Global Methane Initiative
Final Minutes from 12th Meeting of Landfill Subcommittee
Venezia, Italy
11 November 2010

Overview

Approximately 17 participants from Argentina, Brazil, Canada, Colombia, Ecuador, Finland, Ghana, India, Mexico, Pakistan, the Netherlands, Ukraine, and the United States attended the 12th Landfill Subcommittee meeting. The transition from Methane to Markets into the new Global Methane Initiative (the Initiative) was the meeting's overall theme. A majority of the meeting focused on discussing charges from the Steering Committee, including 1) country-specific action plans and project reporting; 2) discussion of subcommittee leadership; 3) defining methane abatement activities under the landfill sector's scope; and 4) brief discussion regarding the wastewater sector. Partners also had an opportunity to report on recent activities. Below is a detailed summary of the topics discussed, as well as a closing section of action items.

Welcome and Opening

Co-Chair Gabriel Blanco started the meeting with a warm welcome to the participants and introduced new co-Chairs Rachel Goldstein and Sandra Lopez. The main meeting's goals were to discuss the charges given to the subcommittees from the recent Steering Committee, discuss the transition from the Methane to Markets Partnership to the Global Methane Initiative, and explore how the landfill sector can contribute to the Initiative's new wastewater focus.

The agenda (available in Appendix 1) also included an opportunity for delegates to provide country-specific updates. A list of all meeting participants is included in Appendix 2.

Ministerial Meeting Outcomes and Discussion

Mr. Henry Ferland, Co-Director of the Administrative Support Group(ASG), provided an overview of the recent Ministerial meeting and Steering Committee meeting and introduced participates to the Global Methane Initiative. The Initiative builds upon the success of the original Methane to Markets Partnership Terms of Reference (TOR) and Mr. Ferland highlighted the key differences between the Partnership and the Initiative:

1. The Initiative modified the scope of subcommittee work to pursue methane abatement. For the landfill sector, Mr. Ferland noted that projects such as composting and waste digestion would now be included in the scope. He encouraged delegates to think about the appropriate focal points of the technologies to discuss under the Landfill Subcommittee, given the expertise and interests of each Partner country.
2. The Initiative also modified the Partnership's scope to include work on a new Wastewater Task Force. Partner countries are encouraged to identify additional delegates from each country with expertise in wastewater topics to participate in the task force.
3. The United Stated committed $50 million in new funding for the Initiative. Other Partners countries in a position to provide funding towards the Initiative's goals are encouraged to provide similar resource commitments.
4. All Partner countries are encouraged to submit Methane Action Plans by the end of 2011 in order to coordinate funding and technical resources for methane reduction efforts. These plans will cover all active sectors in the country and representatives from various sectors should work together to ensure that each topic is included in the plan.

Mr. Ferland also provided an overview of updates from the Steering Committee meeting that was held in conjunction with the Ministerial. Two new Partner countries—Nicaragua and Turkey—were accepted into the Partnership. The Steering Committee adopted a new TOR to accommodate the changes in scope mentioned above, a commitment to routinely discuss and review the leadership of each subcommittee, and a new name for the Initiative. The Steering Committee also agreed to hold a third Methane to Markets Partnership Expo in 2012. Mr. Ferland encouraged all parties interested in hosting the event to contact the ASG.

In order to help each Partner country meet their Methane Action Plan obligations under the Initiative, the Steering Committee tasked the ASG with developing a list of questions to help guide the framework and content of each plan. The Steering Committee also asked the ASG to accommodate suggestions from Partner countries on how to streamline annual projects or other accomplishments reporting requirements in order to facilitate regular reporting of Initiative-related activities. Mr. Ferland mentioned that currently all tracking is supported by the on-line Project Tracking Database and the ASG welcomes any comments on the existing system.

Mr. Ferland noted that currently the Initiative is pursuing a new logo and branding efforts on all printed and web materials. He indicated that the website will be transitioning from www.methanetomarkets.org to www.globalmethane.org as the new home for all GMI documents. As of early December 2010 the new Global Methane Initiative website is now active.

Questions on the Charges to the Subcommittee

Action Plans:

Mr. Blanco asked for input from the delegates and Project Network members on ideas for how to write and what to include in the action plans. Comments received focused on how the private sector and state and local governments could participate in the plan, and what types of inquiries the ASG should include in its questionnaire.

Mr. Portalupi asked the ASG whether or not there are updates on the questionnaire development. Mr. Ferland responded that the ASG is currently developing the questionnaire based on feedback received at the Steering Committee meeting and it is expected to be released to all delegates by February 2011.

Mr. Penido noted that the Ministry of Science and Technology (MiST) is in charge of climate change for the country of Brazil, but he indicated that MiST was unaware of many of the ongoing projects and/or activities under the Initiative. As a representative of the private sector, he noted that for Brazil, the private sector should cooperate with the MiST to develop an action plan that considers the affected industry in that country. Mr. Ferland noted that the MiST did participate in the most recent ministerial meeting and appreciated the suggestion to collaborate with the private sector on action plan development.

Mr. Blanco noted that not all Landfill Subcommittee delegates are serving their home countries in the capacity to represent a ‘national’ action plan per se, due to their role in a local, provincial, or private sector organization. He noted that there would need to be some flexibility in the format of the plan.

Mr. del Villar presented Mexico’s approach for implementing the Action Plan. First, the plan will present the overall general strategy for climate change in the country. Next will follow sections

dedicated to sector-specific plans including a section on landfills, water treatment/water quality, agriculture, and then a consolidated chapter for other industrial/mining.

Similarly, in Canada, Mr. Portalupi noted that they are developing action plans in conjunction with the industry. The projects they are putting forward will involve expertise from technology vendors and engineers in the private sector. Project coordination and written plans are initiated by the government and a technical peer review is made by the private sector to ensure that the plan is technical achievable.

Ms. Goldstein noted the plan should include country-specific goals that already exist, such as renewable energy and waste management strategies and regulations. She also suggested the ASG questionnaire should inquire about how the Initiative can support efforts currently underway in the country in order to identify where the Initiative can provide complimentary instead of overlapping resources.

Mr. Bashir noted that Pakistan had many regulations on environment and renewable energy on the books in Pakistan. However, he noted that regulations without the political will to implement the law are not effective. He suggested that the ASG questionnaire should inquire on ideas for how to implement existing policies and frameworks.

Mr. Guzzone suggested the questionnaire should also inquire on specific project priorities within each sector. He added that if the plans included specific activities to implement, these plans could then be used to leverage funding from the Initiative or multilateral development banks. Mr. Ferland responded that some of the motivation for these action plans and reporting mechanisms was to provide information on the project development priorities within the country to help assist investors in prioritizing their investments.

Mr. Tai asked how developing nations could apply for assistance from developed nations in order to complete their action plans. Ms. Lopez added that in addition to funding limitations, there are also limited capacities in terms of human resources and delegates' time to draft the plans. Mr. Ferland noted that pledges from the United States and other developed nations could be used to help fund these strategic planning and reporting activities. In response to limited human resources and training available to complete the plans, Mr. del Villar suggested that Mexico can exchange their experience with developing their own national climate change plan with other countries that are in need of ideas.

Mr. Salifu noted that water and sanitation has been a longtime priority for Ghana. He referenced the most recent Sanitation and Water for All group meeting coincided with an early 2010 World Bank meeting. Because the meetings were held in conjunction, the organizers worked to tie specific funding allotment to certain elements of each plan. He added that securing funding from the Ministers of Finance allow for appropriate resources to be allocated to the development of a plan or implementation of projects contained within the plan. Mr. Salifu referenced examples of a rural water program in Ghana that had both of an action plan and investment plan and he noted that without a plan to direct funding toward the actions, the action plans tended to remain stagnant.

Methane Abatement

Mr. Blanco next asked delegates how the Landfill Subcommittee could better incorporate methane abatement into the focus of its work. He requested delegates on what abatement topics are of most interest to committee members and what other experts we may need to invite in order to cover these topics.

Ms. Goldstein indicated that the Landfill Methane Outreach Program, which serves as the current U.S. delegate to the subcommittee, only represents the portion of the solid waste sector that is focused on gas capture and use at landfills. Her program is under the Climate Change Division in the United States Environmental Protection Agency (U.S. EPA) Office of Air and Radiation. Methane abatement projects such as composting; waste incineration and waste stream sorting are covered under other offices within U.S. EPA and depending on the technologies considered to be of most importance, additional experts from within U.S. EPA should be recruited. She also asked if other countries have similar structures.

Ms. Lopez suggested that due to the different expertise of gas extraction and composting, each country may need more than one delegate on the subcommittee.

Mr. Penido similarly noted that Brazil's landfilling is very segregated from other waste management activities. He emphasized that landfills in Brazil often refer to open dumps and represent the least expensive solid waste disposal alternative. He indicated that abatement projects (such as composting) require funding from an outside investor since many municipalities, especially the smaller municipalities do not have the resources to invest in compost facilities, but in larger municipalities, the economies of scale may be more manageable. For example, a composting project in Rio de Janeiro that accepts organic material at a rate of 100 tonnes per day is currently contemplating preparing a project design document for this project. He also noted that most composting and waste segregation plans have resulted from national or local zero waste policies and regulation, but without this type of policy directive these technologies are very expensive. Aside from the economic concerns of methane abatement projects, Mr. Penido noted that Brazil's warm climate promotes a rapid degradation of organic waste and it is socially undesirable to have reduced collection or separation of these waste at home. Further, Mr. Penido suggested that in Brazil, the problem is not a lack of technology-based solutions or forward-thinking policies.
He noted that Brazil has recovered landfill biogas for beneficial use since the 1980s. He added that the country and several states have policies and laws to ensure renewable energy and mitigate climate change, but implementing the laws is limited by funding. For context, he noted that there are 5,564 municipalities in Brazil, 90 percent of which have less than 20,000 citizens. In these small areas, it is not cost effective to adopt methane abatement projects.

Mr. del Villar provided some examples of successful composting projects in smaller municipalities in Mexico. These communities originally funded the projects with public finance but since the initial investment, the project has transitioned to completely private ownership. Recognizing the low value of compost and the difficulty to sell this material for a profit, the municipality promotes investment in methane abatement projects by giving the private sector control of organics as well as other more profitable waste streams that can be re-sold as commodities (e.g., metals and plastics). Mr. del Villar also noted that Mexico has modified the federal loan program in order to allow both private companies and municipalities qualify for these modified low interest loans.

Mr. Portalupi agreed with other delegates that methane abatement projects do cost money and require an initial investment. However, if offered, the Initiative could help promote these projects by providing cash flow analysis to consider revenue streams from the sale of commodities as well as certified emission reductions (CERs) from the United Nations program. Similar to how the Initiative has provided technical transfer for landfill gas (LFG) capture and utilization, he added that the Initiative can provide models, tools, training, demonstration projects, and fact sheets about methane abatement technologies in order to help make these new technologies more mainstream, demonstrated and affordable for all Partner countries.

Mr. Bashir agreed there are many different sources of revenue that a project can use to help make the project economically feasible. In Pakistan, for example, 15 percent of the project revenue comes from carbon credits, and a favorable renewable energy tariff of 10 to 12 cents/kilowatt hour helps promote electricity-generating projects. Additional programs such as the United States Open Bank program provide funding of up to 75 percent of project costs if a U.S. company is brought in to invest the remaining 25 percent from the private sector. He suggested that a focus of the Initiative should be to make Partner countries and the Project Network aware of these funding opportunities as they relate to LFG capture and utilization as well as methane abatement projects.

Mr. Kuovo agreed that European Union (EU) regulation drives investment in many of the methane abatement technologies, such as anaerobic digestion (AD). He added that there are many different solutions for waste treatment and minimizing gas emissions from the waste sector including: waste incineration, AD, composting, and LFG capture. He emphasized that the technological solution depends on the local climateand technology availability, as well as local policies on electricity prices and waste management. He cautioned the subcommittee against defining what technologies were most appropriate to consider for methane abatement in this Landfill Subcommittee because a technological interest of one country may not be usable in another Partner country. Mr. Kuovo also noted that a regional approach to solid waste management is necessary to obtain the economies of scale needed to invest in solid waste management solutions. He added that Finland reduced the number of small landfills from 400 to 40 over a ten-year period in order to make the investment in the LFG capture a profitable one.

Mr. Urquizo agreed with earlier comments that the implementers of waste management policies are often local issues instead of national issues. He represents Guayas Province, the largest province in Ecuador, and noted that they are working to promote a regional landfill strategy to eliminate 20 open dumps in the Province. He agreed that a regional approach could also work for other waste management activities such as composting and recycling. He suggested that the Landfill Subcommittee work with each Partner country delegate to identify regional and local project implementers in each country to identify and convey the Initiative's message to these important stakeholders.

Mr. Matveev noted there is often a disconnect between technical professionals and the government officials. The role of Ukraine's Renewable Energy Agency is to compile information to help direct resources to appropriate technologies for the local climate.

Mr. del Villar noted that sometimes the goals of landfill biogas capture projects and methane abatement projects are conflicting. He provided the example of a landfill in Monterrey, Mexico where the biogas is used to generate electricity. As the biogas flowrate has increased, this project has expanded in three separate phases to generate additional electricity. The engines need organics in the landfills in order to maintain gas flows and provide a return on investment over the project's lifetime. So in this case, a new methane abatement policy in Monterrey (at least in the short term) would be difficult to implement. He suggested that the Initiative continue to promote multiple climate-friendly waste management solutions including landfill biogas capture as well as methane abatement.

Recognizing the Initiative's near-term reduction goals, Ms. Goldstein asked her European colleagues about the timeframes and logistics needed to implement waste segregation policies. Mr. Kouvo responded that waste is separated in Finland at a household level, prior to collection. Finland and other EU countries are working towards a goal to eliminate all organics from landfills by 2010, so the integration of source separation has been gradual. He added that the rates of source segregation differ among other EU countries, but all are working towards a common goal.

Mr. Guzzone asked whether or not a white paper to frame the methane abatement technologies being considered by the Initiative should be developed to help focus the subcommittee's efforts and identify where additional experts are needed to participate in the subcommittee and related training and workshop events.

In conclusion, Mr. Blanco summarized the discussion and recognized the need to tailor methane abatement trainings and subcommittee documents and resources to both large cities and smaller municipalities. For the smaller municipalities, he noted that the Initiative could work to provide mechanisms to help promote regional solid waste management solutions. Mr. Blanco also added that future Initiative workshops should consider including methane abatement topics in addition to LFG capture.

Wastewater Sector

Mr. Blanco noted that the wastewater sector will be discussed in detail at the task force meeting later this afternoon, but he wanted to hear input from the delegates on what organizations the landfill sector should partner with to promote methane reductions from wastewater.

Mr. Spanjers noted the International Water Association (IWA) has many specialist groups; one of the groups is focused on AD, while others are focused on various aspects of wastewater treatment. IWA is an organization of professionals with expertise in these areas and would be a good opportunity for collaboration with the Initiative task force.

Mr. Bashir also provided several groups that provide technical and financial support to wastewater projects, including the United Nations Environment Program (UNEP) water program, and focused groups on wastewater within the Asian Development Bank, Inter-American Development Bank, German and Japanese investors, World Bank, United States Agency for International Development, and United States Trade Development Agency.

Mr. Ferland suggested that Partner country delegates may have separate offices and government expertise in this area, and encouraged delegates to identify appropriate experts within their country and recruit them for the task force.

Mr. del Villar suggested that similar to the methane abatement focus discussed earlier today, the Wastewater Task Force should also tailor its work to discuss technologies, barriers, and policies surrounding wastewater in both urban and rural populations.

Updates from Partner Countries

Mr. Blanco invited all Partner country delegates to provide an update on new projects and policies to the subcommittee.

Argentina: Gabriel Blanco, Universidad Nacional del Centro de la Provincia de Buenos Aires, announced that the federal government recently opened a bidding system to purchase up to 100 megawatts (MW) from biogas electricity. Under this system, project owners will bid a price for the electricity. The projects will be selected on two criteria: 1) the price of the electricity and 2) the amount of local labor and materials involved in the project.

Brazil: Mr. Penido reported the top barriers to landfill biogas projects in Brazil. First, the underperformance or overestimation of landfill biogas projects brings hesitancy to investment. He

provided an update on the Conestoga Rovers project, which was projected to have an emission reduction potential of one million metric tons of carbon dioxide equivalent ($MMTCO_2E$) per year. There is concern within the government and private sector that this project overestimated the emission reduction potential given the performance of other biogas recovery projects in Brazil. For example, a much larger landfill in Rio de Janeiro generated 6 million $MMTCO_2E$ over a 7-year period. Further, he noted that the Bandeirantes Landfill is generating 40 percent of its original estimated reductions. Second, the biggest projects in the country have already been developed and the remaining landfill biogas capture projects are located at smaller sites. Third, the world recession has provided significant barriers to investment in the projects in the EU marketplace. Fourth, Brazil has focused climate change efforts on deforestation projects that have achieved large greenhouse gas (GHG) reductions nationwide, despite increases in GHG reductions in the state of Sao Paolo, where emissions have increased by 14 percent between 1990 and 2008. Fifth, due to hydroelectric electricity sources, the price of electricity in Brazil is very low. The income from the sale of the electricity does not cover the costs of engine maintenance. He noted that recent rules removing the tariff on transmission and distribution of renewable energy from biogas have helped increase the revenue stream for electric generating projects. He added that in order to qualify for the reduced tariff, the project owner contracts in a direct power purchase agreement with a consumer in order to obtain a higher price for electricity. Finally, the current solid waste management plan in Brazil is focused on initial upfront investment in sanitary landfill design, but there is a shortfall in long term funding for the operating and maintenance costs associated with a sanitary landfill. He added that if operating and maintenance costs are not covered, the designed sanitary landfills quickly turn into open dumps, which can reduce the ability to collect the landfill biogas.

Canada: Franck Portalupi, Environment Canada, reported on a new project in Cancun, Mexico that is co-sponsored by Environment Canada and SEMARNAT to promote AD technology. He also provided a brief background (i.e., context) regarding the situation in Cancun that led to the selection of an AD project. First, Cancun's dense resort population means land area is scarce for the development of a landfill. Second, the waste stream generated at resorts is very high in organic matter (approximately 88 percent), and the density of collection points at resorts, as opposed to households, provides for efficient segregation of waste. Finally, given the importance of marine tourism for the local economy, an AD technology solution will reduce the environmental impact of the leachate contamination from the existing landfill on the nearby reef. The project is intended to serve as a demonstration project for other resort communities in Mexico as well as the municipality of Guadalajara. The demonstration project includes building an AD system, implementing a continuous waste segregation system, generating power from the biogas, and providing fertilizers as a by-product. Mr. Portalupi emphasized that the public-private partnership is essential for the project's success, and he provided an overview of the project Partner roles. The Mexican and Canadian governments (SEMARNAT and Environment Canada) will serve as the project coordinators. Local sanitation authorities will facilitate the project which includes coordination with the resorts to implement the source separation system and issuing an RFP for the project's construction. Members of the private sector in Mexico will own and operate the AD, while the private sector in Canada will provide project design and engineering expertise based on the design of similar AD sites in Canada. The project is currently finalizing a feasibility study and it is expected to become operational in May 2012. A complete copy of Mr. Portalupi's presentation is included in the meeting proceedings on the Global Methane Initiative website.

Colombia: Ms. Sandra Lopez, Ministry of Environment, Housing and Territorial Planning, updated the subcommittee on the project development status for landfills presented at the New Delhi Expo and other recent Partnership activities in Colombia's landfill sector. The Loma de los Cocos Landfill received its letter of no objection from the Colombian government. The Ministry has been working with U.S. EPA to complete an inventory of landfills in Colombia and it recently completed

the Colombia biogas generation model, which was calibrated using data from three landfills with gas collection systems installed: *Doña Juana, La Pradera, and Antanas*. In addition to these recent activities, Ms. Lopez also summarized the United Nations Framework for Climate Change Convention (UNFCCC) Clean Development Mechanism (CDM) projects currently under development. Out of the pending 152 projects, 26 projects are in the waste management sector. These projects account for 2.5 $MMTCO_2E$ per year. The waste management projects include four LFG capture projects (both flare and electric generation), wastewater treatment, and composting. A complete copy of Ms. Lopez's presentation is included in the meeting proceedings on the Global Methane Initiative website.

Ecuador: Mr. Roberto Urquizo, Government of the Province of Guayas, updated the subcommittee on policies from the new national administration that affect solid waste management. The new constitution holds each of the 214 regional municipalities responsible for environmental compliance in their districts. Aside from new policies, Mr. Urquizo noted that the Las Iguanas Landfill in Guayaquil, one of the sites featured during the Beijing Project Expo, will issue a request for proposal by the end of 2010 (the RFP was issued later in November 2010). He also noted that one of the two projects in Quito shutdown earlier this year due to a dispute between the private operator and local government.

Finland: Mr. Petri Kuovo, Helsinki Region Environmental Services Authority, provided an update on the waste generated in Finland and the country's transition from landfills to other waste management options. He noted that Finland generated 70 million tonnes of waste in 2008, which created 80 $MMTCO_2E$ of GHG emissions. He reported that there are approximately 35 municipally-owned landfills in the country and he showed a graph of Finland's progress towards increasing the amount of LFG that is used beneficially over time. He added that Finland's land availability has resulted in a preferred technology selection of landfills over incineration. However, because of the new EU legislation that mandates waste diversion, there will be a move towards incineration in the future. He noted that a recent law was passed to help support the production of electricity from biogas. As a result of this new law, the base price of electricity is approximately 50 Euro per megawatt hour (MWh), while the new biogas- generated electricity can achieve a premium price of 80 to 90 euro/MWh. Mr. Kuovo also presented a new project at a landfill in Helsinki that is generating between 7,000 and 9,000 cubic meters per hour. This project added an innovative organic rankine cycle process to recover heat from the exhaust of the biogas-fired Deutz engines. The organic rankine cycle uses the exhaust heat to heat up thermal oil, which in turn is used to generate steam using an organic medium such as toluene or pentane to fuel a steam turbine. This rankine cycle increases the efficiency of the electric generating plant up to 50 percent. Outside of landfill gas work in Finland, Mr. Kuovo noted that the Finnish government is currently supporting a technology transfer project for LFG well construction at a landfill in Namibia. A complete copy of Mr. Kuovo's presentation is included in the meeting proceedings on the Global Methane Initiative website.

Italy: Mr. Francesco Pressice, Ministry of Environment, submitted written input and Mr. Ferland read these comments into the minutes. First, Mr. Pressice noted that the Initiative's main focus should be to address barriers and gaps, especially relating the investments in developing countries. With respect to wastewater, he added that the main obstacle to implementing wastewater projects in the developing Partner countries is the small size and rural location. For these small projects, the existing methodologies (e.g., CDM Methodology AMS.III.H) have very time intensive and costly reporting and monitoring requirements that need to be streamlined in order to foster investment. He suggested that the Initiative could contribute to provide evidence and case studies and suggest approaches to suggestive alternative methodologies. He added that sometimes a small investment in

streamlining a methodology (e.g., developing appropriate default parameters) could mobilize much greater investment in wastewater projects from the private sector.

Mexico: Mr. Edgar del Villar, SEMARNAT, reported that Mexico recently launched a national program for infrastructure development, including investment in the waste management sector. In 2010, the budget for waste management was doubled to fund the construction of sanitary landfills and waste segregation plants. He added that SEMARNAT is promoting and prioritizing funding to regional approaches in order to develop cost effective LFG recovery projects. Mr. del Villar also provided a summary of current electric generating capacity at Mexico's landfills: Monterrey is now producing 17 MW, while Aguascalientes is generating 4 MW, and Queretaro is generating 5 MW.

Pakistan: Dr. Basharat Bashir, Alternative Energy Development Board, reported that most waste in Pakistan is sent to open dumps since there are only two or three sanitary landfills in the country. He noted that none of the sites are currently collecting LFG, but that the larger landfills are working with the Development Board to promote energy recovery from landfills given the current demand for new sources of electric generation. He added that the current energy crisis in Pakistan has focused investment in infrastructure projects that generate electricity and the focus has been on waste incineration. Other pending energy projects in the biomass sector are large sugar plants firing bagasse with a potential to generate 5,000 MW. Currently 16 of the plants have applied for an electric generating license. Additionally nine refuse-derived fuel (RDF) plants are proposed and many coal-fired power plants are in the process of converting to co-fire RDF. The United States Trade and Development Agency (USTDA) is currently commissioning a study to evaluate several different waste management technologies for waste energy plant in Karachi that would accept 10,000 tonnes per day of waste.

Philippines: Mr. Ferland read a written prepared statement on behalf of Nonillion Pena, Philippine Council for Industry and Energy R&D. The update included a list of recent site assessments and tools the Initiative has provided to the Philippines. The written statement also introduced the proposed Renewable Energy Act that could potential provide premium power pricing for LFG electricity at a rate of Pup 6-8/kWh (US$0.14-0.18/kWh). See Attachment 3 for the complete written update.

United States: Ms. Rachel Goldstein, U.S. EPA, provided an update on the regulatory scheme affected landfills. She noted that the reporting requirements and air regulations for landfills are changing and she anticipates that additional requirements for flaring and capture of gases will go into effect in early 2011. She also added that landfills are going to begin reporting their emissions to U.S. EPA by March 2011. She also reported that there are now 526 operational landfill gas energy projects in the United States.

Updates from Project Network

Lettinga Associates Foundation was represented by Mr. Henri Spanjers, who noted the Netherlands have achieved a high level of waste separation and the organic waste is either digested or composted. No new landfills are being constructed, since available land space is limited. With respect to wastewater, Mr. Spanjers noted there are more than 400 wastewater treatment plants and the sludge is either incinerated directly or incinerated after anaerobic digestion. There is a dense natural gas grid and it is popular to inject biogas directly into the grid in the Netherlands.

Scientific Engineering Center "Biomass" Institute of Engineering Thermo physics was represented by Mr. Yuri Matveev, who updated the subcommittee on the recent installation of four infrared heaters at a Khelminstky Landfill. In addition to this project, four other landfill projects have been

initiated under the Joint Implementation (JI) component of the UNFCCC. He added that the Initiative provided a feasibility study for one of these projects to convert the flare project into an electric generating project. Mr. Matveev indicated that given the recent election in Ukraine, it is unclear what specific sustainability and renewable energy policies will be the new administration's focal points. One potential initiative called 'Green Cities' would establish waste segregation and modernize landfill design. Mr. Matveev also noted that Ukraine has had an energy recovery project at one of their waste water plants that uses the biogas to fuel boiler since the 1970s, and he is supportive of the Initiative's new expansion into the wastewater sector.

Waste Care Associates was represented by Mr. Lukman Salifu, who provided a general overview of waste management in Ghana. Approximately 40 municipalities have a population exceeding 10,000 and there are two sanitary landfills in the country. The climate ranges in temperature from 28-32°C and the fairly humid although rainfall is seasonal. Land use ownership limitations in Ghana mean that the governments do not own any landfill sites, but instead all landfills and dump sites are owned by the private sector and most landfills occur in quarry sites. He added that the official government delegate to the Global Methane Initiative is in the Ministry of Environment /Science and Technology, while the agency responsible for implementing infrastructure projects, such as landfills, in the municipalities is the Ministry of Local Affairs. The current Ghana waste management policy is called materials in transition, or MINT. This policy has the goal of reducing waste sent to landfills by reducing, recycling, and recovering the waste. The MINT policy is focused on creating waste management strategies that can support employment. These strategies include buyback centers for plastic and other commodities as well as waste sorting activities that create employment. He noted that many villages will be more open to accepting a new landfill site as long as it is paired with job creation for the local economy. He added that 60 percent of the waste stream in Ghana is organic, which provides an opportunity for composting projects. He noted one example of a 300 tonne per day compost site near Accra that is being financed by a Chinese company.

Subcommittee Ongoing Activities

Best Practices Guide

Ms. Goldstein provided a brief history of the United States Project Development Handbook and the role it has served to help project developers working in the U.S. market. She introduced the revised outline that incorporates suggestions made during the March 2010 New Delhi meeting. The detailed outline is available in Attachment 4 and she asked delegates and Project Network members to provide input on the new outline.

Mr. Ferland indicated that today's earlier discussions and the Initiative's new scope suggested that a chapter focused on methane abatement topics and technologies could be useful.

Mr. Blanco noted that several topics listed in the outline are documented in other literature (e.g., World Bank Handbook, university white papers) and he asked if the United States has considered these other available documents in the context of the outline. Ms. Goldstein responded that she envisioned the outline to be a central repository for each topic and that many detailed or regional discussions would be cited within the document to avoid duplicating the efforts completed by existing literature.

Mr. Penido noted one similar reference, a Pan American Health Organization document on landfill design and operations. He added that the best practices and guidelines will vary by location and the document needs to be tailored for each country in order to be relevant for landfill operators. He

suggested that if a regional approach is included in the document that it would be very helpful to include a set of criteria (e.g., waste tonnage, composition, climate) to help municipalities screen their sites to determine project eligibility. Mr. Urquizo added that various countries have different barriers to project development so that the chapter on policy and institutional barriers should include a regional or country-level discussion of the specific barriers facing each nation.

Mr. Godlove agreed that some topics are regional in nature, but also suggested that some topics are universal practices, irrespective of countries. He suggested that one possible solution would be to devote one chapter or appendix of the document to case studies from a diverse set of geographic locations. This section would help landfills identify projects that have been successful and what elements made them successful to use as examples for other countries trying to develop new waste management technologies or LFG recovery projects. He added that the case studies could feature methane abatement projects such as the AD and composting as well as various LFG energy recovery projects. Perhaps this guide could include a section on composting projects.

Mr. Blanco agreed with the idea to incorporate case studies, but he suggested this section mix both successful and unsuccessful projects. He added that often the challenges faced by unsuccessful projects yield more lessons learned compared to only highlighting project successes. He suggested that the Initiative might consider using universities as a reference for gathering project descriptions from project obstacles since other parties might be hesitant to provide accurate information on unsuccessful projects. Mr. del Villar suggested that both successful and unsuccessful examples were important in order to avoid discouraging investment in projects that appear to only be failures.

Mr. Guzzone suggested that another way to include regional consideration is to adopt an Intergovernmental Panel on Climate Change (IPCC) approach and present presenting a range of values for different conditions (e.g., gas modeling parameters, cost parameters). Mr. Blanco emphasized the need for incorporating a range of values because one number is not helpful to a stakeholder considering a project since there is so much variability in parameters over time and space.

Dr. Bashir also emphasized the need to include alternative beneficial use technologies other than electricity generation and how the various technologies are applicable or not applicable in each of the Partner countries. He also agreed with tailoring a section of the project finance chapter to include how financial incentives and policies are implemented. This chapter would serve as a repository of regional policies for project investors as well as a resource for policy makers that have appropriate laws but are lacking the political will to implement the policies.

Mr. Portalupi suggested the audience for this document needs to be identified since the various topics discussed in the outline serve different purposes. His opinion was that the document's readers were politicians and project investors. Further, this book could be used as a document and promote landfill sector activities under the Initiative. Dr. Bashir and Mr. Penido shared the opinion that the audience of this document would likely be landfill operators.

Mr. Guzzone asked Ms. Goldstein what role the United States is looking for each Partner country delegate and Project Network member to play. Ms. Goldstein indicated that she would be looking for each of the countries to develop the facts and project summaries for case studies.

Data Tracking

Ms. Goldstein provided a brief history status update on the International Landfill Database (ILD). The database now contains more than 700 landfills and the Initiative is transitioning this data into a

new data tracking tool called a CRM database. She added that users will still view the landfill data on the Initiative website, similar to how the ILD data is currently viewed, but there will be changes to how data is entered and stored in the new CRM. She anticipated that the ILD data would be transferred into the new CRM beginning in 2011.

Future Events

Ms. Lopez invited all attendees to share upcoming landfill-related activities with the group and Mr. Ferland added that the ASG will publish these event details on the Initiative website. The events discussed are shown below:

1) 8 December 2010. Global Methane Initiative Side Event at the UNFCCC COP 16 in Cancun, Mexico

   The event will be held on 8 December from 9:00 to 11:40 in the morning in the Green Solutions Pavilion (Business Area) in the Fiesta Americana Coral Beach Hotel.

   The side event's goal is to promote the launch of the Initiative and highlight success stories of projects. SEMARNAT and US EPA will introduce the Initiative and then various other Partner countries and Project Network members will highlight their work. Currently, Project Network members PEMEX and Mimosa are scheduled to present and Mr. Ferland encouraged everyone to contact the ASG if they were interested in presenting or participating in the event. The ASG will also post details of this event on the website.

2) 9-10 December 2010 ISWA Beacon Workshop in Novi Sad, Serbia with a workshop in Creating Viable LFG Energy Projects in Eastern and Southeastern Europe http://www.globalmethane.org/news-events/event_detailsByEventId.aspx?eventId=292
3) January 2011 Asian Technology Forums will be held in Singapore, Hong Kong, and Beijing
4) 18-20 January 2011 Baltimore, Maryland for the Annual LMOP Conference will highlight several different energy recovery technologies and discuss the regulatory and policy challenges facing LFG energy projects in the United States http://www.epa.gov/lmop/workshops/14th.html
5) March 2011 Renewable Energy / Alternative Energy Conference in Karachi in. http://www.powerasia.com.pk
6) April 2011. Event to showcase the pending Doña Juana, Colombia electricity project.
7) The 3-7 May 2011 International Conference on Solid Waste http://arcpe.hkbu.edu.hk/conf2011/
8) June 2011. "Get Out" Meeting in Cali, Colombia focused on sustainability in waste management.
9) October 2011. Brazilian Association of Engineering Sanitation and Environment annual event. Approximately 2,000 people attend the event which covers solid waste, wastewater, and water infrastructure.

Mr. Ferland also asked for volunteers to host the next Landfill Subcommittee meeting, which should be held in early to mid 2011. He added that the ASG is tentatively planning a multi-sector and Steering Committee combined meeting for October – November 2011.

Leadership

Mr. Blanco introduced the topic of selecting a new co-chair for the Landfill Subcommittee and he suggested that anyone interested in serving as co-chair contact the ASG directly at

asg@methanetomarkets.org. During the next subcommittee meeting, the group will appoint new leadership, as needed.

Summary of Action Items

ASG Action Items:

- The ASG will incorporate suggestions received on an action plan list of questions and will distribute to all Partner country delegates by March 2011.
- The ASG will accommodate suggestions from Project Network and Partner country delegates to streamline annual reporting requirements. This may include pre-populated web-based forms that will be sent out to initiate project updates from Partner countries.
- The ASG will update printed and electronic materials to update its members and the general public on the Initiative's new goals and introduce the new brand and logo.
-

Partner Country Action Items:

- Delegates are encouraged to work with representatives from other sectors to draft a national methane action plan by December 2011.
- Delegates are encouraged to draft a list of focused activities to pursue for methane abatement in the solid waste sector and nominate additional delegates with expertise in methane abatement technologies and methodologies. These activities will be shaped based on discussion during the meeting and any other priorities reported to the ASG from newly recruited experts. The ideas generated should cover technologies and project development in the context of both rural and urban areas. A white paper may be list of action items to pursue with respect to abatement.
- Delegates are asked to update the ASG with the details of solid waste-related events occurring in their countries in 2011.
- The United States will update the Best Practices Guide outline with suggestions made during the meeting and it will engage Partner country delegates for case studies to highlight as part of the document.
- The United States will convert the data in the International Landfill Database to incorporate into a new data platform that should make information more accessible.
- Delegates and Project Network members who are able, are encouraged to attend the GMI side event at the COP 16.

Attachment 1: Meeting Agenda

GLOBAL METHANE INITIATIVE
COMBINED LANDFILL, WASTEWATER, AND AGRICULTURE
SUBCOMMITTEE AND TASK FORCE MEETINGS
11 – 12 NOVEMBER 2010
VENICE, ITALY

Held in conjunction with
3rd International Symposium on Energy from Biomass and Waste

Landfill Subcommittee Meeting Agenda

Thursday, 11 November 2010
8:00 – 14:00

8:00	Registration
8:30 – 8:45	Welcome Addresses *Landfill Subcommittee Co-Chairs Gabriel Blanco (Argentina), Sandra Lopez (Columbia), and Rachel Goldstein (United States)* • Brief introduction of all meeting participants • Adoption of the agenda • Review of meeting goals – Overview of co-located meeting goals (Wastewater Task Force and Agriculture Subcommittee) – Implementing Steering Committee recommendations
8:45 – 9:30	Update from the Administrative Support Group (ASG): Partnership Steering Committee and Ministerial Meeting Outcomes *Henry Ferland, ASG* • Ministerial Meeting outcomes • Discussion of new Terms of Reference and Steering Committee Charge to Subcommittee
9:30 – 10:15	Discussion about Ministerial Meeting *Gabriel Blanco, Co-Chair* • Questions about outcomes • Implications for Landfill Subcommittee – Additional interest in participating on the Wastewater Task Force – Brainstorming activities to implement charges from Steering Committee *(Gabriel Blanco)*
10:15 – 10:45	Country-Specific Statements Brief updates from Country Representatives regarding status and implementation of any new or planned landfill project activities in country or in other Partner Countries.
10:45 – 11:15	Updates from Project Network *Project Network Representatives* • Partnership activities • New project or technology developments
11:30 – 12:15	Subcommittee Discussion of Ongoing Work

***=** Official Delegate ♦ = Project Network

- Best Practices Guide (see attachment for revised outline based on comments received after New Delhi)
  Rachel Goldstein, Co-Chair

12:15 – 13:15 Lunch

13:15 – 13:50 Subcommittee Discussion of Ongoing Work (continued)

- Reporting and tracking Landfill Sector Accomplishments
  - Update on International Landfill Database, Methane to Markets CRM database, and the Project Tracking Database *(Rachel Goldstein)*
  - Announcements of upcoming conferences/workshops/other events of interest to the Subcommittee *(Sandra Lopez)*
  - Proposals for dates and locations for next Subcommittee *(Sandra Lopez)*

13:50 – 14:00 Summary of Action Items Discussed at this Meeting

- Specific tasks that meeting participants agree to accomplish and report on within specified timeframes

14:00 Adjourn

Attachment 2: Meeting Attendees

Global Methane Initiative

COMBINED LANDFILL, WASTEWATER, AND AGRICULTURE SUBCOMMITTEE AND TASK FORCE MEETINGS
11 – 12 NOVEMBER 2010
VENICE, ITALY

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Attachment 2: Meeting Attendees

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Attachment 2: Meeting Attendees

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Global Methane Initiative
Combined Landfill, Wastewater, and Agriculture
Sub-Committee and Task Force Meetings
11-12 November 2010, Venice, Italy

Methane to Markets (M2M) Sub-Committee on Landfill

M2M commissioned assessment studies at four (4) existing landfill sites were conducted under the Landfill Methane Outreach Program, namely as follows:

- Bulacan Landfill, San Jose Del Monte City
- Lumbangan Landfill, Zamboanga City
- Sinawal Landfill, General Santos City
- Controlled Dumpsite at Cagayan De Oro City

Philippine specific landfill gas modelling tool was developed to provide landfill owners, operators, and developers with a realistic tool to evaluate the feasibility and potential benefits of recovering and utilizing LFG for production of energy for various potential end uses.

Landfill Gas Training Workshop in December 2009 was organized under the M2M Partnership Program, which was participated by local stakeholders from government agencies, academe, local government units, financing institutions and non-government organization.

Two (2) landfill proposals were endorsed by the Philippines under the M2M Program for funding support in July 2010, which are entitled:

- Capacity Building on Methane Emissions Recovery and Utilization from Landfills in the Philippines
- Feasibility Study on the Upgrading of the San Pablo Controlled Landfill into an Engineered Sanitary Landfill for Methane Carbon Dioxide Reforming into Synthesis Gas

Other M2M Landfill related initiatives

As of early 2010, the Philippines have 30 existing sanitary landfill sites and 42 undergoing construction that already have environmental compliance certificate. With the banning of the use of incinerators for municipal solid wastes under the Clean Air Act, there is a significant increase of sanitary landfill site applications that have reached 349 proposed sites throughout the country to displace commonly used disposal facility like open dumpsites.

As part of the implementation of the Renewable Energy Act, the inclusion of providing feed-in-tariff (FIT) for the landfill gas power generation plant is being proposed. The Energy Regulatory Commission is currently conducting stakeholder consultations in

determining the FIT rates for different renewable energy source and initial proposal received for landfill gas power generation ranges from PhP 6-8/kWh (US$0.14-0.18/kWh).

Under the Clean Development Mechanisms financing, as of mid-2010, there were two (2) landfill gas recovery & utilization CDM registered projects that accounts an annual ave. 353,166 tCO2/yr emission reduction. Likewise, there was one(1) CDM project registered as solid waste methane avoidance with 6,058 tCO2/yr emission reduction. The Philippines Designated National Authority (DNA) has approved a total of 4 projects for landfill gas recovery and utilization.

Attachment 4: Detailed Outline of LFG Best Practices Guide

i. Brief Introduction of Landfill Gas, and its role in Integrated Waste Management
   a. This chapter would give an overview of integrated solid waste management as many of our partner countries utilize other methods besides landfilling for waste management.
   b. The next section of this chapter would briefly discuss the importance of methane, the international landfill industry, and the purpose of this best practices guide. Information on these topics is readily available from previous Methane to Markets support work.

1. International Landfill Design and Landfill Operation to Improve Gas Recovery
   a. Comparing and contrasting the ability to collect gas from open dumps, controlled landfills, and sanitary landfills. This section to include some discussion about regional/country specific LF design where applicable.
   b. Types of liners, final capping systems, and their impact on LFG generation/collection
   c. Daily/weekly/intermediate cover and waste compaction practices, thickness and frequency of cover
   d. Re-grading landfill slopes to create appropriate slope
   e. Leachate management.
   f. Fires. Techniques to identify and control subsurface fires

2. Landfill Gas Modeling
   a. Discussion of the various models, pros/cons – when to use them (IPCC, LandGEM, proprietary models)
   b. Documents that discuss/compare values predicted from different landfill gas models
   c. Documents that compare model predicted values to actual gas collection measurements for LFG projects
   d. Documents that discuss how to customize models to different climates and waste compositions
   e. Factors to consider in collecting data, performing gas generation modeling, and estimating gas recovery efficiency to avoid over-predicting recoverable methane.

3. Design and Operation of Existing Landfill Gas Collection and Flaring Systems Internationally
   a. description of equipment
   b. designs of gas extraction wells –including country specific/regional variations if applicable
   c. header pipes
   d. minimizing condensate in landfill gas header pipes
   e. radius of influence for gas extraction wells
   f. open vs. enclosed flares
   g. managing and identifying leaks in the gas collection system
   h. methods for optimizing and managing the system
   i. construction QA/QC

4. Landfill Gas Energy Recovery Technologies (both electricity and thermal energy)
   a. Discussion of suitable technologies
   b. Treatment/cleaning landfill biogas to remove contaminants so it can be used for energy recovery. Documents that discuss how treatment options may need to be tailored for international conditions.
   c. Innovative energy uses, successful energy technologies or uses for dumps/landfills with a small amount of gas

5. Creating a Market for Landfill Gas to Energy- What are the Elements
   Policy issues, barriers, and incentives.
   a. Electric utility regulations and policies
   b. Natural gas utility regulations and policies

   c. Barriers to transitioning landfill gas flaring clean development mechanism (CDM) projects to beneficial energy recovery projects and examples of where a project has converted a flare project into an energy recovery project.
   d. Types of incentives that exist internationally for promoting landfill gas energy recovery/distributed generation/renewable energy in general.
   e. Requirements to install gas collection systems from either an environmental or Health and Safety perspective.
   f. Landfill ownership
   g. Mineral rights/ land rights/ contracts in various countries
   h. Negotiating contracts and securing incentives for renewable energy

6. Discussion of the types of project costs, revenue, and economic factors that should be considered and included in a preliminary economic feasibility analysis of an international landfill gas project Discussion of project finance.

7. Examples/Guidance on how to prepare RFP for landfill methane projects and/or guidance for evaluating proposals received from developers on landfill gas projects