

“Empowering Rural Industries”

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“The Scotch Whisky Industry and the Circular Economy”



Scotch Whisky Summary

- 110+ Malt Distilleries and 7 Grain Distilleries
- £4 Billion of exports per annum
- Sent to 200 markets worldwide
- 80% of Scotland's Food and Drink exports
- A quarter of the UK's Food and Drink exports
- Growth and expansion “at both extremes”





Volume Considerations Whisky

e.g Highland Park Distillery, Orkney

- Capability approx 2.5 mla per annum
- 125 Tankers 63% Spirit
- 300+ Tankers Spent Lees
- 1000+ Tankers Pot Ale
- 250 Trucks Draff

Volume Considerations Whisky

Entire Industry

- 600mla per annum (8%)
- 30,000 Tankers 63% Spirit
- 72,000+ Tankers Spent Lees
- 240,000+ Tankers Pot Ale
- 60,000 Trucks Draff

Options for disposal

- Sea outfall
- Land spreading
- Animal feed
 - Wet draff or dreg
 - Distillers dark grains
 - Pot Ale Syrup
- Anaerobic Digestion
- Combustion
- Novel IB (Industrial Biotechnology) solutions

Issues with Traditional Solutions

- Problems of concentration
 - Speyside
 - Grain distilleries
- Transport cost soon exceeds value of feed/energy/product
- Cost of Energy of Processing
- Scale
- Capex commitment

Financial Incentives Framework

- Renewable Obligations Certificates
- Feed In Tariffs
- Renewable Heat Incentive
- Road Transport Fuels Obligation



Aalborg Energie Teknik a/s

AET has capabilities in development, design, supply, construction, commissioning, operation & maintenance, rehabilitation and conversion of process steam plants, CHP-plants and power plants, fired with a wide range of biomass fuels such as wood chips, bark, demolition wood, wood waste, sander dust, chicken litter, spent compost, meat & bone meal, agricultural waste, grown biomass fuel a.m.

AET also offers consultancy services in the biomass and boiler field.



Helius CoRDe Ltd, Scotland - UK

34 MW_{fuel heat input} - 8.3 MW_e - 80 bara - 450 °C

The Helius CoRDe Plant is a biomass fired CHP-plant located in Rothes, Scotland with an annual fuel input of 115.000 tons of wet draff from local whisky distilleries and 60.000 tons of virgin or clean uncontaminated wood chips.

The plant will be completed and commissioned in 2013.

As turn key supplier Aalborg Energie Teknik a/s will design, supply, construct and commission the following scope of supply:

- Fuel reception, handling and storage systems for draff and wood chips
- Draff press and drying systems
- AET fuel feeding and dosing system
- AET Combustion System with spreader stoker and AET-Biograte
- AET draff combustion system
- Natural gas burner
- AET boiler with superheater and economizer
- AET SNCR DeNOx system
- Bag filter with lime injection system
- Flue gas system and stack
- Ash handling system
- Water/steam system
- Water treatment plant
- Steam turbine
- Condenser and cooling tower
- Electrical system
- PLC control system and SCADA system
- Boiler, turbine and service building



The Helius CoRDe biomass plant site (February 2011)

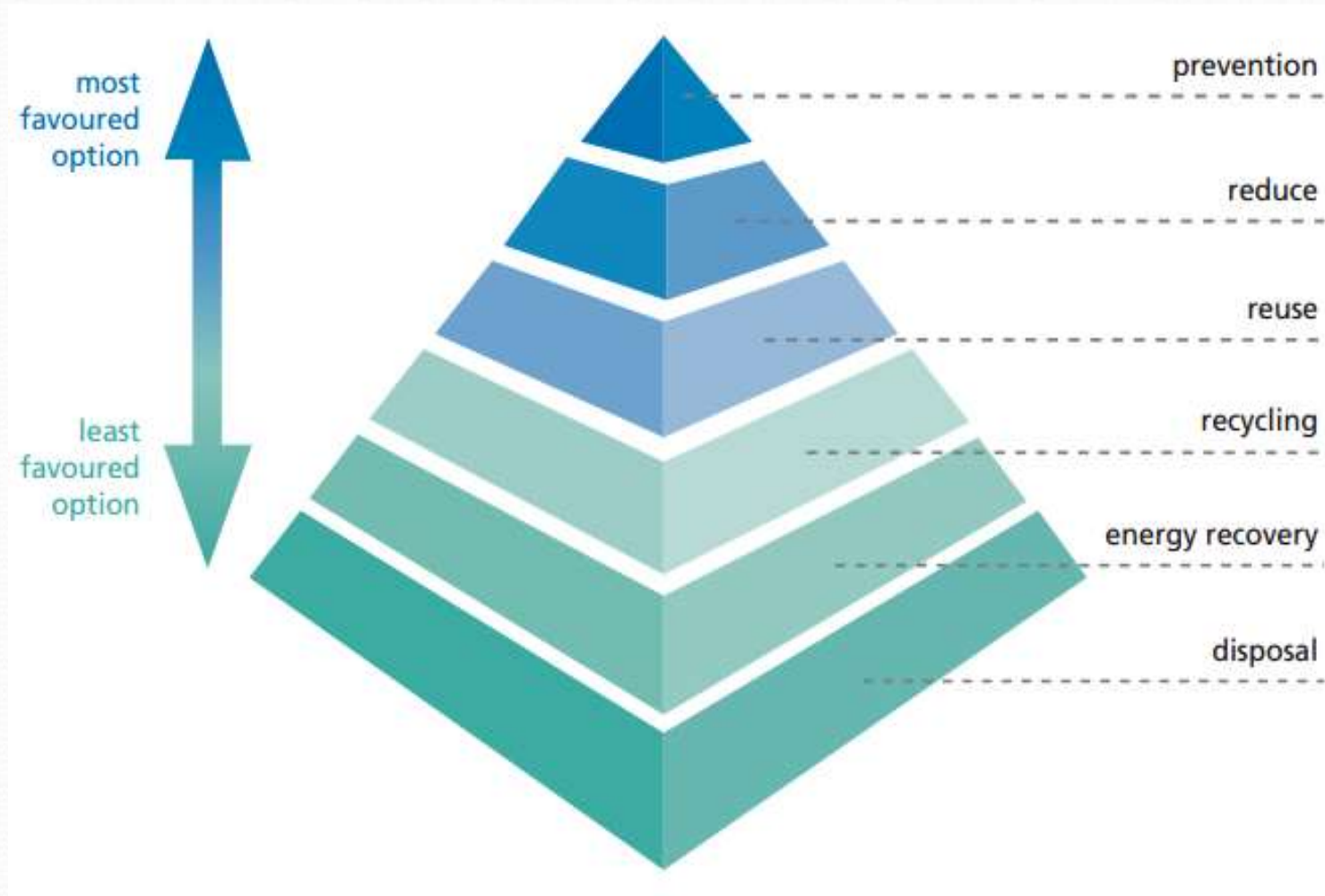
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Current SWI Co-product Situation

- Still much outfall and land disposal, especially in periphery
- AD increasing in use especially at Grain and larger distilleries.
- Dark Grains Plants still run but are not replaced
- Combustion around but controversial
- Small, distributed solutions still of great interest

Waste Hierarchy (ZWS)



IB companies using Whisky Co-Product as their Feedstock

- Horizon Proteins (Protein for aquaculture)
- Celtic Renewables (Butanol etc.)
- Xanthella (Microalgae)
- PUReOPE (Polyphenol recovery)
- Scottish Bioenergy (Microalgae)
- and others

(not mutually exclusive)

Scotch Whisky's IB Opportunity

- A Circular Economy approach
- A **local** biorefinery concept
- Co-products from distilling (and brewing) used as feedstocks for high value processes
- “Stranded” local electricity used to produce high value products such as microalgae or polyphenols
- Linkage to **local** Aquaculture and Agriculture

Scotch Whisky Distilling : Vision

- Biomass fuelled, including biogas
- Onsite electricity generation
- CO₂ Recovery for Microalgae production
- Co-products as feedstocks for high value processes
- Protein recovery from Pot Ale
- Not subsidy driven to combustion
- Net carbon capture?

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