SASTA OLIPHANT SCIENCE AWARDS

SOUTH AUSTRALIAN SCIENCE TEACHERS ASSOCIATION

Prize Winner

Science Writing

Year 5-6

Chengyuan Yu

Linden Park Primary School

Waste not want not:

Reduce, reuse, recycle and recover to save the human habitat

Chengyuan Yu

Year 5, Linden Park Primary School

Every Friday morning when my 4-year-old little brother hears the sound of a garbage truck, he jumps out of his little bed and looks outside for the garbage truck. If he could, I bet he would want to watch garbage trucks the whole day. I was exactly like him 6 years ago. Ever since I was little, I always wondered how the garbage trucks worked and where the garbage went.

One day last year, when I saw a garbage truck picking up our bins, a question suddenly came to my mind. I asked my dad how much he paid to get the bins emptied. He said he did not know as he paid the collection fee with the other council fees. Then I asked if that meant it didn't matter whether the bin was full or not, people still paid the same price. He said yes. I thought it was unfair not to consider the weight. Generally speaking, the heavier the waste bin is, the more waste goes to landfill. This is environmentally destructive. People just create garbage without thinking twice as the fee is fixed in the council rates.[1] Normally, people get charged by the amount of usage of water ($1.966/kL)[2], electricity (41c/kWh)[3] and natural gas (4.056c/MJ)[4]. Therefore, I think that people need to get charged by the WEIGHT of their garbage. It will urge them to produce less garbage as they want to reduce cost. This also motivates people to put compost in their gardens or in the compost bins.

According to the United Nations Environment Programme, every year the whole world generates more than 2 billion tonnes of garbage. By 2050, we would have more than 10 billion people and we would produce about 3.4 billion tonnes of garbage each year (please see Figure 1). When garbage decomposes, it produces methane, which is a greenhouse gas that is 28 times MORE POTENT than carbon dioxide and is a major accelerator for climate change. Open garbage burning causes the release of black carbon that penetrates deep into the lungs and bloodstreams with critical health impacts. About 7 million people die every year from exposure to it.[5] People need to reduce,

[1] Please see Reference (3).
[2] The residential water price was sourced from SA Water https://www.sawater.com.au/my-account/water-and-sewerage-prices/water-prices/residential-water-prices, accessed on 13 June 2022.
[3] The electricity price was sourced from Canstar Blue https://www.canstarblue.com.au/electricity/south-australia-electricity-tariffs/, accessed on 13 June 2022.
[4] The gasoline price was sourced from WATTever https://wattever.com.au/cheapest-gas-rates-adelaide-sa/, accessed on 13 June 2022
[5] Please see Reference (1).

reuse, recycle and recover to save the human habitat. Otherwise, humans will go extinct because of habitat and health problems.

Figure 1. Massive Wave of GARBAGE - World's largest garbage dumps[6]

To help solve this problem, I built a prototype of a bin-lifting arm using a Lego Mindstorm EV3 that was capable of weighing the bin at collection and charging the relevant house owner by the weight of the garbage. This is the link to my video demonstrating how the bin-lifting-and-weighing arm works: https://www.youtube.com/watch?v=GMW85uvoS48. Figure 2 below displays my finished product:

Figure 2. My bin-lifting-and-weighing arm

[6] Please see Reference (2).

To implement my idea of weight-based garbage collection, the Federal Government needs to include it in the Climate Change Action Plan.[7] Then, they should modify the garbage truck arm to be able to weigh the bins and charge the house owners using a unique household barcode.

To charge a fee alone is not enough. People must be educated on how excessive garbage affects the human habitat and how to reduce garbage, reuse and recycle items and recover resources. There are numerous ways to reduce waste. For example, we can use reusable bags and containers instead of disposable ones. We can wear second-hand clothing. There are many ways to recycle.[8] For instance, we could turn old clothes into rags for household cleaning. Regarding recovering resources, by putting compostable items into compost bins or soil, they will become fertilizer that helps improve the soil condition (Evans 2021).

In summary, humans need to minimise the garbage by reducing consumption, reusing and recycling items as much as we can so we can recover resources. If the waste disposal were not managed properly, in the future we would have a dirtier habitat, less wild animals, less food and many more diseases. It will also DESTROY our human habitat. Excessive greenhouse gasses will accelerate climate change and destroy ecosystems. Arable land will be turned into badlands causing crop failures and starvation (Evans 2021). Poor living conditions make people vulnerable against deadly viruses.[9] Pandemics like COVID-19 will happen very regularly which can cause human extinction. Therefore, I strongly believe that people MUST be charged fairly for the garbage they produce so they will be motivated to reduce, reuse, recycle and recover to minimise the amount of waste they produce. For this to happen, the government must adopt my idea of weighing garbage at collection.

When this happens, I will be very happy to see my little brother watching a garbage truck collect the waste and charge a fee based on the weight. I will be even happier to see a cleaner environment in the future.

Word Count: 790

References

(1) *Waste not: the heavy toll of our trash* 2020, https://www.unep.org/news-and-stories/story/waste-not-heavy-toll-our-trash, viewed on 15 April 2022.
(2) *Massive Wave of GARBAGE - World's largest garbage dumps,* https://www.youtube.com/watch?v=TJ9I3d0JX5c, viewed on 18 April 2022,
(3) *Moreland city council*, https://www.moreland.vic.gov.au/living-in-moreland/rates/understand-your-rates/, viewed on 18 April 2022.

[7] Please see Reference (4) & (5).
[8] Please see Reference (6).
[9] Please see Reference (8).

(4) *Australia's climate change strategies*, https://www.industry.gov.au/policies-and-initiatives/australias-climate-change-strategies, viewed on 18 April 2022.
(5) Department of Foreign Affairs and Trade of the Australian Government, *Climate change action strategy: tackling climate change through Australia's development assistance program* 2020–2025, https://www.dfat.gov.au/sites/default/files/climate-change-action-strategy.pdf, viewed on 18 April 2022.
(6) *Recycling Solutions Australia*, https://recyclingsolutionsaustralia.com.au/, viewed on 18 April 2022.
(7) Evans, M. (2021). Soil: The incredible story of what keeps the earth, and us, healthy. Australia: Allen & Unwin.
(8) World Health Organisation, https://www.euro.who.int/en/health-topics/environment-and-health/Climate-change/data-and-statistics, viewed on 22 May 2022.