



GLOBAL METHANE INITIATIVE AGRICULTURE SUBCOMMITTEE MEETING

Fourteenth Session of the Agriculture Subcommittee
Vancouver, Canada
13 March 2013

Final Minutes

Summary

- 1 The Global Methane Initiative (GMI) Agriculture Subcommittee conducted its fourteenth session in Vancouver, Canada in conjunction with Methane Expo 2013 (Expo). The Government of Canada and the U.S. Environmental Protection Agency (U.S. EPA) hosted the Expo on 12-15 March 2013.
- 2 In addition to the Agriculture Subcommittee meeting, Methane Expo 2013 included a site visit on 12 March 2013 to Bakerview EcoDairy in Abbotsford, British Columbia. Bakerview EcoDairy is the first demonstration farm of its kind in Canada, showcasing innovative and sustainable dairy farm practices and providing tours to the public. The 50-cow dairy farm operates a plug flow anaerobic digester designed by Avatar, which produces electricity and hot water. The digested manure is processed through solids separation; the solids are used for bedding or fertilizer and the liquid is treated and used as fertilizer.
- 3 The Expo also included technical and policy sessions specific to the Agriculture Subcommittee on 14-15 March 2013. Agriculture technical sessions included *Tools and Technical Considerations for Biogas Projects, Case Studies, and Project Financing Options*. Technical sessions related to biogas projects in the agriculture, municipal solid waste, and municipal wastewater sectors included *Innovative Models for Developing Biogas Projects* and *Addressing Methane Emissions from the Biogas Sectors through National Strategies*.
- 4 The Agriculture Subcommittee held its meeting on 13 March 2013, the minutes of which are below. Delegates from partner countries and other interested organizations provided updated summarizing their activities to reduce methane emissions in the agriculture sector. Participants also discussed revisions to [*Successful Applications of Anaerobic Digestion from Across the World*](#).
- 5 The full Methane Expo 2013 and subcommittee meeting agendas are posted on the [GMI website](#), as are the presentations given at the Expo.

Welcome and Introductions

- 6 Allison Costa of the U.S. Environmental Protection Agency (U.S. EPA), an Agriculture Subcommittee Co-chair, welcomed meeting participants. She expressed regrets for the other Agriculture Subcommittee Co-chairs, Anil Dhussa of the Indian Ministry of New and Renewable Energy and Jorge Hilbert of the Argentine National Agricultural Technology Institute (INTA), as they were unable to attend Methane Expo 2013.
- 7 Meeting participants introduced themselves; the meeting was attended by GMI Partner country delegates, Project Network members, ASG personnel, and other interested observers.

Country Updates

- 8 Country representatives provided brief updates on the activities in their countries related to the GMI Agriculture Subcommittee.
- 9 **Argentina.** Alvaro Zopatti of the Argentine Secretariat of the Environment and Sustainable Development provided [Argentina's update](#) on behalf of Karina Garcia of INTA. Mr. Zopatti explained INTA has multiple experimental anaerobic digestion (AD) projects throughout Argentina. There are an increasing number of successful AD systems in the agro-industrial sector for waste from breweries, citrus processing, syrup production, corn product refining, and slaughterhouses. There are new commercial, larger-scale AD projects planned in Argentina, including systems at three swine farms, a yeast production plant, two citrus facilities, two slaughterhouses, and a cereal plant.
- 10 Challenges for AD projects in Argentina include an incomplete regulatory context for biogas projects, and lack of feasibility for small projects to generate commercial amounts of renewable energy. In addition, there are few government officials responsible for working on many issues and projects; the lack of government support leads to a lack of private sector involvement. Therefore, Argentina must depend on imports from other countries due to a lack of in-country developers, technical assistance, and materials.
- 11 Birgitta Vainio-Mattila of the Finnish Ministry of Agriculture and Forestry asked what “incomplete regulatory context” means. Mr. Zopatti explained Argentina does not have all of the regulations in place that would encourage biogas projects. For example, Argentina does not have experience or regulations to develop contracts to join or bundle groups of facilities which might be interested in centralized AD systems.
- 12 Jim Jensen from Washington State University asked how collected biogas was used in Argentina. Mr. Zopatti stated it was used onsite or sold to local cities; there is no infrastructure in Argentina to use or sell the biogas in a more widespread way.
- 13 **People's Republic of China.** Huang Hongkun from the Rural Energy and Environmental Agency in the Ministry of Agriculture provided a [country update for China](#). Agriculture emissions are approximately 66 percent of the total methane emissions from China. Of the emissions from agriculture, approximately 57 percent are from enteric fermentation, 31 percent are from rice cultivation, and 11 percent are from manure management. In China, there are approximately 40 million household AD systems, and 72,000 large and medium projects. Barriers to methane reductions from agriculture in China include insufficient incentives, challenges for the use of digested manure due to limited farmland, technical issues related to maintenance of farm-scale digesters, and a lack of methods to reduce emissions from enteric fermentation.
- 14 **Finland.** Ms. Vainio-Mattila presented an [update for Finland](#). Finland has had operating AD systems since 1979. In 2011, there were 10 farm-scale systems in operation. As part of the European Union, Finland has commitments to reduce emissions. Finland's goal is to cut 30 percent of agriculture emissions from 2005 to 2020. In 2011, 0.5 percent of the total renewable energy consumed in Finland was derived from biogas; agriculture's share of this energy consumption was only four percent. Experts estimate there is potential to increase the current biogas production in Finland by more than 30 times. Finland provides subsidies for biogas investments and research projects, and the Ministry of Employment and the Economy provides subsidies such as feed-in tariffs or energy aid for investments. The Ministry of Agriculture and Forestry provides subsidies to smaller biogas plants. In addition, biomethane is exempt from excise tax.
- 15 Finland's feed-in-tariffs have been in place since March 2011. Only new plants are eligible for the feed-in tariffs and landfill gas and municipal plants are excluded. There is a guaranteed price of 83.5 €/per megawatt hour (MWh) plus a 50 €/per MWh heat bonus (therefore, the price for combined heat and

power systems is 133.5 €/per MWh). Facilities can be included in the feed-in-tariff scheme for 12 years. As an alternative to the feed-in tariff program, biogas plants could instead obtain investment support of 15 to 40 percent of their capital costs.

- 16 Research activities in Finland include processing digestate into value added products, developing sustainable crop cultivation, and developing vehicle fuel from biogas. Finland is very interested in nutrient recycling; the goal is to have a closed loop system, but there is much work to be done to achieve this goal. Challenges and barriers to AD in Finland include the need for small-scale AD systems, increased profitability, and easier permitting. In addition, Finland has cold winter conditions and needs technologies which work consistently in this climate.
- 17 William Powell from Environment Depot for Wasterwater to Energy Ltd asked if there were any cost-effective examples of biogas being used for vehicle use in Finland. Ms. Vainio-Mattila noted there is one successful system: a farm which produces energy for the farm and sells the remaining biogas for vehicle fuel. Ms. Vainio-Mattila stated she would provide a case study of this system to be included in the case study guide.
- 18 Christopher Bush from Catalyst Agri-Innovations Society asked if Finland has a natural gas line. Ms. Vainio-Matilla responded there are natural gas lines in certain parts of the country. Mr. Bush noted Sweden has a natural gas pipeline which powers a large portion of the country and there are also a lot of examples of successful vehicle projects in Sweden.
- 19 **Jordan.** Mohammad Dabbas, Director of Energy Efficiency and Energy Conservation at the Ministry of Energy and Mineral Resources provided a brief update on Jordan. There are existing biogas projects in the municipal solid waste sector in Jordan, and many initiatives to implement other technologies such as thermal cracking units and pyrolysis. The government is interested in encouraging waste to energy technologies, including AD of organic waste.
- 20 Jordan is surrounded by countries rich in oil; therefore, Jordan has been importing a large portion of its energy in the form of oil. Jordan also imports natural gas from Egypt. Jordan is interested in renewable energy options in order to become more energy independent. There are policies in place to allow Jordan to invest in renewable energy and energy efficiency, including an energy strategy to increase Jordan's renewable energy potential 20 percent for the period 2007 to 2020 (from 2 percent of total energy to 10 percent).
- 21 **Thailand.** Arux Chaiyakul from the Department of Livestock Development provided a [Thailand country update](#). He noted the government of Thailand is currently extending work on the environmentally friendly livestock farming program. In addition, Thailand is monitoring and enforcing effluent discharge requirements for farmers and slaughterhouses, which are required to report every month to Provincial Environmental offices. Thailand is also promoting the Zero Waste Farm Program, the Carbon Footprint Product, and Clean Development Mechanism (CDM) projects. Thailand participated in the Livestock Waste Management in East Asia project from 2006 to 2012. Multiple AD projects were constructed in Thailand, including 20 Channel Digester Plus (CDP) systems, one modified covered lagoon, and 12 tubular AD systems. In addition, Thailand developed a code of practice for permitting pig farms.
- 22 Challenges to AD projects in Thailand include technical and financial barriers. Technically there is a need for increased operational knowledge, economical hydrogen sulfide removal, and improved engine service from engine companies. In addition, there is a lack of financial incentives because of the uncertainty of the future of CDM projects. Financial incentives are needed to encourage projects since farmers with AD systems have increased operational costs but still receive low prices for their agricultural products.

- 23 The government of Thailand plans to continue monitoring and evaluating their existing digesters and any future digesters that are constructed. In addition, Thailand will continue to expand the use of the tubular digesters. A project currently underway that sells carbon credits from digesters to hotel associations in Thailand will continue. Thailand needs additional incentives to promote a green economy and is trying to develop tax exemptions for products with lower carbon footprint.
- 24 Prem Subedi of Winrock International asked if the tubular AD systems were going to be used to replace other types of systems, and if there have been problems with the other types of systems. Dr. Chaiyakul explained the tubular digesters are less expensive and more appropriate for small-scale operations. The CDP system has had some problems that need to be further evaluated.
- 25 **United States.** Ms. Costa provided a [country update for the United States](#). She explained the U.S. EPA's AgSTAR Program has been in operation since 1993 to encourage the use of methane recovery technologies at animal feeding operations. There are approximately 200 operating AD systems in the United States using livestock manure; AgSTAR estimates there is potential for 8,000 additional AD systems in the livestock sector. Challenges to AD development include decreasing financial incentives, a lack of renewable energy targets for utilities, and issues associated with permitting facilities that co-digest other waste in addition to manure.
- 26 One of the main drivers for the use of AD systems in the United States is concern about water quality, which has led to the development of a nutrient credit market in some parts of the country. Other drivers include diversion of organic material from landfills, state- and industry-level programs promoting AD, cross-sector working groups that encourage beneficial use of waste streams, including the production of renewable energy.
- 27 Recent U.S. activities include updates of its country action plan and the agriculture sector action plan for GMI. Future activities include the AgSTAR Program's national conference in June 10-12 in Indianapolis, Indiana, USA.
- 28 Mr. Bush asked what the greatest constraint has been on AD systems in the United States. Ms. Costa replied the greatest constraint is financial because the systems are not always economically viable without incentives.
- 29 Dr. Chaiyakul asked Ms. Costa to explain the nutrient credit system. Ms. Costa stated there are areas in the United States that have limits on the amount of nutrients that can be land applied. Facilities can reduce nitrogen and phosphorus and sell these "credits", similar to the carbon credit market.
- 30 In addition to the presentations from official country delegates, other participants also had the opportunity to provide updates.
- 31 **Taiwan Environmental Protection Administration.** Jin-Wei Tsai of the Taiwan Environmental Protection Administration provided an [update for the area](#). Methane emissions have been declining in Taiwan since 2000 due to increased regulations and improved waste management. In 2010, 39 percent of methane emissions were from enteric fermentation, 30 percent were from rice cultivation and 10 percent were from manure management. Other sources of methane emissions include daily life and commercial activities, landfills, burning of waste, industrial wastewater, and the chemical industry.
- 32 Taiwan has taken measures to address methane emissions from agricultural sources. There are approximately six million pigs in Taiwan. The country has worked to improve manure management practices in order to reduce water use and use the manure for AD, which results in zero waste farms. Additionally, Taiwan has reduced the amount of land used for rice cultivation and the amount of waste produced from rice production.

- 33 Taiwan is currently implementing the “Regulations for Renewable Energy Development,” promulgated by the Ministry of Economic Affairs in 2012. This regulation promotes the use of renewable energy to increase energy diversity, improve environmental quality, encourage relevant industries, and enable sustainable development. In addition, Taiwan is developing “Biogas Centers” to educate the public about the possible uses of biogas. Taiwan is encouraging the use of AD on swine farms; one system is planned at Green Ranch using wastewater and cattle and chicken manure. Taiwan is also looking to pelletize biomass for energy production and use torrefaction to increase the heating value of biomass energy sources.
- 34 In the future, Taiwan aims to continue their current research to reduce methane. In addition, they will work to strengthen economic incentives and methane reduction strategies as well as promote applied technologies, which reduce methane emissions with the goal of combining the efforts of government and industry.
- 35 ***Climate and Clean Air Coalition (CCAC)***. Sunny Uppal of Environment Canada and Andrew Eil of the U.S. Department of State provided an [update on the CCAC agriculture initiative](#). CCAC was launched in February 2012 to reduce short-lived climate pollutants (SLCPs) including methane, black carbon, and hydrofluorocarbons (HFCs). There are currently nine CCAC initiatives underway where the Coalition is working to leverage political will and partnerships to scale up existing SLCP reduction activities and begin new ones.
- 36 The objective of the agriculture initiative is to share and implement best practices for minimizing emissions of SLCPs from agriculture in a way that is consistent with broader climate change objectives and also enhances food security and livelihoods. CCAC plans to complement and leverage existing work of the Global Research Alliance, GMI, United Nations Food and Agriculture Organization, World Bank, and others. To date, there have been a series of teleconferences and an in-person meeting where the initiative established a steering group. Future activities include a working group meeting in July 2013 and consideration of components for development of specific components of the agriculture initiative.
- 37 Karen Schaffner of RTI International asked what the nine initiatives included. Mr. Uppal replied they include municipal solid waste, brick production, oil and natural gas production, heavy-duty diesel vehicles and engines, HFC alternative technology and standards, SLCP national action plans, financing SLCP mitigation, science for clean cook stoves, and agriculture.
- 38 Mr. Jensen asked how the funds are appropriated. Mr. Uppal explained the steering committee decides how to fund projects. Mr. Eil added that CCAC funds were available for actions with high-level policy impacts and not for any local-level activities similar to what GMI would support.
- 39 ***Catalyst Agri-Innovations Society***. Mr. Bush provided a brief overview of the status of AD in Canada from his perspective. There are approximately 30 operating AD systems, mostly in Ontario. The majority of the systems are mesophilic and are digesting farm materials. Ontario has a feed-in-tariff program for renewable energy projects greater than 10 kilowatts (kW). The program provides 18.5 to 19.5 cents per kW for biogas farm projects. There was an open application process earlier this year and there have been a large number of applicants for the program. Mr. Bush added that he would be presenting details about his own AD project during the Expo technical sessions.
- 40 A challenge to AD in Canada is dealing with nutrients. Mr. Bush explained that much research is being done in this area around the world. He stated that duckweed can remove nutrients from digester effluent. In addition, there are newly identified methanogenic bacteria, which are nitrogen-tolerant, and produce more gas than other methanogens.

41 **Winrock International.** Prem Subedi shared a brief overview of Winrock’s work in the area of biogas sector development in Pakistan. Winrock works with SNV (a nonprofit organization headquartered in the Netherlands) to develop small-scale AD systems in Pakistan that use the produced biogas for cooking fuel. In addition, Winrock has worked with a grant funded by the U.S. EPA that installed five AD systems on four medium-sized dairy farms to generate electricity. This model has the potential for scaling up and Winrock is now designing a project to replicate this model on up to 500 dairy farms in Pakistan.

Update From the ASG

42 Ms. Costa provided a brief update on ASG activities. The ASG is encouraging all countries to complete or update their country-wide action plans. Also, GMI has been working with CCAC in some of the sectors; although GMI is not a partner member of CACC, GMI interacts with the Coalition. Finally, the ASG is interested in any recommendations on how to encourage participation and increase outreach.

International Best Practices Guide: Case Studies

43 Ms. Costa noted the development of an international case study guide for agriculture was the result of brainstorming at the July 2012 Agriculture Subcommittee meeting in Singapore. The creation of this guide will help to increase subcommittee participation and help delegates to play a more meaningful role in subcommittee product development. Daniel Fikreysus of Community Development Research (a PN member) developed a case study template with input from the Co-chairs and ASG. GMI members completed case study templates, which were compiled in the draft report entitled [Successful Applications of Anaerobic Digestion from Across the World](#). SRA International compiled the draft report and Monika Chandler of SRA assisted with the discussion of the document.

44 Prior to the Expo, the ASG sent the draft report and a list of discussion questions to the Agriculture Subcommittee and Project Network members. The questions are included in Appendix A. After allowing the meeting participants time to review the document, Ms. Costa asked for initial thoughts and suggestions. The recommendations are summarized below.

45 Chad Leatherwood of SCS Engineers suggested “Key Accomplishments” should be changed to “Project Benefits,” and benefits could be broken down into categories. He added it would be helpful to include quantitative benefits in a table and to categorize the projects as small, medium, or large.

46 Marion Deerhake of RTI International asked who the target audience for the document was. Ms. Costa replied it would be mostly GMI delegates, which are government officials. Ms. Deerhake recommended including a table of contents at the front of the document. She suggested the project table could be moved to the front and used as the table of contents.

47 Mr. Jensen supported the suggestion that the benefits be categorized and he recommended that the categories be economic, environmental benefits, and social benefits. In addition, he suggested the different categories could be illustrated with different colors or with different icons.

48 Mr. Jensen asked how and/or why the projects in the guide were selected. Ms. Costa explained the projects were those submitted by GMI members and that more projects are being solicited. Mr. Jensen suggested the guide should explain why the projects were selected. He recommended GMI could select projects to highlight and then contact the project owners to obtain the relevant details.

49 Bill Dunbar of U.S. EPA Region 10 (Pacific Northwest) Office noted there are drivers to AD development including economic, health, climate, etc. He suggested categorizing the drivers and listing them for each project. In addition, he suggested health benefits such as reducing nitrogen contamination

of groundwater, reducing particulate matter, and decreasing ammonia emissions could be included as benefits.

- 50 Ms. Vainio-Mattila noted the case studies should include contact information and methane emission reductions should be included in the project summary table. She suggested the report could include a graphic showing the methane reductions from the projects on a map.
- 51 Mr. Powell noted the majority of AD projects are driven by economics and he suggested including information on the income and economics of the systems. Ms. Costa noted the subcommittee's goal would be to develop a separate report related to financial incentives and economics of AD projects.
- 52 Mr. Leatherwood recommended the first paragraph should state the purpose of document. The second paragraph should discuss GMI and how GMI can help increase the adoption of AD systems.
- 53 Mr. Subedi agreed it would be beneficial to classify projects into categories by size or scale, such as household-and large-scale. He also suggested including the use of biogas for cooking purposes as a benefit. In addition, Mr. Subedi noted GMI should be very clear about the units used in the report, especially the clarification of million tons versus metric tons.
- 54 Ms. Chandra remarked that operation and maintenance (O&M) has long been an issue with AD systems. She asked if there has been an evolution of O&M, and if it is better today than in the past. Additionally, she asked if a discussion of the topic should be included in this document. Mr. Dunbar replied that those issues might be best to include in another document. The history and technological evolution of AD does not make sense to include in a case study guide. Ms. Deerhake supported the idea the guide could be used to dispel myths and misconceptions about AD systems.
- 55 Mr. Jensen suggested a graphic showing the components of the entire AD and biogas recovery system (e.g., feed stocks, preprocessing, gas use) would be helpful. It is important for readers to see the whole systems and understand each of the steps because there may be significant preprocessing and post processing steps.
- 56 Mr. Bush noted there are different types of systems for industrial- versus small-sized systems, which have different characteristics and feed mechanisms. He asked if the document should narrow the focus to one size of system. Ms. Costa explained all sizes of systems are included in the work of the subcommittee so they should all be included in the document; however, size classifications can be made.
- 57 Ms. Schaffner added small-, medium-, and large-size classifications vary by country. GMI will have to be careful to make the classification clear. The classification could be household, medium, and industrial instead of small, medium, and large.
- 58 Christian Pichard of Tetra Tech recommended the Expo project posters be used as case studies. Ms. Costa replied they have already been included.
- 59 Ms. Hongkun agreed the size classifications would vary significantly by country. In addition, she recommended each case study should include a problem and solution section to help explain the drivers for the project.
- 60 Mr. Bush suggested the case studies note if liquid/solid separation is used.
- 61 Mr. Pichard advised that each case study include an economic section to show insights, who invested, and the technology provider. Ms. Costa remarked that type of information would be included in the separate economic guide, which would be the second phase of the document.

- 62 Mr. Jensen advocated that the closing section of the document could discuss challenges to the implementation of AD projects. This section could discuss areas for improvements, catalysts for AD, and how to speed up the AD development process .
- 63 Ms. Vainio-Mattila recommended the addition of links to websites with more information.
- 64 Mr. Powell noted including a case study with compressed biogas for vehicle fuel would be good addition to the guide. Mr. Bush agreed, but cautioned there are a lot of factors to consider given the variables on how the gas can be handled.
- 65 Ms. Costa asked if there were other items to include to help the document address barriers. Ms. Deerhake suggested all items be quantified if possible. As examples, quantities could include cost savings on commercial chemical fertilizer or hours a cook stove could operate on the biogas produced by the systems.
- 66 Ms. Chandra asked if the document should include information about methane capture and reduction, and if so, how it should be presented. Mr. Jensen asked if the existing projects in the report are participating in a carbon market. Ms. Costa replied that some of the projects are, but not all of them.
- 67 Ms. Chandra asked if there are other social benefits should be included, such as odors.
- Mr. Powell recommended water quality impacts.
 - Ms. Vainio-Mattila suggested energy independence and self sufficiency.
 - Mr. Subedi added jobs.
 - Mr. Pichard suggested the diversion of organics from landfills.
 - Mr. Dunbar recommended resourcefulness.
 - Mr. Jensen noted cooking benefits and resiliency.
 - Mr. Bush suggested co-products (e.g., bedding).
- 68 Mr. Dunbar noted facts and data are important, but some of the projects (such as the Peru project) have benefits to society that are lost in case study. It would make sense to include ancillary benefits.
- 69 Mr. Bush suggested case study project costs should be included. Ms. Costa noted the costs are difficult to obtain, and could be included in the secondary economic document. Ms. Vainio-Mattila suggested the project support (e.g., incentives) should be included.
- 70 Ms. Chandra asked if the methane reductions should be included. Mr. Bush asked which method would be used to estimate CO₂ avoided per year. Ms. Costa replied the Intergovernmental Panel on Climate Change method is used. Mr. Pichard suggested the amount of biogas produced per year might be more informational than the amount of emissions reduced. Mr. Dunbar supported including CO₂ reductions. Mr. Jensen agreed, but noted many of the submitted case studies did not include that information.
- 71 Ms. Costa asked if the project summary table was helpful. Several meeting participants supported the inclusion of the table. Mr. Subedi supported the previous suggestion for making the table into a table of contents at the beginning of the document. Ms. Deerhake suggested including the type and number of animal. Ms. Costa noted the type and number of animals was included in the feedstock column, and if the information was missing, it was not included in the case study submission.
- 72 Ms. Schaffner suggested the case study template should be expanded to include the information that has been suggested during the meeting.

- 73 Ms. Chandra asked if the project highlights were helpful. Mr. Jensen replied they were helpful because they showed how some projects had different drivers.
- 74 Ms. Chandra asked if enough information was included for each case study.
- Mr. Leatherwood recommended one page is enough.
 - Mr. Bush suggested the case studies should include links to relevant websites.
 - Mr. Subedi suggested there should be a maximum number of photos included for each case study.
 - Mr. Bush added that each case study should include a list of the groups working on the project.
- 75 Ms. Schaffner asked if the document will be translated. Ms. Costa replied it would be beneficial for the guide to be translated, but it is up to country delegates and Project Network members to translate the guide because the ASG has limited resources.
- 76 Ms. Chandra asked the meeting participants to provide input after the meeting if they think of additional suggestions. Ms. Costa noted the ASG will be asking the Agriculture Subcommittee and Project Network for additional input and case studies. The goal is to complete the guide by July 2013.

Action Items Discussed at the Meeting

- 77 The ASG will:
- Revise the draft report.
- 78 Country delegates will:
- Provide comments on the draft report.
 - Complete and submit additional case study templates.