



## Assessing the estimated methane emission into the atmosphere by landfills in Spain

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During the active life of a landfill and even decades after being closed, different harmful gases related with the decomposition of the wastes can be released into the atmosphere, such as carbon dioxide, methane, volatile organic compounds, etc. In order to control the emission of these pollutants, biogas extraction systems are implanted, but a percentage of them escapes into the atmosphere through the surface of the landfill as the so-called fugitive emission.

Methane is one of the most powerful greenhouse gases. It is increasing in the atmosphere by 0.6% each year and more than 10% of the total anthropogenic emissions of this gas is originated in landfills. Normally, landfills report their methane emissions to the atmosphere using model-based methods on the rate of production and oxidation rate, and on the amount of methane recovered. This approach can involve large uncertainties due to inaccuracies of input data and assumptions in the estimation. In fact, we have detected through previous studies carried out in Canary Islands that the estimation of greenhouse gas emissions that have been published in the Statal Register of Emissions and Pollutant Sources (PRTR-Spain), Ministry of Agriculture, Food and Environment of the Government of Spain, particularly methane, are overestimated. This also means that if estimates of non-controlled diffuse emission are actually much lower than those estimated by mathematical models, the efficiency of the extraction system is much better than that appreciated.

In the period 2017-2019, our research group is developing a study funded by the Statal Program of Research, Development and Innovation geared to the Challenges of Society, belonging to the Ministry of Economy, Industry and Competitiveness, which main objective is to estimate the diffuse fugitive emission of methane into the atmosphere from landfills in Spain. To do so, in-situ measurements at 16 Spanish landfills with portable methane and carbon dioxide sensors will be performed. During last year, we have already performed studies in two landfills. One of them is the Arico's municipal landfill (0.7 km<sup>2</sup>) in Tenerife, Canary Islands, and the other one is the whole Controlled Deposit of Pinto (1.1 km<sup>2</sup>), in Madrid, which is one of the biggest landfills in the country. A correct estimation of diffuse emission of CH<sub>4</sub> from Spanish landfills will help to better manage the wastes, to implement measures to prevent the emission of polluting gases into the atmosphere, to manage this powerful energy resource, and to create a mass of new expert researchers in this field.