The climate change impacts of burning municipal waste in Scotland

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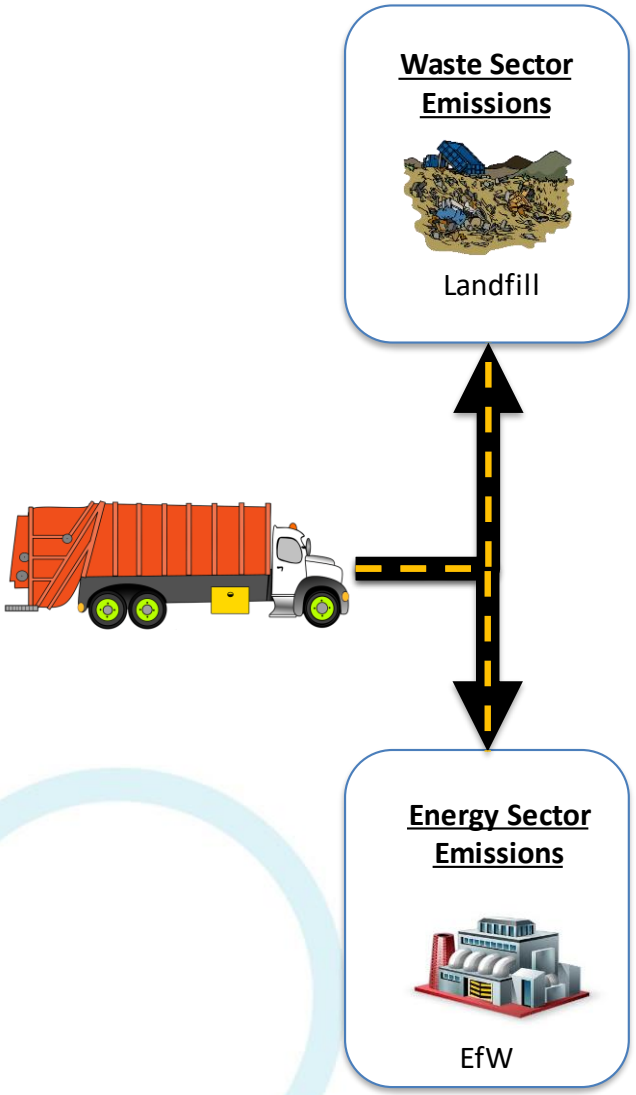
Supporting Scotland's Net Zero Target

- To achieve net zero, we must reduce emissions throughout the economy, including from waste
- This requires accurate, up to date, evidence
- In 2018, Scotland's **Waste Data Strategy Board*** recognised a need to improve understanding of the carbon impacts of EfW in Scotland
- The purpose of the study is to improve understanding and support future evidence-based waste policy

*The WDSB includes SEPA, Scottish Government, Zero Waste Scotland and the waste industry. It co-ordinates waste data improvements for Scotland through its Waste Data Action Plan.

Residual waste in Scotland

- Landfills account for ¾ of waste sector emissions, whereas
- EfW emissions are counted within the energy sector



<u>The shift from landfill to EfW moves emissions from waste to energy sectors</u>

- But how much carbon is being saved overall?

*Scottish Government (2020)

Research questions

1. How do EFW carbon impacts compare to landfill?

   (tCO2e/tonne input)

2. How does the carbon intensity of energy produced compare to the Scottish average?

   (gCO2e/kwh)

Methodology

In 2018, six EfW plants treated municipal residual waste in Scotland

Data sources

- Plant-specific data from operators
- SEPA site return data
- Latest ZWS waste composition data

Key Uncertainties

- Composition of waste is variable and changing
- Data on energy outputs of EfW plants

Reviewed Process

- Overseen by the Waste Data Strategy Board
- Reviewed by energy and waste experts in ZWS, SEPA and SG
- Compared to similar external studies

Methodology

Sensitivity Analysis

- How does converting EfW plants to CHPs change their carbon intensity?
- How does changing the plastic content of waste change EfW and landfill emissions?

Output

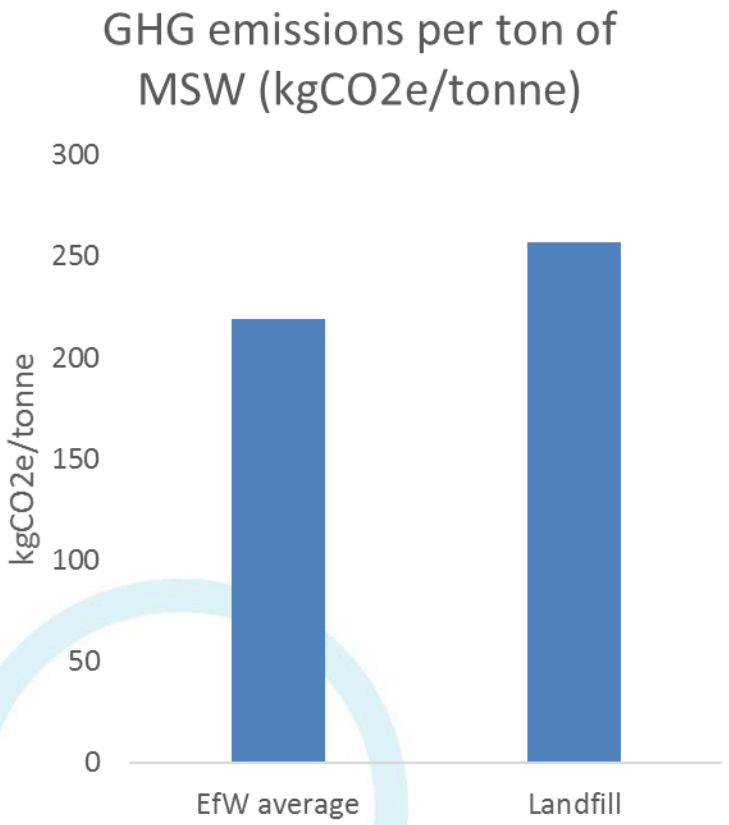
- The most comprehensive study of EfW emissions in Scotland to date

Results

For 2018 municipal residual waste sent to EfW in Scotland…

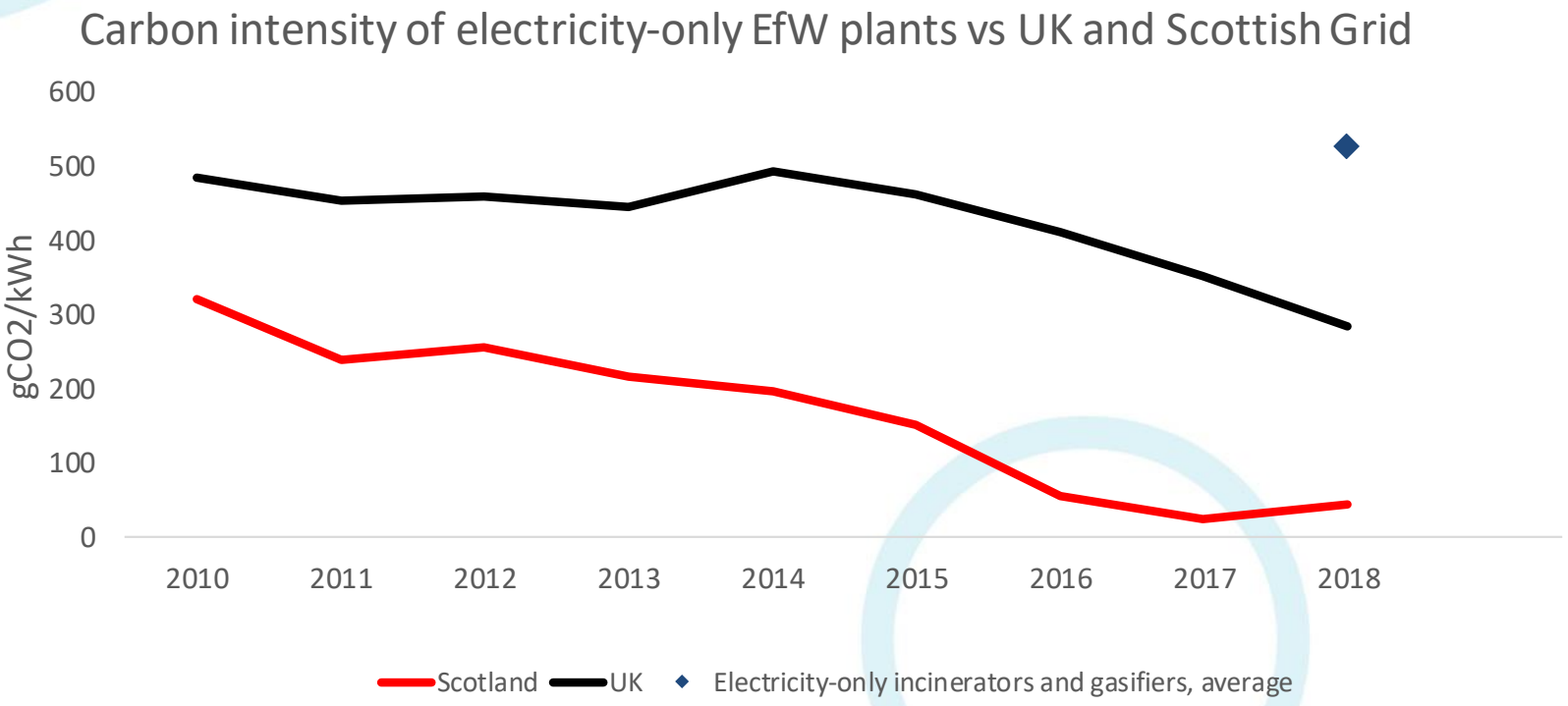
EfW was a lower carbon option than landfill, generating 15% less CO2e/tonne, however

Both landfill and EfW generate significant carbon impacts >200 kgCO2e/tonne



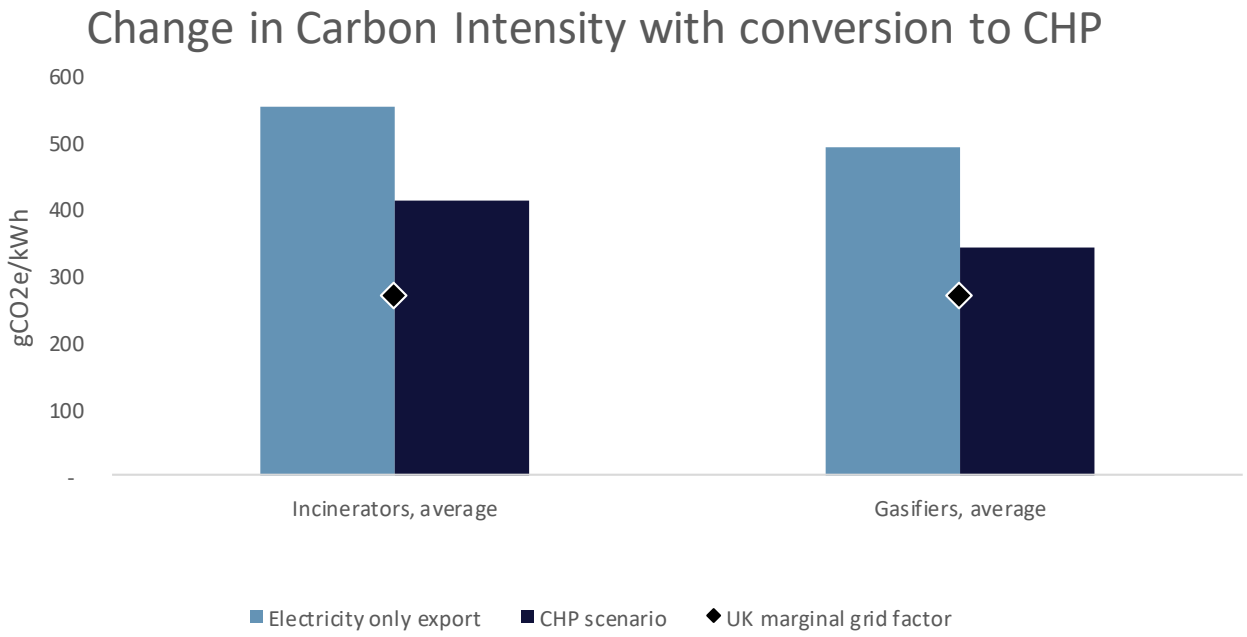
Results

EfW is no longer a source of ‘low carbon’ electricity in the UK



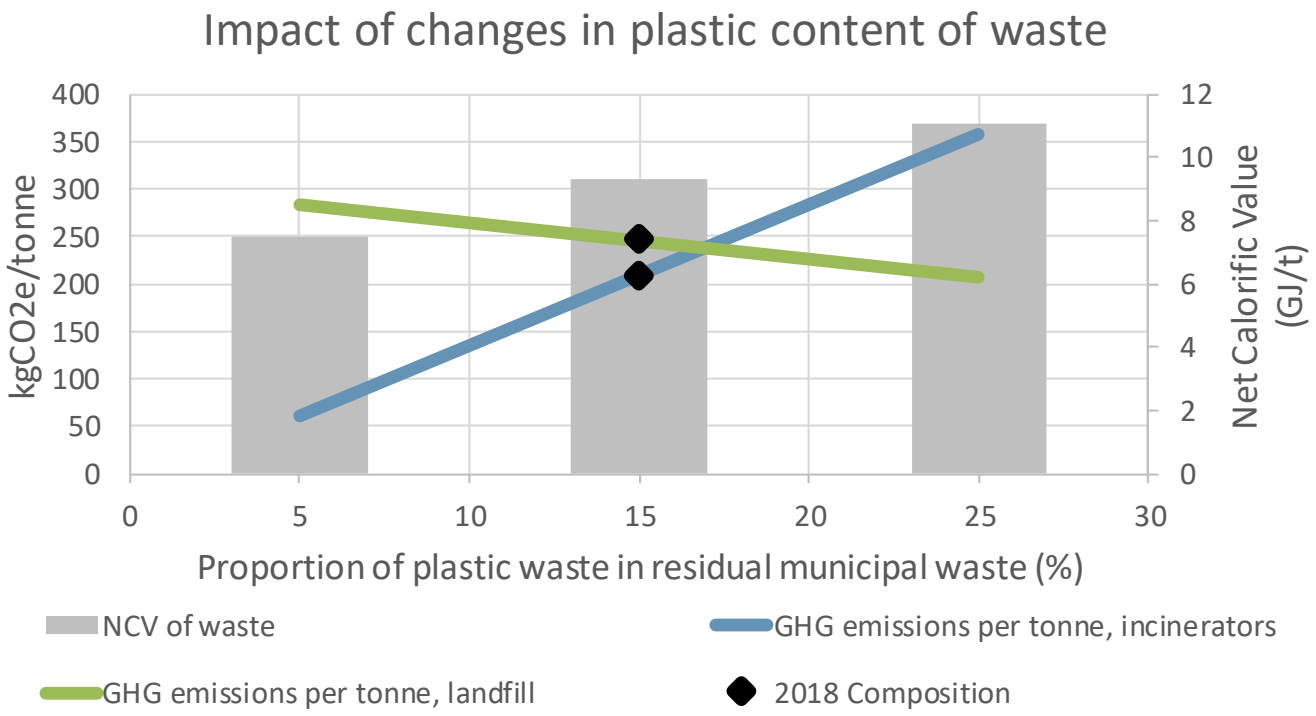
Sensitivity Analysis

Converting existing plants to CHP lowers carbon intensity



Sensitivity Analysis

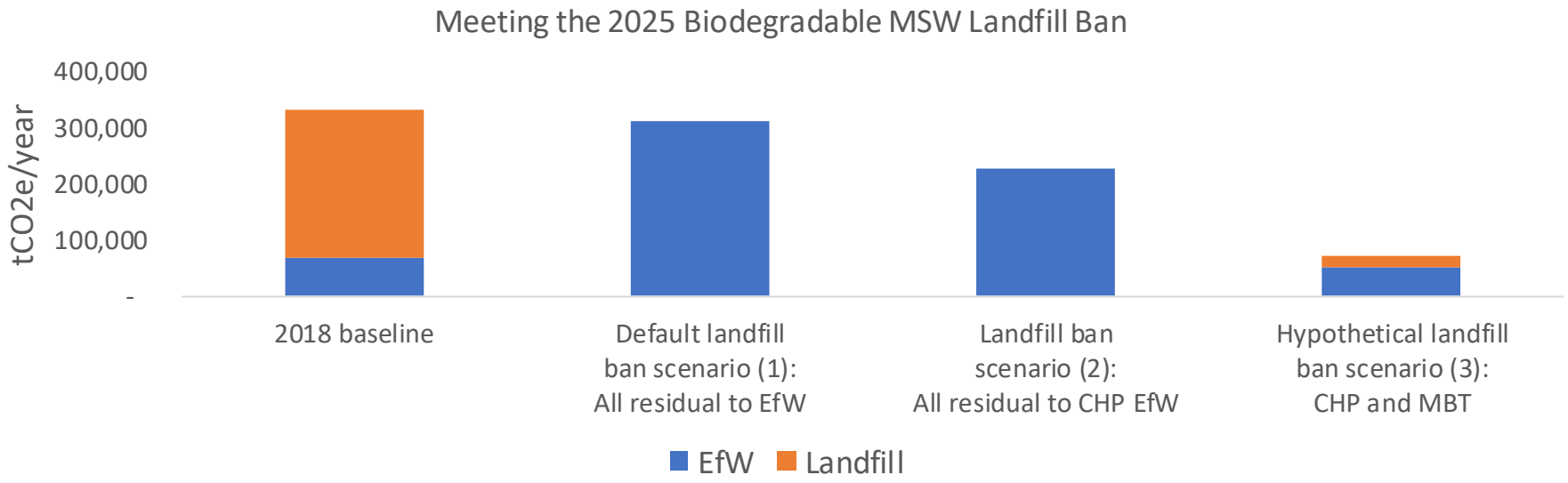
Results are highly sensitive to changes in waste composition



Looking ahead to 2025

Modest carbon savings will be achieved if the 2025 MSW landfill ban is met using current EfW technology

- Net impacts drops with conversion to CHP, but remain significant
- Reducing impacts further will require new measures/approaches
- MBT pre-treatment, as seen in other countries, is one possible option



Initial feedback

- The future role of EfW is hotly debated, highlighting the need for strong, independent evidence
- Stakeholders from all sides of this issue, are expressing their views
- Zero Waste Scotland will continue to work with these stakeholders to improve the evidence base and approach to waste management in Scotland

Next Steps

- Review all feedback received for consideration in an updated version of the report.

- Continuous improvement process:
  - Improve quality of data
  - Tonnage, compositional and plant data could be updated annually

- Work with industry and government to minimise climate change impact of residual waste

Conclusions

1. In 2018, EfW was a lower carbon option for treating residual municipal waste than landfill however,
2. Both EfW and landfill generate significant carbon impact and,
3. EfW is no longer a source of low carbon electricity in the UK
4. Converting EfW plants to CHP will improve their efficiency and reduce carbon intensity
5. EfW (and landfill) impacts are highly sensitive to waste composition
6. Reducing impacts further is likely to require additional measures

Thank you.

Thanks to:
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Colleagues in ZWS, RESAS and SEPA

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