Republic of the Philippines
Department of Education
Region VII, Central Visayas
Division of Lapu-Lapu City
District 5
MARIGONDON NATIONAL HIGH SCHOOL
Marigondon, Lapu-Lapu City
Tel: 236-1396

Innovation Expo

Dirt-E Battery

Carl Kho

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TOC

A) Introduction

A1) Features and Specifications

Producing electricity now involves patches of sifted soil lined in an egg-tray like container, with a series of Galvanized Bolts and nuts carrying a solid copper wire going through the patches of dirt. Like our body, dirt has ions and minerals in it, electrolytes to be specific. Which is capable of conducting and producing a little electricity. It is then watered to make it flowing, but not too much. Creating Dirt-E energy. With each patch being capable of producing as much as 1.2 volts.

A2) Market Trends and Opportunities

Renewable energy is adored and needed by many. The rich want it, the poor need it. People worldwide suffer from inaccessible, limited electricity. A problem for the common farmers and like especially in the Philippines. Chemical wastes like our traditional batteries aren't properly disposed. Our familiar renewable sources of energy can cost, prohibiting us from going green. We live our lives with electricity playing a vital role. We depend on it.

Seeing the SALt lamp (Sustainable Alternative Lighting) by Aisa Mijeno, a Pinay innovator and how solar panels impacted the world, we can be on par with it or perform even better. Projects like these can highly encourage recycling and creative thinking especially in remote areas. Go eco-friendly. The mentioned products aren't very accessible or reproducible though. Dirt-E on the other hand is flexible - it provides electricity and is modifiable. It uses dirt, something found all around us, and is sustainable with mere water, which is also easy to obtain. With it, we can live in a world powered by renewable and sustainable energy. A long dream of the people. No bills, electricity for all!

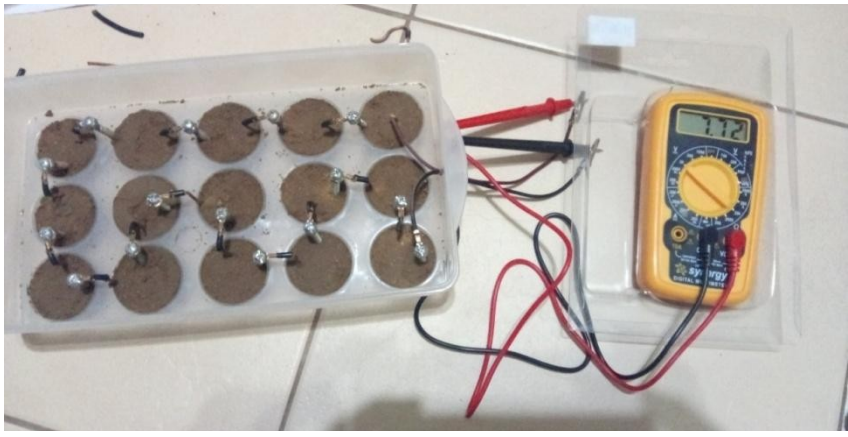
B) Materials and Methods

Obtaining soil is an easy task - soil is everywhere. The researcher sifted the soil, garden soil at home, simply by using a wire mesh he found at home. After sifting, the researcher then went on and distributed the different type of soil into a recycled egg tray, 30g in each egg hole or patch. Using a syringe, the researcher filled each patch with 2 mL of regular tap water, this part is vital as water is responsible for turning the dirt patches into an electrolyte solution, or to allow the flow of electricity. Without water, dirt alone can only conduct so much (approximately 15% only compared to watered patches). Being careful so as not to short or keep 2 separate dirt patches in contact with either dirt or water. The researcher then compressed each watered patch, preparing it for the two metals, Copper and Zinc, to start reacting.

Why Zinc and Copper? Because zinc tends to lose electrons more easily than copper. Dirt-E's setup was made by using a galvanized bolt and nut and a solid copper wire. Since galvanizing something means coating a metal with zinc. It's a win-win for this case. Galvanized materials are less likely to corrode, where corrosion is bad for electric conductivity. Plant it in the ion-rich dirt. An electrical

flow is then witnessed. Its power output is then increased by adding and connecting more patches into it. Take note that there are 3 ways to increase its voltage: a larger patch of soil, more patches of soil, and a more "compatible" liquid to use in a *series* connection. For increased amperage, use a parallel connection.

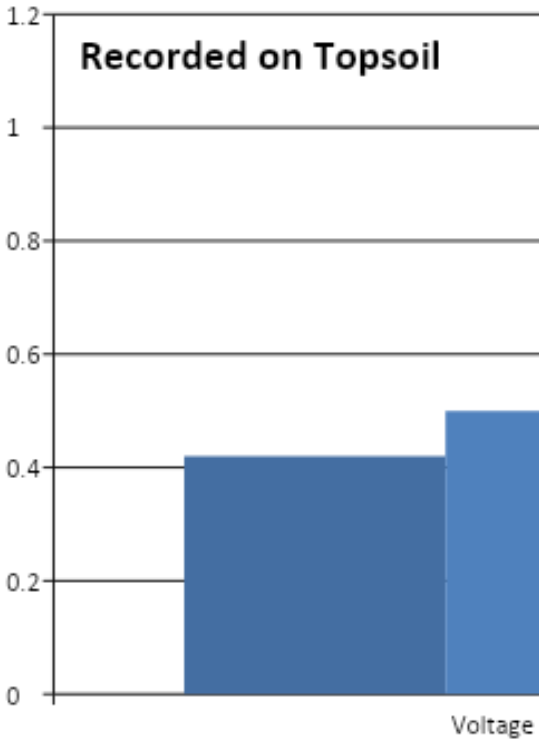
Dirt-E's positive electrode (+) is the copper, whilst the Zinc is the negative (-) one. Connect its terminals to a load and Dirt-E can then be applied as long as it's compatible like a lamp or alarm clock. It can even charge your phone with proper modifications. It can supply DC electricity to any low-power consumer electronic devices.



C) Results and Discussion

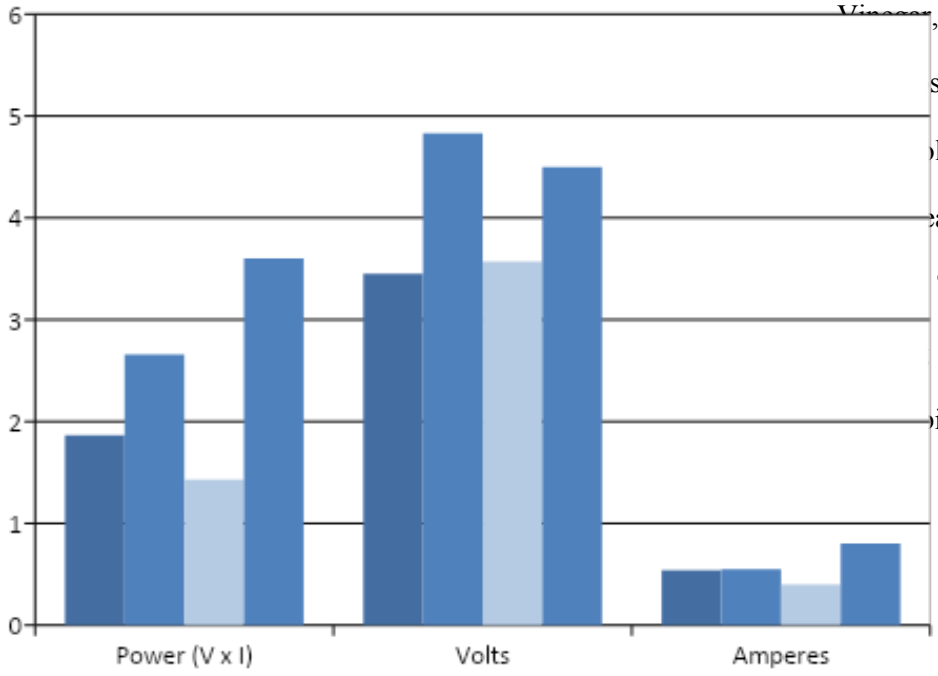
Using vinegar as it provided the highest power output, the researcher added it to different types of soil in dirt patches. Curious to discover which amongst the soil would give the highest power output.

Fine sand distinguished itself as the best type of soil to be used in Dirt-E battery. However, they are all small differences. The researcher still considers the closest one to you the best type.



Dirt-E requires water for it to be an

4 Patches



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Moisture loss in the soil is inevitable. Hence, Dirt-E requires regular "watering" of individual patches. With Dirt-E sealed indoors to prevent moisture from escaping in a room temperature of 20.7°C, the researcher observed how long it would take for its expected power output drop. Surprisingly, a it lasted well over a week before going really downhill.

A 9% decrease in voltage was observed (observed in Topsoil). Although this is still efficient and usable, going beyond 1 week without watering Dirt-E will produce drastically reduced power. Just add 1 mL of water weekly to keep its power output consistent.

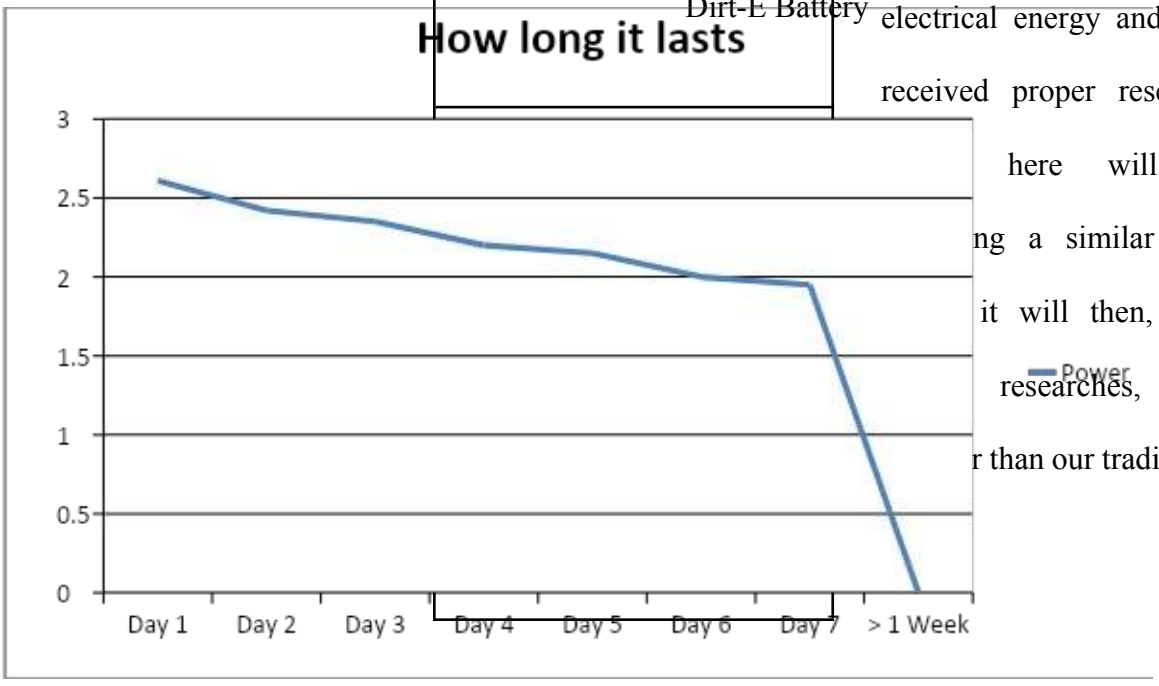
researching can utilize and efficientize Dirt-E battery
Inaccurate measurement of weekly watering risks overwatering

Dirt-E Battery

compared to Solar Panels, a familiar and similar, yet **developed** source of renewable source of energy.

The first solar cells were only capable of converting 1 – 2% of light to working electrical energy and then received proper research. here will be ng a similar path it will then, after researches, shine r than our traditional

Dirt-E Battery



sources of renewable energy.

If given more time, the researcher would try to make large patch, a Dirt-E collection of dirt patches, sort of like a solar farm except it is applied in real farms. To use it to its maximum potential and try to compete with a solar panel. The researcher would improve Dirt-E as much as I can. What kind of two metals work the best? Avoid rust. What kind of soil and liquid is the best? Even go as far as automating the watering process.

To go even greener, the researcher would like to try working with plants, doubling the eco-friendliness of this project. Make it smaller, simpler and more efficient. Incorporate it into our daily lives. With further research and growing technology's help, Dirt-E may even attempt to power our houses. The future will be cleaner, safer, and happier.

Night Before (immediate)

Tap water

2.4V

.02mA

Salt Water

2.35V

0.11mA

Vinegar

3.1V

0.14mA

Fine Sand (unstable)

2.9V

0.6A

Limestone

4.4V

0.22 mA

Loam

4.7V 3.86

0.5mA

Tomorrow 9-20

Tap water

2.5V

0.04mA

Salt Water

2.6V

0.14mA

Vinegar

3V

0.08 mA

Fine Sand

4.5V

0.58mA

Limestone

3.7V

.18 mA

Loam

4V

0.4A

Before Event

Tap water

2.20 V

.04mA

Salt Water

2.21V

0.11mA

Vinegar

3.45 V

0.54mA

Fine Sand (unstable)

4.5V

0.76 mA

Limestone

3.57V

0.4 mA

Loam

4.83V 3.86

0.55m

D) Conclusion

With Dirt-E energy, our traditional farms, jungles, rainforests may become one of our largest sources of electricity. Clean and green electricity. Slowly cleaning our planet Earth from its impurities, from the threat of global warming and the damage from the deathly disease of climate change. A new source of energy can spark collaborations from innovative companies, innovating Dirt-E further. Compact Dirt-E batteries to replace our traditional, harmful, chemical ones.

The next generation won't have to suffer anymore, we can change our ways, not just with Dirt-E but also with our lifestyle. More jobs can be supplied with the production of Dirt-E being implemented. Dirt-E helps us take a step towards a greener and especially cheaper future. The statement is redundant, but it is true. Greener innovations can also be made by future researchers powered by Dirt-E. A total win-win for Dirt-E.

E) Acknowledgement

I would like to express my gratitude to my father Ben Rommel Kho for guiding me in every path of this project. As well as my school, Marigondon National High School for continuously feeding me opportunities. To our Almighty God for breathing life into me and my research, I give him my eternal thanks. Doing a lot of Research, I came to know about so many new things. I am really thankful to them. The wisdom and knowledge gained is going to be treasured.

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E) Appendixes

Pics Budget (no dirt)