

Summary of Topic & Statement of Problem

Biomass-to-energy, also known as biofuels, is a gas, liquid, or solid created from feedstock that includes waste from wood, agriculture, composting, or methane gas from landfills or combination thereof. New and evolving technologies efficiently transform biomass waste into electricity generating fuels illustrating it is a proven, high performing option that boasts environmental, social, and economic co-benefits. As a result, there are over 7,000 megawatts of biomass power capacity installed at more than 350 plants in the U.S. (DOE, NREL, 1998). These plants are owned by a diverse range of producers including the pulp and paper industry, wood manufacturing industry, electric utilities, and independent power producers. Entities producing waste (e.g. farms, restaurants, municipalities) can, and are, increasing the supply of waste that could expand energy feedstock. As a result, many opportunities exist to create biomass energy solutions at the residential and commercial level with municipalities and states across the U.S. Federal and state funding programs provide assistance for large biomass energy projects but these opportunities are inadequate for small to medium projects. A state sponsored program that facilitates a more agile public-private partnership and facilitates *slightly larger* small business loans for composting, woody biomass heat, and agricultural waste heat projects could solve a major barrier to entry in the industry (e.g. financing for construction) and produce short and long-term economic benefits through job creation and energy diversification.

Environmental benefits of electricity generated by biomass:

- Unlike fossil fuels, electricity generated by biomass produces has close to zero sulfur emissions and reduces the intensity of acid rain.
- “Net” carbon emissions are close to zero as the amount of carbon dioxide emitted is equal to the amount absorbed from the atmosphere during the biomass growth phase.
- Less waste is deposited into landfills from waste, including coal ash which is a harmful pollutant.
- Woody and food waste ash can be used as a fertilizer.
- Electricity generated by fossil fuels from landfill gas-to-energy projects turn methane emissions from landfills into useful energy.

Solutions through State Sponsored Public Private Partnerships

The first step toward state implementation is recognizing barriers to energy for commercial small to medium sized woody biomass projects (\$2MM to \$5MM range). The biggest barrier—many projects capable of producing biomass energy and sustaining their business operations fruitfully overtime are not able to raise seed capital for construction. The average lending facility (e.g. banks and limited number of private equity firms) either do not understand the asset class that biomass energy projects fall into or do not loan money for one-off projects (as typically these projects are independently run and owned). Private money will invest capital but typically only when these projects are aggregated and diversified—meaning private money is willing to take over short and long-term lending but only *after* the project is already constructed and built and risk is spread out among multiple projects. At the beginning of project construction, short-term finance to initiate feasibility studies or initiate a demonstration project is sometimes available through governmental grant money (but is being phased out in some cases) or through the Small Business Association (SBA) but governmental grant money typically does not provide enough capital alone (e.g. 30% or less) and the SBA is typically capped at \$1-\$2 MM loans (and rarely \$5mm). The typical small to medium sized biomass-to-energy projects need between \$2-\$5-\$10MM. Also, developers are hesitant to start new programs with existing state and federal incentives for fear –“Once they have invested time and resources planning a project, the rules change”.

One obvious solution is to enhance state supported public private partnerships with loan guarantee program’s that are potentially affiliated with the SBA or follow the SBA model. This initiative could also help sponsor small rural projects from their current SBA maximum loan amount of \$350k to \$3- \$5 MM. This size loan could help fund the construction of plants using money loaned at standard market rates by SBA (e.g. tied to prime +2.50%). States could also sponsor projects through other energy stimulus packages to supplement loan amounts and buy down rates on these loans. States could then hire outside advisors to advise on the sponsorship process much like state pension funds hire sector focused portfolio advisors to add input and oversight in specific fields of investments on their behalf.

The best program states could deploy is a limited feed-in tariff for both electrical production and methane injection. Even if the feed in tariff paid \$120/MW for electric and \$12/MMbtu, that would make a radical shift in supporting projects AND it is very unlikely that the small amount of renewable resource being paid a premium would even be measureable in increased consumer rates.