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Puerto Rico, Factor 3: Biofuels

Puerto Rico: Using Methane as a Biofuel

Puerto Rico has a crisis in the areas of energy, healthcare, and overpopulation, but these problems can be solved by education, diversity of energy production, and increased agricultural production. These solutions will result in higher annual incomes, more jobs, educated citizens, and lower energy costs. This paper discusses the issue of electricity in Puerto Rico and how the use of methane as a biofuel could enrich the lives of its people in many ways.

Puerto Rico is facing a huge electricity problem. When an American goes through a power outage he or she reminisces on how dreadful the experience was. To a Puerto Rican, power outages are a frightening customary procedure every week. Not only are power grids failing, but the average cost for electricity is outrageous. Puerto Rico pays approximately 400% more than America for one kilowatt of power (Greenbriar Capital Corp). One of the reasons the electricity costs so much is that they mainly use petroleum to produce their electricity. Puerto Rico is trying to diversify their energy production process to be more efficient and cheaper. The government has started to try to use renewable resources to produce energy, but there is a renewable resource of which they have not yet experimented. Puerto Rico has 3,223 farms with a total of 257,285 head of cattle (Puerto Rico Agriculture). People in other countries have started harvesting the methane from cattle to power generators and create heat for homes and other small tasks. If Puerto Rico could develop districts for the different farms, and have a power plant in each district that produces electricity from the collected methane, it would solve the energy crisis and open thousands of jobs. Some people may think that there are not enough cattle to produce methane for the island, but they must remember Puerto Rico is thirteen times smaller than Mississippi, so their energy demands are not as high as one may think.

Another crisis that is currently influencing the country is healthcare. Sixty percent (60%) of the island is on Medicare. This has caused \$25 billion dollars in debt for the government. Three thousand doctors have fled the island in the last five years because the conditions are so stressful (Puerto Ricans Brace for Healthcare Crisis). If factories and methane farms are produced, then they will provide cheaper electricity and jobs that will put money back into the citizen's pocket. Once they start having a higher annual income, they will be able to provide their own healthcare. The benefits are endless when it comes to finding an abundant renewable energy source.

A big thing that causes unemployment is that the tropical island is so overpopulated. Mathematically there are 1,009 people on one square mile of land. There are so many people that all the jobs are filled. If the government builds all the plants and harvesting equipment that they need to produce energy from methane, it will provide thousands of jobs for the unemployed. The United States faced the same problem when immigration started being a serious problem. There would be lines out the doors of businesses from people trying to find jobs. Employers did not have to worry about their employees quitting because they knew there would always be people willing to take the job. The only way to solve the problem of unemployment is by creating more jobs (Puerto Rico Unemployment Rate).

The average Puerto Rican household has 2.98 people. The annual income for these households is \$19,518 (US Census). Their diet includes many vegetables from the rich fertile soil of the island. They are known for their popular fruit the plantain. The main source of meat comes from beef and chicken (Welcome to

Puerto Rico). In forty years, the enrollment in schools has increased by approximately 25%. Puerto Rico is the country with the greatest growth in public education. People might think that education has nothing to do with using biofuels to lower the cost of electricity, but thinking in the present and not for the future is what causes people to fail. A country must realize that educating the young people that live there will guarantee the future of the country long after they are gone. In today's world, kids are not just competing on a national level for a good job and future, they are competing on a global level. If Puerto Rico can get 100% of their youth in schools, then a lot of their problems will be solved (Education and Economic Development). Once they get their schools running well they can start to develop programs that cater to different people. For example, some kids are going to be great at the book work part of school while others will be good at working with their hands in real life situations. This is where their government could develop Vocational Technical programs so every kid can get out of school and have a good job, which will eventually put money back into the economy.

There are over 13,159 farms on the island of Puerto Rico. The majority of them consist of cattle and chickens, but that is not nearly everything that is raised there. They raise everything from pigs to horses. With the average age of a farmer in Puerto Rico being 59 years old, it seems they do not educate their younger generations in the practice of farming. If they do not educate the youth, then not only will the plan for a new energy source not work, but they would have to start relying on foreign markets to provide them with their produce. This would only add to their debt. The average size of a farm is 43 acres. In order for the collection of methane to be efficient, there would have to be a well-developed process to get the methane to a central power plant efficiently. Another possible answer is to have small plants within a radius of about ten farms that will send its power to a bigger power plant until it has enough power to send electricity to the power grid. Farms also need to find ways to be more efficient. Over half the farms make less than \$5,000 dollars annually. The answer is not bigger equipment because the farms are too small to need a big 200 horsepower tractor. They also cannot afford that type of equipment. They need to make an investment in small but efficient tractors and equipment. Most of the farms have outdated equipment that uses an inefficient amount of fuel and puts out very little torque and horsepower compared to how big they are (Puerto Rico Agriculture).

With the abundant number of farms on the island, Puerto Rico still relies on ten different countries to get their produce. They only produce 17% of their own food. The territory has many negative factors that contribute to their poor food supply. Two of the main factors are water contamination and less land being devoted to agriculture. Dr. Comas and the Puerto Rico Department of Agriculture have been developing and putting into action multiple solutions to the food crisis. Their main counter attack for the food crisis is educating the public about food security. They have gained 607,000 acres of arable land. Not only that but they have educated farmers on more efficient methods for growing and harvesting their crops. They taught farmers to utilize the grants provided by the United States Department of Agriculture (USDA). They know that it will take a long time for it to be a major factor, but they hope in the long run it will help a great deal (American Society for Nutrition). Another factor to increasing food is increasing agricultural productivity. In school, there will be kids that are naturally good at farming and thinking through real life problems. Instead of trying to force them to do well in the academic part of school, they should put them in agricultural programs in school. That way, when they get older, they can work or be in charge of a major farm that supplies food to their country. Aside from education the current farmers are going to need good markets in which to sell their products. If they have a good income, then they can start to make improvements to their land and farm equipment. This will lead to more productivity of food, so they will not have to rely on foreign markets. The first step to begin this snowball is to create more jobs so people can afford to go to the market and buy the farmers' products. If Puerto Rico develops this method of creating energy, then they will create jobs, and they could put into motion programs like the Civilian Conservation Corps to improve the roads and living conditions of the island.

Puerto Rico's government has started to come up with some acts to help the crisis. The Department of Energy in Puerto Rico has put into effect the Recovery Act. This act includes multiple programs to increase energy efficiency. For example, they give funds to people and businesses willing to build solar power panels to give energy to their local community. They also provide jobs and a steady income for families. The 1603 program gave payments for specified energy property in Lieu of Tax Credits. The government gave a total of over 1,115,000 dollars to corporations and businesses for solar electricity. There were forty-two communities that were awarded a total of 34 million dollars for Energy Efficiency and Conservation Block Grants (EECBG) to develop, promote, implement, and manage local energy efficiency programs (Energy.gov).

Puerto Rico has faced many problems in the past and is still facing many problems. One giant problem that needs to be addressed is electricity. Many people believe there is a way to produce electricity efficiently using methane. There is a dairy in Florida that has figured out a way to harness the raw power of cow dung. The farm contains 5,000 cows that produce enough methane to power 425 standard homes. That is less than 2% of the total number of cows in Puerto Rico (Dairy Farm).

If the government puts these ideas into effect, then it will help the typical family tremendously. Not only will they create jobs that will help with unemployment, they will also lower the household power bill a considerable amount. In the long run this idea could potentially solve the healthcare problem, too. If the average family could raise its income while lowering the power bill, they could pay for their own healthcare and not have to rely on Medicare. From what can be found on the Internet and asking close friends that have lived in Puerto Rico, they do not use this method of energy production, so this is a program that would have to be built from the ground up.

The only factor that could possibly affect this idea for a new biofuel is the demand compared to the production. While Puerto Rico has enough cow manure to power 21,250 standard homes, it will not be enough to power everything on the island. There is a total of 1,261,325 households, but they do not use as much electricity as a standard American household (Puerto Rico Census). The main source of power on the island is petroleum. There is a possibility they could import even more cow dung from America which is only 1,150 miles away. America has approximately 92,000,000 head of cattle (USDA). The major feed lots in America usually waste their manure by washing it into a waste lagoon. Instead of wasting it, America should see if they can work out a deal with Puerto Rico to ship the waste to the island. Then Puerto Rico would not have to worry about a deficiency of manure. America can produce and supply Puerto Rico with enough feces to power almost all one million houses. Making this deal would help both countries considerably. America would be making money by selling Puerto Rico literal waste. Puerto Rico would also benefit tremendously because there would be a steady source of cheap power.

The farms of the island would benefit from using methane biofuel because they would be able to run their equipment for a much cheaper price. This means that farmers would be able to make their products more affordable for the average family. The typical farmer would also be able to increase his or her crop production. Increasing crop production while lowering product cost would increase food security. Production would be up because the same principle can be applied to every other engine. The average person can make his or her own methane tank and use common things like weeds and leftover rotten food to create methane gas to be used in an engine. This means the farmer would not be paying anything to power all his equipment that runs off a regular combustion engine. This being said, the government could

develop programs that teach farmers to build a methane distillation tank. If the farmer plants crops every year, he could gather the leftover plants after he has taken all the products from it and save it to put in his distillation.

The Puerto Rican government could upgrade the programs to include a local level. They could have programs that give money to communities to produce solar panels to create electricity that powers their homes. It could be like a community garden where everyone takes care of a certain part of the land, so one person never has to watch over it all. It would also be very beneficial if the government involved communities in the production of methane. Each home could have a compost receptacle outside their house that they put their organic waste in to produce methane for the farmers in their town. The farmers could go around to the different donation boxes in their designated area of town to pick up the organic matter. Organizations could be made to oversee the boxes and make sure they are always in good maintenance. This means that even the smallest family would be helping to keep the country alive. The families would take their organic waste to the donation boxes to power the farms. Then, the farms would give cow manure to the power plants to put electricity into the homes of their own country. It would be a never ending cycle of power.

In conclusion, the use of methane to create a renewable energy source for the island of Puerto Rico will benefit it in many ways. The only hard part in this plan is getting to the step of creating the energy. There are going to have to be financial investments made to get this idea off the ground. After those investments are made, the outcomes will be incredible. Some of the investments will include building power plants and ways to get the manure to its destination. The Puerto Rican government will also have to employ people to work in the factories and operate the methane harvesting equipment. There will also have to be maintenance crews to keep the plants and collecting equipment in peak condition. If they are willing to take this risk, then there is guaranteed improved energy and healthcare. The problems that arise from overpopulation will also be solved. The problem with overpopulation is that there is so much competition to get a job that not everyone can get a job. So, if they can create jobs while improving energy production and cost, the outcome will be substantially noticeable to the citizens of the island. While the outcomes are significant, they will take a little while to be put into effect. The cycle must start at a certain place and make its way completely around the energy cycle until it is noticed. When this happens, it will be like a circle, never opening for a pause in the prosperity. Once the island citizens realize this and how much it will benefit their everyday lives, they will be wanting to use this renewable source of energy more and more every day. It is like the old saying if you give someone an inch they will go a mile. But, in this case if you give the average citizen an inch, they will create an energy cycle that their great grandkids will be a part of for years to come.

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