Greenhouse Gas Inventory 101
Session 1: Creating an Inventory
October 11, 2008

Slide 1

Operator: Welcome to the EPA Creating an Inventory Conference Call. During the presentation, all participants will be in a listen only mode. This conference is being recording Thursday, October 11th, 2007. I would now like to turn the conference over to Andrea Denny. Please go ahead, ma'am.

Andrea Denny: Thank you.

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Andrea Denny: Thank you. Welcome everybody. My name is Andrea Denny. I work at the U.S. EPA in the Clean Energy Environment Program State and Local Branch. Our clean energy environment programs are our support for state and local governments to promote cost effective clean energy strategies that benefit the environment, energy, public health, and the economy.

We have two main programs in our branch: the Clean Energy Environment State Program, which supports state governments, and the Clean Energy Environment Municipal Network, which is less than one year old. We are still developing a lot of our materials, but our mission is to support local governments, which includes cities, counties, tribes, regional planning associations, councils of government, and anything that fits under the rubric of local. We have a fairly generous definition of that term.

You can see the main website for our program. I certainly encourage you to look at it. While we are a clean energy program, we are also a climate change program, and clean energy is probably the best way to target climate change. When we say clean energy we include energy efficiency, renewable energy, distributed generation, combined heat and power, and some other cost-effective and environmentally-friendly strategies.

As we have been working on clean energy we have found an increasing interest in climate change as an aspect of clean energy policy becoming more and more integrated into energy planning. Our program is seeing increasing interest in and questions about how to track and reduce greenhouse gas emissions, so we wanted to provide the webcast series to provide some of the background and answer some of the questions we're getting about greenhouse gas inventories. These webcasts are very introductory. They are just meant to give a background on greenhouse gas inventories. You are not going to come out of them being an expert or knowing how to use any particular software. We would really like to encourage you to pursue your education on greenhouse gas inventories further through trainings that EPA offers, trainings from the Cities for Climate Protection Campaign, Energy Star trainings, and through reviewing and reading a lot of materials

that are available online. At the end of this presentation there is a slide with a number of the URLs that you can look to for more information.

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I just wanted to quickly go over a few logistics. We are asking people to use the question and answer box to submit your questions. We will have someone reading the questions and consolidating similar questions and we will answer them during the question and answer session at the end of the presentation. We are recording this presentation and we will notify participants when that recording is available and where. We do welcome your feedback after the training. You can email me at denny.andrea@epa.gov with any questions, comments, or follow-ups.

I'm actually going to turn over the presentation to Anne Choate. Anne is a vice-president for ICF International. She has a lot of experience with working on greenhouse gas emissions and inventories, and reduction strategies for states, municipalities, the National Park Service, Environment Canada, the EPA, the Department of Defense, and the Federal Highway Administration. She has been working with EPA on the state level greenhouse gas inventory methods since 1995. She has done extensive work with the California Energy Commission on their greenhouse gas inventories and other work. She is the lead developer on EPA's State Inventory Tool, which some of you may be familiar with, as well as the Waste and Reduction Model (WARM) and the Climate Leadership and Parks (CLiP) Tool. I also just wanted to mention that here at EPA, we have a number of other experts available on the line, so they may be able to answer some of your questions as well as people representing ICLEI, the Conference of Mayors, and from the EPA, we have someone representing EnergyStar, Climate Leaders, and the U.S. Greenhouse Gas Inventory. And with that, I will turn it over to Anne.

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Anne Choate: Thank you, Andrea. I just want to thank all of you for participating. It's a humbling experience to be in the role of presenter, but I hope that some of the information we can provide today will help to shed some light on the inventory process and answer some of the questions you may have had. This will kick of the series of webinars that EPA is going to be hosting, and should encourage some healthy dialogue and some information sharing, so with that I will just provide an overview of what we hope to accomplish today.

The intended audience, as you know, is to be regional, state and local representatives. The goal of this first session is really to clarify and review some of the fundamental issues related to developing an inventory.

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In terms of this presentation, this is just an overview of what we are planning to cover.

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The first and the most important question is: why would one want to prepare an inventory? Some of the reasons for preparing an inventory are listed here. But I would say the main goal is that it is hard to manage what you do not measure and the inventory is a way to measure things that we might want to manage down the line.

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The next question is what kind of inventory is appropriate? What kind of inventory do you need to prepare? There are several types out there. I will get into these more in a minute.

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One of the main questions, that comes up when people are just getting into this and are trying to learn how to navigate the waters is, what's the difference between an inventory and a registry? So the next couple of slides try to address that issue.

One example of a GHG inventory that is very important right now in California is the California GHG Inventory. Actually, we were involved in the inventory from 1990-1999.

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This graph shows some of the findings. This is basically what you are trying to find in an inventory. You want to find the magnitude of emissions by source and by gas, and hopefully over time, so you can start to see trends. This is distinctly different from a registry.

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A registry is more of a way to organize and collect information from an inventory. Just to provide another example, there is the California Climate Action Registry, which is distinct form the California GHG Emission Inventory. The members of the registry conduct and submit their own inventory in keeping with the protocol of the registry.

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To get to the heterogeneity of the registries out there, what you find is that the design of any given registry is dependent on the purpose of the registry. If the registry is simply to account for emissions then you will see a difference level of detail required, as seen in the table.

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When you do design an inventory, one of the most important upfront questions is one of boundaries. What are your physical and organizational boundaries going to be?

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Getting into boundaries, when you're working on an inventory, it is important to think about the end-use sectors that you need to model and to what extent you need detailed information for the inventory at, for example, the municipal level. Thinking through what those operational boundaries should be before you conduct the inventory, will help you down the road when you try to use the inventory.

There are opportunities to calculate emissions from direct emissions sources. Then there are ways to calculate emissions from imported electricity, as an example of indirect emissions. If you are in a region where you generate electricity that is sold outside of your region, that electricity would be direct emissions, which can be calculated in your inventory. However, if you are in a region where a lot of the electricity is used is imported from outside of the region, you need to think when you are developing that inventory, what share of the electricity that is used or consumed within your region is and then figure out how you are going to be able to estimate the emissions associated with generating that electricity.

Electricity is an interesting case because, when you think about electricity there are no emissions associated with the point of use, but the emissions actually occur at the plant where the electricity is generated. We found in a lot of the local inventories that they include the emissions associated with importing electricity because that is often one of the things you have the most control over and so you want to know what those emissions are. Then, you can think about ways that you might reduce them going into the future.

In the state context, in the EIIPE guidance which is the guidance for the state inventories, we have encouraged states to calculate emissions from imported electricity. But to avoid double-counting across states, we have asked state to keep that number separate and for the body of the inventory, just to report on generation. The idea is that you do not want to double count generation that is happening in one state that is supplying electricity to another state.

Another area where direct versus indirect emissions is fairly important is in the area of waste management. The issue here is whether your inventory is going to capture GHG emissions associated with how the waste is managed within the boundaries you have established for the inventory or whether you are going to look at emissions of wastes generated outside of that region. If the waste is collected within your region but is then exported, is your inventory going to calculate the emissions associated with the management of that waste even though it is happening outside? This comes up because this may be an area where, a municipality may have control over the quantity of generation or the composition of the waste and it might provide opportunities for emissions reduction. If the inventory does not consider the emissions associated with

managing that waste even though it is outside their boundaries, then it undermines their ability to track reductions in emissions in that area over time.

Another interesting area which is usually of interest in the private sector is whether an inventory should get at product use or supply chain-related emissions. There are some companies who may not emit many greenhouse gases in their direct operations, but the activities they engage in relate to some GHG emissions happening throughout the supply chain. In some cases, those emissions might be quite significant, so these companies are starting to think about, not only their immediate carbon footprint, but also, what GHG emissions are associated with the stages of the product supply chain or the products they use. For example, if they are using paper, are they using paper that has recycled content? Or, could they be doing things in their purchasing strategies to reduce their greenhouse gas emissions? And of course, these emissions would be outside of their immediate direct emissions. These would be indirect emissions because they are outside of their control.

Thinking of these issues it is an important part of designing an inventory upfront.

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Similarly, thinking through the emission source categories that should be included is something that often comes up. The list that I have here is some of the main source categories. Now these source categories could be broken down into many more subcategories, around fifty or sixty; or you could collapse it to less if some source categories were not appropriate for the geographic region, for example. This gives you an idea of some of the source categories, and any inventory would attempt to at least address emissions that are material within each of these categories.

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Another topic which comes up, is which greenhouse gases to include, and here is a table of the six greenhouse gases and which are included in certain guidelines; here for the IPCC, the EIIP and the Cities for Climate Protection guidelines. The CCP guidelines include carbon dioxide, nitrous oxide and methane. This isn't to say that any inventory should cover or shouldn't cover any particular gases, but that the guidance for conducting inventories at various levels has different thresholds. Depending on your specific circumstances and the specific emissions that are in your control or in your region, you might want to consider those factors as you are trying to decide which emissions to include.

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There's an important aspect of quantifying greenhouse gas emissions, and it relates to the nature of the data you are going to be using. A great example for the top-down approach, is the Energy Information Association's State Energy Data Report, which has fuel consumption data by fuel type and state, and we have used it as a default in the State

Inventory Tool, which Andrea mentioned earlier. It is a very good source of information on fossil fuel combustion.

There are a lot of states who agree with the fuel consumption estimates that come out of the State Energy Data Report, but there are often some end-use types and some source categories where states have better data. For the State Inventory Tool, we allow you to go in and enter your own data if that is the case. Top-down data tends to be more accurate, but there are certainly cases where states may have better data, so states with better data would want to use it instead. This is an extreme example because I am talking about the EIA's data on state fuel consumption.

My example for bottom-up data, would be taking on electricity use from energy bills, or taking on other sources of local energy use. But, depending on the level of inventory you are doing, top-down versus bottom-up may have very different meanings, so top-down data at the level of the municipality might be getting data from a utility and bottom-up data might mean figuring out how many refrigerators there are per household times the amount of electricity those refrigerators use, and calculating the emissions that way.

Whether you select a top-down or bottom-up method will largely depend on the data available and then the purpose of these estimates. What do you plan to use these emissions estimates for? Top-down estimates may be more accurate but they may not supply enough detail that would allow you to assess mitigation strategies. In an ideal world, what you would like to have is disaggregated inventory estimates, so they provide information for the most important end-use, end-uses, or sub-sectors and fuel combinations; for example, gasoline in passenger cars; so you can track those emission estimates in comparison to values that you could generate using bottom-up data, for example, number of cars and vehicle miles traveled or miles per gallon, to estimate the benefits of an emissions reduction measure. If your inventory provides detail down to the emissions related to gasoline in passenger cars, then you'll be able to track those emission estimates over time to compare whether in fact they are being reduced as you implement measures that, for example, might reduce greenhouse gas emissions from gasoline in passenger cars. Often it is some sort of hybrid approach that you are trying to go for, attempting to get disaggregates in the inventory that will allow you to track emission reductions and probably using more bottom-up information in a subsequent stage if you are thinking about mitigation strategies.

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This is a pretty complicated issue. It's an issue that has a lot of nuances in how you select the boundaries, how you design the inventory, how you select the data; so thinking of the 80/20 rule is actually really important here because people can get hung up on the inventory piece.

Just creating the inventory can be such a daunting task that it can put people off, so it is important to realize that much of the inventory work that has been done over the last twenty years has really been to learn about emission sources, or to satisfy treaty

obligations, but as a result, we have a set of protocols and methods that are really good at supporting mitigation strategies in specific sectors or source categories. In general, some of those methods are not suitable for inventories that are intended to support a higher-level strategic planning or a policy analysis. One of the challenges in figuring out your inventory is where do you want to invest your resources and get into those levels of detail, and where you can streamline. This all links back to the original question that I asked, which is, why would you perform the inventory in the first place? If you are performing the inventory because you know that you need to reduce emissions and you want to know what the most important sources in your region, state or county are, then you need an inventory that is going to give you that picture. You need to figure out where you are going to focus your resources; where you are going to get your disaggregated inventory information that will allow you to track any future activities to reduce emissions in those sectors, for example.

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Once you have decided to develop an inventory then you need to set a baseline. Setting a baseline sounds like a very basic step, but actually figuring out what your baseline is, is an important step. Think it through because often people do not think about how the baseline data are going to be used. If you think about the purpose of the inventory, and how the baseline data are going to be used, which is as a benchmark to compare progress going forward. Are there anomalies in the baseline that you are using?

For example, when we were doing the California Inventory, we were looking at a baseline during a period of time that was from 1990-1999 and when you looked at emissions over that period, the change in emissions over time, you found a really small number; it was a very small percentage. Yet we knew that emissions in California had increased over that time period. If you graphed it and thought through the sources of emissions, what you found was there was really a peak in 1990 in the GHG emissions in CA due to a drought producing less hydropower and military activities that were causing higher emissions. Basically, the emissions peaked in 1990, dipped down in 1991, 1992, 1993, and then picked back up and increased to 1999. One of the things to think about was that if you set 1990 as the baseline it was going to an uncharacteristically high year, so we needed to understand what the reasons for that were before we could explain the emission results and then think through emission reduction options in California.

Another question to ask is how the regulatory or voluntary efforts which are proposed or in progress are going to affect our baseline or future emissions. You may have an industry sector that has decided to reduce emissions by 20% by 2020. If that is an industry that is really important within the boundaries of your inventory then it would be important to think about how their baseline and their voluntary reduction target may influence the baseline that you select.

If your inventory is going to be one of several used in some sort of regional activities, it would probably make sense to coordinate the baselines. Finally, are the data available for

the year in question? Sometimes getting data for 1990 is hard to do. You need to think about their availability and if those data are of quality.

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Next, it is important to think about engaging stakeholders. A lot of people think about stakeholders in the context of action planning, but, in particular, stakeholders may be helpful in providing data to the inventory effort; establishing a baseline because they know what data is available for what years; knowing what databases exist and the quality of the data for certain years; and providing personnel resources, databases, or outreach assistance. It's important to get their feedback on some of your decisions, so they will be brought into the processes and then in the future be brought into any planning activities.

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Here is a table to provide information on the methods and tools that are available for developing inventories at various levels. The U.S. Inventory is not a tool in the national level case, but is the product. The State Inventory Tool is included as a method because it has a companion user's guide, which provides information on greenhouse gas calculations and methods used to quantify the emissions. Those user's guides are actually more up-to-date than the EIIP guidance, which has not been updated in a couple of years. I would suggest using the tool and the user's guide in addition to the EIIP guidance. For the local level, the ICLEI guidance has been incredibly helpful to local governments as well as their software. Then there is Portfolio Manager, which maybe someone can speak to more during the Q & A, but local governments can use Portfolio Manager as a way to track energy use, energy costs, and carbon emissions of each of the buildings that are within their portfolio. The idea there is that some local governments would like to start with that, track that information, and then expand out from there. Then as an example, there are company methods and tools like the WRI protocol. Climate Leaders also has protocols and methods to follow in quantifying GHG emissions. Others will speak more to these during the Q & A session.

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Now that we are prepared to create an inventory, some of the issues that are going to come up will deal with the data. Again, data availability is key. Understanding what data is out there and what the data quality is, is necessary for the purposes of your inventory. I've already mentioned bottom-up versus top-down, but how is your data collected? Is your fertilizer data available for your county through some national service? If it is, is it more or less accurate than locally available data? Then you need to think through the level of verification of various data inputs. The issue of scale comes in when data is available at a certain level, but for your purposes you need to find some level of apportioning to bring it to your scale. An example would be with refrigerants, would it be okay for you to use refrigerant data at a national scale and then apportion it to your county or your city based on population? If that is inappropriate it might be best to leave

it out of the inventory, but if you are just trying to get an idea, then it might be best to include just a back-of-the-envelope calculation.

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Certification is a third-party review of methods and the underlying data to your inventory. The purpose of certifying an inventory is to assure that the inventory is high quality and that it is complete, consistent, and transparent. There are several protocols for certifying inventories and some of them are listed here. This may not be as important for some of the local participants but it is important to consider when you decide on the level of rigor you are trying to achieve.

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A good way to review your inventory is to think about your results in context. Compare your inventory to other state and local government's. You can do that at the state level by going to the state summaries page listed here made available by the EPA. Order of magnitude checks have you compare a sector to other states, counties or cities' sector. And you might have to normalize these results by population, GDP or other indicators that might help you to compare emission estimates that you calculate with emission estimates for the same sources or the same sectors or gases in comparable regions or organizations. The CAIT put out by WRI would also allow states, for example, to go in and see how they stack up to emission estimates at the state level for other states.

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Timelines and effort for inventories are all over the map, and one of the reasons why EPA designed the State Inventory Tool was because they recognized that developing a comprehensive GHG emissions tool for all thirty or forty sources was time consuming, not to mention reading through the guidance and the methods. It allows states to quickly move up the learning curve and not have to reinvent the wheel every time. It allows them to more quickly create emissions estimates over the time series, instead of having to go through an entire guidance document to create estimates for one year. The availability of tools certainly reduces the amount of time that is needed. Other factors affecting the timeline are listed here.

Factors that affect the level of effort are also listed here. Again I mention the 80/20 rule because you need to invest the limited resources that you have in areas where it will make the most sense from the standpoint of why you are doing the inventory in the first place.

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This is an incomplete list, but it is a list of resources that may be of interest as you think about greenhouse gas inventories and try to get your hands on some of the important tools or methods that are out there.

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I would like to point out that this is our first webinar in our GHG 101 series. The second session gets into the uses of greenhouse gas inventories. The third will be specific to the State Inventory Tool and will provide training for it. With that I'm going to turn it back over to Andrea and if anyone has feedback on the session and/or questions or comments that we are not able to address here, I have provided Andrea's information here.

Andrea Denny, Clean Energy Environment Program, State and Local Branch, EPA
Thank you, Anne. I want to give Alex from ICLEI a chance to talk about the Clean Air Climate Protection Software that most the local governments are using and some of the other resources ICLEI can provide to local governments to help with their inventory.

Alex Rammel, ICLEI Local Government for Sustainability
My name is Alex Rammel and I'm from ICLEI Local Government for Sustainability. Very briefly, we are a membership organization. Our members are local governments around the world. In the United States we have about 300 members, many of which representatives are on this call. Most of the work we do in the U.S. is the Cities for Climate Protection Program; about 80% of our effort is dedicated to that. The primary benefit we can offer to local governments concerning GHG inventories is the Clean Air and Climate Protection Software Tool in conjunction with the Institution of Clean Air Agencies and the EPA. The tool is basically a calculator with links to emissions factors. It is tailored to the specific needs of local governments. Essentially, it is the easy way around having to develop all your own spreadsheets. For those who are interested, we just released a fifteen-minute demo video that features the software and all of the options and uses of that tool. I am happy to send that to anyone who is interested. In addition to providing the software, we do monthly software trainings for our members as a follow-up to the great information we just heard. We also offer all of our members hands on 101 technical support as needed. As you go through this process and come up with questions we are on the other end of the phone to provide the best answer we can. Thank you and I am happy to answer any questions that come up during the question and answer session as well.

Andrea Denny, Clean Energy Environment Program, State and Local Branch, EPA
I wanted to add two quick points to that. The CICP software is available free to state and local governments although the training is not available for free to non-members of ICLEI. Also, we talked a lot about how CICP is used for local governments, but a number of state governments have used it as well to do state government inventories and look at mitigation strategies separate from using the State Inventory Tool to look at the comprehensive statewide emissions, so it can be a very useful tool for state governments as well.

Question and Answer Session

Anne Choate: Adam and Lauren having been fielding the questions, and it looks like there are a number of questions related to the presentation.

Adam Brundage: Yes. Can you talk more about the plans and progress for developing a protocol for developing regional inventory work, i.e. at the metropolitan level? And what are some ways that activity data and fuel consumption data can be calculated at the regional, county or municipal level?

Andrea Denny: It's always good to start with a challenging question. The issue of regional inventories is becoming more and more important, and we are getting more interest in it from our PAs, NPOs and COGs. We are beginning to investigate ways to develop them and get at least rough estimates for greenhouse gas numbers for regional planning. We are just getting started on it, so it will be a little while before it happens, but there are some regional associations that have started to look at it and are probably further ahead than we are here at EPA. We are planning to tap into the progress they've made and what they've learned. We're looking at possible ways to scale down the state data to the regional level, or to possibly use some of the data collected for state implementation plans to come up with metrics for greenhouse gas inventories.

We'll probably try to come up with some different approaches and then compare them against completed inventories at the local or regional level to see if we come up with similar results. Other than that, it is probably a little too early to go into more detail than that unless Anne has anything to add.

Anne Choate: No; that sounds like a great answer to me. I think that there are certainly some source categories that will be easier to quantify at a regional level than actually within a county, and will be easier to tackle from a mitigation standpoint, as would be the case with transportation. We have been talking about this a lot and trying to think about how we can leverage some of that data that is already being collected and convert it over basically to greenhouse gas emission information that could be used for an entire region or for several cities within a county. And, as Andrea said, we are at the pilot stage of that.

Lauren Pederson: One of the participants asked that they understood that ICLEI is trying to suggest a baseline more near 2005 in part because it is much easier and it allows more research to be directed to action. Alex might be a more appropriate person to comment on this as far as what ICLEI is suggesting.

Alex Rammel (ICLEI Local Government for Sustainability): Our historical advice has been that you should set a baseline year that is as far back in time as you can get reliable and accurate data for. When we first started doing this, the goal was to have everybody in alignment to have a 1990 baseline, but that's really not possible in most cases now. I think we'd like to have local governments set a baseline that's at least five to seven years in the past, so that you can count the benefits and actions that has been taken subsequent to the base year. In that sense you can say, this is your baseline year emissions and a "business as usual" trendline would being increasing each year, but because of actions that have been taken, the trendline has stayed steady or has declined. The second piece to that, and specifically what I think the question is speaking to, is that we're hoping that we can begin to establish a common baseline among our members for comparative purposes.

The idea here is that a lot of our local governments are re-inventorying to track progress and we're suggested that they use 2005 as that re-inventory year or for governments that are just getting started, do an inventory for 2005. That way we'll have as many folks as possible on the same page for comparative purposes. That's a recommendation. It's certainly not mandatory.

Lauren Pederson: Another question from a participant is: can you provide a little more information on the 80/20 rule and does that mean that 20% of total emissions can be considered negligible?

Andrea Denny: The 80/20 rule is a rule of thumb that's not particular to greenhouse gas inventories. It's an adage that means you can put in 20% of the effort and get 80% of the results and that the remaining 20% of your results takes 80% of the effort. We're certainly not saying you can ignore 20% of the GHG emissions. We're saying you may want to consider how much effort you are putting into some of your smaller sources. For example, energy is more than likely your biggest source, so you'll want to spend some time getting those results because it could be 80-90% of your total emissions, whereas if you're a city, your emissions from agriculture are not going to be a large source. We would not recommend you spend a lot of staff, time and dollars on refining your agricultural emissions. It's a rule-of-thumb that you want to spend the most time on what are to be understood as the largest sources of emissions. This comes back to Anne's point, that if you spend a lifetime refining your inventory it could prevent you from ever taking any action because you're so caught up in the minutia of your numbers.

Lauren Pederson: Another question was on slide 8 on inventory versus registry. Can you elaborate on GHG emissions removed and if and how that related to carbon sequestration?

Anne Choate: The protocol for developing an inventory includes quantification of both greenhouse gases that are emitted to the atmosphere and also carbon that is stored. For example, if we look at both the carbon dioxide that is emitted from forestry activities as well as the carbon that is stored in the forest during the timeframe of the inventory. I could go off on a tangent about biogenic carbon, but I will refrain from that and if anyone wants to talk about that later we can. The idea is to cover both emissions and sinks in the context of what I have on that slide.

Lauren Pederson: The next question is, is there any anticipation that municipal inventories will be mandated in the future?

Andrea Denny: As far as I know there is no talk to make inventories at the municipal level mandatory as far as the federal level, but I cannot speak to what some states might do at their level. I believe Texas requires some jurisdictions that are not at the attainment level to report on their energy consumption and emissions related to energy and electricity consumption. It's not the same as a mandated greenhouse gas inventory, but it is an example of the kind of legislation that could potentially happen at the state level. Of

course, a local jurisdiction could pass an ordinance requiring that they do their own inventory, but there are no plans at this point to have a federal mandated requirement.

Lauren Pederson: Thank you. The next question is how many local governments, if any, complete a local inventory on an annual basis. If they do not, then what measures do they take to track progress?

Alex Rammel (ICLEI Local Government for Sustainability): The only local government that I am aware of that does an inventory on an annual basis is New York City and they've only started doing that very recently. Most governments that we work with do a one-time snapshot or do a baseline year, an interim year, and then periodically do a follow-up re-inventory, perhaps every 3 to 5 years.

Adam Brundage: We have a few participants that still don't quite understand the difference between a registry and an inventory. Could someone please elaborate on some of the major differences?

Andrea Denny: I'll take a stab at it and then Anne can fill in where I've missed or erred. The simplest way to think about it is that a registry is a collection of inventories. An inventory is something that one particular entity; whether that entity is a corporation, a power plant, a local government, a state government, or whatever a controlling entity is; conducts on their emissions associated with their operations and activities. For example, a state government could do an inventory on all the emissions related to the operations in their buildings and their fleets or they could do an inventory of all emissions of all activities within the state. A registry is basically a reporting mechanism where usually corporate entities have done an inventory on the emissions related to their activities then take that inventory and submit it to a registry. That registry becomes a repository of what people are reporting to them. It's essentially a collection of inventories.

Some registries will allow you to report on emissions reductions from projects. For example, if a local government was participating in a registry they might report that they did a project to replace all of the light bulbs in their government's buildings with compact fluorescents and they did an analysis and found that they saved this many kilowatt-hours which correlates to this much greenhouse gas emissions. Depending on the format of the registry, they might be able to report that project. Basically a registry is a reporting framework where people can report information about their greenhouse gas emissions, whereas an inventory is the way in which you collect and figure out what those greenhouse gas emissions are. I hope that makes it clearer. Anne, I don't know if you have anything to add.

Anne Choate: I think that was very clear, and probably much clearer than when I went through it the first time.

Andrea Denny: If you're still not clear you can still resubmit a question about this and I will take another stab at explaining it. Sometimes it's difficult when you are immersed in this world to explain it to people who are not, but hopefully that was clear.

Lauren Pederson: For smaller municipalities, ones with populations under 50,000, is it possible and meaningful to set a minimum level, such as is it okay to set a level at over ten or eight percent?

Andrea Denny: Alex, feel free to take this one. I think my answer would be that it really depends on your intention for using the inventory, but Alex deals with this question more often.

Alex Rammel (ICLEI Local Government for Sustainability): That is exactly what I would say. It really depends on what you want this inventory used for.

Slide 8

If your goal is to give policy makers a general sense of scope in the area of the problems so that they have a sense of how to direct resources; should we put resources to energy efficiency improvements in our buildings or should we put those resources to improving the efficiency of our vehicle fleet? I think a larger error bar is probably acceptable, whereas if your purpose is to do a thorough inventory that is going to allow you to say this building is using more energy than this building even though they're the same size and used for the same purposes so you can find where the inefficiencies are, then you need a more accurate inventory. That is really a question you have to decide at the outset. What are you going to be using this tool for?

Lauren Pederson: Alex, we have a couple more ICLEI-related questions. What emissions factors are used in the ICLEI model? I know that there are a bunch of questions related to this, so please give an overview of some of these emission factors.

Alex Rammel (ICLEI Local Government for Sustainability): Essentially, it's the best set of emission factors that we could come up with in 2002 or 2003. They are in the process of being updated. The electricity coefficients are based on the NERC regions, which are fifteen regions within the United States, so the electricity coefficient reflects the mix of electricity sources in your region. If you are in the Northwest it is more hydropower. If you're in the Northeast it is more heating fuel. Most of the other coefficients are fairly standardized and are based on EPA data that was compiled by the Tellus Institute. Our waste sector coefficients are based on the EPA's WARM model and on the LandGEM model. I believe that that is a sufficient overview.

Adam Brundage: There is a mention of aggregation and disaggregation data. Do you see utilities and government agencies in the future, selecting data at local scales to facilitate sub-state inventories?

Anne Choate: I have heard that because several utilities are beginning to be asked to provide more detailed information in ways that they hadn't been asked to do before that they have been working with people like city planners to figure out how they can break

out their data to facilitate some of the analyses that are being done by energy managers within the city, for example. I'm sure Alex or Andrea may have other ideas or examples.

Andrea Denny: It can be challenging because it varies from state to state, from public utility commission to public utility commission, and from utility to utility how they collect that data and how willing they are to share it. One thing that may help gets back to the regional approach. If there are several jurisdictions in your area that are interested in getting this data, you may have more luck consolidating your request, so the utility committee may be getting only one request for that data. Theoretically the data should be available, so sometimes it is just a question of accessing it. Other types of data, like the agricultural data, will be collected at the county level. A lot of local jurisdictions do VMT, or vehicle miles traveled, so that information should be readily available. I'm not sure if there will be an expansion of what will be collected by the federal agencies or how it is disaggregated. A lot of the energy data is collected biennially and because of resources there has been talk about what data will be made available. Unfortunately, I do not know if they will be making this data more readily available, although it would be helpful if it was. Alex, I don't know if you have anything to add.

Alex Rammel (ICLEI Local Government for Sustainability): Just generally, this is definitely a problem that we're tracking. It's a service that I think we will be more and more able to provide in the future. We have a regional office that serves the Northeast and Mid-Atlantic based in Boston, and another regional office for the Northwest based in Seattle. We're opening offices in Houston and in Chicago. Our regional offices are really there to serve the members in that area and allow us to build relationships with the utilities. Our office in the Northeast has created a good relationship with one of the major utilities there, so we are able to provide information on energy use that we obtain directly from them. We sort the information and can provide it to local governments for use in their inventories. We are in the process of developing similar relationships with several utility companies across the country, and as these new regional offices spring up, that is going to be a big piece of what we are trying to provide in the future.

Adam Brundage: Which would you recommend for municipalities to do first: an energy audit of its operations or a greenhouse gas inventory of the emissions from its operations?

Andrea Denny: I'm not sure I have a good answer or a right answer for that question. It depends on the primary concern of that local government. If the municipality decides to do an energy audit, a lot of that data for the audit would be used for the greenhouse gas inventory. It is probably the largest source for your emissions and energy efficiency is generally the easiest most cost effective way to get greenhouse gas reductions. You can get them very quickly and with a very short payback period. In a lot of ways doing an energy audit would be the beginning of your greenhouse gas inventory because it would be a way of collecting the data that you need for it. They are not necessarily distinct and I think that energy use for a local government could be the biggest thing and give you the biggest bang for your buck. Alex may have another opinion, but that is my take on it.

Alex Rammel (ICLEI Local Government for Sustainability): I would just encourage you to do them both simultaneously if you think you are going to do them both, because you are going to run into a lot of economies of scale in terms of the information you have to collect. You'll also avoid duplicating a lot of work if you do them at the same time.

Anne Choate: This ties a lot back to the slide about top-down and bottom-up data. An energy audit would require you to collect a lot of information, a lot of bottom-up data on energy usage, which would feed your energy audit and feed your greenhouse gas inventory. It would also be a very good set of information to use, if you do decide to assess mitigation strategies. You could kill three birds with one stone.

Adam Brundage: I just want to mention quickly too that a lot of people have been asking about acronyms that have been thrown around during this presentation. If you go to the additional resources slide, slide 25, there is a lot of good information that will clarify a lot of these acronyms.

Anne Choate: Some of the key acronyms are: GHG, greenhouse gas, and then there were some of the acronyms that were associated with documents and tools. IPCC is the Intergovernmental Panel on Climate Change. EIIP is the Emission Inventory Improvement Program, which is a suite of guidance put out by the EPA's Office of Air Quality and Panel on Standards to conduct emission inventories across a range of pollutants, including the criteria air pollutants. There is one volume, the EIIP volume eight, that is devoted to greenhouse gases. Another is the WRI/WBCSD which is the World Resources Institute/World Business Council for Sustainable Development, and that acronym is for a guidance protocol. Definitely some of the information and acronyms could be found on, what I think Adam is referring to, is the first link on the additional resources slide; greenhouse gas inventory basic information.

Adam Brundage: We have another question here about the consistency of protocols being used by major inventories and registries, and if they are consistent with, say California's approach to state inventories and registries.

Alex Rammel (ICLEI Local Government for Sustainability): There are definitely a number of different standards that are floating out there. One of the services that ICLEI is trying to provide within the next three months is the protocol that will become the standard for how local governments should count greenhouse gases from their own operations and from anything that occurs within their community's boundaries. To the largest extent possible, that is going to be consistent with the California Climate Action Registry, WRI, and IPCC guidance. For the most part, a lot of the differences in these standards have to do with differences in reporting requirements and/or certification requirements. When it comes down to what things you should count and how you should count them, I think there is a fair amount of consistency because as they are developed, they are looking at each other and making sure they are at least in line, which is an important part of the standard that ICLEI is writing right now. We're not trying to do anything that is completely off the mark from what anybody else is saying.

Andrea Denny: To follow up on that and echo what Alex said, the Intergovernmental Panel on Climate Change is really the driver behind all of these methodologies. Since they are internationally tied to that set of protocols, there is a great amount of consistency and there are slight modifications to the data availability. But, our state inventories are tied to what happens at the national level. EPA was involved in developing the WRI GHG protocols as well, which are very similar to the protocol and registry that California uses and Climate Leaders that EPA uses. We do a lot of work to make sure that emission factors are consistent, so there is a tremendous amount of consistency among the different methods.

Adam Brundage: Can you create an emissions inventory with top-down and bottom-up data as long as there is no double counting?

Anne Choate: I would say that you might have to because of the data availability. I think you just need to keep an eye on the accuracy and definitely on the potential for double counting.

Adam Brundage: Can you elaborate on the control boundaries for waste management sources, for example, what would you recommend in terms of emissions associated with waste being deposited across municipal or state boundaries?

Andrea Denny: I believe typically at the local government level that waste management is considered at the source of the waste generation. Alex, can you clarify that?

Alex Rammel (ICLEI Local Government for Sustainability): I was afraid someone was going to ask this one. This has been a perennial source of confusion, largely because it is a complicated issue. What I would suggest right now is that there are two important things that can be done about waste at a local government level. In conducting these inventories, a large portion of what I think is important to do is think about what set of data is going to be policy relevant. What are the outcomes? In the case of landfills there are two things. One is, if the local government has control over a municipal landfill or has ownership over a landfill that is within its jurisdictional borders, then one of the most effective things that can be done is cap it and install a methane recovery system that will destroy that methane that is coming off of that landfill. In those cases you want to count the methane that is coming from the landfill that is within the jurisdictional borders or that you have control over. In other cases where you are shipping your waste outside of the community, sometimes across state lines, the important thing that you have the capacity to do is to promote waste diversion and recycling. In those cases the important thing to do is look at what is going to happen with that waste, in some cases, several years after you throw it in the garbage can and it is sitting in a landfill somewhere producing methane. In those cases you want to count methane commitment, or the effects downstream of the decisions that were made within the community. The Clean Air Climate Protection Software tool has methodology built into it supporting both of those inventories.

Anne Choate: I've worked on WARM which is the source of some of those factors. If a community is getting into the details of their recycling strategy, you could always access the WARM model to look at the incremental benefit of, for example, adding some material to your recycling program.

Adam Brundage: Concerning the Clean Air and Climate Protection Software, will the software be updated to account for sequestration and trees?

Alex Rammel (ICLEI Local Government for Sustainability): To the extent that we are talking about a recycling program that diverts paper from the landfill using the coefficients that are embodied in the WARM model, it does account for that. There's no plan at this point to update our inventory methodology to include a comprehensive land use component, largely because of that 80/20 rule that Anne mentioned. In order to account for the benefits of, say, a street tree planting program, it would be important at the same time that you account for any debits from land clearing that is happening simultaneously. A basic accounting principle is that anytime you are allowing for a credit you also account for any debits occurring in the same sector. To that extent, we do not have a plan to come up with a comprehensive land use component to include in the software because to do it right would be extraordinarily complex at a local level. The incremental benefit you would get in terms of policy relevance and information would be fairly small.

Andrea Denny: It is time to wrap up. I don't want to take too much of your time, but I did want to thank everyone very much for participating. I hope it was useful, and I hope that you will find the remaining sessions in the series useful. In addition to these inventory webcasts, in January we are hoping to offer webcasts directed specifically to local governments to help more on the mitigation side, looking at some clean energy best practices. The best way to get information about that is to sign up for our listserv. If you go to the website that I've provided in the slides, you will find information about signing up for our listserv there.

Slide 27

Slide 25

I hope you found them useful and I hope to get feedback. I encourage you to email me at Denny.Andrea@epa.gov

Slide 27

Lauren Pederson: If you have not already sent an email saying you would like to attend the second session then you need to send an email to inventory101@icfi.com, but if you have already sent an email saying you want to attend you do not have to send another email.

Operator: Ladies and Gentlemen, that does conclude our conference call for today. We would like to thank you for your participation and ask you to please disconnect your lines. Have a great day, everyone.