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September 2002

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CASE STUDIES OF STATE SUPPORT FOR RENEWABLE ENERGY

Two Different Approaches to Funding Farm-Based Biogas Projects in Wisconsin and California

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CASE SUMMARY

Case Description

California and Wisconsin are the two leading dairy producing states in the nation. Both states are interested in developing biogas projects from livestock manure, but have targeted this renewable energy application differently. California has allocated nearly \$10 million in incentives and buy-down grants to demonstrate the energy, economic, and environmental benefits of biogas systems and act as a catalyst for the development of further dairy biogas systems in the state. In contrast, Wisconsin has a more modest financial incentive and is relying more extensively on education and outreach and other regulatory mechanisms to encourage biogas facilities. Some of the differences between the two states' approaches can be attributed to different philosophies about the best way to deploy biogas technologies. However, the two states have distinctly different climates (which dictate different biogas system designs), dissimilar dairy sizes, disparate histories with biogas systems, and very different

electricity markets. Consequently, conclusions regarding the appropriateness of either approach should take into account these differences.

Innovative Features

Despite numerous past technical failures, some states are beginning to take an increased interest in dairy biogas projects. The programs in Wisconsin and California can be classified as innovative if for no other reason than they focus on a technology that has not received much attention for a number of years. While these programs have not been in operation long, several specific features of each state's biogas activities may be of relevance:

- The California Energy Commission's (CEC) approach is to demonstrate the energy, economic, and environmental benefits of biogas projects on California dairies by co-funding biogas projects on a representative set of dairies. The CEC engaged a dairy producers' trade association—

Western United Resource Development, Inc. (WURD)—to administer a grant program, and empowered an advisory group to help select projects and provide assistance in program direction.

- WURD put a list of qualified biogas vendors on its web site to help incentive applicants with project development.
- Wisconsin has more modest financial incentives than California, but has held two biogas-related conferences, and is working with Wisconsin utilities to offer higher avoided cost rates and streamlined interconnection requirements for biogas facilities.

Results

California is negotiating terms with projects selected in its first biogas solicitation, whereas Wisconsin's program is not even six months old. Therefore, results are relatively sparse.

- WURD received over 30 applications for incentives and has approved nine projects for total funding of nearly \$2.5 million.

Because biogas system costs turned out to be higher than anticipated, the buy-down grant and production incentive levels were increased from the levels initially offered (from \$1250/kW to \$2000/kW). The nine selected projects are expected to amount to about 1.5 MW of total capacity.

- In Wisconsin, one utility—Wisconsin Power & Light—received approval by the Wisconsin Public Service Commission to offer higher buy-back rates for up to 10 MW of biogas facilities. Another Wisconsin utility is considering a similar proposal. The system-benefits charge administrator has funded a couple of dairy biogas projects with limited grant monies, with more applications expected as the state's outreach and education activities continue. In July 2002, a digester gas developer announced an agreement with six Wisconsin farms to install and operate anaerobic digesters that will fuel up to 10 MW of generation capacity.

CASE STUDY DETAILS

California

During the California electricity crisis in 2000 and 2001, the California General Assembly approved several measures intended to ease the crisis. One of these measures was Senate Bill 5X that Gov. Gray Davis signed into law on April 11, 2001. Among other things, this law created the Dairy Power Production Program and authorized the California Energy Commission (CEC) to expend \$9.64 million to encourage the development of anaerobic digestion and gasification ("biogas") electricity generation projects on California dairies. The CEC in turn signed a contract with the Western United Resource Development Corporation (WURD) to administer the program. WURD is a non-profit entity created to administer the CEC program and is associated with the Western United Dairywomen, a trade association of dairy farmers and producers in California. The goal of the program is to install over five megawatts of dairy biogas systems capable of

generating over 30 million kWh annually by September 30, 2002 (the CEC recently extended this deadline to June 1, 2003). The CEC has estimated that approximately 100 MW of near-term biogas production potential from livestock manure exists in the state, with only 370 kW in place today.

Biogas systems were first introduced to California in the early 1980s. However, inexperienced project developers, overly optimistic expectations, and complicated electricity rate structures resulted in a number of biogas system failures in the state. Due to these failures, the dairy industry in the state has been hesitant in embracing biogas-to-energy systems. Consequently, the CEC's approach has been to focus on using commercially available systems and installers with proven track records to demonstrate the energy, economic, and environmental benefits of biogas projects in California. Another unique aspect of the CEC's approach is an

emphasis on biogas systems that are sized to displace retail rate electricity purchased by dairies, rather than on larger systems that would sell electricity at wholesale rates. Recently adopted net metering provisions include biogas systems installed at California dairies. The net effect is that electricity from biogas systems that displaces purchased electricity has a value upwards of 10¢/kWh, whereas wholesale prices for electricity are likely to be significantly below 10¢/kWh.

Applicants could initially request two types of financial assistance: a buy-down grant of up to 50% of the capital cost of the anaerobic digester system but not to exceed \$1,250 per kW, or a production incentive of 3.6¢/kWh for five years. The goal is for the applicant to receive about the same amount of funding whether the applicant chooses to receive the funding all at once under the buy-down grant, or receives the funding over five years via a production incentive. To date, WURD says most of the applicants have chosen the buy-down grant. Applicants can also receive low-interest loans from the California Renewable Energy Loan Guarantee Program to cover the remaining costs.

The grant program is overseen by an advisory board consisting of representatives from the California dairy industry, the California Department of Food and Agriculture, the California Energy Commission, the California State Water Resources Control Board, Sustainable Conservation, the University of California, and the U.S. Environmental Protection Agency's AgSTAR program. A list of qualified vendors is provided on WURD's website to help applicants with their system installations. The web site also provides links to EPA's AgSTAR program, and links to other potential incentives for commercial dairy digester facilities such as energy efficiency incentives. In addition, a separate program to remove or eradicate interconnection barriers—a typical barrier for biogas projects—proceeded under a grant from the CEC Public Interest Energy Research program.

WURD released its initial RFP in July 2001, with a proposal deadline of December 15, 2001. Over 30 applications were filed with a total funding request of more than \$27 million. As of July 2002, WURD had approved nine projects with a total incentive value of \$2,492,198 (total project costs are approximately \$5.8 million). Project details have not been released because WURD is in the process of finalizing the incentive arrangements with the applicants, but in aggregate, the nine projects are expected to contribute roughly 1.5 MW of generating capacity.

WURD and the advisory group evaluated project proposals based on numerous criteria: (1) the projected ability of the projects to generate electricity based on manure management and collection considerations; (2) the financial strength of the applicant; (3) the ability of the applicant to meet all applicable environmental requirements; (4) whether the applicant had adequate insurance arrangements and could indemnify WURD and the CEC; (5) whether the applicant had service agreements for the project; and (6) the commitment of the applicant to get a five-year performance bond. Applicants for the buy-down grant had additional technical and economic feasibility requirements to meet because the applicant would receive the incentive upfront rather than over five years. The additional criteria included overall manure management and collection practices at the dairy, whether the proposed biogas system is commercially proven, and the experience of the project team.

Also in May 2002, the CEC raised the buy-down cap from \$1,250/kW to \$2,000/kW, and the production incentive from 3.6¢/kWh to 5.7¢/kWh. WURD says the biogas system costs turned out to be higher than anticipated, and the payment caps meant far less than 50% of the system costs would be covered by either the buy-down or the production incentive. The nine winning projects will receive these higher incentive levels. WURD is still accepting applications, but projects must be able to come on-line by June 1, 2003.

The CEC has also recently opened a new funding opportunity for anaerobic digestion projects (including landfill wastes, dairy and swine operations, wastewater treatment, and food processing and manufacturing wastes) through its R&D program. Specifically, the CEC has made \$5 million available to support demonstration projects that have high R&D value. This program is intended to be complementary to the dairy-based solicitation discussed above, which focuses on already-commercial technologies.

Wisconsin

While California is partly interested in biogas generation to help alleviate the state's electricity crisis, Wisconsin is primarily interested in biogas to help manage the longer-term environmental impacts of livestock manure spreading or disposal. Dairy farms with over 1000 animal units (an animal unit is defined as 1000 pounds of animals) must have an approved manure disposal plan filed with the state. For example, a dairy herd of 715 with an average weight of 1400 pounds per cow would have 1000 animal units and therefore need a manure permit. A herd of this size is reportedly also roughly the number of animals needed to achieve the economies of scale necessary to make a biogas system economical.

Wisconsin has taken a slightly different approach than California in targeting these biogas applications by focusing on customer education, information sharing, leveraging other incentive programs and strategies, and overcoming market and regulatory barriers towards the installation of distributed power systems such as biogas systems.

Wisconsin's primary system-benefits-charge-based incentive to farm-based biogas projects comes in the form of an up-front grant, the size of which is calculated using a rather complex formula.¹ Using this formula, a 50kW

¹ Specifically, bioenergy projects (including landfill gas, manure, wastewater treatment, and food processing operations) may receive a grant equal to $2100 * (kW * \text{capacity factor})^{0.63}$, with a

system operating at a 75% capacity factor would receive an incentive of ~\$400/kW, considerably lower than that offered in California. Two equipment installation grants have been provided so far by the program to farm-based biogas project: each has provided small grants of under \$15,000 to recover heat from engine-generators. Small technical feasibility study, demonstration project, and business and marketing grants are also available, a limited number of which have been provided to biogas projects.

Rather than issue a sizable RFP for biogas generation and wait for applicants, Wisconsin has conducted extensive outreach through conferences and seminars to find potential biogas projects. Since Wisconsin is still a regulated electricity market, the state has also worked on encouraging favorable buy-back rates for biogas projects from electric utilities and mitigating potential hurdles from interconnecting distributed generators such as biogas projects.

A public-private partnership, termed the Wisconsin BioGas Development Group, was formed and is led by the Wisconsin Department of Agriculture, Trade and Consumer Protection. In April 2002, over 200 people attended a symposium on biogas organized by the group. A second public meeting is scheduled for June 2002, this time covering biomass more broadly, including biogas. The emphasis has been on transferring information to interested dairy producers about biogas systems, and stressing that these biogas systems can help alleviate environmental issues associated with livestock manure as well as provide an important revenue stream.

In addition, the Wisconsin Public Service Commission approved a higher buy-back rate for facilities up to 800 kW in size in Wisconsin Power & Light's (a subsidiary of Alliant Corp.) service territory (eligible technologies include landfill gas and biogas

maximum funding award of \$50,000 or 25% of total project costs, whichever is lower.

from wastewater treatment facilities, food processing plants, and livestock manure). The buyback rates are 8¢/kWh for power produced on-peak, and 4.9¢/kWh produced off-peak, for an overall average rate of 6¢/kWh. The rates last for five years, after which the price reverts to Wisconsin Power & Light's avoided cost rate. The facilities can be owned by the customer or by the utility. The tariffs will be available for up to three years and can be applied to a total of 10 MW of biogas facilities located in Wisconsin Power & Light's system.

Wisconsin has also focused on streamlining the process for interconnecting small generators such as biogas to the utility system. A consensus is near on a streamlined interconnection process for generators ranging from 1 kilowatt to 15 megawatts, with higher levels of insurance and study requirements for larger generating projects than for smaller generating projects.

An early indication that Wisconsin's outreach efforts are starting to bear fruit came in July 2002 when Environmental Power Corporation, a manufacturer and developer of anaerobic digester gas technology, announced that it had signed letters of intent with six Wisconsin farms to install and operate digesters capable of powering up to 10 MW of generating capacity. The power will be supplied to Wisconsin Public Service Corporation under a 15-year power purchase agreement.

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Personal Communication with: Kathi Carkhuff (Western United Resource Development Inc.), Michael Vickerman (Renew Wisconsin), and Don Wichert (Wisconsin Department of Administration)

Comments provided by: George Simons (CEC) and Don Wichert (Wisconsin DOA)

ABOUT THIS CASE STUDY SERIES

A number of U.S. states have recently established clean energy funds to support renewable and clean forms of electricity production. This represents a new trend towards aggressive state support for clean energy, but few efforts have been made to report and share the early experiences of these funds.

This paper is part of a series of clean energy fund case studies prepared by Lawrence Berkeley National Laboratory and the Clean Energy Group, under the auspices of the Clean Energy Funds Network. The primary purpose of this case study series is to report on the innovative programs and administrative practices of state (and some international) clean energy funds, to highlight additional sources of information, and to identify contacts. Our hope is that these brief case studies will be useful for clean energy funds and other stakeholders that are interested in learning about the pioneering renewable energy efforts of newly established clean energy funds.

Twenty-one total case studies have now been completed. Additional case studies will be distributed in the future. For copies of all of the case studies, see:

<http://eetd.lbl.gov/ea/ems/cases/> or <http://www.cleanenergyfunds.org/>

ABOUT THE CLEAN ENERGY FUNDS NETWORK

The Clean Energy Funds Network (CEFN) is a foundation-funded, non-profit initiative to support the state clean energy funds. CEFN collects and disseminates information and analysis, conducts original research, and helps to coordinate activities of the state funds. The main purpose of CEFN is to help states increase the quality and quantity of clean energy investments and to expand the clean energy market. The Clean Energy Group manages CEFN, while Berkeley Lab provides CEFN analytic support.

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FUNDING ACKNOWLEDGEMENTS

Berkeley Lab's contributions to this case study series are funded by the Assistant Secretary of Energy Efficiency and Renewable Energy of the U.S. Department of Energy under Contract No. DE-AC03-76SF00098. The Clean Energy Group's contributions are funded by the Energy Foundation, the Surdna Foundation, the Rockefeller Brothers Fund, and the Turner Foundation. An earlier version of this case study was prepared for the Energy Trust of Oregon, and we appreciate the vision of the Energy Trust – and Peter West in particular – for initiating this work. We also thank Larry Mansueti and Jack Cadogan of the U.S. Department of Energy for their ongoing support.

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