



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
AIR AND RADIATION

July 11, 2016

MEMORANDUM

SUBJECT: LFGcost-Web V3.0 Peer Review Overview

In 2002, the EPA's Landfill Methane Outreach Program (LMOP) developed a cost tool (LFGcost) to help stakeholders estimate the costs of a landfill gas (LFG) energy project. Since then, the Program has routinely updated the model to reflect changes in the LFG energy industry. The model was initially designed for internal EPA and contractor use. In 2014, the Program developed a public version of the model, LFGcost-Web V3.0 (to be called LFGcost for the purposes of this memorandum), which was made available to the public when it was posted on a public page of the LMOP website in December of that year.

The purpose of LFGcost is to conduct preliminary analysis of prospective LFG energy recovery projects for landfills in the United States. The model is primarily used by landfills, developers, and consultants to conduct initial feasibility analysis of the costs of installing an energy project at a *single* landfill.

In accordance with the EPA's Peer Review Handbook¹, LFGcost was classified as a "Technical Work Product." Consistent with the Handbook, in 2015, the Agency requested a review of the LFGcost model, the associated User's Manual (August 2014), and the EPA's approach in using equations from the model to estimate costs for the Municipal Solid Waste (MSW) Landfill Rules.² The purpose of the review was to obtain an independent assessment of the methods, functionality, and documentation of LFGcost to ensure that the model was based on sound technical and cost information. In addition, because select cost equations from the model were used to assess the potential costs of the MSW Landfill Rules, the peer review was initiated to provide an independent assessment of the EPA's approach of using those equations in the regulatory cost analysis. The mechanism to undertake the peer review was an external contractor-managed letter review. The contractor, MDB and Associates, Inc., selected the following peer review experts:

¹ 3rd Edition, available at: https://hero.epa.gov/hero/index.cfm/reference/download/reference_id/194566.

² In 2014, the EPA proposed revisions to the "Standards of Performance for Municipal Solid Waste Landfills" (79 FR 41796, July 17, 2014) and issued an Advanced Notice of Proposed Rulemaking for the "Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills" (79 FR 41772, July 17, 2014). Subsequently, in 2015, the EPA issued a supplementary proposal to the "Standards of Performance for Municipal Solid Waste Landfills" (80 FR 52162, August 27, 2015) and proposed revisions to the "Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills" (80 FR 52100, August 27, 2015).

- Dr. Morton Barlaz, North Carolina State University;
- Dr. Jhih-Shyang Shih, Resources for the Future; and
- Dr. Sarah Stafford, William and Mary.

Dr. Stafford and Dr. Shih are economists, and Dr. Barlaz is a civil engineer with experience in landfills and LFG energy.

The reviewers were provided the LFGcost model, Version 3.0 (Microsoft® Excel file), the User's Manual (August 2014), and several background memoranda that described the cost tool and how it was used in the regulatory cost analysis for the MSW Landfill Rules. All three reviewers were asked to provide comments in the following categories:

- Model methods;
- Model functionality;
- Documentation (User's Manual); and
- Application of LFGcost to regulatory cost analysis.

Overall, the reviewers did not identify any major technical issues with the LFGcost model – the model methods, functionality, or documentation – or its use in the regulatory cost analysis. With respect to the model as a cost tool, in general, the reviewers provided useful, constructive suggestions for improvement. In many cases, the EPA plans to make the suggested changes in a planned update of the model. In other cases, the EPA is not updating the model at this time because the Agency either does not have sufficient data or resources to support such a change or the suggestions were outside the scope of the model's peer review; however, the EPA appreciates the comments and suggestions and will evaluate them for a future significant update of the model.

In regards to the use of the model in the regulatory cost analysis, the reviewers did not identify an alternate model or tool that could be used in lieu of LFGcost to provide a better basis for estimating the costs of controlling LFG emissions from MSW landfills. The reviewers provided constructive suggestions regarding LFG collection efficiency and electricity price inputs to LFGcost. In response to these suggestions, in the final MSW Landfill Rules analysis, the EPA adjusted the collection efficiency assumption, electricity prices and emission rates used to calculate the anticipated revenue estimates from the sale of electricity generated with captured LFG and the associated secondary carbon dioxide emission impacts. In particular, the EPA used forecasted regional electricity prices and emission rates from the Energy Information Administration's Annual Energy Outlook. (Please see Appendix A and the Regulatory Impact Analysis for the final MSW Landfill Rules for more detailed information about the reviewer comments and the updates incorporated in the final rules).

The following documents are included as part of the peer review report:

- Appendix A: Each comment (in verbatim) received from the reviewer and the EPA's response to each comment are contained in spreadsheet format.
- Appendix B: Original documentation of comments received from each reviewer.
- Appendix C: Charge questions provided to each reviewer.
- Appendix D: Background documents provided to each reviewer.
- Appendix E: LFGcost model User's Manual (August 2014).
- Appendix F: LFGcost-Web Version 3.0 (August 2014).