UNEDITED TRANSCRIPT

Paul Wessel (00:00:00):

Hello everyone. I'm Paul Wessel from Greater New Haven Clean Cities, and welcome to the Round Table on the progress of electric school buses in Connecticut. Greater New Haven Clean Cities is pleased to have in today's round table some of Connecticut's key leaders in transitioning the state's fleet to electric school buses. We were just talking beforehand, if it takes a village to raise a child, it takes a nation to figure out how to get that child to school in a way that doesn't undermine our health and threaten our communities. And we'll hear today from a panel of some of the people most active in helping Connecticut school districts move us forward. I'm Paul Wessel. I'm the director of Greater New Haven Clean Cities. I'll be kicking things off, but very quickly turning over the show to Lou Camacho, who's at the Connecticut Technical High School System C Tex.

(00:00:58):

Our voc tech system here in the state has 25 buses on the way, Brendan Sharkey at Daisy Solutions and ACEs up about what the risk community, the regional, regional educational service centers are doing to promote the growth of electric school buses and workplace charging. Kevin de Vivo, who's general manager of de Vivo bus sales in Dat Co here in Connecticut, and Kevin King who's senior EV principal consultant for first student. Each panelist will present on their background. I'll talk a little bit about why their organizations are interested in school bus electrification and their activity in Connecticut. They'll go on for about 10 minutes each. Then we'll follow up where each of them will talk for just a couple of minutes about some of the key lessons they've learned. And then we'll open up for the round table discussion. You can feel free to raise questions and comments in the chat during the presentations. And just so you know, we'll be recording today's session for sharing afterwards. So whatever you say will be recorded and we'll send out the slide deck to everyone who's attending as well.

(00:02:15):

And I'm not going to add much more here because our panelists cover a lot of ground, but I did want to ground us in what we believe to be the current status of school bus electrification in Connecticut. There are currently, it's our Understanding 12 electric school buses actively transporting Connecticut school children today with another 61 that have committed funding, and that's out of a total of 8,000 or so school buses in the state. Clearly we are very early on in this transition. So let me turn it over to the movers and shakers to really explain what's happening and help clue you in. First up is C Tex Lou Camacho. Lou, take it away.

Lou Camacho, CTECS (00:03:01):

Thanks Paul. Hello everybody. So I want to just start by just telling you a little bit about CTE and who we are. So we're the Connecticut Technical Education and Career System. You may maybe be more familiar with us being the Connecticut Technical High School. Paul, do you want to advance to the next slide or do I have the ability to do

Paul Wessel (00:03:19):

That? I'll do it.

Lou Camacho, CTECS (00:03:20):

Yeah. So for over a hundred years we've been the premier workforce provider for the technical trades, and so we have 20 locations. You can actually go right onto the next slide as well. We have 20 locations.

We accept students from all over the state. So we have 17 technical high schools, and then we have one technical education center, which is Bristol, where they have not only high school students, but also adult students. Then we also have two aviation schools that are adult only programs. And so the electrification of school buses are going to be at the 17 technical high schools. You can move on to the next slide. So again, we have 20 locations, 166 sending towns. I think there's 169 towns in Connecticut. So just about every town has, we accept students from, we have over 11,000 students with 31 different trade programs. And so the primary focus of these electric buses, so again, and go right at the next slide is real life learning. So our construction trades, so our carpentry shop, our plumbing shop or electrical students, they all go offsite. So the buses that we're getting are not going to be used for transporting the students to and from school. They're going to be used to transport these students offsite to basically an extension of their shop and what they're learning.

(00:04:53):

So these students will get onto a bus after they arrive at school in the morning, they'll do their theory lesson, learn a little bit about what they're going to do for the day, and then they go offsite and they actually, the carpentry students build a house, plumbers go and work on projects on different houses and different additions, things like that. The electricians, again, same thing, they'll go out and do production work. In addition to the construction trades, we also have some health trades and the health sciences, they go offsite to visit a convalescent home or nursing facility. We have a vet science program in the vet program. They go again to go offsite to work on large animals, things like that. And so there's a lot of offsite opportunity for our production trades. That's the primary use for them. We also use our buses for athletics. So of course after school, our athletics teams, in addition to that, we have field trips and other visits that we do. So we use them all throughout the day, but they're used a little bit differently than your conventional yellow school bus.

(00:05:59):

You can move on to the next slide there, Paul, if you would. Yep. And so we affectionately call them the blue buses, right? You can see the picture on the left. Those are the fleet of the blue buses. And then we just purchased some recently some additional blue buses on the right. And so the ones, these are the type, I guess we'd call 'em a type C school bus. And so right now we're going to be getting, because our drivers all have ACDL without air brakes and only have the ability to drive vehicles under 26,000 pounds. These vehicles all just under 26,000 pounds.

(00:06:41):

We used our grant funding to purchase a Type A bus. So right to the next slide, that's the type of bus we're getting. It'll be blue and it'll serve the same function that we're currently using the other blue buses for. We've actually decided to get ready for the future with a larger school bus and just predicting that the larger school bus is going to be a little bit heavier. All of our new drivers that we're training to get their CDL, we actually bought a training bus. And so this bus is over that 26,000 pounds and has air brakes. All of our new hires and new drivers will have the air brake endorsement and have a class BCDL, which will allow them to drive a heavier electric bus. That's one of the things we've started to started to do, so that we're ready for 2030 and 2035 and then ultimately 2040. So 2030 environmental justice communities. So we have nine schools that are in EJ communities, and so those nine school districts are going to have to be full electric. And so we're prioritizing these buses at those locations. So we're working with the schools and currently installing the infrastructure to charge the buses. So next slide.

(00:08:08):

So here's two locations that we're just finishing up. So the location on the left, there's three chargers at this school and the location on the right, they just installed two chargers at this school. So some schools

are getting two buses, some are getting three. And again, we're prioritizing the 25 school buses are going to locations that are EJA communities. We're prioritizing those schools. And then we've also applied for the next round of funding, and hopefully you can get some more funding for additional electric buses. I guess real quickly, I just talked to you, we'll talk about some of the challenges. I'll just talk to you about the type of charging that we have. Just before the you guys joined the call, we were kind of talking about DC fast charger versus level two chargers. So we're fortunate because of the way we use our buses, the dwell time, the charging time overnight is sufficient.

(00:09:03):

We don't have a morning run and an afternoon run. So we were able to do level two chargers. These level two chargers, I believe are 19,000 kilowatts, but they're going to charge at, our buses are going to charge just over 13,000 and they're going to be regulated with software. And so for instance, in the location that you see on the left, if there was three buses that were parked the bus, the chargers were automatically downgrade to a little lower amperage. So we don't exceed the ceiling of the panel that the buses are charging from. And they're using software to do that. If there's only one bus, then the one bus will get the full capacity, the full output of the charger. So that's some neat stuff that we're doing to try to make it a little easier to install these chargers without exceeding the power requirement.

(00:09:57):

I think that's all I've got. And then we'll wrap up with some questions. I know Kevin DeVivo is on and he'll talk more about the actual electric bus. One other thing I think I will mention just before we move on is when choosing a vendor to install the charging infrastructure, you want to make sure that it's someone who's been approved or has participated in the training program. So there's the electric vehicle infrastructure training program, VITP. So we want to make sure when you're choosing a vendor to do that, vendor that they're approved. And also the chargers have to be EPA Energy star rated.

Paul Wessel (00:10:35):

Yeah, you've learned a lot along the way.

Lou Camacho, CTECS (00:10:37):

Oh, I sure have. Yeah. And I'm sure there's more to learn

Paul Wessel (00:10:40):

As

Lou Camacho, CTECS (00:10:40):

We're getting closer to wrapping up the project here.

Paul Wessel (00:10:43):

And Kevin de Vivo and Lou jointly pursued the funding on the last round of EPA funding, which is helping get these buses on the road had some issues about getting the chargers installed because, and this'll be familiar to a lot of people in public institutions while Lou manages the busing program, he doesn't manage the individual schools. And fortunately the Connecticut building trade stepped up and helped us find somebody that would help him get the installs done and scoped out. And it was, you never know what you're going to encounter along the way. So why don't I turn it over to Kevin de Vivo from Dattco and de vivo bus sales.

Kevin DeVivo, DeVivo Sales / DATTCO (00:11:33):

Great, thank you. Thanks Lou. So yeah, we can go immediately to the next slide. So we were asked to answer a few questions here. Those being who are we, what drives our interest in school bus electrification, what is our experience in school bus electrification and what are the most important lessons learned? So trying to answer those for you guys today. First one is, who are we? So most people know Dattco as a bus company, which it is, and that's how it originally started. We're third generation. I'm third generation. It was started by my grandfather and his brother actually, and his cousin ultimately became involved just as a school bus company. And we have since diversified into shuttle buses, transit buses, we run vehicles for CCP transit, both in New Britain and express commuters. And then people have probably seen our big red motor coaches from our motor coach division.

(00:12:39):

But additionally to that we are, and this is the next slide, a bus dealer. So we have recently rebranded it under the name de Vivo bus sales to kind of give us that distinction between our fleet side of running buses and our dealership side selling and servicing buses. So I am the general manager of that piece, which is the dealership Tova bus sales, and we're the New England dealer for several bus brands, which include IC bus, Collins Turtle, top diamond coach. We sell vehicles, we sell parts service and have a couple of body shops where we work on them as well. Next slide.

(00:13:31):

So yeah, what drives our interest in school bus electrification? I put business strategy. We are trying to look at what the environment is and make sure that we are the leader, not the follower here and in what's going on. I put a blockbuster as an example of a company that didn't evolve with the times, the obvious counter to that being Netflix, which completely took them over. So as we see the environment going towards electrification, we want to be leaders in that and look at the key environmental variables. The big ones really are the political, legal and regulatory forces that are driving us towards greater electrification. And that's next slide really both mandates and incentives that are out there mandates. Examples being the Connecticut Clean Air Act and E-P-A-G-H-G three, which was the rule is finalized in the summer. And then so there's the stick, right?

(00:14:49):

And then there's also the carrots, the incentives. So there's a lot of money out there that are helping in this transition. And on our fleet side, we want to take advantage of that while we can. And on our dealership side, we want to take advantage of that while we can. So that frankly is what's mostly driving us towards this, is making sure that we're the leaders and we're not just following that, we're setting the trends as the environment moves towards this. Just to give a little bit more info on that next slide, we talked about the mandate. What is the mandate, especially here in Connecticut, it's the Connecticut Clean Air Act, which I have as senate bill for, I believe there's another code for it, but essentially a hundred percent of buses, school buses in environmental justice communities have to be zero emissions by 2030. Now, that's also in non-environmental justice communities. You'll see it's by 2040. All of them have to be zero emissions, and that in between phase 2035 is alternative fuel school buses like propane. So that's the environment that we're in right now is we have this mandate that's out there that requiring electric buses or zero emissions buses, which there are no other alternatives that I'm aware of though. People like to talk about hydrogen that will get people to zero emissions school buses by 2030.

(00:16:40):

So there's a couple other pieces of that, including that school contracts can be 10 years if you're providing at least one zero mission school bus. And there's also, and this kind of leads to the incentives piece, deep has been instructed to set up a grant funds program, which is yet to be released that will

support federal funds through Connecticut funding for those who've gotten clean school bus funding. So matching funds. Next slide. And so here's the big incentive that's out there right now that the EPA Clean School bus program, this chart is actually old. It's from the first round of rebate funding. We've now gone through the first round of rebate funding, the first round of grant funding, and we're now in the second round of rebate funding.

(00:17:40):

The current funding period for rebate funding is $345,000. So they've reduced it a bit for the top level of prioritized districts receiving class seven plus and 200,000 for non prioritized for zero emissions class seven plus. So this really gives you the sense of where the political legislative, regulatory regime is in helping and pushing us towards electric vehicles. Next slide. And then Connecticut also has the largest program that's helping to incentivize and fund is Connecticut Volkswagen Diesel admissions mitigation program. Dattco has been awarded it a couple times, most recently for the 10 electric buses that we are running in Middletown and New Britain. So that offers 65% grant coverage in phase three, which has already been awarded. Next slide.

(00:19:00):

So what is our experience in school bus electrification? Keep on moving. So we have the first electric school bus in Connecticut is what's called a Type A. You can see it there. Operating in Middletown, Connecticut. We have 11 electric buses. So they're all, we go back to the VW mitigation funding. They're all funded by VW mitigation funds administered by the state of Connecticut, department of Environmental, department of Energy and Environmental Protection. So there you go. Multiple successful applications for that Connecticut VW Knox mitigation grant. And so in order to support these buses, we have multiple infrastructure installations and multiple sites of Connecticut, I should say that I've kind of broken it down into what's our fleet experience. So in running school buses and what's our dealership experience in selling electric school buses. So this is our fleet experience in school bus electrification. Next slide.

(00:20:06):

So as I said, 11 electric pluses in operation, one type two operating in Middletown, 10 type ones operating in New Britain and Middletown. Next slide. We've performed multiple infrastructure installations. The most complicated being DC fast chargers, which Lou was talking a bit about. On the left, you see our site in Middletown, Connecticut where we have four 60 kilowatt DC fast chargers installed. And on the right you see our site, it's actually at our dealership location, but it's currently being used to power fleet buses. Those are 5 24 kilowatt DC fast chargers. And so in cases where we have needed to go to DC fast chargers, it's a big undertaking, need to almost always, well, you need to upgrade if you don't already have two, 400 volt, three phase power. So you're upgrading your utilities. There's obviously electrical contracting work involved on the left. You can imagine that there was a lot of site development that was involved with, we had to trench in order to get the conduit to those pads.

(00:21:34):

Then poured the pads, obviously have the protection mechanisms around the chargers, and then we have to get those chargers installed and then commissioned by the software provider in charge. Next slide. And so then there's our dealership experience in school bus electrification. Again, that's the de vivo bus sales. So we're dealer of multiple brands of electric school bus. We run what we're calling the New England Electric Bus Initiative on our dealership side, trying to bring electric buses to New England. We have extensive successful grant writing on behalf of our customers. We also are the East Coast Electric Vehicle Training Center for Navistar, which is IC Bus and International Trucks. We have partnerships with organizations throughout the electrification value chain. That's a big emphasis for us is

this takes a lot of support, so we need to know the people that can do it. And then we provide industry leading support. Next slide.

(00:22:45):

The two major brands or major electric buses that we sell are on the type one side, also referred to as type C in the industry as the IC bus, CE series electric. It's a fully purpose-built vehicle all by IC bus. It has 210 or 315 kilowatt hour battery pack, and this range is, they say up to one 40 or 210 plus miles is what they advertise. Type two, we sell Collins Electric, and one of those options is a lightning emos Upfitted Chevrolet chassis, which has a 125 kilowatt hour battery pack and a range of up to 130 miles. So as Lou mentioned that that's the same bus that Lou had pictured. There are 25 of those going to CECs, whereas the top one, we have 10 of those in our fleet.

(00:23:57):

Next slide. So the New England Electric Bus Initiative, we have a mission to support the proliferation of electric buses of all types, whether they be school and commercial. So this is obviously a school bus electrification conversation, but we also sell commercial electric buses being electric shuttle buses and vans for that matter. So it has a foundation of partner and community engagement. At this moment, we have 76 AL buses that are in some stage of procurement. That means they could be already operating or they could be, the purchase orders could be in, they're on the assembly line. The largest procurement out of that is C tex. So it's a good thing that Louis here, those 25 electric buses are building now. And we have pending grant applications for 85 more electric, electric buses that being through round two or the EPA clean school bus grant funding program. Next slide.

Paul Wessel (00:25:04):

Kevin, are there other organizations involved in this initiative or is this your branding of the work that you're doing? Well,

Kevin DeVivo, DeVivo Sales / DATTCO (00:25:10):

Yeah, it's our branding. Yeah, it's kind of how we tie it up and talk about it, especially frankly, when we're going out and applying for grants and really making it a clear what the project is and the scope of what we're doing. So for grants, we were the second most awarded bus dealer in the country under the EPA Clean School Bus program. So we're under that program. We're administering the delivery of 54 vehicles, again, 25 going to C Tex. You can see the rest at the bottom there. Those awards total $18,630,000, which that flows to the districts obviously though it allows them to buy buses from us. So you can see our incentive.

(00:26:00):

So that's almost 2% of the 1 billion that was awarded is going through Dattco Inc. Or the Nepo bus sales. You'll know that none of that is actually going into DA CO's fleet. A lot of that comes down to mentioned quickly that there are prioritized and non prioritized districts on the EPA clean school bus slide there. Unfortunately, I would say none of the DATTCO fleet customers are in prioritized districts. So because of the way that funds have only flowed to prioritize districts as of now. So really as it stands at this moment, only prioritized districts have had 'em. I'm just reading, I don't know if it's time to answer these questions, but what penalties will be assessed to EJ communities or districts that are not compliant that that's a question I don't have the answer to. Maybe somebody else has an answer to that.

Paul Wessel (00:27:07):

It remains to be seen.

Kevin DeVivo, DeVivo Sales / DATTCO (00:27:09):

Yeah, I don't think anything is spelled out in the legislation as to what the penalties would be, but it's certainly a good question.

Paul Wessel (00:27:19):

Kevin, how have you been doing in districts that didn't get fully funded?

Kevin DeVivo, DeVivo Sales / DATTCO (00:27:27):

So when you say fully funded,

Paul Wessel (00:27:30):

So when there are additional costs beyond the grant funding, how have you assisted districts done? So

Kevin DeVivo, DeVivo Sales / DATTCO (00:27:36):

The great part about the first round, the first two rounds of, and maybe this isn't how EPA would look at them, but 2022 was the first rebate round in 2023. We have a rebate round and a grant round and a rebate round. In the first rebate in the first grant round, it was $375,000 per bus. Now, that was enough to fully fund the buses that we were selling to 'em. So that was all taken care of. But it is worth noting, perhaps to your point, there was $20,000 per bus for infrastructure, which does go a fairly long way, especially as C TEX did. You're getting level two AC chargers rather than DC fast chargers. But there are costs that go beyond 'em. Now, I guess I should say that for the other two large procurements, new Bedford and Fall River, Massachusetts, there's an organization called Mass CEC, which maybe Matt Kerns who's on this can help me out with remembering what CEC stands for Clean Energy Commission, I believe now they have

Speaker 4 (00:29:02):

Clean

Kevin DeVivo, DeVivo Sales / DATTCO (00:29:02):

Energy Center. Clean Energy Center, thank you. So they have matching funds for both New Bedford and Fall River that paid for their infrastructure fully. So maybe Lou would see this differently and would push back on this, but as far as I'm aware, those top three customers had no out of pocket expenses in getting these electric buses commissioned.

Paul Wessel (00:29:38):

The EPA funding evolved to allow funding for infrastructure as well as the buses after I think the first round.

Kevin DeVivo, DeVivo Sales / DATTCO (00:29:45):

That's correct.

Paul Wessel (00:29:46):

You did talk about how they reduce the available funding per bus in this latest round. The feeling we hear is that it was EPA pushing back on the bus manufacturers to drop their costs now that they're being

more effective or getting a grip in the marketplace. And the funding that you talked about that is to come from the Department of Energy and Environmental Protection, probably sometime next year or maybe 26 is supposed to supplement funds for districts who need additional funding. But there's an expectation the bus prices will come down, infrastructure will come down, but all this remains to be seen.

Kevin DeVivo, DeVivo Sales / DATTCO (00:30:30):

Right. You got it. So we'll try to keep this as brief as possible. We have the East Coast Electric Vehicle Training Center for Navistar. So we train, in this building that I'm in, we have our training center, it's called Vivo Technical Education Center. It's led by Ron King, who's our director of Product Training support. We were selected to bring on a new program for Navistar, which involves many training aids like the one I have pictured here, but you can see, excuse me, the electric drive motor. It's called the S Box switch box that powers this vehicle. We also have on the right side an electric truck. We train electric truck technicians from dealerships around the country right here as well. And we also train large fleets as well for their technicians to work on these Navistar or IC bus electric buses.

Paul Wessel (00:31:41):

This is great. I didn't know about this until I saw your slides. We'll have to do a field trip if you're okay.

Kevin DeVivo, DeVivo Sales / DATTCO (00:31:45):

Yeah, absolutely. Absolutely. And so just quickly, just a note on our partners, it certainly doesn't encompass all of them, but just giving you an idea of the partnerships that are necessary to make this happen. There is a lot that goes into the bus is the easy part. I guess keeping technicians trained and then servicing it, that can be difficult. But in terms of getting started, we can have a bus delivered in just a few months. It's everything else that goes into essentially the infrastructure. And I guess on the financing piece, it's the getting the money where necessary. That's the big part of it. And so we've tried to prioritize these partnerships to be able to provide that ability to bring in all of these partners to make these things happen. Next slide.

Paul Wessel (00:32:42):

Impressive. I think that's it.

Kevin DeVivo, DeVivo Sales / DATTCO (00:32:45):

You did it. Thanks.

Paul Wessel (00:32:48):

That was great, Kevin. And this is a good segue into Kevin King from First Consulting, talking about the services that they provide school districts. It's become clear that there are a lot of strands to this transition and districts will need a lot of assistance in pulling together those partners in the overall plan is one of the things that's important here. So Kevin King, take it away.

Kevin King, First Consulting (00:33:14):

Afternoon everybody, and thank you Paul for putting this together and giving us a chance to join in today and spread the good news about electric. So thank you. We'll jump right in. First Consulting is a division of first student, though I am tasked more with working with our non-customers than our

customers at this point in time. We have a team internally also that works with our current customer base toward fleet electrification. And just to give you a little overview of first commitment to electric, right now we have the largest fleet of electric school buses in operation in North America. As of today, we're at 306 and we've driven 2.4 million miles and every day we transport a little bit more than 15,000 students in electric school buses. And one of the great things about our experience that we feel makes us very uniquely qualified to work with our non-customers in this area is that we do it in areas.

(00:34:15):

A lot of our electric buses at this point in time have been deployed in Canada, specifically in Quebec. So there's a lot of anxiety about electric buses. Cost is one of them, and the grants are helping to address that range is another. And as Kevin de vivo referenced, ICS coming out with 315 kilowatt hour battery that could go as much as 210 miles, but cold weather is also critical. And in Quebec we operate somewhere approaching 200 buses where last year these buses were deployed in temperatures reaching as low as minus 30 Fahrenheit, and those buses were every day charged, ready to go. You will lose a little bit of range in cold the weather, and it will take a little bit longer to charge, but we had no issues with these buses being able to respond on a daily basis. And another anxiety is people worry about fleet conversion.

(00:35:11):

How should I do it? Do I do five at a time, 10 at a time, whatever the thought or planning may be. And that's a very valid thought and concern. We actually were somewhat thrust into doing a full fleet conversion. So we converted 140 units at one point in time. And again, those units are all operating flawlessly at this point in time. So we feel very qualified to discuss EV and benefits it and the challenges of it as well. But at first consulting, it's a multifaceted approach. Obviously we're going to, as Kevin alluded to, the school bus is the easiest part of this process. And when it comes to EV and working with folks who are not necessarily versed in all that goes into it, I typically will explain that there's four phases of learning, in my opinion. I've always been taught, and I'll spare you all the four phases, but the third one is the unconscious incompetence stage.

(00:36:09):

And when you get into looking at electric transportation for the first time, more often than not, you're going to be at that stage, which means you don't know what you don't know at this point. And that's why working with Dattco or First Consulting or whomever is critical. This is not a Doit Yourself project, but we'll talk to you about consulting. Part of it will be electrification, routing. Not every route is designed for an electric school bus at this point in time. It's just the reality of it. Topography, temperature range on the route, things like that. So when we engage with somebody on a consulting basis, we do, the first step is a routing analysis. And believe it or not, there are 127 different factors that we look at in routing. We'll look at topography, hills, we'll look at temperature and its impact on the battery.

(00:36:58):

We'll look five years down the road because right now batteries and electric buses are degrading at one and a half to 2% a year. So we'll look, if bus one is going to go on route one in 2023, will it still work on that route in 2028? So we'll factor all that in, including maintenance, operations, management, and safety and special needs training. And part of what we do whenever we engage either getting our own buses or working with a non-customer at this point in time, is we will always bring in first responders when a bus is delivered, EMTs, firemen, police officers, things of that nature. We want everyone to understand this is a little bit different than what's out there now. And there are some unique ways in

which you may have to engage with a vehicle if it's been involved with any kind of issue or incident or accident.

(00:37:46):

So if you can go to the next page, please, Paul. Our process begins with the assessment. We'll do the needs analysis and we'll provide a quantitative and qualitative evaluation for you. Then we'll develop a strategic plan, which will take place over whatever the requisite number of years, whatever meets the district's needs or the contractor's needs at that point. So we'll develop the goals for conversion, the timelines, key performance indicators, and an action plan. And then ultimately, implementation and implementation does not end our support. It's ongoing throughout the life of the vehicles. And we do have key performance indicators and progress monitoring and reports that we will continually process and handle and share with whomever we're working with. Next slide please. So fleet electrification, why now and why partner next?

(00:38:42):

Nope, I think you went, did you go one too far? No. No. Okay. Why now? Well, EV technology is field proven, and there's been great leaps and bounds made in this. We just talked about a 210 mile range bus, but if you go back just about six years, these buses were going 60 or 70 miles. So there's been continual advances in battery technology, battery density, battery chemistry, and there's ongoing research and development being done in these areas. Right now. There are state and federal mandates for EV and overall emission reductions. And Kevin and Louis talked about what Connecticut's mandates are, and the grant funding and incentives for buses and infrastructure help that are available now for early adopters is going to be critical because this can be a costly process and as many buses as they're on the road in the US now, and it may be about 1600 or so, I cannot recall of any that were purchased without the aid of any kind of grant subsidy or assistance, financial assistance from whatever entity or agency it may be, and production forecast as we move forward.

(00:39:56):

We were talking prior to the call starting. There are some companies that have been absolutely synonymous with fossil fuel diesel buses like Cummings. And Cummings is right now evaluating their presence in the school bus field with a diesel project because the new diesel requirements are such that they're going to have to put a lot of money into research and development to meet clean diesel and things of that nature. And they just don't know if the market will be there after they invest all this money given the move toward alternative fuels, primarily electric at this point in time.

(00:40:30):

Next slide please. So the clean EPA Clean School Bus program, as we've talked about, there's $5 billion of dedicated funding to accelerate fleet electrification. Round one, there were 2000 applicants asking for 4 billion in funding. There was 900 million ultimately available a little bit more. And 913 million was finally awarded to 381 schools for 2,466 buses. In round two, 400 million was available. And this was more of a, say, needs-based, but this was kind of the best projects were selected in this and not a lottery system as round one. And round three, the rebate rounds are at this point in time and round three right now, there is $500 million available. The application period ends on January 31st of 24. We expect awards to be disseminated probably sometime in April from that, and then you would have until April of 26 to utilize those funds. And it's been said already, there's 345,000, and that is unlike in other rounds, like rounds one where it was 3 75 and 20 for infrastructure.

(00:41:45):

This is 345,000 to use as you will will on approved project related type costs. And one of the things that may or may not be apparent or knowledgeable is that the hope is, and part of what EPA is doing here by reducing the funds is they're trying to get the bus OEMs to lower their prices as well. The first round with the $375,000 allocation to school bus, coincidentally, most of the OEMs were coming in around $375,000 a bus. So in the third round of 3 45, and with increased demand, increased economies of scale, more competition in the marketplace, there's a hope that electric school bus prices will begin to wind down. And EPA is certainly hoping to help drive that and nudge that a little bit with what they're offering for grants in this round. Next slide, please. And why Partner with First Consulting? Go ahead. Well, first and foremost, and this is very simple. This is not ADIY project, as I already said. If you're getting into this now, you probably don't even know what you don't know at this point in time and be it first consulting, be it Dattco or whomever, find somebody that has the experience and the knowledge of the marketplace, the technology, how to best implement it, how to operate it, and partner with those guys and help you through the process here. Next slide.

(00:43:21):

Operational and excellence and EV experience is something we take great pride in. As I've already said, we are the world's largest school transportation provider. We have exceeded 2.4 million miles in our electric school buses. That slide's a misnomer. It's not 600,000, it's about 15,000 morning or 15,000 afternoon. But to give you some perspective on how many students we do transport, if you were to take American Airlines, United Airlines, Delta Airlines, Southwest Airlines, Alaska Airlines put 'em all together and aggregate the number of passengers they transport in a single day. And we take more children to and from school. So we clearly are leaders in terms of operational experience and excellence at this point in time. We have award-winning safety programs. We have huge teams that are dedicated strictly to safety. A first student meeting begins with a safety moment. Safety is the most important part of everything we do every day.

(00:44:23):

We understand we have precious cargo, we're transporting and it means everything to us. And our commitment to ev, ev, and I don't think I mentioned this, but our goal is to have 30,000 electric buses on the road by 2035, and we have 306 today and about 700 more on order. So we've got a long way to go, but it also plays into our safety first approach to school transportation, student transportation. Electric buses are cleaner, healthier. Every electric school bus deployed is the equivalent of eliminating 23 tons of greenhouse gas every year. The students are not breathing diesel particulate, which contains an untold number of carcinogenics in it. If first student, just to give you some perspective, was to meet our goal of 30,000 by 2035. And we believe strongly we will. We be the equivalent annually of removing 460,000 tons of greenhouse gas. We have industry best fleet maintenance, our cutting edge onboard technologies promote operational efficiencies.

(00:45:34):

Our chief engineer is a gentleman by the name of Alex Cook. In two of the last three years, Alex has won the Innovator of the Year award for school buses as awarded by STN. So we have high levels of expertise on our team, our professional routing expertise. As I already mentioned, we calculate 127 different factors, world-class signing training. We could do it onsite, offsite, we do, we'll do self-paced learning. We've got a wide program with a lot of options as to how to best complete it or work through it. Our purchasing power is unmatched. We buy more school buses every year than anybody else, and we do enjoy very strong relationships with all the OEMs, but right now, we seem to favor international and Thomas in the EV space at this point in time. But again, that's part of the value we bring is our strength and our recognized position in the student transportation fields. Next slide, please.

(00:46:45):

And our electrification goal is simple. We want to own and operate the largest fleet of EV school buses in North America, which we do today. And we want to continue that position. As I already alluded to, we would reduce greenhouse gas emissions by 460,000 tons, and one electric bus reduces health costs by $150,000 per year. In aggregate, $30,000 30,000 electric buses will reduce health costs, projected reduction of health costs by 4.5 billion. Next slide, please. So as you're an electric school bus partner, and this is a little redundant, I've gone through this already, but we work at three levels. We develop plans at each level and we work. We'll work from soup to nuts. We'll help you get the grants. We identify all the monies that are out there. We have very strong relationships with all the utilities. We'll work with the local utilities to maximize whatever make ready funds are available for you.

(00:47:49):

We also have invested on our own in research and development, and we have developed what we call a flex power system, which is it requires very little digging or trenching, which helps cuts down on the infrastructure costs related to preparing a site for it. It's somewhat mobile in as much as if you're on site and you decide you want to move your fleet a mile up the road. Well, this thing is, it basically goes on the back of a truck, we move it up the road. And again, with everything being above the ground, we don't use a lot of bollards. We use rails and things like that, that we move wiring down the length of it makes it a very easy move. And it's also modular in design. So if you start with 10 buses, but ultimately you're going to 50, we could set up the flex power system to accommodate those 10 units today. And as you expand your fleet and move forward, it doesn't require additional transformers or switch gear or anything along those lines. We simply upgrade the capacity of the flex power hardware system that we have in place. Next slide.

(00:48:57):

And this is it. The Flex Power system. We'll use, as I said, we'll either use rails or these Jersey barriers that you see in the picture here. They're easy to move, they're not easy to lift, but they're easy to move, relatively speaking. And we've had to overcome significant challenges in how we distribute our power in a flexible but cost-effective manner, which was somewhat the mother of this invention in terms of us needing to invest in something that allows us to provide what we need, do it in the most cost effective manner, and maintain the flexibility to be able to expand or move it as the fleet grows. Or real estate constraint constraints present themselves. That was hard to say. The KRA that is used sur mounting of the conduit and the cabling and charges acts as a solid buffer if the vehicle makes impact at a slow rate of speed. And believe it or not, one of the biggest challenges we're finding early on in this, if there's a failure rate, and it's not necessarily a true failure, but cables, there's been a number of cables that have been pulled and need to be replaced. So this won't necessarily eliminate that, but it does make accessing everything around it quite simple. And by allowing a small amount of slack in the cable management system, the KRAS can be displaced with by a foot or more without severing any of the connections at damaging any of the infrastructure. Next slide.

(00:50:29):

And keys to moving forward,

Paul Wessel (00:50:32):

Let's hold on this. We'll come back to this. Okay.

Kevin King, First Consulting (00:50:34):

Okay.

Paul Wessel (00:50:35):

I wanted to follow up with everybody's key points for lessons learned and pieces of advice.

Kevin King, First Consulting (00:50:43):

Okay.

Paul Wessel (00:50:45):

So here's Kevin King's info, and at the end of all the presentations, I'll give you everybody's email addresses. Why don't we go now to Brendan Sharkey talking about the ACEs up program that ACEs is running statewide through the risks. Brendan, you're on.

Brendan Sharkey (00:51:04):

Thanks, Paul. Yeah, I'd like to take this a little bit in a slightly different direction because what you've heard so far today has been from the bus, the vehicle side of things. But I'm going to be speaking more about the charging infrastructure side. To give you a little bit of background. ACEs, if you're familiar with the risks in Connecticut, there are six of them. ACEs is the regional education service center or risk for the greater New Haven and Waterbury areas. And about three years ago using the DIRA grant that was available from the VW Dira grant that Kevin Devo described earlier, we actually acquired the first full size electric school bus in the state. And it's still an operation from ACEs at ACEs for their facilities. But what ACEs learned from just that process of purchasing a bus and also installing an adequate charger for that bus, they realized we had a steep learning curve in understanding the logistics of electric buses and electrical fleet electrification generally, but particularly on the charging side.

(00:52:36):

And what ACEs decided to do was to create this program called ACEs up, which in part provides technical assistance to help school districts navigate the bus acquisition part. But really ACEs up is envisioned as a network of EV charging stations that are dedicated to public schools. The first thing that ACEs learned when they got this new electric school bus, a Bluebird bus through school lines of Connecticut, who was our partner in acquiring the bus, was range anxiety. The concern that, wow, we are based in North Haven. We're going to be taking some kids on a field trip down to Bridgeport on a cold day. How do we know for sure that they're going to be able to get down and back? And unless we know that there's someplace in Bridgeport where we could recharge at least temporarily in order to get our students back to the North Haven headquarters.

(00:53:45):

So it began a thought process here of what if we could create a statewide network of EV charging so that we could eliminate range anxiety? And the idea is create charging stations at schools. The thing to keep in mind when acquiring EV buses and the charging infrastructure that goes with it is that, I'm not going to speak for all the bus companies here today, but generally speaking, the charging infrastructure is going to be located where the buses are stored, which is typically a gated facility somewhere. It might be on school grounds, but in many cases it's in a private yard that's gated, and the charger is only really available exclusively for the buses themselves. So what ACEs up decided was maybe we should go about this a little bit differently in addition and complimenting what the bus companies are doing. And the idea was what if we were to create a network of EV charging stations that are school-based throughout the state? They would start out as workplace chargers essentially at the schools themselves that could be accessed by this teachers and employees of the school. First and foremost, these are higher powered level two chargers, which usually don't require major upgrades to the power coming into the buildings.

(00:55:32):

And they can charge buses for sure, but the idea was let's start building out this infrastructure now using these level two chargers and placing them at the schools. So that way if a school bus driver was looking to go and take the kids away to an away soccer game that might be 30 or 40 miles away on an electric school bus, they could know that there is a charger at that remote location where they could charge while the kids are playing their game and know that they have enough juice to get back. It's a different approach. It's an infrastructure based approach to electrifying fleets. There is a general acceptance of the fact that right now don't have a lot of electric buses out on the road despite everyone's best efforts, largely because of cost and the sticker shock that most school districts face when looking these buses and the fact that they're just not readily available at reasonable cost.

(00:56:44):

So given that, why don't we build out this infrastructure first? And so that's what we've done thus far. So ACEs up as a risk or working through ACEs as a risk has worked with school districts, not just in the ACEs territory, but actually all around the state now, taking advantage of the fact that it's a fellow, it's considered by the state as a fellow school district, so that if a risk has a program that they're offering, they can do so directly to the school districts and make things a lot simpler for the superintendent and enable these charging stations to go in at every school within the district in close proximity to the parking lots and again, can be used for now by the employees of the school. What we found from surveys that we've done that these are wildly popular for the teachers and the employees of the school districts as a workplace-based charger, but it can serve double duty as a charging station for electric vehicles, not just buses type one, type two buses, but also for vans and other formerly gas powered vehicles.

(00:58:09):

And the network is tied in to an app that is available to all of the members where you can reserve time on the charger for your use. If you're that bus driver taking the busload of students to the away game 40 miles away, you can actually reserve the time on the charger at the location where you're going so that you know it will be available. Not only will there be a charger there, but it will be available for you. And it's set up to be a priority system for school-based uses. And then the last thing I'll just say about it is that the ACEs has invested a $5 million and created a 5 million revolving fund that pays for whatever capital costs are not otherwise covered by grants or rebates from the utilities, and they get paid back. These are for all the capital costs, and then they get paid back from the fees that are charged at the charger at the charging fees are determined by every school district depending upon how they want to configure it, but clearly the charging fees have to cover the cost of electricity, which by the way is cheaper than if the employee is charging at their home, generally speaking, but also the financing costs that's associated with the additional capital outlay that ACEs has put up.

(00:59:48):

So there's no out-of-pocket cost to the school district to install these. So it's a very attractive option that is starting to pick up around the state. And a lot of school districts are already signing up. We have currently about 45 to 50 locations that we've already signed up, and we're in the process of getting permitting, doing drawings, doing layouts and so on. And we expect that this is going to really accelerate next year. So much so in fact that ACEs intends to take the ACEs up program out of state to other nearby states in the Northeast as well as around the country. I'll be going to a conference later on this month, month with ACEs in part to promote just that very idea. So I guess the bottom line on this is as you're thinking about electrifying your bus fleet or switching over to electrifying your school bus and transportation fleet, remember that the charging infrastructure is usually going to be, the word control

is a little bit strong, but it is going to be maintained at the location where the bus company has their buses.

(01:01:10):

What ACEs up is trying to do is create a network. And that won't help you if you're looking to solve range anxiety because if you're not tied in, there may be a charger somewhere in the remote location, but if it's behind a gate in a yard where the buses are otherwise charged, that's typically not going to be publicly available. This solves that problem. ACEs up solves that problem by creating a school-based network of EV chargers that are available to anyone in the network as well as the public, but with a priority focus on school transportation in particular. And I think the general feeling is that just like is happening on the national level when it comes to electrifying our transportation sector, that you've got to build up the infrastructure, the charging infrastructure at the same time and maybe even before the adoption of electric vehicles can really happen in order. In other words, you had to have gas stations before you could have cars, so the cars could refuel. It's the same principle here, and that's why there's a lot of emphasis on creating the infrastructure that's necessary, and that's really what ACEs up is focusing on. So happy to answer questions as we go forward.

Paul Wessel (01:02:28):

That's great, Brendan. Thank you. And it's clear that there are a lot of different pieces to a lot of threads to this tapestry and a lot of people eager and available to help us weave this fabric that we're trying to weave. We want to spend a few minutes just having people sum up with some of their lessons learned and then open it up for more questions and comments and discussion. Why don't I start with Kevin de Vivo on some of your key lessons and pieces of advice for people.

Kevin DeVivo, DeVivo Sales / DATTCO (01:03:02):

So again, I'm trying to keep it quick. Something I've been saying lately is if you were building a house, where would you start right now? What people, people's answers to that question is they would buy the fridge and they'd buy the oven, they'd get their tv, which are all very important parts to your home and very important parts to your day, but unfortunately not the best way of building a house. And so we need to take that same logic and start applying it to our transition to electric. So if you were building a house, I think your answer would be you'd start with an architect and you would design and plan what? Well, maybe backing it up, you'd figure out where you wanted to build your house first. So assuming that you already have the plot of land established, your next step would probably be to have an architect design it, and then you'd have to build all of the things around it that would then be able to power that refrigerator that you really like in that oven and that tv.

(01:04:13):

So start at the beginning, and if you kind of frame it that I think you'll frame it in that lens. You'll start to see how we should be going about this, because right now I told you we're getting the buses and the bus is the easiest part, and that means that people are getting buses delivered with no infrastructure to charge 'em experiencing it. Right now with unfortunately Lou is on top of that, I think it's a little easier with level two AC chargers as well. So that's helpful in that situation where the utility upgrade was not necessary there. We didn't need to bring in switch gear to accept upgraded power switch. Switchgear is backorder we found. So going back to our fleet side, we had switchgear for our locations, backorder over a year. So had the buses again and switchgear not yet there. And then after we got the switchgear installed, we still needed to get the utility power upgraded.

(01:05:32):

So I guess the point though was start with the design and the design engineering and planning process, especially if you're going to be using DC fast chargers and then go from there. Now I recognize that that's very difficult because of the way that the system is set up. You're not going to invest in the infrastructure if you don't get the funding for the bus. So there's a chicken egg problem going on here with the way the funding works, because what happens is with our customers with the vivo bus sales is they don't know if they're going to get the funding. Then once they get the funding, it's press start and panic, and then we have buses coming in without chargers to charge, and it makes things very, very difficult. So I guess the larger lesson or the more simplistic lesson is that the infrastructure is the important part to get figured out. Now, the regulatory cause a lot of issues with, as I described with that, but that makes this a very difficult problem to solve. But the bus is just the tip of the iceberg and everything behind it. This is from the EPA Queen school bus program, is a much more exacting issue to solve along the way. Yeah. Sorry Paul.

Lou Camacho, CTECS (01:07:12):

Thanks Kevin. It's good advice. Lou, you want to add anything there? Sure, sure. Just to kind of echo what Kevin is saying, I think the bus part is the easy part, right? I think that the infrastructure is important. We talked about going with the DC fast charger. It was just too cost prohibitive for us right now. And so we decided to go with level two, which was I think the right decision for us because of the way we use our bus and because we do have that overnight dwell time to charge the bus before we take it back out again the next morning. So for us, it seems to make sense. I think we will have to see how it goes. It is, I call it a pilot program because we're rolling this out and we're going to see how it goes and we will make some changes as we go.

(01:07:57):

Some of the things that I think lessons that, again, we're still learning. We haven't received our first bus yet, but as we're putting in the infrastructure for us, some of the challenges are not only the power in the infrastructure, but it's also the location. We don't have a designated area at each school that we park our buses. And so we are looking at what makes the most sense, right? We're looking at some areas that are prone to flooding. We don't want to put 'em there. And so just deciding where the bus is going to go for us has, it's been a challenge for me because I think the other thing that happens too is again, it's cost prohibitive. So if we have an area that we normally park our blue buses, but there's no power in that area, and now we have to, it's easier to relocate the electric bus to a different area that's closer to where the power is, then it is to run the power out to where we normally park our buses.

(01:08:55):

And so we're making some of those decisions. Now, we do hope to get maybe some DC fast chargers at the athletic fields, so that way when our schools are playing, we have a game we usually play. Athletics are usually within our district, or if there's a visiting school that's going to use a DC charger, it'll be a fast charger that would charge the bus up pretty much more quickly than a level two would. But again, that's down the road. I think we're going to look at that right now. One of the ways we're going to possibly use our buses is because they're all generic. To get the additional range, we might just swap buses. So if there's a bus that's leaving Hartford and going to Danbury and we're worried about the range anxiety, we might just swap and take a Danbury bus back home and just keep that. That's going to be a little bit of a logistic nightmare for me, but it's easier to do that. And then right now for us, we might do that, and I hope with technology and the improvement, we're going to see a better range on these buses in the future and we will see what happens with, like I said, like Brendan said, with the cold weather and using the heat on the bus, I think it makes quite a bit of difference.

Paul Wessel (01:10:09):

It'll be great learning along with you, Lou. So thank you for everything that you're doing. Kevin, Kevin King, you want to leave us with some of your keys to consider moving forward?

Kevin King, First Consulting (01:10:21):

Well, I'll echo what Kevin and Lou said that this is infrastructure is key. And I don't use the architect analogy that Kevin did, but I'll say you wouldn't climb Mount Everest without a guide. So you need a guide to help you through this process here. So you need to include fleet electrification in your district strategic plan. You got to know what your sweet spot is for cost savings, research, all the EV funding sources available to the district. And to that point, I would say apply early and apply often if you are successful in your application, but it's not the right time. You can give the funds back. There's no penalty, nor is there no detriment to future applications. But one thing we haven't really touched on is there's also a political element to this. Certain party affiliations have affinity toward financing of projects like this than others.

(01:11:16):

And if we were to have an administration change in 24, 25, will EPA go away? Nobody knows, but apply now. The money's there. You have nothing to lose. Apply, apply and apply and understand and evaluate the guidelines regarding ENV implementation. It was touched on here by Lou. I was in a Florida State Association of School Board meeting recently, and I won't specify the district. Someone came up and told me they were very excited. They just got three new electric school buses, but they'll be even more excited to use them in six to eight months when they get their infrastructure installed. Infrastructure is key. It takes time and you need to understand what the costs are, what monies are available to offset those costs. And in New York State for arguments, for instance, I live in upstate New York near Saratoga, we have a mandate that says in 2027 you have to buy electric, and by 2035 you have to convert your fleet. At this point in time, it's 2027. Between grant application, as Kevin alluded to, delays in shipping of infrastructure like switchgear and transformers, you got to figure it's 18 to 24 months before you get everything in place. So start now develop ongoing fleet operational experience prior to the arrival of mandates. If you can get EVs going before you have to, it's even better. And the last part only applies to New York, but I know we're running low on time. We want to get some questions, so I'll end it there.

Paul Wessel (01:12:49):

Okay, great. So there are a lot of pieces here. Clean cities coalitions can help localities and local school districts. There are three coalitions here in Connecticut. The utilities have been great at working with us, both UI and Eversource or Avan Grid and Eversource. And as somebody, Kevin Moss pointed out in the chat, there's currently a docket open with the state regulators about what more the utilities could do to assist in the electrification process. We had a question that wasn't answered about range and battery degradation over time. Kevin, can you talked about that a little bit? I don't know if Kevin, Devo, you have any experience.

Kevin King, First Consulting (01:13:39):

Well, I did respond to that question, Paul, but right now we're seeing one and a half to 2% a year. It's been consistent, but we don't know what it's going to be in 10 or 15 years.

Paul Wessel (01:13:49):

Diesel. Is that true as well for range?

Kevin King, First Consulting (01:13:52):

Well, there'll be an impact on range. So in theory, if you lose 10% of your battery, you're going to lose 10% of your range. But what hasn't been discussed at any length is learning how to drive these things. Miling. There are stories in California of buses with 120 mile ranges and drivers getting 145 miles out of 'em, so there are ways to offset it. Yeah, realistically, you can expect some loss of battery capacity. And we

Paul Wessel (01:14:14):

Haven't talked about driver education, but that's clearly an element of this whole transition. Brendan, I didn't shark you. I didn't give you a chance to come up with some of your nuggets. Oh, sure. Well, opportunity, but then I do want to let other people jump in.

Brendan Sharkey (01:14:29):

Sure. Very specific. I think everybody else was kind of making the point that I think what ACEs up is about, which is that the infrastructure is really what has to happen really first, and that's really what ACEs up is focusing on. But the other very practical thing to keep in mind is that a DC fast charger, which is the quickest, easiest way to charge a full size bus, requires by code a very different, and I'm not an electrician, but it does typically require a major upgrade to what is usually available in a building. So you can't just place them everywhere. And the incentives for DC fast chargers diminishes very quickly. The utility rebates for DC fast chargers gets gobbled up very quickly currently, which is again, why I think Lou's point and what he's done within the technical schools is essentially a smaller version of what ACEs up is aspiring to do statewide focus not only on that networking of chargers that are school-based, but also for now anyway, focus on the level two chargers. Try to get as high powered to level two charger as you can, not the small eight KW kind of chargers that would take hours and hours and hours to recharge a bus, but get a larger beefier level two charger. And we have found we have to kind of stay away from DC fast chargers because the infrastructure elements that are involved in getting those installed are usually not only cost prohibitive, but completely impractical right now, depending upon where your charger is going to be located.

Kevin King, First Consulting (01:16:42):

Can I just say one thing that the only counter to that, and it's an excellent point, but what we didn't talk about, because it's more conceptual, there's only a number of projects going around the country right now, but vehicle to grid and grid revenues are a potential reality around this technology, and it will require bi-directional dc fast charging for that. But again, it's the technology is there on the buses and the hardware in the charge management software, but the utilities are not fully engaged already across the country yet. So

Paul Wessel (01:17:15):

We may be working with UI on a project. We may be working with UI on a project around this. Essentially the buses sitting there in the summer are big batteries. You can sell electricity back to the utility and generate some revenue off of it.

Kevin King, First Consulting (01:17:29):

There's

Paul Wessel (01:17:30):

Potential there, but it's potential right now.

Kevin King, First Consulting (01:17:32):

Yes.

Paul Wessel (01:17:35):

Anybody want to unmute and ask a question or make a comment?

Lou Camacho, CTECS (01:17:41):

I have a comment. It's Lou. Sure. Just to kind of, and we don't have the buses yet, so I'm kind of just projecting doing some math here, but I'm looking at, with our level two chargers, I'm predicting that we're probably going to charge at a rate of about 10 to 12 miles of range per hour of charge.

Paul Wessel (01:18:03):

Okay.

Lou Camacho, CTECS (01:18:03):

That's kind of what I'm predicting. I don't know exactly what I'm going to come up with here, but that's based on kind 120 mile range on the bus and the size of the battery and the type of power that we're going to be providing. So I'm figuring that's going to every hour, we charge about 10 to 12 miles of range. We're going to be adding back to the vehicle. Now the battery, when it charges, it charges more quickly when the battery's low and it kind of slows down as the battery tops off. So that might be some variable there, but that's kind of what I'm predicting.

Kevin King, First Consulting (01:18:35):

You can take a simple rule of thumb maybe to take the 19.2 and divide it by the number of kilowatt hours, and that should give you your time to full charge if you were fully depleted.

Lou Camacho, CTECS (01:18:45):

So the charger I have is a 19.2, but the bus is going to be limited to 13.2, but we're putting a bigger charger in future proofing for a larger bus and larger capacity.

Paul Wessel (01:18:58):

I think Lou, we're going to have to do a case study with you. This is great stuff. Somebody asked, are the school districts planning on parking the buses inside or outside? And are there safety concerns about charging and buses being next to one another? There's an issue that's been coming up recently.

Lou Camacho, CTECS (01:19:16):

Yeah, good question. I'll take this one. So we are actually installing some of our buses inside a bus garage. Matter of fact, just today it was the first we did the chargers that required trenching and outside work first. And today we're moving on to the ones that are going to be inside. And we are installing inside a bus crash. There's definitely some concern. Some people have raised some concern, but I feel pretty confident with charging indoors. I think that many people charge their cars inside their garages

today. Of course, we have computers, laptops, Chromebooks, and cell phones that charge inside. I, I'm not terribly worried about it, but we are moving forward with inside storage. Yes.

Paul Wessel (01:20:06):

Anybody else?

Kevin King, First Consulting (01:20:09):

We have experience with both inside and outside. And again, some of our outside charging is done in extreme cold temperatures and there's been no impact. But one of the things we do, and we've not had to utilize it yet anywhere, we have EV electric school buses deployed. We have an isolation area. So if we ever see a battery is starting to heat up and there's any kind of concern about that battery heating up, we have an area where this bus can be parked and it's a minimum of 75 feet from any other vehicle. So in the event it does accelerate to the point where there's potential for a fire. It's not in danger of affecting any other vehicles. But to this point, we've not had any breaches of high voltage electric and we've not had any issues with battery acceleration or heating.

Kevin DeVivo, DeVivo Sales / DATTCO (01:21:00):

I would just say that parking vehicles inside for performance certainly does benefit them. Batteries are very sensitive to do changes in temperature. Specifically, everybody's heard that colder weather does reduce battery life or efficiency. CT Transit has a facility where they park their buses inside Boston Public Schools who now has procured 36 buses is planning to park vehicles inside. The problem is the cost prohibition of parking vehicles inside above all TBD. I guess on safety of that, I don't see anything that's less safe about that. But we would love to be parking all of our vehicles inside. Our drivers would love that, whether they're electric or internal combustion engines. And it's just cost prohibitive already with the infrastructure. So to add a building around that is just more cost.

Paul Wessel (01:22:09):

So Kevin Moss from the Green Bank wanted to follow up on an earlier question about other funding sources. And the Green Bank, which has served as a model for Green Bank across the nation, is doing some interesting work here. Kevin, you want to tell us what the news is?

Kevin Moss, CT Green Bank (01:22:23):

Yeah, I just want to share that the Green Bank is actively getting into the clean transportation space and plans to use, its forthcoming monies from the Greenhouse Gas Reduction Fund to fully focus on electric school bus deployment in Connecticut. And so that's going to really increase the Green Bank's capacity to offer low and no interest financing in this space. And our big award notification will come next spring, but it looks like almost certainly we'll have at least $5 million next summer to start deploying these funds. And those will be no interest funds, financing opportunities and innovative ideas and demo projects in that space. So feel free to follow up with me.

Brendan Sharkey (01:23:13):

We, Devin, if I may, Paul?

Paul Wessel (01:23:15):

Yep.

Brendan Sharkey (01:23:17):

Are those funds primarily for bus acquisition or

Kevin Moss, CT Green Bank (01:23:26):

The EPA category is just clean transportation. So I think we can be pretty flexible. So it could either be bus acquisition or paying for any of the grid infrastructure that isn't covered by the utilities. It really can be pretty flexible as long as it meets that revolving loan, national Climate bank model that EPA is trying to stand up.

Paul Wessel (01:23:53):

So we'll get more information out about this as the program ripens, but thank you for sharing that, Kevin, we, I'm winding down here. I've put people's email addresses on the screen so you can follow up with them. I just have to say this is, I didn't know what to expect today, but the variety of approaches and learnings I think is really valuable. I think providing the service for school districts that are trying to figure out how to move forward under both the burden of a mandate and the opportunity that the funding allows for, and there's more work we'll continue to do, and we'll continue support communities here in Connecticut. Anybody on the panel want to have some parting words or we all talked out.

Brendan Sharkey (01:24:45):

I would just say thank you, Paul, and thank you to everybody who took the time to join the call today. Much appreciated.

Paul Wessel (01:24:53):

All right. Thank you everybody, and we'll talk to you soon. We'll send out a copy of the recording and the slides and we'll have a blog up on our website soon. Thanks a lot. Bye-Bye

Brendan Sharkey (01:25:02):

Bye. Thank you. Thank you. Bye.