

Municipal Solid Waste Subcommittee Meeting  
Internet-Based  
3 December 2013

## **Minutes**

### **Summary**

The Global Methane Initiative (GMI) Municipal Solid Waste (MSW) Subcommittee conducted a Subcommittee meeting via the Internet on 3 December 2013. The meeting provided an update from the GMI Administrative Support Group (ASG) on GMI 10<sup>th</sup> Anniversary planning, an update on outcomes and follow-up activities from the 2013 Expo in Vancouver (specifically regarding anaerobic digestion modeling research), Nationally Appropriate Mitigation Action (NAMA) development, and planning for the next Subcommittee meeting to be held in conjunction with the Agriculture and Municipal Wastewater Subcommittees in Brazil this March.

The GMI website contains links to the presentation slidedeck and a recording of the meeting (large file, may take a few minutes to download).

This MSW Subcommittee meeting was attended by 22 representatives from nine countries, including: Argentina, Colombia, Germany, India, Nigeria, Serbia, Turkey, United States, and Viet Nam. A list of attendees is included as Annex 1 to these minutes.

Presiding over the meeting were MSW Subcommittee co-chairs Tom Frankiewicz (United States) and Diana Milena Rodriguez Velosa (Colombia).

### **Welcome**

Tom Frankiewicz (United States) opened the meeting by introducing himself and his co-chair on the MSW Subcommittee, Diana Milena Rodriguez Velosa (Colombia). Henry Ferland (United States, Co-Director of the GMI ASG) also introduced himself along with support contractors John Carter and Sarah Greenberg from Eastern Research Group (ERG) who were also involved with the meeting presentation.

Next, all the meeting participants were given the opportunity to introduce themselves briefly. The participants included:

- Alexandra Zapata (United States, RTI International). Originally from Colombia, she is new to these meetings and is looking forward to learning more about what the MSW Subcommittee does.
- Brad Johnson (United States, RMA)
- Brian Guzzone (United States, ERG) is a long-time participant in the Subcommittee.
- Dana Murray (United States, SCS Engineers) is one of the contractors that supports EPA and GMI
- Eduardo Conghos (Argentina) is a consultant representing EVA SA which owns a landfill south of Buenos Aires.
- Goran Vujic (Serbia, University of Novi Sad) and his colleague, Dusan Milovanovic, called in from Florence Italy.
- Huong Le (Viet Nam, Climate Change Bureau)
- Judith Wolf (Germany, Federal Environment Agency)
- Linus Orakwe (Nigeria, Lagos Waste Management Authority)
- Oluwaseun Fasuhanmi (Nigeria, Lagos Waste Management Authority)

- Osman Arikan (Turkey, Istanbul Technical University) is a university professor researching landfill gas and works as a consultant. He is currently working in the United States under a grant from the USDA. This is his first participation with the MSW Subcommittee.
- Sandra Mazo-Nix (United States, SCS Engineers) is a contractor to GMI
- Shailendra Jain (India, Shreyans Energy) is in the methane capture business, specifically from isolated wastes including agriculture, industrial, and food processing wastes. He is just beginning to work in the area of methane capture from MSW.
- Syed Ikram (India, SA Power Utilities) was having microphone issues and was unable to be heard.
- Whitney Stohr (United States, EPA GMI)

Ms. Velosa then described the rest of the agenda for the meeting which is outlined in the presentation on slide 3.

### **Update from the Administrative Support Group (ASG)**

Mr. Ferland provided an ASG update, and began by noting the diverse range of people participating in the meeting and thanking everyone for their participation. Topics of Mr. Ferland's update included the following:

- Outcomes from Methane Expo 2013 (see slide 4 of presentation for details). Mr. Ferland summarized the primary outcomes, which included: (1) continued engagement with the Climate and Clean Air Coalition (CCAC), (2) continued identification of financing barriers and international MSW needs, (3) organization of the next GMI Partnership-wide meeting, and (4) continued focus on the action planning process across GMI sectors.
- Action Planning (see slide 5 of presentation). Mr. Ferland stated that a focus is for Partner Countries to develop country-specific action plans describing each country's current and future work related to methane reduction. Revised action plan guidance for MSW is now available on the GMI website. He explained the benefits of developing action plans include identifying a country's needs and opportunities related to methane reduction and facilitating more communication within the global community.
- GMI 10<sup>th</sup> Year Anniversary Activities (see slide 6 of presentation). Mr. Ferland explained the ASG is producing a video and pamphlet to highlight country and project successes and is planning a Partnership-wide meeting in the latter part of 2014. The ASG is working to finalize a host for this meeting. Currently, the ASG is in talks with a couple of potential host nations. This meeting will include MSW technical sessions and a subcommittee meeting. Most likely timing for the meeting is October or November 2014.
- Next MSW Subcommittee Meeting (see slide 7 of presentation). Mr. Ferland explained the next in-person MSW Subcommittee meeting will most likely be part of a tri-sector biogas meeting held in conjunction with the agriculture and municipal wastewater sectors 12-13 March 2014 in Florianopolis, Brazil. The ASG has been in discussions with partners in Santa Catarina to host the meeting and develop an agenda which will focus on cross cutting biogas issues that apply to all three sectors. A save-the-date email has already been sent to Project Network members for all three sectors.

### **Anaerobic Digestion (AD) for MSW - Modeling Research Update**

Mr. Carter summarized research that has been done in response to Jose Henrique Penido Monteiro's question from the 2013 Expo in Vancouver (see presentation slides 8 and 9). The question was in regard to the "default" value typically assumed for modeling biogas production from AD for MSW (100 m<sup>3</sup> biogas per tonne MSW). In response to this question, GMI solicited input from MSW Subcommittee members and

requested any existing models or modeling parameters that could be used to help answer the question raised by Mr. Penido. GMI received two valuable responses from Piotr Klimek (Poland, INIG) and Janya Sang-Arun (Japan, IGES). In addition, GMI, through its contractor ERG, also performed a limited internet search for relevant AD modeling information.

The Institute for Global Environmental Strategies (IGES) model we received uses a default assumption of 592 m<sup>3</sup> biogas per tonne of *dry* organic material at 60 percent methane content. Since MSW typically contains about 20 percent organic matter on a wet basis, the IGES value of 592 m<sup>3</sup> (dry) equates to about 120 m<sup>3</sup> (wet), which is comparable to the 100 m<sup>3</sup> default value.

Other information found during the internet research includes the Regional Information Service Centre for Southeast Asia on Appropriate Technology (RISE-AT) from China which assumes a 100 to 200 m<sup>3</sup> biogas per tonne MSW (wet) at 50-70 percent methane. Similarly, the California Integrated Waste Management Board (CIWMB) assumes 100 to 150 m<sup>3</sup> biogas per tonne MSW organics at 50-70 percent methane. Furthermore, we found published biogas yields from 14 full-scale AD reactors processing MSW. These values ranged from 40 to 180 m<sup>3</sup> biogas per tonne MSW organics. Although the published yields covered a significant range, the bulk of the data (ignoring outliers) ranged from 90 to 150 m<sup>3</sup>/tonne. The average of these values (112 m<sup>3</sup> biogas per tonne MSW organics) was roughly in line with the default value of 100 m<sup>3</sup>/tonne.

Considering all the values found, both theoretical and actual, we have concluded that the default average rate assumption of 100 m<sup>3</sup> biogas per tonne of MSW organics is valid. However, the large range of possible biogas yields indicates significant variability in the process that may be affected by a number of factors. Such factors may include: pre-sorting of the MSW feedstock; moisture content of the MSW feedstock; use of batch or continuous AD reactors; single-step versus multi-step processes; and possibly co-digesting the MSW organics with other sources of organic material such as animal manure.

Given the new and increasing interest in AD for MSW world-wide, there may be opportunity for GMI and the MSW Subcommittee to perform additional research into the industry and/or technology and possibly produce some sort of guidance document, memo, or possibly training sessions to assist the Subcommittee in understanding the potential for this technology. To help guide GMI's activities in this topic area, the discussion was opened to the Subcommittee member for their input.

Mr Frankiewicz asked the Subcommittee about the types of situations they are encountered regarding AD and posed the question, "What type of information would be helpful to you?" He suggested that potential output from GMI could include: a white paper explaining the issues and/or different types of technologies; a catalog of available resources; or something more in-depth such as a best practices guide.

Mr. Jain shared that India has an AD reactor using CSTR technology in a colony with 500 residents. The plant was commissioned in 2004 by the municipality and they have collected ample biogas yield data. The data vary throughout the year due to temperature swings, but the average yield is 80 m<sup>3</sup> per day. 100 m<sup>3</sup> is a realistic yield, but this particular system lacks temperature control within the reactor and production goes down in the winter. Mr. Jain proposes that 100 m<sup>3</sup> is the best, most realistic assumption to use for mesophilic (35-37 degrees C) operation and MSW feedstock at 20 percent dry solids.

Mr. Arikan offered that AD is a good technology for MSW application. He noted that the EU is using AD to process multiple types of organic wastes and suggested that fact sheets would be useful to other countries considering AD. Mr. Frankiewicz noted that Swarupa Ganguli (United States, LMOP) has been involved with some AD projects in Turkey and suggested that Mr. Arikan could work with her to develop some relevant case studies.

Mr. Conghos noted that in Argentina, there is a tendency to separate organic waste for composting so it does not enter landfills due to the expense of construction landfill gas collection and control systems. He asked if

there were any less expensive methods for collecting landfill gas and if there are any technologies available for retrieving metals from compost. Mr. Frankiewicz suggested that these are reasons that countries are pursuing AD as an alternative to landfill gas collection and control. Often, the expense and lack of financing are barriers to AD in some countries. Compost also faces the barrier of there not being a viable market for compost after it is produced. Mr. Conghos agreed, noting that MSW compost in Argentina is not saleable because it comes from household waste and ends up in landfills anyway. Mr. Frankiewicz agreed, saying that this occurs often when a market for compost is not available. Mr. Frankiewicz may be able to share some compost-specific tools being developed by CCAC at the next Subcommittee meeting in Brazil.

Mr. Jain added that the technology for AD of MSW is well-established. The challenge being faced is the segregation of waste. Without separation, the mix of inorganic and organic waste in MSW can cause operational problems in existing technologies. He suggested the Subcommittee focus some attention on how organics separation should be done. He has seen good projects fail due to improper separation of the waste feedstock and suggested GMI offer some solutions for either at-source or centralized separation options. Mr. Frankiewicz suggested that GMI could produce an issues paper or briefing for presentation at the Subcommittee meeting in Brazil. An outline may be prepared for consideration in advance of the meeting.

Mr. Vujic said that AD is a very interesting topic in Serbia. He also suggested that a key topic for smaller municipalities (that might not have enough MSW to sustain an AD project) is the possibility of combining waste streams like agricultural or green waste into a single AD project. Mr. Frankiewicz replied that we may include technical and economic considerations for smaller municipalities that face these issues.

#### **Nationally Appropriate Mitigation Action (NAMA) Development Update**

Mr. Frankiewicz provided background on Subcommittee tracking of NAMAs in the waste sector. At the last Subcommittee meeting, it was requested that GMI continue to track NAMA development and that has been done. It was also suggested that GMI develop tools and resources for Measurement, Reporting, and Verification (MRV) development. Progress on those tools and resources will be shared at the next Subcommittee meeting in Brazil.

Mr. Carter shared an updated version of a table summarizing existing waste sector NAMAs that was originally presented at the 2013 Expo in Vancouver (see presentation slide 12). At the time of the Expo, there were 12 waste sector NAMAs either being developed or being implemented. Since then, we have identified six additional waste sector NAMAs either being developed or being implemented. Those new NAMAs are in Bangladesh, Costa Rica, Dominica, Pakistan, Philippines, and Uruguay. Although this may not be an exhaustive list of existing NAMAs, the additions represent a 50 percent increase in known NAMAs in under one year.

Ms. Velosa then updated the Subcommittee on Colombia's NAMA activity, including NAMA facility financing. Colombia's NAMA development has covered multiple sectors and Ms. Velosa has been very involved with the waste sector NAMA. Colombia has a high percentage of organics in their waste so their NAMA focuses on landfill diversion and composting. NAMA development requires a close look at country-specific factors. For instance in Colombia, they considered AD for processing their MSW organics, but energy prices are very low which resulted in poor project economics. Therefore, AD was not included. Echoing the concerns mentioned during the previous discussion, feedstock quality and source separation of organics are key concerns for composting. Colombia also has regulations in place dictating what types of compost may be used for specific purposes. Another option for dealing with waste in Colombia's NAMA is using waste as a substitute fuel for use in cement kilns due to its high calorific value. This reduces this use of fossil fuels and industrial stakeholders are already involved.

In general, Ms. Velosa stated that Colombia has found it helpful to have a national ministry or sector involved in NAMA development to make it successful. This is important to potential investors. There is

currently available international support for the development and implementation of NAMAs. Colombia has worked with Germany's NAMA Facility for this purpose. The NAMA Facility's goal is to support NAMA development and implementation. They recently reviewed 30 to 40 NAMA proposals and selected four to which they would provide resources for implementation. The NAMAs selected were from Indonesia, Chile, Costa Rica, and Colombia. None of the selected NAMAs were in the waste sector, however. Ms. Velosa's opinion is that there is a lot of international interest in funding NAMAs and she suggests pursuing those opportunities. Co-benefits are also important to potential investors, such as health benefits, air quality, and employment but these co-benefits must be quantified.

Brad Johnson (United States, RMA) assisted Colombia with their NAMA development. Mr. Johnson stated that the best use of NAMA resources would be the creation of an equity fund. Banks are looking for new clients and new projects but they require 30 percent equity in order to fund a project. The equity fund helps make up this funding requirement by the banks.

### **Next MSW Subcommittee Meeting**

As Mr. Ferland previously noted, the next MSW Subcommittee meeting will occur in conjunction with the agriculture and wastewater sectors in Florianopolis, Brazil in March. There is a preliminary agenda already developed (see presentation slide 14) and Mr. Frankiewicz offered the Subcommittee the opportunity to suggest additional topics for presentation or discussion.

Ms. Velosa suggested that financing options and opportunities could be a topic of discussion for the waste sector and other sectors as well. Mr. Ferland noted that a project financing discussion is already slated on the agenda and that additional suggestions are welcome from the Subcommittee and ASG will be actively soliciting input from Subcommittee members as the agenda is being finalized. Mr. Frankiewicz stated the next version of the agenda will have more detail available for both the topics to be included and the potential speakers/presenters for those topics. That will provide the Subcommittee with more information to respond to.

Mr. Frankiewicz, Ms. Velosa, and Mr. Ferland closed the meeting by thanking the Subcommittee for their participation in this meeting and stating that they looked forward to seeing everyone at the next Subcommittee meeting in Brazil and their involvement in the planning of that meeting.

## **Annex 1: Final Meeting Participant List**

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