THE SAE LAO BIOGAS PROJECT

WHAT IS BIOGAS?

Biogas is generated when bacteria degrade biological material in the absence of oxygen, in a process known as anaerobic digestion. Since biogas is a mixture of methane (also known as marsh gas or natural gas, CH_4) and carbon dioxide, it is a renewable fuel produced from waste treatment. Anaerobic digestion is basically a simple process carried out in a number of steps that can use almost any organic material as a substrate (in our case we use excrement). This gas can be compared to natural gas. It occurs in digestive systems, marshes, rubbish dumps, septic tanks and the Arctic Tundra. Humans tend to make the process as complicated as possible by trying to improve on nature in complex machines but a simple approach is still possible. Here at SAE LAO, we have created an all natural, organic biogas plant that helps promote sustainability and a healthy lifestyle in a desperately fragile environment.

HOW DO WE DO IT?

With the right information and guidance, creating a biogas system is not that difficult. First and foremost, we had to decide what was needed in order to start. This included the materials for construction (cement, gravel, sand, bricks, pipe, valves, timber, glue, sealant, buckets, sacks of corn husks, and in our case tiles and a toilet), the necessary tools (shovels, paintbrush, and taping knife, etc.), and the labor needed to construct everything.

Secondly, we had to decide on the best location. The biogas system is most efficient if built near the kitchen (so the gas does not have to travel long distances). The shorter the length of the pipe, the less the risk is for leaks. This also reduces the cost of material. Also, the biogas plant should be built where the sun shines. Thirdly, we had to decide on the correct size of our underground tank (which can been anywhere from 4 to 20 m^3). Since we are an organization with a full-time staff that also frequently hosts volunteers, along with customers from our restaurant, we decided to build a larger system.

And the last step is starting the building process. We won't go into too much detail here, but please feel free to ask questions if you are more

interested in the steps we took in order to implement the biogas system. Also take a look at the "Biogas Plant Construction" article for a step-by-step detailed description.

A biogas plant consists of five main structure or components, and is house mainly underground. The required quantity of dung and water is mixed in the inlet tank and this mix in the form of slurry is allowed to be digested inside the digester. In our case, the feeding tank is also supplied with waste produced from the toilets that are built above the tank. The gas produced in the digester is collected in the dome, called as the gasholder. The digested slurry flows to the outlet tank from the dig through the manhole. The manhole is gas tight and sealed with clay and water. The slurry then flows through overflow opening to the compost pit where it is collected and composted. This overflow can be removed to be used for fertilizer, feed, etc. The gas is supplied to the point of application through the pipeline. The diagram below displays the basic family-size biogas plant.

WHAT ARE THE BENEFITS?

There are innumerable benefits to using biogas, ranging from decreasing the cost of electricity to a healthier, happier garden. Here we highlight some of the most beneficial factors:

ENERGY PRODUCTION

Biogas can replace traditional sources of fuel, such as kerosene and more importantly firewood. Biogas can be used for cooking (gas stoves), lighting, powering hot water heaters and generators.

AGRICULTURAL BENEFITS

The agricultural benefits are boundless. For one, the organic waste can be transformed into high quality organic fertilizer. Fertilizer is essential in rural communities, especially here in Laos where rice farming is a way of life for many people. The composting process which occurs in a biogas plant creates an organic fertilizer that contains all the nutrients and microbe organisms needed for healthy plants. This fertilizer also secretes growth promoting substances like hormones, vitamins, amino acids, and anti-fungal chemicals. All these things promote seed germination and root growth which better ensure lush, green gardens and bountiful harvests! Rural families can have larger, more productive gardens.

ENVIRONMENTAL BENEFITS

The environmental benefits are one of the most important factors in today's world. Biogas plants help ensure the protection of forests, soil, water, and air! One of the most obvious benefits is that trees no longer need to be cut down for firewood. And since firewood is no longer being burned in homes, the air becomes cleaner and healthier for everyone. On a grander scale, there is a decreased emission of greenhouse gases (such as CO_2 and methane). Also, the use of chemical fertilizers is eliminated as farmers have organic alternatives with the organic waste that is transformed into fertilizer. Land and water pollution that is so often caused by the harmful chemicals in fertilizer can be prevented entirely. Instead, soils are enriched by the rich, organic fertilizers that a biogas plant provides.

HEALTH BENEFITS

The majority of people living in rural areas still use firewood as fuel for cooking and heat. This has many detrimental health effects, including respiratory illness, eye infection, headaches, dizziness, asthma, and lung problems. The switch to biogas has proven to reduce these effects. Also, the use of biogas improves hygienic conditions with the reduction of pathogens, worm eggs, and flies. This includes more hygienic environments for raising livestock with the constant removal of waste and excrement. This reduces the amount of intestinal disorders. (Healthier animals = healthier people!) The organic waste produced from the biogas plant can also be used in the construction of mud homes for rural families. Instead of using dung, walls can be plastered with organic waste, which leads to a more sanitary living environment (literally!).

ECONOMIC BENEFITS

As with the above benefits, the economic benefits are also plentiful! Families and establishments can save money on energy costs. Firewood no longer has to be bought for cooking and electricity bills can be avoided when it comes to lighting. Also, farmers no longer have to worry about paying for expensive chemical fertilizers, which before were absolutely necessary for the success of their crops. The costs of raising livestock are also reduced, as the organic waste can be used for feed as well as fish food.

LIFESTYLE BENEFITS

Having a biogas plant minimizes the efforts that people, mainly rural women, have to make in order to complete daily tasks. The time spent gathering firewood and starting the fire for cooking is completely eliminated. Cooking with a gas stove is much more efficient and time-saving than with a wood stove. Also, as stated above, the health benefits directly affect the lives of those who choose to use biogas. Healthier people mean happier people. Also, the economic benefits afford a more productive and improved lifestyle.

WHY DO WE NEED YOUR HELP?

As you can see, the benefits of having a biogas plant are endless, and interconnected with all aspects of life. As we know, with globalization, we as people are also interconnected throughout the world. Any help that we receive is help that we as global community receive. The SAE LAO Project is an up and coming organization that started in 2008. We are just a small part of the greater whole trying to affect positive change in our world. And we could use your help to get us off the ground running with biogas! For one, we need help spreading awareness about biogas and the healthy, organic, and sustainable lifestyle that it promotes.

HOW CAN YOU HELP?

There are many ways that you could lend a helping hand! The easiest being, help us spread the word about biogas! Awareness and education are the first steps to any successful project. Or, if you have time, stop in our restaurant and grab an all natural, organic fruit shake or a savory meal! Also, we welcome any volunteers to come and stay with us. There is always something that needs to be done at SAE LAO. Feel free to become a part of our family here and stay long-term to better help us achieve our goals. ;) And, as always, we greatly appreciate any donations toward our cause.