FINAL REPORT: AHEF TASK GE96
"Capacity strengthening of the SWMCG by introducing applicable methods for assessing landfill gas potential at the existing dumpsites in Georgia"

INOGATE Technical Secretariat and Integrated Programme in support of the Baku Initiative and the Eastern Partnership energy objectives

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Implemented by:

Ramboll Denmark A/S (lead partner)

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MVV decon GmbH

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Statistics Denmark

Energy Institute Hrvoje Požar
Capacity strengthening of the SWMCG by introducing applicable methods for assessing landfill gas potential at the existing dumpsites in Georgia (AHEF_GE_SWMCG)

Draft final

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<thead>
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<tbody>
<tr>
<td>Prepared by</td>
<td></td>
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<td>Reno Munksgaard</td>
<td>28-11-2014</td>
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<td>Approved by</td>
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<td>22-12-2014</td>
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# Abbreviations

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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AHEF</td>
<td>Ad Hoc Expert Facility</td>
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<tr>
<td>GHG</td>
<td>Green House Gas</td>
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<td>INOGATE</td>
<td>Interstate Oil and Gas Transport to Europe</td>
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<td>ITS</td>
<td>INOGATE Technical Secretariat</td>
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<td>LFG</td>
<td>Landfill Gas</td>
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<td>SWMCG</td>
<td>Solid Waste Management Company Georgia</td>
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<td>TNA</td>
<td>Training Need Assessment</td>
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<tr>
<td>ToR</td>
<td>Terms of Reference</td>
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1 Executive Summary

This Report examines the results of two workshops on introducing applicable methods for assessing landfill gas potential at the existing dumpsites in Georgia implemented through the Ad Hoc Expert Facility (AHEF) under the EU funded INOGATE Technical Secretariat (ITS) project. The first workshop took place in Tbilisi, East Georgia on 20 - 21 November 2014 and the second one in Kutaisi, West Georgia on 24 – 25 November 2014. The events gathered 15 and 11 medium and senior managers, as well as specialists of risk management and technical safety from the Solid Waste Management Company Georgia (SWMCG). Each group of participants spent day and a half receiving classroom training and half a day on-site training at local landfill sites.

This training met its objective of contributing to the development of guidelines applicable to landfill gas potential assessment and building up capacity of the SWMCG to monitor landfill gas. Guidelines was worked out in advance and introduced during the training course. Capacity of monitoring landfill gas was build up during two days of intensive training. Participants gained knowledge on how to reduce the environmental and health impacts of methane gas emissions from landfills in Georgia and how to utilise landfill gas for energy generation. The event offered hands-on training through visits at landfill sites and measuring of landfill gases using handheld measuring equipment. The training also enhanced their understanding of the advantages and potential challenges of establishing landfill gas systems. The guidelines for assessing landfill gas potential developed within this assignment will assist the SWMCG to develop its capacity to perform independent monitoring of Georgia’s landfill gas potential and follow existing EU standards.
2 Preparation

2.1. Training need assessment

A training need assessment (TNA) has been carried out by ITS experts at the beginning of this assignment.

The TNA included:

- Questionnaire to beneficiary.
- Interviews with the relevant staff of the beneficiary based on questionnaire developed by ITS experts.
- A table with basic information’s about participants attending the workshop based on background, present responsibilities in the company, training courses attended and experience with LFG management.

However, because of organisational changes within the SWMCG, the list was later revised and updated.

The TNA has revealed that the SWMCG has not been involved with landfill gas management issues before and therefore has little knowledge on this topic. Key capacity gaps included: landfills/dumpsites operated by the SWMCG does not have established gas collection and utilization systems, no monitoring of landfill gas generation is carried out as there is no requirement for it from the local environmental authorities, no statistics on accidents/fires on landfills are collected, no safety instructions or training packages introducing new personnel to the potential hazards to the environment and human health due to landfill gas generation are included in employee induction training.

2.2. Target audience

The target audience was chosen by the SWMCG and with the assistance from the ITS experts. The ToR (Terms of Reference) called for 25-30 participants consisting of relevant staff with practical skills - operators, key personal, etc. - divided into East and West Georgia.

About 80% of the participants were engineers or other technical and administrative staff with minimum bachelor degrees responsible for landfill management related issues. The last 20% had a background in economic and legal studies. Some of the participants had earlier participated in a landfill management course carried out by the Swedish consultancy company SWECO. The full list of participants is presented in the Appendix 1.

2.3 Selection of topics

The workshop program was based on the needs of the SWMCG stated in their application for technical assistance, information received during the preparation of the ToR and the results of the TNA. The capacity building concentrated on introducing the participants to one applicable methodology, guidelines for assessing landfill gas potential and introduction to modern landfill management practices. There are several methodologies available for assessing LFG potential. In this task the focus has been on the LandGem model, which is a simple model and it is available for free on the internet.

The training consisted of the following learning principles:

i. Classroom training of adapted methodology and guidelines for assessing landfill gas potential:

- Lecture material based on methodology(ies), guidelines and local data;
• Introduction to applicable methodology(ies) and guidelines for assessing landfill gas potential;
• Introduction to modern landfill management principles;
• Open discussion on methodology(ies), guidelines and local data;
• Input from participants for final methodology and guidelines;

ii. On-site training
• On-site training to conduct assessment of landfill gas potential at dumpsites.

The agenda of the events is presented in Appendix 2. During the first workshop in Tbilisi, the ITS experts improved the agenda to get a more logical sequence of the course materials. The workshops focused on the guidelines that was developed by the ITS experts prior to the training and on an introduction to methodology in connection with assessing of landfill gas potential at landfill sites in Georgia. Participants were introduced to modern landfill management principals, potential reductions of environmental and health impacts of methane gas emissions both consisted integral parts of the guidelines and training. The course included an introduction to the utilisation of landfill gas as a viable potential for energy generation or if not feasible how to reduce/eliminate the occurrence of methane in landfill gas and thus reduce Green House Gas (GHG) emission from landfills.

The training materials were based on the trainers’ own practical experiences, international best practices, delivered with the support of visual aids such as and with photos, figures, graphs, etc. that are easy to understand and use in the participants’ daily work.

The presentations, guidelines for assessing landfill gas potential, introduction to modern landfill management can be downloaded from the INOGATE web-portal using the following link:


2.4 Selection of trainers

The trainers were selected based on strong practical experience with landfill gas assessment and landfill management and not only based on the trainers’ theoretical knowledge. The trainers also had practical experience in establishing and implementing landfill gas systems and landfill sites and had extensive experience with energy systems and utilization or destruction of landfill gas.

3 Implementation

3.1 The event

The training included two workshops that took place in Tbilisi on 20 – 21 November, 2014 and in Kutaisi on 24 – 25 November, 2014 at SWMCG’s premises. The training was effectively implemented: all invited participants except one (in Kutaisi) attended the training sessions and landfill visits – one in Rustavi and one in Kutaisi – where they conducted landfill gas measurement. Training materials were well prepared and the participants had a lot of questions and many fruitful discussions followed during the workshops.

As far as the most of training participants and representatives from SWMCG were speaking Georgian, there was an interpreter present during the whole training course to translate. There was no problem of understanding even complicated technical issues, and the participants were able to discuss the most interesting issues with each other and the trainers.
The hands-on training was very relevant for the participants as they were able to learn how to measure landfill gas on site and be able to estimate future potential of landfill gas in Georgian landfill sites. The event in Tbilisi also offered hands-on experience with a waste sorting plant and sharing of experience from Denmark and EU with regard to waste handling and landfill management.

### 3.2 Participants

There were 15 participants for the training course in Tbilisi and 11 in Kutaisi. The full list of participants is presented in Appendix 1, while Figure 3 illustrates the composition of groups of participants.

![Figure 3 – Composition of participants for the two training courses.](image)

- Head and deputy head of regional management, 3
- Senior Coordinator, 10
- Coordinator, 10
- Specialist and advisor, 3

### 4 Evaluation

#### 4.1 Quantitative results

To secure an impartial and objective evaluation of the training course content, ITS experts developed an impact questionnaire, which the participants anonymously completed at the end of the training events. The questionnaire included an evaluation of the training topics and methods, performance of the trainers and general usefulness of the training. The written text was supplemented by a structured oral evaluation. Together, the evaluation questionnaire and the oral evaluation constituted the basis for the impact assessment.

The most effective way to evaluate the training results is by testing the trainees at the beginning and at the end of the capacity building event – only in this way can impact be measured in terms of skills and knowledge in comparison to the baseline situation. For these purposes, ITS experts developed a special test (Appendix 3). The test contained a set of fundamental questions concerning the main training topics and was purposely developed with a high level of complexity. The maximum possible score for the entire questionnaire was 100 points. At the end of the workshop, participants were asked to complete a questionnaire containing an evaluation of the workshop quality on a scale of 0 – worst, to 10 – best. The evaluation form is presented in Appendix 4. The selection of topics was evaluated with average scores from 9.4 to 10.0.

The before training test, at the beginning of the course, showed that the participants were familiar with the main topics of the training course. The average score was 60 points, but the variation was rather large: from 30 to 100. The after training test revealed good improvements in the participant’s
knowledge. The average score rose to 79 points (Fig. 4) and the variation decreased with the lowest score at 50 points and the highest remaining at 100.

![Comparison of scores before and after training](image)

**Figure 4** - Average score of the test at the beginning and at the end of the course.

19 out of 26 participants improved their knowledge while 7 participants did not improve their scores at all. It should be also mentioned that only one participant answered all answers correctly before the training and 7 trainees managed to make the maximum score after training. At the same time no one had lower results at the end of the course compared to at the beginning of the course. However, the most significant improvement was that the participants who scored low (less than 50 points) during the first test significantly improved their knowledge. 4 participants really improved their score, and they were all below the 50 threshold in the first test. At the first test only 14 participants passed the threshold of 50, but at the end of course test, some 24 participants received a score higher than 50 points (Fig 5).

![Individual scores comparison](image)

**Figure 5** - Individual scores of the test at the beginning and at the end of the course.

The highest scores were: Experience of experts, help and guidance by experts and Translation. The lowest scores were: Technical equipment, Meals and duration, schedule and format.

The evaluation results have shown that the topic related to assessment of landfill gas potential is very important for participants as currently there is a need to analyse, evaluate and categorize the landfills.
in Georgia. Participants were eager to learn about the general trends in landfill management and examples from EU member countries where such management have taken place recently, especially if the countries had a similar historical background, e.g., Poland, Rumania etc.

4.2 Qualitative results

At the end of the workshop participants were asked to evaluate if the course topics were selected correctly and reflected their needs. The evaluation was based on 10 questions with different reply options. It was possible to reply positive to more than one option in each of the 10 questions.

It is important that the training course becomes not a random event, perhaps interesting and useful, but easily forgotten. All but one participant answered that the workshop was useful for their professional work. The participants indicated the following:

• That the seminar was helpful (100%).
• Reasons for attending were to learn the experience of the EU countries (85%) and to learn something new and interesting (50%).
• Most relevant features of the workshop were new and important information (69%), international experience (46%) and importance of practical skills and discussions (23%).
• Immediate applicability of EU experience in this area (65%) and in the mid-term perspective (38%).
• Recommend this topic in your organization training (96%).
• Most interesting seminar activities were discussions of results and problems (50%), lectures (46%) and group work and presentations (35%).
• Participant will apply of the new knowledge to their work in the future (88%), probably (27%).
• Use of new skills in the future by working with and training other employees (50%) and creating a template/standard approach for evaluating prospective projects (38%).
• Do intend to continue learning of this topic (46%) and probably (54%).
• Suggested improvements were more practical exercises (54%), longer seminars (31%) and more focus on other financial/investment solutions (31%).

4.3 Feedback from beneficiary and participants

The official letter from the beneficiary (Appendix 5) is positive.

The questionnaire showed some suggestions for possible improvement:

• A 2-day workshop was not long enough to discuss in details all of the information that was presented; the event should have been longer.
• The workshop should have provided more practical exercises with specific examples and solutions for resolving problems, which are similar to Georgia’s situation.
• The workshop should have contained examples with economic figures for establishing landfill gas treatment solutions in Georgia.

At the same time, a majority of the participants indicated that the event was professionally organised, and it was difficult for them to suggest improvements. Evaluation scores of the workshop’s organisation showed very high scores, from 9.4 to 10.0.
5 Conclusions and recommendations

The ITS team achieved the key objectives of the assignment, namely to provide the staff of the beneficiary with the necessary skills and knowledge to make the staff able:

- To assess and implement practical measures for minimization of the adverse impact from the landfill gas to the environment and human health in their organization.
- To understand and use applicable methods for assessment of the landfill gas potential as a valuable source for energy production, as well as to be able to plan/implement future utilization of this potential.

The course was evaluated very highly by the participants. The participants stated that they have improved their knowledge on issues relevant to their professional work. The following organisational points became clear as the result of the event:

- Participants had improved their level of knowledge and valued the experienced trainers; they highly valued their performance and appreciated the practical examples and exercises. Thus, future workshops should rightly combine theoretical presentations, practical examples and concrete tasks given to the participants.
- Three or four days are the best duration for similar workshops. This will enable the trainers to involve more subjects and be able go deeper into practical examples together with the participants. It will also make it possible to involve group work in the course.

The participants and management of the SWMCG also acknowledged that the quality and materials of the workshops were well above their expectation. The measurement conducted during the onsite trainings at the 3-year old Rustavi landfill, helped SWMCG to identify and measure the landfill gas (LFG) with a good quality. The measurement was done in the landfill site venting system. This supports the presumptions and initial calculations done with the presented Land Gem model and methodology. At the other landfill site (Kutaisi), which was established in 1956, it was not possible to measure LFG under the given circumstances – very windy weather and no venting system or other measuring points. The conclusion is that LFG are produced at landfill sites in Georgia with a good quality for utilisation and probably in major amounts too.

One of ITS key recommendations was to categorise the landfills in three categories based on the LFG potential. Basic information in connection with categorising the landfills are needed such as: size of site, amount of waste, type of waste, precipitation and year of establishment. Based on this information the LFG potential can be calculated and the landfill sites can be categorised in: Good, Medium and Poor LFG potential. This will help SWMCG to find a feasible financial solution for establishing landfill gas systems at the landfill sites with the biggest LFG potential and the landfill sites with the biggest risk of gas explosions and are most harmful to the surrounding environment and to the climate.

At the period of implementing this assignment there were neither landfill gas systems nor local capacity to identify potential for such system in Georgia. Thus, ITS not only provided the beneficiary, Georgian Solid Waste Management Company with the hands-on experience in this field, but actually trained the representatives from the different regions of Georgia on how to measure LFG potential and develop viable projects independently. The ITS guidelines for assessing landfill gas potential that was published on the INOGATE web-portal can potentially facilitate the development of the similar LFG projects in other INOGATE partner countries.
6 Impact assessment

A short term assessment of the impact of the course will be carried out three to four months after the completion of the training. The assessment will measure the activities and procedures for management of the landfill gas done by the SWMCG. It will include following up on the activities, agreed with the beneficiary before conducting the course and specified below:

- **Have the safety instruction and procedures for the staff working at the landfill, in order to minimize the adverse impact of the landfill gas on the human health and environment, been prepared or updated to accommodate the newly acquired knowledge?**

- **Has a list of the employees to be acquainted with the above-mentioned instruction and procedures been established?**

- **Has employees on the list been trained using the training material and guidelines prepared by the trainers and used at the training course, been established?**

- **Has an overall action plan meeting the criteria below for assessment of the landfill gas generation, potential for all landfills/dumpsites belonging to the beneficiary, been carried out?**

**Table 1 - Activities to be followed up.**

The overall plan shall include a preliminary ranking of the landfills/dumpsites based on a rough estimate of the landfill gas generation potential based on the available information on the composition and amounts of the waste disposed as well as the period of the landfill/dumpsite operation. The plan shall also include preliminary information on the potential energy (electricity and heat) consumers in the vicinity of the landfills/dumpsites as well as the information on any advantages or obstacles for the future energy generation based on the landfill gas utilization.

A final assessment of the impact of the training course will be carried out one year after the completion of the training and include following up on the activities, agreed with the beneficiary before conducting the course and specified below:

- **How many employees from the list mentioned under bullet 2 above under the short term activities have already been trained?**

- **Has a standard introduction course on the adverse impact of the landfill gas on the environment and human health for newly employed landfill staff been prepared and implemented as a standard procedure?**

- **What is the percentage of these employees working at the landfills who have completed the standard introduction course?**

- **What is the percentage of these employees working at the landfills who have completed the standard introduction course?**

- **Has a list of buildings/structures with increased risk for explosion and/or suffocation due to intrusion of the landfill gasses been elaborated for each landfill and communicated to the relevant landfill staff?**

- **Has any methane detectors been purchased and how they are being used?**

- **How many landfills/dumpsites have been accessed for the landfill gas potential by using theoretical
**On which landfills/dumpsites has assessment of LFG potential been analysed and plans for utilization of the landfill gas for energy generation been implemented or is under implementation?**

Table 2 - Final assessment of impact of training.
The beneficiary shall report to ITS on the above-mentioned short term and final impact assessment as well as other relevant activities the beneficiary has carried out on its own initiative, as follows:

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<td><strong>Short term impact assessment to be reported by 1st of April, 2015.</strong></td>
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<tr>
<td><strong>Final impact assessment to be reported by 1st of December, 2015.</strong></td>
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Table 3 - Short term and final impact assessment.
## Appendix 1 – List of participants

### Tbilisi, Georgia, November 20-21, 2014

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Name of participant</th>
<th>Position</th>
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<tbody>
<tr>
<td>1</td>
<td>Aleksandre Grdzelishvili</td>
<td>Senior Coordinator (Regional Relations)</td>
</tr>
<tr>
<td>2</td>
<td>Andro Tseradze</td>
<td>Coordinator (Regional Management)</td>
</tr>
<tr>
<td>3</td>
<td>Anzor Sandroshvili</td>
<td>Coordinator (Regional Management)</td>
</tr>
<tr>
<td>4</td>
<td>Davit Saparidze</td>
<td>Senior Coordinator (Regional Management)</td>
</tr>
<tr>
<td>5</td>
<td>Giorgi Gaprindashvili</td>
<td>Coordinator (Regional Management)</td>
</tr>
<tr>
<td>6</td>
<td>Giorgi Dekanosidze</td>
<td>Coordinator (Regional Management)</td>
</tr>
<tr>
<td>7</td>
<td>Gocha Gelashvili</td>
<td>Senior Coordinator (Regional Management)</td>
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<tr>
<td>8</td>
<td>Givi Kaidarashvili</td>
<td>Senior Coordinator (Regional Management)</td>
</tr>
<tr>
<td>9</td>
<td>Kakhaber Kakhniashvili</td>
<td>Senior Specialist (Technical Safety)</td>
</tr>
<tr>
<td>10</td>
<td>Khatuna Chikviladze</td>
<td>Advisor to Director</td>
</tr>
<tr>
<td>11</td>
<td>Levan Abashidze</td>
<td>Coordinator (Regional Management)</td>
</tr>
<tr>
<td>12</td>
<td>Mikheil Kozmanashvili</td>
<td>Senior Coordinator</td>
</tr>
<tr>
<td>13</td>
<td>Tengiz Giorgobiani</td>
<td>Senior Coordinator (Regional Management)</td>
</tr>
<tr>
<td>14</td>
<td>Grigol Mommetselidze</td>
<td>Senior Coordinator (Regional Management)</td>
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<tr>
<td>15</td>
<td>Zurab Mardaleishvili</td>
<td>Head of Regional Management Department</td>
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### Kutaisi, Georgia, November 24-25, 2014

<table>
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<tr>
<th>Nr.</th>
<th>Name of participant</th>
<th>Position</th>
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<tbody>
<tr>
<td>1</td>
<td>Irakli Tkeshelashvili</td>
<td>Coordinator (Regional Management)</td>
</tr>
<tr>
<td>2</td>
<td>Gabriel Kvirikashvili</td>
<td>Senior Coordinator (Regional Relations)</td>
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<tr>
<td>3</td>
<td>Giorgi Sakvarelidze</td>
<td>Senior Coordinator (Regional Management)</td>
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<tr>
<td>4</td>
<td>Grigol Mommetselidze</td>
<td>Senior Coordinator (Regional Management)</td>
</tr>
<tr>
<td>5</td>
<td>Kakhaber Koplatadze</td>
<td>Coordinator (Regional Management)</td>
</tr>
<tr>
<td>6</td>
<td>Levan Japharidze</td>
<td>Deputy Head of Regional Management Department</td>
</tr>
<tr>
<td>7</td>
<td>Medea Chachkhiani</td>
<td>Head of Environmental Protection Department</td>
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<tr>
<td>8</td>
<td>Severon Iobidze</td>
<td>Coordinator (Regional Management)</td>
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<td>9</td>
<td>Teimuraz Kvaliashvili</td>
<td>Coordinator (Regional Management)</td>
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<td>10</td>
<td>Tengiz Tkeshelashvili</td>
<td>Senior Coordinator (Regional Management)</td>
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<tr>
<td>11</td>
<td>Vakhtang Latairea</td>
<td>Coordinator (Regional Management)</td>
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Appendix 2 – Agenda

**INOGATE Event: Workshop**
20 – 21 of November, 2014, Tbilisi
24 – 25 of November, 2014, Kutaisi
Georgia

Capacity strengthening of the Solid Waste Management Company of Georgia Ltd. (SWMCG) by introducing applicable methods for assessing landfill gas potential at the existing dumpsites in Georgia

**AGENDA**

**Day 1**

<table>
<thead>
<tr>
<th>MORNING SESSION:</th>
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<tr>
<td><strong>10.00-10.15</strong></td>
<td>Introduction – Welcome and introduction to the workshop. Levan Inashvili, President, SWMCG.</td>
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<tr>
<td><strong>10.15-10.30</strong></td>
<td>Introduction to the course and presentation of the objectives to be met – Introduction of the three experts and their background. Introduction to participatory approach to the participants. Reno Munksgaard, Jes Kromann Bak, Lasha Iakobidze</td>
</tr>
<tr>
<td><strong>10.30-11.00</strong></td>
<td>Introductory test – A preliminary written test to establish baseline of the participants at start of training. Jes Kromann Bak, Lasha Iakobidze</td>
</tr>
<tr>
<td><strong>11.00-11.45</strong></td>
<td>Introduction to Guidelines for assessing landfill gas potential – The draft for guidelines that have been worked out will be reviewed. This session will be open for discussions and input from the participants. See comment above. Reno Munksgaard</td>
</tr>
<tr>
<td><strong>11.45-12.00</strong></td>
<td><strong>Coffee Break</strong></td>
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<tr>
<td><strong>12.00-13.00</strong></td>
<td>Introduction to landfill gas (LFG) – A brief introduction to LFG with focus on formation,</td>
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composition and energy potential of LFG and environmental issues in regard to LFG capture.

Reno Munksgaard

13.00-14.00  Lunch Break

AFTERNOON SESSION:

14.00-15.00  Introduction to Safety at landfill sites – Introduction to precautions to be followed to keep a high standard of safety.

Jes Kromann Bak

15.00-16.00  Introduction to Methodology for assessing landfill gas potential - The draft for methodology that has been worked out will be reviewed. This session will be open for discussions and input from the participants

Jes Kromann Bak

16.00-16.15  Coffee Break

16.15-17.00  Introduction to LFG Plant Operation – General introduction to plant operation with focus on LFG assessment and possible solutions for recovery of LFG.

Reno Munksgaard

17.00-17.45  Introduction to modern principles of landfill management

Jes Kromann Bak
# Day 2

<table>
<thead>
<tr>
<th><strong>MORNING SESSION:</strong></th>
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<tbody>
<tr>
<td>9.00-10.00</td>
<td>Transportation to site.</td>
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<tr>
<td>10.00-10.30</td>
<td><strong>On-site workshop training session 1</strong>: Introduction to assessment of landfill gas potential. Getting started with the measuring equipment. Reno Munksgaard, Jes Kromann Bak</td>
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<tr>
<td>10.30-11.00</td>
<td><strong>On-site workshop training session 2</strong>: A joint measurement of LFG will be carried out. A common assessment of landfill gas potential will be worked out. Reno Munksgaard, Jes Kromann Bak</td>
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<tr>
<td>11.00-12.00</td>
<td><strong>On-site workshop training session 3</strong>: Participants conduct their own measurement and assessment of landfill gas potential. The training makes the participants able to conduct simple assessment of LFG at all landfill sites in Georgia based on available data. Reno Munksgaard, Jes Kromann Bak</td>
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<tr>
<td>12.00-13.00</td>
<td>Transportation from site to class room</td>
</tr>
<tr>
<td>13.00-14.00</td>
<td><em>Lunch Break</em></td>
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<th><strong>AFTERNOON SESSION:</strong></th>
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<tbody>
<tr>
<td>14.00-15.00</td>
<td><strong>Summary and evaluation of training in class room and on-site.</strong> Reno Munksgaard, Jes Kromann Bak</td>
</tr>
<tr>
<td>15.00-15.15</td>
<td><em>Coffee Break</em></td>
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<td>15.15-16.00</td>
<td><strong>Training impact assessment</strong> will be conducted by means of a written test and structured oral discussion to see if the overall objectives of the training have been met, and impact compared to the baseline situation can be measured. Reno Munksgaard, Jes Kromann Bak, Lasha Iakobidze</td>
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<td>16.00-16.15</td>
<td><em>Farewell</em></td>
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<td><em>All</em></td>
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Appendix 3 – Test

Name of Participant: ________________________________

Below are a set of questions to be used as a quiz following the Training Programme for “Capacity strengthening of the SWMCG by introducing applicable methods for assessing landfill gas potential at the existing dumpsites in Georgia” (AHEF_GE_SWMCG) under the Programme “INOGATE Technical Secretariat & Integrated Programme in support of the Baku Initiative and the Eastern Partnership energy objectives”.

Instructions to Participant: Select and circle the most appropriate answer.

1. What is Landfill Gas (LFG)?
   A. A natural byproduct of decomposition of inorganic material in municipal solid waste in anaerobic conditions.
   B. A man-made byproduct of decomposition of inorganic material in industrial waste in anaerobic conditions.
   C. A natural byproduct of decomposition of organic material in municipal solid waste in anaerobic conditions.
   D. A man-made byproduct of decomposition of organic material in industrial waste in anaerobic conditions.

2. Landfill Gas typical contains ___ % of methane (CH4) and ___% of carbon dioxide (CO2).
   A. 20%, 80%  B. 50%, 50%  C. 80%, 20%  D. 99%, 1%

3. Which of the statements below is correct?
   A. Methane in LFG is highly flammable.
   B. Methane in LFG has explosion risk.
   C. Methane in LFG can be regarded as a profitable asset.
   D. All of the above.

4. Observe the graph below:
5. In which stage is the production of Methane (CH4) most active?
   A. Stage 1  B. Stage 2  C. Stage 3  D. Stage 4

6. In many places, landfill gas is collected and utilised in different applications due to its high energy capability. How is Landfill Gas utilised in energy sector?
   A. Power Generation  B. Flaring  C. Leachate treatment  D. Pollen Control

7. Which of the following is NOT a hazard of Landfill Gas?
   A. Flammability and Explosivity  B. Power Generation  C. Odour  D. Ecotoxicity

8. Which of the following is NOT an objective for landfill gas management?
   A. Control of insects.  B. Prevent the migration of landfill gas.  C. Minimise the risk of accidents.  D. Prevent harm to human health.

9. In the event of an accident where there is fire in the landfill gas plant, which party should be informed or called in first?
   A. The ambulance.  B. The fire brigade.  C. The police department  D. The boss of the workplace.

10. What instruments are used to monitor and tune the gas wells?
    I. Thermometer  II. Flowmeter  III. Gas Analyser  IV. Pressure meter
    A. I & II  B. I & III  C. II & III  D. III & IV

11. What is the objective in tuning of the gas wells?
    A. To make sure the suction flow rate is greater than the gas production rate.
    B. To make sure the gas production rate is greater than the suction flow rate.
    C. To find the equilibrium of the suction flow rate and gas production rate.
    D. To find enough gas for the gas engine to generate power.
Appendix 4 – Evaluation form – Participant Questionnaire

1. იყო თუ არა სემინარი სასარგებლო? / Was the seminar useful?
   - და / Yes
   - არ / No
   - მეტ / More or less

2. დაასახელეთ დასწრების მიზეზი / Reasons for attending were
   - ახლის და საინტერესო სწავლა / to learn something new and interesting
   - ევროპის ქვეყნების გამოცდილების გაათვალის / to learn the experience of the EU countries
   - ფინანსური გათვალის / to refresh the knowledge
   - მეგობარობა დასასწრები მიღებით / my management sent me to attend
   - კოლეგებთან შეხვედრა / to meet with colleagues

3. დაასახელეთ სემინარის მნიშვნელოვანი ასპექტები / Most relevant features of the workshop were
   - ფინანსური რეალიზებადი პროექტების შეფასება / Evaluation of financial feasibility of projects
   - ინვესტიციების შესაძლებლობა და კვლევი / Feasibility in investments and introduction to case studies
   - ახალი და მნიშვნელოვანი ინფორმაცია / New and important information
   - მნიშვნელოვანი პრაქტიკული უნარების გამოშვება / Importance of practical skills and discussions
   - ფინანსური გათვლება / Financial calculations
   - ალტერნატიული გადაწყვეტილებების შესაძლებლობა / Skills to find alternative solutions
   - საერთაშორისო გამოცდილების შეუძლებლობა / International experience
4. Is EU experience in this area applicable in your country?

☐ Yes

☐ Yes, but in the mid-term perspective

☐ Not sure

5. Would you recommend including this topic in your Bank/organization training?

☐ Yes

☐ Not sure

☐ Already used

6. What was the most interesting seminar activity?

☐ Individual work

☐ Lectures

☐ Discussions of results and problems

☐ Group work and presentations

☐ Tests

7. Will you apply the new knowledge to your work in the future?

☐ Yes

☐ Probably

☐ Not sure
8. How will you the new skills in the future?

☐ Creating a template / standard approach for evaluating prospective projects
☐ Working with and training other employees
☐ Convincing investors and clients
☐ Developing a risk management system

9. Do you intend to continue learning this topic?

☐ Yes
☐ Probably
☐ Not sure

10. Suggested improvements

☐ No improvement necessary
☐ Longer seminars
☐ Shorter seminars
☐ More practical exercises
☐ More focus on other financial / investment solutions

11. Workshop Quality (scale: 0 = worst, 10 = best)

A. Event organisation

☐ Venue
☐ Meals
☐ Technical equipment
☐ Duration, schedule and format
B. ღონისძიების ორგანიზება / Event organisation

- საუკეთესო პრეზენტაციები და საფუძვლო მასალა / Lectures, presentations and training materials
- საამოცანო მასალა / Exercises, tasks, examples
- ექსპერტების კომენტარი / Experience of experts
- ექსპერტების მოთხრობა და წარმოდგომა / Help and guidance by experts
- დისკუსია / Quality of discussions
- ტრანსლაცია / Translation
To: Inogate/Energy cooperation between the EU,

Mr. Alexander Antonenko,

Dear Mr. Antonenko,

On behalf of Solid Waste Management Company of Georgia Ltd/the Ministry of Regional Development and Infrastructure of Georgia we would like to express our sincere gratitude towards the EU/INOGATE programme for successful implementation of the project “Development and introduction of gas collection methodology for landfills”. Your financial support is highly appreciated as the overall goals of the project coincided with the aims and objectives of the Solid Waste Management Company of Georgia itself.

Considering that establishment of effective and efficient solid waste management system is a principal component of our activities, this programme is rather important for the Solid Waste Management Company of Georgia. Providing special trainings and support with the development of gas potential assessment and collection methodology makes the programme even more valuable since building capacities of the Solid Waste Management Company is crucial for improving waste management in Georgia.

Combination of workshops and interactive discussions along with on-site visits have resulted significant outcomes. Presentations and technical information provided by experts gave participants the opportunity to improve their knowledge regarding gas potential assessment and collection methodology. With acquired knowledge and specific skills personnel of the company are able to assess the gas potential and perform monitoring of landfill gas independently. Expectations of the Solid Waste Management Company of Georgia are fully met and we believe your trainings will be exceedingly helpful for our personnel in future performance.
The Solid Waste Management Company of Georgia would like to thank you for your distinguished efforts and looks forward to our future cooperation.

Sincerely,

Director

Giorgi Shakhoshvili