

Finding a Solution For Recycling Wastes

Karim Amer (COE) | Hassan Hamdan (ELE) | Younis Charkaoui (MCE)

Introduction

Over the past few years, there has been a remarkable growth in trash disposal all over the UAE, especially in Dubai, due to its huge demographic growth. Most of this trash is being disposed in large landfills in huge quantities, which represents a lost opportunity for recycling. On the other hand, there have been many technological advancements in every field, except the traditional recycle bin, which has seen minimal to no major improvement for decades now. This means that we are running out of means to efficiently dispose our ever growing waste . [1]

Problems

- The UAE infamously has one of the highest per capita waste generation rates in the world [2]
- The Centre of Waste Management in Abu Dhabi estimates that the UAE economy loses AED 1.5 billion a year due to landfilling waste which can be otherwise recycled into useful products [2]
- There is a need for a fast and dynamic trash disposing method
- Dubai requires an improved and advanced type of recycle bin in order to be able to manage large amounts of recyclables
- For the excessive amount of trash being disposed, current recycle bins are not efficient
- Due to the capacity of the trash bin, when it exceeds the limit rubbish is placed all around the bin which causes a bad odor
- The effect of increase in population that EXPO 2020 will expose

Table 1 : The estimated population and the amount of solid wastes collected [3]

Retrieved from : www.dubaifaqs.com

Year	Population (million)	Waste Collected (billion KG)
1995	1.8	13
2000	3.2	23
2005	4.1	30
2010	8.2	60
2015	10.5	76
2020	20	145

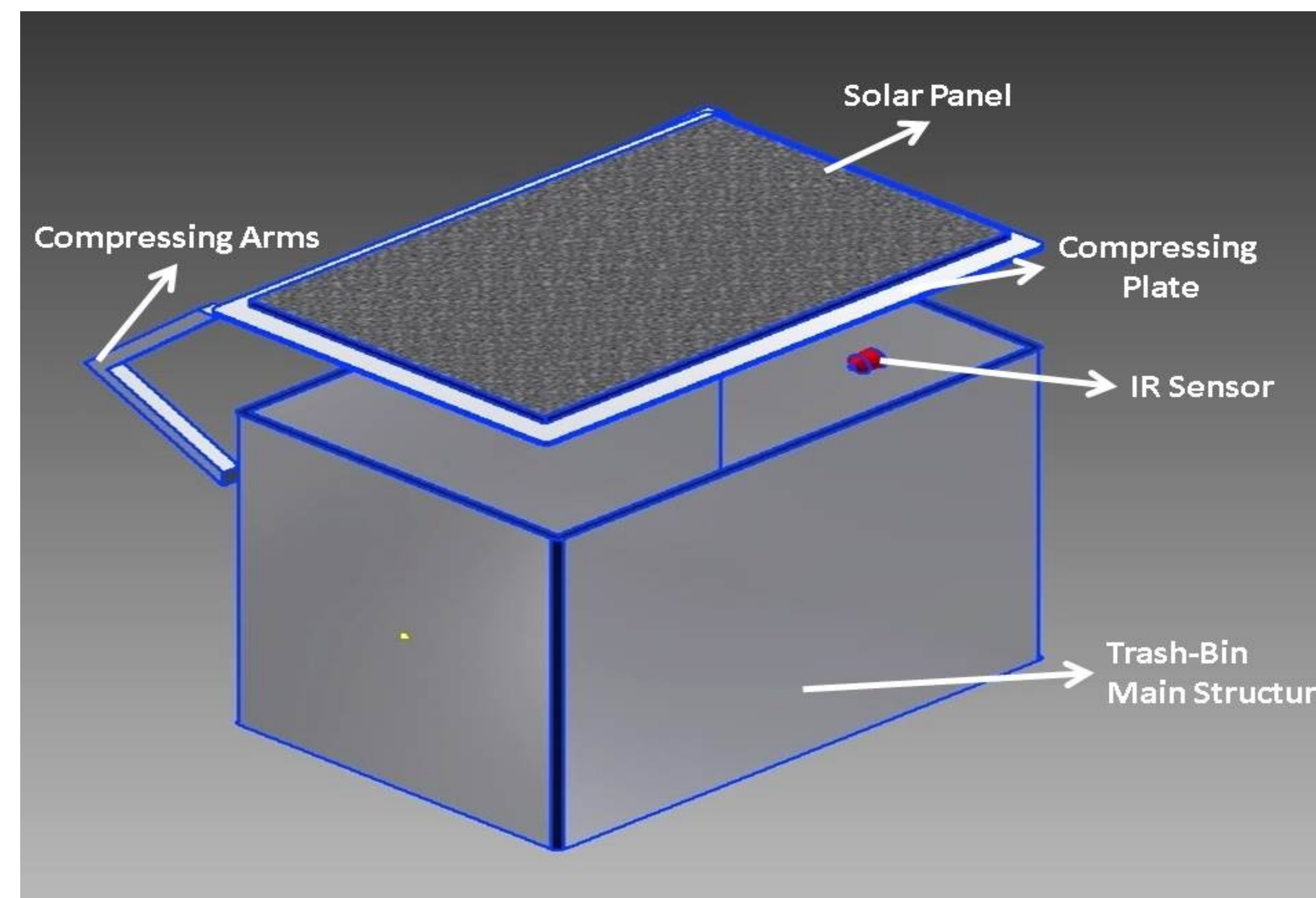


Fig .1 : The trash can designed on AutoDisk

Solutions

- The smart recycle bin will help Dubai and other cities in the UAE to provide a cleaner and healthier environment
- This recycle bin is characterized by a new technology allowing it to operate on its own using compressor arms, infra-red sensors to detect the level of the trash in the bin that can send a signal to municipality trucks when the bin is full for a pick up
- The smart recycle bin work on a solar energy panel in order to save energy and eliminate the need for an electric plug
- The use of the smart recycle bin will cost \$202 Dollars but will save money by reducing the number of trucks

Table 2 : The estimated price of the Smart Recycle Bin per one unit

Item (unit)	Price (Dollars)
IR Sensor	13
Compressing Plate	20
Compressing Arm	24
Solar Panel	100
Micro-Chip	45
Total	202

Evaluation

- The solar panel might be problematic because the bin is usually placed in a dark area
- The material selection for both the arms and the compressing plate was chosen to be aluminum because of its strength per weight unit
- The expected price of the smart recycle bin will be significantly small in comparison to the benefit it will bring to the community, due to the expected increase in population of Dubai the waste production will increase and the smart recycle bin would be a major solution.[4]

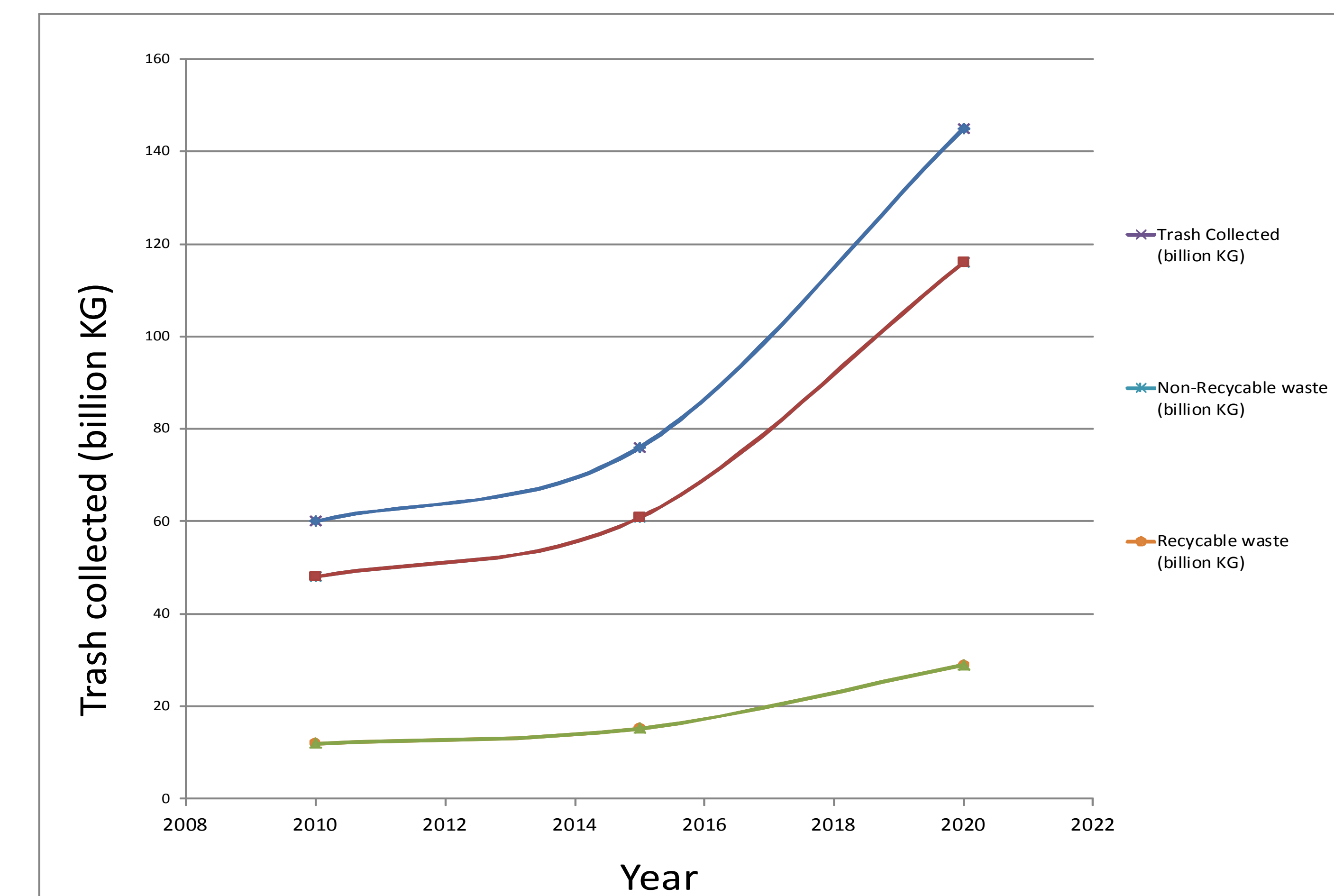


Fig .2 : The amount of recyclable waste from the trash total trash collected

References

- [1] Rehan Ahmed, "Earth day 2014-Focus on green cities," *EcoMENA*, Ecomena.org, April 22, 2014. [Online]. Available: <http://www.ecomena.org/tag/waste/>. [Accessed: April 23, 2014].
- [2] Wissam Yassine, "Waste and Recycling in the UAE," *bgreen*, bgreen.ae, February 05, 2012. [Online]. Available: <http://www.bgreen.ae/analysis/1524/waste-and-recycling-in-the-uae/>. [Accessed: April 21, 2014].
- [3] Abu Dhabi AUH ABD ADB, Ajman AJM, Al Ain AAN, Dubai DXB, Fujairah FUJ, Ras Al Khaimah RAK, Sharjah SHJ, Umm Al Quwain UAQ information guide, "Total population of the United Arab Emirates," *Total population of the UAE*, dubaifaqs.com, March 23, 2014. [Online]. Available: <http://www.dubaifaqs.com/population-of-uae.php>. [Accessed: April 21, 2014].
- [4] Simone Aspinall. "Environmental development and protection in the UAE," *United Arab Emirates A new perspective*, N/A,279-304, N/A. [Online]. Available: http://www.uaainteract.com/uaeint_misc/pdf/perspectives/14.pdf. [Accessed: April 21, 2014].