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| **Supporting Information:** |
| Controlled release testing of the static chamber methodology for direct measurements of methane emissions |
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**Table S1: IPCC Emission factor database – summary of assumptions used for component level methane emission factor calculations.**

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| Category | Assumption | Reasoning (if applicable) |
| Waste | Component level = 1 person |  |
| Waste | 5.12 L of wastewater per capita per hour | - 8,000,000,000 people globally  - 359,000,000,000 m3/yr wastewater generation globally[1] |
| Waste | 0.019 kg of waste per capita per hour | - 8,000,000,000 people globally  - 1,300,000,000 tons/yr solid waste generation globally[2] |
| Energy | 1.12 hours per liquid unloading | - Average duration of liquid manual unloading[3] |
| Energy | 9301 km driven per year per capita | -Population based average from 12 countries[4] |
| Energy | 19.1 g of methane per ft3 |  |
| Energy | 80.5 hours | - Average flowback duration[3] |
| AFOLU | Component level = 1 head of cattle |  |
| Other | 16.04 grams per mol of methane |  |
| Other | GWP of methane = 24 |  |

References

1 Jones, Edward R., et al. "Country-level and gridded estimates of wastewater production, collection, treatment and reuse." *Earth System Science Data* 13.2 (2021): 237-254.

2 Kawai, Kosuke, and Tomohiro Tasaki. "Revisiting estimates of municipal solid waste generation per capita and their reliability." *Journal of Material Cycles and Waste Management* 18.1 (2016): 1-13.

3Allen, David T., et al. "Measurements of methane emissions at natural gas production sites in the United States." Proceedings of the National Academy of Sciences 110.44 (2013): 17768-17773.

4Internation Comparisons – Transportation. Accessed: 2023-02-09. Available: https://internationalcomparisons.org/environmental/transportation/