomass facility
Idle and proposed biomass facilities buffered 25 miles	biobuf_future09_1.gdb	Used to determine which priority communities are potentially serviced by making idle and proposed biomass facilities operational
Bioregions	cnty24k09_1.gdb	Reporting unit for summarizing results

¹ Table 3.4.4 lists the priority communities. A GIS dataset was not created, but they could be extracted from the communities Geodatabase.

Data and Analysis Limitations

Data Quality

Other data required as inputs to create the above data layers or as reporting metrics: vegetation, fire perimeters, land ownership, forest survey data

E = Excellent G = Good F = Fair P = Poor

Data Element ¹	Date	Source	Purpose	Currency ²	Completeness	Detail	Consistency	Relevance	Limitations
Current biomass facilities	2009	Various	Existing facilities	E	E	E	E	E	Required gathering data from various sources, using internet and phone calls to verify if plants were operational
Proposed biomass facilities	2009	Various	Potential future facilities	E	G	E	E	E	Required using internet and phone calls to air quality districts
Biomass availability	2005	CBC/CAL FIRE/CEC	Exclude technically unavailable areas, low biomass areas	G	G	E	F	E	Based in part on outdated, inconsistent vegetation data
Current/possible future renewable energy sites/acres	2009	RETI	Number of current and possible future sites, acres	E	F	E	F	E	Missing existing facilities, possible future sites are based on factors such as site suitability
Priority landscapes	2009	CAL FIRE	Priority areas for biomass projects	G	G	G	F	E	Based in part on outdated, inconsistent vegetation data, fire perimeters
Missing Data Element			Purpose						
Economic availability of biomass based on travel times			More accurate depiction of where biomass is economically available given actual road networks						

Appropriate use and limitations

Renewable Energy

The RETI GIS data used to estimate current and possible future renewable energy production sites and acres is subject to numerous data limitations (RETI, 2009). A number of significant existing sites were not included in the data (e.g. Altamont Pass Wind Resource Area, numerous biomass plants). Also, possible future sites are based on factors such as site suitability, and do not correspond to sites that are actually at some point in the permitting or implementation process.

Biomass energy

This analysis provides a very coarse estimate of areas that would be available for biomass harvest. In particular, economic availability is in reality a complex equation related to travel times along road networks, fuel prices, energy prices, etc. The 25 mile buffer provides a crude approximation for demonstration purposes only.