

# THE BUSINESS CASE FOR CARBON MANAGEMENT: NEW OPPORTUNITIES FOR OFFSET REVENUES FROM MANURE DIGESTERS

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## INTRODUCTION

One of the many benefits of using anaerobic digestion for management of livestock manure is the destruction of methane (CH<sub>4</sub>), a highly potent greenhouse gas with a global warming potential 25 times greater than that of carbon dioxide (CO<sub>2</sub>).<sup>1</sup> For more than a decade it has been possible for livestock operations to generate carbon offsets for this methane reduction when they replace their open manure lagoon systems with a biogas controls system (BCS) to capture and destroy methane. With such a BCS in place, a dairy operation should be able to generate, on average, between 2 and 4 offset credits per cow per year. Unfortunately, historically, the carbon market has been beset by a great deal of variability and instability, resulting in financial uncertainty for farmers, project developers and investors in digester projects.

## MARKET OVERVIEW

Over the last couple of years, however, more voluntary buyers of carbon offsets have entered the market, and they have been shifting their preferences towards offset programs that utilize stringent standards and operate in an open and transparent manner. In addition, there have been significant steps forward in the formal development and implementation of compliance markets for carbon offsets. In particular, the state of California finalized the regulations for its cap-and-trade program, creating a new market for carbon offsets to be used for compliance. For livestock operators this means significant increases in the growth and stability in the demand for their credits, resulting in upward pressure on prices. Prices for livestock offset credits (Climate Reserve Tonnes or CRTs) have recently been trading in the range of \$9-10 each (as of late January 2012; this is subject to change). This price premium is marked in comparison to non-compliance offset credits which are currently trading in the range of \$1-2, reflecting perceived demand for offsets for use in compliance markets.

The Climate Action Reserve is a non-profit carbon offsets program that develops high-quality, conservative standards and maintains a project registry through which serialized CRTs are issued, transferred, and retired. The initial Livestock Project Protocol was developed in 2007, and has received periodic updates and revisions since that time. There are currently 60 dairy and swine manure digester projects that have been submitted from 16 states throughout the United States, as well as 18 projects submitted from Mexico. Together these projects have generated upwards of a half of a

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<sup>1</sup> Shindell, D. T.; Faluvegi, G; Koch, D. M.; Schmidt, G. A.; Unger, N.; Bauer, S.E. 2009. Improved Attribution of Climate Forcing to Emissions. *Science* 326 (5963):716-8

million CRTs, and more are on the way. Please see Figure 1 for a detailed map of the Reserve's projects located throughout the United States and Mexico.

Figure 1. US-Mexico Project Map



## The Compliance Market – Greater Certainty for Farmers, Developers and Investors

In 2006, the state of California adopted Assembly Bill 32 (AB32), the *California Global Warming Solutions Act*, which requires the state to reduce statewide greenhouse gas emissions (GHGs) to 1990 levels by 2020.

In order to achieve the ambitious emissions reductions targets mandated under AB32, the California Air Resources Board (CARB) developed a Scoping Plan to detail the actual regulations that would be put in place. A statewide cap-and-trade regulation was developed and formally adopted by the CARB in October of 2011, becoming law in December following approval by the State's Office of Administrative Law. This program is scheduled to begin in 2013 and run through 2020, with the first compliance period running from 2013-2014.

The main component of California’s compliance market will be tradable emissions permits known as allowances. However, the regulation also includes a provision that allows emitters to use carbon offsets for up to 8% of their emissions for each year. So far the ARB has adopted four of the Reserve’s project protocols for use in creating these compliance offsets: Livestock, Forestry, Urban Forestry, and Ozone Depleting Substances. These projects may be located anywhere in the United States. This means that a dairy manure digester project in Wisconsin (or any other state) may generate offsets and sell them into the California market.

Table 2. Forecasted Compliance Offset Demand (2013-2020)

| <b>Compliance Period</b>       | <b>Year</b> | <b>Allowance Budget (mt CO<sub>2</sub>e)</b> | <b>Total Offset Demand</b> |
|--------------------------------|-------------|--|----------------------------|
| <b>First</b><br>(narrow scope) | 2013        | 162,800,000                                  | <b>26,800,000</b>          |
|                                | 2014        | 159,700,000                                  |                            |
| <b>Second</b><br>(broad scope) | 2015        | 394,500,000                                  | <b>91,784,000</b>          |
|                                | 2016        | 382,400,000                                  |                            |
|                                | 2017        | 370,400,000                                  |                            |
| <b>Third</b>                   | 2018        | 358,300,000                                  | <b>83,104,000</b>          |
|                                | 2019        | 346,300,000                                  |                            |
|                                | 2020        | 334,200,000                                  |                            |

Source: CARB Final Cap-and-Trade Regulation, October 2011<sup>2</sup>

As illustrated in Table 1 (see above), the CARB anticipates the market demand for offset credits to be used for compliance in California will be 13 million tonnes per year for the first two years, rising to approximately 27 million tonnes at the start of the second compliance period in 2015. The regulation includes a minimum price (“price floor”) of \$10.00 per tonne for allowances, so offset projects can expect similar prices when they sell their credits. That said, many market analysts predict robust demand for compliance offsets to drive prices to upwards of \$70. For example, Barclay’s Capital estimates that prices for compliance offsets will reach \$68 during the third compliance period (2018-2020).<sup>3</sup> If such forecasts are realized, then the prices for compliance offsets, such as those generated by the Reserve’s Livestock Project Protocol, should provide ample incentive for dairy operations to invest in biogas control systems such as anaerobic digesters.

<sup>2</sup> California Code of Regulations. Subchapter 10 Climate Change, Article 5: CALIFORNIA CAP ON GREENHOUSE GAS EMISSIONS AND MARKET-BASED COMPLIANCE MECHANISMS. § 95841, *Table 6-1: California GHG Allowances Budgets. (A-72)*

<sup>3</sup> Brinson, J. P., S. Renas, and D. Firger. 2011. California’s Cap-and-Trade Regulations: Design Elements and Outstanding Issues. J. BNA. Daily Env. Report. 245

## PROGRAM DETAILS – HOW TO GET STARTED

The Reserve's Livestock Project Protocol (currently on version 3.0) outlines all of the eligibility requirements for livestock methane projects. Only new digester projects are eligible (you must submit the necessary paperwork to the Reserve no later than six months after your project is operational), and the manure must have previously been managed in an open, uncontrolled anaerobic lagoon (or storage tank). The biogas that is generated by the digester may be destroyed on-site or off-site, there is no prescription about how it is utilized. For example, if a dairy operator wishes to combust the biogas in an engine or boiler to generate renewable energy to power other farm operations or to sell into the electricity grid, it still meets our standards for an acceptable project under our protocol. In order to receive offset credits under the Livestock Protocol, the key requirement is the capture and destruction of methane in a biogas control system – whether you flare the methane or use it for renewable energy is a decision that is left to the individual project operator.

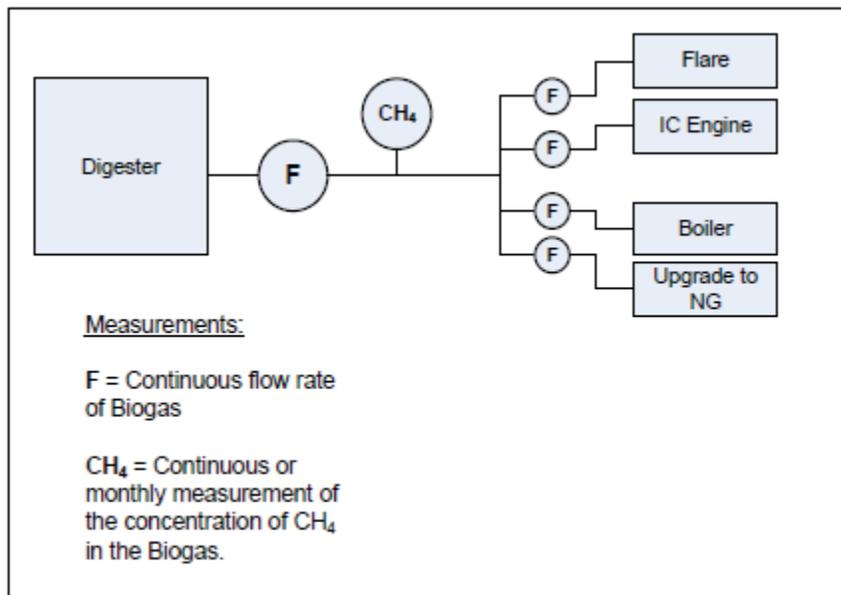
Moreover, facilities that have the capacity to co-digest manure with other organic waste can do so and earn additional credits for the digestion of other eligible feedstocks under the Reserve's Organic Waste Digestion Project Protocol. However, the project must satisfy both the Livestock and Organic Waste Digestion Project Protocols in order to receive additional CRTs for co-digestion livestock manure and organic waste and/or organic loaded wastewater.

The Livestock protocol gives guidance about monitoring and metering requirements, and it will be much easier to comply with these if they are incorporated into the design of the digester project. The major monitoring and metering requirements are the following: (1) Total flow of biogas from the digester; (2) Methane concentration of the biogas; and (3) the flow of biogas to each approved destruction device. For more information please refer to the monitoring diagram in Figure 2. Start early on the development of a monitoring plan to make sure that you have the proper equipment for metering gas flow and methane concentration, as well as the operating hours of your engine, flare or other destruction system. At least every two years, each individual livestock project must go through verification by an independent third-party which cost in the range of \$10,000 to \$12,000. It is only after this verification is successful that CRTs are issued, and this process is much easier if the project is prepared from the outset. To this end, the Protocol should serve as a step-by-step guide to walk the developer through the process of listing, verifying and registering the project.

### Additional Resources

There are a number of resources available to learn more about carbon offsets and the Livestock Project Protocol on the Reserve website, [www.climateactionreserve.org/](http://www.climateactionreserve.org/). There you can download the protocol, as well as the Program Manual which outlines the processes and procedures that must be adhered to in order to successfully implement an emission reduction project according to the Reserve's standards.

Figure 2: Livestock Project Monitoring and Metering Diagram



Note: The number of flow meters must be sufficient to track the total flow as well as the flow to each combustion device. The above example includes one more flow meter than would be necessary to achieve this objective.

For more information regarding past presentations and videos from previous workshops and webinars related to livestock carbon projects, they can also be found on the Reserve's website (Click the link provided: [Presentations](#)). For information related to the various participants in the carbon markets, please visit the [CRT Marketplace](#), which provides links to companies involved with buying and selling CRTs, who can help a project learn more about accessing the financial markets for their CRTs. It is important to note, that the Reserve is not a broker, retailer or otherwise a seller of CRTs; the Reserve simply acts as a publically-accessible database for registering projects and the credits they generate.

## CONCLUSION

The carbon markets are strong and have a high demand for livestock CRTs, and digester technology has matured greatly in the past few years. There are many resources available to farmers who want to learn more and get involved. The timing has never been better for livestock operations that wish to install manure digesters.