Allison Transmission Technology Day
October 6, 2021

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Global Off-Highway Product Development & Initiatives
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Session Two Q&A

(VIDEO PRESENTATION)

Ray Posadas

Hello and welcome to Allison Transmission's Technology Day. I'm Ray Posadas, Managing Director of Investor Relations.

Today you will have the opportunity to hear from key leaders on Allison's electrification strategy and the global opportunities for market expansion within our conventional products portfolio.

In a moment, Chairman and Chief Executive Officer Dave Graziosi will kick things off. Following Dave's remarks, John Coll, Senior Vice President of Global Marketing, Sales & Service will guide us through the commercial vehicle market and industry trends towards electrification. Alex Schey, Chief Commercial Officer for Electrification, will then speak to our ongoing engagements with OEMs on electrification initiatives. Ryan Milburn, Vice President of Product Engineering, will discuss Allison's commitment, capabilities and positioning for the transition to zero emissions. And Mike Foster, Chief Technology Officer, will discuss some of the key attributes and advantages of Allison's eGen power fully electric e-Axle product portfolio. We will then hold our first of two Q&A sessions.

Following a short break, Rohan Barua, Vice President of North America Sales, Global Channel & Aftermarket, will speak to the durability of our conventional market driven by continuous innovation. Heidi Schutte, Vice President of Europe, the Middle East and Africa, Asia Pacific and South America Sales, will guide us through the global trends towards automaticity and highlight recent global OEM releases. Kartik Ramanan, Executive Director of Global Off-Highway Sales, Customer Support and Service Engineering will discuss some of the latest developments in our off-highway businesses. Conrad Rockey, Vice President of Commercial Powertrain Engineering will speak to how continuous advancements within our conventional product portfolio are enabling critical emissions and greenhouse gas reductions today. And finally, Dana Pittard, Vice President of Defense Programs, will close today's event by highlighting our strength, capabilities and latest innovations for the global defense markets. Dana's remarks will be followed by our second Q&A session.

And now, the moment you've all been waiting for, our forward-looking statements Safe Harbor. Please take a moment to review the statement and refer to it in the transcript of the event, to be posted on our website.

Safe Harbor Statement:

The following information contains, or may be deemed to contain, "forward-looking statements" (as defined in the U.S. Private Securities Litigation Reform Act of 1995). The words "believe," "expect," "anticipate," "intend," "estimate" and other expressions that are predictions of or indicate future events and trends and that do not relate to historical matters identify forward-looking statements. You should not place undue reliance on these forward-looking statements. Although forward-looking statements reflect management's good faith beliefs, reliance should not be placed on forward-looking statements because they involve known and unknown risks, uncertainties and other factors, which may cause actual results, performance or achievements to differ materially from anticipated future results, performance or achievements expressed or implied by such forward-looking statements. Forward-looking statements speak only as of the date the statements are made. We undertake no obligation to publicly update or revise any forward-looking statement, whether as a result of new information, future events, changed circumstances or otherwise. These forward-looking statements are subject to numerous risks and uncertainties, including, but not limited to: the duration and spread of the COVID-19 pandemic, including new variants of the virus and the pace and availability of vaccines, mitigating efforts deployed by government agencies and the public at large, and the overall impact from such outbreak on economic conditions, financial market volatility and our business, including but not limited to the operations of our manufacturing and other facilities, our supply chain, our distribution processes and demand for our products and the corresponding impacts to our net

sales and cash flow; increases in cost, disruption of supply or shortage of labor, freight, raw materials or components used to manufacture or transport our products, including as a result of the COVID-19 pandemic; risks related to our substantial indebtedness; our participation in markets that are competitive; the highly cyclical industries in which certain of our end users operate; uncertainty in the global regulatory and business environments in which we operate; our ability to prepare for, respond to and successfully achieve our objectives relating to technological and market developments, competitive threats and changing customer needs; the concentration of our net sales in our top five customers and the loss of any one of these; the failure of markets outside North America to increase adoption of fully automatic transmissions; the success of our research and development efforts, the outcome of which is uncertain; U.S. and foreign defense spending; risks associated with our international operations, including increased trade protectionism; general economic and industry conditions; the discovery of defects in our products, resulting in delays in new model launches, recall campaigns and/or increased warranty costs and reduction in future sales or damage to our brand and reputation; our ability to identify, consummate and effectively integrate acquisitions; labor shortages, labor strikes, work stoppages or similar labor disputes, which could significantly disrupt our operations or those of our principal customers or suppliers; and our intention to pay dividends and repurchase shares of our common stock.

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Allison Transmission's business is subject to numerous risks and uncertainties, which may cause future results of operations to vary significantly from those presented herein. Important factors that could cause actual results to differ materially are discussed in Allison Transmission's Annual Report on Form 10-K for the year ended December 31, 2020.

Now, it's my pleasure to introduce Dave Graziosi, Chairman and CEO of Allison Transmission.

David S. Graziosi

Thank you Ray, and thank you to everyone for joining us. I am Dave Graziosi, Chairman and CEO of Allison Transmission. On behalf of the Allison team it is our pleasure to welcome you to Allison Transmission's Technology Day.

Today we're excited to share with you many of the latest developments and innovations that will not only advance the next generation of commercial duty vehicle propulsion, but also propel Allison into the future. I'm also excited to introduce you to key leaders throughout our organization that are driving these innovations across all of our end markets every day.

For those of you who may be new to Allison, we are a global propulsion technology leader that designs, manufactures and distributes vehicle propulsion solutions for commercial and defense vehicles. We are a leader and established supplier of commercial duty, electrified propulsion solutions and the world's largest manufacturer of medium- and heavy-duty fully automatic transmissions.

Our mission is clear: to improve the way the world works and with the most reliable, innovative and efficient propulsion solutions that deliver the performance, quality and differentiated value propositions our customers have come to expect from the Allison brand. From internal combustion to electrified propulsion, our products are used in a wide variety of applications around the world. From on-highway trucks and buses

to off-highway vehicles and equipment and global defense vehicles, Allison's focus and commitment to ensuring safe, reliable and accessible mobility to all is unwavering. Moving communities forward is our passion and our unique culture of continuous innovation, quality, reliability and sustainability are key drivers of our past and future success.

Since our founding, Allison has always been at the forefront of innovation and technology development. Our corporate lineage can be traced as far back as 1915 when our founder James A. Allison, co-founder of the Indianapolis Motor Speedway and in support of his racing endeavors established the Indianapolis Speedway Team Company, along with a dedicated precision machine shop named the Allison Experimental Company. In the years that followed, the company evolved from working on race cars to becoming a leading manufacturer of aircraft engines that played a vital role in two World Wars.

Allison's first fully automatic transmission for commercial vehicles rolled off our assembly line in 1947. We've come a long way since then, but the one constant throughout our 106-year history has been change. Whether it's new products, new technology, new manufacturing processes or different corporate structures, change, adaptability and innovation have always been part of our DNA.

Today, innovation is the driving force behind our commitment to develop new products like our recently announced eGen series featuring the eGen Flex electric hybrid propulsion system and the eGen Power family of electric axles. We're also investing in a cutting edge innovation center which is right here behind me, and recently completed a state of the art vehicle electrification and environmental test center at our global headquarters in Indianapolis, Indiana.

In recent years, we further advanced our product and service offerings through multiple acquisitions and investments, expanding the breadth of technology and accelerating our electrification capabilities. Our recently announced partnership agreement with JJE seeks to multiply the deep and complementary strengths both companies enjoy in their respective markets. We believe combining Allison's electrified products, brand, channel, technical expertise and product robustness with JJE's broad portfolio of electric motors, inverters and integrated systems will offer a differentiated value proposition to our customers and end users.

The partnership will further leverage Allison's global OEM and fleet relationships and JJE's established presence in the Chinese commercial vehicle electrified powertrain market. The Allison and JJE relationship is an exciting development and highlights Allison's continued commitment to and investments in the electrified space, and will accelerate our global EV programs across multiple regions in all of the end markets that Allison serves today.

The world is undergoing extraordinary change, from how we communicate and do business with each other to how we transport people and goods around the globe, and how we will meet the world's growing energy demands in a sustainable way with minimal impact to the environment. We are currently opening and pursuing new market opportunities across all regions and end markets.

Allison is also developing innovative products with the goal of providing mature solutions that are ready for deployment in the most challenging and demanding environments, end user-ready solutions that will enable the continuous drive towards efficiency and cleaner propulsion today, and drive the next-generation of propulsion solutions that will help our customers and the world reduce emissions, protect our planet and meet the substantial challenges that lie ahead.

Allison was founded on the values of continuous innovation, quality, reliability and durability. I am proud to say these principles remain our driving values today, and with our products and services we will continue to channel the spirit and entrepreneurial ideals that have made Allison a global propulsion technology leader.

Now that I have offered you a glimpse into our culture and our history, I'd like to hand the event over to my colleagues. They will provide you with more detail and insight into how our technology developments and innovations position Allison to be a leader in low-carbon propulsion technologies, as well as continue building on our established success in conventional products.

Please welcome John Coll, Senior Vice President of Global Marketing, Sales & Service.

John M. Coll

Thank you, Dave, and thank you for joining us for Allison Transmission's Technology Day. I'm John Coll, Senior Vice President of Global Marketing, Sales & Service.

Today, I look forward to providing you with an overview of the commercial vehicle market, Allison's view of the industry trends towards EV adoption, and the growth opportunity this creates for Allison globally. I'll also share insights on the company's go-to-market strategy, highlighting how we are leveraging established connectivity and partnerships with OEMs, fleets and body builders to develop a differentiated electrification portfolio that delivers economic value to our customers and addresses their current and future needs.

Over the course of my career, I have experienced a number of transformational industry changes. Trucks moved from manual transmissions to automated and fully automatic transmissions. Natural gas emerged as a clean energy source to power commercial vehicles, and advanced driver assistance systems such as collision mitigation have grown in adoption. All of those technological changes pale in comparison to the generational shift that our industry is currently navigating with commercial vehicle electrification.

Let me begin by acknowledging that commercial vehicle electrification is here and it is not going away. That much is clear.
Allison is embracing electrification because innovation is in our DNA and because we view electrification as a growth opportunity for our business. We understand the end game and we plan to support our customers now and in the future as we mutually work to improve the way the world works.

To support this effort, we have been investing for over two decades in electrified propulsion solutions and refining our knowledge and expertise in systems level integration. In the last three years Allison has invested approximately $250 million to advance electrified propulsion technology.

We have a fully funded, state of the art and proprietary manufacturing and development infrastructure in place, including our recently completed 110,000 square foot electric axle development and manufacturing facility in Auburn Hills, Michigan.

Four market share leaders in North America representing over 80% of Allison's North America on-highway volume have integrated and are evaluating Allison's eGen Power electric axles in their battery electric and hydrogen fuel cell truck development and validation programs.

We are also actively engaged with major OEMs in Europe and Asia Pacific, including China. And many more OEMs including new entrants and established leaders have expressed interest in Allison's electric propulsion solutions. This is a direct benefit of the established relationships we have with nearly 350 OEM customers and the engagement they recognize we have with the nearly 15,000 fleets operating Allison products today.

Collectively, these opportunities span a broad range of markets, applications and duty cycles, including the heavy-duty regional and line haul markets, significantly expanding Allison's addressable market globally. It's important to note that in North America this is the largest segment of volume and is largely unaddressed by Allison today, reinforcing that electrification is a growth opportunity for Allison.

In 2020, Allison launched the Allison eGen product family, which includes fully electric and electric hybrid solutions for trucks and buses, offering state of the art features that matter to our customers. Allison's eGen Power product family consists of single and dual motor fully integrated electric axles with various gross axle weight capabilities up to 13 tons. Numerous OEMs have chosen to integrate the eGen Power 100D, including Hino Trucks North America and Emergency One, a leading fire and rescue vehicle body builder in Europe. The Allison eGen Power electric axle is designed and developed for wide ranging performance, efficiency and durability, reducing the total cost of ownership and contributing to the economic viability of the electric truck.

Let's take a look at eGen Power in action and hear what some of our integration partners and customers have to say about their experience with Allison's electric axle products.

(VIDEO PRESENTATION)

John M. Coll

It's impossible not to get energized seeing the technology in action and watching how customers are engaging with these solutions. It's also reassuring to hear that our integration partners recognize that not all EV solutions are created equal.

Next, I invite you to explore a second offering in Allison's eGen product family, the eGen Flex electric hybrid propulsion system.

Nearly two decades ago we launched the industry's first electric hybrid propulsion solution for articulated and nonarticulated transit buses. Since then, Allison's H40/50 electric hybrid propulsion solution has accumulated nearly 2.6 billion miles, saving more than 340 million gallons of fuel, which is roughly equivalent to an entire month of fuel consumption for a country the size of Switzerland, and preventing 3 million metric tons of carbon dioxide from entering the atmosphere.

In 2020, we continued to lead the charge to an electric future by taking our proven H40/50 electric hybrid propulsion system to the next level by introducing the eGen Flex electric hybrid, which provides revolutionary capabilities and fully electric propulsion without the added infrastructure footprint and investment required of electric only solutions.

The eGen Flex system is capable of operating for up to 10 consecutive miles in full electric mode with zero emissions, and has the ability to operate accessories such as air conditioning and electric heat at their optimal efficiency with clean and quiet electric power. As a result, over 40% of the daily route for a transit bus can be operated in full electric mode while providing a flexibility of a diesel range extender when needed.

eGen Flex can also eliminate engine emissions and noise while loading and unloading passengers in dense pedestrian areas and in zero-emission zones, enhancing the quality of life, reducing fuel consumption and CO2 emissions, and protecting the environment. Let's take a look at this exciting and innovative technology.

(VIDEO PRESENTATION)

John M. Coll

As interest in electrification gains momentum at this early stage, most fleets remain reluctant to go all-in on full electric solutions. This critical feedback from our customers is what inspired us to develop eGen Flex with enhanced capabilities for coach and transit buses.

eGen Flex enables fleets to evaluate full electric capability while still having the availability of a diesel range extender. The range extender provides flexibility, whether needed for longer routes, road closures or an inability to recharge due to power grid challenges. With the eGen Flex, Allison has created a solution that can seamlessly transition between electric and internal combustion power, meeting the dynamic needs of our customers.

The first Allison eGen Flex equipped electric hybrid bus began revenue service with New York City Transit in July of this year. Major OEMs such as GILLIG and New Flyer have integration programs underway, and IndyGo, the Indianapolis Public Transportation Corporation, announced that it will be the lead fleet partner for Allison's eGen Flex electric hybrid solution.

As a leader in propulsion innovation, Allison's electric vehicle solutions are designed to demonstrate bottom line operating benefits and deliver the performance, reliability and durability that Allison has become known for over the past 100 years.

In taking a balanced approach, we recognize the transition to electrification of commercial vehicles will be progressive, not instantaneous. Allison's perspective on the transition to full EV is based on the direct engagement with the largest, most influential OEMs and fleets across the globe. That voice of customer feedback is critical in timing our investments and our go-to-market strategy.

Penske Truck Leasing operates one of the largest, newest and most diverse fleets in North America with over 75,000 vehicles in service made up mostly of medium- and heavy-duty commercial trucks. When combined with other Penske divisions, Penske operates over 328,000 commercial vehicles, including one of the largest medium-duty commercial fleets in North America.

Now, let's hear from one of our customers, Paul Rosa, Senior Vice President of Procurement and Fleet Planning at Penske Truck Leasing.

Paul Rosa - Senior Vice President, Procurement & Fleet Planning, Penske Truck Leasing

Thank you for the introduction, John, and good morning to you all.

For those of you who don't know, Allison has been a trusted partner of Penske for decades. I'm humbled by the invitation to participate in Allison's Technology Day, and I appreciate the opportunity to share my thoughts on what I'm calling The Journey to Zero.

Today's electric trucks feel like a contemporary emerging technology. They've actually been around a lot longer than most people realize. Electric trucks were first used commercially in the 1900s with models like the GMC Sentinel, the Lohner Porsche, they even had hybrid models, they used hub-mounted electric motors in each wheel powered by batteries and a gasoline engine generator, you know that hybrid concept.

So these new disruptive technologies have actually been part of the transportation landscape for quite some time. I think we can say that things have come a little full circle for electric.

What comes to mind when you see a green banana? What's the first thing you think about? Maybe a green banana is not ripe, not ready, at least for most of us. Maybe some of you would eat it. Maybe some of you would think about trying it. Well that's the analogy I'm trying to make, while injecting a little bit of humor with the emphasis on green, today's technology is not quite ready for everyone. It's certainly demonstrated that it works but it's not ready, it's not ripe for most. By definition, the trucks will be green but right now the trucks are green.

There is so much fabulous coverage on electric and zero admission vehicles right now. I don't think you can go a week without seeing at least a few articles on zero emission solutions, and that's so important

because there's so much for everyone to learn. This is another suggestion that we're offering to our customers; please be attentive to these media outlets, the information is invaluable for what is happening.

Now, I think some of you are probably coming into the zero emissions space from different vantage points, awareness and knowledge, points of reference. I'm sure though what I'm sharing isn't a surprise given the great coverage and the amount of information I mentioned that's being shared. Maybe all I'm going to share is a validation of what you already know. Follow me along here now.

With all that great coverage, there may be some unattended misunderstood messaging. I hear quite often from many of the customers that we talk about, "my gosh this is all happening so quickly, I've got to act now." Some customers read and feel that they need to move yesterday. Maybe we're out of the blocks and the zero emissions race has started, but I don't view it as a sprint. We certainly, as an industry, have the enthusiasm for the sprint, but this isn't going to be a quick short race to the finish line. With the finish line being that 100% zero emissions goal.

I don't even see this as a marathon where it takes longer with much more intense work to get to a finish line. We certainly need the endurance of a marathon, but I don't see any end points like when you have races. That's why I view this as an exciting long journey, a journey that will have many surprises, many unknowns and even unexpected delays. I feel good at this journey as it begins, provided we all stay committed and prepared. And if we do, we're all going to get to our individual destinations.

Now metaphorically speaking, we're early in this journey. Think of it as we just left port. We have prototype units, some first generation production units. There will be second generations coming down the road soon. Improved range could happen with those. And third generation, hopefully approaching cost parody at that time. Then the next place we land maybe approaching a 50% of commercial vehicles at zero emissions.

Thank you for allowing me to participate in your day. To the Allison team, I'm grateful for our partnership. Have a great rest of your day.

John M. Coll

Insights from our established customer relationships such as those just shared by Paul, as well as decades of experience with commercial vehicle propulsion, vocational and duty cycle expertise, and established service network are differentiators in an industry that serves uncompromising end users. We do this every day and we know what matters to fleets.

We are focusing on the customer experience and ensuring that we continue to deliver differentiated performance, reliability and support.

A key tenet of the Allison brand promise is to deliver the most reliable propulsion solutions in the world. At the same time, we recognize the speed and urgency of the industry's push to evaluate EV.

Allison has an established history of creating innovative solutions for our customers and electric vehicle propulsion solutions are no exception.

Through our long-term partnerships with OEMs, we understand the needs of our customers and consistently design products with their success in mind. We work in close collaboration with OEMs to develop solutions for the end users that are reliable, durable and that deliver differentiated value.

At this pivotal stage in the evolution of electric powertrains, extensive collaboration is critical to ensuring the success of this emerging technology. The substantial investments that will be required to further develop and mature the electric commercial vehicle, combined with an unpredictable rate of adoption, means industry collaborations are essential to mitigate risk and realize returns.

OEMS are relying heavily on their trusted partners to support their electric powertrain development programs, reinforcing the criticality of the collaboration made possible by Allison's longstanding relationship with our OEM customers and their integration partners.

We remain committed to our brand promise, to provide the most reliable and valued propulsion solutions to help our customers work more efficiently. We are unified in our goal to be the propulsion solutions provider of choice. Our customers know Allison, they trust Allison, and they are looking for us to ensure we can continue to be their partner as they evaluate electrification.

We're not slowing down on the road to full electrification and cleaner, quieter communities. At the same time, we're committed to our conventional transmission business which we believe will continue to grow and remain viable for decades. Continued investments across all of our products will ensure Allison helps support a cleaner and more sustainable future throughout the transition to zero emissions.

Thank you again for joining us today. I am confident you now have a better understanding of Allison's focus on electrification in the commercial vehicle industry, as well as the incremental growth opportunities this will create for Allison.

We understand the end game and we will continue to support our customers now and in the future as we mutually work to improve the way the world works.

Now, I am pleased to introduce Alex Schey, Chief Commercial Officer for Electrification. Alex will provide insights into Allison's engagement with OEMs on our mutual path to develop electric solutions for the commercial vehicle market.

Alex Schey

Thank you John, and to all of you for the opportunity to talk about Allison's engagements with customers around the world. But before I do, I'd like to share some background and personal perspective as both a relative newcomer to Allison and a former entrepreneur in the EV space.

Back in 2009, I created a project with likeminded engineers to build the world's longest range electric car. We were passionate about the performance, efficiency and environmental benefits EVs could have and to demonstrate this technology to a global audience we set out to drive the longest road in the world, the epic 16,000 mile Pan American Highway.

Having successfully completed this life changing project, what next? It felt like this was a pivotal moment in history where the opportunity to power our future in a different way was just getting started. This heady environment was the perfect year for my co-founder, Toby Schultz and I to start Vantage Power, with the idea of designing and commercializing EV technologies in the heavy-duty space.

Over the subsequent years we raised funding, built an incredible team and succeeded in developing truly innovative technology, some of it years ahead of its time. No doubt, this was a factor that contributed to Allison's decision to acquire the company in April 2019. I was, and still am, extremely proud of what our small team accomplished with their limited set of resources, but to be honest, this also bred a mindset of startups knowing better. The idea that startups could be more inventive, faster and cheaper than larger legacy companies, and that they might be better equipped to survive and thrive in the future.

And you know what? Now that I work in one of those larger companies, I still think this is true, at least to a limited extent. There are some things young, purpose-built companies can do better and we see this partially reflected in the valuations some of them have recently attracted. But since joining Allison I've learnt a thing or two that's helped put this mindset into perspective, and even though I'm firmly an entrepreneur

at heart, I see game-changing strengths in Allison that startups and developing companies can only dream of.

I'd like to share one of my most formative experiences since joining Allison. One of our young engineers showed me around our Indianapolis-based test and validation facilities. If I paint a word picture for you, this area is a dizzying maze of hallways buried deep in our 2 million square foot facility with dozens of laboratories, test cells, teardown areas and offices branching off in all directions.

Aside from the monumental capital investment, what struck me most was the deep institutional knowledge that seemed to permeate the very fabric of the building, where you could feel 100 years of history encapsulated in the atmosphere; team members who had been there for decades and the next generation learning from them, testing, tweaking and experimenting. Both conventional and electric hybrid units, decades old, coming in from the field, caked in dirt being torn down for inspection and in many cases still operating safely and effectively.

The conclusion I took away was that no matter how innovative or passionate a company is, no matter how much money is raised or how many people are hired, it truly takes a generation to accumulate this level of deep expertise in manufacturing products that go into the toughest applications on earth and just work, year after year, decade after decade.

But this is what our customers expect and it's the challenge they set out to their key suppliers. I left our test facilities feeling that Allison was deeply capable of taking on this challenge and more than that, actively went looking for it. Because this is who we are, this is where we add value, this is part of our DNA.

Talking of customers, I have the privilege of spending a lot of time with OEMs around the world and every time I do it's always accompanied by a little private chuckle. You see, as an entrepreneur there was one question I was always asked and it's a question I haven't heard once since joining Allison. "I love the product," a customer would say. "I love the tech, but how do I know you'll be around in 10 years' time to look after it?" As a young company we always found this a tricky question to answer. Candidly, we couldn't say with a high degree of confidence that we would be around in two years, let alone 10, and when it came to talking about service and support a decade later, well, that was little more than a figment of our imagination. This was a real learning curve for me when joining Allison.

Simply put, aftermarket considerations are central to our new product development. Today, with several electrified products in preproduction, we have both the plans and the means to deliver the world-class service, support and aftermarket experience our customers expect and deserve.

I think those two anecdotes really speak to how Allison differentiates itself from the wide spectrum of players in the electrification space, and it's certainly something I've learnt to embrace as we've introduced customers to our electrified products.

On this note, I'd like to share with you how we engage our customers in the EV space and, more importantly, what they're saying.

Allison is fortunate to have a substantial global presence. Over 300 Allison team members in our Sales, Marketing, Service and Customer Integration Engineering teams work across dozens of countries to engage our global customer base every day. To this, we are complemented by our network of approximately 1,400 channel partners, and collectively, we are able to synthesize deep insights into our customers' requirements.

We see the following three elements among the key factors impacting OEM sourcing decisions. Firstly, for most OEMs the science experiments are over. Our customers are moving on from demonstration vehicles built with a disparate set of components that haven't been designed for the task at hand and are demanding access to products with the performance they are accustomed to. In fact, some OEMs are taking the

opportunity to elevate the performance of their EVs above conventional vehicles. For example, we're seeing requests of greater acceleration from standstill, higher speeds on grade, and full for life cooling and lubrication systems.

Secondly, OEMs are in search of proven product architectures that deliver an improved customer experience and value proposition. Some examples include enhanced durability and efficiency by eliminating the right-angled gear found in some conventional and competitive axle products; failure modes that limit impact to vehicle operation; and the ability to maintain performance during even the most extreme edge case scenarios.

Lastly, as OEMs become increasingly sophisticated in their requirements, we see significant value being placed on elements other than price. I'm not suggesting price isn't important—clearly it is—but we are not seeing a race to the bottom. OEMs continue to value quality, reliability and durability, but also other factors that actually sit far closer to a conventional transmission than an axle. For example, shift quality and customization, minimal noise and vibration, and control system functionality all combine to help OEMs differentiate their vehicles and offer superior value to their end users.

In conclusion, through our acquisitions we are leveraging a dynamic and entrepreneurial spirit and have merged this with decades of stress-tested experience and process. There is no doubt we are in the midst of an era-defining transformation and I'm proud to see Allison thinking big, powered by the expertise of a long-established company and the passion of a startup.

Thank you again for allowing me this opportunity and please join me in welcoming Ryan Milburn, Vice President of Product Engineering, who will take you through Allison's history of innovation and some of the latest enhancements to our product development capabilities.

Ryan Milburn

Thank you, Alex.

So far, you've heard John and Alex speak extensively about our commitment to electrification, as well as various industry trends that will continue to influence the transition to zero emissions for years to come. Now, let's explore why we believe Allison is well positioned for this unprecedented transformation.

For nearly half a century Allison Transmission has been a leader in commercial duty propulsion, supplying the global market with fully automatic transmissions and electric hybrid solutions. Over those decades we have developed a diverse family of products across on- and off-highway and defense end markets. As the industry begins to transition towards zero emissions, we are expanding our product portfolio with products specifically developed for fully electric vehicles.

Similar to our conventional products, one size cannot cover the full breadth of commercial vehicle applications, so we are developing a portfolio designed to meet the unique demands of the vast array of applications in end markets that we serve.

Allison is ready for this challenge. Our history of developing and delivering innovative solutions has prepared us well for this industry transformation. Allison's fully automatic transmissions are one of the most complex and sophisticated machines on the commercial vehicle. They require robust mechanical components accompanied by advanced electronics and software algorithms that analyze real-time sensor data as well as communications from the engine and other vehicle systems. These algorithms dynamically learn and adapt to vehicle operating conditions and manage torque to provide optimized shifting, drive quality, performance and fuel economy. These capabilities built on decades of propulsion controls experience are very difficult to replicate. This is a competitive advantage for Allison as we develop fully electric solutions.

Building on this legacy, later this year we will introduce our next-generation electronic control system. This is our sixth generation of control system based on four decades of evolution and experience. And combined with state of the art microprocessor and software operating system technology, it is capable of supporting advanced capabilities including functional safety, cybersecurity, advanced communications and over-the-air programming enabled by vehicle telematics. Many of these technologies are in the early stages of adoption and Allison is delivering these next generation capabilities in partnership with our global OEM customers. These capabilities require integration, integration beyond an individual component. They require vehicle system level integration. This foundational system-level expertise is critical as commercial vehicles transition to electrification.

Beyond conventional powertrains, Allison has a legacy of demonstrated leadership in electric hybrid propulsion. Our electric hybrid system for transit buses, originally launched in 2003, features two electric motors and a multispeed transmission, all housed within a fully integrated drive unit. This system also includes power inverters and a battery system, as well as electronic controls and software required to integrate and operate the system within the vehicle. The system controls integrate with a conventional internal combustion engine to blend conventional and electric propulsion and optimize system energy consumption, performance, emissions and fuel economy. In fact, the controls for blending of propulsion power from two different sources in a parallel electric hybrid are quite sophisticated and more complex than controls for a pure electric application. Allison's proven electric hybrid experience is directly applicable to full electric propulsion.

As technology evolves, we will continue to develop next-generation products to remain a propulsion solution provider of choice, but one thing will not change; we will remain committed to the Allison brand promise of providing the most reliable, durable and valued propulsion solutions to enable our customers to work more efficiently.

Over billions of accumulated miles, we have compiled and analyzed countless global commercial vehicle applications and duty cycles to ensure our products meet the demands of our customers. Our product development is driven by robust design processes, simulation and modeling capabilities, manufacturing best practices and rigorous validation and testing that have all evolved throughout our history. These processes are applied across all elements including hardware, system integration and controls. Product validation occurs at the full system level and down to the smallest of components because every part is critical. This is a key differentiator for Allison. Our propulsion solutions are often referred to as bulletproof and we accept that feedback with great pride.

That reputation has been earned over decades, billions of miles and through the product development, validation and manufacturing processes that support it. This is a direct result of our commitment to the Allison brand promise.

As John and Alex mentioned earlier, Allison has made strategic investments which have greatly enhanced and accelerated our ability to deliver world-class electric solutions. For example, the acquisition of AxleTech's electric vehicle division and Vantage Power brought to Allison purpose-built, fully integrated e-Axle technology, as well as two talented teams with electrification capabilities including propulsion, battery system and vehicle integration, all of which have helped to accelerate our electrification development. We are also investing in new and differentiated ways to create partnership opportunities and accelerate our readiness for electrification.

The Allison Vehicle Electrification and Environmental Test Center is a unique facility that provides a controlled environment with battery emulation capabilities that enable around-the-clock development and validation of electric vehicles without the need to stop and charge batteries. Simply said, this enables Allison and our OEM partners to reduce product development time and bring new products to market faster. Instead of traveling around the world in search of specific testing conditions, we can create the ideal conditions right here at our global headquarters in Indianapolis, Indiana. A picture is worth 1,000 words so let's see the facility in action.

(VIDEO PRESENTATION)

Ryan Milburn

Building off the next-generation capabilities of the Vehicle Electrification and Environmental Test Center, the Allison Innovation Center will open early next year. This all-new engineering center of excellence will consolidate many of our Indianapolis engineers into one single facility. As John mentioned, industry collaboration is critical to the success of the electric commercial vehicle. The Innovation Center will promote innovation and enhanced development collaboration through expanded virtual and physical system simulation capabilities that we will leverage to support our customers, industry partners and suppliers.

Today, system-level knowledge, expertise and best practices that can only be developed over decades in the commercial vehicle propulsion industry are being combined with new investments in technology, talent and capabilities, and applied across our entire family of electrified products. This positions Allison as one of the few established propulsion providers with EV solutions proven to withstand the rigors and application complexity of the commercial vehicle industry.

I am pleased to introduce our next presenter Mike Foster, our Chief Technology Officer.

Michael Foster

Thanks, Ryan, and thank you to everyone attending Allison's Technology Day.

I'd like to begin with a brief overview of Allison's recently launched eGen Power brand, which includes our portfolio of e-Axles for medium- and heavy-duty trucks and buses.

Allison's first electric propulsion product within the eGen Power Series, the 100D, was unveiled last year in North America, coinciding with Hino Trucks Project Z Zero Emission Development Program. Designed for Class 8 heavy-duty trucks with gross axle weight ratings of 23,000 pounds, the eGen Power 100D generates 424 kilowatts of continuous power with peak power capability of 648 kilowatts. Combining two motors and a multispeed gearbox, the fully integrated propulsion system generates high torque required to launch heavy loads, while maintaining superior efficiency at highway speeds. The 100D is a highly advanced electric propulsion system that delivers the quality and performance that OEMs and fleets expect from an Allison product.

Leveraging many of the core components of the 100D, we expanded the eGen Power portfolio with the introduction of the 130D and the 100S. With a 13 metric tonne gross axle weight rating, the 130D is ideal for European and Asia Pacific Markets. While the 100S is Allison's first single motor variant within the eGen Power Series, it is designed for medium-duty and tandem axle heavy-duty applications. Hino Trucks will be the first global OEM to integrate the eGen Power 100S as part of a recently announced e-Axle development partnership with Allison for Class 6, 7 and 8 battery electric trucks. With integrated motors, optimized thermal management is achieved through a combination of water and oil cooling, boosting eGen Power's continuous power and facilitating a compact integration. This approach eliminates external motor housings and an associated gearbox interface, a key differentiator compared to competitive offerings.

The eGen Power family of electric axles utilizes a parallel axis scheme, which means the motor is oriented in the same axis of rotation as the axle shaft and wheels. This arrangement eliminates the right-angle gear found in conventional axles and many competitive e-axle products, and is utilized to maximize power, transfer efficiency and enable 100% regenerative energy recovery. These performance and efficiency advantages translate directly into lower operating costs and increased range across duty cycles in many vehicle classes.

Another critical factor to consider is a preference for battery electric versus hydrogen fuel cell. Here, uncertainty remains in many regions and for many applications. While both approaches offer emission-free operation, weight, packaging, time for refueling or recharging, and equally important, infrastructure availability must all be considered.

Allison's eGen Power products will seamlessly integrate across all EV applications independent of the energy source. The compact integrated design provides vehicle packaging flexibility, freeing space for battery or fuel cell system components, and enables a drop-in electric propulsion solution for many existing vehicle chassis and frame rails. Battery electric, hydrogen fuel cell, and range extending electric hybrids will all benefit from Allison's portfolio of electrified products.

In summary, the eGen Power Series is a highly engineered, fully integrated and differentiated solution that eliminates many of the inefficiencies of competitive electric axles. By integrating electric propulsion, traditional axle features, all necessary control systems and vehicles interfaces, the 100S, 100D and 130D are among the most sophisticated and powerful electric propulsion systems in the world. Whether for bus, medium- or heavy-duty trucks, single or tandem axle tractors, or vocational applications, battery electric or fuel cell electrified propulsion, the eGen Power is designed to optimize the economic value delivered to the end user and enhance the value proposition of the electric commercial vehicle.

As Dave mentioned earlier, in recent years we have been advancing our product and service offerings through multiple acquisitions, investments and global partnerships. The recently announced collaboration agreement between Allison and JJE seeks to leverage Allison's more than 100 years of experience in building reliable and valued propulsion solutions, including two decades of electrified propulsion systems development and commercialization. JJE brings more than 10 years of experience in electric motors and power electronics, as well as central and direct drive electrified propulsion architectures. We believe these combined capabilities will enable the strategic partnership to offer innovative and reliable electrified propulsion solutions to commercial vehicle manufacturers around the world. The partnership will further allow both parties to benefit from global manufacturing, R&D, sales and service networks to support customers in local markets.

For those who are not familiar with JJE, the company is a top electric component supplier within the largest electric vehicle market in the world, and a winner of the FCA North America Outstanding Quality Award. Founded in 2008, the company is focused on the design, development and manufacturing of electric motors, drive systems and inverters for electric hybrid and fully electric vehicles. JJE is headquartered in Beijing, has an established sales, manufacturing and R&D presence throughout China, and boasts a manufacturing and technical center in the United States near Allison's Auburn Hills, Michigan facility.

JJE's background in electric motor and inverter development, along with its established presence in the Chinese electrified powertrain market, will complement Allison's deep experience and investments in fully electric and electric hybrid propulsion, duty cycle expertise, global OEM relationships, and a global service channel.

Allison and JJE will work to assess and prioritize the development of an integrated and efficient electric propulsion solutions portfolio for the global commercial electric vehicle market. This is an exciting development and presents the latest opportunity to accelerate global EV products and programs across multiple regions. It reinforces our collective and continued commitment to the electrified commercial vehicle space. And through a financial commitment, Allison will directly support JJE's North America commercial electric product development, testing, and manufacturing efforts.

Over the years, Allison has made significant investments in full electric propulsion technology and we will continue to assess additional opportunities to further accelerate our EV programs and readiness. We are uniquely positioned to leverage our vocational and application duty cycle expertise and nearly two decades of electric hybrid propulsion knowledge. Our customers will benefit from EV products that help them operate more efficiently and create a sustainable future in the transportation of people and goods around the world.

In conclusion, Allison is embracing this industry transition and we are committed to guiding our customers as a trusted partner. We are, and intend to remain the propulsion solutions provider of choice.

Now, I'll hand it over to Ray Posadas, Managing Director of Investor Relations, to kick off our first of two live Q&A sessions.

Ray Posadas

Good morning and thank you for joining us for Allison's Virtual Technology Day.

I'm Ray Posadas, Managing Director of Investor Relations. Joining me for our first of two live Q&A sessions are Dave Graziosi, our Chairman and CEO; John Coll, Senior Vice President of Global Marketing, Sales and Service; Alex Schey, Chief Commercial Officer for Electrification; Ryan Milburn, Vice President of Product Engineering; and Mike Foster, our Chief Technology Officer.

Please note, this Q&A session will be followed by another series of presentations, focused on our conventional and defense business, and our second Q&A session of the day.

With that, let's get started. Our first question comes from Rob Wertheimer of Melius Research. Please go ahead, Rob.

Rob Wertheimer - Melius Research

Hi, good morning, everybody, and thanks.

My question is on the competitive landscape. You gave a lot of kind of detail on technology paths and on service and (inaudible). Can you tell us what will the competitive landscape or financials look like (inaudible)? How many providers are there today? (Inaudible)

Ray Posadas

I'm sorry, Rob. We're having a little trouble hearing your question. I believe the question is whether the start-up universe is evolving as these programs are coming to production. Rob, is that right?

Rob Wertheimer - Melius Research

Yes, just the competitive landscape in e-Axles.

Ray Posadas

Understood.

Alex Schey

Yes, if I start with that, and thanks for the question, Rob.

You know, when we look at competitive e-Axles, we see probably more of the established companies tackling that kind of product. When we look at the start-up space, I think most of them tend to be focused on vehicle manufacture. We're laser focused on proving out our value proposition and hardware reliability and durability in that component and subsystem space, particularly e-Axles.

Rob Wertheimer - Melius Research

How many competitors would you say there are in e-Axles right now, and how does that, you know, how do you position yourself?

Alex Schey

I think as we look to North America in particular, we have, you know, two or three competitors that we keep focused on and obviously have a great deal of respect for. Respectfully, you know, we are taking somewhat of a different path when we look at our technology, and I'd look to Mike or Ryan to jump in here with any of the technological elements that differentiate us. Particularly as we think about architecture and efficiency, which really, we think, will come down to differentiating these products when they're out on the road and are having to deliver real value to end users and customers.

Ryan Milburn

Yes, Alex, I can step in on that a little bit here.

As we think about, you know, Alex sited those differentiators when it comes to our purpose built, fully integrated e-Axle propulsion solutions with the parallel axis gearing that provide improved efficiency, which ultimately result in lower total cost of ownership. Those are very important differentiators. In addition to that, we really would call or reiterate that propulsion solution expertise. When we talk about propulsion solutions, we're really talking about actively, systems that actively manage power and torque on the vehicle.

When you really think about commercial duty propulsion solutions that are managing acceleration and deceleration and everything in between on that vehicle's route, they tend to get very complex due to the varied and segmented nature of the commercial vehicle market. You have to be able to develop and validate and adapt solutions across a broad range of vehicle types, a broad range of customers, and then apply those in a broad range of end use applications; so the complexity really gets exponential. Software and controls are really a key element to being able to manage that complexity.

As we think about Allison's solutions, whether it be conventional, or hybrid, or electric hybrid, or full EV, all of those are propulsion solutions that actively manage power and torque. We've been developing those capabilities over many decades, direct day to day experience. We know how to develop. We know how to validate, and we know how to integrate those solutions with other subsystems on the vehicle to manage torque and propulsion.

As you think about conventional axles or drive line components, those components are passive components. They play an important role in the vehicle drivetrain, but they're effectively a combination of gears and shafts that power and torque pass through, but they don't actively manage that. Those capabilities are really difficult to build and scale and be able to manage the complexity. They're not easily acquired. They really have to be developed and evolved, and experience is really the best teacher there. We really see that ability to actively manage power and torque, and propulsion, apply those propulsion solutions to a broad range of commercial vehicle applications is a key differentiator.

Michael Foster

Hi, Rob. Maybe just to add one other point, going back to your first portion of the question.

I think what Ryan indicated there with all that complexity at that system level knowledge and the software and controls to do that, I think that's quite frankly why the start-ups are not in this e-Axle space. When you think about integrated e-Axles and all the complexities, that is just something that has to be evolved over

many, many years, and decades, you know, in the case of Allison. I think that's why the start-ups really aren't coming into that particular space.

Ray Posadas

All right, thank you for that. Our next question comes from Jamie Cook of Credit Suisse.

Jamie Cook - Credit Suisse

Hi, thanks for the opportunity to ask a question.

I guess just, you know, two questions. Can you just speak to your view on how EV evolves across geographies, Europe, China, U.S.; which adopts first, and sort of the timeline? Also, sort of by product type, because I'm just trying to understand how you're investing based on when you think the EV transition happens.

Then my second question, can you talk about how we should think about R&D over the longer term, just because of the investments required, associated with EV and your traditional product lines? Thanks.

Alex Schey

Thank you for the question, Jamie, certainly appreciate that.

As we look at sort of the three big geographies around the world, we think about North America, Europe, and APAC. I would say Europe and North America, while Europe maybe is a little bit further ahead in adoption, they're pretty close together. Really as you look to China, they are really leading the world in terms of not just adoption but in terms of expectations around what they want from their vehicles and their components. What we see with some of the big Chinese OEMs is they are actually taking the view that they need to ground-up redesign their vehicles around EV, and that points towards an e-Axle solution. They have the opportunity to engage with the latest and greatest in terms of technology and really optimize their vehicles for EV.

We see that Chinese adoption really driving, but North America and Europe very much on that road now and plan to catch up. You see many announcements in terms of legislation and regulation driving quite significant adoption towards the end of this decade and into the next. If you look at various legislation coming out of the EU and North America in particular, so a lot happening there.

As to the R&D questions and the investments, I think I'll hand over to Ryan on that.

Ryan Milburn

Yes, I'd be happy to take that.

From an R&D perspective, certainly you see from the video we are making significant investments to build out that electrified propulsion solution portfolio. As you'll see in the second session, we're also making investments to enhance our conventional product portfolio across on-highway, off-highway, and defense end markets. In the near term, we would certainly expect R&D expenses to be elevated, and then over time we'll evaluate and ultimately size that R&D based on market opportunity.

David Graziosi

I think, Jamie, relative to your question in terms of investment, timing, and aligning that with EV adoption, you know, as we've talked before timing continues to be very variable, as well as overall volumes. Our

engagement as we received inquiries, we think about timing continues to shift a bit to the right. We're also seeing some of the volume estimates typically land at the lower end of the range. That being said, our timing is going to be consistent with our view of probable outcomes there as we continue to choose the OEMs we're working with, with really programs that we believe are meaningful, relative to our market position, our addressable market. But ultimately, we're positioning to be able to meet that demand as we see it coming through. That being said, should things accelerate, we're certainly positioned to take advantage of that.

John Coll

If I could, Jamie, thank you again for your question. I'd like to go back to your first part of that as far as how are EVs evolving across the different geographies and regions. Just to add to what Alex told you, if you think about Europe, as well and America, you have common global OEMs that are leading in both of these regions, and in many aspects in Asia Pacific as well. We believe what differentiates us today and most importantly in the future is our connectivity and our level of business with these global OEMs today and our engagement, not only at the C-level, but also into their engineering and R&D levels as well. We believe that's going to help differentiate us going forward.

Ray Posadas

Thank you for that question. Our next question comes from Ross Gilardi of Bank of America.

Ross Gilardi - Bank of America

Thanks, guys. Good morning.

Dave, maybe you could just expand on the comment that you just made about, you know, how the pace of investment at Allison will be influenced by the pace of adoption. Why is that? Why not just really hit the accelerator on it now, because you know it's coming at some point. If others are having to pull back, or if it's taking slower than expected in some places, I don't know, why wouldn't you use that, take that to your advantage and really try to push things forward even more aggressively?

David Graziosi

Ross, good morning and thank you for that question.

In terms of pace, understand, you know, we have been at this a while in terms of launching programs and products. You know, what you said I think certainly makes sense in the context of a more mature marketplace. You know, I would point out that our view of the space right now is it continues to be rather immature. We know that based on the inquiries that we receive and the continued movement in terms of ask, right, in terms of performance. We've started out, our focus is delivering at or better than conventional experience, which as everybody knows relative to Allison is an extremely high bar. As you think about what end users are focused on at the end of the day, we don't believe this is a situation where it's absolutely mature.

With that in mind, we're continuing to maintain a relatively high level of optionality and flexibility to be able to meet that demand for a mature end state. That being said, our structure right now is to choose the right partners to work with to in fact collaborate and leverage the investments that multiple parties have been made, with an ultimate focus on again an end state with a mature answer. As we see that, that will take some time. Should that, as I said earlier, require some level of acceleration, we're certainly positioned to do that. You know, we're fortunate in that we don't lack capital.

Our business generates a healthy amount of cash flow, as you well know. We can make those choices. We also believe it's absolutely imperative upon the benefit for all of our stakeholders to deliver mature solutions that meet or exceed our current brand promise.

Ray Posadas

All right, thank you for that question. Our next question comes from Courtney Yakavonis from Morgan Stanley. Please go ahead.

Courtney Yakavonis - Morgan Stanley

Just maybe, I mean, on the topic of EV adoption you mentioned different geographies, but can you also talk a little bit about the different product lines? Obviously, you know, you talked about the 100s versus the 130 model that you have. You know, can you help us think about when you would expect to see those products potentially have an exclusive partnership relative to right now? You know, it seems like a lot of the partnership agreements are very much in the early phases of exploration.

Michael Foster

Yes, Courtney, thank you for that question.

Relative to some of the early movers in the areas where we would expect that the adoption, specifically the 100 versus the 130 and the 100D that you mentioned, you know, we certainly see things like transit, refuse, anything that has this pickup and delivery, return to base type of a duty cycle is going to adopt first, and that's quite frankly why we've introduced both a 100D/130D and a 100S, primarily so we can cover both the heavy-duty segment and the lighter-duty and the medium-duty space.

In terms of partnerships, all the OEMs that we were working with are actually focused on both heavy-duty and medium-duty applications, as they have those in their current portfolios today. We are trying to make sure that we can cover those bases with those product lines. You know, we're scaling the product. We started at the heavy-duty end with the 100D with the two motor, and we're scaling that now to the single motor for the medium-duty. The idea is to build this foundational capability in these e-Axles and be able to start to deploy those in different variants across different levels of product.

In terms of the partnerships, you know, maybe John and Alex want to talk a little bit more about the OEM adoptions on those particular products, but I think we see very clearly that, you know, we're going to start in the heavy-duty and the medium-duty for pickup and delivery because we think that there's a lot of benefit in those vocations for the electrified products. It just starts to make sense in some of those applications.

John Coll

Okay, thank you, Mike.

Going back to your first question, regarding adoption globally and by region, I think everyone, whether it's third parties, or the OEMs, or suppliers like Allison, we all have our opinions and forecasts on where we're going to go with electrification. With that, I think many of our customers, our global OEMs, have been public about their rate of adoption. In the next couple of years, we're talking hundreds. You think about North America and maybe two to three years out you're talking about thousands. Those applications, I think many agree that are going to start in transit bus, in port areas, and then moving into pickup and delivery, and ultimately into heavy-duty and heavy haul.

Regulatory areas, whether it's Europe, Asia, China, North America, will also play a part in that adoption and where the OEMs and suppliers like us move forward with that. I would say the OEMs, they continue to

move from testing prototypes in the past years to into low-rate production, and then where they'll go into the next two to five to 10 years is actually into then serial production. The adoption rate is yet to be determined. I think, as Dave's talked about and in the last question, we'll be here today and tomorrow as that adoption rate continues to grow, and we'll continue to put forward our investments in order to not only be a part of that but to win and differentiate going into the future.

Ray Posadas

Thank you for that question, Courtney. Our next question comes from Ann Duignan of J.P. Morgan. Please go ahead, Ann.

Ann Duignan - J.P. Morgan

Can you talk about the opportunity to be successful in China, given that you (inaudible) are not being pulled by global OEMs and you don't really have a brand and reputation in China in automatic transmissions?

And how you compete.

John Coll

Hi, Ann, good morning. John Coll. Nice to hear you.

Ann, relative to your question, in China and our brand presence there and how we compete, I think it's fair to look at our business we have there today. We're actually a leading provider, the leading provider of automatic transmissions throughout various segments and end markets and sectors, from sanitation to mining to actual bus. The OEMs there that we just made the announcement last week with SAIC Hongyan with a partnership to develop e-Axles, as well as other OEMs that we're working with, they depend on us because of what Mike and Ryan talked about is our experience and our differentiating actually managing power and torque in an intelligent product, such as transmissions, but also in an e-Axle.

E-Axles in China, even though it's very mature in some segments like bus with electrification, is actually just starting as it regards to e-Axles. They are looking towards a company like Allison, and they see some of the announcements we've had in North America and in Europe, and we've been in discussions with them in technical reviews, and, as we just announced with SAIC, actual partnerships.

Our experience there over several decades has actually helped us because of that credibility with the OEMs today as we move into electrification of e-Axles in China.

Michael Foster

Yes, I would add to that, too.

Our recent announcement with JJE, you know, now we have the opportunity as we think about the expansion into e-Axle. We also have a partner now that has central and direct drive and a lot of knowledge of that, you know, Chinese EV market, so I think that's going to be something that we can leverage as well out of that partnership that will benefit us.

Ray Posadas

All right, thank you for that question, Ann. Our next question comes from Rob Wertheimer of Melius Research once again. Please go ahead, Rob.

Rob Wertheimer - Melius Research

Howdy. Maybe this is a difficult question to answer, but investors are very curious about the margin potential of e-Axles and so forth at maturity. Can you share a view on whether you think there's more or less differentiation possible versus your conventional product?

David Graziosi

Rob, it's Dave. Thank you for that question, your question on margin potential for e-Axle at maturity and the point about, you know, more or less differentiation of our e-Axle versus traditional products.

While we're not here to discuss EV margins, it's worth noting that, you know, we sell our products based on the value that they deliver, and it really gets to the second part of your question. If we didn't believe we had a differentiated solution and technology, we wouldn't pursue e-Axle or any other products for that matter. We firmly believe, given the discussion you've heard here and through the presentations, and even the Q&A here this morning, we believe there's a fairly high level of differentiation.

That being said, as the process has played out with our conventional products, we did not achieve the margins on our conventional products that we have today immediately. The fact is it took time to earn those, and the earning came through showing value. That's really what we're focused on. I believe, as the industry continues to evolve and solutions mature, differentiation will become that much clearer through these development processes. We again look forward to those advancements but also staying very focused ultimately on the value that our solutions are delivering and thus the margin potential.

Ray Posadas

All right, thank you for that question, Rob. Our next question, once again, comes from Ross Gilardi of Bank of America. Go ahead, Ross.

Ross Gilardi - Bank of America

Yes, hi, guys. Can you comment at all or take a stab at what do you think the mix of alternative propulsion products will look like over the next five to 10 years versus conventional? Then just M&A opportunities, particularly with, you know, the valuations in the SPAC universe for some of these newer entrants. Are you taking kind of, you know, a fresher look at M&A, and do you see, you know, better at least valuation opportunities than you did six to 12 months ago?

John Coll

Hi, Ross. Good morning. It's John Coll. Thank you for your first question.

Regarding your comment of what the mix of EV in the next five to 10 years versus conventional products, our view on that. As I mentioned earlier, it is going to depend on what region of the world you're in, as well as the regulatory environment and landscape you're dealing with. Really from a regulatory point of view, Europe is leading the way there as far as pushing for zero emission vehicles. In the U.S. we have regulatory environments with the carb states, starting with California, and obviously with the new administration there.

But as I mentioned and has been publicly stated by many of our customers, today over the next several years you're going to see this in the hundreds as far as EV. It's not because just of the demand or the regulatory is here or not here. It's the total holistic view of the system, of the infrastructure, of the grid, of the utility. You know, everybody really gets moving up the curve of electrification. Hundreds for the next couple of years, then to the thousands in the U.S. Obviously you look at a region and country like China that maybe has a greater regulatory influence, that scale will grow much larger.

David Graziosi

Ross, it's Dave. Appreciate the second question you had there in terms of M&A activity of SPACs versus our approach to date.

As you know, we continue to take a very proactive stance in the marketplace for opportunities, whether those are internal or external investment alternatives. We certainly believe the external market continues to provide some opportunity.

To your point on SPACs, you know, we have obviously watched that market continue to evolve. I would say part of that is, is the use of capital, the pace at which capital is being used. You know, we think about collaborating, which EV by its definition are extremely complex systems, as Ryan and Mike mentioned. You know, that requires a very high level of collaboration. We also believe there are synergies to be had by working with parties on these complex systems. We take that approach as we're looking at external market opportunities is what collaboration would we like to have? What is additive to our existing strengths, as well as opportunities to improve our position?

JJE, you know, being the latest example as we think about collaborating and partnering is a good way to think about that as we look at the future, what else is going to be required. It really does get to your point about EV adoption by segment, by region, but ultimately what those opportunities are and what they require. We believe over time the maturity will point us ultimately towards other opportunities and frankly attract parties to Allison. You know, it's no secret that the strengths that the team has mentioned here throughout the presentation and Q&A, when you get back to it we actively manage power. We manage that propulsion.

That is very different than many parties that are in the EV space today. We ultimately believe that adds a tremendous amount of value to ultimately fielding vehicles that meet or exceed conventional requirements today. That's not an easy task and one that we take obviously to heart. Thus, when we're looking at the broader ask, it's what is going to be required to take that next level to the fully mature marketplace and ultimately meeting or exceeding those end user requirements.

We appreciate the questions and I'll turn it over to Ray.

Ray Posadas

Thank you for that. We've come to the end of our first Q&A session. We'll have a short break and return with our Session 2 presentations. Thank you.

(VIDEO PRESENTATION)

Rohan Barua

Welcome back and thank you for joining us once again for Allison Transmission's Technology Day.

My name is Rohan Barua, Vice President of North America Sales, Global Channel and Aftermarket.

During the second half of today's event you will hear from Allison's global leaders responsible for North America and outside North America sales, Global Off-Highway, Commercial Powertrain Engineering, and Global Defense Programs. We will discuss how we expect our continued investments, innovation and focus to continue driving growth in our core conventional transmission business in North America, while pursuing additional global growth opportunities across all of our end markets.

As you heard Paul Rosa mention earlier, the transition to zero emissions will be a complex journey for our industry. Accordingly, conventional propulsion does not have the luxury of standing still during the time it

takes for the electric commercial vehicle and its corresponding infrastructure to attain maturity. Global emissions regulations will continue to become more stringent and increasingly demanding. This creates a long runway for greener and more efficient conventional propulsion solutions, especially when you consider the competing demands on OEM R&D budgets as they refocus their efforts towards electric vehicle development.

Trusted partners such as Allison have always been relied upon to help our customers meet the rigorous and evolving demands of the commercial vehicle industry. These partnerships are critical to the evolution of the commercial electric vehicle and are equally imperative for the continued improvement of conventional propulsion. We remain committed to developing and delivering innovative and differentiated solutions to address the wants and needs of our global customers.

For more than 100 years, Allison Transmission has continuously discovered new ways to improve the way the world works. Believing our customers simply deserve the best, we design and build fully automatic transmissions that deliver premium performance with proven reliability, durability and differentiated vocational value. Our customers have rewarded Allison for our commitment to quality and our ability to deliver value, enabling Allison to become the world's largest manufacturer of fully automatic transmission for medium- and heavy-duty commercial vehicles.

Allison transmissions can be found at work around the world in a wide variety of applications, from construction and distribution to transit and off-highway applications. Allison fully automatic transmissions are engineered to make our customers more productive.

But don't take my word for it. Let's see what our customers have to say about Allison.

(VIDEO PRESENTATION)

Rohan Barua

In North America, the Allison team continues to drive growth, as demonstrated by our recent achievement of approximately 80% share in the Class 8 straight vocational truck market, and gains in the Class 4/5 truck market through releases on the Chevy Silverado 4500, 5500 and 6500, and the Navistar CV platform, as well as the recently secured releases in the Isuzu NPR. Despite these significant gains and strategic releases, considerable opportunities for growth remain.

As John mentioned during the first half of today's event, Class 8 heavy-duty tractor represents a significant growth segment for Allison through our electrified powertrains. However, in recent years we have also been investing in innovative and new fully automatic transmission technology that will enable us to capture share in this segment immediately.

Allison introduced a new regional haul transmission in 2020. The 3414 Regional Haul Series is a variant of Allison's proven and well established 3000 Series fully automatic transmission. It is designed to meet the unique needs of distribution and final mile customers in the Class 7 and 8 tractor markets. Built on years of reliable performance and customer-inspired innovation, the 3414 RHS was recognized as a Top New Product of 2020 by Heavy Duty Trucking for its innovation as the lightest and most durable new transmission in its class, accelerating 25% faster than competitive AMTs. Multiple North America OEMs have already released the product since its introduction in 2020 with additional releases scheduled in 2021. The largest private tractor fleet in North America has begun to convert their build to the 3414 RHS.

Allison understands that commercial electric vehicle technology will need to evolve further before it can fully support medium- and heavy-duty vocational duty cycles. As a result, we believe conventional powertrain solutions will remain prevalent for decades. We view our knowledge and experience with our customers'

operating duty cycles as a differentiator and a competitive advantage, and are honored to enjoy a position of trust as they select their electrified powertrain partners.

Our independent service network is equally prepared to support our conventional products, as it is our EV products, all-in one location with the service personnel and the Allison brand promise our customers know and trust.

Regardless of propulsion type—diesels, gasoline, natural gas, electric hybrid or full EV—we will continue to support our customers as their partner and propulsion solutions provider, and continue to offer the power of choice.

Now, please join me in welcoming Heidi Schutte, Vice President of Europe, Middle East, Africa, Asia Pacific and South America Sales, who will highlight additional on-highway growth opportunities around the world.

Heidi K. Schutte

Thank you for the introduction, Rohan, and to those joining us, thank you for your interest in Allison Transmission.

In North America, we've seen automaticity proliferate over multiple decades in both the automotive and commercial vehicle transmission market. This migration towards automaticity has been driven largely by the fully automatic transmission in the vocational truck market, and by the automated manual transmission in the line haul market at the expense of the manual transmission.

As safety, fuel economy and emissions regulations have gradually become more stringent, commercial fleets have continuously adopted safer and more sophisticated technology across the entire commercial vehicle drivetrain, including the fully automatic transmission. As a result of this transition towards automaticity, the pool of available and qualified drivers that can properly operate a manual transmission has been declining over multiple decades. This has forced fleets to accelerate their adoption of automaticity to facilitate the hiring and retention of drivers, increasing the share of fully automatics and AMTs on the road, and further reducing the pool of experienced and qualified drivers that can operate a manual.

Today, these trends that have driven the adoption of automaticity in North America are manifesting themselves all over the world, building momentum at different rates in different regions. Global trends are influencing the adoption of more efficient, sophisticated, cleaner and safer propulsion technology around the globe. The effects of these trends are already visible in the global automotive industry where automaticity continues to gain ground at the expense of the manual transmission. And as we saw here in North America, demographics are also a contributing factor as the global pool of drivers that can properly operate a commercial vehicle manual transmission begins to decline. It is incumbent upon us to position Allison to capitalize on this global trend as it unfolds at different rates in different parts of the world.

Over the last several years, Allison has made meaningful investments to expand our presence beyond North America. With regional headquarters in China, the Netherlands and Brazil, manufacturing facilities in the U.S., India, and Hungary, and global sales and engineering resources, Allison has boots on the ground in every major market around the world. We are consistently cultivating relationships with regional governments, municipalities and end users around the world, reinforcing our established global independent service network and increasing availability of our transmissions for our global customers.

While roughly 50% of Allison's revenue is currently attributable to the North America on-highway end market, our business outside of North America has enjoyed meaningful growth in recent years, and the Allison team continues to secure impactful new releases at OEMs that will drive incremental volume in Asia Pacific, Europe, the Middle East, Africa and South America. For example, in Asia Pacific the team has secured new releases in medium-duty bus in Japan, in light-duty truck in Korea with the Hyundai Mighty, in

heavy- and medium-duty truck in Australia with the Croner and Quon and in medium-duty refuse with Dongfeng in China. As an illustrative example of the impact of these new releases, we expect to grow our light-duty truck share in Korea from 0% to nearly 40%.

Prior to the global pandemic that impacted nearly all markets in 2020, we had achieved five consecutive years of volume and revenue growth in our Europe, Middle East and Africa region. Within the last 12 months we have secured multiple incremental OEM releases including fire and rescue with DAF, municipal sweepers with Daimler, mini-bus and dump trucks with Kamaz, tank transporters with BMC, and construction and mining applications with Volvo.

And finally, in support of our global growth initiatives, we are developing and launching innovative and new conventional transmission products as well. Another example of our innovation and drive to improve the way the world works is our new and the industry's first nine-speed fully automatic transmission. The nine-speed, a variant of Allison's proven 2000 Series six-speed transmission, maximizes the value proposition delivered to our customers through a highly sought after yet seldom realized combination of improved performance and improved fuel economy. While drivers will enjoy improved acceleration and productivity, the included FuelSense 2.0 and nine-speed architecture will deliver optimized fuel efficiency and reduced emissions. This improved efficiency will help our global customers meet planned and increasingly rigorous environmental regulations that will continue to be adopted around the world in the coming years. The Allison nine-speed fully automatic transmission is currently being evaluated by our OEM partners around the world.

Now, I'd like to turn our attention to our global off-highway business and introduce Kartik Ramanan, Executive Director of Global Off-Highway Sales, Customer Support and Service Engineering.

Kartik Ramanan

Thank you, Heidi.

As you've heard several times throughout this presentation, the transition to zero emissions will be a long journey. During this time, global requirements for energy, minerals and precious metals will continue to grow, in part driven by the transition to zero emissions itself. Allison is an industrial leader in designing, engineering and manufacturing fully automatic transmissions for the global off-highway end market. This includes the mining and energy sectors.
In oil and gas fields all over the world Allison's rugged and reliable transmissions are at work, making operations more productive and efficient, even in the harshest conditions. As hydraulic fracturing fleets and operators move toward higher horsepower equipment, seek to deploy less equipment in the field to reduce their environmental footprint, and shorter times to reach depth in search of improved sustainability, efficiency and profitability, Allison is innovating with them to remain a desired partner of choice within the energy market.

Despite the state of the global energy market throughout the majority of 2020, Allison remained committed to its global off-highway customers. In fact, when others stepped back, Allison stepped up, reinforcing our commitment and promise to our customers.

In June of this year, at a launch event at our global headquarters, Allison announced FracTran, our latest offering for hydraulic fracturing applications. Built to perform under pressure, this all-new oilfield series transmission was purpose-built to meet the unique and continually evolving demands of the hydraulic fracturing industry, particularly in North America and China. The design was the direct result of extensive voice of customer insights, as well as an analysis of duty cycle information from decades of Allison products operating in this application. This significant front end effort was to ensure FracTran provides differentiated value, meets the evolving needs of our customers, and delivers the Allison brand promise. Please join me in exploring this innovative and groundbreaking transmission.

(VIDEO PRESENTATION)

Kartik Ramanan

In summary, the key benefits of the Allison FracTran are up to a 25,000-hour service life, an overhaul that provides a second life without hard parts replacement, eight gear ranges that are available in flexible ratios to meet the unique performance demands of varying rig setups and operating requirements, and ratings that meet current and future potential horsepower requirements with maximum power capability up to 3,500 horsepower. We believe that FracTran's high reliability, low total cost of ownership, and optimized performance will meet the needs of our energy customers for decades to come.

Let's transition now to explore Allison's more than 65 years of experience moving earth, minerals and precious metals around the world.

Allison Automatics have proven themselves in some of the most challenging conditions imaginable and are widely adopted in articulated and rigid dump trucks all over the world. Over the past two years, Allison has implemented growth initiatives to penetrate and gain share in global mining applications. For example, China's widebody mining dump truck market represents a growing segment in China, driven by safety and performance requirements that no longer allow on-highway dumps to operate in most off-highway mining applications. Today, the Global Off-Highway team is establishing key wins and realizing growth in this area, driven largely by the execution of our integrated marketing plan and through relentless customer engagement.

We've also identified growth opportunities in articulated dump and mobile crane applications, particularly across Asia Pacific, Europe, the Middle East and Africa. The unique duty cycle of these applications demands specialized features such as the ability to achieve higher reverse speed. In July, we announced the Allison TerraTran. A variant of Allison's proven 4000 Series transmission, the TerraTran is purpose-built for these off-highway applications but with enough application flexibility to enable Allison to target multiple additional on-highway opportunities as well. As part of that announcement, we also highlighted our lead OEM customer for the product in mobile crane applications, Chinese OEM XCMG.

Finally, last month we announced an agreement to acquire the off-highway transmission portfolio of India-based AVTEC. This acquisition positions Allison to accelerate its pursuit of incremental growth in the India off-highway market, as well as regional expansion in the Asia and Middle East markets. AVTEC's off-highway portfolio also expands Allison's product portfolio for new applications, including wheel-loaders, telescopic handlers and heavy-duty forklifts, with both new and existing customers. And, Allison will merge AVTEC's off-highway component machining operations into our Chennai manufacturing facility to produce housings for Allison's off-highway transmissions, in alignment with our overarching sourcing and operation strategies.

Allison is making investments required to aggressively pursue conventional transmission growth in our global off-highway end markets. Global initiatives with the new Allison FracTran in hydraulic fracturing applications, with the Allison TerraTran in articulated dump and mobile crane applications, and in the China widebody mining dump truck market will enable Allison to meet the uncompromising demands of our global off-highway customers for years to come.

The Global Off-Highway team plans to keep our foot on the throttle in driving Allison's conventional transmission business, providing propulsion solutions that deliver to our customers the Allison brand promise and the power of choice.

Next, please join me in welcoming Conrad Rockey, Vice President of Commercial Powertrain Engineering, who will showcase some of the technical highlights of the innovative new conventional transmission products that Rohan, Heidi and I featured in our remarks.

Conrad Rockey

Thank you, Kartik.

Our team has demonstrated Allison's commitment to the advancement of full electric and electric hybrid propulsion for the commercial vehicle market. Rohan, Heidi and Kartik demonstrated our commitment to our conventional transmission portfolio, and we continue to evolve our products through the introduction of new variants, new features and advanced controls. Throughout the electrification journey our innovations in the conventional space will enable reduced emissions and help our OEM customers meet the critical greenhouse gas reductions required of them. Our global customers rely on Allison for conventional solutions that will further improve the way the world works, and we are prepared to deliver on these global demands today and for years to come.

Earlier, Rohan discussed the new Allison 3414 Regional Haul Series fully automatic transmission. For this innovative new transmission, Allison engineers were able to make internal modifications to our proven 3000 Series product without changing the external dimensions, to deliver a more efficient product for the on-highway regional delivery market. This product provides a fully automatic alternative to manual and automated manual transmissions in the city delivery, construction and line haul markets.

With the 3000 Series at its core, we are so confident in the reliability of this transmission that we are providing an impressive five-year, 750,000-mile warranty. Along with the durability that comes from this fully automatic transmission, the 3414's re-engineered geartrain enables improved efficiency at vehicle launch as well as reduced engine speeds while on the highway, reducing the amount of fuel consumed.

The 3414 Regional Haul Series transmission features Allison's advanced FuelSense 2.0 controls that seamlessly puts the transmission in neutral at a stop. FuelSense 2.0 also includes Allison's proprietary DynActive Shifting Technology that calculates the ideal shift points based on vehicle load, the grade of the road and the desired acceleration.

Together, these features optimize efficiency and performance by providing up to 8% fuel economy gain, while delivering 25% faster acceleration in a product that weighs less than competitive automated manual transmissions. With the same external dimensions as the 3000 Series, OEMs can easily integrate the new 3414 into their current vehicle platforms.

Earlier, Heidi mentioned in her remarks another key innovation, the new and the industry's first-ever medium-duty, fully automatic nine-speed transmission, engineered for multiple vocations including straight trucks, step vans, buses, and defense vehicles.

Our customers continually tell us that reliability and durability are a top priority. They can only produce revenue when the vehicle is operational, so up time is the most important attribute.

Allison knows the demands of the commercial market, so instead of using an automotive duty transmission, we are coming to the market with a truly commercial duty-ready product. Our engineers started with our proven 2000 Series six-speed product, and with some Allison ingenuity added another planetary and clutch to transform it into a nine-speed. Additional improvements were made to increase its torque capability while sustaining its proven durability.

Fuel efficiency and emissions reduction are also high priorities for our customers. The three additional gears along with FuelSense 2.0 deliver meaningful fuel economy gains over our own fuel-efficient six-speed automatic.

Next, the Allison TerraTran, which Kartik briefly discussed, is a heavy-duty, fully automatic transmission with seven forward speeds and two reverses. Our engineering team started with our 4800 Series product

and once again delivered a new product with the same external dimensions, optimized gear ratios, and when combined with FuelSense 2.0, improved fuel efficiency and performance. These features enable an articulated hauler to get the job done faster and more efficiently, improving the customer's bottom line. And with its common packaging the new TerraTran can be easily utilized in vehicles already engineered for Allison's 4700 and 4800 Series products.

Another product that will continue Allison's longstanding reputation for delivering dependable and durable products is our next-generation fracking transmission. This product has been designed to meet the ever-increasing requirements of the hydraulic fracturing market. This industry is demanding higher efficiency in the delivery of the energy that the world depends upon. From dual-fuel engines with capability to run on the natural gas at the site to increasing horsepower and significantly reduced idle time, this industry needs a transmission that can deliver the dependability necessary to maximize up time and handle any unexpected operational challenge. Allison will meet these industry demands with the all-new FracTran.

I am sure you have heard of hydraulic fracturing, but do you know what it is and why it needs a transmission? Hydraulic fracturing is a technology that allows us to access vast energy supplies trapped in shale rock thousands of meters below the surface. This has been a critical development to continue the delivery of a much-needed energy supply while other alternative energy sources continue to evolve.

In this process a well is drilled down to the shale layer, providing a path for a water and sand mixture to be pumped into the shale, opening up holes where the oil or gas is trapped. This is where the transmission does its work. A frac site is made up of multiple frac rigs working together. Each frac rig is made up of three basic components: the engine, the transmission and the hydraulic pump. Engines up to 3,000 horsepower drive the transmission, which can be put into the optimal gear to deliver the torque and speed needed by the pump.

The new FracTran has been designed for the sole purpose of fracking and provides the power capability to meet current and future requirements.

After extensive customer interviews, duty cycle analysis and benchmarking, we are providing to the world a dependable and durable frac transmission. With flexible ratios and ratio steps, this product can meet the needs of any type of frac rig design. FracTran also offers an array of features including an integral damper to protect against damaging vibrations, a transmission mounted control module to simplify installation, an integrated break-in warm-up mode, as well as advanced prognostics and diagnostics to provide critical information to the operator. This includes a torsional vibration detection system that alerts the customer when something is wrong with the rig and takes action before damaging valuable components.

Finally, not only do we continue to improve our conventional products and introduce new electrified products, but we also continue to evolve our vehicle controls technology. With the introduction of our next-generation electronic controls system later this year, we will provide an enhanced transmission control module and shift selector to address the ever-changing vehicle architecture trends. The new multicore microprocessor will have an added hardware security module, expanded memory and higher speed communication capability, all with the same mounting dimensions and connector design to minimize impact on our OEM customers. These technical enhancements are necessary to maintain our capability to control not only our conventional products but also our new electrified products.

In addition, our next-generation electronic controls system will provide connected services capability that can communicate to both Allison and our customers key information on how their propulsion system is performing, as well as the capability to optimize the product through over-the-air programming. This generation of controls will also provide the foundation needed for autonomous vehicles with the latest in security against cyber-attacks and a design that meets the latest standards in functional safety to ensure the components will always operate as intended.

I hope this brief overview of our recent conventional product innovations has convinced you that Allison is committed to continual advancement in the efficiency, performance and proven durability of our products.

Thank you for your time, and please welcome our final speaker for today's event, Dana Pittard, Vice President, Defense Programs.

Dana Pittard

Thank you, Conrad. I'm Dana Pittard, Vice President of Allison Defense Programs.

As a former soldier for 34 years, leading organizations from a platoon of four tanks, to an army division of over 25,000 soldiers, we depended on our vehicles to accomplish the mission. Those vehicles use an Allison transmission and were put to the toughest tests during training, peacekeeping operations around the world, or during combat operations.

Allison differentiates itself from others in the automotive and commercial vehicle industries as we are one of the few manufacturers of products for defense tracked armored vehicles and defense wheeled vehicles. Our Defense team leverages Allison's internal investments for commercial products and applies them to defense applications. We remain well positioned today and into the future with our current portfolio.

Even more exciting is our growing portfolio of electric and electric hybrid products. We are the largest supplier of U.S. Defense wheeled and tracked transmissions. An Allison transmission is used in 100% of the U.S. military's tactical wheeled vehicles larger than the Humvee. Notably, our portfolio of wheeled transmission products for defense applications are variants of our commercial transmissions and built on the same assembly lines. We also provide the majority of the transmissions for the U.S. military's tracked vehicles.

Allison fully automatic transmissions with uninterrupted torque during shifts are a key differentiator for defense applications, especially critical in off-road conditions and the difficult terrain armies frequently operate in. Militaries around the world expect their vehicles to perform in the most demanding environments and have consistently placed their trust in Allison Transmission. We remain committed to working with our defense partners and customers around the world to meet the demanding propulsion requirements of today and developing new propulsion solutions for the future.
Our defense customers value Allison products. Over the last three decades, vehicles that use our products were selected by the U.S. Army and Marine Corps in every major wheeled or tracked vehicle program competition. When selected, U.S. military vehicle programs retain major components for decades. For example, the Abrams Main Battle Tank right behind me here, has used the Allison X1100 cross-drive transmission since entering service in 1980. That's 40 years already. And the U.S. Department of Defense has plans for the Abrams to remain America's battle tank for another 20 years. We also continue to upgrade the capability of this transmission as the Abrams tank weight has grown by more than 20% since its introduction.

Our global reputation as a premier propulsion solution provider for wheeled and tracked defense vehicles is well known. Similar to the North American market, customers rely on Allison in Europe, South America, Africa, the Middle East and the Asia Pacific region. We leverage our extensive network of approximately 1,400 independent dealers, distributors and licensees to extend our support to wheeled and tracked vehicle customers around the world.

With a substantial installed global base, we will continue to service and provide parts to fleets worldwide for many decades into the future. Our priority efforts today include vehicle competitions in Asia, Australia, the Middle East and across Europe.

In addition to our conventional propulsion products, several of our vehicle partners have expressed interest in our electrified and electric hybrid products as well. Now, the U.S. Department of Defense electrification strategy is in its early stages, but it has begun. Military leaders and technical experts are looking closely at commercial markets at how emerging technology can be adopted.

However, the military is looking at electrification differently. First is how electrification can increase vehicle survivability in combat, making a vehicle more difficult to detect, more difficult to engage and with increased electrical power for protection systems. Advanced propulsion systems will enable silent mobility through electric-only propulsion, eliminating noise from the engine and reducing the vehicle's thermal signature, increasing survivability of the vehicle and protecting its occupants.

Second, by decreasing reliance on fossil fuels, we help militaries around the world conduct longer distance and duration missions with less fuel.

Military leaders must also solve complex issues such as lack of charging station infrastructure on the current and future battlefields, as well as weight-to-power issues with electrified vehicles.

These are just some of the technical solutions we're working on today. Leveraging our commercial product engineering expertise, we can effectively and efficiently blend the torque produced by both the engine and electric motor to improve vehicle mobility, reduce detection and increase survivability.

One future opportunity I'd like to highlight is the Optionally Manned Fighting Vehicle, or OMFV. It's a tracked vehicle program and the U.S. Army's largest tracked vehicle procurement in over four decades, with the potential of nearly 4,000 vehicles. For the OMFV, Allison is developing an innovative new product, the next-generation electrified transmission for an armored tracked vehicle. The next-generation electrified transmission will enable electric hybrid propulsion as well as electric-only silent maneuverability. It is designed for tracked vehicles weighing 50 US tons and scalable past 70 tons, meeting the needs of both the tracked medium Infantry Fighting Vehicle market and the heavy Main Battle Tank market. No company has been able to do this before: one product, two applications in North America and across the world.

In support of autonomous vehicle operation, a key consideration of advanced future platforms, the next generation electrified transmission also features fully integrated steer, brake and drive-by-wire systems. For the next generation electrified transmission, Allison has partnered with American Rheinmetall Vehicles and a formidable team of defense partners in support of the U.S. Army's OMFV program.

Next, for medium and heavy trucks, we have partnered with Leonardo DRS to develop the Transmission Integral Generator, or TIG, to provide up to 120 kilowatts of electrical power for onboard and offboard power requirements. A 2020 Military and Aerospace Electrical Innovators Platinum Award Winner, the TIG is an innovative technical solution that converts transmission mechanical power to electrical power for use on the vehicle or off the vehicle, reducing reliance on traditional towable generators.

As we continue to refine requirements for our commercial customers, our Defense team is evaluating our portfolio and preparing to meet the U.S. Army's electrification strategy. Thanks to Allison's decades of experience and expertise with electrified propulsion, as well as our differentiated and growing electrification product portfolio, we are well positioned to meet the future needs of the U.S. Army and our global defense customers.

I'd like to leave you with some closing thoughts. Our customers who build vehicles for militaries in over 110 countries around the world know Allison and rely on our products in their vehicles. Customers value and trust our innovative products' durability and reliability under the most demanding conditions. We believe we are well positioned for sustained competitive advantages based on our portfolio of propulsion solutions and electrification experience over multiple decades. We will continue technical discussions with defense customers on what fully electric or electric hybrid products will best meet their needs.

Militaries around the world often look to the U.S. to drive technological changes. This is a partnership for the long term and we fully expect several more years of Department of Defense testing and prototyping before adopting electrification across fleets. We view this deliberate electrification approach as prudent for the defense market. There will be changes, but we will evaluate and assess innovative technology and not just chase fads.

We are the largest global manufacturer of medium- and heavy-duty fully automatic transmissions, a leading designer and manufacturer of conventional and electrified vehicle propulsion solutions for tactical wheeled and tracked defense vehicles. Our products consistently perform in the most difficult terrains and demanding environments. As I know only too well, in combat there are no second chances when lives are on the line. Military and civilian leaders throughout the world remain confident in the reliability of the Allison transmission.

Thank you for your time today. We'll return with a Q&A.

Ray Posadas

Hello and thank you for joining us once again for the second Q&A session of Allison's Virtual Technology Day.

Once again, I am Ray Posadas, Managing Director of Investor Relations. Joining me are, once again, Dave Graziosi, our Chairman and CEO; Rohan Barua, our Vice President of North America Sales, Global Channel and Aftermarket; Heidi Schutte, Vice President of Europe, the Middle East and Africa, Asia Pacific, and South America Sales; Kartik Ramanan, Executive Director of Global Off-Highway Sales, Customer Support and Service Engineering; Conrad Rockey, Vice President of Commercial Powertrain Engineering; and Dana Pittard, Vice President of Defense Programs.

Let's get right into it. Our first question comes from the line of Ann Duignan of J.P. Morgan. Please go ahead, Ann.

Ann Duignan - J.P. Morgan

Hi, good afternoon.

Could you talk about the return on invested capital that you consider when you're investing in something like a nine-speed, which may be obsolete in 10 years, plus or minus, versus an e-Axle who's success may be more uncertain? Just can you remind us whether you build the e-axle, or you buy a competitor's axle and put in the electronics from there?

David Graziosi

Ann, it's Dave Graziosi. Thank you for that question.

Let me start at the top. As we discussed before, our hurdle rates for investment is typically in the 15% to 20% internal rate of return. As you also know, we make investments in both existing products, variants, as well as R&D. Specific to the nine-speed, you know, that's a variant of our long running and very successful six-speed product. It provides an option to OEMs, frankly, as we thought about it in terms of the market, really focused on additional fuel efficiency, should that be required.

As we think about your comment on obsolescence, we don't really think it's the next decade, frankly. As we talked about, I believe in, the EV session, you know, this is a moving process and evolution that I don't think even when it's done that it's fully complete. There will always be conventional technology that's required.

In terms of the investment in e-Axle, our initial efforts there, as you know, through R&D and M&A continue to evolve, really focused on end state solutions that meet or exceed conventional product performance. That is the near-term approach there. We would also take, as you know from some portions of our conventional business, mostly off-highway, as well as some of our military business, assemble, test, and ship product is really the focus initially. That allows us to mitigate, frankly, the uncertainty around initial product design and development, and really focus again, as I said earlier, on end state.

With that in mind, certainly our initial efforts relative to e-Axle have a fairly high level of purchased content, and ultimately we'll make, as we always do, the appropriate make versus buy decision, subject to a number of different return and timing hurdles.

Ray Posadas

All right, thank you for that question, Ann. Our next question comes from Tim Thein of Citi. Go ahead, Tim.

Timothy Thein - Citi

Great, thanks and thanks to you, Ray, and team for hosting this event.

I wanted just to come back to the discussion from earlier around the margin potential for e-Axles, and I apologize for not fitting it into your earlier segment. But, you know, I'd assume that the level of integration in the software and controls will be an important factor in driving that. It's not clear to me, though, how this partnership with JJE will play into that in terms of what exactly they're bringing to Allison versus, you know, what you already have in house.

David Graziosi

Tim, I appreciate those questions.

On the margin potential, as you know, we didn't achieve the position that we have in conventional products overnight. It took decades, and the result in terms of margin outcome is really focused on the performance and the value that we deliver in terms of conventional solutions. That being said, there are currently very high value and certainly appropriate margins, given the value that we're delivering. We believe and certainly our focus is in e-Axles is to provide fully integrated solutions that are differentiated at that level. It really does get back to, as these margin questions are raised, the real question is what value is Allison going to deliver as part of our e-Axle solutions, or frankly, our EV solutions.

You know, I would point out as a comparison, you know, we've been selling our hybrid transit bus product for upwards of 18 years now; $1.5 billion in sales; 9,000 systems delivered. That was not achieved, you know, in the first year or two of the production of that particular solution. Understand that we also provide not only the drive unit there but also the battery, as well as the power electronics. As we think about margin for EV, it's really focused on the level of components and ultimately solutions that we're delivering, but it all starts with what value are we delivering versus others.

In terms of your question on JJE, you know, as we indicated in the presentation materials, certainly they have an established foothold in China, are very capable in terms of motors and power electronics. We believe that pairs well in terms of Allison's capabilities concerning system solution, propulsion solution, validation, further development, and frankly focusing on end user appropriate solutions. You know, they certainly have a presence in China in terms of commercial vehicle and automotive as well.

We think about some of the earlier questions in terms of EV around regionalization. There are regional differences. We believe the combined efforts of those parties, as we've talked about collaboration, really allow us to leverage and frankly exploit what we've already invested in, where our existing talents are. It

also gives us manufacturing optionality relative to footprint and localization, which is another aspect of EV adoption going forward is ultimately where products will be produced.

Ray Posadas

All right, great. Thank you for that question. Our next question comes from Jamie Cook of Credit Suisse. Go ahead, Jamie.

Jamie Cook - Credit Suisse

Good afternoon. I guess two questions for Dave.

Dave, you know, you talked about a lot of new product opportunities, geographies that you can, you know, move into outside of the U.S. Do you think, you know, alternative powertrain offerings, do you have a view that, you know, over sort of the next five to 10 years Allison can continue, can outgrow the overall market? And if so, how should we think about that? Then my second question, you know, Allison's stock is trading at a discount to the peer group and you guys continue to buy back your stock. What do you think is most underappreciated about Allison that Wall Street is missing? Thanks.

David Graziosi

Thank you, Jamie.

I'm taking your questions in order there in terms of alternate powertrain offerings and outside the U.S. over the next five years. To the comments earlier in terms of the question on EV in China, for instance, we do believe there is growth potential there for us. You know as we think about the market, you know, we talk about our addressable market historically in terms of conventional products. The EV plans that we have really represent a 50%-ish growth in our total addressable market. We believe there's real opportunity there to grow Allison on the EV side as well, especially when you start to think about, you know, new offerings from our existing platforms, eGen Flex for instance, as well on the hybrid side, which we do believe has a place in the longer-term market relative to properties that don't have the ability or a number of operating restrictions around full EV. We do believe we can outgrow the market.

If you look at the balance of the conventional portfolio, as you saw in the presentation materials, you know that we've had a number of wins. I think the team has worked hard and been very successful around conventional with the 3414 offering, as well as a number of products and variants that we have launched in the off-highway space as well as defense. You know, I think the team has really leveraged how we look at our platforms, as well as our ability to invest both in near-term solutions as well as longer-term programs. You know with off-highway it's a volatile market. We capitalize that business accordingly. In defense, very large programs take a fair bit of time to ultimately come to fruition, but the reality is very long annuities and an asset-light structure.

To your question on Allison's stock, you know, I would certainly argue it is trading at a significant discount to peer group. We believe what's underappreciated is, frankly, what you've heard the last hour or two hours of material. You know, we are a differentiated solution provider, relative to managing power and torque. We don't have passive components. We add value across an entire range of end markets and vehicle types. You think about the balance of our business in terms of other end markets, defense being asset light, off-highway being asset light, very attractive returns on invested capital.

It's apparent that, you know, I certainly need to do a better job of communicating that message to the street. I also believe taking a balanced approach and listening to our customers and reacting to what they're telling us they need, whether it's Paul Rosa from Penske in the prepared comments, to our defense partners, and

ultimately what we hear in the off-highway space is continuing to be a close partner to all of our customers and meeting or exceeding their expectations.

Ray Posadas

Thank you for that question, Jamie. Our next question comes from Ross Gilardi of Bank of America. Go ahead, Ross.

Ross Gilardi - Bank of America

Thanks guys.

Dave, you know, just sort of a softer question, you know, first on. You know, just as the CEO, I mean, how do you lead a company with a hugely profitable, conventional business, and get all of your people really behind just really embracing alternative propulsion without hesitation or skepticism, and just really make sure you're moving forward as aggressively as possible without, you know, clinging to, you know, the golden goose, which has been your conventional business over a very, very long time?

David Graziosi

Ross, I appreciate that question.

You know, as CEO, first of all it's an honor to lead this Organization and the team that I'm fortunate to have with me. I would tell you one of our values as a business has always been teamwork. There's a collective approach, a collaborative approach to everything you've heard this morning and through this early afternoon. What we do, we do it as a team. We work cross functionally. We're a flat organization. We don't have business segments. We have one segment. We behave as such. You know, the team that you saw earlier on the stage here, as well as the team that's with me now, we all work together. There's not a problem in terms of getting everybody organized to drive ultimately to our strategic imperatives. That's never been an issue and I don't believe it ever will be an issue.

We are fortunate with the margins that we earn. It's happened over time through delivering value to our customers. Again, everybody that's here with me, that is the focus every day, day in and day out, is stay close to customers, meet or exceed their expectations, deliver value. The margins will follow. As we think about the future, we're all focused on, you know, the next steps for Allison. And what holds is growth. You know, we're not interested in holding serve, so to speak. You know, this team is always focused on growth. We have a record amount of initiatives underway, and I appreciate the support of our Board and our Shareholders to do just that. It is an expansive portfolio of activities, as you've seen through the presentation materials here and as the team here could certainly elaborate on.

But you know, again, very proud of what they're doing. I'm not sure, frankly, we could do more at this stage. You know, we can always do more. The question is prioritization. We're all very clear on what our priorities are, which is maintain and grow this business and work as a team to do just that.

Ray Posadas

Thank you for that question. Our next question comes from Rob Wertheimer of Melius Research. Go ahead, Rob.

Rob Wertheimer - Melius Research

Hi. I had a couple questions on off-highway and international, and I'll just ask all three. Do you have a sense of where off-highway was way back in '04, '05, '06? Since housing is coming back in specific products, did

we ever reach those peaks again? Could you talk a little bit about the fracking channel as vertical integration has come to the industry with that? Then could you detail how long the pools of revenue could be in India and China in a reasonable timeframe of three to five years? India and China, how big those pools of revenue could be.

Kartik Ramanan

Thank you for your question, Rob.

As far as off-highway, as it was in 2004, 2005 when the housing was coming back versus off-highway today, of course we saw a down cycle post the 2008 financial crisis, but then it has taken some time to get to a point where it then took off again. Today, we see off-highway, you know, it's pretty strong and we see other forces also driving the strength in the off-highway market. Of course, the demand for energy, infrastructure projects that are happening across the world, and finally, there has been a trend towards safety, sustainability, and user comfort.
I see that more prevalent across the board. It used to be a first-world thing. We see it across the board. That specifically is very, of course, aligned with what we do as a company, in terms of value add. For instance, we have fuel economy. That is a major ask. We also have lack of skilled operators that is also driving a trend towards automatics. All of that, we see that is—there is an uptick, but that uptick is based on a slightly different set of baseline trends.

Coming to your next question about fracking, vertically integrated CAT, whether it's a risk or opportunity. I believe it is, when you look at the market, they are looking at a couple of things. One is of course the ability to have choice in the market, and that is what we have to offer, as well as the ability to make decisions on how they frac, where they frac, as well as what components they can use flexibly. That, I believe, is a major factor in whether CAT could be looked at as a risk or opportunity, because with the acquisition of Weir's pumping business, there is obviously a concern among some packages on what the next steps are as far as CAT is concerned.

Finally, coming into adoption rate for the next four or five years in India and China, I would say both of these regions are heavily into, as I mentioned, sustainability, safety, automation, etc. In fact, we see a trend towards autonomous vehicles as well. When you talk about autonomous vehicles, we do; again, an automatic transmission lends itself really well to such trends because you have advanced controls that mesh well with the vehicle controls, and that is something that's very favorable to us and positions us to grow in these markets.

Ray Posadas

Thank you for that question, Rob. Our next question comes from Luke Junk of Robert Baird. Go ahead, Luke.

Luke Junk - RW Baird

Yes, thanks for taking the question,

I had a philosophical question in R&D really, and the question is how you think about balancing R&D for the conventional applications that we've been talking about in the second part of the session versus those more forward-looking investments and next gen propulsion. In particular, I was hoping you could speak to how that mix evolves in the near to medium term, say as you think about your five-year plan for R&D.

Conrad Rockey

Thanks, Luke, for that question.

As far as R&D spend, we've obviously ramped that up in the recent years and we've balanced that between conventional and electrification. On the electrification side, we're trying to get a full range of products to deliver to our customers. On the conventional side, we've been looking at how do we improve our current product, or what kind of features or variants that I talked about in my video are key to the market and to continue expanding our conventional offerings. Right now, I think in the near term we will continue to spend at an elevated level, definitely for EV and also for conventional in the near term. As we bring some of these products to market, we'll continue to look at that and see, you know, what makes sense for Allison and our investors to address needs in the market.

Heidi Schutte

Yes, I would just add to that, Conrad. Thank you. Just a couple of things around that.

As we look at the future of products and we look at the future of the industry, there will be a transition as we look at our current product portfolio and we look at electrification, as well as looking at hybrid, flex hybrid, as we look at the different transmission propulsion solutions, different alternative fuels, and those types of things. As we transition, we'll also need to be very aware of regulatory compliances that come into play here as well. Our current products and the investment that we've made and are making will help to transition through that process, providing our customers with long-term solutions for the market and beyond electrification.

Ray Posadas

Thanks for that question, Luke. Our next question comes from Courtney Yakavonis of Morgan Stanley. Go ahead, Courtney.

Courtney Yakavonis - Morgan Stanley

Great, thank you for the question, everyone.

Just to follow up on the growth opportunities outside of North America, I think you've historically talked about emerging penetration being at around 5%. Do you have any goalposts how that combined portfolio adoption could be over time or penetration target over the next several years? Then, you know, back on the e-Axle conversation, can you also comment on the ability of the success of that product in electric versus hydrogen applications and if you have any strong views on how zero emission will develop over time between hydrogen and battery electric?

Heidi Schutte

Thank you, Ray, and thank you for the question, Courtney.

Just a couple of things around where we're going and what we're targeting for growth. As we look at the world, yes, current penetration is right around 5%. The way that we are actually addressing growth outside North America through our growth initiatives is targeting very specific regions, countries, markets, and segmentations where Allison offers the best value proposition in the industry. As we look at the different areas and we look at the different end markets and vocations that we serve, you know, we've got goals and objectives for each of those countries, each of those segments. As the team pursues those opportunities, we've continued to invest in placing people in the right countries, the right geographical locations, and really setting the stage and foundation for being able to develop those markets, generating interest in the product, generating demand for the product.

As we talked about in the videos in a couple of different instances, this trend towards automaticity, well, our global team is prepped and ready to go to deliver to customers based on that adoption of automaticity. As

we look at the different regions, we take a look at Asia Pacific, for example in the video, I describe how the team is winning with the different releases. Just this year through the first three quarters, the team has secured over 10 different releases, incremental tier releases that we've had with different OEMs targeting Southeast Asia, Japan, Australia. Those are some pretty big opportunities for wins for us as those markets, along with South Korea, are really adopting automatic transmissions. As we look at China, for example, China is trending towards automatic transmissions. It's a great market opportunity for us. We are positioned to win there. We are winning in the sanitation segment. The team has delivered incremental releases, as I mentioned in my video earlier. In addition to that, they've got a whole portfolio of releases ready to go over the next couple of years here.

As we turn our attention to Europe, Middle East, and Africa, we have teams in Turkey and Russia with BMC and Kamaz really driving new product technology and automation and winning with releases there. We have about five different releases over the next 12 months that will be coming to market there. Really exciting opportunities around the world. In addition to that, as we turn to South America, you know, very large commercial vehicle market and segment for us to play. South America also trending towards automaticity and moving forward towards automatic transmissions. We've got a team that's poised with growth initiatives and go to market strategy to really penetrate that particular market as well.

As we start to add up all of the growth opportunities, it becomes quite significant for us in the future.

David Graziosi

Courtney, to your question on the e-Axle application in full battery electric as well as hydrogen fuel cell. As you know, with our conventional products we are largely energy source indifferent. The fact is, we've taken the same approach with the e-Axle solutions that we're developing. We are, we believe, very well positioned for both battery electric as well as hydrogen fuel cell electric with our e-Axle solutions.

I would also add, you know, as you know, we launched the Vehicle Electrification and Environmental Test Center last year. We are now adding hydrogen capability to that facility as well. It will help us assist us with both conventional as well as full electric and hydrogen development.

Rohan Barua

If I may add one other thing to Heidi's comments.

I think a lot of our global growth is going to be driven by our now what we're seeing more and more of a consolidation in the conventional space as our OEMs that we serve in North America today. A lot of them are global in nature because they have markets that they have entered over the past few years or decades through acquisitions or partnerships. A lot of the expertise and knowledge of the vocation, the experience that they have with Allison Transmission in North America, that's what they are taking with them when they go into these markets. I think that creates an opportunity, because that familiarity is not creating a brand-new expectation around product performance. It's something that they are used to, they are familiar with and they trust. I think that's what they are looking at expanding into when they are looking at expanding outside of North America markets with Allison. I think that also positions us well to be successful because a lot of these OEM customers are familiar with our products already.

Ray Posadas

Thank you. Once again, we've come to the end of our Q&A session. Now, I'd like to hand it over to Dave for closing remarks.

David Graziosi

Thank you, Ray.

First, I'd like to recognize and thank the Allison team and our partners for producing an outstanding event.

Second, I'd like to thank all event attendees for your participation and the opportunity to demonstrate the power of Allison, namely the power of our people, our processes, and our electrified and conventional propulsion products.

Finally, the commercial vehicle industry is undergoing a pivotal transition, and we've demonstrated that Allison is fully engaged in this process. As we've done over the decades in leading disruptive transition to fully automatic transmissions, we will leverage our internally developed, well established, and proven capabilities to continue the development of differentiated products that deliver value to our customer and meet the needs of the market today, and in the future.

If you take one thing away from what you've seen and heard throughout this event, it's that Allison has the experience and the expertise to navigate the pivotal transition to electrification. We understand how to develop, validate, integrate, and highly customize commercial vehicle propulsion solutions that actively manage power and torque. We understand the challenges and the opportunities, and most importantly, we understand our customers. Allison knows how because we've done it for decades.

Thank you again for taking the time to participate in our Virtual Technology Day and for your continued interest in Allison. We look forward to updating you on our Third Quarter Earnings Conference Call.

Enjoy the rest of your day.