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# Energy from Waste CHP

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## Energy from Waste CHP

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- INEOS Chlor Energy demand and proposed EfW plant
- Brief Introduction to Energy from Waste and the economics of Energy from Waste
- Issues for EfW CHP - the Renewables Obligation, Good Quality CHP and biomass metering

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## INEOS Runcorn Site – Energy Facts

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- **Facility energy demand over 300MW of electricity and 150MW of steam.**
  - Electrical power largely supplied from adjacent CCGT, steam is from gas fired CHP and on-site boilers
- **Continuing to look to diversify energy generation to a “fuel mix” rather than gas alone**
- **Proposed EfW CHP will deliver 80MW of power and 50MW of steam as baseload.**

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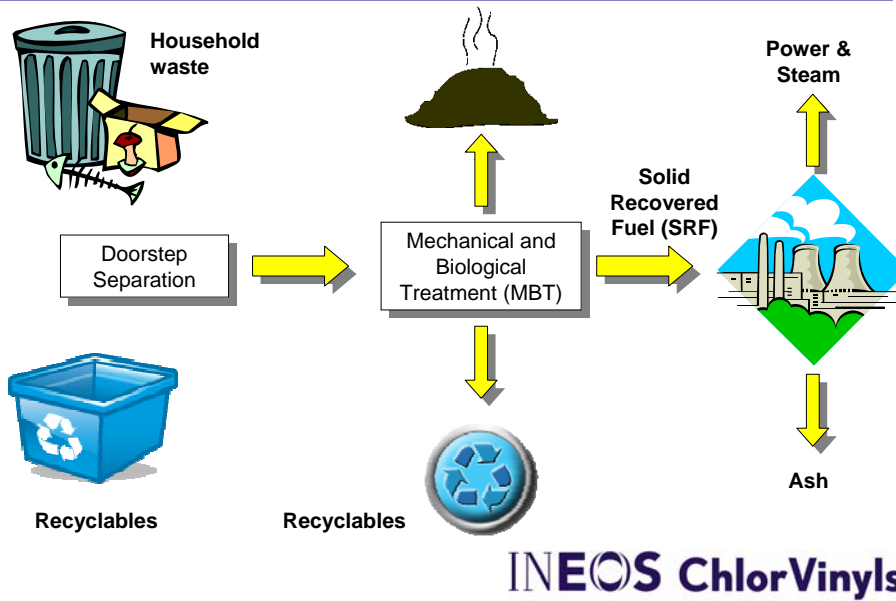
## Energy from Waste – the need

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- **EC Waste framework Directive (2006/12/EC)**
  - Article 3 – Member States should
    - firstly look to prevent or reduce waste production
    - secondly undertake
      - The recovery of waste by recycling, re-use or reclamation
      - the use of waste as a source of energy
- **EU Landfill Directive**
  - Article 5 (Biodegradable Municipal Waste or (BMW))
    - by 2010 reduce BMW to landfill to 75% of 1995 level
    - by 2013 reduce BMW to landfill to 50% of 1995 level
    - by 2020 reduce BMW to landfill to 35% of 1995 level

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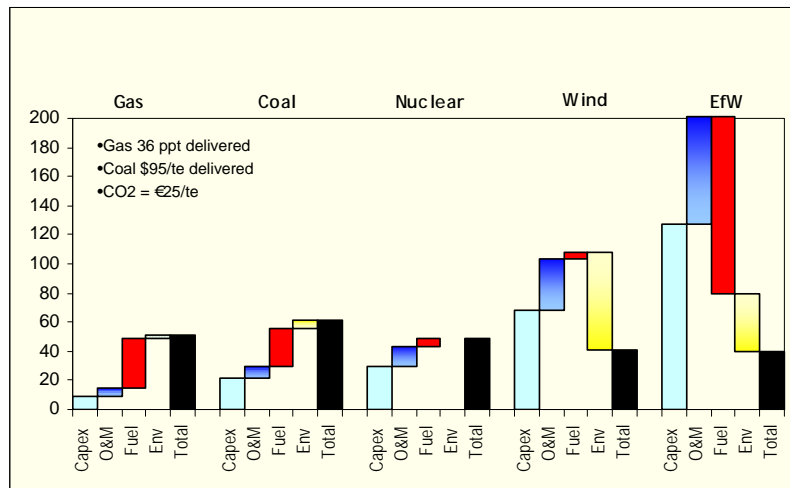
## Production of Solid Recovered Fuel From Municipal Waste



## SRF Characteristics

- **Dry, stable, odourless transportable fuel.**
- **Calorific Value typically 11-16 GJ/te (black coal approx 25GJ/te)**
  - 1 MWh of power typically requires 1 te SRF (power only plant)
- **Biomass content typically 60%**
- **ROCs only available for biomass content in SRF if electricity is**
  - produced in EfW CHP
  - produced by gasification & pyrolysis (*advanced combustion technology*)
- **For EfW CHP, ROCs issued on *qualifying* proportion of power output**

## New Build Generation Cost: (Euro/MWh)



Based in part upon "The Costs of Generation"  
2004, Royal Academy of Engineering

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## Cost of EfW Generation

- **Very high Capital cost & O&M**
- **Plant can operate at baseload with predictable output**
- **Economics depend substantially on**
  - Revenue for taking fuel (Gate fee)
  - Revenue from ROCs/LECs
  - Revenue from sale of energy

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## Challenges for developers of EfW

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- **Financing of high cost plants requires guaranteed revenues over long time periods**
- **Ilex report recommending EfW CHP for ROC support (1 ROC per MWh) was based upon**
  - Output being 100% GQCHP
  - biomass content of fuel 60%
- **Neither of these appear fully realisable**
  - Issues with X&Y factors arising from compliance with European CHP Directive
  - Issues with measurement of biomass content

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## Changes to UK CHPQA – X & Y factors

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- **Mahmoud Abu Ebid, DEFRA , 8<sup>th</sup> October**
  - “Some CHP schemes with TPO > 25MWe will not be able to fully qualify as GQCHP leading to reduced ROCs benefit”
- **High efficiencies level CANNOT be achieved with SRF as fuel**
  - Combustion temperatures restricted because of corrosive nature of fuel
  - (Electricity only efficiency typically 28%)

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## Biomass content of SRF

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- **In order to receive ROCs, OFGEM require measurement of biomass content.**
  - No ROCs have yet been issued for any waste burning plants (EfW CHP or advanced combustion)
  - Almost impossible to meet measurement criteria set down by Ofgem
    - Requires excessive and prohibitively expensive sampling of fuel
    - would **far** outweigh ROC benefits
- **In absence of measurement government proposing a default biomass content of 35%**
  - could be 50% or less of biomass content of some schemes!

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## Challenges facing EfW – possible solutions

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- **Separate ROC eligibility from CHPQA**
  - Legislation within the ROO setting efficiency targets
  - (would also fix eligibility within the Renewables Obligation Order rather than through CHPQA criteria)
- **Changes in legislation allowing sensible measurement of biomass in mixed waste streams**
  - Concern that this may require changes in primary legislation

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## Summary

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- **EfW CHP fits with a broad array of government & EU policy objectives**
  - Security of supply
  - Renewable
  - CHP
  - Waste & landfill directives (waste diversion)
- **Problems alongside GQCHP and waste sampling are recognised and solutions being sought**

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