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Anaerobic Digestion in Nebraska

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Climate change is a global crisis that can be fought by all locally. Nebraska is my home, and it's one of nine states in the U.S. in which cows outnumber humans. Statistically, there are three cows for every person (1,868,516 humans to 6,150,000 cows). While we have fewer humans than cows, it's not hard to understand that we rank very low in CO2 emissions when ranking all states in the country. However, our emission of the more potent greenhouse gas CH4, or methane, is significantly higher. Methane is released by cows via gas and manure, and it's causing serious implications to Earth's climate change problem. At our current rate, methane is expected to cause 15 to 17% of the global warming over the next 50 years (IPCC, 1922). Methane in Nebraska, and in agriculture as a whole, is a problem with a simple solution: increasing state and federal government subsidies to private farms for the purpose of implementing anaerobic digestion technologies.

Anaerobic digestion has multiple societal benefits such as reduction of stench from manure, creation of biogas, generation of electricity, and reduction of methane and carbon dioxide emissions. The problem is that it is expensive to implement this technology. With the high cost of startup and the low cost of energy in Nebraska thanks to public power, very few farmers have decided to invest in anaerobic digesters. More than 250 farms around the U.S. are enjoying energy independence through anaerobic digestion, saving thousands per year and reducing greenhouse gas emissions by 3 million tons annually. The price simply isn't right in Nebraska for energy alternatives. Farmers around the U.S. have loans available to help raise funds to construct an anaerobic system, but without significant financial help in Nebraska, cheap energy reduces the risks they're willing to take to become energy independent. The benefits of anaerobic digestion have garnered the attention of state and federal programs across

the country who have increased financial support for these ventures, leading to more and more farmers adopting these technologies.

One farmer in Nebraska has taken the chance on anaerobic digestion, and it was covered in an article by Algis J. Laukaitis of the Lincoln Journal Star in 2011. Danny Kluthe of Dodge, Nebraska began harvesting hog manure in 2005. Kluthe began the operation by utilizing the manure produced by his 7,500 hogs. The operation generated 30,000 to 40,000 cubic feet of methane daily, and was able to produce about 80 kilowatts of electricity. While Nebraska is run solely on public power, Kluthe was classified as an electricity generator and required to sell his power to a utility. However, the income generated from selling his clean electricity to a utility more than covers his monthly electricity bill. According to the Nebraska Methane Workgroup, the combined energy potential of anaerobic digestion of manure on Nebraska livestock operations could provide power equivalent to a 95 MW coal fired plant. These farms aren't only reducing the emissions of methane by digestion, they're also reducing CO2 emissions by reducing the electricity usage of dirty fuel sources such as coal.

As with individual farms, the highest costs to the government providing financial assistance come at the implementation stage. China and India have been able to provide cost effective digestion systems by providing financial support to start these operations. Germany has also seen success by providing subsidies and providing performance-based incentives for anaerobic digestion operations. Germany currently has over 7,800 digesters compared to the United States' 250. Currently the U.S. government provides support to Ag professionals through other means. The EPA established the AgSTAR program, which provides technical assistance to producers on biogas recovery, and the USDA provides guaranteed loan financing. By reducing the amount of money farmers will pay through subsidies and teaching them how to use this new technology on their farms, the federal government would essentially be "teaching a man to fish", allowing him to feed his energy needs for generations. The tech support is there for our farmers to make this technology work, but as I've mentioned before, the actual cost of

implementation is too high. As long as farmers are obligated to bear the whole cost of implementation, Nebraska's low energy costs will keep many from adopting anaerobic digestion in their livestock operations.

So, how much will it cost the average Nebraskan to make this a reality? Considering the true cost of CO2 and Methane production is not accounted for, we are essentially paying subsidies for pollution. While we're saving money in electricity costs, we're losing money in medical costs at a higher rate. By including the social coast of coal electricity generation we can generate the necessary funds for farmers seeking to implement this technology into their livestock operations. According to the EPA, the average cost of carbon dioxide pollution per ton is around $40. A tax of $40 per ton on carbon dioxide release to Nebraska coal plants would more than raise the funds needed to subsidize anaerobic digestion in Nebraska. This will decrease our demand for coal while ultimately increasing Nebraska's demand for alternative energy sources including solar, wind, and of course biogas from farmers and ranchers through anaerobic digestion. The average Nebraskan will inevitably see an increase in their electricity bill for a time before the growing alternative energy sources catch up with and overtake the energy generated by coal. In the long run, it will decrease electricity costs.

When combatting climate change, every small improvement helps. Every positive change in habit is another step to a cleaner planet. The use of anaerobic digesters produce societal benefits that must be paid for by all of us if we want clean agricultural operations, therefore government subsidies must be introduced to achieve this goal.