

BIOMASS 101

TURNING WASTE INTO ENERGY, PRODUCTS, & MORE



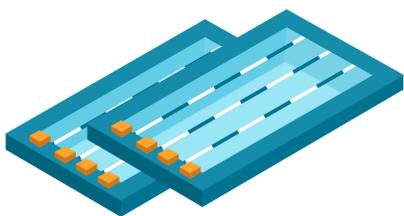
What is Biomass?

Biomass is organic waste material derived from plants and animals, naturally and through processing. It is low-to-no-value waste material that can be turned into high-value, high-demand material like green renewable energy. In California, biomass primarily comes from:

- **Forestry Residuals:** Woody debris from forest thinning, fire prevention, and logging.
- **Agricultural Waste:** Prunings, orchard removals, nut shells, and crop residues.
- **Urban Landscape Waste:** Tree trimmings, green waste, and construction wood debris.

California produces about 47 million Bone Dry Tons (BDT) of biomass annually.¹

How much is **47 MILLION BDT** really?



X 855,000



X 13 MILLION

Enough to fill around 855,000² Olympic-size swimming pools, with each pool holding about 88,000 cubic feet. One BDT of biomass can generate enough energy to heat an average home for a winter,³ meaning California's annual supply of 47 million BDT could heat every household in the state (over 13 million) for more than three years.

Utilizing Biomass Benefits Communities & The Climate

Biomass can be transformed into renewable energy, fuels, heat, and bioproducts. This creates a **circular economy** and provides multiple co-benefits:

Climate Action

- Reduces greenhouse gas emissions: Replacing open burning of 1 ton of dry forest biomass with energy generation can drastically reduce emissions and improve air quality. Reductions include PM by 98%, CO by 96%, and VOCs by 92%⁴
- Displaces fossil fuels with clean alternatives
- Supports California's Scoping Plan and Carbon Neutrality by 2045

Environmental Stewardship

- Improves forest and watershed health
- Reduces wildfire risk
- Enhances air and soil quality
- Post-fire erosion is reduced up to 70% in areas where biomass and fuels were reduced in advance⁵



Community Resilience

- Supports a local economy
- Creates local jobs in rural and disadvantaged areas
- Promotes energy independence and equity
- Reduces threat of the danger of catastrophic wildfire
- Across the Western U.S., restoration investments typically yield **15–24 jobs per \$1 million invested**, with each dollar generating \$1.4–\$2.4 in local economic activity.⁶

Footnotes:

1. "Biomass Availability." UC Agriculture and Natural Resources - Woody Biomass Utilization, University of California, <https://ucanr.edu/site/woody-biomass-utilization/biomass-availability>. Accessed 31 July 2025.

2. And 3. California Biomass Collaborative. (2015). Biomass resource assessment in California (CEC-500-2014-074). California Energy Commission. Retrieved from <https://biomass.ucdavis.edu/publications/biomass-resource-assessment-in-california/>
U.S. Forest Service. (n.d.). Forest product conversion factors. U.S. Department of Agriculture. Retrieved July 31, 2025, from <https://www.fs.usda.gov>

3. U.S. Department of Energy. (n.d.). Biomass for heat and power. Office of Energy Efficiency & Renewable Energy. Retrieved July 31, 2025, from <https://www.energy.gov/eere/bioenergy/biomass-heat-and-power>

California Energy Commission. (2023). Energy consumption data management. Retrieved from <https://www.energy.ca.gov/data-reports>
Jones, G., Loeffler, D., Calkin, D., & Chung, W. (2010). Forest treatment residues for thermal energy compared with disposal by onsite burning: Emissions and energy return. *Journal of the Air & Waste Management Association*, 60(7), 936–945. <https://doi.org/10.3155/1047-3289.60.7.936>

5. Robichaud, P. R., Lewis, S. A., & Ashmun, L. E. (2008). Emergency post-fire rehabilitation treatment effects on burned area ecology and erosion: A synthesis of relevant literature. U.S. Department of Agriculture, Forest Service. General Technical Report RMRS-GTR-105. <https://doi.org/10.2737/RMRS-GTR-105>

6. Moseley, C., & Nielsen-Pincus, M. (2010). Economic and employment impacts of forest and watershed restoration in Oregon. University of Oregon, Ecosystem Workforce Program. Working Paper Number 24. <https://ewp.uoregon.edu/sites/ewp.uoregon.edu/files/WP24.pdf>