



GLOBAL METHANE INITIATIVE WASTEWATER TASK FORCE MEETING

First Session of the Wastewater Task Force
Venice, Italy
11 November 2010

Meeting Minutes

Summary

- 1 The Global Methane Initiative (GMI) Wastewater Task Force conducted its first session in Venice, Italy in conjunction with meetings of the GMI Landfill and Agriculture Subcommittees and the 3rd *International Symposium on Energy from Biomass and Waste*. The wastewater meeting was conducted on 11 November 2010. Key agenda items included:
 - Welcome address
 - Developed and developing country perspectives
 - Perspectives from Brazil
 - Perspectives from the European Union (the Netherlands, specifically)
 - Reactions from the Wastewater Task Force, including discussions of:
 - How GMI should focus efforts in this sector
 - Obstacles to implementing projects in the sector and how they can be overcome
 - How GMI can encourage greater participation in this sector
 - How GMI can leverage existing financial sources or CDM funding
 - Moving forward, including:
 - The critical steps to pursuing wastewater projects
 - The types of expertise needed to best pursue activities within this sector
 - Recommendations to provide to the Steering Committee
- 2 The combined task force and subcommittee meeting agendas are posted online on the GMI Web site at: http://www.globalmethane.org/documents/events_combined_20101111_agenda.pdf.

Presentations from the Wastewater Task Force meeting are posted online at:
<http://www.globalmethane.org/news-events/index.aspx?month=11&year=2010>.

Welcome Address

- 3 Mr. Gabriel Blanco from the Secretariat of Environment and Sustainable Development of Argentina welcomed meeting participants on behalf of the Wastewater Task Force. Mr. Blanco explained that the meeting's goal was to define the possible future of the Wastewater sector within the GMI and he requested that the meeting participants provide brief introductions. The meeting participants included GMI Partner country delegates, Project Network members, Administrative Support Group (ASG) personnel, and other interested observers. A list of the participants is presented in Annex 1.

- 4 Mr. Henry Ferland, director of the GMI ASG, provided an [overview of the wastewater sector](#) to set the meeting's context. Mr. Ferland noted that GMI has been considering the sector since 2009 and the Steering Committee recently designated the sector as one that GMI should explore. Wastewater is a significant source of methane; methane emitted during the anaerobic treatment and handling of wastewater accounts for 9 percent of the estimated global anthropogenic methane emissions. China, India, the United States, Indonesia, and Brazil are the largest emitters of methane from the wastewater sector and GMI Partner countries account for 70 percent of total methane emissions from the sector. The total estimated methane emissions from wastewater are projected to increase by nearly 20 percent in the next 10 years.
- 5 While wastewater treatment is an important source of methane emissions, the opportunity to capture and beneficially use that methane is often overlooked. There are widely available, cost-effective technologies to produce energy from wastewater methane emissions using anaerobic digestion (AD). The production and use of biogas energy creates cost savings, stabilized energy costs and production, progress towards national goals for renewable energy, enhanced energy security, reduced greenhouse gas (GHG) emissions, and improved local air and water quality. Options for implementing the technologies include constructing or retrofitting wastewater treatment systems with anaerobic sludge digestion, installing biogas capture systems at existing anaerobic treatment systems and lagoons, and creating new aerobic treatment facilities or covered lagoons. Barriers to implementing projects include high capital costs, lack of local capacity to design and maintain systems, lack of awareness as to energy end-use opportunities, site-specific design challenges, utility-related policy(ies), social taboos, and limited onsite demand for the produced electricity or heat.
- 6 The GMI Steering Committee initially discussed the wastewater sector in January 2009. As a result of that meeting, the ASG developed a scoping paper to assess the potential for including wastewater in the Partnership. The paper was presented to the Steering Committee in September 2009 and the Steering Committee recognized that the sector had the potential to capture and use methane in the near term. In March 2010, the Steering Committee agreed to modify terms of reference to add the wastewater sector and convene a Wastewater Task Force. The first teleconference of the task force was conducted in July 2010, and it was determined that a Wastewater Task Force meeting should be held in conjunction with the Landfill and Agriculture meetings.
- 7 One of the main purposes of this meeting is to determine how GMI should focus its efforts in the wastewater sector; there are several potential activities that GMI could undertake. GMI may play a role to support the analysis and documentation of technical and economic options for methane emissions reduction. GMI may also help to define the scope of the sector through the creation of inventories of existing treatment facilities where gas capture may be viable, the documentation of existing projects in a best practices compendium, determining methods to cost-effectively cover existing anaerobic lagoons, or determining the most cost-effective and technology appropriate AD options. GMI may explore partnership opportunities with other organizations promoting methane emission reductions in wastewater treatment. GMI may also engage with development bank Carbon Finance Units and other divisions within these agencies where wastewater projects are conceptualized.

Developed and Developing Country Perspectives

Perspectives from Brazil

8 Dr. Eduardo Pacheco Jordao, of Associação Brasileira de Engenharia Sanitaria e Ambiental, presented [information about the wastewater sector in Brazil](#). Dr. Jordao explained there are 187 million people in Brazil and only 51 percent of that population has sewer coverage. Only 35 percent of the sewage from that 51 percent of the population is treated. Dr. Jordao noted that treating wastewater is important to sanitation and human health. Developing countries have only 3-5 infant deaths per 1000 births, developing countries have 5-20, the least developed countries have greater than 100. Sanitation improvements play an important role in reducing infant mortality, and wastewater treatment improves the overall sanitation situation. Brazil has been making efforts to increase the amount of sewage that is collected and treated in the country.

9 There have been great advances in wastewater treatment technology in Brazil in recent years and economical processes for wastewater treatment have been well established. Since 1996, a government organization (FINEP) has been sponsoring a research institute to investigate wastewater treatment technologies. The research network comprises 15 universities.

10 Brazil has found that one of the most economical AD wastewater treatment technology options for their situation, is the upflow anaerobic sludge blanket (UASB). UASB was developed approximately 30 years ago to treat high strength industrial wastewater; however, USAB has been used successfully to treat municipal wastewater. UASB has the advantage of possessing a small footprint, low construction and operating costs, low energy consumption, little excess sludge production, and biogas production. USAB is currently successfully employed at numerous wastewater treatment plants in Brazil and India and elsewhere around the world. Many of these plants are using the captured biogas to economically produce energy. More wastewater treatment plants could be retrofitted to include USAB.

Perspectives from the European Union

11 Dr. Henri Spanjers, of Lettinga Associates Foundation (LeAF) Netherlands, gave [a presentation](#) providing an overview of wastewater treatment technology, summarizing the wastewater sector in the European Union along with a brief overview of international opportunities.

12 Dr. Spanjers provided an overview of the basics of AD. He explained that aerobic treatment requires energy for aeration, and anaerobic treatment is favorable because it may not require any energy, plus it can produce biogas, create less sludge, manage high loading rates, and has a smaller footprint. Disadvantages of anaerobic treatment are that there is no nitrogen and phosphorus removal and there are higher effluent levels of chemical oxygen demand (COD).

13 AD includes fermentation (consisting of hydrolysis, acidogenesis, and acetogenesis) and methanogenesis. Hydrolysis is the rate limiting step of the process and is a surface related process. Acetogenesis is the process by which the fermentation products are converted to acetate, hydrogen, and carbon dioxide. Acidification may occur when the methane capacity is exceeded, then the methanogenic bacteria are inhibited and methane production halts.

14 He explained that UASB facilities are common high rate anaerobic treatment systems that can be used to treat sewage. There are many examples of wastewater treatment plants that use UASB. However, he noted that globally, of the ten largest wastewater plants using anaerobic treatment, only one plant uses the produced biogas. The challenges of using UASB include having lower

COD removals than expected, lower biogas yield than expected, higher sludge production than anticipated, and higher operator attention required.

Reactions from the Task Force

- 15 Mr. Blanco requested that the meeting participants review the questions listed in the agenda, including how GMI should focus efforts in this sector, what obstacles exist to implementing projects in the sector and how can they be overcome, how GMI can encourage greater participation in this sector, and how GMI can leverage existing financial sources or Clean Development Mechanism (CDM) funding.
- 16 Mr. Anil Dhussa from the Indian Ministry of New and Renewable Energy noted that not all human sewage produces large amounts of methane. Mr. Dhussa explained that a large percentage of human waste is not stored in anaerobic conditions, especially in the least developed and developing countries. Mr. Dhussa stated that some of the emission estimates presented in the meeting may have overestimated methane emissions if they have not taken this into account.
- 17 Mr. Dhussa noted that USAB is a common and successful wastewater treatment technology, but he cautioned that it may not be applicable for all situations. He also stated that a large percentage of populations are not connected to sewage plants and GMI should consider decentralized technology options for reducing emissions from these populations.
- 18 Mr. Jorge Hilbert of the Argentine Instituto Nacional de Tecnología Agropecuaria (INTA) asked the meeting participants what the challenges would be to implementing projects in the wastewater sector. Mr. Hilbert noted that some contaminants in the wastewater may cause failure of the AD system at the wastewater treatment plant.
- 19 Dr. Spanjers responded that antibiotics in the wastewater may cause AD systems to fail, but there are some pretreatment steps that can reduce the effects of the contaminants on the system. Dr. Jordao noted that you would not expect large concentrations of harmful contaminants in municipal wastewater, unless there are industrial plants that discharge into the local sewer.
- 20 Mr. Chris Godlove of the U.S. EPA noted there is financial support available for projects in this sector and he suggested the Wastewater Task Force determine what role GMI can play to help focus where the money is spent. Mr. Godlove noted that only one out of 10 plants highlighted in Dr. Spanjers presentation was using the produced biogas, and suggested GMI should investigate barriers to using biogas and how they can be overcome.
- 21 Mr. Kurt Roos of the U.S. EPA explained that wastewater includes industrial wastes, but some industrial wastes (such as food processing wastes) are already included in the work of the GMI Agriculture Subcommittee. He suggested that the GMI Wastewater Task Force should focus on sewage. Mr. Roos also observed that the Agriculture Subcommittee does not specify which technology to use to achieve methane reductions and/or energy recovery; the technology that is most appropriate for the specific circumstances of each country and project is selected on a case-by-case basis.
- 22 Mr. Roos also noted that nitrous oxide (N₂O) is a very important GHG. N₂O has a much higher global warming potential than methane, so small impacts to N₂O may have large impacts on the overall GHG emissions. N₂O emissions should be taken into account when considering sewage projects.

- 23 Mr. Roos mentioned that the Agriculture Subcommittee supported the development of a guidance document for agricultural AD projects, the [*International Guidance for Quantifying and Reporting the Performance of Anaerobic Digestion Systems for Livestock Manures*](#). Mr. Roos suggested that GMI could provide the leadership to develop a similar document for the wastewater sector.
- 24 Mr. Blanco responded that the task force had decided to include all wastewater for now, including industrial, and to decide at a later date where to focus the Initiative's efforts.
- 25 Mr. Lukman Salifu of WasteCare Associates in Ghana stated that less than 5 percent of the population of Ghana has sewers, but that number is increasing. Septic systems are common, but disposing of waste when septic systems are emptied can create sanitation issues.
- 26 Mr. Basharat Bashir of Pakistan's Alternative Energy Development Board suggested that the wastewater sector should include sewage and other organic wastes, including industrial wastes.
- 27 Mr. Roos observed that the Philippines are following the same path as Ghana – as they become more developed, there is more centralized treatment. However, the most common method of treatment is using open lagoons. Modifying the wastewater treatment plants to allow for methane capture in the design state is easier than retrofitting existing plants.
- 28 Mr. Ferland noted that in Dr. Spanjers list of 10 UASBs, only one plant is using the biogas produced. Using the methane produced is not the primary focus of the plants, but GMI could play a role to inform plants of the benefits of using the methane. Mr. Ferland observed that wastewater is similar to other sectors in which methane is not a focus of the sector, so, like in other sectors, it is incumbent on GMI to help build capacity and to explain the benefits of capturing and using methane
- 29 Mr. Dhussa replied that gas use is not an issue that wastewater treatment plants are interested in, because the plants do not produce enough gas to make it enticing. Also, the biogas contains contaminants such as hydrogen sulfide (H₂S), which would need to be removed in order to use the gas. In India in the 1980s, there were plants that used biogas to generate electricity but the engines were destroyed quickly due to the high H₂S concentrations in the biogas. There are now affordable technologies to remove H₂S from biogas so they should be used and the biogas could be processed to generate energy. Mr. Dhussa suggested that GMI's focus should be on methane use from the wastewater sector and not only methane emissions abatement.
- 30 Dr. Spanjers explained that for wastewater treatment plants, the core business is wastewater treatment. Biogas production from a wastewater treatment plant is relatively low due to the dilution of the wastewater. There is a significant cost associated with the equipment to convert biogas to electricity and the high cost is not covered by the low gas production. Dr. Spanjers recommended that using the biogas for heating may be the best option for the wastewater plants. Mr. Bashir noted that heating may not be needed in countries with warm climates.
- 31 Mr. Edgar Del Villar of Mexico's SEMARNAT stated there are 110 million people in Mexico, and 70 million of those people are in the largest cities. Mexico is currently treating 36 percent of its wastewater, but is aiming to treat 46 to 50 percent by 2012. Producing methane was not a concern when wastewater treatment plants were designed, so Mexico is now working to retrofit plants to capture and use biogas. Some plants have stopped working because of the high cost of operation; energy production from biogas could be used to cover the operational costs, with the added benefit of reducing methane emissions. Mr. Del Villar suggested that GMI should increase awareness of the importance of capturing methane to make plants more efficient

economically and environmentally and GMI should involve the private sector in wastewater projects. Mr. Del Villar also mentioned that one of the biggest plants in the world is being designed for Mexico City. The plant is designed to treat wastewater from 20 million people and to capture and use biogas.

32 Mr. Brian Guzzone of Eastern Research Group in the United States noted that pretreatment of biogas for energy production adds costs. These expenses may decrease the economic competitiveness of energy production. If electricity costs are not high, energy recovery may not be economically worthwhile.

33 Mr. Hilbert suggested that GMI could perform Resource Assessments for the wastewater sector to help determine the scope of the industry and the possibilities for projects.

34 Ms. Sandra Lopez of Colombia's Ministry of Environment, Housing and Territorial Planning explained that in Colombia, the majority of wastewater treatment plants are very basic and many municipalities do not even have plants. Ms. Lopez suggested that GMI needs to investigate the wastewater industry in each country to better define the possibilities for projects and increase awareness of potential projects in the public and private sector.

35 Mr. Del Villar noted that electricity prices are high in Mexico and local governments often have huge debts to electricity companies for water pumping, public lighting, and wastewater treatment. In Monterrey, landfill gas is used to cover some electricity needs and it has been less expensive than electricity from the electric companies. Mr. Del Villar suggested that GMI could review prices to see if recovering methane from wastewater could be as economical as recovering energy from landfills.

36 Mr. Godlove suggested that one step for moving forward could be to perform an exploratory wastewater feasibility assessment.

37 Mr. Dhussa noted that GMI should evaluate systems that have energy recovery. He stated that energy recovery is necessary because it can increase efficiency and many countries have favorable prices for renewable energy. Mr. Dhussa suggested that GMI could help the sector by conducting demonstration projects, performing resource assessments, conducting technology evaluations, developing a best practice manual, identifying problems and addressing them, and developing gas use projects.

38 Mr. Jose Henrique Penido Monteiro from Brazil's COMLURB stated that in Brazil, wastewater treatment has no connection with landfills. The ownership and issues associated with each industry are different. Ms. Lopez noted that she supported the development of a new subcommittee for wastewater. In Colombia, local governments are in charge but the private sector is involved and there are differences in who is in charge of wastewater versus landfills. Dr. Spanjers agreed that the sectors should not be combined.

39 Mr. Del Villar noted that in Mexico, the responsibility of wastewater treatment and landfills are both in the local governments, which is why the two sectors make sense to be combined for Mexico. Mr. Blanco noted that this was also the case for Argentina. Mr. Franck Portalupi from Environment Canada states that Canada was similar to Mexico and Argentina and the sectors should be combined into one subcommittee to save on administrative costs. Mr. Petri Kouvo of HSY in Finland agreed that the sectors should be combined because of similar management and gas treatment and use technologies. Mr. Hilbert supported the combination of the sectors to reduce burden.

40 Mr. Godlove noted that GMI should review the subcommittee structure and determine what the best solution might be. He noted that the Landfill Subcommittee had to reach beyond their scope to get experts on wastewater and he also expressed concern that there might be time limitations to including both sectors in one combined sector.

41 Mr. Potalupi noted that other subcommittees are very broad. For example, the Oil and Gas Subcommittee spans from gas production to the end use. Mr. Potalupi observed that wastewater and landfills are both addressing biogas produced from waste.

42 Mr. Del Villar noted that although wastewater treatment and landfill management were both services provided by the local authority, they are two separate branches of the local authority so there may need to be multiple representatives. Mr. Roberto Urquizo from the Ecuadorian Government of the Province of Guayas noted that there might be a need to have representatives from regional governments, which might be difficult.

43 Mr. Portalupi mentioned that if the sectors are combined, the name of the Subcommittee may need to change. Many participants strongly agreed with this suggestion, noting that the term "wastewater" could refer to a range of waste including dilute stormwater or high strength industrial waste, whereas the focus of this sector is specifically human sewage. The name change would help the focus of the sector to be apparent and would help to avoid any overlap with the Agriculture Subcommittee, which addresses agri-food waste. Some suggested names for the combined Subcommittee from the meeting participants include: Solid Waste and Wastewater Treatment, Sewage Treatment, Organic Residue Treatment, Solid Municipal Waste and Wastewater, Organic Waste Treatment.

Moving Forward

44 Mr. Blanco summarized the meeting's discussions and noted that GMI will not narrow the focus on the wastewater sector at this point (i.e., will consider both new and existing systems). Although barriers exist to implementing projects, GMI can provide technical and financial support for studies, raising awareness, conducting demonstration and pilot programs, and developing a best practice manual. Initial steps include asking each Partner country delegate to provide an overview of what the current situation is in their country, then performing feasibility studies to determine the potential methane reductions in each Partner country.

45 Mr. Blanco noted that wastewater treatment technologies are more similar to the technologies used in the agriculture sector, but in many countries wastewater ownership and operations are at the same level of government as the landfill sector. Mr. Blanco proposed a 2-year trial period to have the wastewater sector combined with the Landfill Subcommittee (which would have a new name). The meetings could be held together with shared agendas to save administrative burden and the situation could be reassessed after 2 years. Mr. Godlove noted that 2 years was a long time to consider the options. Mr. Blanco explained that the Landfill Subcommittee only meets twice a year at most. Mr. Blanco suggested that the situation could be reevaluated after 3 meetings instead of 2 years. Ms. Lopez stated that a trial period was a good idea and that each Partner country should be sure to have the appropriate representatives at the meetings, which may mean that there would be more than one country representative.

46 Mr. Roos suggested that the Wastewater Task Force should be sure to set goals in order to determine if the combined sectors are successful. Mr. Hilbert noted that the task force should focus on defining the work to be accomplished and who will carry out the work. Mr. Bashir

suggested that a workshop to develop a road map for the wastewater work could help to determine the goals for the wastewater sector.

47 Mr. Urquizo noted that he supported holding the wastewater meetings in conjunction with the Agriculture and Landfills Subcommittees.

48 Ms. Rachel Goldstein of the U.S. EPA stated that the creation of a Wastewater Subcommittee would need the support of a Partner country or countries. She noted that there is less funding available for GMI for the next 5 years than there was in the previous 5 years, and more support would be needed to create a new subcommittee.

49 Mr. Blanco expressed concern that the Wastewater Task Force was unable to reach a consensus about how to proceed with the sector in order to make a recommendation to the Steering Committee. Mr. Godlove suggested that the task force provide options to the Steering Committee. Ms. Goldstein noted that if the task force provided options, financial commitments for each option could be determined. Mr. Blanco suggested that the Wastewater Task Force could provide the following three options to the Steering Committee:

- Create a separate Wastewater Subcommittee.
- Combine wastewater with the Landfill Subcommittee for a trial period.
- Continue to have the wastewater meeting in conjunction with the Agriculture and Landfills Subcommittee meetings.

50 Mr. Hilbert noted that countries need to come forward to commit interest in the wastewater sector. Mr. Blanco suggested that the Steering Committee should also request input from countries to determine which countries would be interested in participating in the wastewater sector.

51 Mr. Blanco thanked Dr. Spanjers and Dr. Jordao for presenting, participants for their input, and the ASG for its initial exploration of the wastewater sector. Mr. Blanco then adjourned the meeting.

GLOBAL METHANE INITIATIVE
WASTEWATER TASK FORCE MEETING
11 NOVEMBER 2010
VENICE, ITALY

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