

Tinh Tran
North High School
Sioux City, Iowa
Timor-Leste, Malnutrition

Timor-Leste: A Cow to Save the Country

Most people in the Midwest have traveled through their state and smelled a foul smell in the air. The cause of the foul scent is most likely due to cow byproducts, such as manure. When cows exhale or produce manure, they produce a special gas called methane, which is a harmful greenhouse gas. Nevertheless, when methane is burned, it can be used to create energy. A system that creates energy using cow byproducts is the Methane extraction dome. The Methane Extraction Dome (MED) uses cows and their byproducts of methane to power itself and put energy into a reserve that allows citizens of Timor-Leste to use for electricity. Timor-Leste is a newer country in Indonesia that does not have a constant supply of electricity for its citizens. The MED is a great innovation that can be used to power homes and buildings for the people of Timor-Leste. The MED can be the best alternative power source for everyone across the world. The MED provides people with food, energy, and can help slow down the process of global warming.

The MED is a complex piece of machinery. The MED uses cows to produce methane, which transpires into energy. The MED is built out of concrete, corrugated steel, fiberglass, steel, and steel I beams. There will be around twenty cows in use at one time in the MED. The cows will be used in rotation system. For example, the first twenty cows will be used in the MED for four days and then the second group of twenty cows will take their spots and so on with the third group of twenty cows. The MED will use five groups of twenty cows for the project in Timor-Leste. This rotation system is used in order to create a lower stress environment for the cows. About every two weeks the MED will bring back in the first group of cows and cycle those cows through the rotation again. The best way for this to work is to make five MEDs that are slightly different from each other to keep the cows alternating from MED to MED. The MED uses airway fans and vents to bring in fresh air, so the cows can have an abundant supply of air flow. Methane is less dense than air, so towards the top of the MED, there will be extractors that collect the methane gas produced by the cows. The cows will receive nutritious foods like hay and grains for their food source, which will keep them healthy. This will also insure that the milk produced by the cows is nutritious for the people of Timor-Leste. The MED will be a great tool that Timor-Leste can utilize to provide power throughout the country.

Timor-Leste is an up and rising country that received its independence in 2002 from the Portuguese. However, Timor-Leste still has a long way to go to become a first world country, but shows many promising signs. Timor-Leste's government system is semi-presidential republic (CIA). Unfortunately, Timor-Leste still faces many problems. Some of these problems are malnutrition in children and poverty throughout the region. The main diet of the people in Timor-Leste consists of "rain-fed agriculture" which can at times be scarce and leave families without food (WFP). Natural disasters such as El Niño, floods, drought, and pest infestations destroy Timor-Leste every year, which decreases the country's food supply (WFP). So, not only will the MED provide the country with power, but the cows used in the MED would help feed the people of Timor-Leste throughout the year.

The MED will help try to solve two major problems in Timor-Leste. One of these problems is malnourishment in the people. "Just over half the children aged up to 5 suffer from stunting" (WFP). Families that need meat will be able to receive food donations from the cows once they fulfill their purpose in the MED. The meat being harvest from the cows would contain many nutrients that people in Timor-Leste lack in their diet. Not only would the meat supply from the cows help nourish the people of

Timor-Leste, but the milk that the cows produce can support its citizens. Milk would provide the other remaining nutrients missing in the daily diets of the people of Timor-Leste that cannot be found by consuming the beef from the cows. The cows from the MED will provide the whole country of Timor-Leste with the nutrients from their meat and the milk being produced by the cows.

About every “1 in 6 people in America face hunger” everyday (Do Something). That would come out to be about 54 million Americans that face hunger. There are about 1,290,000 people living in Timor-Leste. More people are going hungry in the United States than there are people in Timor-Leste. The United States has been a country for about two hundred and a half years and many of its citizens are still in poverty and facing hunger. Timor-Leste has only been a country for about sixteen years and is in poverty. With the MED, Timor-Leste, should rise as one of the top countries in the world in a few generations. As stated, the MED can provide nutritious meat for the people of Timor-Leste. This will drastically reduce the amount of people in poverty and create healthy children of the future. Timor-Leste has a bright future ahead if they are able to resolve their problems.

The second major problem in Timor-Leste is the lack of electricity throughout the country. The main purpose of MEDS is to provide the country with electricity. The average household in the United States uses about 10,766 kilowatt hours a year. The MED creates about 194,178 kilojoules to 332,876 kilojoules per day, which equals to about 54 to about 92 kilowatt-hours. When MED is used for one day, it can produce an electricity supply for two American houses for a full day. The citizens of Timor-Leste most likely will not be using the same amount of energy that someone in the United States would use in a single day. The households will probably use electricity in smaller dosages until Timor-Leste becomes a first world country with many amenities such as a TV, computer, microwave, etc. When the industrialization of the country starts up, the MED will account for a smaller amount of energy production but has the ability to provide sustainable energy for years to come. The methane conversion will be a huge advancement for Timor-Leste. Energy would be cheap enough for every family to have it, regardless of their profession. Energy from the MED will provide more eco-friendly electricity to Timor-Leste and sustain itself upon industrialization.

Electricity is a necessary amenity for most Americans. Almost everything uses electricity. Without power, life would be very different. Over half of Timor-Leste does not have electricity. There are about 1,300,000 people living in Timor-Leste with about 750 thousand of those people not having access to electricity. The MED will be a huge leap for Timor-Leste, providing it with electricity for many people. The transition of not having power to having power will be a difficult change for the people living in Timor-Leste. The MED can provide energy, but not the equipment or products that use the energy. Timor-Leste would have to import many electronic devices, which would cost millions of dollars. Although, a simple way around this would be to import electronic devices only as fast as it is needed. Since Timor-Leste is mostly in poverty, most of the energy would not be used for a while. A solution to this is to sell the excess energy for money in order to import these products. The MED can bring Timor-Leste energy and a steady flow of money to help provide for the communities in Timor-Leste.

Methane is a strong greenhouse gas that harms the atmosphere. “Methane (CH₄) is estimated to have a GWP [Global Warming Potential] of 28–36 over 100 years” (EPA). GWP measures how much heat the greenhouse gas will trap in the atmosphere. Methane does not stay in the atmosphere as long as other gases, like carbon dioxide, but traps heat better than carbon dioxide. The impact of methane is “more than 25 times greater than CO₂, over a 100-year period” (EPA). “60 percent of total CH₄ emissions come from human activities” and methane makes up of about ten percent of greenhouse gases in the atmosphere (EPA). Methane is one of the most dangerous greenhouse gases in the atmosphere that can easily be regulated properly, so it is not harmful to the environment. Cows produce methane throughout their life, which can add up quickly to be quite harmful to the environment. The MED will take in all of the

methane produced by the cows and convert it into usable energy for the people living in Timor-Leste. Using the MED, methane emissions should and will go down, creating a more sustainable environment.

There are many ways to capture methane from cows, but the MED has far more benefits compared to the other methods. Another proposed solution to capture methane gas is to strap a backpack to the cows and stick a tube straight into their rumen. This solution is a very unique as it takes the methane straight out of their digestive tract and traps the methane into their backpack. Although this is an effective method, there are negative effects to well-being of the cows. The tube being permanently stuck inside the cows is not humane or creates a better living environment for the cows. This may decrease their overall happiness and could be considered as animal cruelty. In addition, the backpack may not be able to collect all of the methane, therefore methane is still able to pollute the environment. MED, on the other hand, allows the cows to move freely throughout the dome while extracting all of the methane. The cows in the MED do not have any tubes sticking in them or backpacks on them, so they are able to live in a lower stress environment and have a better quality of life. This in turn leads to more methane being produced as their breathing would be regular, not short, and their digestive tract would be in full force. The MED is an overall better choice for the well-being of the cows and for extracting all of the methane gas being produced by the cows.

Healthy cows ensure the longevity of the MED and the community that it provides for. The cow's health is one of the top priorities of the MED. Cows have vaccinations very similar to that of humans. Cows and calves will be vaccinated as early as possible. These vaccinations would protect against, "Infectious Bovine Rhinotracheitis (IBR) caused by Herpesvirus-1 (BHV-1), Bovine Viral Diarrhea (BVD), Bovine Respiratory Syncytial Virus (BRSV), IBR (Rednose, Infectious Bovine Rhinotracheitis), Parainfluenza 3 (PI3), Hemophilus somnus bacterin, Leptospirosis, Black Leg, Brucellosis, Pasteurella, Rotavirus scours, Coronavirus scours, Enterotoxemia (Clostridium perfringens types C and D), Vibriosis (Campylobacteriosis), [and] Tetanus" (Dana). Vaccines would cost about \$100 per cow, so with 100 cows, it would cost about \$10,000 to vaccinate all the cows (Dana). Of course, breeding would insure a stable number of cows and energy production, but to vaccinate all future calves would cost significantly more than \$10,000. A large number of vaccines would be given to Timor-Leste, since this is a large amount of money that they would not be able to sustain for many generations. The UN or even just the US could provide for the vaccinations of the cows, and Timor-Leste could provide for the maintaining and nurturing of the cows. This would allow for a continuous lineage of healthy cows. Vaccinated, healthy cows would in the long run be much cheaper than buying new cows/ constantly breeding cows whenever one would die.

The MED will be used to provide food and energy for the people of Timor-Leste. Timor-Leste is a growing and developing country that needs the MED to lower the malnourished rates in children, which, in turn, create brighter and stronger adults that can make Timor-Leste a better place for future generations. Though the industrialization of Timor-Leste will take several generations to take place, the impact of the MED will affect families now. The families that the MED affects will have the resources to raise healthy children. These children will be able to help the economic and technological growth of Timor-Leste. The MED is an innovative solution that can provide almost any country with energy and food through the use of cows. While doing all of this, the MED can help reduce global warming. The MED creates the best environment for cows and the beneficiaries that receive the benefits.

Works Cited

- CIA. "East & Southeast Asia." *World Factbook*. 2018. cia.gov/library/publications/the-world-factbook/geos/tt.html. DOI 19 Mar. 2018.
- EPA. "Overview of Greenhouse Gases." *EPA*. 14 Apr. 2017. epa.gov/ghgemissions/overview-greenhouse-gases. DOI 19 Mar. 2018.
- Nyman, Patti. "Methane vs. Carbon Dioxide: A Greenhouse Gas Showdown." *One Green Planet*. 30 Sept. 2014. onegreenplanet.org/animalsandnature/methane-vs-carbon-dioxide-a-greenhouse-gas-showdown/. DOI 19 Mar. 2018.
- World Food Programme. "Timor-Leste." *WFP*. 2018. wfp.org/countries/timor-leste. DOI 20 Mar. 2018.
- "Energy From Fossil Fuels." *WOU*. 2018. wou.edu/las/physci/GS361/Energy_From_Fossil_Fuels.htm. DOI 20 Mar. 2018.
- "Are Cows the Cause of Global Warming?." *Time for Change*. 2018. timeforchange.org/are-cows-cause-of-global-warming-meat-methane-CO2. DOI 19 Mar. 2018.
- "Kilojoules to Kilowatt-hours conversion". *Metric Conversions*. 2018. metric-conversions.org/energy-and-power/kilojoules-to-kilowatt-hours.htm. DOI 19 Mar. 2018.
- "What do Dairy Cows Eat?." *BCDA*. 2018. bcdairy.ca/dairyfarmers/articles/what-do-dairy-cows-eat. DOI 19 Mar. 2018.
- "Political System." *Timor-Leste*. 2018. timor-leste.gov.tl/?p=33&lang=en. DOI 19 Mar. 2018.
- "11 Facts about Hunger in the US." *Do Something*. 2018. dosomething.org/facts/11-facts-about-hunger-us. DOI 19 Mar. 2018.
- Dana, Stacia. "Re: Healthy and Happy Cows." Received by Tinh Tran 3 March, 2019.