

Biopower Technologies—Distributed Generation (Final Technical and General Version)

Anthony Turhollow, Alan Teel, and Burt English

Biopower is the use of biomass resources to produce, either singly or in combination, electricity, heat/steam, and cooling. The U.S. used 2.1 Quads (1 Quad = 10^{15} Btu) of wood and waste to generate electricity and useful thermal output, of which 0.82 quads were used for electricity generation in 2007. About 1.3% of the total electricity generated in the U.S. is from biomass (DOE, 2008).

Distributed generation is typically defined as using small-scale production of electricity at or near the load being served. Distributed generation can come from conventional or renewable technologies, including biomass. Many commercial and industrial customers value highly reliable electricity service, which can be provided by on-site generation, either solely as electricity generation or electricity generation from a combined heat and power (CHP) operation.

Distributed generation is distinguished from traditional electricity generation by location (at or near the location of use); capacity (small $<1 \text{ MW}_e$); and ownership (nonutility). Distributed generation, if done properly, can potentially lower the overall cost of electricity; enhance the reliability of the power grid; reduce the need for investment in transmission and distribution to serve growing demand; and improve environmental quality (CBO, 2003).

Barriers to the greater use of distributed generation include contractual and technical interconnection requirements; surcharges imposed by utilities on operators of distributed generation for standby services; price of electricity received by the distributed generator; and environmental and permitting requirements of local governments.

Preliminary evaluations of a variety of small modular biopower systems estimate capital costs of around \$1700/kW for a 5 MW unit and between \$3000 and \$4000/kW for a 1 MW system (Bain, 2000).

References

Bain, R. 2000. Small modular biopower initiative phase I feasibility studies executive summaries. NREL/TP-510-33502. National Renewable Energy Laboratory, Golden, CO.

Congressional Budget Office, Washington, DC, (2003). Prospects for distributed energy generation. Accessed at:
<http://www.cbo.gov/showdoc.cfm?index=4552&sequence=0>.

U.S. Department of Energy, Energy Information Administration, 2008, Monthly energy review, May 2008, Washington, D.C. Accessed at:
<http://www.eia.doe.gov/emeu/mer/pdf/mer.pdf>.

Biopower Technologies—Distributed Generation (Final At-a-Glance Version)

Anthony Turhollow, Alan Teel, and Burt English

Biopower is the use of biomass resources to produce, either singly or in combination, electricity, heat/steam, and cooling. About 1.3% of the total electricity generated in the U.S. is from biomass.

Distributed generation is typically defined as using small-scale (<1 MW_e) electricity (or combined heat and power) production technologies located near the electricity user, and can use conventional fossil or renewable fuels such as a biomass.

Distributed generation can potentially lower the overall cost of electricity and reduce the need for investment in transmission and distribution to serve growing demands.

Issues associated with expanding the use of distributed generation include connection to the existing power grid, relations between generators and utilities, and environmental and permitting requirements of local governments.