Programme Area: Bioenergy

Project: Energy From Waste

Title: Initial financial model assumption list to promote discussion - Waste to Energy: High-level generic plant assumptions

Abstract:

This document should be read in conjunction with the Work Package 4 project framework document. This document was used to inform discussions at a project workshop.

Context:

The Energy from Waste project was instrumental in identifying the potential near-term value of demonstrating integrated advanced thermal (gasification) systems for energy from waste at the community scale. Coupled with our analysis of the wider energy system, which identified gasification of wastes and biomass as a scenario-resilient technology, the ETI decided to commission the Waste Gasification Demonstration project. Phase 1 of the Waste Gasification project commissioned three companies to produce FEED Studies and business plans for a waste gasification with gas clean up to power plant. The ETI is taking forward one of these designs to the demonstration stage - investing in a 1.5MWe plant near Wednesbury. More information on the project is available on the ETI website. The ETI is publishing the outputs from the Energy from Waste projects as background to the Waste Gasification project. However, these reports were written in 2011 and shouldn't be interpreted as the latest view of the energy from waste sector. Readers are encouraged to review the more recent insight papers published by the ETI, available here: http://www.eti.co.uk/insights

Initial financial model assumption list to promote discussion - Waste to Energy: High-level generic plant assumptions

The aim is to derive a cash flow model from which all manner of metric and 'output' could be obtained and presented. Some of which are discussed in the WP4 scoring matrix.

Item	Comments/Actions/Owner
Project Length	
Project Start (financial close - date contracts signed)	Assume 2012
Project life	EDF Energy & CPI (WP3): Optimal economic/technical length interaction
	Potentially assume 25 year project life
Electricity and Heat Strategy	
Electricity sales	Assume sales to the grid
Heat sales (demand and customer mix)	Heat modelled to plant 'gate' only - heat demand not modelled
Operational strategy (how much and when run which equipment -> drives elec sales price)	EDF Energy/CPI (WP3): simple capacity factor assumption to be made to derive a tariff
Plant flexibility (to meet heat demand profile)	EDF Energy/CPI (WP3): Heat demand will not be modelled, so only flexibility of fuel input and elec output are considered
Generation	
Plant type	CPI (WP3)
Plant heat efficiency	CPI (WP3)
Plant electrical efficiency	CPI (WP3)
Plant availability	CPI (WP3)
Plant capacity	CPI (WP3)
Capex/repex	
Capex equipment	Caterpillar (WP2)
Capex price & spend profile	Caterpillar (WP2)
Capex risk/contingency	Caterpillar (WP2)
Capex useful life (and therefore replacements required, proportion of repex/lifecycle required)	Caterpillar (WP2)
Enhanced capital allowance applied to capex or not	EDF Energy/Caterpillar (WP2)
Pricing (& volumes)	
Gate fee for landfill waste	EDF Energy - with Cranfield & Shanks (WP1)
Volumes for different recyclables	EDF Energy - with Cranfield & Shanks (WP1)
Prices different recyclables	EDF Energy - with Cranfield & Shanks (WP1)
Volumes for compost/organic material (@ different grades)	EDF Energy - with Cranfield & Shanks (WP1)
Prices for compost/organic material (@ different grades)	EDF Energy - with Cranfield & Shanks (WP1)
Standing tariff for heat per customer type	EDF Energy - will model single variable heat tariff at the plant 'gate'
Variable tariff for heat per customer type	EDF Energy - will model single variable heat tariff at the plant 'gate'
Variable tariff for electricity per customer type	EDF Energy - will model single variable electricity tariff ('to the grid') at the plant 'gate'
Sales price of electricity to grid	EDF Energy - will model single variable electricity tariff ('to the grid') at the plant 'gate'
ROC sales price	EDF Energy - will allow for input in the model (to be modelled as zero at ETI request)
ROC volume	EDF Energy - will allow for input in the model (to be modelled as zero at ETI request)
RHI sales price	EDF Energy - will allow for input in the model (to be modelled as zero at ETI request)
RHI volume	EDF Energy - will allow for input in the model (to be modelled as zero at ETI request)
FiT sales price	EDF Energy - will allow for input in the model (to be modelled as zero at ETI request)
FiT volume	EDF Energy - will allow for input in the model (to be modelled as zero at ETI request)
LEC sales price	EDF Energy - will allow for input in the model (to be modelled as zero at ETI request)
LEC volume	EDF Energy - will allow for input in the model (to be modelled as zero at ETI request)
LECs (or equivalent) end date	EDF Energy - will allow for input in the model (to be modelled as zero at ETI request)
REGO sales price	EDF Energy - will allow for input in the model (to be modelled as zero at ETI request)
REGO volume	EDF Energy - will allow for input in the model (to be modelled as zero at ETI request)
Triad price	EDF Energy
Triad volume	EDF Energy
Connection fees paid into project (heat)	EDF Energy - only model a single variable tariff for heat, thus exclude connection fees
Opex	
Waste transport costs	EDF Energy - with Cranfield & Shanks (WP1)
Sorting costs	EDF Energy - with Cranfield & Shanks (WP1)
Sorted waste transport costs	EDF Energy - with Cranfield & Shanks (WP1)
Tech processing costs	Caterpillar (WP2)
Tech running costs	Caterpillar (WP2)
Tech maintenance costs	Caterpillar (WP2)
Plant running costs	EDF Energy
Plant BOP	EDF Energy
Admin/office costs	EDF Energy
Fuel	
Fuel type	CPI (WP3)
Fuel calorific value	CPI (WP3)
Fuel emissions factors	CPI (WP3)
Waste Cost	EDF Energy - with Cranfield & Shanks (WP1)
Fuel cost (back-up/alternate fuel sources; e.g. gas)	EDF Energy/Caterpillar (WP2) - if Caterpillar state back-up required
Fuel transportation cost	EDF Energy
Heat Network	Excluded
Network loss factors (heat)	Excluded
Capex and opex cost for DE network	Excluded
Greenhouse gases (Savings and other)	
Emissions volumes	CPI (WP3)
Carbon emissions methodology (vs. base case etc)	EDF Energy
Carbon costs applicable	EDF Energy to allow for input
Other emissions	
Other emissions volumes	CPI (WP3)
Cost of prevention of release of other GG	EDF Energy/Caterpillar (WP2)
Financial & modelling	
Upfront costs (costs to close)	All parties
Funding methodology	EDF Energy - model pre finance
Ownership structure	EDF Energy - model pre finance
Finance structure	EDF Energy - model pre finance
Bank debt rate	EDF Energy - model pre finance
Terminal value	Assume no terminal value beyond project life
Tax rate	EDF Energy - model pre tax
VAT rates	Assume UK large business VAT rates - required for accurate initial cash flows
Working capital	EDF Energy - with Shanks for waste and recyclables (WP1)
Capital allowances	EDF Energy - model pre tax so not directly relevant, but useful to include
Interest rate on cash balance	EDF Energy - model pre finance
Interest rate on overdraft	EDF Energy - model pre finance
Indexation	
indexation factors (capex, opex, labour etc)	ETI to provide guidance