



Department  
for Transport

# Recycled Carbon Fuels

## *Proposed GHG Accounting Methodology*



- ▶ Very brief intro to the RTFO
- ▶ What are recycled carbon fuels?
- ▶ Research performed: GHG emission savings from RCFs
- ▶ Selecting the counterfactual
- ▶ Landfill?
- ▶ Next steps



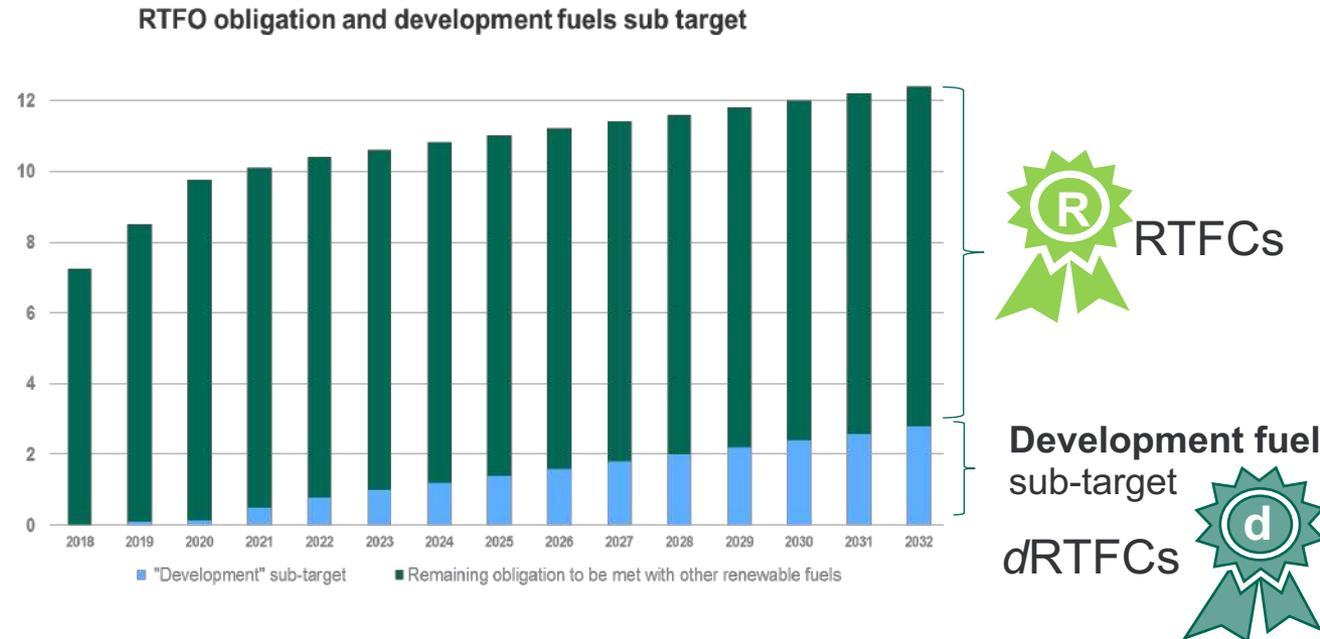


## ▶ Renewable Transport Fuel Obligation (RTFO)

- ▶ Has been operating since 2008 – saves ~ 2.5 Mt CO<sub>2</sub>/year
- ▶ Typically has rewarded biofuels – though since 2018 there is support available for renewable transport fuels of non-biological origin

### ▶ Two obligations

- Main
- Development fuel





- ▶ **Recycled carbon fuels are introduced and defined in REDII**
- ▶ **REDII states that recycled carbon fuels can contribute to the share of renewable energy in the transport sector**
- ▶ **REDII is yet to set a minimum GHG emission saving threshold for recycled carbon fuels**
  - ▶ the Commission will produce a delegated act by 1 January 2021 which will establish a minimum GHG emission saving threshold for recycled carbon fuels.
- ▶ **REDII has also not set how the GHG emission savings from RCFs should be determined**
  - ▶ by 31 December 2021 the Commission will produce a GHG assessment methodology for RCFs.
- ▶ **We are proposing to develop our own GHG methodology that will be implemented by 2021**





## What are recycled carbon fuels?

### *Solid wastes*



**Recycled carbon fuels (RCFs)** are transport fuels made from fossil derived wastes that are not suitable for reuse or recycling, or cannot be avoided.

### *Gaseous wastes*



We recognise that RCFs are not **renewable** but have explored the potential GHG emission savings that can be achieved by RCFs





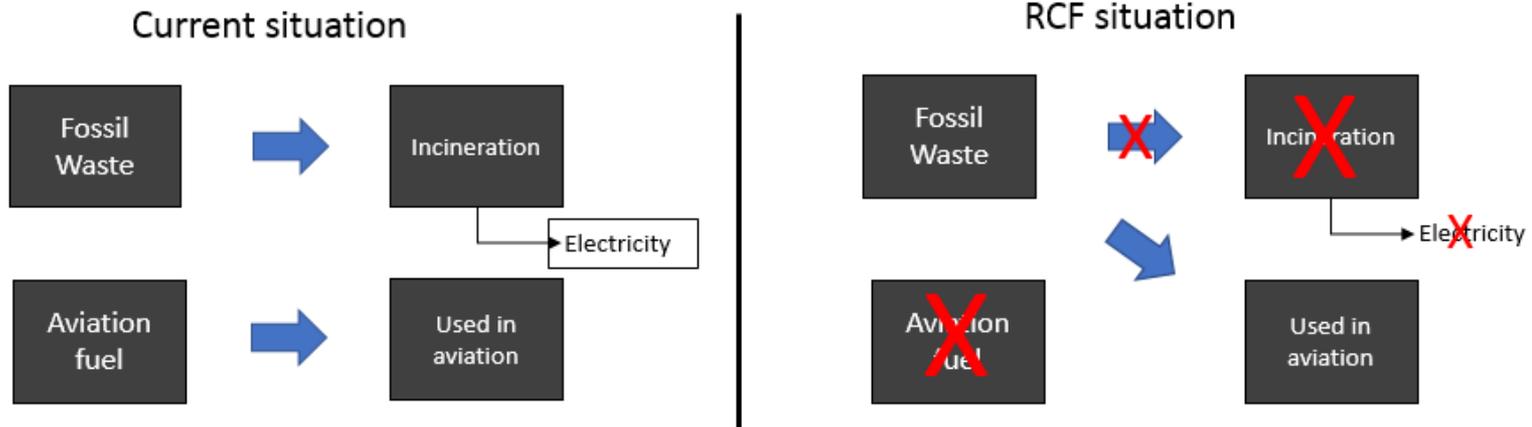
- ▶ The objective is to decarbonise transport
  - ▶ RTFO: Supports renewable transport fuels that meet GHG emission saving criteria
- ▶ We aim to develop a GHG assessment methodology in order to be able to distinguish between RCFs that **do** and **do not** deliver GHG emission savings.
- ▶ Set an appropriate level of reward





## How we approached this...

- ▶ Commissioned research
  - ▶ Two reports now published (links at end)
- ▶ Compared the GHG emissions from changing how fossil wastes are currently disposed
  - ▶ .... With using them to produce RCFs instead.



X = avoided GHG emission





## Recent research (August 2019)

- ▶ Focused on current uses of the fossil waste **in the UK\***
- ▶ Looked at fossil waste streams but **excludes recyclable portion.**
- ▶ Includes wastes such as:



Sorted residues from several waste processing streams  
e.g. SRF, composting residues,  
unrecyclable plastics



Waste rubber



Fossil fractions  
of residual  
mixed waste  
from  
households, or  
C&I



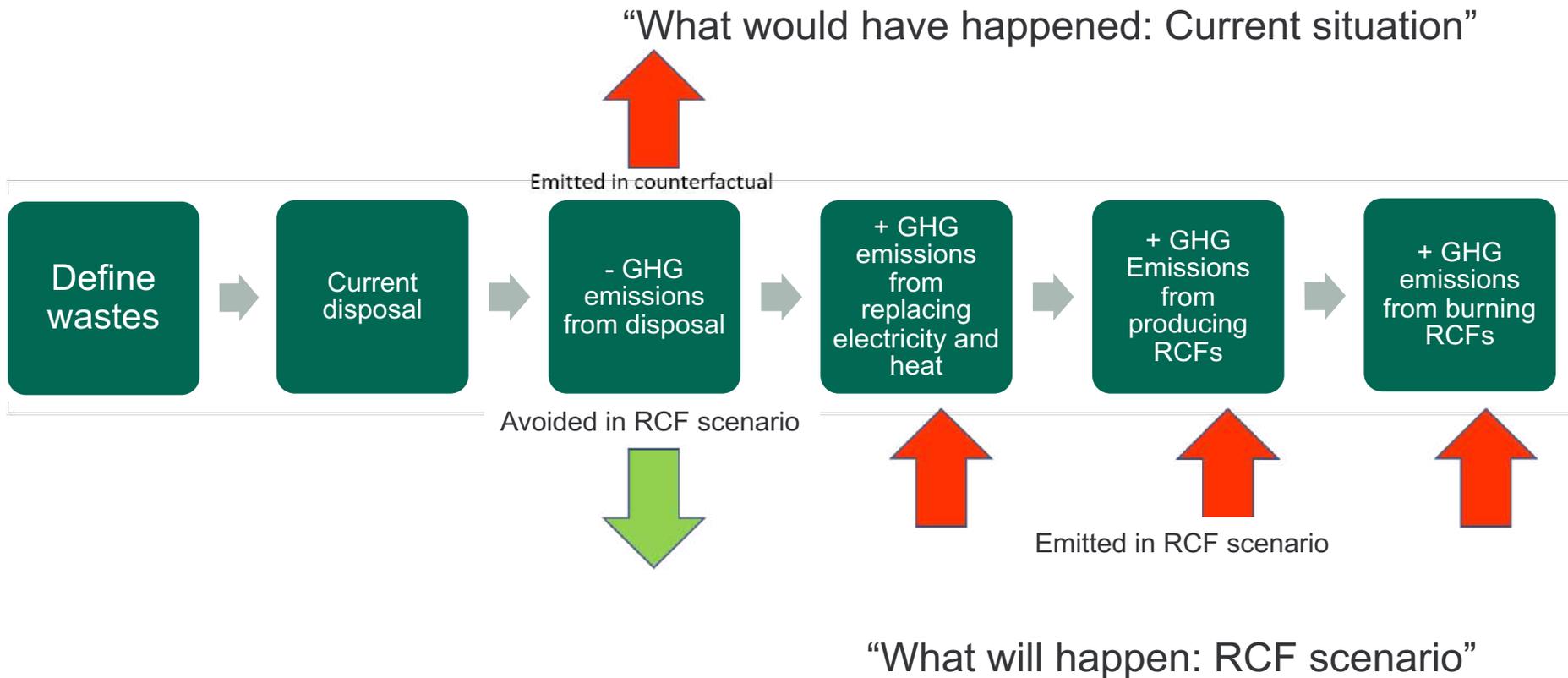
Blast furnace,  
steel mill and  
refinery waste  
gases





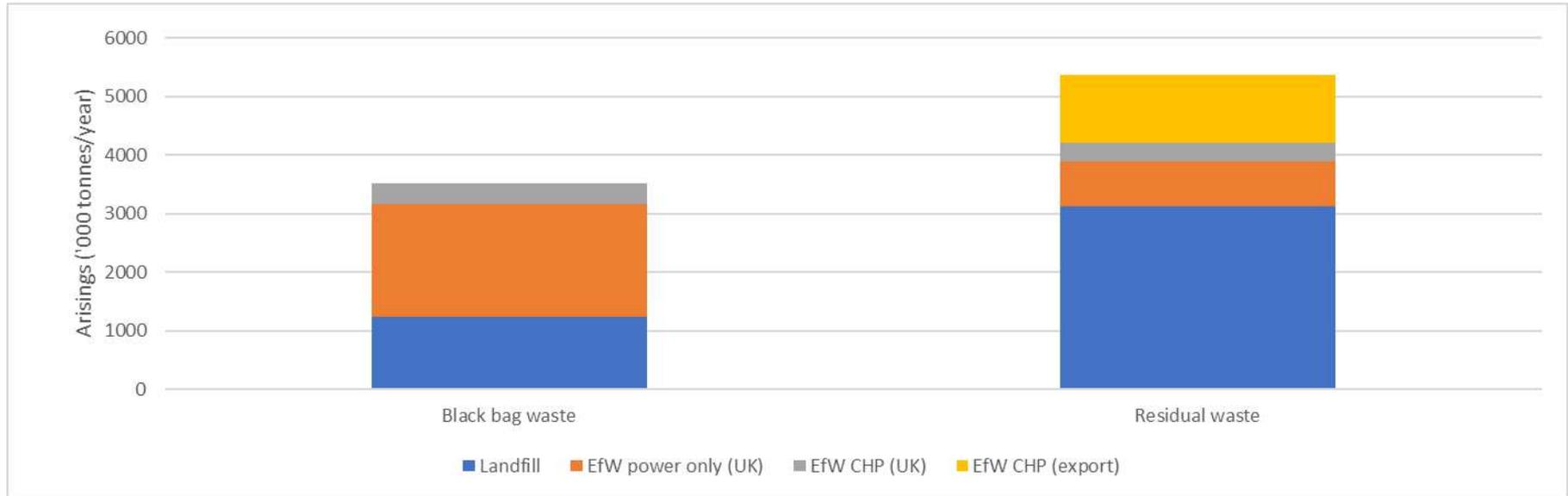
# Calculating the GHG emission savings

- ▶ Calculates GHG emissions from ....





## Results: Current disposal Solid Wastes



Black bag waste and residual wastes ~ 23-30 MT

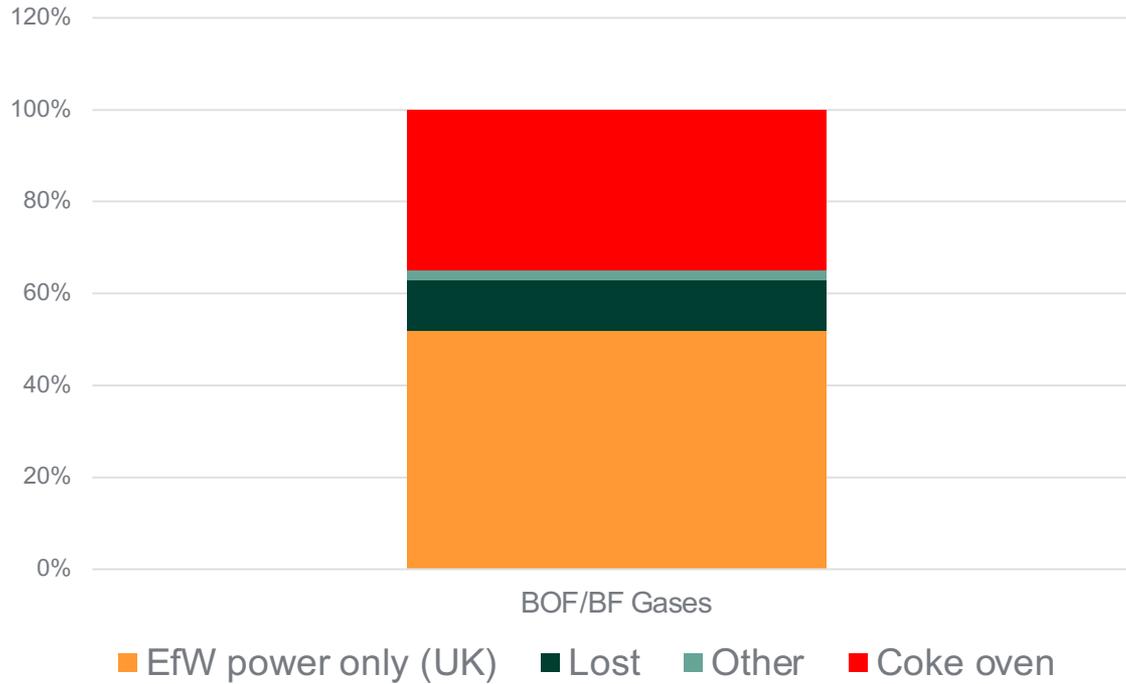
**Landfill is the most common end-of-life fate (~50%)**

Followed by EfW (~30%) (overall) and EfW CHP (~20%).





# Current disposal: Fossil Gases





# The GHG emissions from disposal

- Landfill – negligible for fossil part – not for bio
- Energy from waste (EfW) GHG emissions from **combusting** the waste to generate heat or power
- These emissions are avoided in the RCF scenario



Landfill	EfW (power)	EfW (CHP)	Export CHP	Gases only: Coke ovens
No replacement	Grid average electricity (2024 projected)	<b>Grid average electricity and natural gas</b>	<b>Grid average electricity in country and natural gas</b>	Natural gas





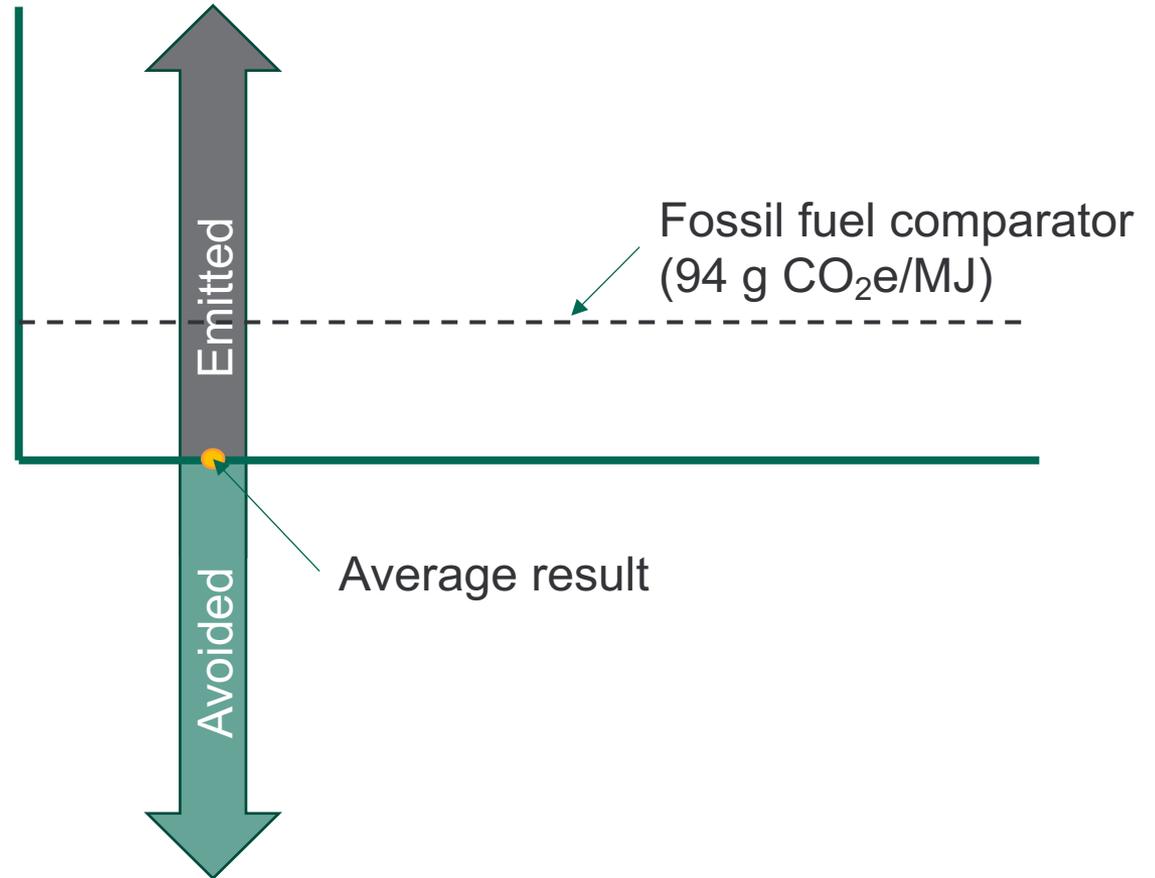
## Emitted when we make RCF

- Combustion emissions
- Processing emissions
- Energy 'penalty'



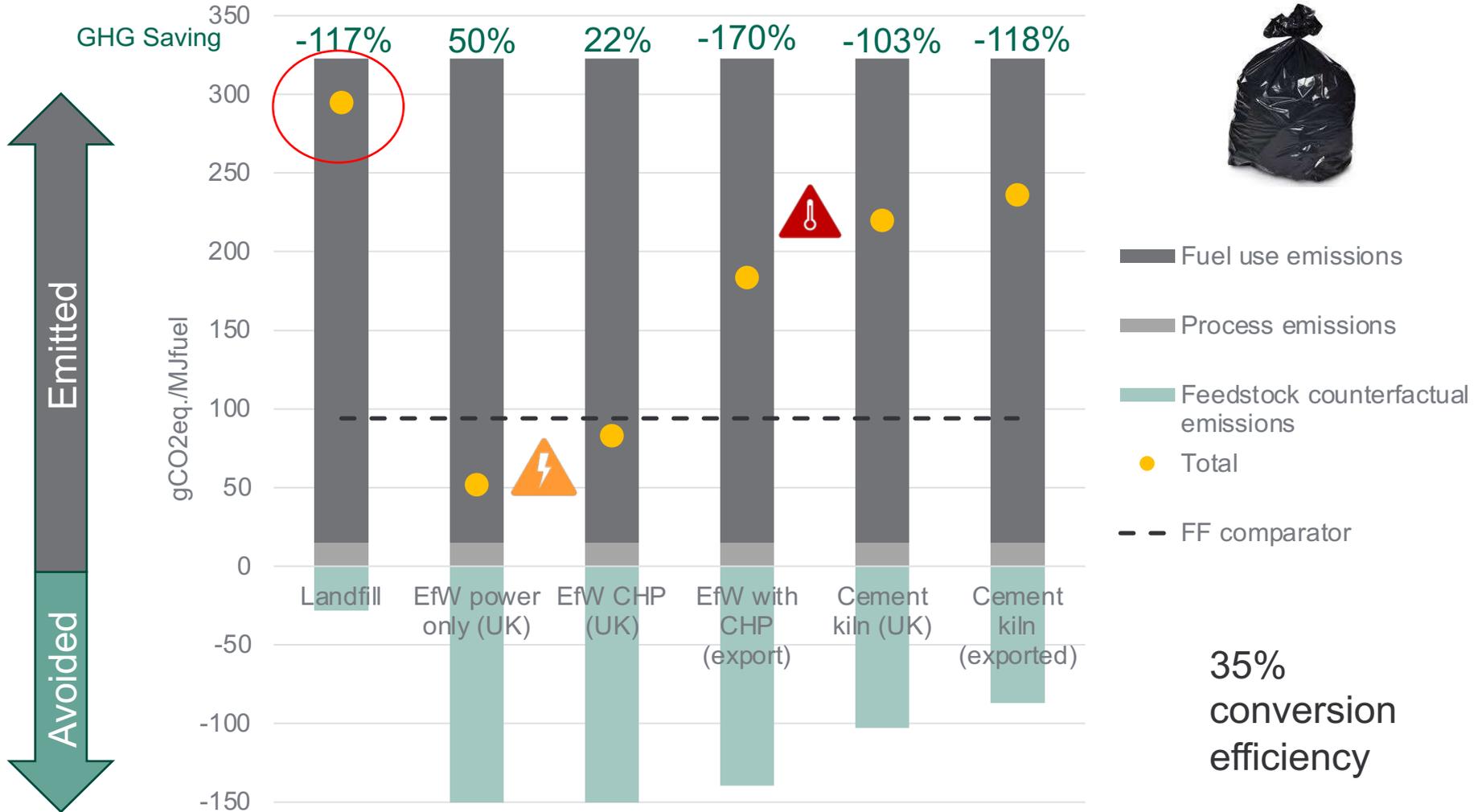
## Avoided when we make RCF

- Emissions from  
incineration





# The counterfactual affects the results: Plastics





# The counterfactual affects the result: Gases



- Fuel use emissions
- Process emissions
- Feedstock counterfactual emissions
- Total
- FF comparator

65% conversion efficiency





- ▶ Landfill acts as a store of carbon
  - ▶ But does it?
- ▶ If RCF feedstocks are diverted from **EfW** then there are GHG emission savings, because:
  - ▶ The conversion efficiency for RCF plants is better than for incineration
  - ▶ The average grid emissions are lower than incinerating waste.
  - ▶ And they will get lower over time
- ▶ If RCF feedstocks are diverted from **heat** then the GHG emissions increase because the heat is replaced by natural gas, or coal.
  - ▶ Will there be competition for RCF feedstocks for use in heat?





## Let's talk about landfill

- ▶ Is landfill an appropriate comparison system for RCF feedstocks?
  - ▶ UK: Targets to reduce waste to landfill
  - ▶ **Landfill not an option we should compare against**
- ▶ Does it act as a carbon store?
  - ▶ There is a considerable biological component of the waste would degrade and be emitted as **methane**.
  - ▶ Could remodel RCF study to include biogenic methane
  - ▶ But we know that it's good to divert biomass from landfill
- ▶ ***Change of question:*** If material is diverted from landfill- where should it go?





## Discussion: What counterfactual to select?

- ▶ Is it appropriate to select a specific counterfactual for RCFs?
- ▶ Our research suggests RCFs are “next best” option compared to landfill
  - ▶ If the RCF plant is more efficient than an incinerator
  - ▶ If the feedstock is mixed with biomass- all the better.
  - ▶ **Still have questions: Where do these savings occur?**
  - ▶ **What happens when RCFs are exported?**





## Discussion: The counterfactual of RCFs?

- ▶ What about industrial gases?
- ▶ Would occur at a specific plant- could we have more information on what displacement has occurred?
- ▶ Could propose to do a “site specific” approach.
  
- ▶ What about double claiming?
- ▶ If a plant can demonstrate that CO<sub>2</sub> emissions from industrial gases are counted already- can they be **CO<sub>2</sub> neutral to the importing country?**
- ▶ We would still want to ensure they were being produced in an efficient plant.
- ▶ Could this be regulated by certification? Or verification? (like UERs?)





## Next steps

- ▶ Refine policy for consultation in summer 2020.
- ▶ Public consultation
- ▶ Implementation now likely to be in 2021



Mixed wastes



Waste industrial  
gases



Aviation fuel

Hydrogen

Drop in fuels

Synthetic natural gas





- ▶ Thank you for listening
- ▶ Any questions or follow up conversations contact me on [carly.whittaker@dft.gov.uk](mailto:carly.whittaker@dft.gov.uk)
- ▶ Links to reports
- ▶ 2018 Study <https://www.e4tech.com/resources/129-low-carbon-fossil-fuels-sustainability-risks-and-accounting-methodology.php>
- ▶ 2019 Study <https://www.gov.uk/government/publications/greenhouse-gas-emissions-created-by-producing-fuels-from-fossil-wastes-and-residues>

