THE LAW OF BIOMASS

—What Is Biomass and What Does a Viable Project Look Like?—

John M. Eustermann
Stoel Rives LLP
101 S Capitol Blvd, Suite 1900
Boise, ID 82702-7705
208-387-4218
jmeustermann@stoel.com

Debra H. Frimerman
Stoel Rives LLP
33 South Sixth Street, Suite 4200
Minneapolis, MN 55402
612-373-8819
dhfrimerman@stoel.com

Biopower, or biomass power, is the use of biomass to generate electricity. The term "biomass" encompasses an array of diverse feedstocks or fuels derived from organic materials. Given the capacity of many of these fuels to regenerate year after year, and in light of the fact that some are considered waste, the use of such materials to generate electricity is very compelling at many levels.

I. What is biomass? The following list sets forth some of the typical biomass materials currently being converted into renewable and sustainable energy:

Agricultural Residue – Crop residues such as corn stover (stalks and other nonedible portions of the corn plant) and processing residues such as hulls from the fruit of certain nut varieties.

Animal Waste – Cattle, poultry litter, and swine waste converted to gas or burned directly for heat and power.

Energy Crops – Trees or herbaceous biomass grown specifically for energy.

Forest Residues – Wood fiber such as slash, tree-tops, and other forest thinning from logging operations.

Landfill Gas – The natural byproduct of bacterial digestion of organic garbage.

Pulp and Paper Operation Residues – The byproducts of logging and fiber processing operations.

Urban Wood Waste – Lawn and tree trimmings, wood pallets, and construction and demolition wastes.

II. How is fuel made from biomass? Using biomass as a source of energy has been happening for thousands of years. The typical conversion process was simply to burn the biomass to generate heat, which could be used directly for heating, cooking, and industrial processes, or indirectly to produce electricity. Today there are a variety of processes and technologies that convert biomass into heat, steam, electricity, and other types of fuels and products. The majority of biomass power plants today use a direct fire system (the same kind typically used to burn fossil fuels) to burn lumber, agricultural, or construction/demolition wood wastes to generate steam, which is used to drive a turbine that turns a generator to convert power into electricity. There are also a number of noncombustion methods available that convert biomass into a variety of gaseous, liquid, or solid fuels that can then be used directly in a power plant for energy generation or broken into chemicals that are useful fuels. Other conversion technologies are being developed that use thermochemical and biochemical processes to convert the biomass into gas or liquid that is then used to generate electricity. The following table sets forth some of the more common conversion technologies used to generate electricity for different types of biomass.

BIOMASS	CONVERSION PROCESS TO GENERATE POWER
Crop Residues	Boiler fuel
	Gasification, producing biomass gas
Farm Waste	Anaerobic digestion, producing digester gas
Food Processing Waste	Dry: boiler fuel or gasification, producing biomass gas

BIOMASS	CONVERSION PROCESS TO GENERATE POWER
	Wet: sludge waste, producing digester gas
Municipal Solid Waste (MSW)	Dried, producing boiler fuel
	Sorted into refuse-derived fuel and gasified, producing biomass gas
	Landfilled, recovered as landfill gas
Sludge Waste	Dried, producing boiler fuel
	Anaerobic digestion, producing digester gas
Wood and Wood Waste	Boiler fuel
	Pulp and paper mills, producing black liquor
	Gasification, producing biomass gas

III. What are the elements of a successful biomass project? A project needs the following components to be viable and eligible for financing. Developers should objectively examine their project to make sure they have all these components in place or will have these components in place before investing too much time and money into a project that will not be financeable or profitable.

- *Technology* – The technology to be used to convert the biomass to electricity must be proven and capable of generating reliable estimates of efficiency. Investors and lenders will want a process guaranty from the technology provider to provide assurance that the technology will perform as expected.

- *Feedstock* – The feedstock for the facility must be reliable. If possible, it is best to be able to utilize different types of feedstock to protect against fluctuations in feedstock processes. Feedstock contracts should also limit price fluctuation. The feedstock should be located within a reasonable distance to keep transportation costs to a minimum.

- *Output* – The project must have customers that will purchase the power. If connecting to the electricity grid, transmission access must be secured and available from the project site.

- *Project Site* – The site for the project must be able to be secured and have access to necessary utilities and transportation. Also permits must be attainable without too much time or expense. Proximity to feedstock suppliers and power offtakers is important because they can have a large impact on the costs of operations. Local support or opposition to the project should also be considered.

- *Economic Viability* – The costs to construct and operate the project must be less than the income the project will receive from selling its power and co-products. Financial modeling must be completed and tested to determine the parameters for construction and operation costs that provide for profitability. Typically, investors and lenders want the financial models to show that, without any tax or government incentives, the project will be profitable.

- *Project Agreements* – Bringing a biomass project on line requires multiple parties with matched expectations working together at all stages of the project. These relationships are memorialized in appropriate agreements that set forth the duties and obligations of the parties. The project agreements also directly impact the creditworthiness of the project because investors and lenders look to these agreements to determine the viability of the project.

The above components of a biomass project are discussed in detail in the other chapters of this book along with other important legal and business issues associated with the production of electricity from biomass.