

# Bio-Oxidation of Low Calorific Landfill Gas

at Kinsale Road Landfill Site, Cork

Presented by:

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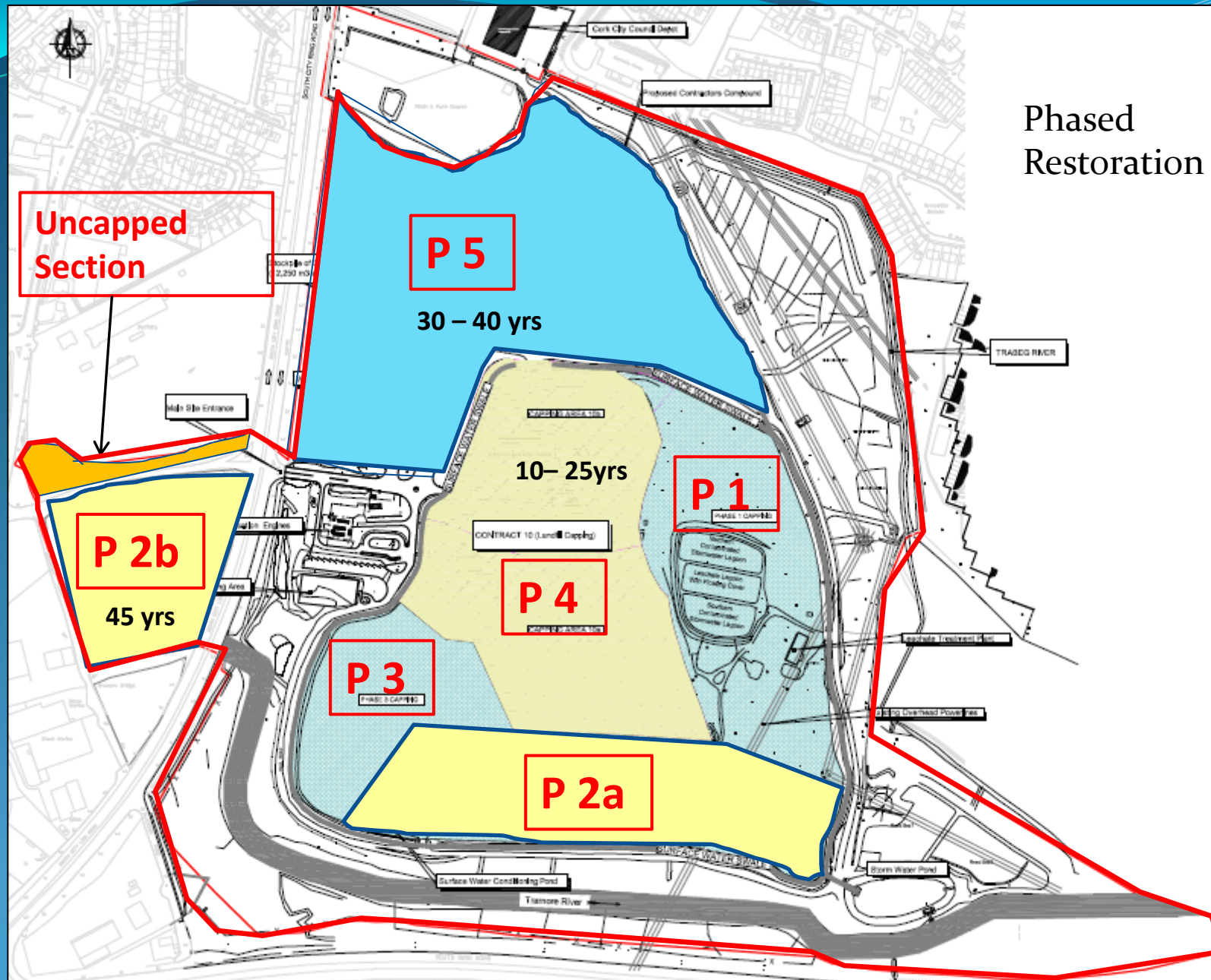
## Background

### Low Calorific Landfill Gas @ Kinsale Road Landfill Site

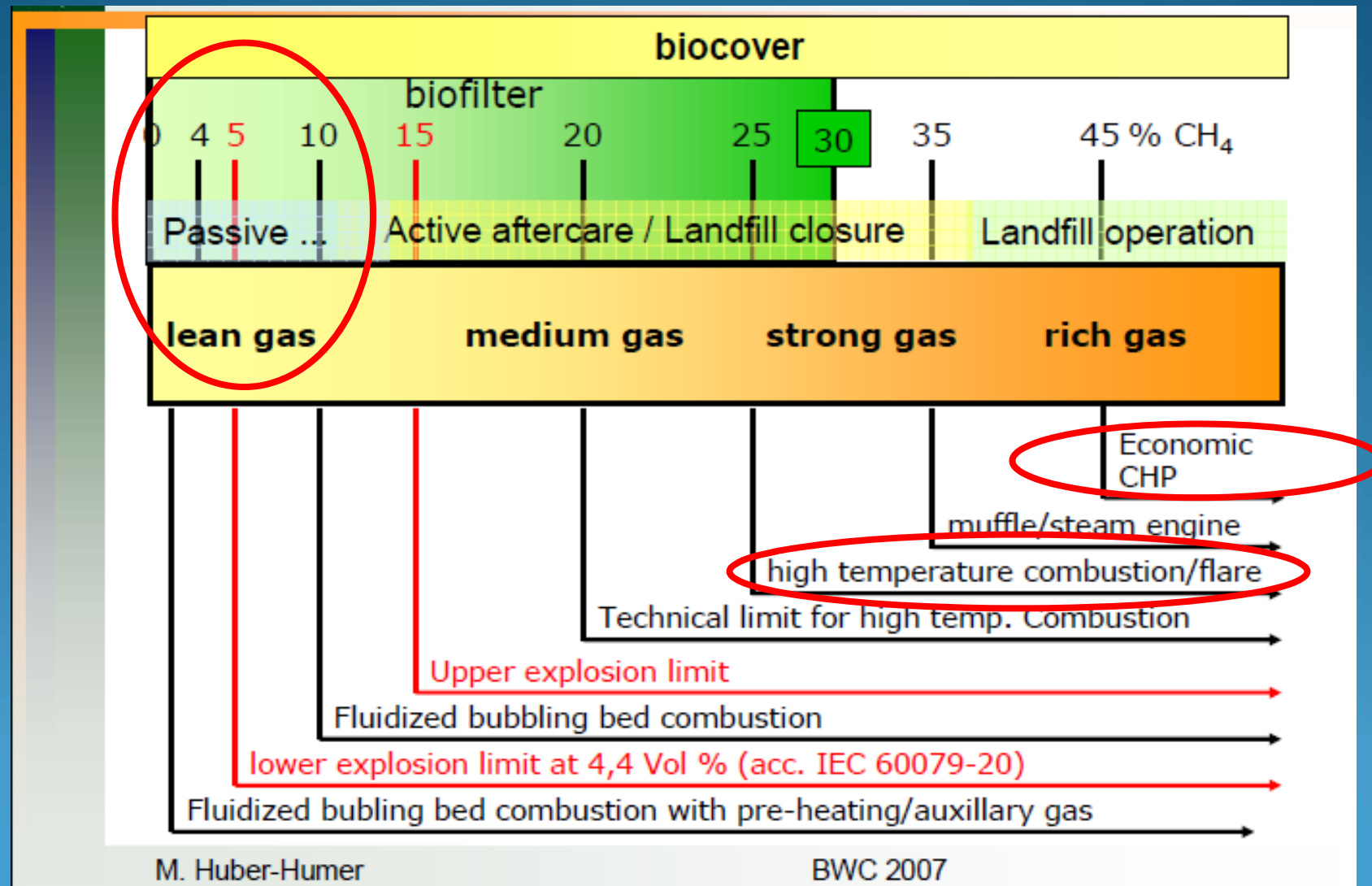
- Old unengineered landfill site – operated 1963 – 2009
- Site is 70ha, 35ha waste footprint, majority of waste in landfill dome (25ha)
- 2.78m tonnes of non hazardous municipal waste landfilled at the facility
- Site Restored (capped) & due to open as a park in 2018
- Deposited waste of varying age at the landfill site
- Gas yield (quality and quantity) is declining
- 0.5 Mw LFG Engine/turbine (operating at 60% load capacity)
- Low Calorific Gas from portions of the site is collected but unburnt (700m<sup>3</sup>/hr of “dirty air” (0.1 - 3% CH<sub>4</sub>))
- The landfill operator is currently non compliant with the regulator (EPA) as all gas requires ‘thermal oxidation’
- Alternative solution to bio-oxidise the low calorific LFG



## Phased Restoration



# Landfill Gas Utilisation Ranges According to Methane (CH<sub>4</sub>) % Concentration





# Exploration of Bio-Oxidation

- Designed & Built a Biofilter unit (12m<sup>3</sup> (2x3x2 WxLxH))
- Situated on a concrete pad (20mx20m) on restored area
- Fibreglass unit, insulated hood, stainless steel fittings
- Two Suspended Decks (fibreglass grills) with bark mulch (0.5m depth) 3m<sup>3</sup>/deck
- Irrigation system installed in each deck
- Field trials commenced end May 2017
- Poor initial results (cold gas)
- Installed heating system (air – water) in March 2018
- Aiming for steady state 30°C, 50% moisture content
- **Test bed** – ability to control CH<sub>4</sub>% range at inlet to bio-ox unit and gas flow (variable speed blower)
- IOT sensors to be installed (CH<sub>4</sub>, O<sub>2</sub>, CO<sub>2</sub>, Temp, moisture content, humidity)
- Ultimate aim is to (partially) replace large 2500m<sup>3</sup>h<sup>-1</sup> flare/blower unit with the bio-ox unit for treatment of lean gas and comply with licence obligations

# Expected Outcomes

- Reduction in fugitive methane emissions from the facility
- Contribute to lowering Cork City Council's carbon footprint and associated energy use
- Considerable Energy Saving
  - 2 Amp** motor in bio-ox unit versus
  - 32 Amp** motor in large flare unit
- Cost Savings:
  - **€16,000** electricity cost to operate existing flare unit
  - **€1,000** electricity cost to operate bio-ox unit
- Contribute to existing field of knowledge
- Replication possibilities at similar type facilities











# Acknowledgements

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- Mr. Robin Bateman, Irish Biotech Systems Ltd.
- Mr. Garret Fallon, Director, Irish Biotech Systems Ltd.
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