

S&P Global

Market Intelligence

SES AI Corporation NYSE:SES

Earnings Call

Tuesday, November 7, 2023 1:30 PM GMT

CALL PARTICIPANTS	2
PRESENTATION	3
QUESTION AND ANSWER	6

Call Participants

EXECUTIVES

Eric Goldstein

*Vice President of Investor
Relations*

Jing Liu Nealis

Chief Financial Officer

Qichao Hu

Founder, Chairman & CEO

ANALYSTS

Shawn Michael Severson

Water Tower Research LLC

Unknown Analyst

Yan Dong

*Deutsche Bank AG, Research
Division*

ATTENDEES

Unknown Attendee

Presentation

Operator

Hello, everyone, and welcome to the SES AI Corporation Third Quarter Earnings Conference Call. My name is Bruno and I'll be operating your call today. [Operator Instructions] I will now hand over to your host, Eric Goldstein, Vice President of Investor Relations. Please go ahead.

Eric Goldstein

Vice President of Investor Relations

Thank you, operator. Hello, everyone, and welcome to our conference call covering our third quarter 2023 results and financial guidance for 2023. Joining me today are Qichao Hu, Founder and Chief Executive Officer; and Jing Nealis, Chief Financial Officer. We issued our shareholder letter earlier this morning, which provides a business update as well as our financial results. You'll find a press release with a link to our shareholder letter in today's conference call webcast, the Investor Relations section of our website at ses.ai.

Before we get started, this is a reminder that the discussion today may contain forward-looking information or forward-looking statements within the meaning of applicable securities legislation. These statements are based on our predictions and expectations as of today. Such statements involve certain risks, assumptions and uncertainties, which may cause our actual or future results and performance to be materially different from those expressed or implied in these statements. The risks and uncertainties that could cause our results to differ materially from our current expectations include but are not limited to, those detailed in our latest earnings release and in our SEC filings. This morning, we will review our business as well as results for the quarter.

With that, I will pass it over to Qichao.

Qichao Hu

Founder, Chairman & CEO

Thanks, Eric. Earlier this year, we laid out the goal to transition to B-Samples, and I'm happy to report we're almost there. We expect to sign a sample joint development agreement, JDA, with 1 of our OEM customers in the next few weeks. This will be the world's first automotive B-Sample for lithium metal. This will be a historic milestone for SES for the battery industry and for the future of transportation.

We had to overcome monumental challenges to get to this point. One of the most important challenges was safety. And we're not talking about lab-scale safety. We are talking about practical real-world safety. In the battery industry, there's an inherent trade-off between energy density and safety. Many companies improve safety by using safer chemistries, such as lithium iron phosphate, LFP cathodes or solid-state electrolytes. LFP is indeed safer than high nickel cathodes. And in theory, solid state appears to be less volatile than liquid lithium metal.

So why don't we switch to these safer chemistries? While these safer chemistries appear to improve safety, we believe they make unacceptable compromises to energy density, manufacturability and other important parameters. For example, an LFP cathode has about half the energy density of a high nickel cathode. And solid state has yet to prove its manufacturability and performance in a cell that can actually be used in a real-world application.

So what's the point? We don't want our cells to be impractical but safe. We want our cells to be alive, powerful and safe. Our goal all along has been to improve safety without any compromises to other parameters. We start with a high energy density approach that has inherently higher safety risk than a lower energy density solution. And we make it safe.

It's extremely difficult, but we have always chosen to do things the hard way. That is what we will have achieved to qualify for automotive B-Sample for lithium metal. No one saw listened with a high nickel

cathode would achieve the level of practical safety that we recently demonstrated in our internal testing. This was a combination of very exciting fundamental breakthroughs in materials and engineering.

Given advanced lithium ion with a high nickel cathode can have severe safety risks, and we believe our advancements address the safety issues in both lithium ion and lithium metal. For example, our new high nickel cathodes active materials have the same capacity as equivalent traditional high nickel cathodes, but are much more stable. Our new cathode electrode coating and treatment process allows the same cathode to pass rigorous safety tests, including nail penetration and heating. Has new pouch cell engineering with a self-venting mechanism that allows gradual safe release of energy during thermal runaway. A new electrolyte that is safer with no compromise on performance, a newly protected lithium metal anode and the new charging protocol that improves overall safety. These are fundamental breakthroughs in both engineering and materials, not just for lithium metal, but also for lithium ion, especially our developments in the cathode. We are now able to delay the thermal runaway on-site temperature and reduced peak temperature and pressure during thermal runaway, significantly.

Some companies that are in earlier stage of lithium metal development talk about dreams of perfectly safe batteries. In most cases, the battery capacity or energy density is so low that it's useless. To be in automotive B-Sample, which we believe is the most advanced in lithium anode development anywhere in the world, we deal with practical safety concerns, not dreams on paper. It's exhilarating to see our batteries during safety tests going from big explosions to small explosions to big fires to small fires to just smoke. It feels like witnessing a successful rocket launch after many failures.

We recently completed our second testing bunker. Now we have even greater resource to test new things. For many people, risk means danger and should be avoided. For us, risk means innovation, and we embrace risk by creating a safe environment to test unsafe things. Without these bunkers without this safety environment to test unsafe things, we will not be able to understand the mechanism. We will not be able to make unsafe things safe and next-generation batteries and transportation will not be able to move forward.

At our upcoming Better World 2023 in December, we will demonstrate some exciting videos of high-energy density lithium metal batteries passing very rigorous safety tests. We never thought we could achieve such safety while maintaining high energy density. This is a big milestone towards our goal of commercializing large capacity high-energy density lithium metal cells for automotive applications.

In terms of manufacturability, last quarter, we indicated we will increase our A-Sample lines to 1,000 large capacity 100-mPOWER cells per line per month from approximately 500 per month. November will be the first month that we will attempt to build 1,000, A-Sample 100-mPOWER cells at our Chungju line in Korea. These cells will be used for both internal testing and OEM sample qualification and Avatar safety prediction algorithm training.

We currently have 3 A-Sample lines in operation and 3 B-Sample line under preparation, 1 line for an EV application and 1 for a UAM application. For the B-Sample lines, we are in the final stages of completing our vendor qualification review. We expect to continue to use the A-Sample lines for B-Sample cell development until the new B-Sample lines become operational, which we expect to occur in 2024. By running our lines up to 1,000 large 100-mPOWER cells per month, we will also gain valuable experience in Avatar cell traceability and quality system development. We have even hired a dedicated field data collection team to help ensure that the data are correct and collected through the correct process. This team helps our Avatar algorithm safety prediction tremendously by providing verifiable and complete data.

In summary, earlier this year, we established a milestone to transition to B-Sample and we are almost there. This is a major milestone for us and for the battery and transportation industry and is a result of solid fundamental hard core material chemistry and cell engineering breakthroughs in safety, for high energy density lithium metal batteries with a high nickel cathode. From A-Sample to B-Sample JDAs with EV OEMs, the most important value of these JDAs is helping us build a solid foundation in technology development, process development, engineering development, quality development and manufacturing development. With this solid foundation, we are now able to expand into other applications that are ideal for our unique high energy density and high power density lithium metal batteries such as drones and

urban air mobility, UAM. These applications also represent early-stage commercialization opportunities for us.

We are very excited about the UAM opportunity and believe that lithium metal will enable UAM in the 2020s, the same way that lithium-ion enabled portable consumer electronics 30 years ago in the 1990s. The world's first lithium B-sample will be a small step for SES, but has the potential to be a giant milestone for the future of sustainable transportation both on land and in air.

Now I'll hand the call over to Jing.

Jing Liu Nealis

Chief Financial Officer

Thank you, Qichao. Good afternoon, everyone. Today, I will cover our third quarter financial results. and discuss our operating and capital budgets for full year 2023.

In the third quarter, our operating expenses were \$19.4 million, down slightly from the same period last year. Stock-based compensation expense was \$2.4 million in the quarter. We reported research and development expenses of \$8.5 million, up \$0.1 million from the same period last year. Our gross R&D spending in the third quarter was \$11.4 million, which includes \$2.9 million that was billed to our OEM customers and is treated as contra R&D expense.

Our G&A expenses were \$10.9 million, down \$2.4 million from the same period last year. This decline was primarily driven by lower insurance premiums and lower marketing, accounting and audit-related expenses.

Through the first 9 months of 2023, cash used in operations was \$43.9 million, and capital expenditures were \$12.3 million. Importantly, our balance sheet remains very strong. We ended the third quarter with combined cash, cash equivalents and marketable securities of \$342 million. We continue to believe our liquidity is sufficient to reach commercialization.

Our updated guidance for cash usage in 2023 is now \$85 million to \$105 million. This is comprised of cash usage from operations of \$65 million to \$75 million and for capital expenditures in the range of \$20 million to \$30 million. We continue to be very prudent with our cash. We have a very practical process to evaluate where we should spend our cash in order to execute on our business point and drive our commercialization road map forward, while we keep investing in core material innovation with the goal to always stay ahead of our competition.

As Qichao mentioned, we're in the final stages of completing our vendor qualification review for Line 4 and Line 5 in preparation for B-Sample. We expect the bulk of our capital expenditures for Line 4 and Line 5 to fall in the first half of calendar year 2024. We're making significant progress and remain on track for transition to B-Samples by the end of this year.

Our strong liquidity position allows us to continue investing in our next-generation manufacturing lines to support our OEM customers while continuing to innovate at the forefront of battery material science and to attract and retain top talent. We are very thankful for all the support we have received from our OEM customers and shareholders. With that, I will hand the call back to Eric.

Eric Goldstein

Vice President of Investor Relations

Thanks, Jing. Bruno, let's open the line for questions.

Question and Answer

Operator

[Operator Instructions] Our first question comes from Winnie Dong from DB.

Yan Dong

Deutsche Bank AG, Research Division

I was wondering if you can describe sort of how the next month of work will look like in the context of transitioning to B-sample. What are some of the key data points or transition to look forward within the next few months heading into 2024 as you're preparing Line 4 and 5.

Qichao Hu

Founder, Chairman & CEO

Yes, that's a good question. So from a contractual perspective, basically, we're going through the standard legal and the financial process to getting the documents signed. And then from a practical work perspective, so 1 key thing that we have demonstrated is safety, hazard Level 5. And then we've already demonstrated hazard Level 5 at a small cell level. And then in the next few months, we need to further verify hazard Level 5 at larger cell level. So the safety is a key thing.

And then A-Sample was really about demonstrating the chemistry and the cell design and then now B-Sample, in B-Sample we are going to build about 5 to 10 cars worth of batteries. So now safety and then practical safety actually becomes really important. So they want to see a very detailed testing under very detailed testing parameters. And then both at the small cell level and also the large cell capacity level. And also, we are also in the process of completing vendor qualification so that we can start building the line for B-Sample. So B-Sample will likely take about 1 year to 1.5 years. So complete by end of 2024 to mid-2025.

Yan Dong

Deutsche Bank AG, Research Division

Got it. And then earlier on this year, I think you guys have spoken about talent acquisition as 1 of the key initiatives this year. I was wondering with the year almost ending. Are you where you hope to be or need to be with your sort of like talent composition?

Qichao Hu

Founder, Chairman & CEO

Yes, it's a talent -- I mean, we always want more and better. And we're never satisfied with talent acquisition and the market is very competitive, which is a good thing. I mean, it's a really exciting market. And then -- and you can probably tell the kind of people that we're trying to hire, battery engineers, material scientists, AI scientists, these are very much in demand, almost around the world.

So I'm sure we can always do better. But actually, recently, we actually made some pretty impressive hires. For example, on the material science side, we hired our Chief Scientist, Kang Xu. He is 1 of the world's most renowned experts in battery electrolyte and also with -- on the cell engineering side, we also hired -- we also made a few hires recently. And then -- and these guys have extensive experience from the big Korean battery companies. So actually recently, we made quite a bit of progress. And then that allows us to beef up our team for the B-sample and also to expand to eVTOL.

So we actually have -- so in the past, we have 3 teams for the 3 A-samples. And now we're going to keep beefing up our team to go from A to B and also expand into eVTOL. So we're making good progress, but never enough.

Yan Dong

Deutsche Bank AG, Research Division

And then maybe a more high-level question just in the context of like recent narratives around EV adoption curve that may be not coming as strong as expected, we sort of hear that from suppliers and we hear that from OEMs. Understanding that you guys are sort of in the product development phase, but do you hear any of this from your OEM JDA partners in terms of the adoption curve looking for not coming in that strong or you can color -- any color you can provide there?

Qichao Hu

Founder, Chairman & CEO

Yes. I think I mean the adoption curve can always be impacted by, for example, the economy and then other factors. But the overall trend that's unstoppable. And then especially these OEMs like GM and Honda which, I would say, are behind the newcomers like the Tesla and NIO, they are very much committed to EV adoption. So there might be some impacts by the economy and other factors. But in terms of the battery road maps, no change there.

Operator

Our next question comes from Shawn Severson from Watch Tower Research.

Shawn Michael Severson

Water Tower Research LLC

Qichao, I was wondering if you could talk a little bit about the air mobility space. And I'm trying to understand, I guess, lack of a better word, the synergies between the automotive and transportation side and what you're doing in Air Mobility and then extending from that a little bit of the time line of what we'd be looking at in the urban air mobility space.

Qichao Hu

Founder, Chairman & CEO

Yes, Shawn, that's a really interesting question. So all the work that we are doing with the EV OEMs in A-sample and B-Sample, building up the line, improving the quality, improving the cell design, the safety, the performance. Almost all of that get transferred to the eVTOL. Because eVTOL the urban air mobility meets all the parameters that the EV OEMs require. The safety actually even more rigorous safety requirements, the cell design, the quality, they need all of that. And then what's better is that for the OEMs you have -- I mean even though the EV OEMs are very committed to lithium-metal, you still have the incumbents like LG, CATL, Samsung, SK, the big companies that are very much invested in the EV space.

Whereas for eVTOL is blue ocean. And then some of the bigger companies are less interested in the eVTOL because the near term market -- they think the near-term market is smaller. But then for us, for next-gen batteries, it's really exciting. For example, say 1 eVTOL is about 2 cars in terms of batteries, right? So in the EV B-Sample, we built 10 cars water batteries. That's just the B-Sample for EV. But 10 cars worth of batteries, that's by eVTOL worth of batteries. If we supply 5 eVTOL worth of batteries to the likes of Joby, Archer, the eVTOL companies, then that actually consider commercial. And the volume is smaller, but then the margin, the economics are much more favorable. And also, it's a new market.

So the standards have not been set yet. And then we have the opportunity being the first mover in lithium metal for eVTOL. We have the opportunity to set the standards. And once you set the standards, then the FAA or in Europe the EASA, then they will adopt the standards. Then our lithium metal could be the first FAA certified lithium metal battery for UAM. And then once we set the standards, then we influence the next 5, 10 years of certification process in this field. So the impact is really big.

Shawn Michael Severson

Water Tower Research LLC

That's very interesting. And would you be able, I assume, through this process, get a lot of data, right, a lot of operating data that would apply back to [road] transportation. Is that correct?

Qichao Hu

Founder, Chairman & CEO

Absolutely, absolutely. And then I mean, we love working with the EV companies, but then those companies tend to be bigger, right? And then the eVTOL companies are more entrepreneurial and they are more like minded and similar size. And we work together and we share data, And we also tune our business model to fit what the market wants. So it's actually a really exciting market and eVTOL is actually happening much faster than we expect. I mean next year, at the Paris Summer Olympics, 1 eVTOL company will do a demonstration play. And then several cities around the world are beginning to have these eVTOL demonstrations. So it's actually happening much faster.

Shawn Michael Severson

Water Tower Research LLC

And my last question is we've -- we've had the supply chain shift in place for several quarters now in terms of pushing towards domestic supply, right, and qualifying for IRA. What's the progress report there? Have you seen things materially changed. I know you have some special relationships in your supply chain. But are you seeing that this move is being made. And as far as your strategic outlook, you feel very comfortable that you've got everything that you need at this point going forward.

Qichao Hu

Founder, Chairman & CEO

Yes. Yes. So very good point. And then, for example, on the anode side, and then I was just at a conference with Applied Materials. So Applied Materials [indiscernible] into these U.S.-based lithium anode companies are building up plants in the U.S. Some of them are in North Carolina, some are in other states as part of the IRA initiative. And then going forward, we definitely plan to purchase and qualify the anode from U.S.-based vendors. And then also in terms of lithium salt, we are working with a few partners to potentially set up facilities also in the U.S.

So we can produce this salt for our high concentration solvent installed electrolyte. And so the anode and the salt are 2 really key parameters to us. And then also several of our cathode vendors are already setting up plants. For example, in Canada, North America to supply the cathode. And then once we are towards the later stage of B-Sample, then we will sit down with our EV OEMs and potential eVTOL OEMs to discuss where in North America to set up a plant for the battery cells.

Operator

Our next question comes from [Jeff Graham] from [Alliance Global Partners].

Unknown Analyst

A question on the transition to B-Sample with the auto OEMs. Is there a way to assess how far behind. It sounds like you have kind of 1 kind of a front runner that you're very close with. Is there a way to assess kind of how far out the other 2 are relative to this first one? And is having one, assuming you get across the finish line, getting 1 to B-Sample, does that kind of give you guys an ability to nudge the others since there's some third-party validation? Or is that not really relevant as you guys have, as you guys see OEM seeing it.

Qichao Hu

Founder, Chairman & CEO

Yes. Good question. So actually, the spec, the transition from A to B for all the 3 OEMs and actually all OEMs around the world are actually quite similar, the performance and the safety. So we are going to transition to B with 1 of them because the testing and the type of studies and testing that we've done is the most extensive. And I would say the other 2 probably in terms of the gap, probably can be measured in months, just different OEMs.

In the past, a year to 2 years during the A-Sample development process, we had different time lines because we had different focus in then facilities, for line setup, but the progress is different. But then I would say the overall platform, the core technical progress that we make for safety and performance,

that's very transferable. And different OEMs may have different internal processes for getting to the next phase. But also they're measured in months. But -- that's more on the contract level. But in terms of core technical progress, we made progress with 1 OEM, and then we get to B-sample. And that progress can be transferable to the other OEMs.

Unknown Analyst

Great. That's very helpful. And for my follow-up, more of a macro question for you guys. But obviously, there's been some articles in the industry talk about some slowing EV sales and some building of inventories. I think a lot of that relates to cost as well as maybe some ranging side, which are obviously things you guys can address pretty impactfully. So I'm wondering if you guys are maybe seeing any different level of urgency from your JDA partners to move a solution like years forward? Or is it pretty similar from what you guys have seen historically?

Qichao Hu

Founder, Chairman & CEO

Yes. So the OEMs have sort of modified their focus, for example, from range anxiety to maybe safety to maybe cost. But then in terms of technology platform, the OEMs have not really changed their commitment because, for example, lithium metal, it can mean longer range. But then it can also mean lower cost because a longer-range battery, if you keep the range the same, then the battery is actually smaller.

So you pack -- the packaging can be actually cheaper. So lithium metal can actually be designed so that it can mean longer range or lower cost to fit the OEMs target.

Operator

[Operator Instructions] Our next question comes from Timothy Johnson.

Unknown Analyst

Yes. My question concerns the lithium metal anode. There are many processes for making such an anode. They're all problematic to 1 extent or another. Can you please elaborate a little bit more on the process that you use to lay down your lithium metal anode and whether or not you have any major problems with this going forward. I'm also interested in the composite coating that you're putting on the lithium metal anode. You mentioned today that you've got a new coating material -- and I'm wondering if you can elaborate on that.

Qichao Hu

Founder, Chairman & CEO

Yes. So also it covered the landscape. The first 1 in terms of how you put lithium foil down at the anode. There's about 3 main techniques for putting down lithium foil. And then 1 is extrusion, as you take the [indiscernible] lithium foil and then extrude it like a pasta maker, extrude it to a thinner foil and then you laminate onto your turn collector. And then another physical deposition. This is inside a chamber, you evaporate lithium and then that falls on to your substrate. And then third is slurry coating. You can take the lithium powder, you make a slurry and then you coat it and then you dry off the solvent. And there's pros and cons to each of the technique.

I would say the most mature currently is the extrusion and then lamination. That's by far the most mature process for putting down lithium foil. And there are disadvantages to that, for example, it's hard to make the foil wide, but we have an internal process for making the foil wide. And then that's why we're able to make the large format 100-mPOWER lithium metal cells. And then the other is in the extrusion and the lamination process for now. But we are actively testing the other 2 approaches because the 2 approaches may offer long-term advantages over the extrusion and lamination process. And for example, maybe in a year to 18 months, we might switch to the other processes and will keep the industry updated.

So -- and for us, the different process basically comes down to which 1 gives the best metrics in terms of cost, manufacturing efficiency and performance. And then your second question about composite

coating. So the composite coating serves 2 purposes. One is to improve safety, secondly, to improve the cycle life and we can't really get into the details of exactly what material we use. And the industry has different types of coatings and there's different ways and different places in the cell that you can put on the coatings. So I can't really get into the details, but it's basically used to improve safety and then prevent internal short and also to improve cycle life.

Operator

Our next question comes from [Amish Hu] a private investor.

Unknown Attendee

My question is so previously, you have mentioned that A-Sample JD includes different cathode chemistry in addition to high nickel. Has any progress been made in other chemistry other than high nickel, such as LFP lithium metal.

Qichao Hu

Founder, Chairman & CEO

Yes. So actually, in A-Sample, we tested both high nickel, LFP and also mixtures of those 2. And then in B-Sample we will continue to test these different capitals. And the reason that now that we are in B-sample, and that we need to finalize the cell design. But the final output of B sample is especially, we have to finalize the cell design. And 1 of which is what cathode we're going to use. And then these different cathodes will have different points on the [spider chart] in terms of safety, cycle life and cost. And this may vary for the different types of vehicles, even within the same OEM.

Many OEMs will have, for example, the premium brand and the economy brand. And then, of course, they would wish to have 1 standard unified cell with a unified cathode, but that's not likely. So we are actively testing high nickel and those different types of high nickel, LFP, different versions of LFP and the mixtures of those 2. And of course, there are different ways of mixing those 2. And we evaluate at the end of the day, the performance, energy density and overall set of parameters.

Unknown Attendee

So during the battery [roll] do you plan to share the data on other chemistries other than lithium metal?

Qichao Hu

Founder, Chairman & CEO

No. So all the data will be for lithium metal. The cathode may come from a combination of high nickel and LFP, but they're all lithium metal. We don't make any other cells. We only make lithium metal cells.

Unknown Attendee

Okay. So related to Line 4 and 5. Line 4 and 5 are designed for B-Samples since eVTOL has a lower volume, but can Line 5 be used for commercialization for eVTOL?

Qichao Hu

Founder, Chairman & CEO

Exactly. Very good question. And I think Shawn, from Water Towers asked the same question. So Line 4 and 5 are very similar. Line 4 is for EV, but then it's 10 cars of batteries a year, and that's considered B-Sample for EV. Line 5, we can make 10 cars or 5 eVTOL worth of batteries per year. But that's considered commercial because in EV, no OEM will give you an order for 10 cars, right? But then in eVTOL, a lot of the eVTOL companies will happily give you an order for 3 aircraft or 5 aircraft, and these are very high margin. And this helped us set the standards in the industry. Clear Line 5 will be for much eVTOL...

Unknown Attendee

So if that's the case, will there be a C-Sample line just for eVTOL or Line 5 is more like C-Sample and SOP for eVTOL.

Qichao Hu

Founder, Chairman & CEO

Yes. Yes. So eVTOL OEMs don't really divide the phases as clearly as the EV OEMs. So B, C SOP are sort of mixed together.

Operator

We currently have no further questions. So I would like to hand the call back to the management team for closing remarks. Over to you.

Qichao Hu

Founder, Chairman & CEO

Yes. So thanks, everyone, for tuning in and also supporting us. And it's not been easy for us to get to this point, and we're very close to entering B-Sample for EV applications and then all the solid foundation that we've built with EV OEMs, we plan to definitely continue to work with our EV OEMs, and we continue to have a very good relationship and partnership with them.

At the same time, we plan to take this solid foundation that we built modify it for eVTOL applications. It's a totally new field. It's a field that's happening much faster than we expect it and it's a field that like I mentioned earlier, lithium metal -- we really believe that in this decade, 2020, lithium metal is going to enable eVTOL the same way that lithium ion enabled consumer electronics 30 years ago in the 1990s. So it's a really exciting field for the future of transportation as well as lithium metal batteries. So I really appreciate everyone's support. Thank you.

Copyright © 2023 by S&P Global Market Intelligence, a division of S&P Global Inc. All rights reserved.

These materials have been prepared solely for information purposes based upon information generally available to the public and from sources believed to be reliable. No content (including index data, ratings, credit-related analyses and data, research, model, software or other application or output therefrom) or any part thereof (Content) may be modified, reverse engineered, reproduced or distributed in any form by any means, or stored in a database or retrieval system, without the prior written permission of S&P Global Market Intelligence or its affiliates (collectively, S&P Global). The Content shall not be used for any unlawful or unauthorized purposes. S&P Global and any third-party providers, (collectively S&P Global Parties) do not guarantee the accuracy, completeness, timeliness or availability of the Content. S&P Global Parties are not responsible for any errors or omissions, regardless of the cause, for the results obtained from the use of the Content. THE CONTENT IS PROVIDED ON "AS IS" BASIS. S&P GLOBAL PARTIES DISCLAIM ANY AND ALL EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, FREEDOM FROM BUGS, SOFTWARE ERRORS OR DEFECTS, THAT THE CONTENT'S FUNCTIONING WILL BE UNINTERRUPTED OR THAT THE CONTENT WILL OPERATE WITH ANY SOFTWARE OR HARDWARE CONFIGURATION. In no event shall S&P Global Parties be liable to any party for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses (including, without limitation, lost income or lost profits and opportunity costs or losses caused by negligence) in connection with any use of the Content even if advised of the possibility of such damages. S&P Global Market Intelligence's opinions, quotes and credit-related and other analyses are statements of opinion as of the date they are expressed and not statements of fact or recommendations to purchase, hold, or sell any securities or to make any investment decisions, and do not address the suitability of any security. S&P Global Market Intelligence may provide index data. Direct investment in an index is not possible. Exposure to an asset class represented by an index is available through investable instruments based on that index. S&P Global Market Intelligence assumes no obligation to update the Content following publication in any form or format. The Content should not be relied on and is not a substitute for the skill, judgment and experience of the user, its management, employees, advisors and/or clients when making investment and other business decisions. S&P Global Market Intelligence does not act as a fiduciary or an investment advisor except where registered as such. S&P Global keeps certain activities of its divisions separate from each other in order to preserve the independence and objectivity of their respective activities. As a result, certain divisions of S&P Global may have information that is not available to other S&P Global divisions. S&P Global has established policies and procedures to maintain the confidentiality of certain nonpublic information received in connection with each analytical process.

S&P Global may receive compensation for its ratings and certain analyses, normally from issuers or underwriters of securities or from obligors. S&P Global reserves the right to disseminate its opinions and analyses. S&P Global's public ratings and analyses are made available on its Web sites, www.standardandpoors.com (free of charge), and www.ratingsdirect.com and www.globalcreditportal.com (subscription), and may be distributed through other means, including via S&P Global publications and third-party redistributors. Additional information about our ratings fees is available at www.standardandpoors.com/usratingsfees.

© 2023 S&P Global Market Intelligence.