

2024 Global Methane Forum

Mobilizing Methane Action

18-21 March 2024, Geneva, Switzerland

Dealing with Leftover Mixed Waste

Dr Dominic Hogg
Equanimator Ltd

Context

- Waste quantities large (we don't really know how much) and almost certainly growing
- Typically large putrescible content (mainly linked to food preparation, also parks / gardens) though declining (proportionately) with income
- Growing use of plastics (proportionately, more similar across country archetypes)
- Urgent need for better management (funding structure) for waste, including separate collection of food waste (twin-stream?)
- Need for a sustainable way of dealing with 'leftover mixed waste' / sorting rejects
- Climate change ((fossil-derived) CO₂, methane, N₂O)
- Note: mitigation associated with waste management is reported under different 'Sections' of the inventory (not just 'Waste')

Household waste



Leftover Mixed Waste (LMW)



Leftover Mixed Waste (LMW)

Non-household MSW



Separate Collection

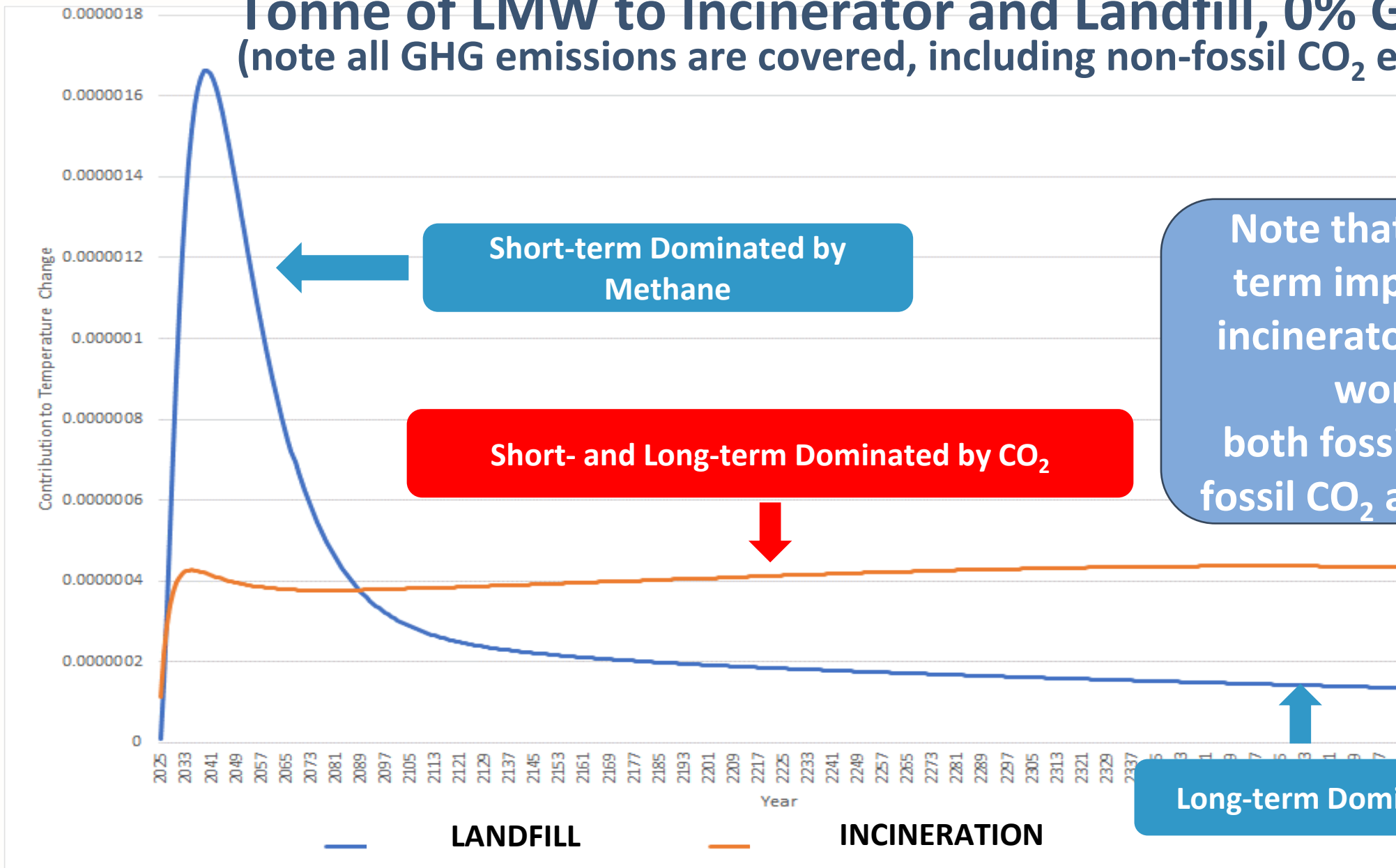


Blue arrow pointing to rejects.



Rejects

Tonne of LMW to Incinerator and Landfill, 0% Gas Capture (note all GHG emissions are covered, including non-fossil CO₂ emissions)



Note that the long-term impact of the incinerator is always worse – both fossil and non-fossil CO₂ are released

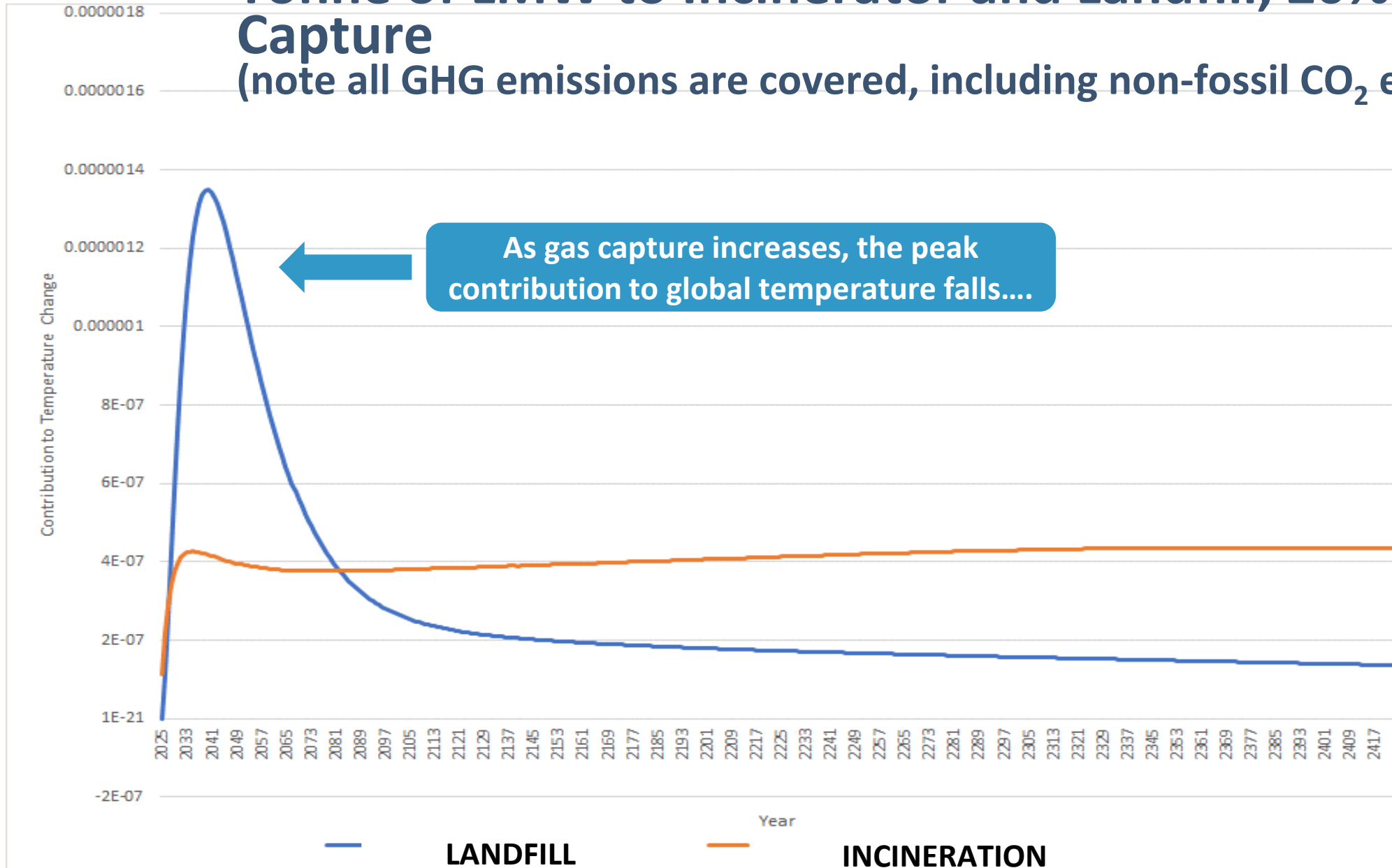
Short-term Dominated by Methane

Short- and Long-term Dominated by CO₂

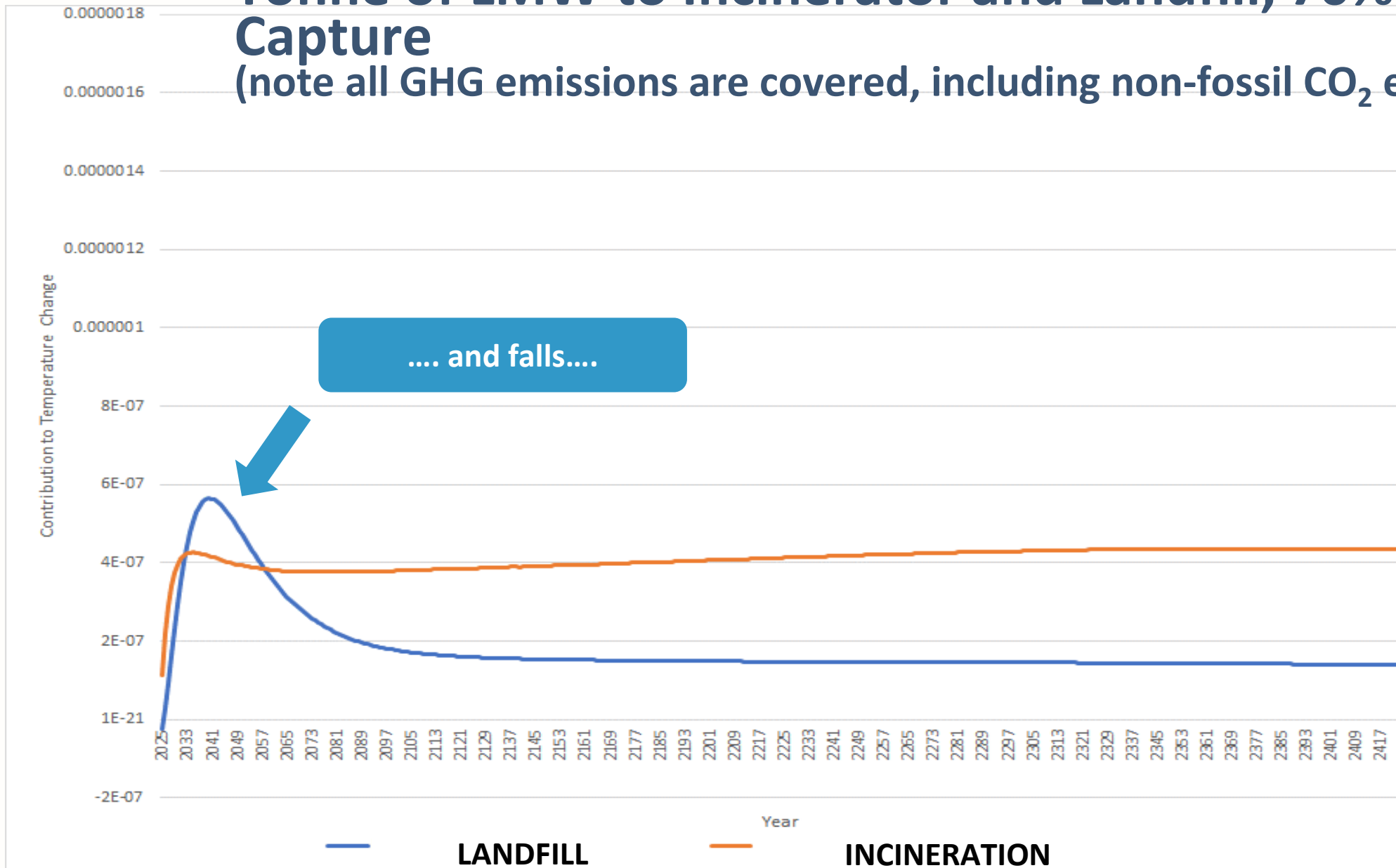
Long-term Dominated by CO₂

Tonne of LMW to Incinerator and Landfill, 20% Gas Capture

(note all GHG emissions are covered, including non-fossil CO₂ emissions)



Tonne of LMW to Incinerator and Landfill, 70% Gas Capture (note all GHG emissions are covered, including non-fossil CO₂ emissions)

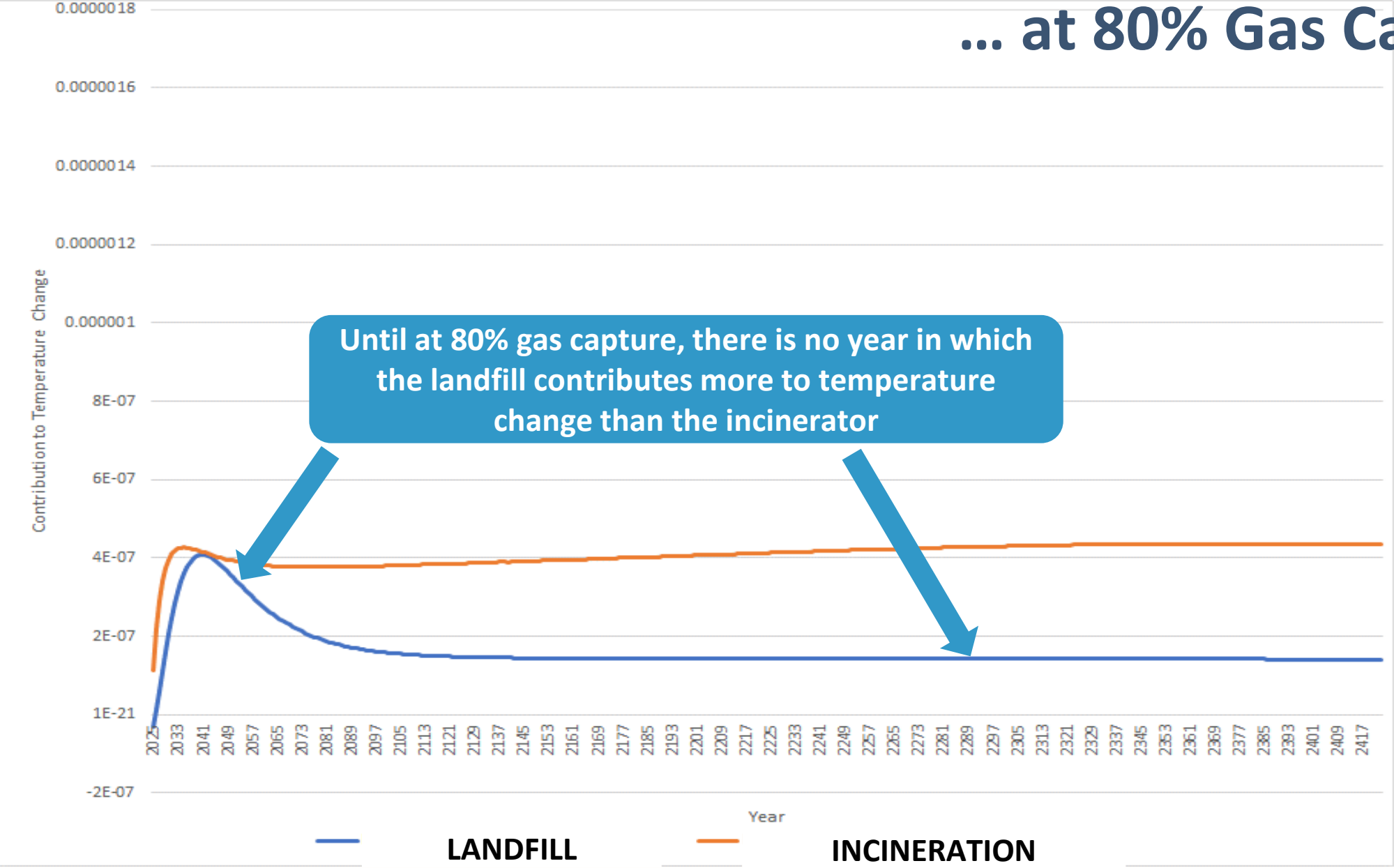


... and falls....

LANDFILL

INCINERATION

... at 80% Gas Capture

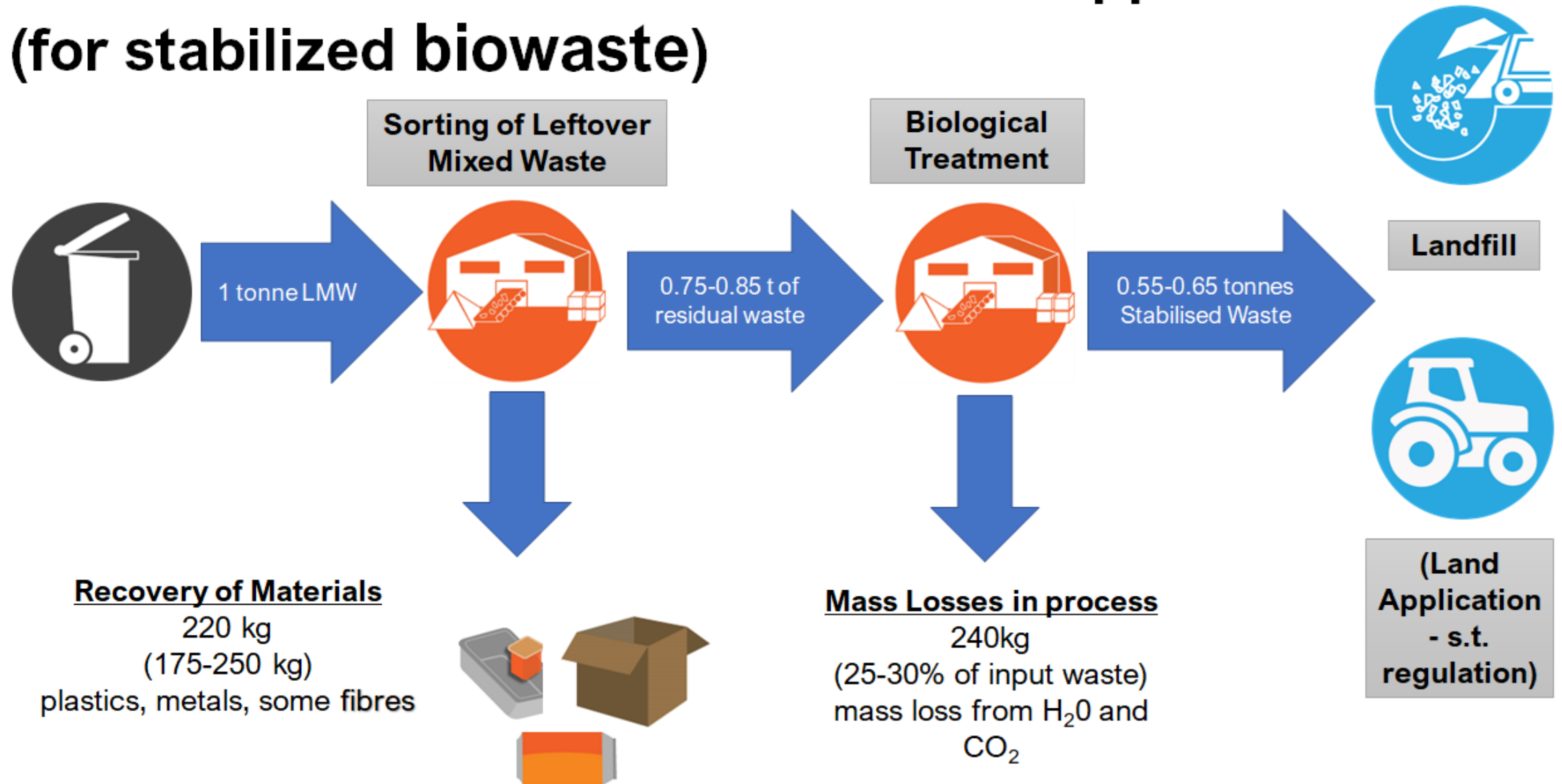


Until at 80% gas capture, there is no year in which the landfill contributes more to temperature change than the incinerator

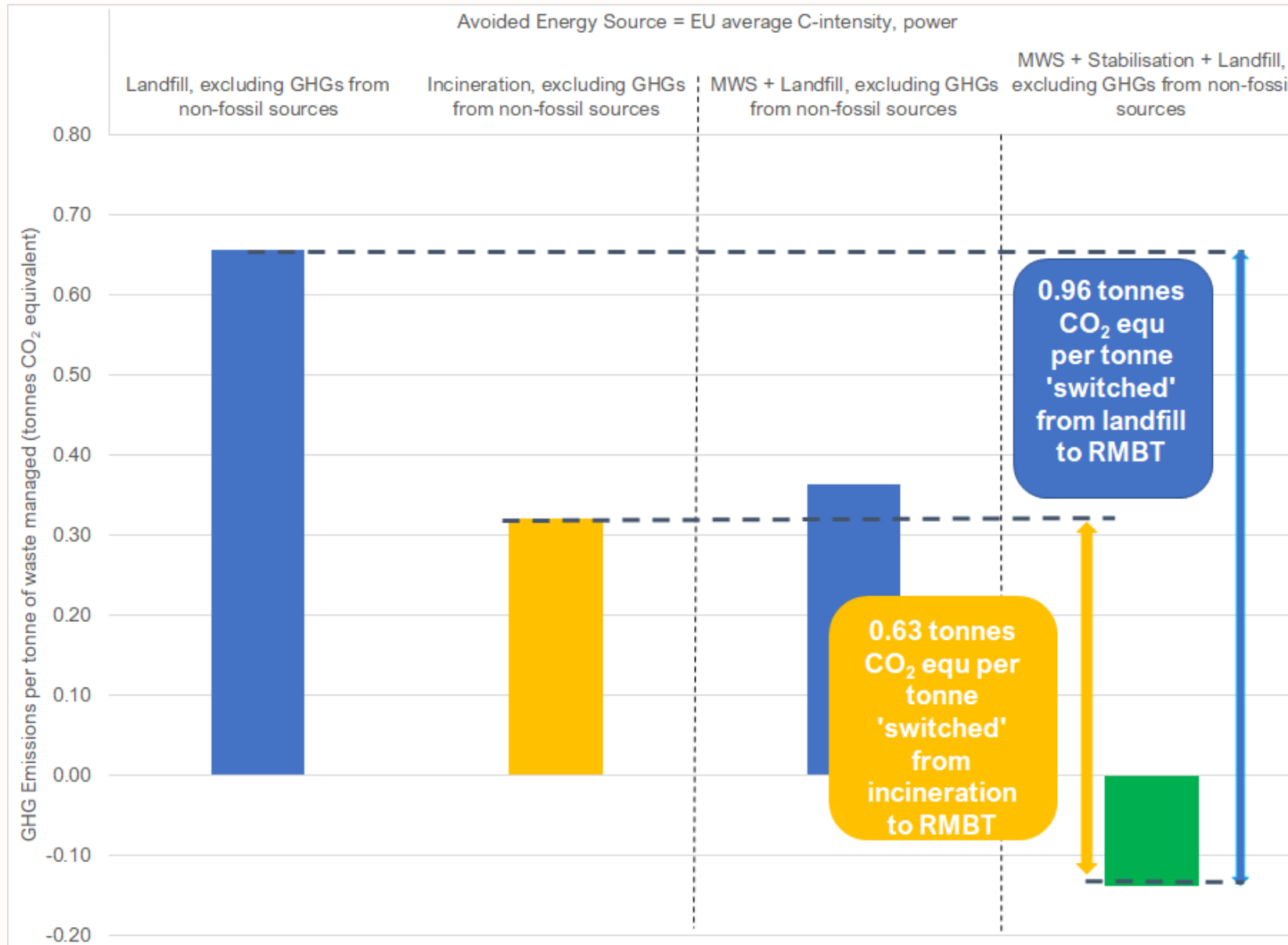
What does this tell us?

- Other things being equal, improving gas capture helps
- But landfills are not easy to manage, and achieving very high captures over a landfill's lifetime is not easy
- So, should we “ban landfilling” of biodegradable waste?
 - Not if the ban implies ‘no landfilling’ - leads to over-investment in incineration
 - Can lock-in to rates of recycling being achieved when the ban takes affect
 - Don't specify threshold calorific values - leads to combustion of fossil C-sources)
 - Greater commitment to temperature increase in the long-term
- Better to make biological treatment of waste prior to landfilling a requirement
- Minimise the potential for waste to generate methane when landfilled...
- ... lower the rate of flux through the landfill surface and use active cover layers
- Also mandate sorting (depending on collection system) – of leftover mixed waste (may be rejects from dry scheme in wet / dry collection systems)

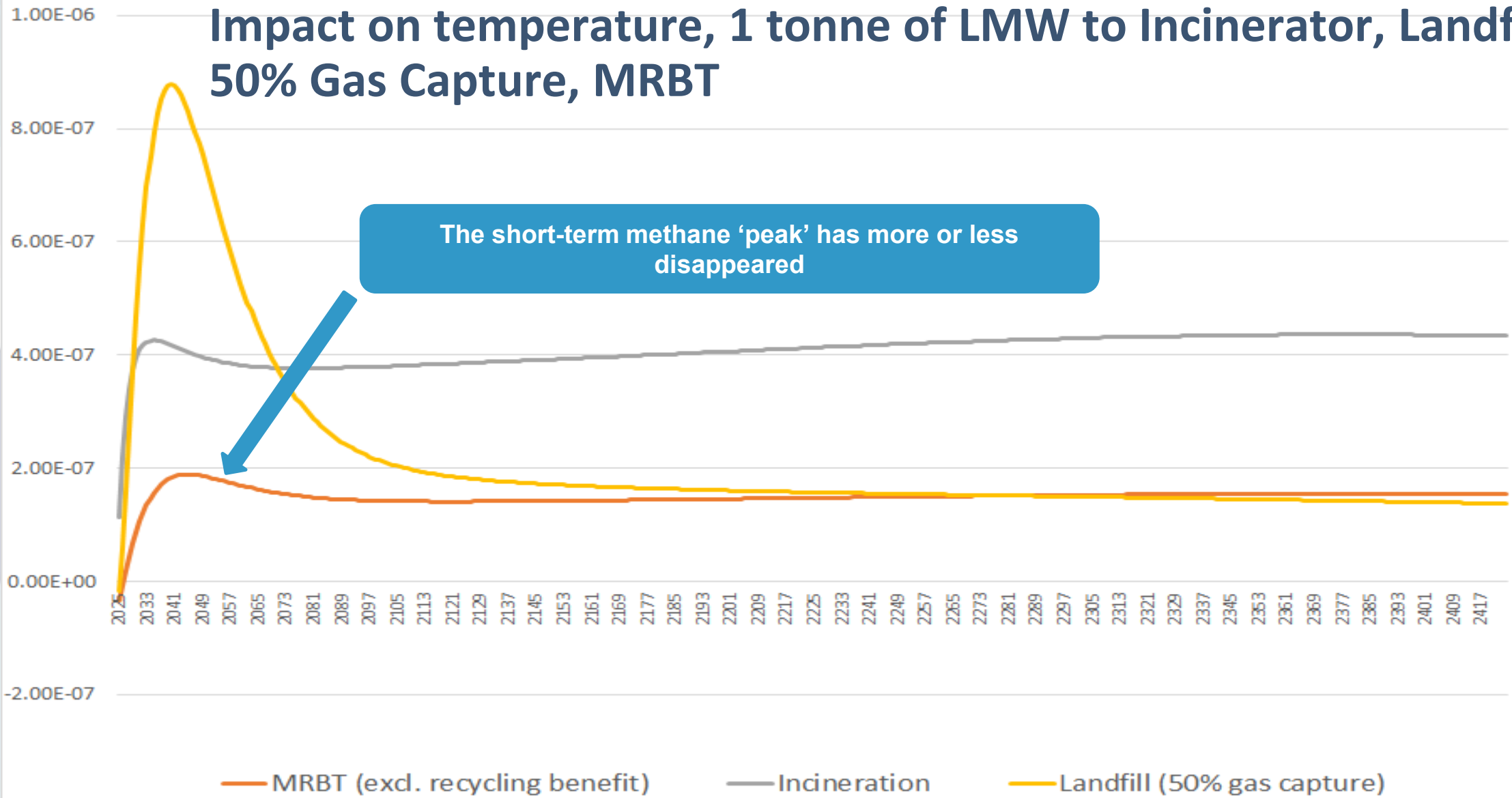
MRBT = LMWS + BT + Landfill / Land Application (for stabilized biowaste)



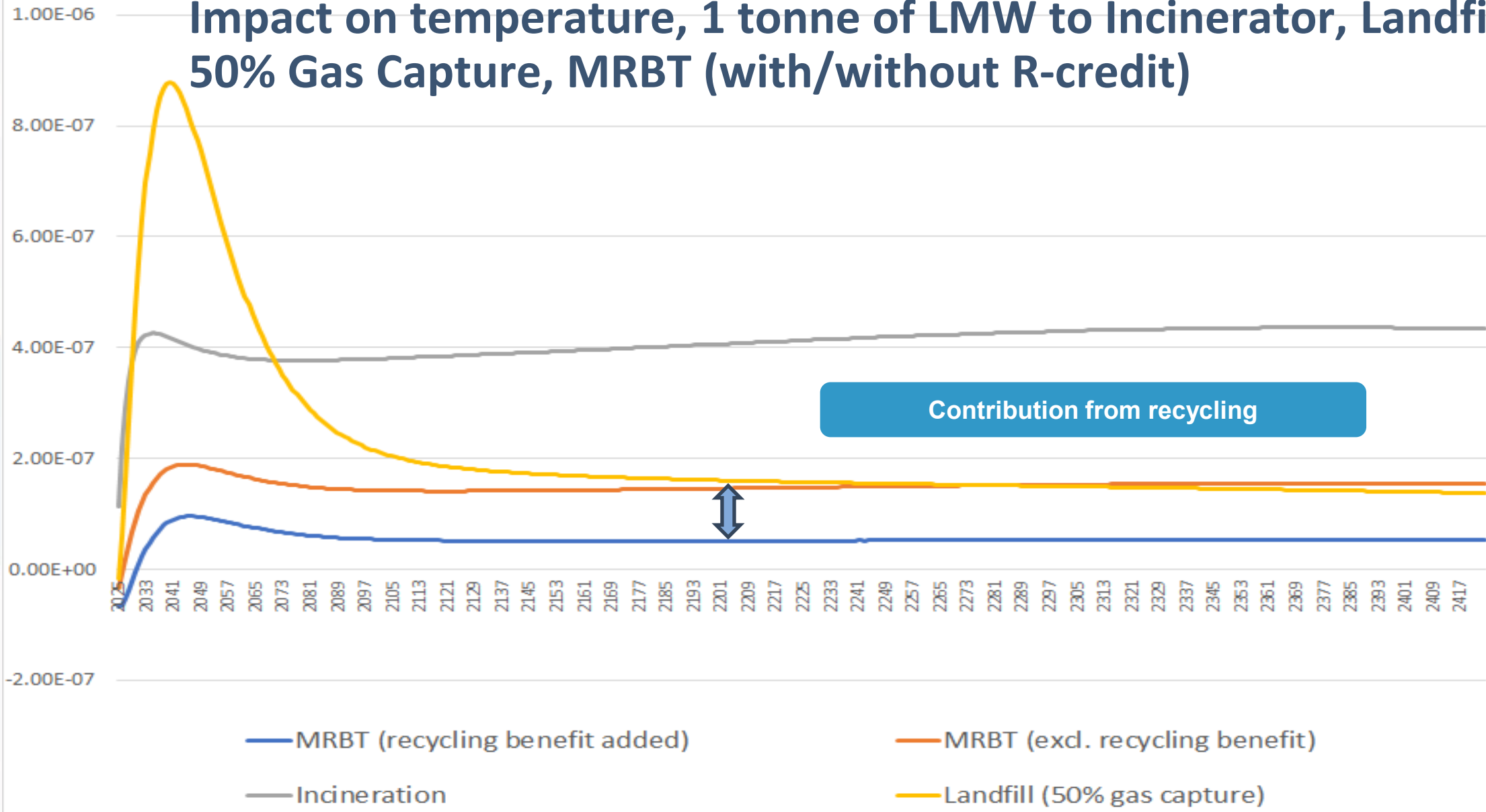
Conventional LCA-type Analysis



Impact on temperature, 1 tonne of LMW to Incinerator, Landfill with 50% Gas Capture, MRBT



Impact on temperature, 1 tonne of LMW to Incinerator, Landfill with 50% Gas Capture, MRBT (with/without R-credit)



Summary

- We can't carry on sending waste to facilities where fugitive methane loss is significant – the short-term contribution to temperature increase is not acceptable
- Improving gas capture is important, but how good can captures be, globally?
- Future management of 'leftover mixed waste' should consider 'MRBT' solutions:
 - a) Further sorting (as warranted, given collection systems)
 - b) Biological stabilization of the residual material
 - c) Either using the output in a restricted way, and if not, landfilling in facilities with active cover layers
- Biological stabilization uses familiar technology (less alienating) and can be implemented swiftly
- It can be designed to be flexible to further source segregation of organic wastes
- The likelihood of locking-in to low recycling rates is less than with e.g., incineration
- The process itself can be part of a system that supports livelihoods (rather than threatening them)
- Capital commitment is far lower than for incineration with better GHG performance in short- and long-term
- Makes landfills easier to manage (leachate, placement density / settlement, gas capture systems...)
- Importantly, it helps reduce contributions to global temperature rise

Thanks for listening

Further reading:

- *Equanimator (2021) Rethinking the EU Landfill Target, Report for Zero Waste Europe, October 2021.*
- *Dominic Hogg (2023) Debunking Efficient Recovery: The Performance of EU Incineration Facilities, Report for Zero Waste Europe, January 2023*
- *Equanimator (2023) Enough is enough: The case for a moratorium on incineration, September 2023.*
- *Dominic Hogg (2022) The Case for Sorting Recyclables Prior to Landfill and Incineration, Special Report prepared for ReLoop, June 2022*
- *Dominic Hogg and Dinkar Suri (2023) Nothing left behind: Modelling MRBT to maximise recovery of resources and minimise contributions to climate change, Report for Zero Waste Europe, April 2023.*