mote

Our sustainable biomass commitment

Mote's mission is to remove carbon from the atmosphere to help avoid dangerous climate change. In addition, Mote is a Triple Bottom Line company, which means that we value people and the planet as much as profit. We believe that we can achieve our mission while benefiting local communities, air quality, and ecosystems. These are the principles we apply to ensure our feedstock is sustainable.

01

Mote uses only wastes and residues

That means the primary purpose of the collection of the biomass or cultivation of the land where it grew was not for energy.

02

Mote maintains chain-of-custody records for each load of feedstock it uses

We know where our biomass came from and who collected, processed, and transported it.

03

Mote's carbon removal is based on full life-cycle accounting

Calculations include emissions from transport and account for alternative uses of the feedstock.

Biomass wastes and residues

To supply biomass for carbon removal, Mote believes we should focus first on wastes and residues, where the benefits are most clear. Cultivation of energy crops and harvest of forest products can also be done sustainably. However, both carry additional challenges and are not Mote's practice. Mote's technology can process a wide range of feedstocks across three broad categories. Examples are detailed in the boxes below.

Forest residues

Byproducts and wastes from forest management and wood products.

- Wildfire prevention projects
- Forest health and resiliency projects
- Sawmill residue
- Utility vegetative management programs non-urban

Agricultural residues

Byproducts and waste from agriculture.

- Orchard trees & vineyard removal
- Pruning/maintenance of orchard and vineyard
- Harvest waste from nutshells
- Almond shell
- Walnut shell
- Pistachio shell
- Fruit pie from olive, prune, peach, plum
- Recovered orchard wood

Urban greenwaste

Solid biomass wastes collected in cities.

- Pallets
- Construction debris
- Tree pruning
- Removal from urban forestry practices
- Shrub and grass
- Landscape pruning

(Biomass waste and residues continued)

Researchers at Lawrence Livermore National Laboratory estimated that there is about 50 million tons per year of biomass in the categories above in California alone (see Figure 1). The U.S. Department of Energy and National Academy of Sciences estimate between 365 and 709 million tons per year are available in the U.S. Mote's plans to use forest residues in California have the support of state and federal agencies because of their potential to help with fire prevention.

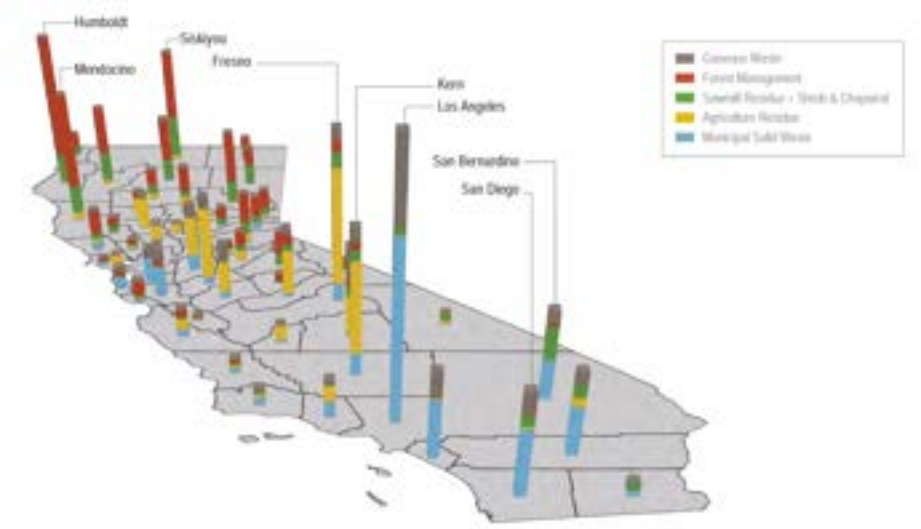

Figure 11. *Spatial Distribution of Biomass Resources in California for the year 2045. Los Angeles total biomass availability 3.4 million tons*

Our forest sources include fire control, health, and resiliency projects.

Mote's use of agricultural residues and urban green waste helps to divert waste from landfills, compost piles, and field burns. In California several pieces of legislation support our efforts by discouraging these practices (see box left).

By diversifying our feedstock sources, Mote will ensure we are not stressing any particular local supplies.

USDA Wildfire Crisis Strategy

Complete treatments on up to an additional 20 million acres of National Forest System lands.

Complete treatments on up to an additional 30 million acres of other Federal, State, Tribal, and Private lands.

Develop a plan for long-term maintenance beyond the 10 years.

"Biomass removal and utilization is an important component of USDA's shared state and federal goal of treating one million acres of forest per year to reduce wildfire risk and increase forest resilience throughout California. Mote's proposed facilities, which convert waste biomass to hydrogen fuel, have potential to provide a much-needed market for the byproducts of forest restoration treatments in the Sierra Nevada region. In addition to the forest health benefits associated with stronger long-term markets for woody biomass, this project would create clean energy and support hundreds of jobs."

USFS Christopher Fisher
Director, State and Private Forestry

Chain of custody

To ensure sustainability, each load of delivered biomass comes with detailed documentation (Figure 1) showing the origins of the product, tracking information and end user which can be used to validate the sustainability of the feedstock. Mote will retain electronic records of all incoming biomass shipments to support our sustainability statements.

Legislations that supports Mote's sustainability

CalRecycle
(CALGreen, Sections 4.408.1 and 5.408)

Requirements for diversion of wood materials from landfills

CalRecycle
(SB 1383, AB 1594)

Reducing biomass demand for alternative daily cover (ADC) at landfills.

California Air and Resources Board

Restrictions on open field burning of agricultural waste.

Life-cycle accounting

Mote's use of wastes and residues categorically avoids many impacts associated with bioenergy. For example, with corn grown for ethanol fuel, there are life-cycle impacts that can include water and fertilizer used on the land, and indirect changes in land use due to competition with food crops. Residues do not have these effects. As another example, with commercial logging for paper, there can be sustainability issues if the rate of harvest exceeds the rate of growth of the forest. There can also be net ecosystem impacts. Good forest management, however, enhances forest sustainability and ecosystem health. Mote supports this by using forest management residues.

There are other life-cycle effects that Mote must account for, including emissions from transporting the biomass. These emissions are straightforward to calculate when we have chain-of-custody records for each load. They are also minor, offsetting only 1–2% of the carbon that Mote's facilities remove from the air.

In some cases, we must also account for alternative uses of the wastes and residues. Often, this can yield additional benefits, like avoided emissions when Mote utilizes wastes that would otherwise be burned in piles. In rare cases, residues might be used to form a long-lived product, such as particle board from sawdust. Mote will follow regulatory or industry standards to discount carbon storage benefits in this case.

Life cycle issues like these are not simple, but they are solvable. There are already frameworks and regulations that support biofuels while accounting for life-cycle impacts. Similar programs will be developed for biomass carbon removal. Mote is working with institutions and governments to establish and improve sustainability criteria for biomass carbon removal. We pledge to follow best practices as they are developed.