

Nottingham City Transport Biogas Double Deck Buses and Fuelling Infrastructure



Nottingham City Transport

- The major inner city operator in Nottingham
- Current fleet 312 buses, 222 double deck and 90 single deck / midi buses, average age 6.3 years
- 76% Euro V & VI; 24% Euro III & IV
- Nottingham is one of the 5 Cities outside London to have a mandatory Clean Air Plan
- UK Bus Operator of the Year 2012, 2014 and 2016, City Operator of the Year 2018



Clean Air Challenge

- Euro VI required by 2020
- 53 biogas double deck buses (plus fuelling infrastructure) purchased in 2016 – 2018
- 185 Euro V buses to be fitted with upgraded SCR exhaust treatment systems to give Euro VI equivalent NOx
- 67 double deck buses to be purchased in 2019
- This will give fleet all Euro VI or Euro VI equivalent



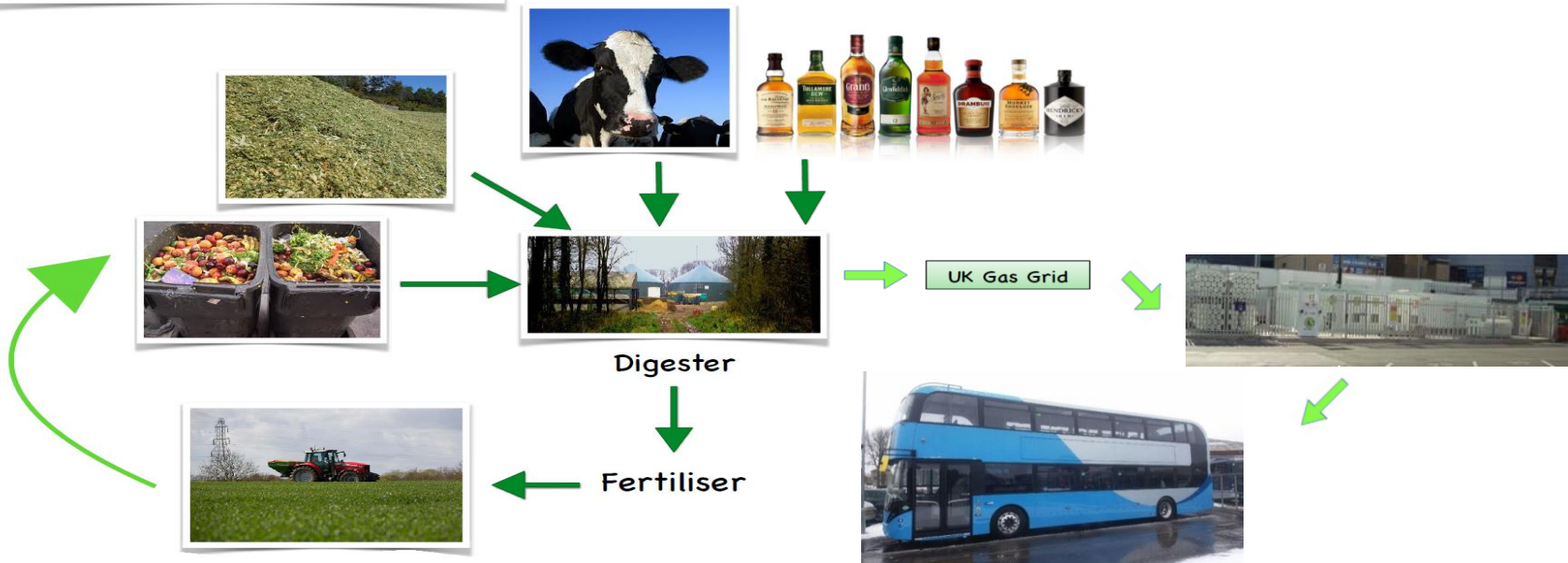
Why Biogas for NCT?

- Diesel – complicated exhaust treatment for Euro VI and limited impact on carbon footprint
- Electric – insufficient range, concerns regarding infrastructure, battery and whole life costs
- Biomethane gas bus achieves our objectives of a 250 mile range and, CO₂ emissions and is available now, in time for the Clean Air Zone in 2020



Biomethane Production Cycle

Biomethane - Supply Chain (1)



Gas Double Deck Buses



Gas Bus Fuelling



Gas Buses - Benefits

- Range of 250 miles with only 3-4 mins fuelling time
- Biomethane fuel facilitates a carbon footprint that is a close to carbon neutral as currently possible
- Driveline technologies used in gas buses are conventional
- Biogas buses are not only clean and green, they run smoother and quieter than diesel engines to give an enhanced passenger experience
- Gas buses achieve Euro VI emission standards without the use of complicated exhaust treatment and Adblue



Pollutants

- The initial focus was on particulates
- More recently NO_x has been recognised as a serious pollutant
- Ammonia is the one pollutant that has increased in recent years – will that be the next cause for concern?



Future Pollutant?

Ammonia emissions rise in UK, as other air pollutant levels fall

Levels of powerful air pollutant rose by 3.2% from 2015 to 2016 according to government statistics



The Next Phase

- 67 more new double deck buses are required (bringing the total to 120) and complete the exhaust retrofit project
- Double the capacity of the fuelling infrastructure with the addition of more compressors, storage and dispensers
- But – the lack of support from Central Government to decarbonise public transport via biogas buses is both challenging and disappointing



Nottingham City Transport

Thank You



Nottingham City
Transport



**AWARD WINNING
BUS COMPANY 2018**

City Operator of the Year
Gold Winner of the Environment Award
Britain's Top Bus Driver