Incineration Investment

This intervention increases incineration through capacity for collection and processing. It is used by the "X Billion USD for Waste Management" scenario.

1 Introduction

This intervention relies on information about capital and operating expense to incinerate a certain mass of waste.

1.1 Assumptions

- This intervention is assumed to have incineration rate go up gradually and linearly from a selectable start date to the configurable end date.
- Capital expenditure is amortized over 50 years.
- The expanded capacity will be used for all waste types of which only a fraction is plastic ($\%_{plastic}$).
- The addition of new infrastructure will redirect landfill and mismanaged to incineration.
- There are known region specific observed values for mass of waste incinerated ($m_{incinerated}$) and both the operating cost (r_{opex}) and capital expenditure (r_{capex}).

1.2 External knowledge

This uses materials describing capital and operating expenditures for incineration facilities (Lau et al. 2020).

2 Primary impact

Investment is a mix of capital and operating expense:

$r_{annual} = r_{annual-opex} + \frac{r_{capex}}{50}$

This intervention assumes a potential change in the incineration ($m_{increase}$) over time based on an investment I:

$m_{increase} = I * \frac{m_{incinerated}}{r_{annual}}$

With this potential change defined:

$\Delta_{incineration} = min(m_{increase} * \%_{plastic}, W_{mismanaged} + W_{landfill})$

This is then applied to the overall incineration rate:

$W_{incineration} = W_{incineration} + \Delta_{incineration}$

See secondary effects for change to mismanaged and landfill.

3 Secondary impact

This intervention assumes that the newly incinerated material would have otherwise been mismanaged or sent to landfill. Starting with mismanaged:

$W_{mismanaged} = W_{mismanaged} - \Delta_{incineration} * \frac{W_{mismanaged}}{W_{mismanaged}+W_{landfill}}$

Next, for landfill:

$W_{landfill} = W_{landfill} - \Delta_{incineration} * \frac{W_{landfill}}{W_{mismanaged}+W_{landfill}}$

There are no further assumed effects.

4 Discussion

Future work includes additional investigation into how additional incineration capacity impacts other end of life plastic fates. Note that this intervention reflects an implicit belief that incineration is a preferred outcome to landfill. To that end, users may choose to direct investment only to landfill through the second tab if they disagree with this perspective.

Works Cited

Lau, Winnie W., Yonathan Shiran, Richard M. Bailey, Ed Cook, Martin R. Stuchtey, Julia Koskella, Costas A. Velis, et al. 2020. "Evaluating Scenarios Toward Zero Plastic Pollution." *Science* 369 (6510): 1455–61. https://doi.org/10.1126/science.aba9475.