Business Plan

Kirkwood Community College & Sulaimani Polytechnic University in Iraq

Problem Summary

Introduction:
Households are still looking for a way to reuse/reduce their food waste to make a positive effect on the environment, since they have limited resources to do so, a team full of creative and well trained youths should embrace the opportunity and look for a way that eliminates half if not all of the problem.

Impact on the environment:

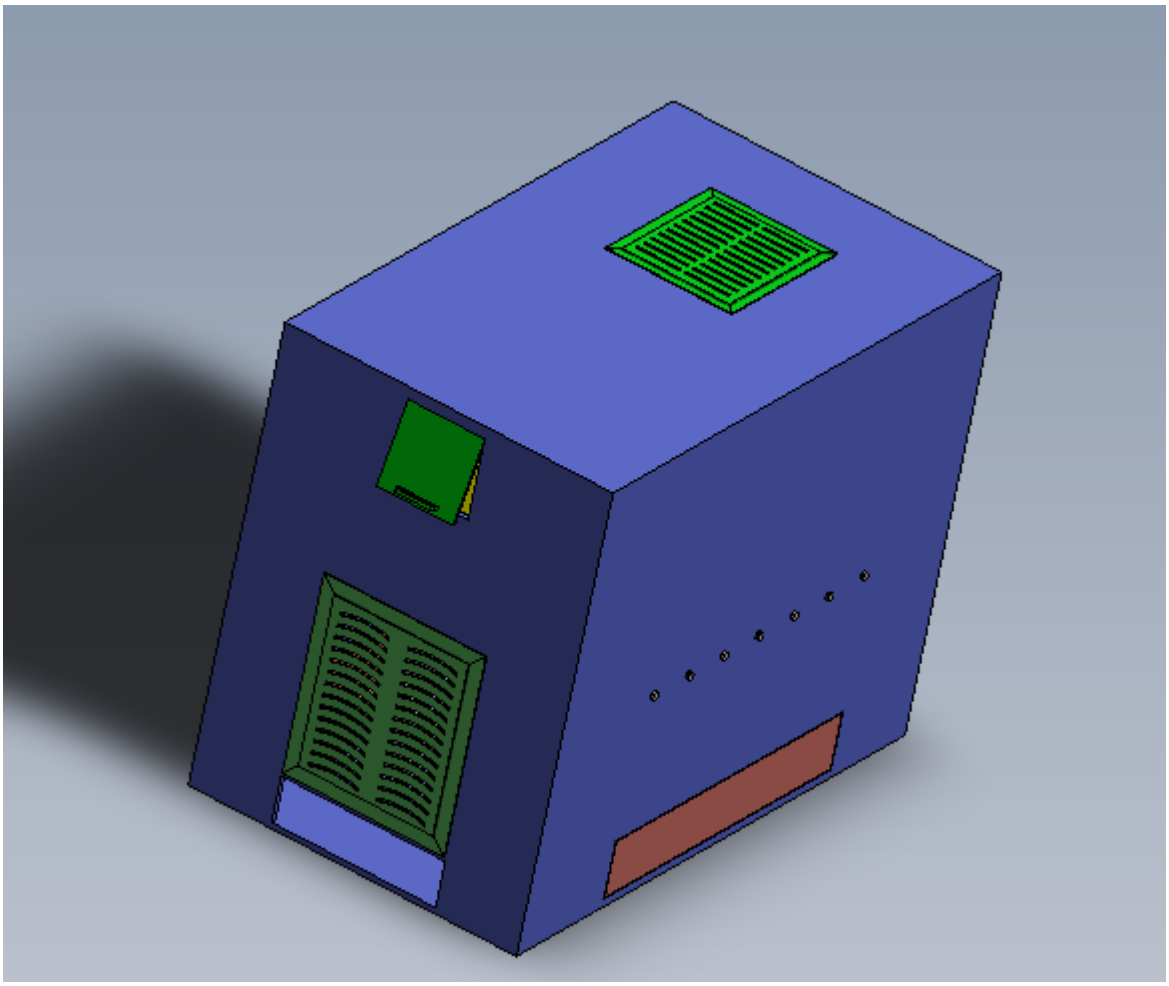
The great impact that food waste has on the environment is overwhelming to imagine, research has shown that %8 of the global pollution is caused by food waste emissions, not just that, also according to a research done by NRDC, food waste ends up wasting nearly a quarter of our water supply in the form of uneaten food or over $172 billion in wasted water, Each year, as a country we spend over $220 billion growing, transporting, and processing almost 70 million tons of food that ends up going to waste. If the land that we cultivate growing food that goes to waste in the US were all in one place, it would cover more than 3/4 of California! Growing food that goes to waste ends up using up 21% of our freshwater, 19% of our fertilizer, 18% of our cropland, and 21% of our landfill volume. This comes with a heavy carbon footprint as well. When food is disposed in a landfill it rots and becomes a significant source of methane - a potent greenhouse gas with 21 times the global warming potential of carbon dioxide. Growing and transporting the food that goes to waste emits as much carbon pollution as 39 million passenger vehicles. The global food system is responsible for up to one third of all human-caused greenhouse gas emissions, making it one of the largest contributors to climate change, according to the Consultative Group on International Agricultural Research. The fact that we carelessly waste 40% of our food in the U.S. and 33% globally means there is huge potential to reduce our environmental footprint. Big picture, energy and transportation tend to be the face of climate change, but with food's impact arguably larger it definitely deserves more of a focus.

Impact on Economy:

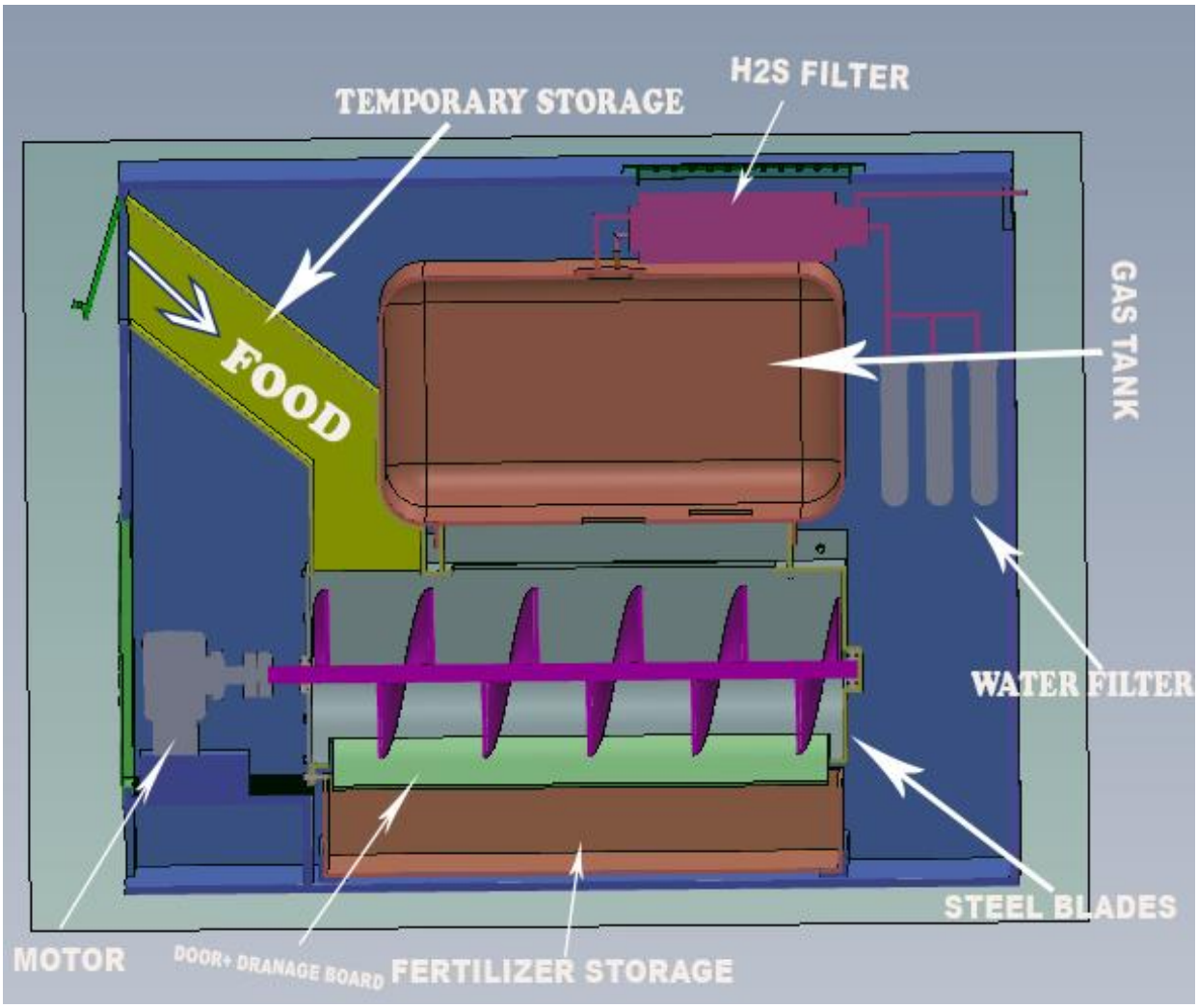
Food waste is not just negatively affecting the environment but it's also hurting the economy. As researches show, globally we waste 1.3 billion tons of food which accounts for a lot of money, in fact food waste is the cause of American people to be $1500 less rich at the end of the year, and a substantial amount of money is wasted producing food that is never used. Additionally, one must consider the wasted labor, material resources, time and energy that go into food production. It's nearly impossible to estimate the potential economic benefits from redirecting these resources, but the situation carries considerable gravity. The Food and Agriculture Organization of the United Nations (FAO) recently estimated annual losses of $1 trillion from resource costs. In addition to squandered resources, there is the externality of environmental impact, both from resource overuse- like water scarcity and soil erosion- and from pollution. 95% of food waste goes to landfills, which produce methane, the leading culprit in climate change. The FAO estimates the environmental cost of food waste at $700 billion per year, which was calculated by quantifying carbon, land, and water costs and potential savings, along with the semi-quantifiable cost factor of biodiversity. The lost consumer surplus resulting from our food waste pushes up the price of food. This loss has a relatively greater impact on poorer individuals, as food costs account for a greater percentage of their income. Higher prices and lower quantities of food invariably cause nutritional deficiencies for lower-income people. This, in turn, may result in externalities like higher healthcare costs and lost productivity from individuals weakened by nutritional deficiency and food insecurity. This cost is estimated by the FAO to be approximately $900 billion per year. Adding this to resource and environmental costs, the FAO projects a combined annual cost of $2.6 trillion from America's food waste.

Solution:

As the growing population increases with the rise of global emissions and environmental negativities that cause food to be decreasing rapidly at an unimaginable rate, humans need their creativities more than ever, we have come across an idea that eliminates most of the problems mentioned above, and that is by making a machine to turn food waste into bio methane which can be used for cooking, the gas is not the only product of the machine, in fact the machine can turn food waste into fertilizer in 24 hours after input, the functions of the machine are fully automatic with digital monitoring through an application,



The picture above is the actual 3D model of the prototype, as you can see it's like a normal washing machine and this is exactly why it's innovative, all of the operations are fully automatic and the products are practical as well as being useful.



As it's shown in the picture above the machine has many parts that helps the food waste to be processed, the first encounter of the machine with food waste is the input door on the upper left, the food is put inside the temporary storage which has an automatic valve that lets the food to go down if there are no other operations taking place inside the machine, otherwise the valve will shut until the current process is done and then lets the waste go down to the blade room where it's swirled around by the blades for a couple of hours, this process is not only effective for the duration of the whole operation but it helps to make better fertilizes as well, after the blades stop spinning the waste is going remain there until the whole gas is extracted and gone into the tank above it, inside of the gas tank there sensors to monitor the gas movement and pressure, the biogas contains some harsh and toxic compounds that need to be taken out, these compounds are really bad for health and could be lethal in many cases, that's why the gas is going through two levels of filtration to ensure that it's purified enough to be used.

The first filter is to extract the H2S out of the biogas then a vacuum will pull the gas downwards to the water filter, the water will dissolve the CO2 and the methane goes up in the shape of bubbles which goes up the pipe and out through the output, after that the gas would be ready to use

While all of the above mentioned process is being taken care of by the machine, the food waste remains on the drainage board that helps to dry out the fertilizer, 24 hours after the input when most of the processes are done the drainage board will automatically open downwards and the fertilizer goes into the storage, but before putting the food waste inside the machine we have to put an additive pack inside, this pack is used to help fasten the duration of the fertilizer process along with making it healthier.

Finally the fertilizer would be ready to use and we can pull the storage like a drawer and take it out of the machine.

The machine can be used on various scales but we tend to design it for households for the time being, and the maintenance is very easy as there are many sensors to detect any problems with the machine, so this concludes that the machine will hit most if not all of the points of sustainable business.

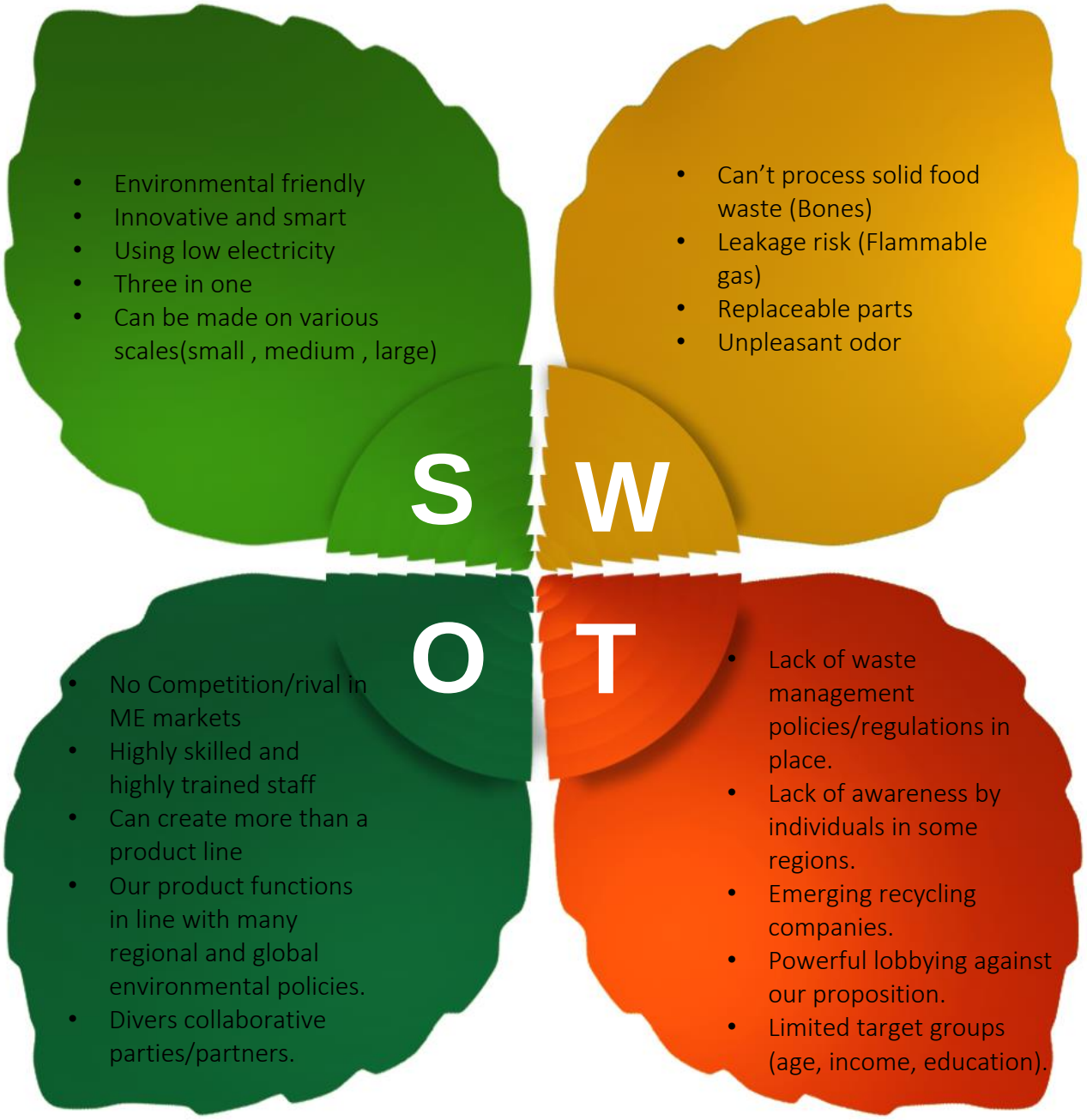
The machine requirements are like the following:

Electronics (circuit
Boards, sensors...)
• Stainless Steel
Plates
• Manufacturing
Plants
• Land
• Logistics/ means
Of transportation
• HR
• Engineering (all
Disciplines)
-Business
Developers
-Technical staff
-Software
Developer

Market analysis/ Market target

Our target customers are families (households) or restaurants depending on the machine's size. Due to large amounts of wastes from households this Prototype would be the perfect solution for this problem. On average 4.40 pounds of waste is produced per person daily. What better to transform this waste to fertilizers for your garden? As we know from the interviews we conducted on week 2 and 3 the main problem of the people is "Food Waste" each person stated how food waste is their main issue and concern. A machine like this one in Middle East will have no competition since there are no competitors. What is unique about this machine is that it's very innovative, smart, and more important than that its environmental friendly which is what the Global Solutions Sustainability Challenge is working on consistently. We will be having different sizes according to the type of the household being used for. In this case very low electricity will be used as you only need electricity for the motor to mix and process the food waste with the blade and the circuit boards that automate the operations. Our product is 3 in 1 since from the food waste that is being processed in the machine we will have fertilizer, liquid fertilizer, and methane gas. Our main channels of distribution would be a main store in big cities with small branches in towns and small cities. Having an online store would be a good way to display the product to anyone in anywhere in the world, also allowing online review would be like a free advertisement for our product.

SWOT ANALYSIS:



Conclusion:

Given the problems mentioned above, this machine is a great technology for our growing communities, imagine having this machine everywhere you go, which means we never have to use LPG gas nor do we have to pollute the environment by throwing out our food waste.

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Author: Sabrina Weber, Kerstin Palme
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