Factors affecting anaerobic digester adoption in the West

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Introduction

• Recently, climate policy has recognized the role of non-CO2 greenhouse gases (GHGs), particularly in agriculture.

• In 2009, U.S. Secretary of Agriculture announced an agreement to decrease GHG emissions on farms by 25% prior to 2020 with anaerobic digestion as the primary means to meet this goal (USDA, 2009).

• Dairy and swine farms are the most viable options for anaerobic digesters.

• What does this mean for dairy farms?

• Methane is shorter lived in the atmosphere than CO2, but has much higher capacity to trap heat.

• One unit of methane emitted has a warming impact over 100 years that is 25 times greater than a unit of CO2 (Shindel et al. 2009).

• Anaerobic digesters (AD) on dairy farms represent a promising opportunity for cost effective GHG mitigation due to decreased methane emissions.

• Background

• Dairy farms of all sizes (75 to 24,900 cows) have adopted ADs in 27 U.S. states. In the past 10 years, dairy ADs have increased from 41 to 193 operational (AgStar, 2014).

• AD production provides the greatest benefit of AD adoption.

• Despite benefits for farmers, AD adoption has not been widespread.

• Dairies in the West have the greatest potential due to the number of cows and warmer climate for methane production.

• What can be done to increase adoption?

• Subsidy programs at a state and federal level → EQIP (Environmental Quality Incentive Program) → DSPP (Dairy Power Production Program available in California)

• Carbon prices that align social and private benefits.

Research Objective

• Evaluate the effectiveness of subsidies for adoption of ADs that reduce GHG emissions on California dairy farms

• Evaluate the divergence between social and private benefits that occurs in the absence of a carbon price.

Methods

• Benefit-Cost framework

Data


• Variables: electricity production and consumption, price paid and received for electricity, AD cost, operating costs, and total subsidies received. Farm level characteristics include herd size, AD capacity, and type of digester system.

• Assumptions—financed the farmer cost with a 20 year loan at 7%, discount rate at 9%