Performance Analysis with RETScreen

—Transcript of a webinar offered by the Clean Energy Solutions Center on 15 February 2017—
For more information, see the clean energy policy trainings offered by the Solutions Center.

Webinar Panelists

Dinesh S. Parakh	RETScreen International
Kevin Bourque	RETScreen International
This Transcript	Because this transcript was created using transcription software, the content it contains might not represent precisely the audio content of the webinar. If you have questions about the content of the transcript, please contact us or refer to the actual webinar recording.

Stephanie Bechler	Hello, everyone. I'm Stephanie Bechler, with the National Renewable Energy Laboratory. And welcome to today's webinar, which is hosted by the Clean Energy Solutions Center, in partnership with CanmetENERGY, with the Government of Canada. Today's webinar is focused on the performance analysis module of RETScreen Experts. Before we begin, I'll quickly go over some of the webinar's features. For audio, you have two options. You may either listen through your computer or over your telephone. If you choose to listen through the computer, please select the mike and speakers option in the audio pane. Doing so will eliminate the possibility of any feedback or echo. If you choose to dial in over the phone, please select the telephone option and a box on the right hand side will display the phone number and audio PIN to dial in. If anyone is having technical difficulties, you can contact GoToWebinar's help desk at the number on the screen—(888) 259-3826.
	If you would like to ask a question during the webinar, and we encourage that you do, please use the question pane on the GoToWebinar toolbar. If you're having difficulties viewing any of the materials through the portal, you'll find a PDF copy of the presentations on cleanenergysolutions.org/training. And you can follow along as the speakers present. We will also have a recording of the presentations and demonstration on the Solutions Center's training page within a few days of the broadcast, and it will also be on the Solutions Center's YouTube channel, where you will find other informative webinars, as well as video interviews with thought leaders on clean energy policy topics. One important note of mention before we begin is that the Clean Energy Solutions Center does not endorse or recommend specific products or services. The information provided in this webinar is featured in the Solutions Center's resource library as one of many best practices resources reviewed and selected by technical experts.

Today's webinar agenda is centered around a presentation and demo from our guest panelists, Dinesh Parakh and Kevin Bourque, who have joined us to discuss RETScreen Experts. Now before we jump into the presentations, I'll provide a quick overview of the Solutions Center. Then, following the presentations, we'll have a Q&A session where the panelists will address questions submitted by you, the audience and at the end of the webinar, you'll be automatically prompted to fill out a brief survey. So we thank you in advance for taking a moment to respond.

The Solutions Center was launched in 2011 under the Clean Energy Ministerial, and the Clean Energy Ministerial is a high level global forum to promote policies and programs that advance clean energy technology, to share lessons learned and best practices, and to encourage the transition to a global clean energy economy. 24 countries and the European Commission are members, covering 90 per cent of clean energy investment, and 75 per cent of global greenhouse gas emissions. The Solutions Center is one of nine initiatives of the Clean Energy Ministerial. Other CEM initiatives include 21CPP and Global LEAP. All of the initiatives work towards the three overarching goals. One, to improve energy efficiency worldwide. Two, to enhance clean energy supply. And, three, to expand clean energy access.

This webinar is provided by the Clean Energy Solutions Center, which focuses on helping government policymakers design and adopt policies and programs that support the deployment of clean energy technologies. This is accomplished through support in crafting and implementing policies relating to energy access, no cost expert policy assistance, and peer to peer learning and training tools, such as this webinar. The Clean Energy Solutions Center is co-sponsored by the governments of Australia, Sweden, the United States, with in-kind support from the government of Mexico.

The Solutions Center has five primary goals. It serves as a clearinghouse of clean energy policy resources. It also serves to share policy best practices, data, and analysis tools specific to clean energy policies and programs. The Solutions Center delivers dynamic services that enable expert assistance, learning, and peer to peer sharing of experiences. We also foster dialogue on emerging policy issues and innovation around the globe. Lastly, the Solutions Center serves as a primary resource for project financing options and information to expand markets for clean energy. This finance technical assistance service of the Solutions Center was announced last year at COP21. Our primary audience is made up of energy policymakers and analysis from governments and technical organizations in all countries. But we also strive to engage with the private sector, NGOs, and civil society.

The Solutions Center is an international initiative that works with more than 35 international partners across a suite of different programs. Several of the partners are listed above, and include research organizations like IRENA and IEA. Programs like SE4ALL and regionally focused entities such as ECOWAS Center for Renewable Energy and Energy Efficiency. A marquee feature of the Solutions Center is our no-cost expert policy assistance, known as ask an expert. The ask an expert service matches policymakers with one of

the more than 50 global experts selected as authoritative leaders on specific energy finance and policy topics. For example, in the area of renewable energy policy, we're pleased to have Toby Couture from A3 Analytics serving as one of our experts. If you have a need for policy assistance in renewable energy, or any other clean energy sector, we encourage you to use this service. Again, this assistance is provided free of charge. If you have a question for one of our experts, please submit it through our simple online form at cleanenergysolutions.org/expert. We also invite you to spread the word about this service to those in your networks and organizations.

Now I'd like to provide a brief introduction for today's panelists. First up is Dinesh Parakh, who manages strategic partnerships, communications, business development, and training and capacity building for RETScreen International at the Natural Resources Canada's CanmetENERGY. Our second speaker today is Kevin Bourque, who is part of the development team of RETScreen Clean Energy Management Software. And with those brief introductions, I would like to welcome Dinesh to the webinar.

Dinesh S. Parakh   Thank you very much, Stephanie, can you hear me?

Stephanie Bechler   Yes, I can it sounds great.

Dinesh S. Parakh   Okay. All right. Thanks again. So good morning. Good afternoon. And good evening to all of you. Welcome to everyone from around the world, and thank you very much for making the effort to attend this webinar. This is the latest in a series of webinars on the RETScreen Clean Energy Management Software, provided as part of Canada's contribution to Solutions Center's ask an expert service. I am first going to provide a very brief overview of RETScreen International. And the performance analysis capabilities of RETScreen Expert. Following this, Kevin Bourque, who is a project engineer for RETScreen International, is going to do a live software demonstration of the performance analysis module of RETScreen Expert.

So before we get into performance analysis, I'd like to provide a quick introduction to RETScreen for those of you who may not be familiar with the software. RETScreen is a clean energy management software system for project feasibility and analysis and ongoing energy performance analysis. It is the world's leading clean energy management software. It handles energy efficiency, renewable energy and co-generation, available in 36 languages, covering two thirds of the world's population. RETScreen has over half a million users in every country and territory of the world, with over 50,000 new users being added every year. At least 800 universities and colleges use RETScreen for teaching and research. And RETScreen has been responsible for well over $8 billion in direct user savings since 1998.

Furthermore, RETScreen is developed by the government of Canada with the contribution of numerous partners, including the Renewable Energy and Energy Efficiency Partnership, based in Vienna, Ontario's Independent Electricity System Operator, NASA, the United Nations Environment Program, and the Global Environment Facility. So RETScreen Expert is the

next generation of the RETScreen software, and that's what we're going to be showing today. This was released to the public in September of 2016.

Performance analysis in RETScreen Expert allows managers to very easily measure and verify the actual performance of their facilities. It is also an excellent tool to help find additional energy savings or production opportunities. So RETScreen Plus was the previous software for performance analysis. RETScreen Expert has many new features and enhancements over and above what was in RETScreen Plus. So that's a lot of text. I'm not going to read through all of that. As Stephanie said, this presentation will be made available later. But I do want to highlight a couple of the new performance analysis features in RETScreen Expert, including the fact that there are enhanced regression analysis and statistics for the International Performance Measurement and Verification Protocol, or IPMVP, as well as for ISO 50001, and the US Department of Energy's Superior Energy Performance standards.

Performance analysis in Expert is also fully integrated with RETScreen Expert's Benchmark and Portfolio Analysis modules. So everything can now be used on one platform, and this makes this very powerful. And these performance analysis tools are now directly linked to NASA's near real-time weather database. So Kevin is going to be showing a number of these features during the software demonstration.

This final slide highlights some of the important markets where RETScreen Expert's performance analysis capabilities are already being used. In some cases, quite extensively. So for example here we have markets for energy management in industry, universities and colleges, government buildings, and school boards. The many more refers to additional markets that are using RETScreen Expert's performance analysis, such as hospitals, municipalities, utilities, engineering firms, etcetera. Anyways, the best way to understand how to use RETScreen Expert for comprehensive performance analysis is to actually see it in action. So, with that, I am now going to hand over the controls to my colleague, Kevin, who is going to conduct the live software demonstration. Afterwards, there will be time for question and answers, and, as Stephanie mentioned, you can submit your questions through the question pane of the webinar. And just before I hand over, wanted to let you know that you can download the software from our website at www.RETScreen.net. You see that in the corner of the slide there. So on to you, Kevin.

Kevin Bourque   Thank you very much, Dinesh. Can you hear me okay?

Dinesh S. Parakh   I can hear you, thank you. And I can see your screen.

Kevin Bourque   Okay, great. So thank you everyone for joining. Good morning, good afternoon, good evening to everyone. And thank you so much for joining us. I think this is going to be a very useful session. And I also want to thank the Solutions Center for hosting us. This is a very good service that they provide for everyone. And I do want to thank them for hosting this event. So as Dinesh mentioned, I'm going to be spending the next little while directly in the software, and we're going to be doing a project together. And we're going to be focusing on RETScreen's performance analysis module, as Dinesh

mentioned. RETScreen's performance analysis module lets us monitor, analyze, and report on key energy performance data for facility operators, managers, and senior decision makers. As Dinesh mentioned, it can be used worldwide, globally, to track a facility's actual energy performance, and compare that to its predicted performance. So that's something we're going to be looking at, is how to create these predictions and compare that to what's actually happening on the ground.

Today we're going to focus on how to do a measurement and verification project, sometimes called M&V. We're going to be able to get an idea of the actual energy savings achieved by a clean energy project. This is a very important step in the energy decision chain. RETScreen's M&V tools can be used with the IPMVP, as Dinesh mentioned, and other internationally recognized procedures and protocols and standards. And moreover M&V allows us to compare our predicted energy consumption with the actual fuel consumption. And it lets—this lets you determine whether your consumption or actually production as well is higher or lower than what you would have predicted. You can then calculate the difference between your prediction and the actual consumption. And that difference is savings, both in fuel and money.

You can also use RETScreen Expert to implement energy monitoring targeting and reporting, or sometimes called MT&R, if you want, though that won't be the focus today. So here in the software on the home page, you'll see the circle in the middle. We're going to be focusing on the top left quadrant, where it says performance. This circle is the project lifecycle flowchart. And it shows the different types of project you can do with RETScreen. The other parts of the circle, specifically the bottom half, the feasibility analysis part, was—we discussed that in a previous webinar with Solutions Center. And it's available on their website, as well as on the YouTube channel. And also we link to it directly from within the RETScreen software on the help page. So if ever you're in RETScreen and you need to—would like to go over these webinars, you can do it directly from within the software.

So today we're going to be looking at a commercial building, and looking at the energy system for that, and [inaudible] the performance of it. And so RETScreen can be used to track the energy performance of commercial institutional buildings. So today we're looking at a small office, but it also could be a school, a hotel, a hospital, a clinic. You can also look at residential buildings, so single family homes, or multi-unit residential buildings, and see the energy performance for those—even agricultural facilities. So here's a picture of a greenhouse on my screen, and you could look at say the fuel consumption and electricity consumption and compare that to the output or the climate data, the weather data for that greenhouse.

And moving up here to industrial facilities, you can even look at factories and compare the output of what that factory is manufacturing with the energy consumption, the energy input, and see the relationships and see the performance and optimize there. So I've mentioned energy consumption, but we can also look at the other side of that coin, and that's energy production.

So you can also do performance analysis on power plants. For example if you have a wind farm, or a PV plant—photovoltaic plant—you can look at the energy output of that, and compare the performance to see if that—what you would be expecting. On the right hand side here, we have the different features in RETScreen. We have the user manual, which I would encourage you to use as much as you can when you're in the software. There's thousands of pages that have been carefully written with tables and charts and graphs and explanations. '

And a product database, which has thousands of products and lights and motors and pumps and wind turbines and PV panels—a new and updated cost database that's in RETScreen Expert—our benchmark database. And then our climate database, which we'll be looking at in a few moments, and our weather data, which we're going to be using extensively a little later on. Just bring your attention to the left column—the Virtual Energy Analyzer. We won't be discussing that today. That was discussed in another webinar. And the portfolio analysis is another new thing in RETScreen Expert, and that will be dealt with in another webinar as well. So tune in and I encourage you to sign up for that.

So, today, I'm going to jump right into performance analysis with RETScreen Expert. And today we're going to look at a small office building in British Columbia, Canada. They've collected their gas bills for a few years, and they've installed a new heating system. They've told us that happened in March 2007. And they want to know if they're getting the savings they were expecting. About 6,000 square feet, about 600 square meters, and they've given us that data, and I'm going to work with you now, live, and see how we can analyze that data. So when you get to RETScreen on this homepage, to start a performance analysis project, you'll click on performance here in the middle. And what will happen is RETScreen will load up the—set up the model to be ready for a performance analysis. And you can tell that you're able to do a performance analysis study by the tabs at the top.

You have location and facility. These are standard tabs in all the RETScreen analysis types. But specifically we have data, analytics, and report. And data and analytics are specific to performance analysis. So the first thing RETScreen does is bring us to the location page. The location page is where we're going to describe where our project is. We need a location to get the climate data and specifically the weather data for where our project is. I'm going to click here on this icon in the menu, select climate data location. And in a second or two, a map will show up on the screen. And this map is dynamic. You can zoom in or out and move all around. And you'll see different points on this map. The red points are ground stations, and the blue points are NASA stations. So these are climate data locations. This is where we have climate data, long term climate averages. And the red is for ground stations. And often they're airports, or climate facilities, measuring locations. And the NASA stations are reconstructed stations based on NASA satellite data.

And so our project, as I said, is in a town in British Columbia called Burns Lake. So I'm just going to use this search feature here and type in Burns Lake, BC. And using the search feature of the map, we'll be brought to the first available place in Burns Lake. So if I zoom in to the Burns Lake, we can see that we have a standard internet map. And you can drag the icon for the facility location to where your facility is. I know that my facility down here at the corner of these two streets. And you can actually switch into the satellite mode, and actually put the icon right on the roof of your building, which I've done here. RETScreen has automatically selected the closest climate data location. You can see that on the right hand side of the screen. You'll see there's a blue icon beside the Burns Lake climate data location. And you can change that if you want by double clicking on the climate station that you want, or when you're happy with it, you can click on paste data, and the location page is now updated with the climate data location and the facility location that we've selected.

So at top we have a map. You can zoom into that map if you need to get more detail and show the relationship from where your project is to where the climate data location is. We have the climate data location, the latitude longitude and some information about that station—and the facility location. And below we have the actual climate data. We have air temperature and humidity and precipitation and heating degree days and cooling degree days and so forth. If I go a little bit further below, we actually have the ability to start looking at some of this data—very quickly. So here we have a graph of daily solar radiation and air temperature. But we could look up, for example, precipitation, or heating degree days, and see the relationship of when the heating season is with the temperatures.

So once you're done with selecting where your project is, and defining that, the next thing you want to do is describe what your project is, and what your project is doing. To do that, we use the next tab in RETScreen, which is the facility page. So I'll click on the facility page, and wait a moment for the webinar to catch up. The facility page is we're going to describe what our project is. It allows you to put some descriptive information about your project, and some of it is used for reference, and some of it is used in different parts of the software, such as the report and portfolio analysis. So here in facility type I'm going to select commercial institutional. You'll see here repeated the facility types I mentioned on the home page. So we're doing a commercial institutional building, and an office building, and you'll see as I start changing this that the model is already starting to adapt and pick out different information about this facility. So we have a photo of the right, which you can replace with a photo of your facility. And I'm starting to type in some descriptive information about our project.

You'll see here, if you click on this little icon with the person on it, you can get even more detailed information, which can be used later on in the—just as a reference. And it's good practice to start entering this data. Below the facility information, we have the benchmark section. And so the first thing we ask you to do is to put in the facility size. So I mentioned before that this small office is 600 square meters. And right away, using that, RETScreen is

7

able to, at the bottom of the screen, calculate the base case and proposed case energy consumption, based on base case and a proposed case set by the target. These benchmarks are taken from a RETScreen benchmark database, but of course you can customize them as you see fit. I'll show a way a little later that maybe you can use the performance analysis actual data to set your base case, and your proposed case.

You can also change units here to be the units of your facility, of your specific fuel, and customize this as you want. So now that we've sort of set up our project, we know where and what it is, the next thing we're going to do is start getting our information, getting our data into the project. So I'm going to click on the data tab on the—in the top of the software. And now we're getting into the details of starting to do a performance analysis. So the first thing we need to do is we need to collect the data, and to prepare it to be the output needed for the different models and regressions and relationships we'll be looking at later. You can think of this page as a database of sorts. When you first start out, it'll be blank, just as it is now. And we really should follow the steps in the menu at the top.

And the steps, if you look at them, is to first gather the energy consumption or production data. And then we're going to gather the drivers of that energy production or consumption. The last steps over here are to manipulate and standardize and harmonize that data—so for further analysis. And the last step here is to summarize that, so you can start zooming out, if you will and look at sort of the big picture. So the first thing I'm going to do is we're going to insert our consumption data. You can see that the data we have, we can import—we can look at electricity consumption data. So you can look at your electric bill. We can look at fuel consumption. You can look at district energy as well. So if you have district energy, heating systems, through either steam or hot water, or district cooling system, you can use the information from that. You can also look at non-energy consumption. So you can look at water consumption, and look at the things that might influence the consumption of water in your building, or your industrial process, for example, if you're looking at a factory.

Also we can look at electricity production, so not just the consumption but the production, if we have say a wind farm, and want to see if we're getting the output we want from that. And you can also import a user defined table. So if you want to just import your own data and use RETScreen analytics and data manipulation tools, you can do that, and those are very powerful. So for now, I'm going to stick with the fuel consumption. So I'll click on fuel consumption here. And you'll see that we're given the option of many different fuel types. And for each fuel type, we have different units. So in my case, in this British Columbia small office, they heat with natural gas, and they're billed in gigajoules.

So I click on fuel consumption, natural gas, gigajoules. And when I click that, RETScreen instantly creates a data table, a blank data table, where I can start entering that information. So I can start entering the information right away if I want by clicking here and typing in my data manually. Or when you start

with a project like this, you often will have data that's been collected or gathered. So one of the new things in RETScreen Expert that if you have access to green button data, you can import that. So if your utility provides you with your either electrical or gas consumption data in a green button format, you can download it from them and import that directly into RETScreen. In our case, they have given us the file in a CSV file. And RETScreen allows you to import both CSV and Excel files. So I'm going to select the file here, and click on open, and the next dialogue that we see, we're going to spend a minute on, just because it's important to understand how it works.

This is the import file dialogue you get when you open RETScreen. And what RETScreen has done is it's opened that data, and scanned it, and tried to intelligently determine what is what, and what the columns are. So you'll see here that in this blue section in the middle of this dialogue, the first column, we have the header information. RETScreen is able to determine the header. And the data underneath that. RETScreen is also able to scan the titles of that header data, and take a guess at what's contained in them. In this case, it's guessed correctly. So we're able to have the year in one column, the month in the next, and the day in the third column. We have in this fourth column here the fuel consumption in gigajoules, and RETScreen was able to find that column as well.

You could also, if you want, have cost data. You could have a column with text in it that has comments that describe what's happening on each of those rows. You can also import a user-defined column. So you may have other information that you want to bring into RETScreen and use that as a user-defined column. There's also this do not import. So sometimes we'll get files that have many, many columns, many of which are intermediate calculations or not necessary, or perhaps RETScreen wasn't able to identify what that was. So you may want to say do not import.

So these labels are correct. We're going to leave them here. Now the other thing is that these dates represent the date that this fuel consumption here was completed. So these are the end dates of this fuel consumption. And so we also need to specify if this is the end date for this first, first item here, we need to say, well, when did that consumption period start? So right at top, RETScreen asks, what the begin date—where was the first date where this consumption started for this first line, for this file? And it will make a guess, and I'll leave that data as is. When you're done with that, you click on the okay button, and RETScreen will import that immediately into the software. And you'll see now we have the begin date and the end date for each of these consumption periods. RETScreen will calculate the duration between those dates and have the fuel consumption for that period. And you'll see that it's correctly imported the units.

Another thing we might want to do on a table like this is we might want to say, well, one thing you'll notice is the duration between these dates is all different. We go from 30 to 36, down to some periods which are quite a bit shorter, 27, 27, and so on. So how much fuel are we consuming per day for

each of these? And so one thing that we have found useful to let people know about in RETScreen is that now that this table is here, it isn't static. You can continue editing and adding to it. But you can also import or insert new things. So I'm going to click in the menu here, on insert column. I'm going to call this column fuel consumption—consumption per day. And the units are going to be gigajoules per day. And so now that I have this insert column dialogue up, you'll see I can create a calculated column. So in my case, I'm going to have—I'm going to calculate fuel consumption per duration. And you'll see here at the bottom we have a description of the formula of what we're going to calculate.

When I'm happy with that, I'm going to click on the okay button. And RETScreen again will instantly create a calculated column. So this we've found is useful to know how to do. And we have some good information here, and a little peek into the—how our fuel consumption is behaving. The next thing I'm going to do, I'm going to skip now to step two, where we're going to look at what is the driver of this fuel consumption, what is influencing this natural gas consumption. You'll see we can look at the occupancy. So for certain building types, say hotels, or office buildings, the occupancy, how many people are in the building might have an impact on the fuel consumption. You can also look at production level. If you're looking at manufacturing or industrial facilities, the output might be something important that can impact the fuel consumption. In our case we're going to stick to weather as being our primary driver.

So I'll click on the weather button. And once again, instantly RETScreen will create a weather table. You'll see here that there's all sorts of different columns you can import. Once again, you can enter the data manually, or you can import your own. But in this case, we're going to use the NASA download satellite data. So I'll click on the NASA download button. And I'm going to put in my dates. And when you click okay, what RETScreen will do is go into the NASA website, and download that data, for the dates selected. And it'll do that for each of these, data, each of these weather measures. So we have air temperature, the average air temperature, the minimum and maximum air temperature, the relative humidity, the precipitation—how rainy it is. The daily solar radiation. So if you're doing a solar project, you'll need that. The pressure, the wind speed, and the earth temperature. So once you've downloaded the data, you—it's in this table. So we actually now have 12 years of data that I've just downloaded live into this project here.

And it's actually a little too much. We don't need all of this. One thing you can do in RETScreen as well, that I'll show, is you can hide some of these columns. If I go again in the options section and click on show hide column, you get this dialogue where you can hide some of it, and simplify the view a little bit. So I'm going to stick just to the average air temperature, and really just leave that on screen. That's another useful thing that you can do in RETScreen.

The next thing we need to do is when you're comparing the energy consumption with weather data, we often don't use temperature, we use

something called heating degree days. So we finished step one, step two, and now I'm going to go to step three, which is labeled data processing. And I'm going to click on degree days here. If you don't know what degree days are, I mentioned the help at the beginning, and that's where you can click on these help buttons. As I said, they're peppered throughout the software. If you click on the help button, you'll get RETScreen's help manual that shows up. That will describe to you what heating degree days are, and how to use them in RETScreen. I'm going to close that now. I'm going to just leave the options right now on the screen as they are, for calculating heating degree days. And I'm going to click on okay. Once again, RETScreen instantly calculates the heating degree days, and creates a column for that.

The next thing I'm going to do is that these heating degree days, I need to associate with the fuel consumption that I have. So you'll see in this data here that for every day, I have a temperature, and a heating degree day. For every single day, from 2005 until the end date that I downloaded the data. So I need to now take these heating degree days and aggregate them in a way to associate them with my natural gas consumption. I'm going to go to my natural gas table right now. And you'll see as we mentioned before the duration between these natural gas consumption periods is always—it's different. Some are 30, some are 36, some are 31, etcetera. So we need to merge the heating degree data into this. And the way we do that is we click on this button, again, in the data processing, step three. Click on the merge button.

When you click on the merge button, you get a dialogue that asks you where you want the data to go, the destination table. We want to put it in this natural gas table. And what data you want to bring into it. What is the source data? So we want to take the heating degree day data that we just calculated from the weather table, and merge it into the natural gas table. So I'll select that from the dropdown menus, click on okay, and RETScreen will aggregate and correctly sum for each of these periods, which are all different, the correct heating degree days. If you've ever tried to do this on your own in a spreadsheet, this is very tedious and very error prone, and you inevitably need to do it at least three or four times before you get it right—you think. So this is very valuable in its own right.

Another thing that I will show here in the data processing step is we can also do—on the filter, we can also do different groups. So we can group this data now by year, by quarter, on a monthly basis, weekly basis, or some user-defined, say a season or semester. For example, if I click on year, I will take this data now. RETScreen asks if I'm sure I want to group it by year, and whether I want a calendar or fiscal year. I'll leave it to a calendar year. And when I click okay, RETScreen will now summarize this natural gas consumption, merged with the average fuel consumption per day, and the total heating degree days, for each of those years. So we can see for 2006 what our fuel consumption was, for 2007, and so on.

So this is a good way to start looking into your data. The last thing I'm going to do before we move to the next step is also just briefly mention a new tool

here in RETScreen called the event log. So as you're building evolves and moves, you're going to have things happen to your building. Might have an expansion, or, in our case, we installed a new heating system. So by typing in what your heating—what's happening to your building—install new heating system on this day—you're able to create a log, what we call an event log of your building. And I'll show later how this can help in helping to identify things that happen to your building. Now we have some columns here, but you can also import your—insert your own. So, for example, if you want to have a log of the different alerts or alarms, the different history, if things were implemented or not, who did it, whether it was due to an occupant complaint, or what not, there's lots of different options that you can have here to really customize your event log as you need it.

So we've collected our data. We've now merged it and harmonized it and standardized it. Now this data in the natural gas table, we now want to start forming relationships on it. And that's the next step in the analytics tab. So I'm going to click on the analytics tab in the software. And analytics is where we're going to start to understand the data and explore the different relationships with it. Again in the menu we're going to follow the steps—that one, two, three. The step one where it says graph allows us to create a dashboard, where we're going to be able to look at the data, visualize it in different ways. Step two, we can establish a baseline where we're going to be able to form a formal relationship between that data. Step three, and onwards, will allow us to dig deeper and explore the data a little bit more.

The first thing I'm going to do is click on graph. And you'll see the different types of graphs we can create. We can create an annual bar graph—so year by year, look at various things in our data. So for example fuel consumption. You can look at that also on a quarterly basis. Or even a monthly basis. You can select a couple of years and look at the monthly consumption—compare, say, January of one year to January of another year. You can also look at bar and pie charts to look at the relationship and the ratio of different things, and how they sum together. You can also plot things on a time series graph, and look at how things change and evolve over time. We can also create a climate data graph, and look at climate—so the long term averages—versus weather, or the average weather. We can also create a moving graph. So a moving graph would be for example you can create what they call a rolling average or running total. And if you have different types of fuel, you can stack those on top of each other.

So if we have electricity and gas, or other fuels, you can get the total energy consumption and harmonize the units, looking consistently across fuels. I'm going to create an annual bar graph with you now. So if I click here on annual bar graph, I get this dialogue. I'm going to spend a couple of minutes in this dialogue, because you're going to be—this will come up several times, and it's good to get familiar with it. So the first thing on the top we're asked for the name of the bar graph. I'm going to keep it as annual bar graph. Next, on the left, we're asked to what we want to graph, when we want to graph, and for how long. So what we want to graph for now, we're going to graph our natural gas from our natural gas table, we're going to graph the fuel

consumption. What—when we want to graph, we're going to graph is on a calendar year, from January to December. We also have added now, as I mentioned before, the fiscal year ability.

So for example if your fiscal year starts on April 1, you can look from April to April, or April to March. Then we'll ask how long you want to look at that data. So here we can look at the last X number of years, or, if you want, you can look at a specific subset of years. So, for example, if I wanted to only look at the data starting in 2007 onwards, or I can also set an end date, so from say 2007 to 2010, I'm only interested in those three years, you can do that. For our purposes, I'm going to look at the last seven years. I'm going to type last seven. And I'm going to click okay.

RETScreen now will graph that data. At the top of the screen, you'll get the graph, and at the bottom of the screen you get the table and the information that's used to create that graph. That's a pattern used throughout the analytics section in RETScreen. The graph or chart is always on top, and the data used to construct that chart is on the bottom. You can see here that in 2006 we had quite a lot of natural gas fuel consumption. And we changed that boiler in 2007, in the spring. And you can see in 2007, sure enough, there was a reduction. And that reduction was carried through to the subsequent years, 2008, 2009. So we can tell at a first glance we have saved energy consumption, fuel consumption. How notice that we don't know exactly why. Perhaps the years of 2008 and 2009 were particularly warm, and the heating system wouldn't have gone on much anyways.

So we're able to start qualifying our energy savings, but not necessarily quantifying them rigorously yet. This hides, if you will, any energy efficiency measure, because we don't have a relationship with the energy driver. We're just looking at the energy use over time. Also, note that RETScreen is quite careful, if we don't have the data for a full year, to put a label to alert that to you. For example, in the first year, 2005, and the last year, 2011, we don't have all the data, and so far that says partial data. So that bar isn't fully constructed yet, it doesn't cover the full year of 2005 or 2011.

Once you have a graph, you may want to customize it. So I'm going to click on format graph in the menu, and you get the—you can get the table up again. So I'm just going to quickly describe some of the things on the right hand side. So we have our main graph, and we can overlay things onto it, if we want. So if I want, I could overlay, for example, the heating degree days, not forming a regression or formal relationship, but just visually seeing what the relationship between the heating degree days and the fuel consumption would be. I can also, if I want, overlay the benchmark data. So the benchmark data that we looked at briefly on the facility page, I can overlay that. Now you can see here, I can type in my own information, but there's also this button to copy from the facility page. So if I click on copy from facility, the information from the facility page is copied over, and those values are here. The last thing I can do, if I want, is highlight or isolate one of these years to be a reference year. And showcase that somehow.

So for now I'm going to—let's just leave the benchmark from the facility page and see what that looks like. So if I click okay, you'll see that overlaid on the graph now are some lines, and we have the benchmark, the baseline, and the target. And, once again, we've added a column to the table, because it's graphed above. So we can now see the fuel consumption per square meter for each of the years that's been added to the table, and then it's graphed in this moving line here.

The next thing I want to do is create another graph. If I click on graph here, and go to moving graph, if I click on the line graph, we can get a view of how things change over time. So I'm going to call this—I'm going to leave it as baseline. I'm going to look at my natural gas fuel consumption, and I'm going to sum it, and I'm going to sum it over the previous 12 periods. So I'm getting a running total of 12 periods. And you'll see this interesting graph shows up, where we can see there's a clear decline in the sum of the previous 12 months. So the data once again is in the table below. And you can see we start summing the data after the first 12, and this is what's graphed on this chart above.

So we could continue creating different graphs, but let's move on to form a relationship and start describing it quantitatively. So we've looked at qualitatively looking at our data. Let's put numbers to it. So the way we do that is step two, to establish a baseline. So I'm going to click on establish baseline. And we have the option to create a regression analysis. So I'm going to click that. So when we have this regression analysis, the first thing I'm going to do, I'm just going to quickly throw all the data into a regression. And I'm going to look at the fuel consumption as the dependent variable, and the driver, or independent variable, is my heating degree days. So I'm going to look at all the years, and look at the relationship—or I'm going to create a relationship between the fuel consumption, and the heating degree days. When I click on okay, RETScreen very quickly creates a regression.

So you'll see here that we have this relationship, as described by this straight line here. So this is a linear equation. And there's a lot of dots above, and there's a lot of dots below, and the graph is heating degree days per—by fuel consumption. So this isn't a great regression, because you'll see the dots vary quite widely away from this line. But what it allows us to do is at least see where our data is. If I go to the time series tab, you'll see that you can see the relationship over time. So the blue line is the fuel consumption, and the green line is the heating degree days. And sometimes they move in lockstep, quite closely, and other times they diverge quite a bit.

Again, if I move to the line tab of the regression analysis, now we're actually seeing what the equation predicts, this prediction of this regression. And you can see once again that sometimes the equation predicts it well, and sometimes it doesn't. Sometimes they diverge quite a bit. The blue line here is the prediction. So this is what the equation says it should be. And the green line is what the actual is, for this regression period. Sometimes it overestimates, and sometimes it underestimates.

The reason we're doing this is I'm going to skip right away to the next step, which is to create a cumulative sum. And I'm going to create the cumulative sum right away. And without describing it quite yet, I'm going to come back to this in a moment, one thing I want to convey is that the cu-sum, when the slop changes, when the slope is positive, it means the energy consumption is higher than what we predicted, compared to the baseline. And if the slope is negative, if it's going downwards, the energy consumption is lower than what we predicted. So you'll see here, just as we saw in some of those graphs, sometimes we under-predict, and sometimes we over-predict. And importantly a change in the cu-sum graph slope tells us that a change occurred in the energy performance in the system. So we can see that this graph really has two parts—a part that's under-predicting, and another part that's over-predicting. And where that change is tells us that something happened to that, to the system.

So let's form a relationship now at—for just this first part here. So if we form a relationship, just this first part, you'll notice, if you look at the dates, it pretty much happened in the year 2006. So let's now go and create a regression just for this 2006. The way you would do that is go back to the regression data here, and see here—I skipped over it before, but we have a begin date. So when do you want to start your regression, and how much data do you want to include in that relationship? So if I type in 2006 here, and one year, I'm going to get this relationship. So I've gone ahead and created a different relationship, a different regression, where now I'm looking at one year, and I'm only forming that relationship on the data from 2006.

You'll see now that there's many fewer points on this linear relationship, this linear equation, and they're scattered much less further from that line. This tells us that this relationship is better, and quantitatively we can see down here below we have the R-squared value, which is over 0.96, which is very good. You can also see the equation that we're using, Y is equal to AX+B. That's a linear equation. So RETScreen will automatically apply a linear equation. But if you want a different relationship, a different equation, you can click on select equation and you'll see here that RETScreen has many different equations that you can select from the box—polynomial and logarithmic and what not.

I'm not also going to go back to the time series tab. And you'll see here that the fuel consumption, the heating degree days, move much more in lockstep. The relationship is much better. Similarly if I go to the line chart, you'll see that once again we're not consistently over-predicting, and we're not consistently under-predicting. The relationship is much better. Now I'm going to create a cu-sum chart just like we did before, with this new relationship, with this new equation, with this new regression. And we'll see here, now we're going to be able to tell some interesting information about our system. So now—I never actually said what a cu-sum is. A cu-sum is the difference between the actual and predicted values for each period, and then that difference is added together, creating a running total. This is called a cumulative sum, or cu-sum, of the differences. It's also sometimes called a cumulative total savings, and it represents all the reduction in energy

consumption compared to what it would have been if it would have acted according to the baseline amount.

So this chart helps you calculate the savings so far, and shows any changes in energy performance. Remember, a change in slope indicates a change in the system. By definition, the cumulative sum of differences is zero at the end of the baseline period. And we'll see right here that we hit a number of zero. So this is the regression. And sure enough there's a change of slope, and we start going down. That means that we're consuming less energy than we would have predicted. And the difference between that prediction and what we actually do is kept added, since it's a negative difference. We keep adding a negative number, and it gets a larger negative number. And once again, the table below shows what's being graphed in the chart above. And you'll see that this cu-sum column here, the before last column, keeps getting bigger. And we have here in the last value the total fuel savings to date for that system.

Now, remember, when I was in the data section, we had the—we took the time to add the event tracker. So I'm going to add the event tracker to this graph. You'll see I installed a new heating system. If I click okay, you'll see that that lines up exactly with when we changed the slope in our cu-sum graph. So this is a good way to label what's happening in your charts. The next thing I'm going to do quickly is go to the measurements and verification chart, the M&V chart, and you'll see here that the M&V chart, we see very clearly everything before this dark line is what our prediction is, and everything after that we get to see the prediction versus the actual amount. With RETScreen, we can also have a commissioning date, which is labeled here. Also important in M&V is to correctly—is to accurately describe whether the data is being included or not in the regression. So we have a column here that says included, yes or no.

The last thing we're going to do now is once we have this analysis done, we can now create a report. And by clicking on the report tab at top, RETScreen automatically creates several different types of reports for you. Most of the report writing is automatic. And you can see here that you can customize it at will. You can add pages, and text, and images, and you can customize it however you want. You can also see that the report itself is multi-lingual, as RETScreen is. So the whole RETScreen software is available, and translated into 36 languages. And that includes the reports section as well. So let's suppose that instead of this project being in British Columbia, it was based for a client in China. I can click on language, Chinese, and not only is the whole software, all the analysis, the data tables, the climate data, but eh report itself is translated into these 36 languages.

The other thing you can do with RETScreen is this report you may now want to send it to the colleagues or facility manager or your client. So you can send an email, you can send it as a PDF. This report, you can send just the worksheet, so what we were looking at, the data analytics. You can also send the figures itself, just the images. Or the RETScreen file by email, so they can continue working with it. You can also do the same to print or to exports. You

can export to PDF. You can also export just all the graphs if you want to create your own chart or PowerPoint presentation or use it for your own reporting purposes. So that closes the circle. And I'm now going to hand it back over to Dinesh for some Q&A so we can answer some of your questions.

Dinesh S. Parakh   Great. Thank you, Kevin. That was excellent. Very informative. We have some questions that have come in. So I will start with the first one. So the first question is, Kevin—the heating degree day was referred to as 16 degrees Celsius. Based on the facility's actual space set point, can this be changed to a different value, say, 20 degrees Celsius?

Kevin Bourque   Absolutely. Just to make sure, can you all still hear me?

Dinesh S. Parakh   Yes, I can hear you, Kevin.

Kevin Bourque   Okay, good. Absolutely. Yes. So the heating degree days can be changed as you wish. And you can actually have multiple heating degree days on the same table. So here I have 16 degrees, but if I wanted, I could put 20 degrees. And RETScreen would calculate the 20 degree heating degree days. So you could have multiple, and see which performs better. And moreover, when you're creating your relationship, in the regression, if I move to the analytics section, if I go to my regression, you'll see here in the options we actually have an optimized reference temperature. So for the purposes of this webinar, I picked 16, but if you wanted, you could actually optimize that very carefully. So what you can do is you can put in a minimum and maximum and a step, and what RETScreen will do is create many, many, many regressions, and pick the best one for your—for that specific regression.

So we'll see here, I've just optimized the temperature. And using this degree day optimizer. And it actually says the best regression, the best R value that I get, is if I use a set point of 17. And so if I click okay, what RETScreen will do is create that base temperature of 17, and create a regression for it. So, yes, you can change it, and RETScreen has quite powerful tools to actually optimize that for you.

Dinesh S. Parakh   Thanks, Kevin. The next question is—what is the accuracy of the data, and did you test it for some real cases to compare the results to real figures?

Kevin Bourque   So this is—when doing performance analysis, we like to say garbage in, garbage out. This is your data. So it's up to you to make sure that the data you're putting into RETScreen is accurate. Especially when it comes to your consumption data. So your electricity consumption or fuel consumption data. Sometimes there's some massaging that needs to be done. But generally if you're taking it off of your electricity bills or fuel bills, you need to make sure you're actually looking at the dates for the consumption of the data, not the billing dates. So that's important, and that's a source of error sometimes that people are not aware of. In terms of the weather data, yes, the NASA data is accurate and vetted worldwide and used by millions of people. If you're using your own data, again, you have to be careful. So the data question is more— you need to be confident of the data you're importing. If you're using the

	NASA downloads, NASA satellite data for weather, that of course is very accurate, but the other things are up to you.
Dinesh S. Parakh	All right. Next question, Kevin, is where can we get an example of this project that you just showed?
Kevin Bourque	Okay. Actually everything I showed you today you can follow along. So once this webinar is on [YouTube](#), if you want, you can follow along by going to open, and if you go to open, you'll see this tab, case studies and template. Here we actually have dozens and dozens of, well, case studies and templates. Case studies are actual real projects, different places in the world. And templates are—will set up RETScreen for that type of analysis for you, with realistic numbers, and then you go in and change them. For example, this performance analysis project I just opened with you is labeled here. It's called the Office Building—Office—Small—Space Heating—Energy Efficient. And if you actually click on this hyperlink on the left column here that says template, you actually get in the help manual a description of what we asked you to do.
	So this can be used in a classroom setting, or for own personal training and personal development, professional development. What a good exercise to do, a good practice, is to see what we're asking you to do, and try to do it on your own, and then compare that to the template. And this applies for all of these case studies and templates. While I'm on this page, I'll also notice that when you're working in RETScreen and you save your project, this is also how you get to them, by going to open my file. You can also save projects as templates. So you can—if you're re-using many different values or specific equipment or settings, you can set those—or locations—you can set those and save your project as a template. Then when you open a new project, and you open it from that template, all your defaults are set, if you will.
Dinesh S. Parakh	Great. Thanks, Kevin. The next question is you mentioned quarterly and fiscal year reporting. Where can we do that?
Kevin Bourque	Yes. This is something new in RETScreen Expert compared to the previous version. So if you go to data, I briefly went over filter here. So if you go to data, filter, you can filter by—we looked at year. You can also look at the fiscal year. For example, if your fiscal year starts on April 1, then RETScreen will calculate—will group that by fiscal year. The other thing is if you—you can also group by quarter. So this is the—another option here, you can group by quarter. This option also appears in different places in the analytics section. So let's specifically look at let's say the annual bar graph. If I go to— or say the quarterly graph. I can look at a quarterly graph, and have even different fiscal quarters. Say, again, starting March 1, and looking at different fiscal quarters, we can graph those, effectively that way as well. So this is sort of throughout the software the ability to look at fiscal year and quarters and look at graphs. So you'll see here the graph will identify Q1, Q2, Q3, Q4 ,etcetera.

Dinesh S. Parakh	All right. The next question should be a quick one. Does RETScreen need to have internet access to get data from the web, or does it deliver data to some kind of central server?
Kevin Bourque	So if you're downloading the data from NASA, yes, you do need an internet connection. However, once you've downloaded it once, RETScreen will keep that on your local computer. We won't save that on any servers. So that you can continue using that even if you don't have internet access. But of course if you want to update it, you do need internet access. The NASA data is hosted on a secure NASA website. And so that's the connection there. The other internet connection is if you want to use the mapping facilities. So on the location sheet, remember we opened that climate map. Climate data location map with all the points. If you want to use that, you do have to be connected to the internet, because we're using Bing Maps, which is an online mapping service.
Dinesh S. Parakh	All right. Thanks, Kevin. The next question here is—are there any other kinds of regressions you could make, and also how does RETScreen know if it's a good regression? Are there statistics?
Kevin Bourque	Yes. So the answer to that is yes, you can. So going to the analytics section again, I'm going to go in one of my regressions here. And so yes, you can have different regressions. So I quickly showed the different equations that you can have. So if I click on select equation, we have many, many, many different regression [inaudible] that you can use. And they're all ranked according to different statistical metrics. You can also—I'm just looking here at one factor of influence, but you can also do multivariable analysis. So we only are looking here at heating degree days. But if we did have heating degree days and, say, occupancy, you can run multiple factors of influence, and RETScreen will use a multivariate analysis. And then of course select the appropriate equation.

Now, once you do—once you have selected a regression, the measure of how good that regression is depends on the tools you want to use. I skipped over this details pane here in the regression during the presentation. You'll see here now that I'm on it, at the top we have the regression equation. We tell you explicitly what the dependent variable is, and what the independent variable is. On the right hand side we have the coefficients of that regression, so what the values of them are [inaudible] numbers about how good they represent that regression. Here we have several statistical measures to characterize and describe and quantify our regression. And we keep adding and customizing this depending on what's required. So for example we're now looking at the DOE's Superior Energy Performance, SEP and ISO 50001, and some of these values may be required in some of those.

So, for example, the RMFC and the coefficient of variation of our NSD, the net determination of biased errors. So some of these are quite advanced, and I won't get into the details there. But yes, RETScreen does have a way for you to say if it's a good regression or not. But ultimately it's up to you to decide whether the regression is appropriate or not. |

Dinesh S. Parakh	Okay, and related to that last question, Kevin, is this next question. Is there any form of interpretation for the regression analysis from RETScreen?
Kevin Bourque	Interpretation of the regression? Well that's where I guess the engineering comes in. I guess it's up to you to be able to properly interpret these. We do have an extensive—the help manual has quite an extensive series of explanations of these. But RETScreen won't teach you how to do regressions. There is a judgment aspect to this that is up to you doing the analysis.
Dinesh S. Parakh	Okay. Thanks, Kevin. The next question here is—how are RETScreen benchmark values determined? For example, the emissions factors of diesel generators—is it based on the most recent or best available technology? And the questioner further notes that the question is in the context of setting forward looking or aspirational baselines, say for mini-grids.
Kevin Bourque	Okay. Great question. So there's actually two questions in that question. So the first part is the benchmark section. So how we get the overall benchmarks. So these benchmark values are facility level benchmarks. So it's looking at the facility as a whole. And these values are actually taken from our benchmark database. And once again, there's a whole set of help and bibliography about this benchmark database. Each value in here comes—has a reference. And I would strongly encourage you, if you're interested in benchmarking aspects, to really dive into this part of the model. So these are—they're sort of continent wide and facility specific benchmarks for these facilities. So when we were talking before about the benchmarks for this small office, this is the North American minimum and maximum typical energy use intensity benchmark for a small office. It'll be different if it's a hospital or a school or a supermarket or what not.

That said, you can also put your own benchmarks. If you have corporate benchmarks or corporate targets or something from local state or something that's put in by say a school board or municipality, there's nothing preventing you from typing in your own benchmarks. But these, when you first open them, they come from that benchmark database. The second part of that question was fuel based. So RETScreen's fuel benchmarks, or what we call emission factors or energy fuel conversion efficiency factors, yes, those are again they're standardized. We're taking the latest data from—we're taking the latest data from the various databases, the Energy Efficiency Energy Information Agency, DOE, etcetera. However, again, you can customize it yourself. So when I—I didn't talk about step four here.

But step four, we allow you to create your energy consumption. We're just looking at natural gas here. But if I want to summarize my natural gas, you'll see here we ask you for a conversion factor for natural gas, and the emissions factor for however you are converting that natural gas. And it'd be the same if I had electricity generation here. So if I'm generating electricity, or consuming electricity, we're going to ask you how you convert, what the emissions factor of your electricity generation is. We're going to default to your locations. RETScreen has an emissions database for every country in the world, for the United States and Canada every province and state. And those are reported by the various entities required. And on a national level, they're |

Dinesh S. Parakh   Great. Fantastic, Kevin. The next question, I think we probably have time for a couple more questions here, so the next question is—can you log costs in addition to energy expenses?

Kevin Bourque   Absolutely. In fact, cost is one of the default columns here. In this example, because we only have an hour, I didn't talk about cost, but you'll see here I have the show-hide column. So any of these fuel consumption or production tables in step one, in data, you do have cost there that is a default. So if you do have your cost data, absolutely, RETScreen can calculate that and use that. I think my screen might be frozen here. I'll just wait a moment to catch up. But generally, yes, you do want to do costs. And just like when I mentioned in a previous question about looking at the consumption summary and the conversion factors, you may see on your screen that there is also the ability to look at the cost of it. So you can also do a cost analysis there.

Dinesh S. Parakh   Thank you, Kevin. Probably have time for another question or two here. This question is can the analysis tab be used to forecast the energy consumption using regression based on HDD and CDD and previous year data?

Kevin Bourque   Yes. Well, that's exactly what the regression is doing. So the regression is making that prediction for you. So I'm going to go to the M&V chart, and that's exactly what the M&V chart is doing. We have the prediction, which is the blue line, and the actual one is the red line, or sorry the green line. So that's what the regression does. Is it makes that prediction, based on the CDD or—the CDD is cooling degree days, and HDD is heating degree days. So that's exactly what RETScreen is doing. That's a very important step that you need to do, and RETScreen does that for you with just a couple clicks of the button. The other sort of related to that is something that I didn't have a chance to look at, is using the reference year. Reference year is again a new tool in RETScreen Expert. If you click on reference year, what you can do is you can say, well, what would I have consumed if the CDD or HDD was like it was in the baseline? And again that's another way to do the prediction. There's also a way to look at long term averages. You could say what if I had a typical climate year?

So we're trying to predict 2017. We're trying to predict the energy consumption for next year. If you assume next year is going to have typical climate conditions, typical HDD and CDD. And this is one tool you can use to do that, using the reference year tool. So yes, RETScreen does that. And does it in multiple ways, actually.

Dinesh S. Parakh   Thank you, Kevin. We have I think time for one last question here. How can I update my data for ongoing monitoring of my project?

Kevin Bourque   Okay. That's a good question. So on the data tab, there's a couple ways you can do it. You can manually enter the data, if you go to the bottom and click here to add a new row and just add it. Also, when you import data, and you import into a table that has existing data, you'll—RETScreen will give you the option to ask whether you want to append data. So you'll see here now that the import file button—import file dialogue has a new option called append data. So what it will do is only add data to the end of your file. So that's the second way. The third way is if you want to look at it a different way is RETScreen has an update tool. As you click on update data, RETScreen will convert to a sort of friendlier user interface that you can't actually change any of the analytics. So if you have staff, which is non-technical staff that you don't want them to be changing the regression statistics and just update the data, you can also add PDF and images of your bills, as a reference point. You can use this feature up here in options. Options, update, is how you would get there.

Dinesh S. Parakh   Thank you, Kevin. We are right on time. There are a few other questions, but I'll assure the participants we'll be able to answer those later on. We get I think a list of those questions and we'll certainly be sure to answer those by email. If anyone else has questions, please go to our website and contact RETScreen customer support. The email address is right on our website, RETScreen.net. And with that, I'm going to turn it back over to Stephanie to close the webinar.

Stephanie Bechler   Great. Thank you so much, Dinesh. And as Dinesh mentioned, we will be exporting all the questions that were sent in for the webinar, so please if there's any last minute thoughts you want to ask, please submit those now. On behalf of the Clean Energy Solutions Center I'd like to extend a big thank you to Kevin and Dinesh, and all of our attendees, for participating in today's webinar. We really appreciate your time and hope in return that there was some valuable insights that you can take back to your ministries, departments, and organizations. We also do invite you to inform your colleagues and those in your networks about the Solutions Center's resource services, including the no cost expert policy assistance through our Ask an Expert service.

We invite you to check the Solutions Center website if you'd like to view the slides and listen to the recording and view the demonstration from today. As well as any previously held webinar. Additionally you'll find information on upcoming webinars and other training events. We are now posting the recordings to the Solutions Center YouTube channel as well. And please allow a few days for those to be posted. Finally, I would like to ask you to take a moment and complete a short survey that will appear when we conclude the webinar. Please enjoy the rest of your day, wherever you're listening from, and we hope to see you again on future Clean Energy Solutions Center events. This concludes our webinar.