July 22, 2016 - 9:12am

DESCRIPTION

This Measurement and Verification Case Study webinar is the fourth in its series highlighting U.S. manufacturing facilities that have achieved Superior Energy Performance (SEP) certification. These facilities have fully implemented the ISO 50001 standard and improved their energy performance significantly—up to 30% over three years. This webinar highlighted Daimler’s Detroit Diesel Corporation facility, which used a rigorous energy management system to meet the ISO 50001 standard and save an impressive $37 million over 10 years (see their success story featured in this [**video**](https://www.energy.gov/eere/amo/articles/sep-success-story-detroit-diesel) on the SEP website). Topics included the facility’s use of the SEP measurement and verification process to quantify energy and cost savings and demonstrate a strong return on investment. Measureable results instilled confidence in management, which led to additional capital funding for energy projects with more flexible payback periods. Download the [**presentation slides**](https://www.energy.gov/node/1922991/).

TEXT VERSION

SEP MEASUREMENT AND VERIFICATION CASE STUDY WEBINAR: DETROIT DIESEL – JULY 14, 2016 – PAUL SCHEIHING (U.S. DEPARTMENT OF ENERGY); CARLO CALTAGIRONE, CHRIS LONG (DETROIT DIESEL); RANDY GREEN (GEORGIA INSTITUTE OF TECHNOLOGY)

>> Yannick Tamm

Hello everyone. Welcome to the Measurement and Verification Case Study Webinar. Thank you for joining today. We’re going to go over Detroit Diesel’s SEP experience for the next 40 minutes or so and then we’re going to end with a 20 minute Q&A session. Just a reminder that everyone in attendance is muted. But if you have any questions, you can type them in to the question bar within the GoToMeeting bar on the right and we will address as many as we can at the end of the webinar. So today we will have Paul Scheihing from the U.S. DOE Advanced Manufacturing Office. We will have Carlo Caltagirone and Chris Long from Detroit Diesel to tell their experience. And we’ll also have Randy Green from the Georgia Institute of Technology to share some information on SEP as well. So without any further ado, I’m going to hand it over to Paul Scheihing of the Department of Energy.

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>> Paul Scheihing

Thank you Yannick. So this is the fourth in a series of webinars we have held on SEP. And there’s a number of purposes of this webinar. One to communicate the business value of SEP. Second to share learnings from the SEP pilots, from real end users, especially on measurement and verification, since that’s what SEP focuses on, beyond ISO 50001. Demonstrate the rigor and robustness of SEP verification. Then develop some follow on case studies. And then hear from the SEP community, you folks, at the end of the call, about your M&V experiences. Next slide please.

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So many of you might be familiar with the ISO 50001 Energy Management System structure. But I thought I’d go over it real quick. This standard is now 5 years old. It is considered the world’s best practice on how to manage energy in your facility or organization. And it follows the plan, do, check, act continuous improvement structure that other ISO management systems follow. It has particular interest in energy performance improvement. As such, there’s a very rigorous energy planning and review process within ISO 50001. Next please.

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Okay, if you compare ISO 50001 to SEP, as I said, it’s the internationally recognized best practice. It requires a very robust energy data and metric regimen to look at all the energy going into your plant, as well as focusing on all the significant energy uses in your plant. It has a lot of value in that it is a world standard so it has relevance to, for example, a global corporation that has facilities in many countries. What SEP does is build upon ISO 50001 with a specific energy performance improvement target and criteria that the companies have to meet. Right now, it’s about 5% over 3 years is the minimum that you have to improve. That’s going to change slightly moving forward. It is a national program. The DOE administers the program. It accommodates a diverse type of facility in industrial sector, commercial sector, type of program you have, maturity of program. And it gives transparency over and above 50001 through the rigorous 3rd party verification that we’re hoping that the market will reward in an increasing way. Next please.

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So these are the sites, companies, excuse me, companies that have at least 1 or more facility that has been SEP certified. Next please.

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And today we’re going to focus on Detroit or Detroit Diesel, based in Detroit.

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We’re going to have two speakers from Detroit Diesel speak today. But first I’d like to introduce Randy Green from Georgia Tech, who is going to give a short overview of the SEP measurement and verification approach. And so I’m going to hand it over to Randy right now.

>> Randy Green

Yes, thank you Paul. We would like to do a brief review of the SEP approach to measurement and verification of the facility’s energy performance. So in SEP, energy performance is really evaluated using two methods or two techniques: top-down, whole facility energy performance indicator that’s labeled the SEnPI and then there’s a bottom-up sanity check, with check being the key word there. But it’s just a list of projects that validate or confirm the top-down approach. SEP utilizes a robust statistical approach for the top-down measurement of energy performance. It’s very familiar to the method C of the IPMVP that some of you might be familiar with. It takes a whole facility approach by developing a linear digression model for the energy consumption at the site. In the slide, you’ll notice a typical model for natural gas consumption with a relevant variable for production. And the equation for natural gas consumption is in the upper right-hand corner of that graph. The relevant variables account for you know, our energy consumption may include things like weather, other input characteristics like moisture. And those will vary with industry. Commercial buildings look at occupancy and other types of relevant variables. So the SEnPI, the SEP performance indicator, excuse me, its ratio is the total actual energy consumed by the organization is compared to the total energy consumption that the facility would be expected to consume if they had not implemented any of their energy improvement saving projects. So we get a ratio of performance as it is actually measured and we compare that with what has been modelled which represents the energy performance as it would have been had no improvements been made. And you see the formula there. In the end, the savings or improvement is expressed as a percentage and there is a prescribed methodology for the baseline and performance period. The bottom-up sanity check is just a validation of the top-down. It’s a much less robust process/procedure. It’s a list of projects with their calculations of estimated savings. It does not have the same rigor, as we mentioned, but it is reflective of all the activities that the organization has put in place to improve their energy performance, not just the capital projects, but the other types of activities, operational control, behavior change, maintenance improvements for their energy systems. The two of these validate each other and give us what has turned out to be a very qualified demonstration of measured energy performance. So Paul, I will turn it back over to you.

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>> Paul

Thank you Randy. Actually, I’m going to introduce Carlo. And I want to briefly…we wanted to play this video, which is a really great video. It’s really short, 3 minutes, and we had technical challenges in you being able to see it and hear it over this webinar. So we’re just making you aware of it. We’re going to send out an email after this webinar and it will have the link to this video, but I really would encourage you to watch it. It’s, like I said, very short, 3 minutes, and it really gets to the value of doing the SEP process where, by the Detroit Diesel team going through the verification process and getting the numbers, they determined that they had saved 37 million over a 10 year period. So with that, I’m going to hand it over to Carlo and he’s going to tell the Detroit Diesel story.

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>> Carlo Caltagirone

Thank you Paul for giving us this possibility to share this. So what we see here is the energy policy which we actually created just for the ISO 50001 and also for the SEP later on. This energy policy was created and adapted together with our sister plant in Germany. So it’s a similar energy policy as we use in Germany and it’s just translated in English though. Next please.

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In this energy policy, we can see our corporate goal which is to save 2% annually up to the year 2020. Baseline is the year 2010. So this means 20% by 2020. This is the main goal, the main corporate goal actually which tracks also overseas. Next slide please.

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So all of our locations worldwide are ISO 14001 certified. And a total of 22 locations in Germany already are 50001 certified. They started the certification process for 50001 in 2010, 2011. And by 2014, all the 22 locations were certified by a 3rd party. And in 2014, we started to implement the 50001 outside of Germany. And the first facility who is 50001 certified outside of Germany is Detroit Diesel, starting in 2014, and repeating the certification in 2015, plus including the SEP certification. It was a pretty seamless thing because we could use the very robust existing ISO 14001 environmental management which existed here at Detroit Diesel already, for 14 or 15 years already. So we had many processes already in place we could use for the 50001. So overall, you can see, it shows more than 98% is certified in 14001 in the world, plus it’s probably very close to 100%. Next slide please.

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Facility background here at Detroit Diesel – let’s go over the project summary. So what we produce here is mainly diesel engines, medium duty and heavy duty for trucks - also axles, transmissions, and many other components like gear sets. The facility is located in Detroit and also partially in Redford, which is a suburb of Detroit. Operations are mainly machining, assembly, and a lot of test. We have a research department and actually, a test department – around 2,800 employees and we work 24/7, 3 shifts, 7 days per week. I mean, right now, there’s some economical impact, but we usually run 24/7. SEP certification level is platinum. We achieved 32.5%, which is pretty good and I think we are 2nd in the United States. We are very proud of that. And the used energy management system is the ISO 50001. Here on the picture, you can see the assembly line where we have our medium duty that we actually produce. Next slide please.

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So here’s an overview of the facility. It’s a 3.2 million square feet facility. It’s a pretty big facility. You can see the boundaries, the entire campus over there. We actually have a plan to expand this facility in the future, if we get the opportunity for that. We are the 2nd largest Daimler facility in North America. And I say Daimler because we have a very big car facility in the Carolinas. But it’s the biggest truck facility that we have in North America. The scope includes research and development. As I said, we have a lot of testing over there and a lot of diesel consumption. We have some machining areas, some assembly areas, especially for engines, axles, and automatic transmissions for trucks, and the engine testing production. So we have a test in research and development which is a durability test and they run almost 24/7 and sometimes for a whole year. There’s a huge diesel consumption over there. And we also have production engine tests. So we test there for 10 to 12, 15 minutes. Each engine is tested before it leaves the facility. Next slide please.

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Let’s look at our energy profile. As I mentioned, our Superior Energy User is the engineering (E4) lab for research and development. Also, in the boiler room, we use natural gas for the boilers and actually 90, almost 90% of our natural gas or even more goes just for heating. We almost don’t use any natural gas for production. As I mentioned, the 50001 and SEP certificate, platinum certificate, was 32.5% of improvement. It was a big deal for our energy management system. They gave up a huge stage actually to the top management. We’re looking at the baseline period from April 2004 to March 2005. We’re looking at the model period from April 2012 to March 2013 and the reporting period is April 2014 to March 2015. And as I mentioned, we got certified November 2015. The certification body was DEKRA. And we also used an internal consulting company to support us with that. They are very experienced with the ISO 50001 and also with the SEP. DEKRA was the 3rd party conducting the 50001 and also the SEP verification. You can see here our energy usage rate now which shows that we have 63% electricity usage that is probably our priority, our biggest utility. Then the natural gas, which is 21%, as I mentioned, just for heating. And then 16% in diesel. And as I mentioned, Diesel is used in production, which is the 27%, like 10-15% testing in production of each engine. And 73% for our durability tests which is actually a lot. You can see a picture of one of our durability tests right there. Next slide please.

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Daimler has, as I mentioned, extensive energy management expertise because all the German facilities are certified already. And now since 5 years, they could gain a lot of experience. I was actually asked and sent over to Detroit Diesel to support with the ISI 50001 certificate. I was fully responsible for the facility in Gaggenau. This is a facility in South Germany and it’s almost the same size as Detroit Diesel, where I implemented the ISO 50001. We don’t have the opportunity to add the SEP certificates in Germany. I think this is very valuable because it gives you such a great stage and is supported by the Department of Energy. And this was very valuable to us and very fortunate. And as I mentioned, to assist me, we used the PHI Environmental Consulting which is a very experienced consultant in this area - and for many years already, the ISO 14001, for probably 4 or 5 years now, and the 50001 and also with the SEP, very experienced. We emerged at the end of 2015 with 50001 and ISO 14001 environmental management so we actually have one team that is energy and environmental management together. And we try to use energy cleaner and support the ISO standards which are currently more important. So I support my colleague who works more with the ISO 14001 when we get closer to a project and the other way. The implementation was very similar to the 14001 because there’s the plan, do, check, act which is almost the same as the 14001. You have to identify all of the responsibilities. You conduct gap analyses with the SEUs in audits like we do. We just had one last week. And you need to identify what you do next and what you need to do to meet the ISO 50001. So this is pretty similar to the ISO 14001. We used a lot of best practices from Germany and exchanged information also with Germany. But I would not say we are here in a state where we give best practices back to Germany. I think the improvement was so great and so big that we did a great job with our facility and that we can show our colleagues in Germany that they can even learn from us right now. So as mentioned, the ISO 50001 was actually an amendment of the ISO 14001. Next Slide please.

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Here I would like to hand over to Chris Long who is responsible for our EnPIs.

>> Chris Long

Thank you Carlo. One of the most important things that SEP does provide you with is the EnPI tool. What the tool does is it allows you to quantitatively show your energy usage and what you save. So what this chart is pretty much telling us is what is happening throughout the facility. This is an old facility that’s been here since ’31. And in ’04, which is our baseline year, pretty much after the transfer, before it was actually a GM site, then got sold to Penske, and then Penske sold it to Daimler, so a decision was made on “Are we going to keep the doors open or not?” So Daimler wanted to reinvest in Detroit and thought that was a good placement for it. So we had something in our baseline year called the Redford Renaissance. So you see our production was extremely low, which is the dotted purple line in 2004. And then you see it go up and down just like the economy with everything else. But the important thing is that you start to see our energy go further and further down, little by little, but we eventually get there. We have increased our production volume by 93%. Next slide.

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So with the EnPI tool model, there are several variables that we have to look through – production hours, heating and cooling days. And when it comes to electricity, electricity is one of our major energy users. And production hours and cooling days, we use the AC units for those. Natural gas – Carlo said before that a lot of it is heating for the area. And diesel is based on production hours. You know, how many…every engine that goes through this facility is hot tested, so it’s anywhere from 7-8 minutes. And then we have our testing durability stands that go 24 hours a day. Through the model, we used a chaining method. Our model year was 2012-2013. And all statistical tests were completed and calculated the savings, so we were able to go to our top management in this facility and tell them how much we saved. Next slide.

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So this is a snapshot of the model of how we did. You first see a large, once we started investing into the facility, doing repairs, investing into the facility, you see a real quick jump in energy efficiency. Then as we all know, the economy kind of hit us, fall point, and we tanked a little bit. But it did eventually go up. You know, when you talk about manufacturing, it’s production hours. So that spread the influence in the actual model. So sometimes you have your good years, sometimes you have your bad years. However, you start seeing your energy improvement. Once you invest in the bad years, you get back in the good years. So you see that efficiency slowly creep up as we go through. You invest for the future when you’re talking energy management. Next slide.

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So this is one of the things that we really wanted to point out. Once we actually implemented ISO 50001 and then you add SEP into it, you see the increase between 2014 and 2015. We increased our energy efficiency by 7.28%, almost a 40% energy improvement. So that kind of shows how robust the system is and it brings a lot of attention to the facility. Next slide.

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So when it comes to any facility, dollars and cents at the end of the day are everything. With the EnPI tool, we were actually able to calculate how much energy we actually have saved. So through the tool, you can see that we show the MMBTU that we saved and then we turned around and through invoices, we figured out how much we paid per MMBTU. We calculated up, so we have over 12 million dollars savings in electricity. You have 7 million for natural gas and about 17 million for diesel. You add it all up and you get 37 million dollars. This is an extremely important number to our management here. That shows we are producing engines here for absolute less which helped the bottom line which are able to fund more and more projects. The whole point of manufacturing is to be as lean as possible and be able to get going. So SEP allowed us to show our top management this number. Now you just made it extremely real and that’s the important part when you’re talking energy management, to get support. Top management is extremely important and when you tell them “Hey, I just cut you a check for 27 million or 37 million dollars,” that gets you a lot in the facility. Next slide.

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So one of the good parts that we quite enjoy, it’s great that you save this energy and you have the model, but how did you get there? What did you do? And this list is…pretty much, Daimler did invest heavily into the site. So we went and systematically replaced a bunch of the roofing. We went from an R2 roof to an R24 roof. We also replaced windows for energy efficiency. We also went through the energy efficiency combustion program with our boilers since the boilers are a significant energy user within our site. So we’re using our natural gas to the most efficient possible. We also did a steam reduction program. We are almost to the point where we can shut down all the steam in the facility in the summer. Steam is an extremely inefficient way of heating up things around here. So we have systematically tackled that. Another kind of expensive energy user is compressed air leaks. A lot of people take it for granted – oh, it’s just air. But the compressed air can be extremely expensive so we actually implemented a leak detection program where we have our guys go through and find major leaks and repair them. We also replaced one of our compressors. We have now, as was said, a 3.2 million square foot facility and we use one air compressor for the entire facility. So we’ve made monumental increases in efficiency with that. We also went through and repaired all the HVAC systems and controls. We also replaced a chiller. Our facility has gone through a re-lamping program where we replaced all the high-pressure sodium lights that were in the facility to LED lights. We have maybe about 60% of the facility with LED lights. Our plant manager loves them. Our union loves them. Everything is now visible and we upgraded every other management system around. So our plant manager has dedicated himself and pretty much said that by 2020, the entire place will be LED lights. We also developed a Secure Building Envelope Program where we have our security several times a day go through the facility and make sure that all the external windows and doors and garage doors are actually closed. This is an important part because if you’re paying to air condition the facility, and then you’re opening up the doors, it’s just like your mom always said, “close the door, I’m not trying to air condition the world.” We also went through and looked at other things, not just the facility. How do we do things? Our engine paint – we changed our engine paint to a water-borne paint. The water-borne paint actually allowed us to have a lower cure temperature. So we were able to reduce the temperature of the ovens, which helped out a significant amount. We also put in a variable speed dry program. Every pump and motor that we go ahead and replace now has a variable speed pump instead of just a regular pump, so we’re not uselessly wasting energy. Like Carlo said before, our R&D facility here uses a ton of diesel fuel. And before, they were just running for one test the engine. And we said, well how can we calculate this? We need to research. We need to run engines. So we were able to all come up with a layering system where they are testing several parameters at one time. So that cut down diesel consumption by a great amount. We also went through some changes in the facility. We are…the old standard used to be the series 60 engines, which is an outdated engine, and we have changed over to the 8 step engine. So all the old machinery that were originally built for that, we were now able to get energy efficiency machines in here. Every machine that comes in this facility has a check mark of, is it the most energy efficient machine on the market and how can we reclaim some of the energy that we use in that? Next slide.

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So here’s pretty much where we were talking about before where we were going and we were kind of doing energy efficiency but trying to maintain. And then pretty much right when we decided, hey, we’re going to follow our sister plants and do 50001, you start to see the awareness creep up. And people are like, hey, energy is something to pay attention to. And right when we said, hey, we’re going to do SEP and commit to that, and we were able to show how much we are saving. Our top management really pushed it and made energy a part of everyday operation. So as you see with SEP, it invigorated the entire plant to have a better energy performance. Next slide.

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I’m going to go ahead and turn it back over to Carlo and he will talk about the next slide.

>> Carlo

Thank you Chris. As we have now mentioned a few times already, management engagement is very important. I would almost say that is everything because when we started the program to get 50001, we really worked on getting all of the management engaged. So you can see in the picture on the bottom left, this is our management attending our monthly meeting where we can share our information. And it’s not anymore like they have to attend, it’s if they request that we give them an update right now. So they really like to see how we save money and how we get more efficient. And so it’s also very important for the time requirement. I mean, you need manpower. You need time and expertise. If you have management engaged, you get all that. Once you get to the stage with the ISO 50001 and also with the SEP, it helps. As Chris mentioned, 37 million dollars in savings helps you to get a lot of manpower and expertise. It could still be more, but we are very happy with what we’ve got now. Even with a budget, it helps a lot. And to look at the competing interests like cost spending versus energy efficiency, I think we have great stacks in the corporation and where we make sure that all the new engines which come in and machines that come into the production area are very energy efficient. So we prefer to spend a little more to have an energy efficient production now. And there’s a culture change here in this facility. You can tell there’s a difference. Sometimes you can see that if you go by the cafeteria around 4 or 5pm, the lights are turned off. We didn’t have that before. So it looks like people have had a mind change and now they turn off the lights. It’s a little step but great to see that people have adapted. So we use the green corner, the picture in the middle as you see, as our communication center. That’s where we conduct the monthly meetings. That’s where we have all of our energy policies and environmental. You see on the left side, the green, that’s the environmental side. The right side is the energy side. We combine that. We have some of the awards that we’ve won over there. We are very proud about that. We won awards for Daimler Corporation, also here in Michigan with the Free Press. The SEP is a big deal and with the EPA and also the Environmental Leadership, which is kind of a hats off award in Germany which we won last year and made us very proud. So we really have a changing plant culture here. Next slide please.

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Our cost/benefit analysis, so platinum, ISO 50001, 32.5% over 10 years, that’s a mature pathway. Actual energy cost savings is $815,000. We’ve saved currently more than 3.7 million dollars, but this is including our new contract negotiation. $815,000 is the plain savings due to the ISO 50001, including the SEP. The cost to implement that was around $130,000. I mean, yeah, and as you can calculate, we had a 2 month payback period. I mean, that’s nothing. This shows that you really, really have to go for that. You should implement it for what it’s worth. And what our plant manager says is payment. So to the right, you can see the graph. It’s actually the same information again. Audit preparation was around $30,000. EnMS was $3,000. And so on. Next slide please.

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As I mentioned, we have an increased awareness in the energy consumption and from the top management, a lot of engagement in this stage. And SEP provided pathways to set even new energy goals, other energy goals. And it gave us also the chance to attack projects that we thought we would never be able to do that because we would never get the funding for it. Now, and you will see it on the YouTube video that Paul mentioned right before, the plant manager will talk about what we achieved and you will see that he’s actually pretty enthusiastic about it. And he likes it. So whenever we go there, he kind of thinks, “oh, you guys are heroes because you’re not expensive but you’re saving a lot of money.” That’s all what he thinks. But we also have the environmental side. So just for this reason, it’s a big deal. And I would immediately go again with SEP if I could. If I were asked about it… As mentioned, our manufacturing unit is always part of our new equipment procurement decisions. So everybody that plans new machines and plans new production lines has to use the stacks and the standards. And you are always asked, what is the energy impact? What is the environmental impact? So you make sure before you start production that you have the energy efficiency machinery in place. Even Daimler plant managers in Germany, I had the chance to go back last year and talk to some of them, and they were like, “what did you guys do there? How did you achieve that?” They couldn’t believe that Detroit Diesel, a facility in America, where energy is actually cheap and it is hard to get a good payback time, usually industries give you money just if you achieve a 2 year payback time, so they were like, “how did you do that?” I think that the culture changed. I think you can feel it here in the United States. They put the SEP program on top of the ISO 50001 and they pushed that a lot. I think right now here in the United States, we are at the level where we can show even our sister facilities in Germany how to do things. Next slide please.

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As mentioned, top management is everything to help you with your projects to be successful. And when Paul was here, he probably can confirm it, that the plant manager, he loved it. He took the time. He spent the day with us almost, also with Paul. You can see they are very dedicated. They definitely value the public recognition. And they of course loved to spend some time and create the video and to support the system. They are actually asking, “Hey what’s the next step, what can we do next, what can we achieve?” We’re struggling a little bit because we got so much recognition and so many awards that we right now don’t know how to go on and how to show off anymore. But, okay, that’s actually a good thing. It’s very simple: energy saving is saving money. That’s all that management cares. The next step actually is now that we are here at Detroit Diesel, we have many facilities in North America, Daimler facilities, not just Daimler trucks, Daimler cars, Daimler vans and buses. So the next goal is to join the Better Plants program and expand the energy management to other facilities. We would like to start with the 9 other major Daimler facilities/plants where are most of them in the Carolinas, and also in Oregon, where our headquarters are in Portland. That’s the next goal. I mean, if we are able to use the best practice shared service and all the processes we used here and just copy-paste it to other facilities, I think that’s probably better than the next award we can achieve then. It’s huge savings. We’re looking at millions of savings there, each opportunity. And I hope we will get a lot of support from the Department of Energy using the Better Plants program. Thank you, next slide please.

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>> Paul

So thank you Carlo, and you will get support, once you join the Better Plants program, alright. Good job guys. Okay, we’re going to take some questions now. And there’s a few questions listed in the questions box. If you have questions, please put them in. And I’m going to read them. Okay, the first question is does R&D at the site have the same reporting chain as the plant? For example, do they report to the same management? If not, were there issues gaining the buy in needed from R&D and their associated management? What strategies were used to overcome any silo issues?

>> Carlo

Yes, R&D has a different reporting structure. They have also different management that they report to. They actually report to the top management directly in Germany. And the rest of the facility reports to the top management here in Detroit. So we created like an interdisciplinary team which included all the directors. Also the directors, all the directors inside, including the directors from R&D, and we invited them to an event where we explained what our goal is and what we would like to achieve and asked them if they would commit to our goals. And R&D asked the management in Germany and since they saw the huge savings and a lot of money potentially involved and the huge possibilities, they committed to it and they are very supportive. They are also part of our monthly plant management meetings. And they are tracked with the same KPIs as the facility is. We track the whole facility with one main KPI. And then we have one KPI for each director. And so, yeah I think it’s important to show them what the possibilities are, what the potential is. And it is very important to ask them, to involve them, just go there and tell them, “Hey, we can save you some money. Would you like to commit to this goal?” Overall, I think the plant manager did a good job there in bringing all of the directors together – R&D or production or assembly. It doesn’t matter and that’s how we approached it.

>> Paul

Okay, very good. Okay, next question: how did your utilities support your pursuit?

>> Carlo

Like the utility provider?

>> Paul

Yeah, I guess it would be Detroit Edison in your case.

>> Carlo

Yeah, I actually did wonder. They have rebate programs. So if you use renewable energy sources and you relamp your light sources or you use LED in the future, they have rebate programs. Also if you install, as Chris mentioned, VFDs like variable frequency drives, they have rebate programs. And this was the chance to switch from regular lighting to LED and get a $60,000 check from DTE and hand it out to the plant manager. So we told him, “oh, we relamped that area and it’s all LED and you know what, here we’ve got a $60,000 check for it.” He liked that. So you know, DTE supported us a lot. And we actually got rewarded and awarded by DTE for energy efficiency in large businesses. And you have to see that Michigan, where we are here, it’s not deregulated. So DTE is our supplier and will be our supplier. And they made huge efforts to adapt the rates. So we not just saved energy, we also saved money by getting the rated adapted. It helped a lot. I think DTE is a big support here.

>> Paul

Okay, what was the EnPI used for the ISO 50001?

>> Carlo

The EnPI used…we were trying many different EnPIs before. But at one point, we decided how can we compare our facility to our sister facilities in Europe or even in North America. We all have different products. So it’s tough to compare. So we decided to take the energy, which is the KWH, we convert it to natural gas in KWH. We use the KWH from electrical usage. And we divide it by hours worked. So if the facility is busy and we produce more of our product, hours worked goes up and the KWH too. And if the ratio overall goes down, you’re more efficient. It’s the same method that our colleagues in Germany use so we are able to calculate and compare our EnPI and we can get tracked by the CEO.

>> Paul

Okay, what was the significant energy use in your facility?

>> Carlo

As we showed before, it’s the boiler room, which I can probably say, is almost $1 million just for natural gas. It goes all through the boiler room and it’s just for heating. And probably also the E4 lab. I mean, I don’t have now the exact number in my head, but we spend a ton of money for diesel and 73% goes just to the E4 lab, just for durability tests. But it’s research and development, so you have to be very careful how you react there.

>> Paul

Right. Alright, next question is: were plant operators supportive of the energy management program? And was there any resistance?

>> Carlo

At the very beginning, there was resistance, then especially. I remember the time when I just started and the plant manager said, “Okay, show me how you save. Go on.” And after about a month, he said, “Why don’t you put solar panels on the roof? Why don’t you do that? Why don’t you do here?” And I was like, “Okay, this is kind of stressful.” And I couldn’t really use my approach for things. So definitely, they just started to believe in us when we started to earn money. You see, when we had the ISO 50001 implemented, when we started the SEP to show them, “Hey, we saved $37 million,” they opened all the doors.

>> Chris

Also, one of the things that really helped out when it comes to the floor operators, is the LED lights. There’s a big difference when you’re going to work with those high-pressure sodium, and you got that orange glow to it, when you turn around and say, “Hey, I’m going to do an energy efficiency project here and I’m going to give you white light and you’re not going to come out of work and think that you’ve been stuck in a building all day.” They come out thinking that they’ve been outside the entire day. So they really see the immediate…it does impact them, you know, at the end of the day, the bottom line. Plus, you know, your work conditions have a lot to do with energy efficiency.

>> Paul

Good, good, that’s interesting. Alright. Was there ever a time that management wanted to stop SEP at Detroit Diesel or other places and what happens to the stranded costs? Do you just save money on the efficiency but just aren’t tracking it?

>> Chris

Well you know, I think the facility was always doing energy management. I mean the whole part of your facility’s group is that pretty much try to do as best you can and the management here was extremely supportive. They had seen in other facilities how it does work. So at first, it may have been, “Oh, let’s see how this goes.” But once you start showing changes and the plant manager is now looking at the final budget and he just realizes, “Wow, why is there so much money left in the utility budget?”

>> Paul

Yeah, Yep. I think the other thing is that, excuse me Chris, the 37 million doesn’t even account for the last year.

>> Chris

Exactly.

>> Paul

You saved 7% more right?

>> Chris

Yeah, we tacked on another $3.7 million this past year. And I can tell him however he wants. However, when he looks at his checkbook, he wondered why there was a lot more money left over that hadn’t been spent, which went into general funds. So right then and there, he was extremely supportive. It has worked. And I think it also draws on the fact of this pull from outside sources. If you are the first one in your company to start this, you know, show…you know, the Department of Energy has plenty of examples to show how it is successful.

>> Paul

Okay, next question. It looks like the room where you had the awards and help meetings is on the factory floor. Is that right?

>> Chris

Absolutely. The green corner is in a main aisle that everybody, from going into your work station to pulling parts around, it’s in a very prominent location. And it’s lit with LED lights. We invested a lot for aesthetic purposes for it to look good, that we are getting things accomplished. And people, no matter, it reinforces the fact that energy and environmental do very much matter to Daimler and this facility. It’s almost a subconscious type thing that it is. And we hold management meetings out there. So the hourlies and the professional employees that are here do see the plant managers out here and it is a core value and it reinforces it subconsciously.

>> Paul

Great, so the next question, you kind of answered, but maybe just expand on it a little bit. How did you communicate the energy efficiency with employees? You talked about the shop floor. Is there anything else you have?

>> Carlo

I mean, we do have the shop floor and the green corner for that. You can go there anytime you want and read about what we are currently doing. But we also have a Good to Know article that goes out once a month. We even just had a special edition just about energy efficiency which was an idea from the plant manager who said, “What about if we do a Good to Know article?” We have what we call desktop alerts. We send out alerts to each computer here on site with some notes and information regarding the energy efficiency. We have an online database and everybody can access that online. And we have several TV monitors here on site and we use those TV monitors also to go through PowerPoint presentations, including a lot of energy information on them. We have even an idea engine here on site. So for really good ideas, you get rewarded, financially rewarded, and you can be part of it. And we also reward with on-site parking. You can park right next to the plant manager if you have a good project, an energy efficient project, an environmentally-good project. You get to park 2 weeks next to the plant manager. It’s actually pretty neat.

>> Chris

No badging in either.

>> Paul

Alright. I think…here’s one. Awards you received were great. Recognition was perhaps something you didn’t expect, but were there other things, benefits that this initiative achieved that you did not expect?

>> Carlo

I didn’t expect that all the people on the floor would actually support us so much because after they really saw us, as Chris mentioned, with the LED and with all this recognition and awards. And this all is for Detroit Diesel. It’s not for the energy team or assembly team or for the plant manager. That’s for Detroit Diesel. This makes us look good. And everybody is proud of it. And you can see that people really react on that. And people stop us on the floor with ideas and say, “Hey, I’ve got an idea. I’ve got a pump over there and I would like to change it. What do you think about it?” So, yeah, this surprised me a lot. This is again part of the culture change here on site.

>> Chris

And it also reinforces the fact that this facility will stay. You know, the jobs will stay in Detroit. The more efficient we are with making engines, the cheaper that we can do it for and employment for our families will continue to stay within the area. And that’s a message that everybody can take home.

>> Paul

That’s a big one. Okay, you already achieved 32.4% savings. Where can you make further improvement in this facility? Do you have a next target for this facility?

>> Carlo

Of course, we have the 5 and the 10 year plan for us. Of course, the low hanging fruit are a long time gone. No chance. So to make huge improvements, it would be, what Chris said, we work on a steam reduction to shut out the steam during the summer time. But the best improvement would be like if we got a few million dollars and we converted to hot water. I think this would be a huge thing. Now we’re talking about a lot of money and even with SEP, it would be a tough one to get that amount of money. So we are doing little steps to get close to it. And at one point, we’ll replace maybe the steam boilers with hybrid boilers, steam and hot water, and try to transition slowly to the next big project. That’s the approach.

>> Chris

Yeah, right now we’re currently trying to get…heat recovery is kind of the next big topic that we have on the plate for the next couple of years.

>> Paul

So here’s a good question that I’ll ask. We’re out of questions on the chat, but keep your questions coming in if you have any. So I think when I visited you, we talked about payback. And I think the SEP process led to a change of thinking in the management and what an acceptable payback would be? Can you talk about that a little bit?

>> Carlo

I mean, I mentioned that our corporate payback is 2 years right, and especially with the low hanging fruit, it’s 2 years. But we all know that LED lights don’t have a payback of 2 years. We know it’s a payback of 6, 7, 8, 9…

>> Paul

Or heat recovery for that matter.

>> Carlo

And heat recovery is even more. I think they would probably accept a payback of 4-5 years right now. But it depends on the amount. I mean, if we are looking at boiler something or heat recovery, which costs like 5 or 6 or 7 million dollars, there’s still an economical impact. If we’re looking at 20, 30, 40 grand, you could get that very easily right now with that standing, even with a 4 or 5 year payback time.

>> Chris

Yeah, we very much lucked out here that our top management is able to. It’s long term goals versus short term goals and the fact is that, you know, as our plant manager progresses up through the ranks at his time at Detroit, it will help him in the future when we goes to the next level that Detroit Diesel will continue to be energy efficient and increase the bottom line. And that is absolutely invaluable that we have executive management here that does understand long term goals.

>> Paul

Okay, alright. We got another one. What is the frequency of energy updates or meetings? Sorry, it’s kind of hard to read these questions.

>> Carlo

I think I have an idea what the question is about. We have a weekly meeting on our Detroit Conserves group. This is a group of supervisors and the technical services and also security, R&D, where we talk about and do some brainstorming, talk about extra projects, little projects. We also have an interdisciplinary circle which meets every 3-4 months. And there are actually from each department, one representative there. And we update them and we take new ideas from there. And then we have a monthly meetings with the management and all the directors and the plant manager, where we talk about the KPI, the tracking, and metrics.

>> Paul

Okay. Alright, let’s see if I got all the questions. Are you extending the energy savings performance into your supply chain companies?

>> Chris

We are pushing in our contract management portals. We are asking our suppliers to, just like we do for environmental, to go ahead and talk about energy. We push them as much as possible to develop energy management systems, not solely based on the fact that it’s good for the environment, but the fact is it saves money. The more profit they make, the more streamlined the process can be. So we haven’t said “you shall” but we are showing the benefits that are happening at Detroit Diesel. And we recommend that they do the exact same.

>> Paul

Fantastic. Let’s see. I think I have one more here. How would you design a new facility differently with this experience?

>> Carlo

Oh, I mean, I would love to design a new facility like a greenfield. And I think I would need too much money for that. But I would try to use a lot of renewable energy, definitely. I would try to not use steam. I would try to go from the very beginning with LED. And I would try to use, like, white ceiling panes and clean floors because then you show everything is nice, everything is efficient. And people like and love to work there. That’s how it’s supposed to be. But all of that is extremely expensive. If I could use a greenfield, I would use heat recovery. Everything is possible. I’ve never worked in a greenfield and this would be kind of a dream to do something like that.

>> Paul

Alright, well we’re up on the hour here for 3:00. Really good questions by the audience, thank you. And for Carlo and Chris, thank you very much. Randy, thank you.

>> Randy

Thank you.

>> Paul

Yes, so we’re going to end the webinar. And I appreciate this great case study you’ve given us today.

>> Chris

Thank you.

>> Carlo

Thank you.

>> Paul

And this concludes our webinar. Goodbye.