

Landfill Gas to Energy
Webcast Transcript
February 18, 2009

Slide 1: The Landfill Gas to Energy Webcast will start in a few minutes.

Operator: Thank you. Please Stand by. You will now be placed into conference.

Slide 2: Webcast Agenda

Neelam Patel: Hello, welcome to the EPA landfill gas to energy webcast. The EPA Local Climate and Clean Energy Program holds monthly webcasts on different topics targeted for local governments. For today's webcast I, Neelam Patel will do an introduction of the Local Climate and Clean Energy Program and sitting here with me is Andrea Denny who also co-manages the local climate and energy program.

This recording is a re-recording of the original webcast that was held the first week of February, February 5th, 2009. Due to technical difficulties during the webcast we were unable to record all of the speakers that presented. This recording will cover the EPA landfill methane outreach program and Victoria Ludwig will be doing the presentation. The presentations by Susan Harrison from Greenville County Solid Waste Division and the presentation by William H. Brinker Sr. are available for download from the website..

Slide 3: Local Climate and Energy Program Overview

Neelam Patel: A quick overview of our EPA Local Climate and Clean Energy Program. Our goal in this program is to provide information and create a peer exchange network for local governments. Our goal is to advance climate and clean energy strategies in local governments and their communities. We focus on establishing cost-effective best practices and we try to get that information out to our audience. We also serve as a gateway to existing resources both at EPA and with other organizations and we are in the constant process of developing tools, resources and guidance. And through webcasts and other avenues we try to facilitate peer to peer exchange.

Slide 4: Local Best Practices Guide

Neelam Patel: Currently we have a best practices guide that is under design and we actually have 6 chapters that are available on our website and we have more chapters coming out. These chapters focus on different subject areas. As you'll see in the background materials for this webcast we have the landfill utilization chapter. Each chapter focuses on the benefits, measures, participants, and on pursuing these types of projects, mechanisms for implementation, the cost and funding opportunities, and how to work with existing programs at the state, federal and regional levels. And we have case studies throughout the chapters and also additional resources that are helpful to local governments in planning for implementing these projects in their own communities.

Slide 5: Webcast Series

Neelam Patel: As I mentioned the chapter that goes with today's webcast is available online. Our webcast series, which is hosted on a monthly basis, covers not only chapters but additional topics. Our next webcast is going to focus on timely issues related to the recovery act that was signed on February 17th. It will focus on EPA resources as they relate to some of the funding coming through the recovery act. If you'd like to see other webcasts, our Clean Energy Environment Program offers state technical forums and the Energy Star program has a training center.

Slide 6: Contacts

Neelam Patel: For more information on the Local Climate and Clean Energy Program please contact either Andrea Denny or myself, Neelam Patel. Our website is listed for your convenience. And with that I'd like to introduce our first speaker on today's webcast. This is the landfill gas to energy webcast.

Slide 7: Landfill Gas Energy – Good for the Community.

Neelam Patel: We have from EPA, Victoria Ludwig. She is a program manager for EPA's Landfill Methane Outreach Program. She has 14 years of experience in the environmental field specializing in both municipal solid waste and climate change mitigation. Before EPA she worked for ICLEI Local Governments for Sustainability where she managed a climate change technical assistance program for municipalities in Latin America. Victoria was also a project manager at ERG where she oversaw technical and outreach activities in support of a variety of EPA waste reduction initiatives, for example Pay As You Go. For 4 years she coordinated the recycling programs of Arlington County, VA. She holds a bachelors degree in Biology from Xavier University in Ohio and a Masters degree in environmental management from Duke University. I invite Victoria to spend some time talking about EPA's program on landfill gas methane.

Victoria Ludwig: Thank you, Neelam. The presentation I am going to give is a general overview of what landfill gas to energy is and some of the costs for those projects as well as the benefits both economic and environment benefits. I'm going to slant it towards the perspective of a local government that owns a landfill and is interested in these projects.

Slide 8: Landfill Gas 101

Victoria Ludwig: Just to explain, landfill is what is created when the organic component of municipal solid waste decomposes anaerobically in a landfill. Methane is a byproduct of that decomposition process. And landfill gas also contains some carbon dioxide and a small percentage of non-methane organic compounds. Landfill gas if it is uncontrolled contributes to smog and global warming and also has safety and health concerns.

Slide 9: Why Landfill Gas is a Concern

Victoria Ludwig: Therefore EPA is concerned about landfill gas not only for the air pollution issues but because methane is a greenhouse gas. In fact it is 20 times more potent as a greenhouse gas than CO₂. And right now we are seeing increasing amounts of methane in the atmosphere. In the United States landfills were the second largest human made source of methane in 2006. So this is why EPA has the Landfill Methane Outreach Program and why we are concerned about using landfill gas as energy.

Slide 10: Modern Sanitary Landfill

Victoria Ludwig: As I said landfill gas contains 50% methane - methane is a greenhouse gas but it is also the same component that is in natural gas - so it is an energy source. And just to show you an example of how that gas can be used as energy, just to give you a context of what a landfill looks like in the first place, this is an example of a modern sanitary landfill in the U.S. that includes a bottom liner. The waste is segregated into cells and compacted and throughout the landfill there are gas wells which collect the landfill gas and direct it towards a flare where some of it is burned but the majority of it is used for energy. You don't see the energy part on this slide but on the next slide you do see the energy part.

Slide 11: Landfill Gas to Energy

Victoria Ludwig: In this case the landfill gas is being sent to an electricity generation system and used to generate electricity. The waste heat is also collected and used in a thermal use for manufacturing plants – just to give you an idea of how these projects work.

Slide 12: Benefits of Landfill Gas Energy Projects

Victoria Ludwig: Why are these projects beneficial? Methane landfill gas energy projects, if you were to do one as a local government you would be showing leadership and you can generate additional revenue for your government, and I'll explain a little bit more about what types of revenue you can generate. You can reduce greenhouse gases so you can be part of the solution to reducing global warming. It improves air quality and if you have to comply with several environmental laws which most landfills have to, the revenue from these projects help you reduce that cost. You can create jobs and I have more data on that in a few minutes and you conserve land. There is evidence that shows that collecting landfill gas saves a little bit of the space in a landfill so you don't have to plan a new landfill as soon as you would normally.

Slide 13: Diversity of Project Types Electricity Generation

Victoria Ludwig: What kinds of projects do we see for landfill gas energy? In the U.S. we have about 450 projects that are currently operational where landfill gas is being used as energy. Three quarters of those are using landfill gas to generate electricity. This slide, you don't need to get bogged down in the details, but it just shows that there are

many types of equipment that you can use to generate electricity. But electricity is the predominant project type that we see

Slide 14: Diversity of Project Types Direct Use of LFG

Victoria Ludwig: The other type that we see is direct use. What that means is that the gas is being used as a medium Btu fuel. It is minimally processed and then piped to a manufacturing plant where it is used in a boiler, a kiln or an oven. This type of project is on the rise in the U.S. recently. Right now about one quarter of the projects that are operational in the U.S. are using landfill gas as a medium Btu fuel in the following ways: it is used in greenhouses, it is used to evaporate leachate, it is used in fish farming even. And there are, in addition to direct use and electricity, there are about a dozen projects operational in the U.S. where the gas is converted to pipeline quality natural gas and then piped into the normal gas piping system.

Slide 15: Look Who's Using Landfill Gas

Victoria Ludwig: And, just in case you are wondering, there are many very big companies in the U.S. that are using landfill gas as a medium Btu fuel – everyone from Frito-Lay to Ford to NASA and as they are private companies I can guarantee you that they are not doing these projects unless they're able to save money. And we have some documentation that they are saving money on energy costs by using landfill gas.

Slide 16: State of the National LFG Industry (April 2008)

Victoria Ludwig: I mentioned that there are about 450 projects in the U.S. right now. That is equivalent to 11 billion kilowatts hours of electricity – a pretty impressive number. And that equates, that electricity use, coming from a renewable clean source of energy such as landfill gas, equates to significant environmental benefits. I have listed several here; one of the ones that make the most impact on my mind is that the benefits of these projects are equivalent to removing over 14 million passenger vehicles from the road. So they do not have small environmental benefits.

Slide 17: LFG Energy Projects and Candidate Landfills

Victoria Ludwig: And EPA has tools to help you calculate the environmental benefits from your landfill gas project. This map shows you the distribution of those 450 projects. It varies widely, but most of the projects are taking place in the mid-Atlantic, and the northeast and the west coast and the south. We also show, in addition to the operational projects, the number of landfills that we call candidate landfills which we are defining as landfills that meet some basic technical criteria for being viable to do a landfill gas project. So EPA, we are trying to work with these candidate landfills to help them do projects.

Slide 18: Project Structures

Victoria Ludwig: One thing you might be wondering is how I do these projects as a local government. There are many ways to do them, but in general what we have seen at EPA from the variety of projects that we have worked with, there are some local governments that are developing the projects themselves, which is the first option listed here, they are not hiring a third party company to do the financing and the building and the constructing. They are financing it and constructing it themselves.

You could also team with a project developer. If you do this, the way it usually works is that the project developer will finance the project, pay for the construction and the installation of the landfill gas collection system as well as the electricity generation equipment, but in exchange they have the right to sell the gas and receive the profit from that, but usually they pay the local government a user fee, a royalty fee for using the gas.

Then there's a mix. You can team with the project developer but not give them complete rights to the gas. You could share 50% of the profits, and therefore 50% of the costs; usually that's how it works. The important thing to remember is that your landfill gas is an asset, it's not a waste product, it has value on the open market, and so you should consider very carefully who you want to sell it to and how.

Slide 19: Typical Electric Project Components & Costs

Victoria Ludwig: Everyone is always interested in knowing how much these projects cost. We at EPA therefore have therefore tried to estimate some average costs and obviously that is an important thing to keep in mind, these are average costs. Most landfill gas projects in the U.S. are between 1 to 5 megawatts in size, there are some really big ones, but the average is about 3 megawatts so we are using that as an example and we have outlined the capital cost, maintenance cost and some of the interconnect cost. So this gives you an idea, 3.76 million capital plus an additional half million per year for operations and maintenance.

Slide 20: Typical Direct-Use Project Components & Costs

Victoria Ludwig: If you wanted to do a direct use project, the size of these is dictated by how much gas is flowing through the pipes. This one is an 800 standard cubic feet per minute gas project the pipeline is 5 miles long to the end user and over the course of 15 years this is the total capital cost – 1.63 million, and obviously a much lower operations and maintenance cost than the electricity project. In these projects what we find is the biggest expense is laying the pipeline, because oftentimes you have to buy rights of way, you have to go under rivers, over highways, that can be expensive.

Slide 21: Potential LFG Revenue

Victoria Ludwig: But regardless of how much these projects cost, it is important to remember that you do receive revenue from them. And we've tried to outline some of those revenue types here. If you do an electricity project, obviously you can sell the electricity to the utility, you'll receive money for that. You can sell renewable energy

credits, which you are allowed to do because landfill gas is considered a renewable clean energy source, and there are federal tax credits available, there are federal incentives available, the clean renewable energy bonds are an example. Those bonds are available only to local governments who want to do these projects. So these are ways to pay for your project as well as maybe make a little extra. If you are doing a direct use project, obviously you can sell the landfill gas to either the end user or to the developer of the project. And in addition you can also receive money from selling the gas as a greenhouse gas credit and that applies to both electricity projects and direct use projects.

Slide 22: Jobs and Revenue Creation

Victoria Ludwig: So, I will mention at this time that on our EPA website, the epa.gov/lmop, which stands for Landfill Methane Outreach Program, we have resources that explain a little bit more about everything that I'm including here today. We have a factsheet that explains what the clean renewable energy bonds are, for example, and where you can, what states will allow you to sell renewable energy credits, so if you have any further questions, the website is a great resource.

I mentioned earlier that a landfill gas project also generates jobs and we have tried to document that here. You can see on this slide that a typical 3 megawatt project is estimated to increase the output of the national economy by 14 million dollars and employs nearly 70 million nationally. Obviously, I think a large percentage of this is a local benefit and so this is something you can use to help justify your project.

Slide 23: Jobs and Revenue Creation (cont.)

Victoria Ludwig: We've also tried to estimate this for direct use project. Obviously the revenue and the number of jobs created differ on the size of the project. Just as an example, a 5 mile pipeline project similar to the one I was talking about before, would employ 43 FTEs nationally, which is not a small number. So they have numerous economic benefits.

Slide 24: LFG and State Renewable Portfolio Standards

Victoria Ludwig: But, how do you pay for these projects? I mentioned some of the ways that you can receive revenue. One of them is by selling a renewable energy credit. And you do this, you do this, you work with utilities that are in states that have renewable portfolio standards. A renewable portfolio standards is something that the state government has issued that requires utilities in that state to supply a percentage of their power from renewable resources. Right now, we estimate that 30 states and the District of Columbia in the U.S. have either a renewable portfolio standard or a renewable portfolio goal which is similar to a renewable portfolio standard but is not enforceable. And all of those states consider landfill gas to be one of those renewable sources of energy that would qualify. So these are additional ways to pay for your project. If you are not located in a state that has a RPF you can often sell your credits to a broker who

will then sell them to a utility in a state with a RPF. So there are many ways to receive income from that source.

Slide 25: Public and Private Entities Moving to Reduce GHG Emissions

Victoria Ludwig: Another way to pay for these projects and receive revenue is through the emerging carbon market. These are markets that you may have heard of, where people are buying and selling credits for reducing their greenhouse gases and landfill gas projects qualify for these. It's rapidly changing and EPA is trying to stay on top of it as much as we can. In summary though I can say right now that there are two sets, there are voluntary group of markets and regulatory markets. The voluntary market right now is where most of the activity is happening, and some examples you might have heard of include the Chicago Climate Exchange, Blue Source, and these organizations are actively trading credits from landfill gas to energy projects. In certain regions of the country such as the northeast and in the west there are regulatory markets where utilities are required to reduce their greenhouse gases and one of the ways they can do that is by buying credits from other projects. So, and this is changing every day, and then there is movement on the national level as well on the regulatory side. So stay tuned, but it is important to know that this is a very important source of revenue that you can get for your project.

Slide 26: Emissions Trading of LFG

Victoria Ludwig: How does emissions trading work for carbon credits from your landfill gas project? An example is the Chicago Climate Exchange which was one of the first voluntary trading markets in the US. What they do is they offer a credit of 18.25 metric tonnes of CO₂ per metric tonne of methane that you combust. So, and that's because the methane is almost 20 times more potent than CO₂ in causing global warming, so therefore you receive 20 times the benefit. They have some rules about when these projects could have been operational and they have some other rules, but the most important thing to know is that you can only sell your credits on the Chicago climate exchange if your landfill is not required by federal law to combust landfill gas, or if it's required by state law it would not qualify either. The idea here is that if you are using, if you are generating your electricity or combusting your gas because you are required by law, then there is no benefit from that to anyone else, but if you are doing it voluntarily than that is worth a credit and therefore you can sell it on the emissions trading market.

Slide 27: Federal Financial Incentives

Victoria Ludwig: What other incentives do we have? I mentioned the clean renewable energy bonds which are available only to publically owned landfills and these are basically low interest bonds or they have other benefits as well. And these are new, but they have been very popular, we know that several landfill gas energy projects have taken advantage of these bonds and they have been instrumental in helping them fund their projects.

Slide 28: EPA's Landfill Methane Outreach Program

Victoria Ludwig: There's also the renewable energy production incentive, which is similar, and EPA's the Landfill Methane Outreach Program that I work on has been around since 1994 with the sole goal of helping reduce methane emissions from landfills and the way we do that is we provide technical assistance to landfills, to industries, to state governments, to private project developers to help them understand how these projects work and to overcome some of the barriers to these projects.

Slide 29: LMOP Tools and Services

Victoria Ludwig: Specifically we have many tools and services that are all free, because this is a voluntary program, we have a newsletter, we do workshops, we have our own annual conference, we have a great website, we can help you promote your project, we can help you estimate the amount of gas that your landfill could generate, we have technical publications that explain the pros and cons of these projects and how to overcome some of the barriers. And as I mentioned earlier we have fact sheets that explain a lot about the financial incentives and we are working on a new factsheet to focus on the emissions trading market that I mentioned since that is a new arena for these projects. So I encourage you to check out our website and sign up as an LMOP partner.

Slide 30: How Can We Work Together? Direct Project Assistance

Victoria Ludwig: Specifically, I mentioned that we have technical assistance, what does that mean? We can actually help you, for free, analyze the potential of your landfill, in terms of producing gas, how much gas do you have, and we can also help you find a nearby industry that might be a good end user for your gas, conversely if you are an end user and you are looking for a good landfill nearby we can help you, with our LMOP locator tool, we can help you find those landfills. We can also do, we have an economic feasibility tool, called LFGcost, that helps you analyze the operating and maintenance costs of a project as well some of the economic output such as net present value, internal rate of return, so that you can see whether the project is economically feasible at all. And we can do all of these for free.

Slide 31: For More Information

Victoria Ludwig: So we want to make it easy for everyone to do these projects, we are lucky to have a team of four people, that, we divide the country into region, I encourage you to contact any of these, any of us at all, regardless of region even, and just ask any questions you have, because we put our phone numbers on the website out there so that everyone can ask us questions because we do know that these projects have a lot of aspects to them and we are here to help. Thanks very much, that is the end of my presentation, I hope it was helpful.

Neelam Patel: Thank you Victoria. If you'd like to review the presentations by our other presenters, you can download them at our website. And now we will take some broad

reaching questions that were asked during the initial webcast to benefit the listeners of our audio recording.

Andrea Denny: Thank you Victoria. If I wanted to get a list of landfills that were designated as candidate landfills, how could I get that?

Victoria Ludwig: Very good question. We have a database that we maintain at EPA of candidate landfills in the U.S. and that database also includes a list of currently operational projects in the U.S. It is an Excel spreadsheet that has many fields to it, it is on our website at epa.gov/lmop and you are welcome to take a look at that. It is organized by state, so you can go to any state and it will show you the names, the locations and some basic characteristics about all the candidate landfills that we've identified in the U.S.

Andrea Denny: Great. Are there any specific resources available for small scale landfill projects, maybe something about a half megawatt in size?

Victoria Ludwig: I am not aware of resources that available only, are targeted specifically at small landfills, but I would say that right now the carbon market is a great avenue to help fund a small project. Small and medium sized landfills often need a little bit of extra revenue to help them overcome some of the economic obstacles, and so I would encourage you to look at the carbon trading market. On that note I'll add that also a tool that we have on our website is a guidebook to different kinds of funding incentives that are available to landfill gas projects at both the federal and state level. And that includes everything from the federal tax credit for electricity projects that exists, as well as state, some states offer low interest loans, some states have grants, some states have their own tax credits that are available just to projects in those states, that's in our documents, tools and resources section of the website.

Andrea Denny: And finally, the slide in your presentation talks about clean renewable bonds and they showed them being extended through December 2008, were those extended or renewed for 2009 or later?

Victoria Ludwig: Well, they were extended as part of the economic bailout plan that was passed at the end of 2008 and we are now conducting research this very week because we understand that there were some more provisions included related to the bonds as well as the federal tax credit for electricity projects that were passed as part of the stimulus bill. So we are following those, and one thing we will, we're going to do a summary of what that is and how it impacts landfill gas projects. But I do know that in the economic bailout plan they were extended for 2 year. So check our website, send us an email and ask to be added to our listserv, and then you will be sure to get the first notice of it, but we also always put it on our website.

Andrea Denny: Great, that concludes the questions. Thanks.

Neelam Patel: Thank you Victoria. And thank you for joining us for our webcast. Look out for our next webcast which will be the first week of March. Take care!

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