

**Waste**

**Solution Card No. 1: Create an organic waste recycling onsite to produce compost**

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| **Solution Card No. 1: Create an organic waste recycling onsite to produce compost.** | |
| **Overview** | |
| *Objective* | Implement significant reduction in waste management costs and reduce carbon footprint by adopting on-site composting practices. |
| *Action* | Install small-medium scale bins/composters |
| *Key Challenges* | * Long Composting Duration * Low Nutrient and Agronomic Value * Detection of Pathogenic Microbes in Composts * High fixed and operating costs for In-vessel systems; and * Finding a market to the produced compost (This is applicable if the product is not consumed within the site). |
| **Assumptions** | |
| *Compost Production* | Producing 1 ton of compost requires 2-3 tons of organic wastes |
| *Saving Disposal Costs* | According to EU:  - In average, the general costs of incineration and landfilling of residual waste in EU are:  - Incineration of residual waste: 64€/ton  - Landfilling residual waste: 56€/ton  ***If the hotel produced 10 tons of organic wastes, their incineration will cost 640 € and if they applied composting technology, the product value will be about 1056 €*** |
| **Constraints** | |
| *Compost Area* | 150-300 m2 |
| **Proposed Solution** | |
| *Total Area Required* | 150-300 m2 |
| Annual cost Savings | 88450 ***€*** (If annual organic waste is 2000 ton – Hotel with 84 beds and 150 meals served per day) |
| **Economic Features** | |
| *CAPEX* | 530,000[[1]](#footnote-1) USD (5 ton organic waste/day)[[2]](#footnote-2) |
| *OPEX[[3]](#footnote-3)* | 15,000 kWh/month x 0.078[[4]](#footnote-4) USD = 1170 USD/month |
| *Expected Savings* | 104,270 USD/year (If annual organic waste is 2000 ton – Hotel with 84 beds and 150 meals served per day) |
| *Simple Payback Period* | 5 years |
| *Lifetime* | 5-10 years |
| *Net Savings Over Lifetime* | 521,350 – 1,042,700 USD |
| *Annual CO2 Reduction[[5]](#footnote-5)* | 1360 ton CO2 equivalent[[6]](#footnote-6) (for annual 2000 ton of organic waste) |
| **Notes** | |
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The transportation phase is not included in this estimation as it varies due to the location of the facility

This estimation is based on Cabaraban, M. T. I., Khire, M. V., & Alocilja, E. C. (2008). Aerobic in-vessel composting versus bioreactor landfilling using life cycle inventory models. *Clean Technologies and Environmental Policy*, *10*(1), 39-52.

1. This is the cost of the composting equipment only. No site preparation and infrastructure costs are included [↑](#footnote-ref-1)
2. This is a rough cost estimation based on Rasanu, S. University of Toronto, Sustainability Office (2008).On-site in-vessel composting at the University of Toronto George campus: A financial analysis. [↑](#footnote-ref-2)
3. The cost does not include maintenance and labor costs [↑](#footnote-ref-3)
4. The cost of Kwh from the Egyptian public network in 2020. This cost can be changed according to the Egyptian tariff change. This cost is not applicable if the facility generates the electricity. [↑](#footnote-ref-4)
5. The transportation phase is not included in this estimation as it varies due to the location of the facility [↑](#footnote-ref-5)
6. This estimation is based on Cabaraban, M. T. I., Khire, M. V., & Alocilja, E. C. (2008). Aerobic in-vessel composting versus bioreactor landfilling using life cycle inventory models. *Clean Technologies and Environmental Policy*, *10*(1), 39-52. [↑](#footnote-ref-6)