

0843 Supporting Evidence	GDN Comments	Relevance
<p>(2022) Continuous CH<sub>4</sub> and δ<sup>13</sup>C<sub>4</sub> measurements in London demonstrate under-reported natural gas leakage  <a href="https://acp.copernicus.org/articles/22/3595/2022/acp-22-3595-2022-discussion.html">https://acp.copernicus.org/articles/22/3595/2022/acp-22-3595-2022-discussion.html</a></p> <p>Long-term methane stable isotope analysis coupled with mole fraction measurement has been used to link isotopic signature to gas leaks in London, UK.  Location: Imperial College London, Huxley roof</p>	<p>It cannot be concluded that the leakage element of the SLM is misreported by 30-35% as this paper describes a study in London which is not representative of the whole of the UK.</p>	<p>Single study in London not representative of the whole of the UK.</p>
<p>(2022) Street-level methane emissions of Bucharest, Romania and the dominance of urban wastewater  <a href="https://doi.org/10.1016/j.aesoa.2022.100153">https://doi.org/10.1016/j.aesoa.2022.100153</a>  An example of a city-level study that explores the source apportionment of methane emissions.</p>	<p>This describes a study in Bucharest which identified "58-63% of CH<sub>4</sub> elevations (above background) were attributed to biogenic wastewater". This is outside of the UK and therefore not representative of UK DN Shrinkage.</p>	<p>Study in Bucharest not representative of the UK.</p>
<p>(2019) Environmental baseline monitoring for shale gas development in the UK: Identification and geochemical characterisation of local source emissions of methane to atmosphere  <a href="https://doi.org/10.1016/j.scitotenv.2019.134600">https://doi.org/10.1016/j.scitotenv.2019.134600</a></p>	<p>This study was to establish a baseline ahead of shale gas extraction not to allocate the background emissions and compare to any models.</p> <p>The 2019 Shale gas study states that the value for natural gas emissions is in the range -42 to -39, as this is returning higher values outside the natural gas range and also outside the cow barn range (-67 to -58) then where is this methane from.</p> <p>This states that it is overstated. Based on London not applicable to GB.</p> <p><b>Note: This has been taken out of the appendix of the mod.</b></p>	<p>No relevance.</p>
<p>(2019) Assessing London CO<sub>2</sub>, CH<sub>4</sub> and CO emissions using aircraft measurements and dispersion modelling  <a href="https://doi.org/10.5194/acp-19-8931-2019">https://doi.org/10.5194/acp-19-8931-2019</a></p>	<p>This is arguing that CH<sub>4</sub> values inventories are too high contradicting other studies. This paper does not appear to be relevant to the case for suggesting that Shrinkage volumes are understated as it describes a single study in London which yielded an inventory scale factor of 0.66-0.79 for CH<sub>4</sub>.</p>	<p>Single study in London not representative of the whole of the UK.</p>
<p>(2017) Characterization of interferences to in situ observations of δ<sup>13</sup>C<sub>4</sub> and C<sub>2</sub>H<sub>6</sub> when using a cavity ring-down spectrometer at industrial sites  <a href="https://doi.org/10.5194/amt-10-2077-2017">https://doi.org/10.5194/amt-10-2077-2017</a>  "An example study conducted on a UK compressor station, carried out by the LSCE Paris group a few years ago now and linked with an NPL survey of the site. This was from the early days of the laser-based instruments and there were difficulties in extracting good ethane data." (Dave Lowry, RHUL)</p>	<p>This paper does not appear to be relevant to the case for suggesting that Shrinkage volumes are understated as it discusses the biases that need to be accounted for when measuring elevated C<sub>2</sub>H<sub>6</sub> for CH<sub>4</sub> source determination.</p>	<p>No relevance.</p>
<p>(2017) Evaluating methane inventories by isotopic analysis in the London region  <a href="https://www.nature.com/articles/s41598-017-04802-6">https://www.nature.com/articles/s41598-017-04802-6</a></p>	<p>This paper describes a study in London which is not representative of the whole of the UK.</p>	<p>Study in London not representative of the whole of the UK.</p>
<p>(2017) Origins and trends in ethane and propane in the United Kingdom from 1993 to 2012  <a href="https://www.sciencedirect.com/science/article/pii/S1352231017301103">https://www.sciencedirect.com/science/article/pii/S1352231017301103</a></p>	<p>This paper describes a study, using data from 13 monitoring stations. It concludes that 'a program of leak detection and repair may be a cost-effective solution for fixing leaks that have become apparent through atmospheric observations.'</p>	<p>Number of monitoring points not large enough to be representative of the entire UK gas network.</p>
<p>(2016) Spatial and temporal variability of urban fluxes of methane, carbon monoxide and carbon dioxide above London, UK  <a href="https://acp.copernicus.org/articles/16/10543/2016/acp-16-10543-2016-discussion.html">https://acp.copernicus.org/articles/16/10543/2016/acp-16-10543-2016-discussion.html</a></p>	<p>This paper describes a study in London which is not representative of the whole of the UK. Additionally, it suggests that 'biogenic sources of CH<sub>4</sub>, such as wastewater, is unaccounted for by the atmospheric emissions inventories, make a substantial contribution to the overall budget'.</p>	<p>Study in London not representative of the whole of the UK.</p>
<p>(2017) Natural gas and climate change  <a href="https://pure.manchester.ac.uk/ws/portalfiles/portal/60994617/Natural_Gas_and_Climate_Change_Anderson_Broderick_FOR_DISTRIBUTION.pdf">https://pure.manchester.ac.uk/ws/portalfiles/portal/60994617/Natural_Gas_and_Climate_Change_Anderson_Broderick_FOR_DISTRIBUTION.pdf</a></p>	<p>This paper does not appear to be relevant.</p>	<p>No relevance.</p>
<p>(2015) Plume mapping and isotopic characterisation of anthropogenic methane sources  <a href="https://www.sciencedirect.com/science/article/abs/pii/S1352231015002538">https://www.sciencedirect.com/science/article/abs/pii/S1352231015002538</a>  Methane stable isotope analysis coupled with mole fraction measurement has been used to link isotopic signature to methane emissions from landfill sites, coal mines and gas leaks in UK.</p>	<p>This paper does not appear to be relevant to the case for suggesting that Shrinkage volumes are understated but does make the case for the discrepancies between a "bottom up" approach and direct measurements.</p>	<p>No relevance.</p>