

Fast Pyrolysis Barriers

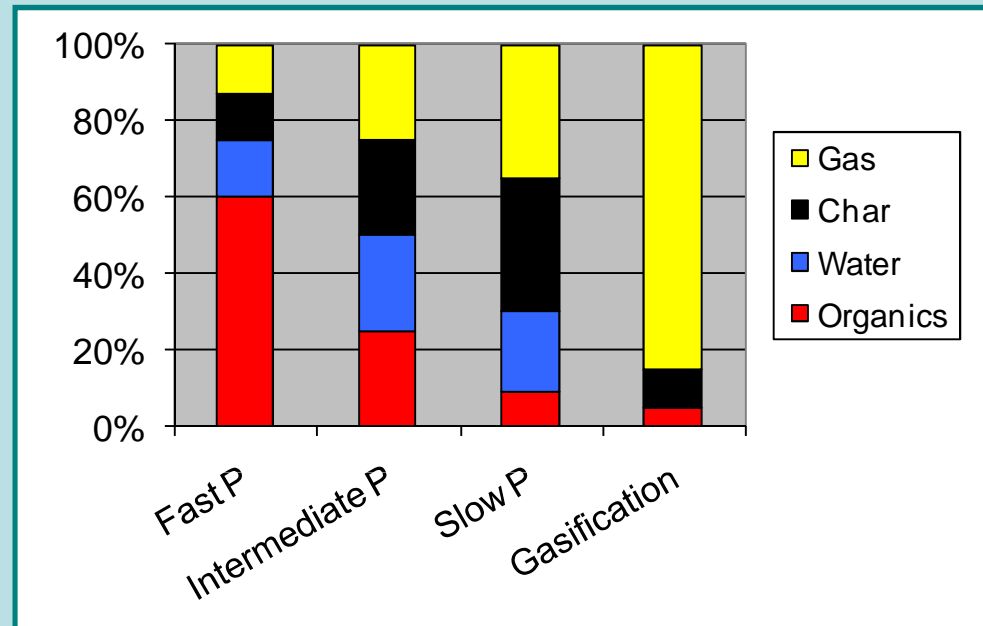
Technical and Non-technical

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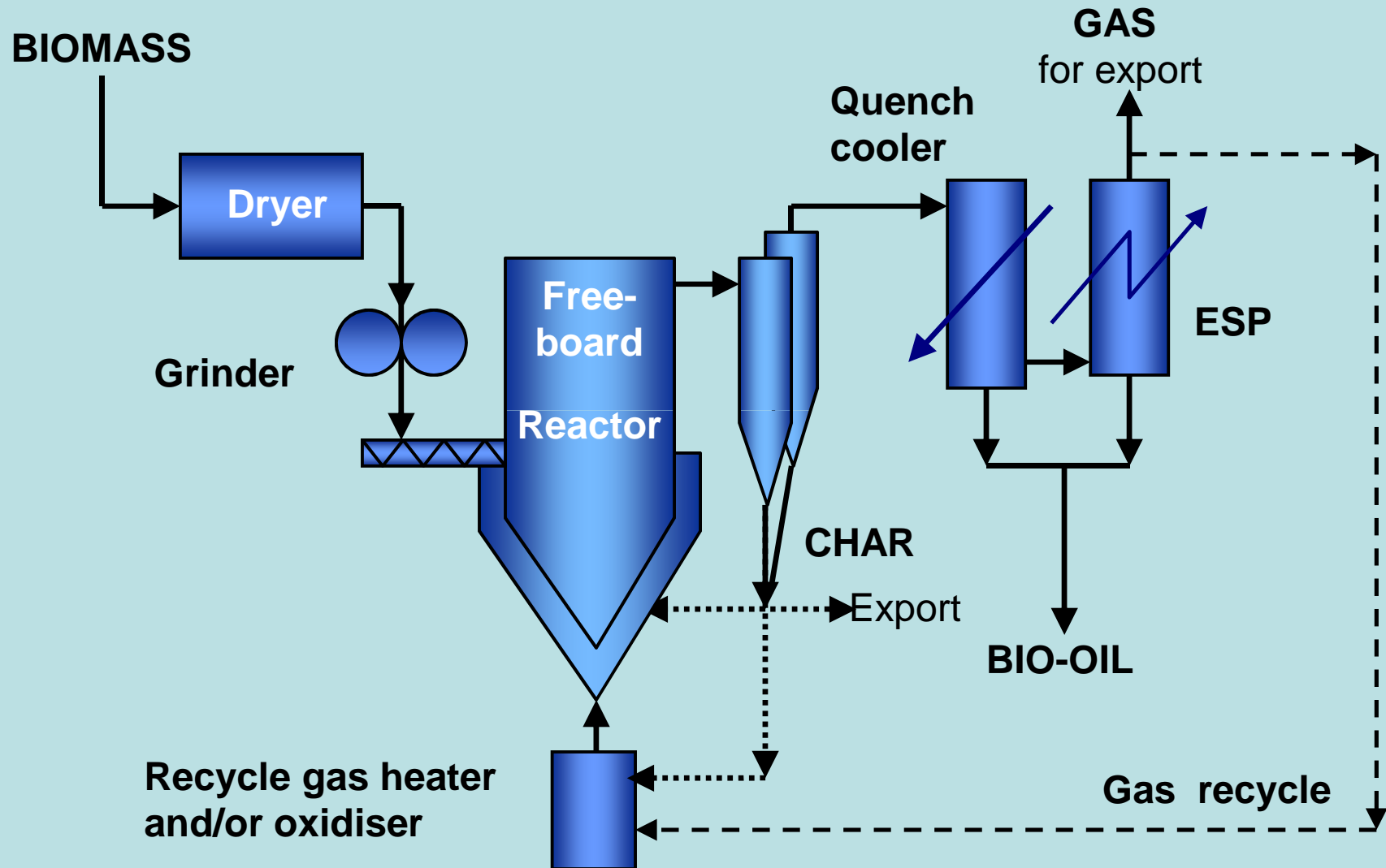


Opportunities

- Flexible range of products
 - liquid, solid, gas
- Process can be energy self sufficient
- High energy density liquid as an energy carrier
- Direct use for power, heat, chemicals
- Technical and economic advantages in gasification for biofuel synthesis
- Potential for direct production of biofuels as hydrocarbons and/or refinery feedstocks



Conceptual process



Issues - 1

■ Feed

- selection
- preparation
- fractionation
- characteristics
- modification
- drying
- size & shape
- location
- seasonality
- multiple feeds

■ Reactor

- configuration
- development
- catalysts
- heat supply
- scale up
- scale limits
- improved modelling

■ Liquid product

- vapour condensation
- aerosol capture
- quality control
- norms and standards
- trading

■ Gas product

- recovery
- utilisation

■ Char product

- separation
- utilisation



Issues - 2

■ Cost reduction

- from optimisation
- From process development
- From learning

■ Applications

- integration with upgrading
- interaction with applications
- norms and standards
- health and safety
- transport
- trading
- environment
- user's lack of familiarity
- biorefineries
- fuels, chemicals, biofuels



Pyrolysis non-technical barriers

Economics	All bio-fuels have to compete with fossil fuels. No company will invest in a guaranteed loss. Support may always be needed
Perception	Everyone wants renewables – but not near me! Pyrolysis is viewed as a “dirty” & “smelly” process
Politics	Fiscal incentives [or disincentives] are needed. Only governments can create the instruments.
Scale	Economies of scale – the larger the cheaper. But biomass is diffuse - 10 MWe = 40 km ² . Technology limitations must not be forgotten
Risk	Investors compare risk & return $H_i + H_i / L_o + L_o$ Technology developers minimise technical risk.
Competition	Gasification, combustion, biofuels
Vested interests	Existing providers will compete!
Health & safety	Process and products
Permits	Planning permission increasingly difficult - NIMBY

