

# Bandung, Indonesia

GHG reduction potential in Road-to-ZW scenario: 50%

## Key statistics (2017)

- Population: 2,500,965
- Total municipal solid waste generation: 638,997 tonnes/year
- Per capita waste generation: 0.70kg/day
- Recycling rate: 6.64%



@Rahadiansyah

Bandung is the capital of West Java Province with a population of 2.5 million which is expected to reach 2.6 million by 2030. During daytime, Bandung receives an additional 1.2 million people from the surrounding regencies/cities. According to YPBB Bandung's estimation, the waste generation rate in 2020 has reached 0.70 kg/capita/day and is projected to reach 0.78 kg/capita/day by 2030. Nearly half the waste stream is organic waste (44.51%) and plastic comes in the second (17%). There is only little recycling currently happening in Bandung – only about 6% of the waste is collected for recycling, primarily dominated by paper and cardboard (29,021.6 tonnes/year), followed by plastic (9,270.5 tonnes/year) then organic waste (4,111.1 tonnes/year). There are no official data that record the amount of waste informal sectors collected for recycling. The rest is sent to the landfill with no gas collection.

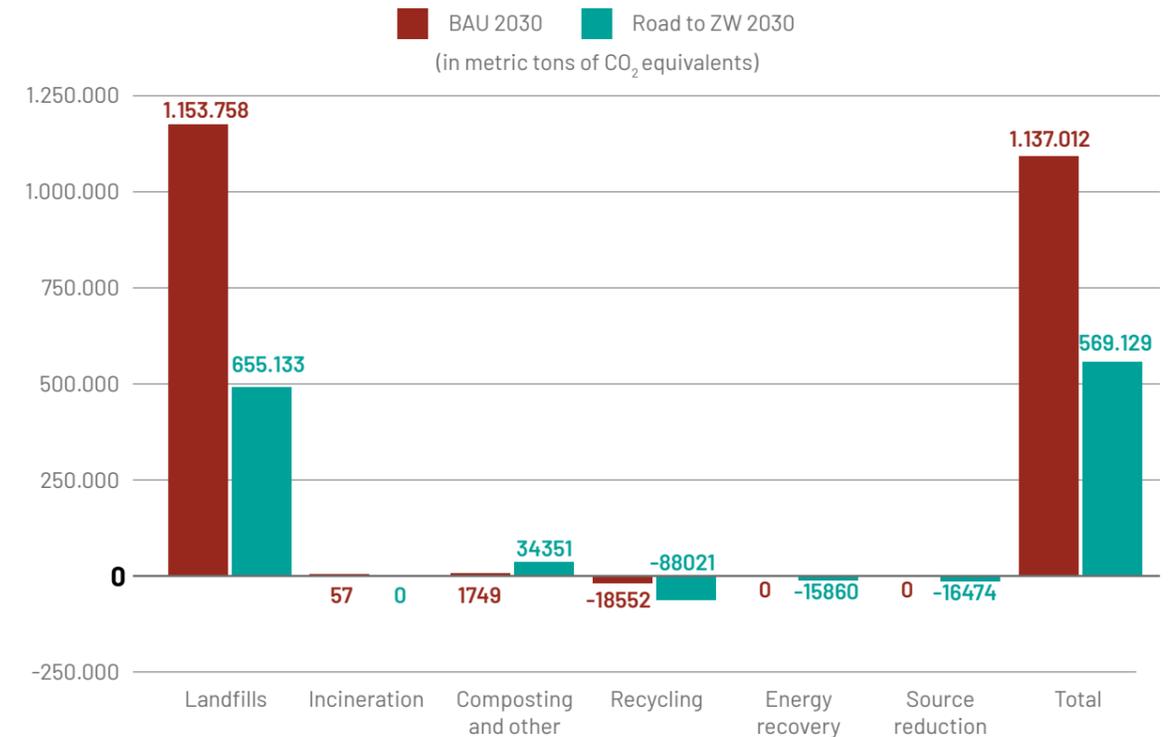
Along with waste generated by the neighbouring regencies/cities, Bandung disposes of its waste in the Sarimukti Landfill. Historically, Sarimukti Landfill started its operations after Leuwigajah Landfill (the previous regional landfill) collapsed in 2005 – resulted in the deaths of hundreds of people and caused Bandung to be filled with waste. After operating for 15 years, Sarimukti Landfill has reached its maximum capacity and caused several occasion when the waste hau-

ling process to this landfill got disturbed. Given the situation, the government plan to move the regional landfill to a new location in Legok Nangka and instal waste-to-energy incineration technology. However, due to the high tipping fee that burdens the city, Bandung government has realized that the best way is reducing the waste transported to the landfill with various approaches through an existing Zero Waste Cities program (in local language: Kang Pisman).

Since its inception in 2017, Zero Waste Cities in Bandung has reached almost 12,000 households and 60,000 people in Bandung, and has been adopted as Kang Pisman program by Bandung City Government. The compost produced from organic waste processing in the area has also encouraged the development of urban farming and community gardens.

## Bandung in 2030 – Business as Usual vs. Road to Zero Waste

The below chart shows estimates for annual GHG emissions associated with waste management in 2030 in two scenarios: 1) Business as Usual (BAU) and 2) Road to Zero Waste based on consultations with local groups including Yaksa Pelestari Bumi Berkelanjutan (YPBB). Assumptions that informed each scenario are detailed in the table below.



Treatment	BAU 2030	Road-to-ZW 2030
Landfill	692,774 tonnes of municipal solid waste landfilled	Only textiles, rubber and leather, diapers and hygienic products, and other waste are landfilled (403,271 tonnes/year, 42% in municipal solid waste landfilled)
Incineration	Minimal (open burning and some small-scale incinerators)	No burning of waste in waste-to-energy incinerator facilities and cement kilns
Composting & other treatments	Limited access to composting	105,721 tonnes (18.04% of total waste) composted – both food and garden waste
Recycling	Minimal recycling through waste bank initiatives and informal sector activities	Divert 16% of total waste by recycling (paper & cardboard, glass, and metal)
Energy recovery	Mixed waste and residual is converted into Refuse-derived Fuel (RDF) and sent to cement kilns. Minimal biodigestion	54% of food waste (93,377 tonnes) is treated with anaerobic digester
Source reduction	Limited source reduction program, only single-use plastic bag ban in retailer	Reduce 30% of total waste at source (44% through food waste prevention and 100% of plastic through SUP bans and reuse/refill)
Overall diversion rate	7%	42%

**Estimated GHG reduction from Road-to-ZW scenario: 50%**

## Key takeaways

- 1** The major source of GHG emissions in Bandung is methane emissions from landfilled organic waste.
- 2** If the current status continues, annual emissions from landfills in Bandung will amount to 1,153,758 tonnes CO<sub>2</sub>e by 2030.
- 3** In the Road to Zero Waste scenario, Bandung would achieve an increase in overall diversion rate from 7% to 42%, avoiding annual GHG emissions by 498,625 tonnes CO<sub>2</sub>e in 2030. This is equivalent to over 5% of Indonesia's NDC unconditional target.
- 4** The Road to Zero Waste scenario includes diverting 81% of waste from being landfilled and incinerated by 2030. More than half of that diversion percentage comes from food waste prevention and organic waste treatment program (49%). An aggressive single-use plastic ban program coupled with reuse/refill program would also result in 17% diversion rate. The rest comes from glass, metal, paper and cardboard recycling.
- 5** This approach would reduce annual residual waste by 42%, landfill methane emissions by 43%, and overall GHG emissions by 50%, compared to the BAU 2030 scenario.

## Recommendations

Both local and central government should **ensure 100% separated waste collection, maximize waste treatment, and focus on waste prevention** with a focus on **food loss prevention, single-use plastic ban, and refill/reuse systems**. As for waste treatment, 100% organic waste should be treated through decentralized composting and anaerobic digestion. Lastly, separated waste collection will maximize recycling for paper and cardboard, glass, and metal.

**This can be done through national policy reforms by the central government which can be achieved in a relatively short time with the right political will to issue these required enabling policies:**

- Create sufficient institutional capacity through the inclusion of environment sector as part of the government's basic service. It will enable local governments to allocate sufficient budget and execute low-tech and labour intensive waste prevention and reduction programs.
- Strengthen local government capacity through distribution of roles and responsibilities.
- Currently, the role of financing and operating waste management service is put solely on the local government, specifically the Environment Agencies. Once these roles are spread among institutions at various levels, the local government's burden on waste management will decrease.
- Allow local governments to expand law enforcement capacity for faster implementation of the single-use plastic ban as part of achieving a national target
- Stop ongoing and planned thermal waste treatment projects (i.e. waste-to-energy incineration, RDF burning in cement kilns, coal-fired power plants, or other industrial plants). These projects will lock cities in carbon-intensive waste infrastructure and undermine waste prevention and separation collection, wasting limited public funds on stranded assets.



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Written by: Yobel Novian Putra. This case study was prepared as part of the report, "Zero Waste to Zero Emissions: How Reducing Waste Is a Climate Gamechanger (GAIA, 2022)." Please visit [www.no-burn.org/zerowaste-zero-emissions](http://www.no-burn.org/zerowaste-zero-emissions) to access the full report and detailed notes on data and methods.