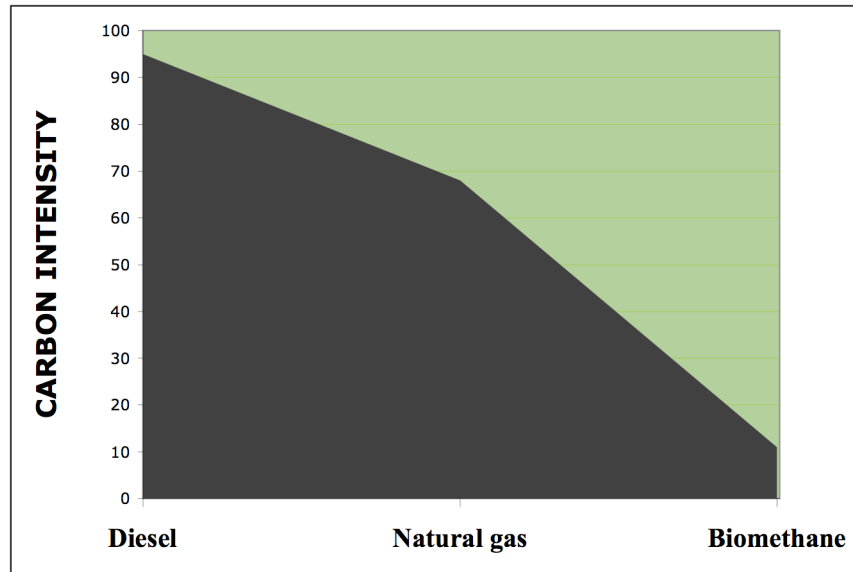


Appendix 7

Greenhouse Gas Reductions Achieved with Natural Gas and Biomethane Fuels

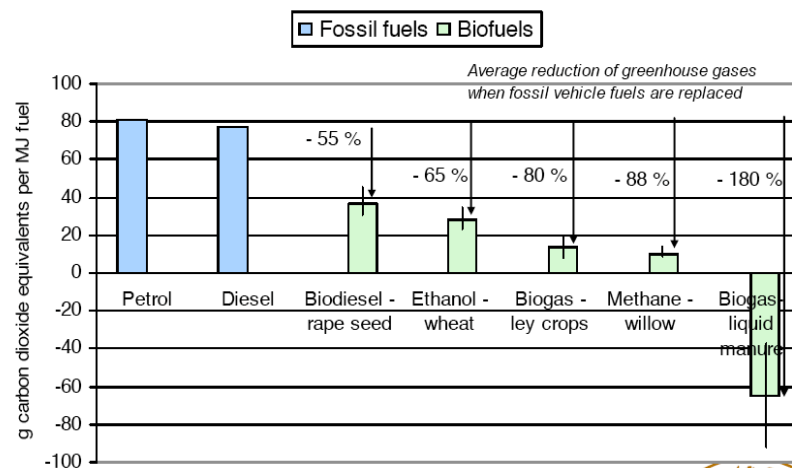
In establishing its new Low Carbon Fuel Standard (LCFS), the California Air Resources Board characterizes conventional and alternative fuels by their “carbon intensity,” a ratio that relates “well-to-wheels” greenhouse gas (GHG) emissions to delivered energy, and that measures all GHGs in “carbon dioxide equivalents.” Low-sulfur diesel fuel



has a carbon intensity value of “95,” but two substitutes for diesel – natural gas and biomethane – have significantly lower carbon intensities. Natural gas has a carbon intensity of “68” and biomethane made from landfill gas has a carbon intensity of “11.” This means that natural gas reduces carbon emissions compared to diesel by 28%, considered over the entire lifetime of the fuel, (although it has a lower 20-23% reduction in emissions that are measured at the tailpipe). Biomethane reduces these heat-trapping gases by 88% over the fuel’s lifetime cycle, as depicted on the chart above. Source: LCFS Lookup Tables. <http://www.arb.ca.gov/fuels/lcfs/lcfs.htm>. L

Research in Sweden comparing greenhouse gas emissions of several biomass-based fuels to conventional gasoline (petrol) and diesel, finds that biogas made from liquid manures reduces GHG emissions by 180% when compared to fossil fuels.

Emissions of greenhouse gases (well-to-wheel)



(Based on current conditions in Northern Europe, biomass-based energy input in biofuel plants, and economic allocation of by-products)

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