Digest of Green Reports and Studies

Title	***Biogas: Rethinking the Midwest's Potential***
Author	Taglia, Peter – Professional Geologist; Staff Scientist
Organization	Clean Wisconsin
Author Contact	(608) 251-7020 ext. 27; information@cleanwisconsin.org
Publication Type	Report
Publication Date	June, 2010
# of Pages	49 pp.
URL	http://www.americanbiogascouncil.org/pdf/Clean%20Wisconsin%20MidwestBiogasPotential.pdf
Summary	The report produced by Clean Wisconsin, an environmental advocacy group, explores the potential of biogas, a gas fuel created from biological materials, as a cost saving, environmentally sustainable alternative to commonly used energy sources, such as natural gas. The report recommends biogas production and associated biogas technology could be further integrated into the resource rich United States Midwest agricultural infrastructure through the policy implementation of financial incentives. The report has four sections illustrated with charts, graphs and other visual aids: biogas in the current energy and environmental landscape; emerging technologies and approaches to biogas production; biogas end-uses; policies needed to foster growth of the biogas industry. Key technical terms are defined at the beginning of the report.
Key Findings	There has been a successful integration of biogas technology within European agricultural infrastructure. The U.S. Midwest's agricultural infrastructure is comparable. The region has the potential to further integrate biogas production through emerging technologies and approaches and to provide emergent and versatile biogas end uses. Based on modified designs of the conventional anaerobic digesters, some emerging technologies and approaches to biogas production are manure digesters on small farms, community digesters, co-digestion of waste materials, such as manure and discarded food, and dry digesters that use solid manure. The gasification process is another approach. The process has transformed with the emergent technological capabilities of modern, industrial-sized systems and facilities that use high temperatures and pressure to convert wood waste into biogas. Emerging and versatile end uses of biogas are: electrical production and heating, where biogas is converted into electricity through internal combustion (IC) engines and microturbines; renewable natural gas or biomethane, which can be distributed through an established natural gas pipeline network; and renewable compressed natural gas (CNG) vehicle fuels, a lower carbon fuel than petroleum already used in European transit systems.
Recommendations	To capture the potential of biogas energy in the U.S. Midwest the article recommends State implemented policies to mandate standards and tariffs that offer financial incentives such as tax credits. The four policy recommendations are: • Enhanced renewable electricity standards (RES) policy; o Redefining renewable resources, such as heat produced by cogeneration systems and energy of renewable natural gas proper, allows the renewable energy to be calculated into a conversion ratio equivalent to electrical energy. o Credits can be issued either through direct conversion, which may provide the greatest incentive, or through conversion based on available heat to electricity technologies. • Renewable natural gas standards; o Percentage requirement of pipeline natural gas to be renewable natural gas. • Feed-in tariff (FIT) or Advanced renewable tariff (ART); o Similar yet complimentary to a RES policy, a mandatory FIT policy would target small-scale renewable resources, such as biogas, by meeting a portion of renewable sales within a state. o A benefit of FITs would be the stimulation of smaller distributed forms of energy generation, reinforced by large-scale renewable energy technologies • Low carbon fuel standard (LCFS). o Requiring the energy content and carbon footprint rates of different types of transportation fuels, such as ethanol, biodiesel, natural gas, and biogas

	compressed natural gas, creates greater choice, lower prices, and market competition between fuel providers. o Policies must be established separately or jointly by state legislatures; o Credits could then be shared amongst providers in and out of state.
Definition of "Green"	"Renewable energy" may be defined as a reproducible energy source that provides an alternative to fossil fuels and accounts for a variety of environmental impact concerns.
Methodology	Comparative case study; inferential statistics
Data Sources Cited	American Gas Association American Gas Association, True Blue Gas (blog) BioCycle (publication) Bioenergy Site.Com, The BIOFerm Energy Systems Biogas Energy Incorporated Biomass Energy Resource Center Bloom Energy Bündnis 90/Die Grünen-Bundestagsfraktion California Energy Commission CCI Bioenergy Inc. ChemGuide, Europe Dane County Public Works Environmental Law and Policy Center Environmental Science and Technology (journal) eXtension Foundation Federal Republic of Germany Focus on Energy Frontline BioEnergy, LLC Green Plains Institute IEA Clean Coal Centre (CCC) Integrys Energy Group International Association for Natural Gas Vehicles Lawrence Berkeley National Laboratory Manure Manager (periodical) Methane to Markets (now: Global Methane Initiative) Michigan Gas Utilities Midwestern Governors Association Natural Gas Supply Association's NaturalGas.org Oak Ridge National Laboratory Ohio BioProducts Information Center Ohio State University Organic Waste Systems (Belgium) Pacific Gas and Electric Sentech TerraPass Carbon Management Services The Minnesota Project U.N. Environment Programme, GRID-Arendal U.N. Food and Agriculture Organization (FAO) U.S. AgSTAR Program U.S. Clean Water Action Plan U.S. Combined Heat and Power Association U.S. Department of Agriculture U.S. Department of Energy U.S. Energy Information Agency (EIA) U.S. Environmental Protection Agency U.S. Geological Survey Union of Concerned Scientists University of Arkansas, Division of Agriculture University of California, Davis University of Minnesota-Morris University of Wisconsin, Oshkosh USDA Economic Research Service USDA National Agriculture Statistics Service USDA Natural Resources Conservation Services

	USDE Alternative Fuels and Advanced Vehicle Data Center USDE Clean Cities Program USDE Lawrence Berkeley National Laboratory USDE National Renewable Energy Laboratory Various interviews and personal communications Wisconsin Department of Natural Resources Wisconsin State Government site Wisconsin's Strategy for Reducing Global Warming, Final Report Xcel Energy
Report Geography	British Columbia; California; Canada; Europe; Germany; Lille, France; Minnesota; Ohio; Oregon; United States Midwest; Toronto, Ontario; United Kingdom; Washington; Wisconsin
Green Occupations Cited	Biomass Collectors Engineers Farmers, Sustainable Utilities and Pipeline Operators
Green Industries Cited	Agriculture Biomass Construction Engineering Governmental & Regulatory Administration Renewable Energy Transportation Waste Management Wastewater Treatment
Keywords	Agriculture; anaerobic digester; biodiesel; biogas; biomass; biomethane; British thermal unit; carbon footprint; carbon monoxide; cogeneration; compressed natural gas; dairy farms; energy; ethanol; fertilizer; forestry; fuel; landfill; natural gas; gasification; global warming; Greenhouse Gas; hydroelectric; infrastructure; methane; natural gas; organic waste; policy; pollution; producer gas; renewable energy; renewable natural gas; solar; substitute natural gas; synthesis gas; town gas; transportation; turbine; wastewater; wind
Legislation Cited	Clean Water Act Energy Independence and Security Act, 2007 California Low Carbon Fuel Standard (LCFS) Program Public Utilities Regulatory Policy Act (PURPA) 1978 Renewable Electricity Standard (RES) Renewable Fuel Standard (RFS) Rural Energy for America Program (REAP)
Bibliography (Y/N)	N
Reviewer Name/Org	Loren Shimanek/LMID/ORG

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