Universidade Federal de Santa Catarina (UFSC)
Florianopolis, Brazil
14 March 2014

Minutes

Summary

The Global Methane Initiative (GMI) held a tri-sector subcommittee meeting (Agriculture, Municipal Solid Waste [MSW], and Municipal Wastewater Treatment) on 14 March 2014 at the Universidade Federal de Santa Catarina (UFSC) in Florianopolis, Brazil. The tri-sector meeting began with a welcome from the University and included an update from the GMI Administrative Support Group (ASG), country updates from countries represented at the meeting, and dedicated sessions for each sector.

The subcommittee meetings focused on the following:

- **Agriculture** –- Development progress of the *Anaerobic Digestion Policies and Incentives Best Practices Guide* and identification of next steps.
- **Municipal Solid Waste** – Follow-up on action items from March 2013 subcommittee meeting held in Vancouver, Canada, with a focus on the use of anaerobic digestion for MSW.
- **Municipal Wastewater** – Overview of country-specific wastewater action plans and development of new tools.

The tri-sector subcommittee meeting agenda is posted on the GMI website, and is included as Annex 1.

The tri-sector subcommittee meeting was attended by 34 representatives from 12 countries: Argentina, Brazil, Bulgaria, Canada, Chile, Colombia, Dominican Republic, Finland, India, Mexico, United States, and Vietnam. A list of participants is included as Annex 2 to these minutes.

Presiding over the meeting were:

- **GMI ASG**: Monica Shimamura and Henry Ferland (United States, Environmental Protection Agency [EPA]), Co-Directors
- **Agriculture Subcommittee**: Allison Costa (United States, EPA), Anil Dhussa (India, Ministry of New and Renewable Energy), Jorge Hilbert (Argentina, National Institute of Agriculture Technology [INTA]), Co-Chairs.
- **Municipal Solid Waste Subcommittee**: Tom Frankiewicz (United States, EPA), Co-Chair.
- **Municipal Wastewater Subcommittee**: Elias Freig (Mexico), Chris Godlove (United States, EPA), and Federico Grullon (Dominican Republic, National Council for Climate Change and Clean Development Mechanism), Co-Chairs.

Welcome

Professor Luiz Carlos Pinheiro Machado Filho from UFSC began the meeting by welcoming all attendees. He gave a presentation, providing an overview of the University and their active engagement in the international arena via a vibrant exchange program and cooperation with other universities around the world.

ASG Overview

Monica Shimamura (ASG Co-Director) thanked Professor Luiz Carlos Pinheiro Machado Filho for the welcome, and gave special thanks to UFSC and Fundação do Meio Ambiente (FATMA) for hosting GMI this week, noting that the meeting would not have happened without them.

Ms. Shimamura asked attendees if there were any additions or modifications to the meeting agenda needed. There were none, so the agenda was formally adopted.

Ms. Shimamura provided an overview of the GMI ASG. Attendees noted they were knowledgeable about GMI's structure and subcommittees so she skipped those slides. The ASG activities discussed include:

- Working on 10-year celebration (e.g., all Partnership meeting), with 2015 date and location to be determined.
- All-sector GMI video, which will also have coal, oil and gas, and biogas video modules that are more technical in nature.
- Infographic pamphlet about methane and GMI's role in reducing emissions that will be a visual description of GMI activities and accomplishments.
- GMI website updates
    - New map will show GMI projects worldwide (Ms. Shimamura encouraged attendees to submit information for the map).
    - Goal is to release map in next couple of months.
- Marketing the GMI brand through social media (e.g., Facebook, LinkedIn).
    - GMI posts ~10 articles/week about methane
- *Methane International* newsletter
    - Issued quarterly.
    - Goal is to help inform delegates and Partners.
    - Topics include:
        - New projects and activities.
        - Subcommittee updates.
        - Upcoming events.
    - Ms. Shimamura encouraged attendees to share story ideas and information through ASG email address: asg@globalmethane.org.
- Non-biogas activities
    - The Coal Subcommittee held a meeting in November 2013 in coordination with the 8th Session of UNECE Ad Hoc Group of Experts on Coal Mine Methane.
    - An Oil and Gas Subcommittee meeting is planned for 12 May 2014 in San Antonio, Texas, United States.

Country Updates

After providing the ASG overview, Ms. Shimamura invited country representatives to provide an update of biogas-related activities in their respective countries.

Jorge Hilbert (Argentina, INTA) – Presentation slides available. Highlights included:

- There are a number of projects in the works.
    - Four new big projects in the last year
- It is still difficult for biogas projects to compete with fossil fuels (i.e., fossil fuels have high subsidies).
- Two Nationally Appropriate Mitigation Actions (NAMAs) are in development:

    - Pig manure treatment in small farms
    - Biogas production and use (PROBIOMASA)
- Challenges to biogas project development include:
    - Low energy prices
    - No carbon market
    - Unclear regulatory environment on effluent final disposal or farm application
    - Non-rationalized energy prices
- Opportunities for additional biogas development:
    - New legislation and regulation to encourage biogas use
    - High cost of importing conventional energy sources
    - High risk of energy shortages
    - Energy pricing reforms (cutting of oil and gas subsidies)
    - Capacity building and technology transfer
        - Trainings and workshops with Germany over the past few years have produced a number of trained professionals.
- There have been discussions about sector-specific action plans for agriculture, MSW and wastewater, but little progress to date.
- There have been a few resource assessments completed at the provincial level.
- An overview of a few biogas projects was given.

Joao Pimenta (Brazil, FATMA) –Mr. Pimenta thanked everyone for their participation in the Biogas workshop and noted the past couple days of presentations provided a good overview of Brazil's biogas situation.

Grigor Stoyanov (Bulgaria, Ministry of Environment and Water) – Presentation slides available. Highlights included:

- An overview of Bulgaria' s methane emissions in Bulgaria.
    - The waste sector is a large source.
- There are two directives related to waste and landfills:
    - Goal of 50 percent recycling of MSW by 2020
    - Goal of 65 percent diversion of biodegradable material from landfills by 2020
- Directives require changes in legislation (waste management act and secondary legislation).
- There is a NAMA in place for a biowaste management project.
- Challenges to mitigating landfill gas emissions:
    - Knowledge and capacity development
    - Enforcement
    - Business Models
- There is a National Waste Management Plan (2014-2020) in place that calls for building 55 regional waste treatment systems to significantly decrease landfilled waste. Bulgaria is aiming to become zero waste society.
- Goals of the Waste Management Plan include:
    - Improving knowledge
    - Enforcing compliance
    - Developing business opportunities
- Current recycling rate of MSW is 25 percent.

Franck Portalupi (Canada, Environment Canada). Mr. Portalupi noted there are numerous domestic and international biogas activities taking place. Domestically, Canada is taking a sector-by-sector approach. Internationally, Canada is an active GMI member. Mr. Portalupi indicated an interest in working more closely with the GMI wastewater sector. Canada is a major contributor to the Climate and

Clean Air Coalition (CCAC), and wants to continue its close relationship with GMI and CCAC. Canada is working on NAMAs in six countries and mentioned United Kingdom and German efforts to support NAMAs (there will be a second round of funding for project support in 2014).

Carolina Ascui (Chile, Ministry of Environment) – Presentation slides available. Highlights included:

- Since 2003, there have been numerous CDM projects.
- 122 projects were presented for CDM support and about half generated CERs.
- Ministry of Environment is focused on NAMAs right now.
- Chile is working on a Sustainable Solid Waste Management Plan and new carbon reduction incentives.

Maria del Mar Mozo Muriel (Colombia, Emsirva) – Highlights included:

- Colombia's waste generation equals 24,600 tons/day.
- Waste sector emissions comprise 5.7 percent of total GHG emissions.
- There is strong private sector involvement in collection and disposal (good and profitable sector).
- There is a tariff system that incentivizes correct final disposal.
- Objectives and summary of Colombia's solid waste NAMA,: formulation process, barriers identified, actions proposed, potential emissions reductions, and the financial mechanism employed.

Federico Grullon (Dominican Republic, National Council for Climate Change and Clean Development Mechanism) – Presentation slides available. Highlights included:

- There has been an increase in production and emissions of biogas.
- The country is constructing two new coal power plants (300 megawatt [MW] each).
- An increase of 300 MW of renewable energy capacity is expected by 2015.
- Changes in Law 57-07 on Renewable Sources of Energy Incentives and its Special Regimes
- The wastewater treatment coverage in Santiago Province is 30 percent.
- Pending projects are in the works that would increase coverage to approximately 40 percent of in Santiago de Los Caballeros, Licey, Tamboril, and Puñal.
- The main challenge to increasing coverage is lack of available funding.
- Main challenges to emissions reduction projects include:
    - High energy prices
    - No national carbon market
    - Restrictive regulatory framework.
- An overview of wastewater treatment projects (e.g., Rafey, Cienfuegos, Los Salados, El Embrujo, Tamboril).
- Dominican Republic has not yet started a country-specific wastewater sector action plan.

Birgitta Vainio-Mattila (Finland, Ministry of Agriculture and Forestry) – Presentation slides available. Highlights included:

- No significant updates since the Vancouver meeting; however, there is good knowledge of how to produce biogas in arctic conditions in Finland.
- Wood biomass represents over 80 percent of renewable power energy sources. Renewables as a whole represented 30 percent of total energy in 2012.
- There are 45 operational biogas plants and plans for 39 more.
- Several incentives for biogas projects are available (e.g., feed in tariff for larger biogas plants).
- An example of a closed circulation project (i.e., biogas generation, greenhouse, aquaculture, biofuel production) was presented.
- Use of renewable energy on farms has increased strongly (in particular, wood chips for heating).

- Eighty percent of Finland's population is connected to wastewater treatment.
- There are 540 wastewater treatment facilities; the primary treatment process is combined organic material and nitrogen removal.
- Wastewater treatment facilities are generally small.
- There is strong pressure for co-digestion (i.e., digesters that treat wastewater sludge in addition to other organic material such as fats, oils, and greases).
- A couple of wastewater treatment case studies were presented.
- Beginning in 2016, it will be forbidden to dispose organic waste in landfill, which will decrease the amount of biogas produced from landfills.

Anil Dhussa (India, Ministry of New and Renewable Energy) – Presentation slides available. Highlights included:

- There has been a drop in power production from biogas, and increased interest in biomass-generated compressed natural gas (BioCNG).
- The size of projects is increasing across the renewable energy sector.
- There are 30,000 MW of planned renewable energy additions anticipated from 2012 to 2017.
- The first projects for BioCNG from sugarcane are set up.
- Main challenges to projects include:
    - Lack of government support
    - Soft carbon market
    - Biogas for power is being compared with low cost energy supplies from large thermal or hydro projects (BioCNG has advantage of being compared with petrofuels).
- Challenges are being overcome through legislative actions, incentive development, energy pricing reform, and capacity building.
- There is a brainstorming workshop scheduled for 24 March 2014 to discuss ways to increase research and development (R&D) for biogas (Mr. Dhussa encouraged attendees to provide input and promoted the idea of collaboration).

Elias Freig (Mexico) – Presentation slides available. Highlights included:

- There have been big, important and transformational Constitutional reforms in Mexico over the past 15 months proposed by President Enrique Peña Nieto.
    - 12 constitutional reforms
    - 8 new laws and 28 changes to existing laws and regulations are under way in order to implement the Constitutional Energy Reform.
- The Energy Reform passed in December 2013 is going to be very important.
    - New regulations, incentives, and markets are being developed
    - New actors from the private sector will be involved.
- Starting 01 January 2014, Mexico has a carbon tax (~$3/ton).
- The agriculture sector has been one of the most active sectors.
    - Approximately 850 actions have taken place, mitigating about 600,000 tons of carbon dioxide equivalent (CO_2e) in last 5 years.
- Challenges to emissions reduction projects include:
    - Limited incentives
    - Insufficient financing for mitigation projects
    - Weak energy price structure
    - Incipient knowledge of smart grid technologies. Technical assistance is much needed in this field.
- Approaches to overcoming challenges include:
    - Strengthening secondary legislation and regulation involved with the Energy Reform

    - Prioritizing development of policies, programs and incentives for renewable energy and energy efficiency
    - Energy pricing reform
    - Setting up short- and medium-term renewable energy and energy efficiency goals
    - Greater promotion of smart grid technologies
    - Increased financing for projects
- 2014 is going to have reform of Agricultural Sector.
- MSW and wastewater are moving forward, guided by the new Energy Reform that will be fully implemented before January 2015.
- Need and would like specific technical and financing assistance from GMI to help with project development in order to identify, analyze and develop more methane capture and biogas energy generation projects in Mexico
- A brief summary of a few wastewater projects that capture methane and will generate energy like the Atotonilco (32 MW) and the Hermosillo (2 MW) WWTP, as well as 2 land fields in Coahuila and Nuevo León that each could generate 3 MW, was outlined.

Allison Costa (United States, EPA) – Presentation slides available. Highlights included:

- Approximately 2,000 sites are producing biogas (livestock farms, landfills, and wastewater treatment facilities) &and about 12,000 more sites potentially could implement biogas projects.
- Summary of U.S. methane emissions.
- Challenges to emission reduction projects include:
    - Inadequate payback/economics
    - Lack of available capital
    - Operations and maintenance complications and concerns
    - Utility interaction
    - Difficulties with air regulations or obtaining air permit
    - Technical merits and concerns
    - Inertia to maintain the status quo
- The United States has a variety of domestic programs and policies in place to help overcome challenges (e.g., AgSTAR, LMOP, CHP Partnership).
- U.S. goals for GMI involvement include:
    - Support technology transfer and knowledge sharing
    - Identify potential partners and specific opportunities for emissions reductions
    - Work to identify and remove barriers to methane project development where practicable
- Overview of U.S.-supported agriculture, MSW, and wastewater treatment activities.
- Support for profile of Polish agricultural anaerobic digestion opportunities.

LaVan Kinh (Vietnam, Institute of Animal Sciences for Southern Vietnam) – Highlights included:

- Livestock production is increasing, especially poultry.
- An overview of methane emissions from the agriculture sector was given.
- There are more than 200,000 installed digesters.
- Challenges to project development include:
    - Lack of skilled technicians
    - Insufficient and/or poor substrate for digesters
    - Lack of commercial enterprises selling biogas equipment in Vietnam
    - Lack of awareness of biogas technology
    - Limited government support
    - Complex procedures for accessing financial resources
    - Lack of policies that support project development
- An overview of a few specific projects was given.

Ms. Shimamura adjourned the meeting for a coffee break and encouraged discussions and networking.

GMI Agriculture Subcommittee Meeting

Co-chairs ***Allison Costa (United States, EPA)*** and ***Jorge Hilbert (Argentina, INTA)*** introduced the topic of discussion: *Anaerobic Digester Policies and Incentives Report*.

Ms. Costa gave a presentation that provided background for the report, progress to date, objectives, target audiences, countries in focus, and the current report outline.

Ms. Costa asked attendees to consider the following questions for discussion:

- Are the policies and incentives of your country represented?
- How will you use this report to influence policy development or guide business practices?
- What additional resources and/or tools would you consider valuable?
- How could this data be presented in a more useful form?

Moving forward, Ms. Costa solicited feedback on work completed to date, and asked for ideas to disseminate the report.

Ms. Costa opened up discussion among attendees.

Elias Freig (Mexico) suggested adding media as a target audience. Mr. Freig noted he liked how the technical sessions that took place over the previous two days were held at the national assembly. This introduced the topic to a new audience and allowed the media to become familiar with the topics discussed.

Ms. Costa urged countries that had not provided details about incentives and policies in place in their countries to please send her and the other Co-chairs the details.

Mr. Hilbert suggested the subcommittee send another email to members reminding them again to send information and to provide a deadline.

Octavio Montufar (Mexico, Col. Santa Cruz Atoyac) asked why Mexico was not included in the list of countries, and who in Mexico was contacted about the request for data. Ms. Costa did not know the answer, and Mr. Montufar said he was happy to help coordinate and provide the information needed.

Ms. Costa introduced ***Grigor Stoyanov (Bulgaria, Ministry of Environment and Water)*** and ***Birgitta Vainio-Mattila (Finland, Ministry of Agriculture and Forestry)***, who gave prepared presentations on anaerobic digestion policies. Mr. Stoyanov's presentation focused on policies in place in Europe and Ms. Vainio-Mattila's presentation focused on policies in place in Finland. After the conclusion of the presentations, Ms. Costa thanked Mr. Stoyanov and Ms. Vainio-Mattila.

Ms. Costa then asked attendees how they would use the report and how it should be disseminated (e.g., printed, available on website, highlights delivered via presentations). Ms. Costa called on Mr. Montufar to offer his thoughts. Mr. Montufar stated incentives are very important, and that he would like to see the report available on the Web.

Tathiana Almeida Seraval (Brazil, Methanum Resíduo e Energia) volunteered that she would like to send information about incentives and policies in Brazil for inclusion in the report. Ms. Seraval also

mentioned here is a guide developed by Germany, which describes rules for biodigester construction, use, and operation that could be referenced in the policies and incentives report. For example, certain projects in certain regions don't need to pay to access the electric grid.

Mr. Hilbert stated language is often a barrier, and suggested the report be translated into other languages, specifically Spanish.

Chris Godlove (United States, EPA) stated there have now been a few tri-sector subcommittee meetings that have worked well given the synergies between the three subcommittees. He described the report as an excellent template, but urged the subcommittees to think about how it could be used by other sectors since much of the information is applicable across sectors. He didn't want to see efforts duplicated, and suggested the report be thought of as a GMI biogas initiative rather than just an Agriculture Subcommittee product.

Mr. Freig asked Ms. Seraval what size projects in Brazil are eligible for no-grid access payment. Ms. Seraval answered that projects need to be in the 500-kilowatt to1-MW range.

Aleixo Dellagnelo (Brazil, AgE Tecnologias - Meio Ambiente, Saneamento & Ambiência LTDA) followed up by saying there is national regulation in place for biogas projects in Brazil to gain access to the grid but implementation is supposed to be done by local distributors, which leads to an uneven situation. He stated one key barrier to biogas project implementation is that small farmers are paying very cheap electricity so there is no incentive to create their own energy from biogas. Also, there is significant excitement around the issue, but a lack of information. He also suggested the report be posted online and be available in Spanish.

Ms. Vainio-Mattila noted the subcommittee should keep in mind how the report will be updated so that it does not become outdated.

Professor Luiz Carlos Pinheiro Machado Filho from UFSC stated the University has many labs working on the issues discussed and that when talking about biogas policies sequestration, these issues should not be overlooked.

Co-Chair Anil Dhussa (India, Ministry of New and Renewable Energy) stated the report is very important and can be used to help with proposals in Partner Countries to receive money for biogas initiatives, programs, and projects. He also echoed Ms. Vainio-Mattilla's point that it is important to keep the report up to date.

Ms. Costa concluded the subcommittee meeting by saying she will follow-up with all members to ask for comments on the report. She also encouraged attendees to get in touch with her with any other questions, information, and suggestions.

GMI MSW Subcommittee Meeting

Co-chair ***Tom Frankiewicz (United States, EPA)*** introduced the topic of discussion: follow-up from Vancouver subcommittee meeting (2013) regarding anaerobic digestion for MSW.

Mr. Frankiewicz stated that during the Vancouver subcommittee meeting, there were questions raised about:

- Available anaerobic digestion modeling programs for MSW
- Default anaerobic digestion biogas production rates for MSW
- Operational and economic issues related to anaerobic digestion of MSW

Mr. Frankiewicz emphasized that since Vancouver, the subcommittee had worked to collect answers to these questions and gave a presentation summarizing the results.

In summary, research found modeling assumptions and published digester data appear to confirm the a100 cubic meters (m^3) per metric ton MSW default "rule of thumb" for biogas yield from anaerobic digestion of MSW. However, there are several other operational and technology-specific variables that might affect the biogas production rate for anaerobic digestion and should be considered on a project-specific basis:

- Quality of waste separation and pre-treatment
- Wet versus Dry feedstock
- Thermophilic versus Mesophilic process
- Batch versus Continuous reactor
- Single-stage versus Multi-stage digestion
- Possible co-digestion with animal manure or other types of waste

Also, although anaerobic digestion technology for MSW is proven, operational issues remain the greatest challenge. The majority of operational issues encountered, however, are mechanical as opposed to biological or biochemical. Waste collection and organics separation are key to ensuring a consistent, high quality feedstock for digestion. Using high quality equipment helps alleviate mechanical issues, as does minimizing material handling requirements.

With respect to economics, anaerobic digestion systems typically come with a higher initial cost than some other waste treatment technologies, with the average payback being 5-7 years. The true life cycle cost, however, is often difficult to calculate due to the complexity of waste management issues and decisions.

Mr. Frankiewicz concluded his summary of research findings by posing the following questions to the subcommittee:

- Would the subcommittee like to proceed with additional research?
- Have we characterized the problem correctly? Are there more than operational issues at play?
- Are there any topics or pertinent information you would like to see added to the analysis?
- In what format would the information be most useful (e.g., white paper, fact sheet[s], detailed case studies)?
- How else might GMI support the subcommittee's interest in this topic?

Mr. Frankiewicz encouraged attendees to comment and opened the floor for discussion.

Chris Cox (United States, University of Tennessee) expressed reservations about declaratively stating that anaerobic digestion for MSW is proven. He suggested the subcommittee state the technology is proven, but be clear about the considerations that dictate success or failure. For example, documenting which feedstocks have proven to be successful, which ones have failed, and which ones for which the effects are unknown.

Franck Portalupi (Canada, Environment Canada) noted the subcommittee should be sure to let people know that anaerobic digestion of MSW works and it can be deployed anywhere in the world. He suggested it would be nice to have a back pocket document that gives an estimate of how much biogas could be produced through anaerobic digestion based on a certain quantity of MSW. This type of document would be very helpful for communicating project opportunities.

Elias Freig (Mexico) stated that it would be extremely helpful when communicating project benefits to local and national officials (e.g., mayors, ministers and governors) to be able able to give them a general range of what is possible and what sort of amount of energy could be developed. Mr. Freig also stated it would be helpful to have hard data and case studies explaining the extended cost, benefits and other characteristics and co-benefits associated with alternatives to biogas (e.g., renewable solar, wind, etc.), because often biogas could be the better option but this must be proven to decision makers. He also suggested it would be good to have ready in 2014 some sort of document that explains best practices for developing a power purchase agreement (PPA) or even develop a GMI template PPA that could be used by projects.

Anil Dhussa (India, Ministry of New and Renewable Energy) stated it is too much of an overstatement to say that anaerobic digestion of MSW works, as it is really dependent on the feedstocks used. The subcommittee needs to be careful about overselling the benefits of anaerobic digestion of MSW.

Mr. Frankiewicz agreed with the comments made and said the subcommittee needs to promote anaerobic digestion as an option, but be clear about what is necessary for success.

Josias Zietsman (United States, Texas A&M University) noted transportation is very much involved with all three sectors discussed at the meeting. He added significant efforts can be undertaken to optimize operations, and suggested the subcommittees develop vehicle use inventories.

Brian Guzzone (United States, Eastern Research Group) echoed Mr. Freig's comment that information about PPAs would be beneficial, but also suggested information on what should be included in tenders is also needed and would help greatly with project implementation. He also stated there is not much information available about anaerobic digestion of MSW, and knowing where these projects are being implemented would be helpful.

Miguel Franco (United States, Tetra Tech, Inc.) noted Europeans have been doing anaerobic digestion for 10-15 years, and have numerous successful project examples. There are at least 6-7 projects in the United States as well. He suggested approaching companies that are developing projects and get them to join the GMI Project Network. Many of these companies would be willing to provide estimates of biogas output based on different feedstocks.

Tathiana Almeida Seraval (Brazil, Methanum Resíduo e Energia) stated design data does not always match operational data. The subcommittee needs to be clear every project is unique and there is not a one-size-fits-all approach that can be followed. Projects need to be planned based on local conditions. She suggested promoting anaerobic digestion of MSW as being a sanitation measure is the best approach to gain traction in project development; energy production is secondary.

Mr. Frankiewicz concluded the meeting by summarizing that more information is needed, which requires more research. He will work with the MSW Co-chairs to engage the subcommittee to outline the needs related to this subject and what kind of product would be most useful.

GMI Municipal Wastewater Subcommittee Meeting

Co-chair ***Chris Godlove (United States, EPA)*** introduced the topic of discussion: country-specific wastewater action plans.

Mr. Godlove described how the Municipal Wastewater Subcommittee is the newest of the GMI subcommittees. The subcommittee has created a Municipal Wastewater Subcommittee Action Plan, but important tools to complement this overarching action plan are country-specific wastewater action plans.

Mr. Godlove stated country-specific action plans can help provide a framework for countries as they work to reduce, recover, and use wastewater methane.

To provide an example for countries, Mr. Godlove described the recently produced *Draft United States Municipal Wastewater Action Plan*. Mr. Godlove walked through the main sections of the plan, and noted other countries could follow this template or develop their own based on what would be most useful for them. Countries are also free to call their plan whatever they want (e.g., Wastewater Methane Strategy).

The main sections of the U.S. Action Plan include:

- Introduction
- Country Background and Overview of Methane Emissions
- Characterization of Public and Private Sector Involvement
- Challenges to Methane Mitigation, Recovery, and Use
- Activities to Promote Methane Mitigation and Abatement
- Policy, Market, and Legal Drivers to Advance Methane Project Development
- Country Priorities
- Additional Information - Emission Sources, Mitigation Potential, and Successful or Potential Projects

Mr. Godlove encouraged countries to start the process of developing their own plans.

Henry Ferland (ASG Co-Director) echoed Mr. Godlove's comments that the United States example is just one way a country can develop their sector-specific action plan. The goal of these documents is for countries to be able to use them as planning documents and a framework for wastewater methane reduction, recovery, and use. He stated if countries are developing a NAMA, they could incorporate their wastewater plans into those documents and then use the NAMA as their plan.

Mr. Godlove invited attendees to provide comments and topics for discussion.

Adalberto Noyola (Mexico, Universidad Nacional Autonoma de Mexico) noted developing countries often have trouble developing an inventory of their wastewater emissions, and the Intergovernmental Panel on Climate Change (IPCC) methodology can underestimate emissions when operations are not well managed. He stated it might not be a good idea for the subcommittee to push for increased anaerobic treatment if these operations are not going to be well managed.

Qiang He (United States, University of Tennessee) described how several items could be improved with anaerobic technologies and practices. Most digesters are completely mixed. Older digesters utilize simple mixing, but new technologies can greatly increase biogas production and sludge reduction. He noted sludge reduction is a huge benefit for wastewater treatment facilities (in addition to being able to produce electricity and/or heat) and should be touted as a benefit of anaerobic digestion.

Mr. Godlove suggested the subcommittee could be a clearinghouse of information for wastewater treatment facilities.

Tathiana Almeida Seraval (Brazil, Methanum Resíduo e Energia) described how Brazil is participating in a Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) project to measure methane emissions and biogas generation rates from facilities in different regions of Brazil. She will share that information with the subcommittee.

Mr. Godlove followed up by describing how the United States is working on similar projects in Mexico and China.

Elias Freig (Mexico) introduced the topic of wastewater analytical and modeling tools and resources. He said it would be good to start by developing or integrating a catalog of tools and resources that the other subcommittees are using. Many of these are likely also applicable for wastewater treatment. He also mentioned it would be helpful if CCAC could explain how they can help GMI; specifically, the wastewater subcommittee. He suggested in the next meeting, the subcommittee dedicate some time to the identification and development of tools, and plan to discuss the basics of these tools to foster widespread understanding among subcommittee members. He suggested holding a1-2 day workshop. He also suggested using other very powerful databases and modeling and assessment tools used for climate change finances, and economic and mitigation assessment and quantification like GLOCAF and MEXCAF + M. These tools have been used by the European Union and México´s Ministry of Finance to develop the Green Climate Fund, mitigation quotas, carbon taxes, cap & trade, NAMAs, and a new climate change mitigation and adaptation financial architecture. Mr. Freig offered to coordinate former peers like doctors Theodore Panayotou and Federico Gallo to have an exploratory meeting in Washington, D.C. in June or July (2014) to see how these very powerful and unique tools could serve and benefit GMI and EPA initiatives. This meeting should be sponsored by GMI.

Mr. Freig concluded the subcommittee meeting by volunteering Mexico as a host for GMI's 10-year anniversary meeting. Given the powerful energy reforms that are taking place, he believes Mexico would be a great host for the meeting and would work to see if it could be held at the location of the Mexican Congress in Mexico City. This event is currently being planned for 2015, and an exact date has not yet been set.

Franck Portalupi (Canada, Environment Canada) thanked Mr. Freig for his generous offer and said he will take the suggestion back to the GMI Steering Committee for discussion.

Closing

Monica Shimamura (ASG Co-Director) concluded the tri-sector subcommittee meeting by thanking everyone, especially UFSC and FATMA, and encouraged continued dialog.

Summary and Review of Action Items

Action items from the meeting include the following:

GMI Agriculture Subcommittee

- Co-chairs, ***Allison Costa (United States, EPA)***, ***Jorge Hilbert (Argentina, INTA)***, and ***Anil Dhussa (India, Ministry of New and Renewable Energy)*** will follow-up with all subcommittee members to ask for comments on the *Anaerobic Digester Policies and Incentives Report*.
- Subcommittee members will reach out to the Co-chairs with questions, information, and suggestions to help with report development.

GMI Municipal Solid Waste Subcommittee

- Co-chair, ***Tom Frankiewicz (United States, EPA)*** will engage with subcommittee members to outline the needs related to anaerobic digestion of MSW and solicit suggestions for the type of product that would be most beneficial.

GMI Municipal Wastewater Subcommittee

- Subcommittee delegates will begin work to develop country-specific action plans to guide efforts to reduce, recover, and use wastewater methane.
- Co-chairs, ***Elias Freig (Mexico)***, ***Chris Godlove (United States, EPA)***, and ***Federico Grullon (Dominican Republic, National Council for Climate Change and Clean Development Mechanism)*** will engage subcommittee members regarding tools and resources for the sector.

Annex 1: Tri-Sector Subcommittee Meeting Agenda

Friday 14 March 2014	
9:00 – 9:15	Welcome *Facility host, Universidade Federal de Santa Catarina*
9:15 – 9:45	GMI's ASG (Secretariat) Overview – *Monica Shimamura* • A decade of GMI: Where do we go from here? • GMI video and brochure • All-partnership meeting discussion • Finance – update on Methane Fund • Coordination with Climate and Clean Air Coalition (CCAC) • Update on GMI's tools and resources
9:45 – 10:45	Country Biogas Sector Updates
10:45 – 11:00	Break
11:00 – 12:00	Agriculture Working Group for the AD Policies and Incentives Best Practices Guide Co-Chairs: Jorge Hilbert (Argentina), Anil Dhussa (India), and Allison Costa (United States) • Results from AD Policies and Incentives Best Practice Guide – Allison Costa • Input and discussion on the Best Practice Guide
12:00 – 12:45	Municipal Solid Waste Subcommittee Business Co-Chairs: Diana Rodriquez (Columbia) and Tom Frankiewicz (United States) • Progress in NAMA development - Tom Frankiewicz • Promoting AD development for MSW
12:45 – 1:30	Municipal Wastewater Subcommittee Business Co-Chairs: Federico Alfredo (Dominican Republic), Elias Freig (Mexico), and Chris Godlove (United States) • Action planning – Chris Godlove • Tools and Resources for the sector
1:30	Conclude

Annex 2: Meeting Participants

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