

Task Force 02

SUSTAINABLE CLIMATE ACTION AND INCLUSIVE JUST ENERGY TRANSITIONS

Unlocking the Potential for Scaling up Financing of Methane Mitigation from Solid Waste

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Abstract

Despite growing appreciation that methane contributed more than 0.5 degrees C to (net) global temperature increase of 1.1 degrees C in 2019 (IPCC 2021), and that reducing methane emissions can constrain global temperature rise, funds committed to abating methane are small relative to those spent abating carbon dioxide (CO₂).

Methane emissions from waste will increase in the absence of urgent action as waste generation increases. The challenge related to municipal-type wastes is not just one of infrastructure and capital investment. The United Nations Environment Programme (UNEP) estimates that around 2.7 billion people on the planet still lack any formal waste collection (UNEP 2024). Incentivising methane abatement and enhancing waste management are vital tasks, and both waste collection, and its management, have to improve.

We recommend that the G20:

- Defines ways of using market mechanisms to valorise, incentivise and fund methane abatement from waste, supporting a resetting of finance in line with TF-CLIMA's priorities;
- Consistent with the G20 Sustainable Finance Working Group's priorities, ensures that International Environmental and Climate Funds (IECFs) are designed to support 'high in the waste hierarchy' approaches. This will require improvement in collection services, helping to support livelihoods in line with the Presidency's proposed Global Alliance Against Hunger and Poverty, as well as capacity building in many countries.

Together, these changes can contribute significant methane abatement from municipal, and other sources of waste, such as agriculture, and food processing in a manner consistent with a just transition.

Keywords: Waste; Methane; Climate; Finance; Livelihoods

Diagnosis

The Intergovernmental Panel on Climate Change (IPCC)’s Sixth Assessment Report (IPCC 2021) estimated that methane emissions are responsible for half the net contribution to radiative forcing, and temperature increase, since pre-industrial times (see Figure 1). Heightened attention is being focused on methane emissions since the relatively short time-period over which methane affects global temperatures means that cutting the rate of emissions can lower its contribution to temperature increase within decades.

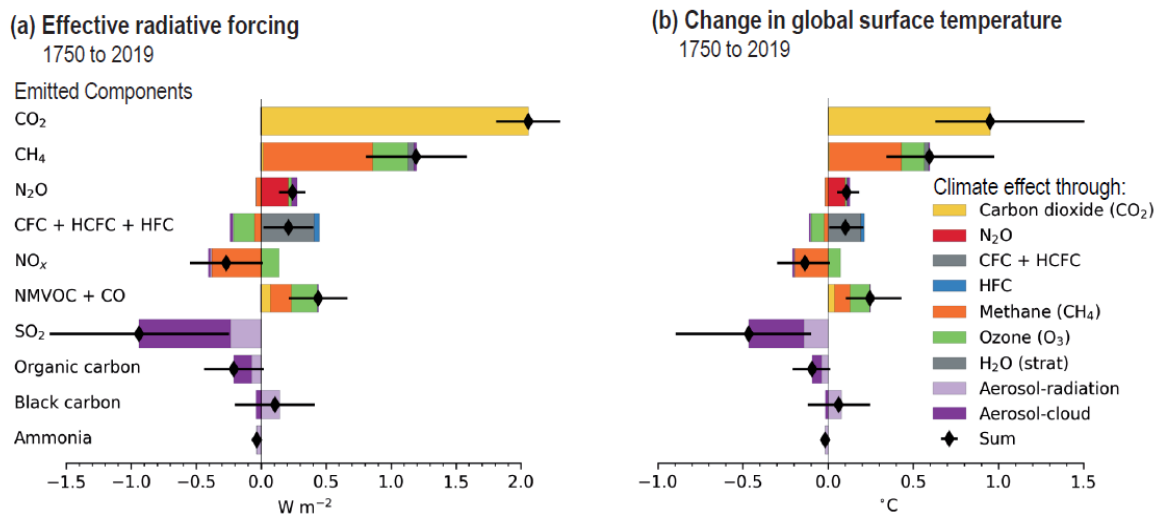


FIGURE 1: Contributions Made to Radiative Forcing and Temperature by Different Gases. Source: IPCC 2021

Recognising this opportunity, UNEP noted: “Urgent steps must be taken to reduce methane emissions this decade. Given the wide range of impacts from methane, the social, economic, and environmental benefits of acting are numerous and far outweigh the costs” (UNEP 2021). Anthropogenic methane emissions are linked to three main sources:

agriculture (40%); fossil fuels (35%); and waste (20%). Finance for methane abatement is increasing, though it remains inadequate, and sometimes inappropriate, to address the challenge.

Most estimates of the adequacy of financing focus on the requirement for capital, but for municipal waste, this might not be the main constraint on methane abatement. One assessment of waste-related methane finance indicates that financing is heavily weighted towards more capital intense solutions towards the base of the waste hierarchy, such as incineration (see Figure 2).

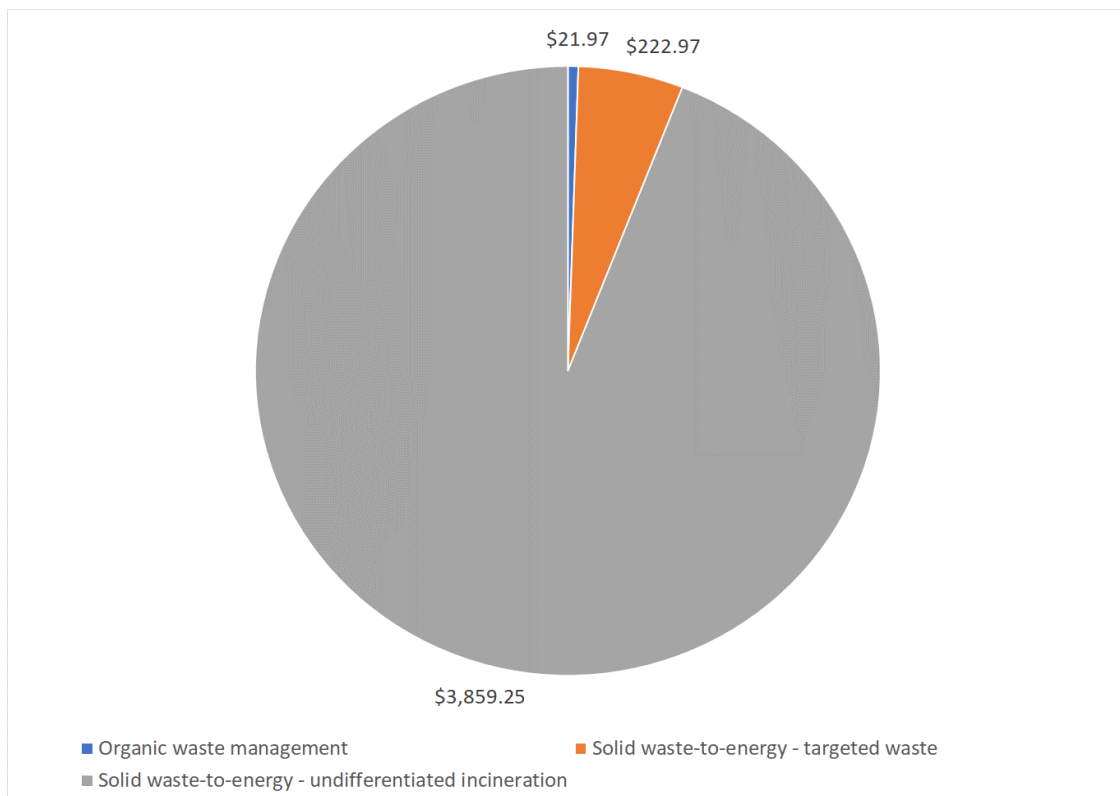


FIGURE 2: Methane Finance for Solid Waste Measures (US\$ millions). Source: Climate Policy Initiative 2023

The flow of finance to solutions higher in the waste hierarchy is paltry by comparison. Globally, most municipal waste comprises a relatively wet organic fraction (Figure 3): segregating such waste for treatment can prevent landfill methane, enable better use of organic wastes, and contribute to a more just transition.

Financial support is urgently needed to help countries ‘leap-frog’ to improved management of waste. Our concern is to enable adequate solutions for the abatement of methane from three main sources:¹

1. Municipal waste;
2. Waste from food processing operations; and
3. Residues from agricultural production.

¹ We do not consider here biogas facilities whose feedstock may be, for example, silage maize grown specifically as feedstock – we note, however, that in the context of managed crop rotations, some crop biomass could be used in facilities established principally for other reasons.

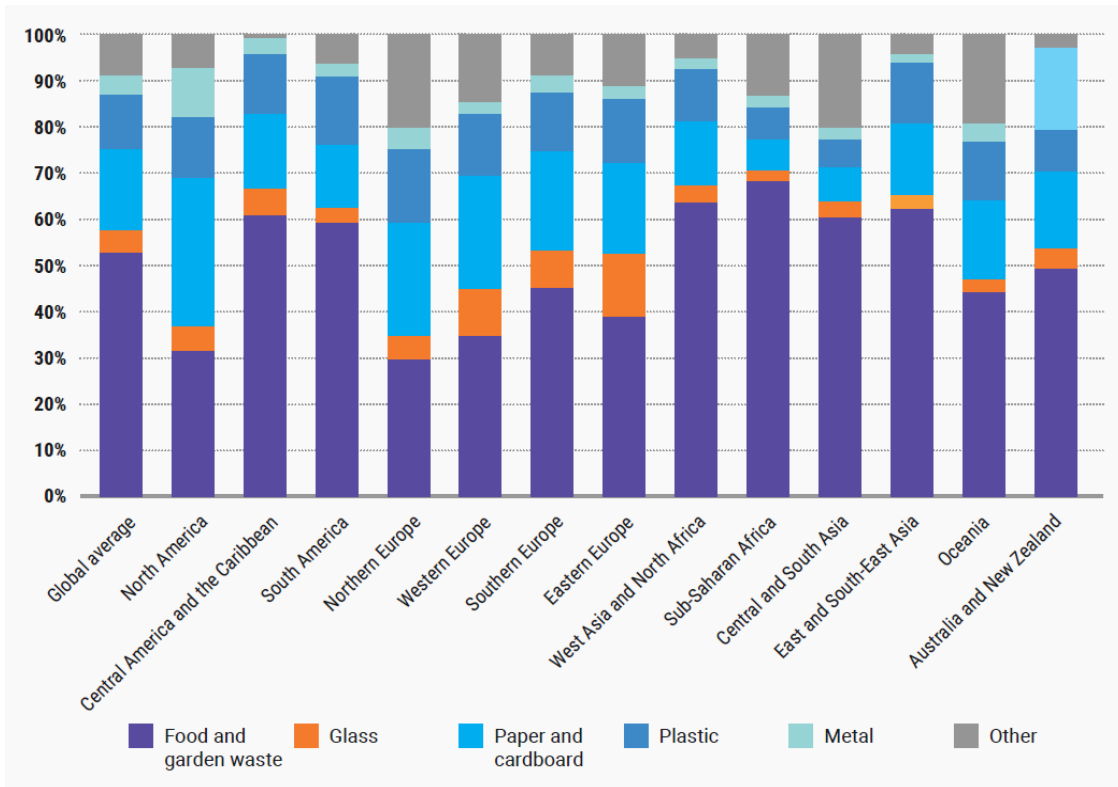


FIGURE 3: Municipal Waste Composition. Source: UNEP 2024

Reasons why these wastes may be landfilled, or dumped, or otherwise managed in ways that likely cause greenhouse gas emissions, are different. The paths to addressing the associated emissions are correspondingly varied.

There is broad agreement that the potential scale of abatement potential in relation to waste is large. Understanding of the range of possible measures is, though, relatively poor and there is less transparency around the necessary costs. As regards municipal waste, collection systems – which offer potential for employment creation - play a critical role that is too often overlooked. A better understanding of ‘what needs to happen’, and what the associated funding requirements are, is needed, as well as suitable incentives in order to unlock methane abatement potential in the waste sector. This requires a shift of focus away from the linear management system currently in place towards solutions that

consider waste as a resource, with improved collection systems enabling management of biodegradable wastes to reduce methane emissions, return organic matter to soils, and make biogas available for various uses.

The G20 Sustainable Finance Working Group has set out priorities (Sustainable Finance Working Group 2024), including:

- Optimising the operations of the International Environmental and Climate Funds (IECFs) to deliver sustainable finance; and
- Advancing credible, robust and just transition plans.

The G20 can lead in scaling up methane mitigation activity worldwide. Elements of this framework need to include (i) elaborating means to valorise methane mitigation; and (ii) reviewing operations of the IECFs so that their relevance to just and inclusive waste-related methane mitigation is enhanced. There is also a need to build capacity in countries developing their waste systems to quicken the pace of methane abatement in the context of a just transition.

Recommendations

There are two recommendations for the G20:

1. Valorise methane abatement

Various studies have considered the potential role of methane pricing as a means to deliver abatement (e.g., UNEP and CCAC, 2021; Parry et al 2022). However, in the waste sector, reported emissions are generally based on modelling, and calibration of existing models is difficult because emissions from a landfill today are linked to wastes deposited in the landfill over many years.

Nonetheless, mechanisms to quantify emissions do exist. Under the Clean Development Mechanism (CDM), credits (certified emissions reductions, or CERs) can be claimed for projects that avoid landfill methane emissions. Also, although methane emissions are out of scope in many emissions trading schemes (see Figure 4), and although the waste sector is often excluded, landfills in New Zealand have been required to surrender New Zealand Units under its Emissions Trading Scheme (ETS), using either a default factor for emissions, or a Unique Emissions Factor, which requires submission of data in line with Regulations (NZ Government 2010). Waste is also included in South Korea's ETS.

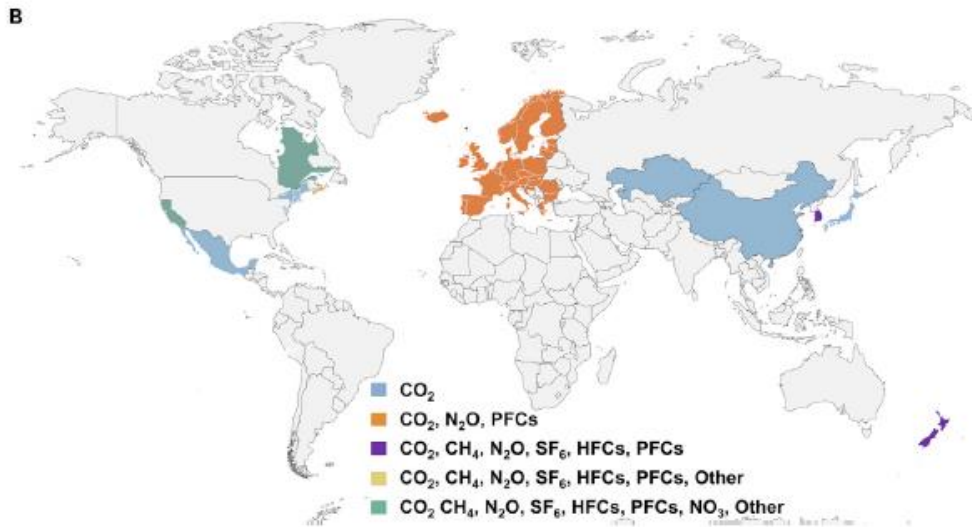


FIGURE 4: Key Emissions Trading Schemes Showing Coverage of GHGs. Source: Singh et al 2022

Article 6 of the Paris Agreement provides for parties to help achieve their nationally determined contributions (NDCs) through internationally transferred mitigation outcomes (ITMOs). These may take several forms, but they imply one party discharging its commitment to reduce emissions by paying for / facilitating reductions in net emissions by another party.

Various possibilities exist, therefore, for valorising methane abatement. All ought to consider the implications for trajectories of emissions abatement, and hence, global temperature rise (see Allen et al 2021). In principle, this brings into focus the matter of the means to express equivalence between CO₂ and methane, especially if a trading scheme includes both gases. The use of GWP100 – the measure most often used to convert emissions of different greenhouse gases into a ‘carbon dioxide equivalent’ - might not be the best choice in trading schemes. It might be more relevant to consider the social costs of different emissions, including methane. The relative social costs (of methane and

carbon dioxide) do not generally reflect GWP100 values. On the other hand, the social costs of methane are high, figures ranging from \$US1,000 to \$US4,000 per tonne methane (see [Appendix 1](#)). There is room for creative thinking, but also, a need for common rules of engagement, which G20 can lead on.

The G20 should:

- Agree modalities for including waste-related (and other, as necessary) methane within existing ETSs with a view to inter-operability in future;
- Consider the case for setting floor prices for methane abatement achieved through ITMOs, considering estimates of the social cost of methane;² and
- Consider the case for using the G20's reported emissions of methane (from solid waste) as a basis for generating a stream of revenue for distribution via suitably adapted (see below) IECFs.

It should be considered that the measures included in the modelling of methane abatement from waste have been rather limited (for example, to landfill gas capture). The available options extend beyond the operation of the landfill itself, including prevention of waste, and separate collection for composting, or biogas generation, or other uses, e.g. rearing black soldier fly for animal feed. In addition, waste can be pre-treated so that emissions are minimised when the waste is subsequently landfilled. With appropriate

²Note that as per CERs under the CDM, a percentage of revenues could be used to support climate adaptation.

incentives in place, methane abatement will become attractive to the financial sector (in line with TF-CLIMA’s priorities).

2. A catalytic role for IECFs in waste management

UNEP estimates that around 2.7 billion people globally still lack any formal waste collection (UNEP 2024). This has not been a focus for development finance, though interest is growing in, for example, improved management of plastic wastes (see Figure 4).



FIGURE 4: ODA specifically targeting plastics, 2014-2020. Source: Organisation for Economic Co-operation and Development (OECD) 2022.

There is a risk that the landscape for financing waste management will become fragmented, with some actions focused on plastic pollution, others focused on methane, and still others addressing energy. There is an urgent need to coral funding.

Despite the fact that municipal waste is usually made the responsibility of local government/urban bodies, its ability to provide a quality service for collection and management of waste is evidently failing in many locations. Typically, the service is

reliant upon user fees, which are often only partially collected, and there is reluctance – for political reasons – to increase them to fund service improvement. Yawning chasms emerge between the intent of policy and law, and the prevailing reality on the ground. The gap is exacerbated by a lack of technical know-how and clarity regarding institutional responsibilities in addition to funding gaps and low level of social awareness.

IECFs need to adopt a systems view of waste management (Wilson et al 2023). Waste management can contribute to mitigation of GHG emissions in numerous ways, not all of them reflected in the ‘waste’ part of inventories reported to the United Nations Framework Convention on Climate Change (UNFCCC). If IECFs are to support, globally, the abatement of methane in solid waste management systems, they should do so in ways that support a transition which is inclusive and just, maintaining livelihoods of those already engaged in waste picking, and generating additional employment in collection services. The separate collection and treatment of food waste, as a means to avoid landfill emissions, and generate biogas that can be put to a range of different uses (depending on local context and needs), is especially relevant.

In order to support this development, the G20 needs to revisit the way in which IECFs and other funds are made available, and are accessed. The ways in which funding is made available should be tailored so that it can support high-in-waste-hierarchy activities that generate multiple benefits. In short, IECFs need to ‘flex’ further to support the development of separate collection and management of putrescible wastes, whose decomposition is the main source of waste-related methane emissions. Critically, ways to support capacity building also need to be considered.

Scenario of Outcomes

The impact of the two recommendations being implemented is potentially profound. Where waste management is poorly developed, and considerable amounts of waste are still uncollected, there is potential for ICEFs to catalyse blended finance solutions in pursuit of projects that generate revenue from methane abatement. This can support the development of more sustainable waste management, including through enhanced separation and treatment of biodegradable wastes, reducing methane emissions from landfills, as well as through improved management of waste that continues to be landfilled. Conventionally, the revenue stream to support investment has been linked to energy, but not all approaches to methane abatement generate energy (some do), and enhancing feed-in tariffs for energy can place additional demands on public finances. Valuing methane abatement can generate a revenue stream which does not draw down scarce public funds that are needed to support delivery of waste management services.

Where municipal-type food waste is concerned, the viability of a given project is affected by the costs of both collection and treatment, and hence, the call for better targeted support from IECFs for collection in developing countries as well as support for avoided methane emissions (though suitably high values of the latter might be sufficient) will enhance viability of developing suitably adapted collection and treatment services.

In respect of climate change, the impact of better management of food waste is considerable. Around 930 million tonnes of food waste are generated per annum by households, retail and food service (UNEP 2021). Figures 5 and 6 show, respectively, how much municipal waste is managed without control (dumped or burned), and is

landfilled (UNEP 2024). In most regions, food waste is not well targeted for separate collection.

In landfills with no gas capture system, but with some oxidation of methane at the cap, around 60kg of methane might be emitted per tonne of food waste landfilled. In landfills with a 50% capture over the lifetime, the figure would be of the order 30kg per tonne of food waste landfilled.

At the global level, capturing 50% of this food waste for composting or anaerobic digestion would enable of the order 20 million tonnes of methane to be abated annually (or 560 million tonnes CO₂e using a GWP100 figure of 28). The avoided social costs would be of the order US\$20-US\$80 billion per annum. In addition, climate related benefits associated with the use of biogas would be expected.

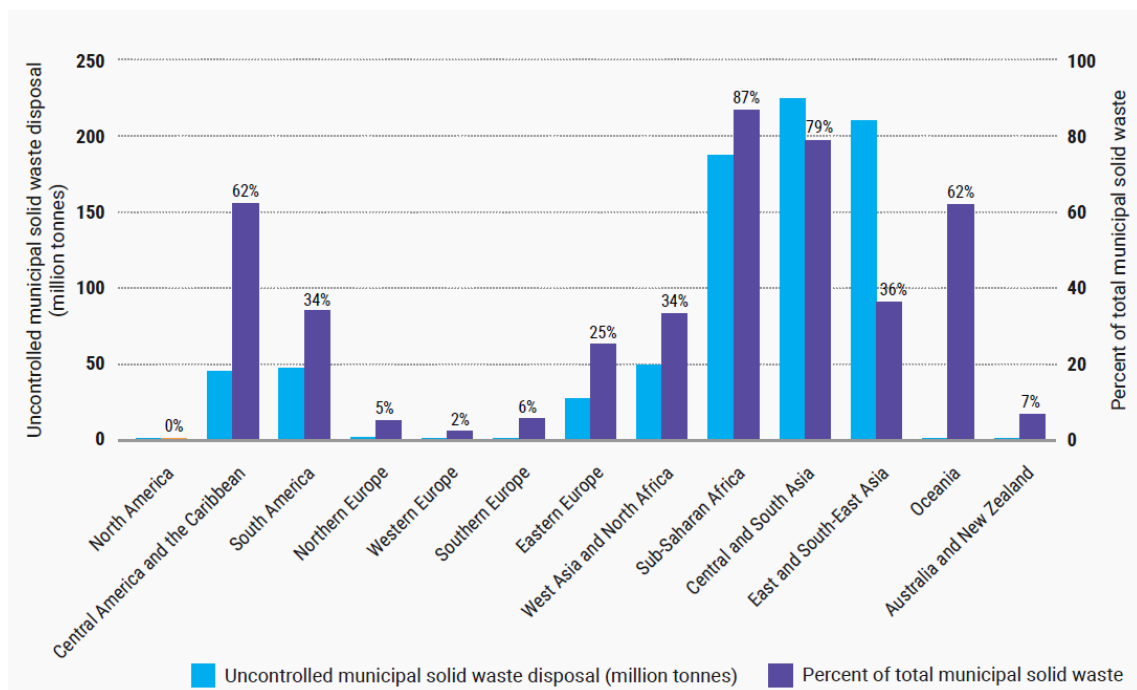


FIGURE 5: Proportion of Uncontrolled Waste by Region. Source: UNEP 2024.

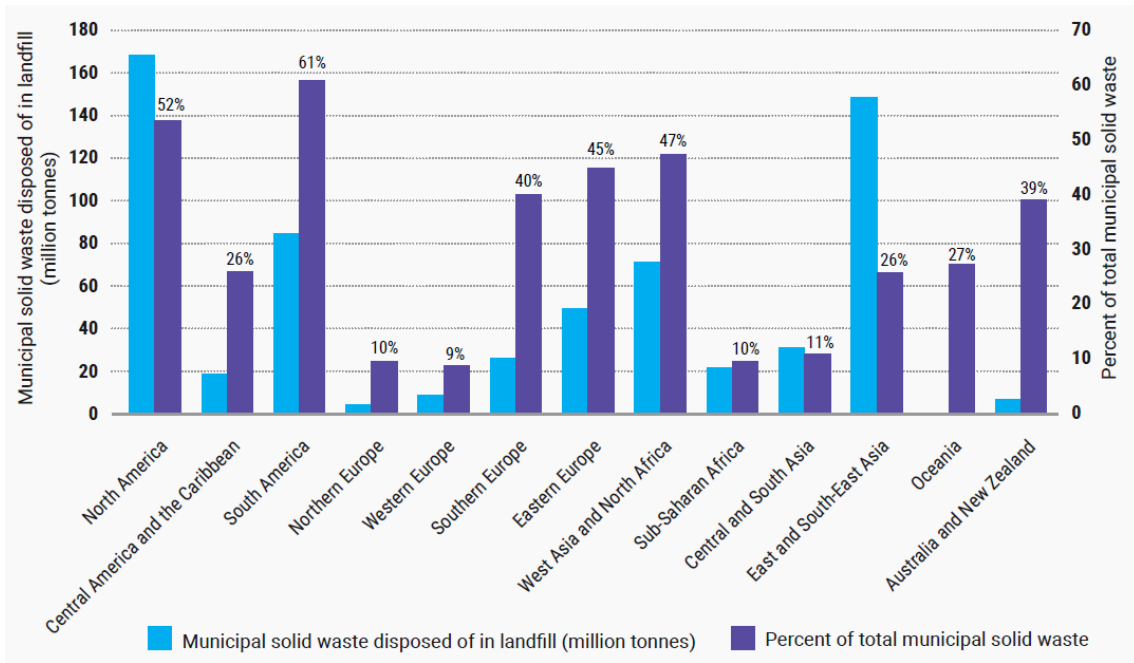


FIGURE 6: Proportion of Landfilled Waste by Region. Source: UNEP 2024.

For these reasons, our above recommendations, to valorise methane abatement and to ensure a catalytic role for IECFs in waste management, should be considered of the utmost importance to the G20.

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