

# ***Biomass Acquisition, Biomass Energy, and Biochar Production in California***

**A Sonoma Biochar Initiative Policy Paper  
June 1, 2019**

- Millions of tons of “waste” forest biomass are being generated in California annually, along with millions of tons of similar agricultural residues.<sup>1</sup> Unfortunately, much of this material is not being used in ways that could be providing valuable benefits. Given this situation, an enormous opportunity exists to convert a large portion of these materials into three types of highly useful products: baseload (renewable) electricity and heat, biochar, and compost. Doing so achieves a great complex of benefits:
  - help reduce the risks of catastrophic wildfire damage to our communities,
  - limit harmful air pollution from wildfires as well as from standard open pile burning,
  - sequester carbon beneficially in farm, rangeland and forest soils, and –
  - create healthier soils.All of this can and must be done responsibly with as little damage to local ecosystems as possible.
- Sufficient surplus biomass materials are available to supply a sustainable energy sector and biochar industry with woody waste feedstocks. Supplies can come from sustainably managed timber harvests; clear cutting techniques are not condoned nor needed. In addition to biomass sourced through normal commercial forestry related operations, millions of tons of biomass are also being produced during fuels reduction work for community fire protection, urban landscaping activities, as agricultural residues, from electrical utility right-of-way clearing, and as mill leftovers.
- Years of drought and the resultant pine bark beetle infestation have caused massive tree mortality in the Sierras (now estimated at around 150 million trees), with the die-off particularly significant in the central and southern sections of this mountain range. While most of this dead material is inaccessible and should just be left for nature to take its course, a substantial amount of this biomass can be carefully and responsibly harvested—particularly in and around populated communities where its removal will

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<sup>1</sup> \* *In nature there is no waste. Almost no waste products are produced by industry and our society that cannot and should not be recycled, repurposed, and/or used as inputs for other processes. When we throw things away we are truly just misdirecting valuable resources that should be better used to benefit society.*

reduce catastrophic fire danger. Other such materials can be taken along easily accessible roads where these areas can be re-forested economically.

All of this material could then be converted to renewable energy, biochar, and sawdust for compost using existing, available technologies and employing hundreds (perhaps even thousands) of laborers in the process. The electricity would go into the grid; the biochar and compost would be distributed back into the forests, onto local rangelands, and into nearby farming communities where it would directly reduce water and nutrient input costs and increase production.

- Given the growing climate crisis causing increased danger from catastrophic wildfires, and the new focus in California on building healthier soils as part of the emerging model of regenerative agriculture, we should be working as quickly as possible to increase biochar production and use.
- Over the short term, while new, higher efficiency technologies are being permitted and deployed, some existing co-generation plants can be converted to produce large amounts of high-carbon biochar; these conversions deserve our support. Economies of scale can be leveraged from these 30MW biomass-to-energy plants to help bring down the price of biochar for use in agriculture.

Priority should be given to plants that are located close to high fire hazard areas that need to be thinned to protect high-risk communities. Other easily accessed areas with large stands of trees impacted by bark beetles and drought are important targets, as are areas close to agricultural “waste” producers. Siting along these parameters will minimize transportation impacts of incoming materials and the outflow of biochar back to the farms.

- Over the long term we advocate development of a series of integrated ECO-Parks or “Resource Conversion Centers” up and down the state. Such new facilities would follow an industrial ecology model—where outputs of one system or process within the park are used as inputs for another system or process. Each such Eco-Park would have as its base tenant a modest-sized (1 - 5 Mw) cogen plant employing a highly-efficient pyrolysis or gasification system. This plant would generate electrical power and heat that would be provided to the other local businesses as well as to the local community. Compared to a large centralized plant, a relatively low volume of biomass would be required to keep this type of system operating continuously. This in turn would allow lower transportation impacts and more resiliency for the fluctuating biomass supply chain.
- A range of inexpensive, low-tech methods and techniques also can also be employed to convert “waste” biomass effectively and efficiently into biochar.

These include simple earthen kilns, flame-cap kilns, *KonTiki* kilns, use of conservation burns, or other inexpensive alternatives suitable for small or medium-scale land owners and land managers with limited budgets. When used correctly, these methods produce significantly lower smoke pollution than a typical open burn pile and can produce high-carbon biochar.

- Above all, the Sonoma Biochar Initiative supports sustainable forestry management and regenerative agricultural ethics and models. Biochar production and use should be integral to both, with benefits that go far beyond better use of our surplus biomass resources. Environmental tradeoffs are inherent with ALL energy systems, including renewable energy systems (rare earth mineral mining and steel production for wind and solar manufacturing, for example). From this perspective, improvements can and should be made to retrofit and make many existing biomass energy facilities as environmentally benign as possible and good neighbors in the communities where they are located.
- The baseload electricity that biomass plants now generate helps balance energy from intermittent renewables. These plants reduce our dependence on fossil energy sources, including natural gas. And perhaps of greatest importance, they can play a badly needed role in converting into useful products the massive amounts of woody “waste” materials generated each year. Given these benefits, when coupled with biochar production, we believe the positives far outweigh the challenges. When done responsibly and sustainably, biochar production using biomass energy plants of all sizes can contribute to our net-zero carbon emission goals while also making our energy grid more resilient.