OMAR: So Will, we’re back again. We're talking about electric vehicles today, and I know you've driven them for a few years. What do you think about their evolution so far?

WILL.I.AM: I'm a fan of electric vehicles. I'm a car guy. So I love cars. I like concept cars, prototype cars, cars that are on the streets, power cars, F1 cars. I love cars. I love ‘em, love ‘em, love ‘em. I like the art of them, the design of them and the new technologies that are pushing cars to be things that we never thought cars
could do and that's, self-driving autonomous, fully autonomous cars. Do you drive an electric vehicle?

OMAR: You know, Will, it's so embarrassing because like, actually the question you should be asking is, do you drive a vehicle? Um, because a few years ago, like the London traffic wardens convinced me that like owning my own vehicle was too painful. So yes, I do drive, uh, electric vehicles… hybrid vehicles, but I typically am renting them and like you, I love where the, the future of this industry is headed like electrification, autonomy, the whole thing. It's incredible. And there is no doubt that the auto industry is undergoing arguably its most drastic change ever. And we can thank electric vehicles for that.

The demand for electric vehicles is so high that popular models are already sold out, leaving manufacturers with one or two year waiting lists and this is a trend that experts think is going to accelerate. Around 6.75 million electric vehicles were sold around the globe in 2021 and that number is expected to jump to 9.5 million this year, and leaders like Ola Kallenius, the CEO of Mercedes-Benz group must find timely solutions in this fast moving industry.

Ola joins us to talk about the future of electric cars, autonomous vehicles, and more, and how Mercedes is leading the charge. Welcome to Changemakers, Ola.

Ola K: Thank you. Hello Omar. Hello Will, good to see you guys.

WILL.I.AM: Good to see you too Ola. Before I met you, I was a fan of an owner of the products that you lead and before I had one, I dreamt of having one and everyone that has one probably feels the same way I feel about the products that you guys make. So it's great to have you here. I salute your bravery on what you're doing with the company and taking it to a brand new direction. So thank you for joining makers, cause you're definitely one of the change makers on the planet.

OMAR: I mean, I think Will, um, represents it well that when it comes to vehicles, uh, it's super personal for people. Would you describe yourself as a car guy? I'm kind of scared to say petrol head nowadays. Um, but you know, what, how, how
would you find describing the most exciting thing about leading Mercedes now during this enormous shift in the auto industry,

**Ola K:** Yes, I am a car guy and I guess, maybe switching that from a petrol head to an electric head in the meantime. I've spent my entire career at Mercedes, so it's almost 30 years at the company. So how can you not be a car guy if you're working for a brand like that? What's so exciting right now is that most of you know, the auto industry is going through a fundamental transformation towards zero emission, uh, the autonomous vehicles, uh, everything that's going on there.

So in a way, it's like reinventing the original invention from our founding fathers. They invented the car 136 years ago, and here we are. And now we, we have the privilege of reinventing the original invention. So it's very exciting to be in the auto industry right now.

**OMAR:** That is indeed super cool. And, you know, we can see that you've, um, stepped out and said that Mercedes will invest 40 billion euros, $47 billion by 2030 to become an electric only manufacturer of vehicles. What do you feel it really will take to reach that goal? What are the obstacles that you see in your way?

**Ola K:** I believe in this decade, we will see the tipping point towards electric cars. So, uh, moved from being dominant, uh, combustion based to being dominant electric and that's why we are investing indeed, uh, an enormous amount of money to put the company in a position that by the end of this decade, we can go all electric and markets where that are ready. Uh, what will it take… if you are an incumbent, you have to, in a way, uh, rebuild part of your industrial infrastructure. So everything that has been combustion based, uh, eventually is going to be all electric. So we're investing in technology, it's of course a Herculean task for the R&D team, but at the same time for the production team and, uh, and a mindset shift for the whole company. It's a 360 degree effort where you have to look all the way down to raw materials, you know, where’s the lithium, where’s the nickel, going to come from..it's multi- it's a multifaceted challenge, uh, but uh, exciting nevertheless.
**WILL.I.AM:** Yeah, batteries are a crucial piece to the success of this transition, but the supply chain delays have a negative impact on production. Do you have a long-term plan to address battery production?

**Ola K:** Yes, we're ramping up fast. We're in fact, uh, in the process of, of building gigafactories around the world.

So our production footprint is Europe, United States and China, primarily. So in all those three economic regions, with our supply partners, we're in the process of building up gigafactories. Some of them are already up and running, but more is to come. If we want to go all in on electric by 2030, we should have some somewhere north of 200 gigawatt hours.

Uh, so that's a lot of investment but we are fairly optimistic that we can get that done. One thing that we do have to watch though, is availability of raw materials, especially on the lithium and nickel side, but not only those two.

**WILL.I.AM:** Hmm. How are improvements in technology improving the life and quality of batteries? Like what does the next generations of batteries look like?

**Ola K:** Uh, already in the last few years, we have seen some rapid development here in primarily energy density. This is what happens when billions of dollars of investment meets, uh, uh, intelligence…everybody's going in, and the, uh, dynamism in terms of the technical evolution is, is, is very, is very vivid. Right now, we're using, uh, what people call lithium ion batteries, which, uh, different types of chemistries but we're already looking at what's next and, uh, two of the things that we are looking at, then many others, as well, is on the one hand to see if we can gain energy density by switching to an even silicone richer or all silicon anode, and what's considered a bit of a holy grail is what is referred to us - solid state batteries. So batteries where you can take the electrolyte out, you can maybe gain significantly higher energy density. If you do that, uh, you get better range obviously, or you can make lighter batteries because one of the challenges of an electric car is that, uh, these batteries are quite heavy.
They can be 6-700 kilograms, just a battery in a, in a car. So to get the weight down, uh, through increasing energy density is going to be one of the things. And then of course, fast charging and also longevity. So you have several dimensions that you're tackling. Um, and I think that, uh, on the way to 2030, we will see at least two or three iterations of these technologies come into the market, uh, which is going to make electric cars better, even better.

**OMAR:** Amazing. Okay. So I'm shifting gears cause that stuff was in Mercedes's control. But on the other side, uh, in the US for example, there are fewer than 50,000 public charging stations, which is not really nearly enough. So how do you think about balancing battery range and battery range concerns in a world where charging networks don't seem to be keeping up pace with the demand for the electric vehicles themselves.

**Ola K:** The buildup of charging infrastructure is going to be one of the main deciding factors for how quickly electric adoption will happen. And if we look at the charging landscape, there are really three places where customers charge: at home, especially Mercedes customers. Here, we have a specific clientele which is maybe more likely to have access to a wall box in their driveway or in their garage.

So charging at home, you kind of live at the, you live at the gas station in a way that's, that's more or less 70%, or even more than, than, than the charging events. Then, many people charge at work. Uh, if you work for a progressive company like Mercedes, uh, they might offer charging for you. Maybe you live downtown, you're in an apartment, you don't have access to charging at home, but during eight hours during the day, you can charge at work. And then the third thing, and this is what everybody's talking about, i.e., public charging. So, fast charging along the highways, and in other places, this needs a significant, significant lift up.

Uh, originally when we started with electric cars, we thought about this, like, okay, we make cars, we don't do infrastructure. Today, we make cars, we don't build the gas stations. Right? But in the electric era now in the beginning, we have to think a little bit different. So we have joined in Europe to start with a consortium called Ionity, where we're building a fast charging network along the whole highway network across Europe, and we're looking at more - we're looking at the United
States, we're looking at China and other places. So I think in this transformation age, to avoid the chicken or egg situation, we have to do more than just build the car, but we're not alone. The many players are jumping in - the big energy companies and many others as well.

So I think 10 years from now, it will be a very, very different picture than what we see now. Uh, we had a little bit too few charging stations still.

**OMAR:** So as you know Ola, Tesla sort of came into the market with this whole focus on software and consumer experience. And so when you sit there now, after a few years in, and you've been driving a giant transformation of Mercedes, and you think about all the OEMs, all the original equipment makers in the industry, and who's going to succeed in this transition to electrification on autonomy and who isn't, what do you think it'll take?

Like who, you know, from the traditional pack will still be standing in the next 10, 20, 30 years?

**Ola K:** Every time an industry goes through a fundamental transformation or I would call it disruption, usually new players look at that industry and go, “I can do that or I can do what's next.” Uh, and this is what the auto industry is experiencing as well. So just because you have a 100 year plus of, you know, pedigree, great tradition, engineering excellence, there's no guarantee that you're going to be a winner 10 years from now, if you don't accept change.

So I think what the challengers do, first and foremost, they cause a mind, a mindset change with the incumbents, or at least with the ones that want to stay in the business. If you think that you can sit back and just wait, I don't think that's going to work, but I wouldn't underestimate the usual competitors either.

So if we would only concentrate on the, on the new kids on the block, we would make a mistake because some of those incumbents are also investing like we are doing and our formidable, formidable competitors…so we, we, we tend to watch both. And having said that if you just tried to run after somebody else's strategy, you're going nowhere.
You got to know who you are, what your brand DNA is, what your brand promises, and you have to try to deliver that to stay true to your own core while at the same time, keep an open mind and never be complacent. I think that's, that's the mindset that we have to have if we want to be in a leading position 10 years from now.

OMAR: Brilliant, brilliant. And Ola, sustainability is a giant topic. We cannot make transportation sustainable without pervasive electric-electrification of vehicles. So if you had to say like three things that the world must do to dramatically increase the penetration rate of electric vehicles, what would be the big things from your perspective?

Ola K: It's interesting that you say three things because it really needs to be three things. The obvious one, the product will take care of that and from a 360 degree point of view...so supply chain or own production, but the product itself, the product in use. So we're not just thinking about building an electric car, you've got to look at what, how are you sourcing it, how are you producing it... everything. But the other two things that we need for this systemic shift to happen is infrastructure, charging infrastructure. We talked about it before, we need it everywhere and then the last piece, and it's the most important piece, we're really talking about the energy transition. We're going away from fossil fuels as the energy source to other energy sources. So it doesn't make any sense to burn fossil fuel, uh, and create electricity to drive an electric car. I mean, what's the sense in that? Ecologically it's, it's not the way to go.

So the energy transition away from fossil in the next decades will be the third element and the most important element.

OMAR: Thanks. You said that to, um, make this electrification, uh, in the transportation sector really take off, we need three things, the product, the charging infrastructure, and then the energy transition itself. From your vantage point as a CEO of a giant multinational, what do you think of the incentives that we need to create in our markets to really make those three things happen at pace?
**Ola K:** Well, anybody who read the latest, uh, uh, climate report through the international panel of experts, I think that's incentive enough. Uh, and as a business person, to let potential climate change go unchecked is a risk that we shouldn't take. So the cost of that is going to be much greater than the cost of the investment to fix this issue. So I think most countries, most companies, most people, they have realized that this is not an option. This is something we have got to do. Having said that, it's almost like, you know, where do you start? How do you eat these elephants spoon by spoon? But if, uh, leading companies and, uh, governments around the world work hand in hand and we create the right incentive structures so that moving away from fossil as a base energy more costly and the cleaner alternative will be the better choice - it's those things that we have to do in terms of economic steering, going hand in hand with the innovation. I think the innovation is happening anyway, but we need a, another layer of economic steering as well, policymaking, and then work with the market through, uh, some sort of CO2 pricing so that we pay for the side effects of burning fossil fuels.

And if we do that in a careful way, we can kind of tip the scale in this next decade or two, and it really needs to happen. Most of the heavy lifting needs to happen in this decade and in the next decade, if we want to have a fighting chance to get to a zero position in 2050, or perhaps, uh, sometime, uh, beyond up, but not too, too far beyond that.

**OMAR:** Thank you. I couldn't agree more. I mean, we're overdue putting a price on the real cost of this stuff, so thank you so much.

**WILL.I.AM:** Wow. That's awesome. The AMG brand is getting electrified as well. What's the timeline?

**Ola K:** Well, when we met only a couple of weeks ago in France, Will, you saw that we unveiled what we called the Vision AMG. So the electric future of this performance brand and the key is, uh, AMG will be just as thrilling, just as exciting in the electric era, uh, like it has been in the combustion and we both know that a performance car is not one, one dimensional.
It's not just about the roar of the V8 and the sound. It's so many things - the driving dynamics and all those things. But I think in terms of sound, we have to, we have to invent something new. I remember when we had dinner once, you talked about, you know, we need to make the car come alive. So we will also rest upon your expertise, uh, coming from a mixture between tech and music to find that new sound soul of an electric car, there we’re not done yet, but I can promise you in terms of acceleration or driving dynamics, this new, all electric generation AMG’s is going to be unbelievable.

**WILL.I.AM:** I've been working with Mercedes for two years now and, uh, one of the things that Ola mentioned was how, how do you reimagine audio, the audio experience in an AMG vehicle?

And when I'm talking about audio, we're not talking about music, like one part of an AMG vehicle is what it sounds like in the vibration of that… that engine, the rumble, the sound, vibration but when it's electrified, you don't have that. So you have to re-imagine the sound and the experience because it's different materials, but how do you do that? So I got my computer scientist guys here and my audio engineers here and we're having a go at just rethinking re-imagining what that is.

**OMAR:** I want to hear it. I want to hear it. Awesome.

**WILL.I.AM:** It’s so exciting.

**OMAR:** That sounds brilliant. It sounds brilliant.

**OMAR:** Ola, Mercedes has been prolific in Formula 1 and in the next few years, we're expecting to see more carbon regulations in F1 racing.

How are you preparing for that shift?

**Ola K:** Uh, the brand Mercedes was actually born on the racetrack, uh, and I think, uh, many people know the story of the Austrian industrialist that, uh, ordered a race car from Gottlieb Diamler and Wilhelm Maybach, his chief engineer to go racing in Nice. He only had one, uh, condition - the car needs to be named after his
daughter, Mercedes. He won the race. The rest is history. That's why we are in racing. Formula 1 is changing too. Formula 1 is, is, is growing fast, especially in the US - big Drive to Survive, has played a role in that, but also the new race in Miami this year; next year, we're going to have a race in Vegas, which is going to be amazing, but Formula 1 also needs to develop into the future.

So we need to decarb- decarbonize, uh, Formula 1. I've spoken several times to Greg Maffei uh, who runs Liberty, which are the commercial rights holder of Formula 1 that we have to have a clear path towards CO2 neutrality, uh, net zero for Formula 1, and we're taking steps. Uh, one is going to be the new powertrain regulation that will come in 2026, where the part of the electric drive train will grow significantly and what's left of the high-tech combustion will be running CO2 free fuels.

So it will be like a lab for synthetic fuels and fuels to take the, uh, the carbon from a circular point of view out of the equation and that's what Formula 1 has always been…like the fastest lab in the world, trying out new technologies, but we will also optimize logistics. We will optimize how we host guests at races.

Everything is thought through and the Mercedes AMG Formula 1 team has committed to a full de-carbonization CO2 neutrality, uh, latest by the end of this decade.

OMAR: Uh, fantastic. Uh, and I love your push on F1 there. Um, when, when we think about the future of cars we think electric and autonomous, and I don't know if everyone knows, but Mercedes’ drive pilot is the world's first, fully certified level three autonomous driving system…and now available in Germany. Tell us a little bit about it, please.

Ola K: Well, that's the other, uh, technical revolution that was going on in the auto streets, auto industry. It's not just one. It's not just about the drive train. It's also about the intelligent vehicle, what's happening here. We can now package in vehicles a phenomenal amount of processing power, much much more processing power than we had only 5 or 10 years ago.
If you marry that with a sophisticated set of sensors, new generation sensing technology and software based on artificial intelligence, suddenly, uh, the car has a brain and it can start replacing things that the human usually does, and in an even more precise way. So autonomous drive, uh, we're in this twilight zone now where the first few baby steps into autonomous drive is happening.

You mentioned level three and for those of you who don't know these different levels - up until level two, the driver is in control and is responsible. It's also, uh, legally liable for what's happening. But once you take the step over to level three, It's actually the computer that takes over in some situations.

So you have to rely fully on, on, uh, the car. Uh, and also as a company, you take over liability and especially for our American listeners, you know, you don't do that lightly. So now with this level three certification of the S-Class of the EQS, uh, to start with in Germany…Germany was the first country with a fully comprehensive law around this, that we have some situations on the highway where you can literally push a button, the car takes over and you're a passenger and you get back from the car that most precious gift of all which is time. And you can decide what you're going to use this time for, maybe just want to sit back and relax; maybe you want to talk to, to the passenger next to you or check your emails or whatever you want to do. So this is a, it's like planting a flag on the moon, but now what's next is how do we build a moon base? How do we create more autonomous drive situations?

**WILL.I.AM:** Autonomous cars have algorithms controlling, uh, acceleration braking, and steering. What have you learned from the data you've gathered and what does the data reveal about what it will take to make a safe, fully autonomous car?

**Ola K:** What we have learned is that it's relatively easy, quote, unquote, easy to get to the 99%, but it's the last percent that requires the 99% of your, of your work.

And we don't think the public at large would accept, uh, autonomously driven vehicles, computer driven vehicles to cause a lot of accidents. So it's almost like we have to hold an autonomous car almost to a higher standard than we expect
from humans, which can be flawed and make mistakes. Uh, and, and, and that's where the work is...to in a gradual way, introduce this technology so that it's safe, uh, which is one of the pillars, one of the core principles of the Mercedes brand, and also that, uh, people in general get used to this and as technology gets better, we learn more, uh, we process this data. Uh, the learning algorithms become smarter so that we can unleash the car in more situations and drive more autonomously. And it's going to make traffic so much safer because that computer in the end will make less mistakes than humans and will then reduce the number of accidents in traffic, which is one of the biggest benefits of this dawn of autonomous drive that we are seeing now coming.

**WILL.I.AM:** But how do you, um, balance the race to do at first with the need to do it safely.

**Ola K:** It's almost like you have to hold your, hold yourself back a little bit.

Uh, uh, as an engineering company, as a tech company, you are so excited, you've now invented an intelligent machine and you just want to let it go but you also carry a responsibility. So I think in the beginning here for the first few years, perhaps we need to let the machine do a little bit less than it actually can do so that we learn and once we go from baby steps to bigger steps, uh, then we will let the car do more. So here, it's more of a judgment call of how you want to go to market, maybe not what's technically possible at the time...more is possible, but you hold yourself back a little bit to keep a little bit of a buffer and then as technology evolves, you will unleash the whole power of it.

**WILL.I.AM:** You guys are a full fledged technology company. Like what people thought Mercedes was in the past is not Mercedes today and tomorrow. You guys are a full fledged technology company and the investment that you guys are making, the engineering advancements and the innovation that you guys are doing.

The future of automobiles and mobility and productivity, it's exciting.
Ola K: Thanks Will. Sometimes I say internally a little bit as a joke, we're a startup company, the original startup company of the auto industry. We just happened to be 136 years old. But if we keep the same spirit of our founding fathers: Gottlieb, Daimler, and Karl Benz that sat there and thought about transportation and thought beyond the horse. They said, how do we get the horse out of the equation? If we keep that spirit, you know, breaking boundaries and always thinking forward, then we will remain a startup company and keep that startup mentality that a tech company needs. We're not just a tech company, we are a luxury and tech company. So the Mercedes brand promise will be the blend, the symbiosis of luxury and tech. So the perfection, the design, the aesthetics that it just feels right. The ride, the glide, the ride, and also the noise level in the car. All of those things matter. they matter as well. Uh, at least as far as Mercedes is concerned.

OMAR: I really love where you went there because blending tech and luxury is really hard and it's even really hard just for a website, let alone a vehicle. So, uh, I mean really, I mean, in, in- incredible, incredible step forward by Mercedes. So Ola, I want to come back to autonomy. Uh, you talked about level three before, what does a jump to level four autonomous look like and what do you think is a realistic timeframe?

Ola K: In fact, we have taken a small jump into level four already. We have worked together with Bosch, which is also here in Stuttgart to develop a valet parking technology. So for instance, at the airport here in Stuttgart, we're installing this now as we speak, you can drop your car off at the drop off area, just go in and check in….not the tedious procedure of looking for an empty spot. Then, you know, you go so many floors and all that. We all, we all know the experience. So here you drop your car at an empty spot…and that car, like with a magic hand, guides itself without a driver in the car to a free parking spot in this garage.

That's the definition of level four that the car can actually completely take over. And even if nobody is, is, in it. So that's the next step after level three and uh, many players are working on this and I think that the, uh, first applications, like the one I just mentioned, we will see in this decade and this will grow as well.
That will be a true game changer...once we have perfected that technology everywhere, we'll take a little while and is, is also expensive clearly but once that technology is out there, it's almost like you could have your own driver. So you have your own personal driver, computer driver. Think about that.

Wouldn't that be amazing?

OMAR: That’s incredibly cool.

WILL.I.AM: Uh, where do you see the car industry in 2050?

Ola K: I think it was Bill Gates that said, uh, you tend to overestimate what's going to happen in the next two years but you tend to underestimate what's going to happen in the next 10 years. So if we start guessing what's going to happen in 30 years, I guess the sky's the limit.

I believe that we, we, we're still going to want to move, so people will want to move from A to B and whatever way that will be in 2050, if you want to move from a, to B in style, then it's going to be a Mercedes.

OMAR: What a brilliant place to end it. Um, Ola, thank you so much for being with us here at Changemakers. This is exactly the kind of thing we want to talk about - Change for making the world better. So appreciate it.

WILL.I.AM: Thank you so much.

Ola K: Thanks.

WILL.I.AM: Hey, do you remember those documentaries and summits from early 2000s that Al Gore used to always say, like, we have to hit these emissions by this date? Well, that date is right around the corner and a lot of the things that people like Al Gore and leaders of industry were warning us about…we've missed those dates.
2020 came and went, 2030’s right around the corner. And it seems like we're far from it. So do you think we'll meet a global goal of emissions by 2040 like that?

**OMAR:** Gosh, I mean Will, I do remember those summits. Actually, I was part of something called the Global Energy Board that was chaired by Lord John Brown, the previous CEO of BP in the early 2000s…and I remember being part of a, like a survey we did like in 2005 saying how many electric vehicles do we think would be on the road by 2020? And honestly, we're at, we're at the lower end of what those estimates were back then. So I think the world has an enormous amount to do exactly the way Ola said it, between now and 2040, like an enormous amount. This, this decade is the crunch. If we don't like, change drastically in pretty much every aspect of the energy system, uh, we have a major, a major problem.

Do I think we will do it? Ultimately. I, I am a believer in human ingenuity. I am a believer in the potential of technology and innovation and I also think that as human beings, we, you know, this English phrase of need’s a must because we need to do it, we ultimately will do it, but we're cutting it pretty fine.

**WILL.I.AM:** Yeah. I think, I think they'll be able to do that. Right. They’re by 2030, they're only going to make electric vehicles. That's what they're, that's where they're pushing and that's a bold, that's a bold thing to say - when you're making one, lots of money selling awesome vehicles; two, you realize that you have to make that change; three, you make a bold commitment to do it by eight years from now,

Um, but globally all the other car companies have to come on board and, uh, I, I think we will be able to do that because the demand is there. Here we are - 2022, gas prices are like insane, um, global warming. People are all, are all agreeing that it's an issue.

**OMAR:** Yeah. I think the world has got it. Actually I think every single car manufacturer in the world has totally got it. They're all, all in on electric and they're going there. So now it's a question of practically, how can we just go as fast as possible for the vehicles, for the charging infrastructure, which again, the market signal is there and you know, where people have a chance to make money, you
know, capitalism generally works. So that should go. But the core issue is this energy transition. How do we get our fossil fuels in primary energy and onto other sources of energy?

And that's all about the financial incentive and putting a price on things like carbon, because it actually does cost us. And, and, and that's, that's difficult because policy makers have to figure out how to get that done in a way that doesn't disrupt their own populace who in the meantime, in the short term, is suffering things like inflation. So that's stuff that we have to deal with.

**OMAR:** So Will as ever, it's a pleasure. It's a joy being with you. Thanks so much. Great to see you again.

**WILL.I.AM:** Thank you so much. See you later.