Westport Fuel Systems

2022 Capital Markets Day

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Westport Fuel Systems Participants

Ashley Nuell, *Investor Relations*

David Johnson, *Chief Executive Officer*

Bill Larkin, *Chief Financial Officer*

Scott Baker, *Vice President of Engineering*

Anders Johansson, *Vice President of Heavy-Duty OEM*

Bart van Aerle, Executive *Vice President, IAM and LD OEM*

Arek Kubasik, *Vice President, Product and Business Strategy*

Conference Call Participants

Sameer Joshi, *H.C. Wainwright*

Eric Stine, *Craig-Hallum*

MacMurray Whale, *Cormark Securities*

Chris Dendrinos, *RBC Capital Markets*

***Jeffrey Osbourne**, Cowen & Co*

***Anton Arnberger,** AVL*

Martijn Stamm, *Director of Mobility and Tracking Transport, TNO*

P R E S E N T A T I O N

Ashley Nuell

Well, good morning, everyone and welcome to Westport's 2022 Capital Markets Day. My name is Ashley Nuell, I'm the Senior Director of IR here at Westport and we're incredibly pleased that you could all join us today.

In our time of COVID, we've certainly brought about a new virtual world so we do have a number of investors globally joining us online today who will be participating in asking questions as well. So, that's exciting. Come on, there we go.

As you've all seen this before, we'd like to remind everyone that of course, during today's presentation, we'll be making forward-looking statements. The information is subject to certain risks and uncertainties and as outlined in our forward-looking information disclosure on the slide, I imagine everyone's going to take a moment to read that fully. Our public filings can be found on SEDAR and EDGAR.

As a quick agenda, today we'll be covering a number of different topics. After a period of change and transformation, we really are pleased to host our first Investor Day in a number of years. We'll be going over a lot of information. We have a really jampacked scheduled for you today.

We'll be starting with David, our CEO, and he'll be walking you through strategy and our growth initiatives. Bill, who has joined very recently, our CFO of about seven days, will provide a bit of a financial update and then we will dig into our HPDI opportunities from both our technical and commercial perspectives.

As I mentioned, we will be doing this both in-person and virtually so expect some participation from our audience virtually. We do ask that all those virtual participants, as the presentation goes on, pop those questions into the question area and we can address them at the end.

With that, I'm going to pass it over to David to kick us off.

David Johnson

Thank you so much. Good morning, everyone. I really do appreciate everyone being here today. For those of you who are in town, thanks for making the time. For those of you who travelled, thanks for making the travel, and for those who are online, I think we have—we've come out of a real tough period in many ways. But we've learnt some new skills and I think what we do online these days is super-efficient and super-effective, and I really hope, and I aspire that it's that way for you today.

As Ashley mentioned, I want to thank Ashley for getting us all together and doing this. As she mentioned, we haven't done this in a few years. Frankly, we needed the right leader to make that happen, and that's Ashley. Really pleased to have her join our team just in the last few months.

In addition, in the room, I want to just have—let's see who is here. We've got a great lineup, as you know, those who were with us last night had a chance to meet some of our executive team, but I want to introduce a few more that have joined us here in the room.

Arek Kubasik is with us from Poland. He joined us as a result of our acquisition of Stako last year. I've promoted him to Vice President of Product and Business strategy. Just a great strategic thinker and I'm super happy to have them as part of my team and him here today.

Brenda Eprile is here with us. Brenda's a long-serving Board member and currently serves as our Audit Chair. Brenda has been a fabulous contributor to the Company's journey and success and future success.

Lance Follett has joined us. Lance our Chief Legal Officer, has been with the Company for more than 20 years and guides us strongly every day on our path.

You'll hear from Scott and Anders who you met before.

Bill, I very much welcome you to the Company and I'm so glad to have you with me as my partner as we build this great Company.

Louise Hackett brings massive contributions as our Director of Communications.

Christian, thanks for making the trip. Thanks for all the hard work you do. I think what we do as a team is really, really valuable and really important.

I don't want to miss Bart van Aerle. Bart comes to us from Eindhoven, has been with the Company since Westport acquired Prins in 2015, and now is leading our independent aftermarket and our light-duty OEM. So, all of our light-duty products are sourced through or sold through our aftermarket as well as our OEM channel.

We do have a lot of content. I want to press straight ahead. But fundamentally, I think it's important just to paint the picture of who Westport is. We are a leader in clean technologies. We are changing the world by bringing clean energy into transportation and other applications.

We're a global company So, we're regularly coming from different parts of the world, as you can see by the people who are in the room today, as well as by the travels we do, the customers we serve in over 70 countries, the OEMs who are our customers. More than 20 OEMs around the world are our customers day-in and day-out depending on the products that Westport Fuel Systems makes. We are that Tier 1 supplier. We are growing and developing as a Tier 1 supplier. It is a journey, and we feel really strongly about what we can offer our customers. Everything we do, everything we do is focused on clean gaseous fuels. I think you all know well, but I think it's good to state it for the record, right, we're talking about propane, otherwise known as auto gas or LPG or GPL, if you're in Europe. CNG, LNG, RNG, bio-gas, biomethane, bio LNG, all the forms of natural gas and all the different names, and very importantly for us, we see a very strong future for the hydrogen molecule in our fuel systems. If you think about energy and what we need to do with transportation, hydrogen is going to play a very important role in our future, and we feel very well positioned for that.

As Ashley mentioned, I'd like to walk through our strategic priorities and really, it's all about growth. For us. The market is poised, and we are poised to address that market and grow and prosper as a result of delivering clean, affordable products to the marketplace. We see a tremendous opportunity and I think it's important to recognize in the world of transportation, typically, our industry is making on the order of 100 million cars and trucks every year, 95, 93, 102, something in that order. It's a huge industry and that's just what we make new each year, let alone what the car park is of 1.4 billion or 1.5 billion vehicles around the world today and we address both of those markets.

We see opportunities in places like Africa, in places like Southeast Asia, in places like India, where there's a really huge need for our technologies that are affordable, clean transportation. The air is foul in many, many markets. The CO2 contributions in many, many markets are huge, and we addressed both of those urgent needs.

We also see as a company and priorities three and four here, that we need to develop as a Company and become operationally excellent, become efficient, and drive more of our revenue at the top line to profits at the bottom line. So, this is our agenda.

We've talked about—we've all seen, and we all know how challenging 2022 was, as was 2021, as well as 2022. The last three years have been really challenging for everybody in our industry and around the world. Whether it's COVID, supply-chain inflation, or an outbreak of war in Europe, who really have been dealt a tough hand around the world. When I look back at our track record over the last few years and including 2022, I see a lot of success, a lot of progress despite the significant headwinds.

Just this year, we announced record-breaking results with our hydrogen HPDI fuel system. We'll talk more about that. Scott is going to take you through it in detail. But fundamentally, for my career, the goal for a commercial truck engine has always been 50% break thermal efficiency. The U.S. Department of Energy, for example, has put hundreds of millions of dollars behind trying to get engines to 50% break thermal efficiency. It's some like an unobtainable moonshot goal, and with our hydrogen HPI, we demonstrated on the Scania engine as we released to the public recently, 51.5% break thermal efficiency. It doesn't sound

like a lot, but it's absolutely huge because it's such a monumental base to come off of 50% and then improve on it so easily as we did use our technology that's already in production today.

Meanwhile, our customer Weichai just recently announced record-breaking results of 54% breakthrough efficiency with natural gas in a commercial truck engine. Again, just amazing results, and what that really means is these precious quantities, the precious quantities of fuel that we put into our vehicles will be used more efficiently and it all goes to a better world, better economically and better environmentally.

We'll be talking a lot today about our hydrogen HPDI product. This was the year of introduction. We started by taking our truck to Long Beach, California, for the ACT Expo. We showed up later with a second truck at the Hanover Truck show. We've taken the truck to Brussels, to Berlin, to Washington DC, to Sacramento. We have a lot of work to do to educate the industry, our regulators, the population, and investors about what hydrogen HPDI really can deliver for our industry.

That's a really important journey for us. We'll spend a fair bit of time on that today.

I highlighted Arek as joining our Company a year-and-a-half ago. We are super pleased with the acquisition of Stako and what they contribute to our Company. We see ourselves as providing that fuel system from tank to injector, and with the acquisition of Stako, we take that to the next level with that fuel system for LPG. We're really pleased not only with the acquisition but the profitability and the revenue that it's contributed to the Company. It has been material in our numbers going forward.

Our OEM business adds a lot to what we do, and we're really excited about the recent announcements we've been able to make about adding LPG OEM business to our portfolio. Again, these are material numbers. We've talked about $38 million of revenue—excuse me, euro of revenue over the next two years, $40 million year-on-year going out when we get into the Euro Seven product. This is really important for us, and frankly, just a step, another milestone to achieve with more in the future.

I just want to talk, as we don't have a chance so far to break out our hydrogen business, which is just down the road from us here in Toronto and in our office in Cambridge, Ontario, but our GFI products, the hydrogen-branded products that serve the market for fuel-cells and internal combustion engines, that business is up 50% this year, and over a three-year period, it's tripled.

It's a small piece of our business, but it is our strongest growth engine in the business in terms of growth rates and we're really excited about that potential, especially in combination with our hydrogen HPDI, because the components that take the fuel from the tank to the fuel-cell, are the same components that take the fuel from the tank to an internal combustion engine with HPDI.

Frankly, despite all the headwinds, I'm absolutely fully encouraged about the results we've had in '22 and the outlook for the future.

I think one of the most important things that we all need to kind of get our hands around and understand is that the world is still growing and still increasingly prosperous. If you think about economic development around the world, if you think about population development, to me, these are the two big levers that drive the need for transportation. The need to move people, the need to move freight is driven by the economy and driven by the needs of people. So long as this continues to grow, the need for transportation will continue to grow.

We all know we have a bad problem right now with air quality and global warming, both of which are heavily contributed to by transportation. We think our offer to the marketplace, our products that bring cleaner fuels to transportation are really, really valuable in the marketplace and are poised for significant growth. We need them because right now we're not having as much success as an industry, as a population, or as humanity with mitigating climate change and delivering clean air. I was just for example, just in India, just this past weekend, and the air is terrible. It is terrible, and this is an economy that two

years ago went from Bharat Standard 4 to Bharat Standard 6, dramatically improving the emissions of their newest vehicles. Unfortunately, there's a lot of old vehicles on the road still, and there's a lot of work to be done.

If you go to places like that and you see that, if you go to Africa, if you go to China, you can see what needs to be done. We don't see it so easily because CO2 you don't see. But in these countries, where the old vehicles are still running, you can literally see the problem. It's like Los Angeles 60 years ago, and we've fixed that, and these emissions regulations are super valuable in fixing that, but clean energy can take it to the next level, and so that's where we see ourselves having a significant growth opportunity.

I want to talk about applications. In many cases, people think there's this idea that we just need one thing, one technology, just this. If we just knew what the one thing, we could do to fix this problem would be, we'll just do that one thing. This is a failure of our thought process. We absolutely need to recognize that different applications require different solutions. We'll spend a lot of time today talking about heavy-duty applications because these are extremely, extremely hard to decarbonize with some of the technologies that have been proposed in name them speaking about battery electric vehicles. Battery electric vehicles for long-haul heavy-duty trucking are challenged at best. It's the weight of the battery, it's the cost of the battery, it's the recharge time of the battery, and it's the disruption of the actual purpose of the vehicle. You put 20,000 pounds of batteries on a truck. If you have 20,000 pounds less of freight to move, then you need more trucks. This really isn't a workable solution. If it were the only solution, we should definitely do that, but it is not the only solution. Our HPDI product is in the market today. Satisfying the drivers, satisfying the fleets, cleaning the air, using less fuel, and less carbon-intensive. With hydrogen, we take it to the next level because hydrogen has no carbon. This is actually a beautiful thing that we're super excited about and will drive our business going forward.

Let me talk about the macro enablers. What are the things that are driving our business today and will drive our business going forward. I've listed them here, but I'm going to go right into the slides so that they can get—talked about one by one. First and foremost, regulations, I talked about basically a moment ago, California, what's happened over 60, 70 years as regulations have come in place to clean up transportation, the air is dramatically cleaner there as a result.

These kinds of regulations are good for Westport Fuel Systems because the fuels that we enable address those problems directly. We reduce NOx, reduce particulates, reduce CO2. We do so affordably, which allows it to scale. So, these regulations and literally around the world step-by-step, everyone is adopting them. Not so much in Africa yet, but it will come. It's necessary as they develop economically to then provide clean air for their citizens. So that will come.

But fundamentally, we see India going from Bharat Standard 4 to 6. We see China going to Euro 6. We see Euro 7 regulations being promulgated in Europe. These kinds of regulations that drive towards the lowest emissions possible are very helpful to our business.

Another key for our business is the affordability of our products. When people go to buy transportation, whether it's a truck fleet owner or an individual truck driver or you or me buying a passenger vehicle for our family. How much it costs is one of the top ingredients for what are they going to buy. What are we going to buy?

When we make vehicles, and you can notice it today in the marketplace here in North America, vehicles have gotten a lot more expensive just recently. This actually is taking transportation away from humanity by making it expensive. It also reduces the propensity to change. If the vehicles are more expensive, I'm not going to get rid of my old vehicle, polluting vehicle. I'm going to keep it and keep using it. The technologies we provide, HPDI, natural gas fuel systems, LPG fuel systems, and hydrogen fuel systems are affordable and therefore can reach scale, and can address the problem head-on.

Another key ingredient for our business, of course, is fuel availability. It's so clear. If there are trucks and cars that run on gaseous fuels, but there are no gaseous fuels available, that will not work, if there's all gaseous fuel available but there are no cars and trucks that run on them, that will not work. So, while we only provide one of these ingredients to the fuel system to make these vehicles, the actual availability of fuel is key. I'll point out this chart; you might notice they're oriented in a sequence from most available to least available. The U.S. as an example, and Canada as our friend, we're a bit behind the rest of the world, China is actually out in the lead. More LNG stations, more hydrogen stations and continuing to build. Europe has done a fantastic job and is continuing to build those infrastructures too.

So, we see these opportunities, and India is on a tear. I mentioned India a moment ago. When I joined Westport four years ago, there were about 1,200 stations for CNG in India: now it's more than 4,000. So, they're really addressing this problem of building out the infrastructure to support the availability of cleaner vehicles using cleaner fuels. I think it's important that we all watch this, and support this. Governments can get behind it as India has done, and it does make a difference and it's required for our growth strategy.

I think it's also important to recognize that the fuels we're talking about, natural gas, LPG, or fossil fuels, they're cleaner, but they're fossil fuels. The good news is there's a renewable variance of those fuels that are increasingly available.

Anders Johansson will talk later about what's happening in Sweden, what's happened in Sweden and how much bio-gas is used there. Germany's at like 60% bio-gas. Hydrogen is the ideal green fuel, and it’s renewable We take excess solar and wind, excess nuclear and hydro, and make green hydrogen that can be used in transportation. These are truly beautiful things and the technologies, and the products that we offer directly address and directly use those renewable fuels in the future.

For those of you who haven't heard so much about bio-propane, basically, when you make bio-diesel, you get bio-propane. As that builds up, we'll get more and more bio-propane and it's all good. It's almost like free fuel. If you think about the methane molecules as an example, coming off an animal, dairy, landfill, waste treatment, all these different sources, if we don't capture that and put it into a car or truck, it's going in the atmosphere and it's much worse. We talk about methane leaks in the oil and gas industry, yes, that's the thing. But you've got a big methane leak called the dairy farm. Let's solve that problem and people are doing that now.

There was a point in time historically when we thought, oh, there isn't really enough bio-gas to even worry about it. We thought that was nothing. Don't pay attention. That is absolutely not the case. It's super valuable. It's super significant, and we're making inroads right now in places like California, Scandinavia, Europe and other places. I saw China has got a new big initiative on bio-gas now. Everyone is recognizing this is free energy that is better for the earth.

Finally, for Westport Fuel Systems, unlike a lot of companies, our products are in the market today. Our HPDI fuel system was launched in Europe in 2018. There are thousands of trucks on the road today. If we talk about the benefit of bio-gas, as bio-gas gets increasingly used in the refuelling infrastructure in Europe, the trucks that were made five years or were custom-made five years ago, get cleaner every day. The government plays a very important role. Whether it's emissions regulations or the incentives they put in place, or the rules they write. This is an absolutely critical role for our business and our industry, and we can see it around the world. And I think right now, more than anything else, you're hearing about the support that governments have for building out hydrogen infrastructure, for recognizing where the future is and supporting the world and industry to get there. These are really valuable and really important to our development as a Company and our future prosperity.

I won't go through any of that in detail because, of course, it's a lot of detail. But I can't tell you enough about how important the regulation is from the admission side, and also from I'll say the carrot-and-stick approach of the government contribution to our business.

Right now, we see ourselves very much as winning in the heavy-duty market. Our HPDI product is far and away the best product for using natural gas in the marketplace. The fundamentals Scott will go through later, but it's all about taking a diesel engine and running it on natural gas, as opposed to taking a diesel engine and converting it into a petrol engine or gasoline engine. Once you have a diesel-engine, you should feed it gas and then it gets cleaner. That's what we do with HPDI.

Where we see it going with hydrogen is absolutely exciting for us. To take the trucks that we build, and the diner work we did and show that around the world this year is changing the fortunes of Westport Fuel Systems.

We'll talk in detail in the next few slides about the light-duty, so I'll leave this one for your reading. Fundamentally, LPG growth in Europe is really happening now and continuing to happen. I talked earlier about 45,000, and 47,000 LPG stations in Europe. The numbers you see on this chart are all about savings. The savings a customer can have on an annual basis by using LPG as a fuel instead of petrol, instead of gasoline.

Making that substitution, I'll tell you my own personal experience from four years ago when I joined Westport and went to Europe and filled up an LPG and I see people filling up on petrol spending 100 euros and it cost me 45 euros to fill my vehicle on LPG. That happens day in and day out, and I can tell you those people filling up with petrol and paying the 100-euro, 120 euro, they're looking over at the guys filling up on LPGs and I want that. That drives our aftermarket business, it drives customers to OEM saying, where are your LPG vehicles?

This is really working, and I'll tell you through this latest, let's say, movement of energy prices around the world, the advantage of LPG in the marketplace has grown significantly. So, we see actually, you can see it in the blue bars, basically better economics now for our business with respect to fuel prices and LPG than we had historically.

That LPG business is growing, but also on the OEM side, we're really pleased to secure the business that we announced recently for Euro 6 and then the follow-on business for Euro 7, and we see that demand for LPG growing around the world. It is the most common and most well-used fuel around the world, and we're a leading supplier of those fuel systems. It's a big important part of our business that's, let's say in our financials and sometimes hard to see.

I had some time to talk about India and what's happened there. Our business in India has tripled over the last three years. Again, our hydrogen business has been a relatively modest piece of our business, but we see this really as another growth engine for Westport Fuel Systems. The Indian government has taken a specific initiative to grow the fueling stations to 10,000 by 2030, and they're more than half the way there and it's only 2022. It's super, super encouraging to see that development and to see the lines still of customers lined up to fill up on CNG in India.

This is a place where we see continued growth. I'll tell you currently this moment, the Indians are able to access Russian oil, and so that price advantage that we see in Europe we don't have with LPG, we don't have so much right now in India. We do expect that to be reestablished, but that is the driver. That is the driver of the business for the individual going to the station, going to buy a vehicle, or going to get a retrofit is what is that price differential between, in this case in India, natural gas, and petrol.

We are unique in our delayed OEM business. Maybe kind of a funny name, but fundamentally, what we're doing is we're getting brand new vehicles from manufacturers before they go to a dealer or customer, and we're applying our fuel system to them so that when they get to that dealer and they get to that customer, it looks like, it feels like it's warranted like an OEM product.

We're doing this every day at our factory in Italy, where trucks are bringing vehicles to our plant. We're installing the fuel systems and then the vehicles go back to the dealer and onto the customer. This business is super strong just right now, just because of those fuel-price economics that I told you about before. Also, I'll tell you there's a number of OEMs in the world who have let's say been a little slow to recognize the opportunity for LPG, and so they say, ah, delayed OEM is an opportunity with Westport Fuel Systems. Delayed OEM is an opportunity to bring that vehicle to market much more quickly, and so we do that for them. This is another growth engine of our vision. This is a very profitable part of the business. We're really excited about continuing to expand that.

I talked a moment ago about our hydrogen business. Here you can see some of our components. Our revenue has tripled over the last three years. The growth curves that we draw internally are very, very exciting. We've got a new business that's pending right now on the order of nearly $100 million, just in that business. I want to tell you that the hydrogen economy is developing. The OEMs are responding, and we are the one that's sought after more times than any other with respect to providing the fuel systems that are necessary to connect hydrogen storage to a fuel-cell or hydrogen storage to an internal combustion engine.

I think another strength of our Company that we continue to build on is the diversity of markets we serve and the diversity of products we offer. We've been talking about different fuels. We're talking about vehicles from heavy-duty vehicles to light-duty vehicles. But around the world, we're in 70 countries. We just recently secured some new business in Bolivia; a large tender was secured on the order of 10,000 CNG vehicles with more to follow. Countries around the world, they're saying, hey, we need to take action to provide affordable, clean vehicles for our population, and our citizens and Bolivia is just one example. I would say in my career, we don't speak so much about the Bolivian automotive market, but this is the kind of business that is meaningful, the Westport Fuel System and just one example.

Another example, I want to tell you about a little bit of a product called dual-fuel. This picture is a picture of a CNG refuelling facility that we commissioned, which we built for our customer in Africa. Dangote Cement. The Dangote Group in Africa is one of the biggest conglomerates in Africa. They have fleets and fleets of cement mixers and other trucks. They recognized and sought our support and help to build the station and equip their trucks. We've retrofitted hundreds of trucks with this dual-fuel system. What it allows Dangote and the operators to do, is it allows to substitute natural gas in place of diesel. The trucks become cleaner and more affordable to operate because of the price differential between diesel and natural gas that prevails today in Africa.

We're absolutely thrilled with this kind of development. We support our customers in any way to bring cleaner, more affordable product to the marketplace, and to support their businesses to deliver and develop the economy in Africa. This product though is not just a CNG product, it's also a hydrogen product. You may have heard some stories about people doing dual fuel with hydrogen, we're a pioneer in that technology. We're developing it now and we're offering it to our customers right now. I expect very important things to happen with respect to hydrogen dual-fuel, and the reason is that the infrastructure is not built out and these trucks if you can't find hydrogen, you come home on diesel, no problem.

As the infrastructure build-out is used, more and more hydrogen becomes cleaner and cleaner, and if there isn't the infrastructure, you can still use your truck. You're not stranded. This is absolutely critical. If you're stranded, that's not a real truck. Nobody wants a stranded truck.

In Europe, we see tremendous success really in the marketplace with the build-out of LNG infrastructure. Just a few years ago, it was barely 100 stations. Now we have 607 stations. A lot of these stations are being fueled and supplied with biogas. I love the commitment Shell made a few years ago. They said, we're going to build 50 stations in Germany alone for LNG, and we're going to supply them with fuel that's carbon-neutral. When we talk about zero-emissions, this zero-emissions that, you can do today in Germany to LNG station with our technology, zero today because of their fuel and our technology.

The build-out of the stations continues. I think this is a sign, and as we talked about earlier, if you look at the refuelling of infrastructure, this is clearly a sign of what our Company can do, and where we're going with the growth trajectory is possible.

Nicely, the business is recovering post-COVID, post-supply-chain, and even in the face of the war in Ukraine. We see a rebound in vehicles, and we see growth in the natural gas market.

Sometimes for us, it's very difficult to talk about our customers because our customers like to do the talking. I can't blame them. I've been those customers before, and I understand exactly what they're doing and why they're doing it. But I wanted to let you know that there aren't that many customers in the world for our business. In the OEM business, I haven't counted recently, but let's call it less than 50 companies make up 98% of the vehicles. I made all those numbers up, but it's about correct. There aren't that many. In the truck business, it's even less.

If you think about the global truck market outside of China, we're talking about less than 10 companies in total. We're currently working in Europe with companies that supply about 70% of the vehicles. I don't get to tell you everything I'd like to tell you, but I want you to know it's happening now. To our customers in China, we are so thrilled with what they've done recently and told the world about with respect to their natural gas engine. It's super-exciting. We see with this development and this announcement by our customer, that we can put the instability and the prices of fuel that have kept the market on pause for us for a while. Perhaps that's coming to an end.

We're really excited about what they're doing. We think the future for hydrogen, as well as natural gas and biogas in China, is very, very strong. It is today the largest trucking, the largest automotive market in the world, and the most well-developed infrastructure for refuelling with alternative fuels. We have to pay attention and we think we're super well-positioned, and the growth trajectory looks exciting to us.

Now we have our hydrogen engines. I can't tell you how exciting this is for all of us at Westport Fuel Systems. Fundamentally we're able to take a product that's already in production, basically, plum it with hydrogen storage and be able to demonstrate more power, more torque, and more efficiency than either diesel or natural gas is unbelievably amazing to us and super-exciting.

I think it's important to recognize in our business that this hydrogen opportunity that we see with HPDI is a long-term opportunity. It's not tomorrow. But as soon as the world is ready for hydrogen, we have a product that's ready to go. In the meantime, that same product and technology can be used with natural gas and biogas. That's actually how our customers see it too. They see this as a pathway with natural gas and biogas to hydrogen, a technology platform they can use that allows them to access the market, respond to their customers, provide cleaner transportation, and can provide affordable transportation today.

I think in the grand scheme of things, you've got this lovely picture of these different segments. The applications matter. There are a lot of applications that we haven't even started talking about it at Westport Fuel Systems for HPDI. We go to engines that are bigger than 10 to 13 litres. That's the core, if you will, of the commercial truck market, 10 to 13 litres. We go to engines that are bigger than that for marine applications, rail applications, for mining applications, there is a world of opportunity, and that opportunity can be accessed with biogas and natural gas and hydrogen with our technology. We think there's a tremendous opportunity in front of us that will be exploring and exploiting in the months and quarters and years to come.

HPDI, it’s, super cost-effective and responds to the customer's needs. It works with LNG works with CNG, works with hydrogen, and truly works with biogas. This to us is the new frontier, providing compression ignition engines, the most efficient, durable, reliable, trustworthy engines in the world, but running on cleaner fuel with hydrogen, HPDI, natural gas, HBI, Westport's HPDI product.

Ladies and gentlemen, thank you very much for your time and attention. I'm super happy to be here with you today. I look forward to the chance later in the program to answer questions and dive into any topics you'd like.

With that, I'd like to bring up Bill to talk about where we're headed financially and what the outlook looks like.

Bill Larkin

Great. Thank you, David.

Thank you for joining us. It's great to be here today. I'm Bill Larkin, I'm the CFO, and I'm the newest member of the management team. It is great to rejoin Westport and to partner with David on the Westport team on this journey. I believe in our technology and Westport has a very bright future. However, we have a lot of work to do.

I joined about two months ago. It was a perfect time for me to join in to really dive into our annual planning process. We get out there, meet with our business leaders, visit our operations, work with the teams, just walk the production lines, and refamiliarize myself with the operations.

It really helped me get into the details, and more so really help understand the strategy as well as our guiding principles. As we go through our annual planning process, and then we can make sure that our plan was aligned with our strategy. It was a very insightful process, and it really helped define and also refine our 2023 initiatives and beyond.

With a lot of change over the last several years, especially after the merger, Westport is now a very diverse business. In 2017 2018, and 2021, Westport was gaining a lot of momentum in sales, growing the business and generating good margins. However, the pandemic killed it. Westport persevered through the downturn in the pandemic and recovered in 2021 with about 24% year-over-year growth. The diversity in their business helped Westport persevere through these challenging times and this diversity in our product base is going to be the foundation for our future growth.

Year-to-date through Q3 of 2022, we've generated revenues of $227.7 million. Twenty-two has been full of challenges and headwinds as David discussed. Our revenues were impacted by the Russia-Ukraine conflict. Russia is a very large market. LNG pricing, CNG pricing, and energy prices, in general, have impacted our revenues, and we've been facing a lot of headwinds. A little bit more subtle and may not be quite obvious is foreign exchange translation, this is when we translate and report our financial statements in U.S. dollars. We generate a significant portion of our revenues in euros dollars.

And, with a strengthening U.S. dollar over the last 6 to 12 months. When we translate our financial statements into U. S. dollars, it's translating those revenues at a lower level. You don't really get to see, as David talked about, is really, we are seeing growth in our businesses and unfortunately when we convert from Euro to U.S. dollars and with the strong dollar, it kind of masks that growth in our business in the positive trends.

Despite all these industry headwinds, there are a lot of positive trends emerging, especially in our businesses. We are seeing growth in our core business, as well as advancement in our hydrogen HPDI. It's great to see the truck run around, running on hydrogen.

Everyone is dealing with inflation, we're no different. We're dealing with inflation. We're not immune to it. We are seeing increasing manufacturing costs, which translate to higher costs for us and producing our components, kits, and systems, and is having an impact on our margins and our financial performance.

Looking back at 2018, our gross margins were roughly about 22%. Year-to-date through Q3, our margins were roughly about 14%. We're going to navigate these challenges and we're going to change this trend around, and I believe we're going to start seeing improvements in our overall margins. We're preparing for revenue growth and improved profitability, and I'm really optimistic about our long-term future in the growth and profitability of our Company.

What's our roadmap? What are our priorities going forward? Since starting, as I mentioned we're working on the budget process, and really what came out of it, there are really two clear financial priorities. One is to enhance our financial performance, and the second is to drive working capital efficiencies, execution that this priority is going to be really critical to support our strategic initiatives and our long-term growth goals.

We are going to continue to face inflation. It's not going away. It's going to be here for the foreseeable future, and we're going to see cost increases in our supply chain labour overhead, we're going to evaluate our entire cost structure in 2023 and we're going to look at all of our operations, our overhead, and the cost to support our business. This is just not going to be a 2023 initiative. This is about establishing a foundation for continuous growth, and continuous improvement beyond 2023.

Then also diversity in our business. This is going to be an asset in driving our revenue growth and our financial performance. What are some of our priorities? We have increased pricing, and we have passed along those increases, price increases where we can to our customers, however, it's about finding the right balance. We want to recover those costs increases, however, we can't increase our prices too much which harms our revenue, so it's finding the right balance and working with our customers.

Volumes are going to solve a lot of issues that we're facing today on the cost side. We're working to drive demand for all of our products. We're working with our HPDI customers to drive demand and sales for HPDI technology, and then also this is going to set the foundation for executing our long-term strategy of commercializing the hydrogen version of our HPDI technology. We want to expand the sale of our existing components, so we've got customers who may be just selling an injector where our fuel control system, we want to sell them the fuel storage system, we want to sell them the refill, the filling receptacles.

We want to expand the number of components that we're selling to each of our customers, but also, we want to leverage our diverse product portfolio and expand into new markets.

Of course, hydrogen, that's going to be a huge opportunity for us in the future. I think that's going to be that's going to drive a lot of growth in our revenues in the future an increase in volumes of revenue, it's going to help us inherently reduce our variable cost. It is going to give us a broader base to spread our fixed manufacturing cost, so inherently, that's going to improve our margins, it's going to improve our bottom-line profitability, and more importantly, it's going to improve our cash flow.

Our second priority is going to be driving working capital efficiencies. We've talked about our inventory the last couple of quarters, it's too high. We're going to work on bringing that down, we're going to be more effective in managing our inventory, and I think that's going to free up a lot of cash in 2023.

In addition, we're looking at our accounts receivable and we're looking at our entire balance sheet and looking for opportunities where we can enhance our liquidity and generate cash. We are focused on enhancing our financial performance and we're going to be relentless about how we approach it, and growth is going to be a really important driver in realizing these efficiencies in managing our cost. We are evaluating all the opportunities and then we are defining our initiatives on how we're going to tackle this and optimize our cost structure, which includes our facilities. The good thing is we have the capacity to support our growth. We're going to have to make a minimal investment to support the growth of our revenue within those existing facilities. However, there's a cost associated with them. We got to take a really close look at it and optimize our production footprints in our space.

Our team is working to mitigate and soften the impact of inflation, our input costs are working with our suppliers. They're working to try to reduce those costs. Volume is going to solve all those issues. Evaluating alternative suppliers, but also make versus buy. We're looking at certain components and see if we can produce them ourselves at a lower cost than what we acquire for those products. Also, we're looking at production labour and how we schedule that labour.

Then finally, we talked about our product portfolio. We've got to evaluate our product portfolio. We've got to rationalize our products, and look at, do we have gaps in our product offering that we need to go fill. Do we have certain products which they are not generating profitable revenue? It's a very comprehensive process that we are going to be going through.

We will drive sales growth across our product portfolio and HPDI is going to be that growth catalyst. Increased volumes are going to help drive down our costs as we get the economies of scale. That's also going to translate and improve the margins.

We have a full slate of opportunities and initiatives in ‘23 and beyond, all of which are going to be geared toward enhancing our financial performance and driving top-line and bottom-line growth.

We need to improve our liquidity and financial strength. I think that's a lot of concerns. Execution of our initiatives is going to improve our cash flow. Then that's going to allow us to use debt to fund our cash needs.

Looking year-to-date through September, we’ve consumed $44 million in operations. We've invested about $8.5 million in Capex. We've paid down roughly about $17 million in debt. At the end of Q3, we are in a strong cash position. We had about $86 million. However, we cannot continue to consume cash at this rate. We need to improve our liquidity. Then going back to our priorities, which are enhancing our financial performance, as well as managing our working capital by executing on those, that's going to help improve our liquidity and our cash flow.

We're also going to be managing our Capex in 2023, we're targeting roughly about $12 million to $15 million in Capex, which is fairly consistent with what we've invested over the last couple of years. We are going to manage how we allocate our capital. We're going to be very prudent in our approach to that. Then focusing on how we manage and improve our liquidity.

As I mentioned, we are managing our capital. We only have a limited amount of capital that we can allocate and we're going to prioritize what are those initiatives which are the advancement of HPDI and hydrogen technologies, including investments in our test cell facilities, as well as other hydrogen components. I think hydrogen is going to be a huge opportunity for us in the future in driving revenues and our profitability.

M&A, we haven't talked much about it, but we're still going to evaluate M&A. We're going to look at other potentially key components or technology that we're missing, and that we need to fill in gaps in our product portfolio. We will be looking at tuck-in acquisitions, as well as maybe there are some opportunities to consolidate in certain markets. However, we will be very prudent in how we approach any M&A opportunities, and we will make sure that they make economic sense.

This page just gives an overview of our debt payments, our historical debt payments in 2021 and 2022 and then what were expecting to pay in 2023. Then what our future cash debt servicing is going to be through 2026.

At the end of September, we have roughly about $62 million in debt. The good thing is over 60% of our debt today is at fixed rates and it's at very, very attractive rates. The fixed rate is less than 2%. Then your variable rates right now on average are about 9%. On a blended rate, we have very attractive financing

rates on our debt. We continue to service our debt. We have paid down a lot to pay down our debt over the last three, four years. By driving on our initiatives, we expect to see improvement in our cash flow, and this will allow us to seek and utilize debt, if necessary, to fund any type of cash flow needs.

I think we're going to be able to accomplish that. First, we're going to go try to expand our existing relationships with our debt partners. They've been very supportive, and they've been a great partner for us.

2023 is going to be a very important year for us. It's really the year of the change, but it's just not 2023, it's setting us up for success beyond 2023 in driving our initiatives. We're going to be evaluating our cost structure. We're going to try to optimize our operations. All about trying to drive top-line growth, enhance our margins or profitably in our cash flows. We expect to deliver on these priorities, and this will set us up for long-term growth in 2024 and beyond.

We've communicated our mid-decade goals. Now those goals are a billion in revenue, 20% gross margin, and 10% EBIT margin. However, because of the impact of COVID, the Russia and Ukraine conflict, and energy pricing, we've had to push the timing. When we originally set out these goals, who would have thought about whether we're going to be impacted by COVID or Russia and Ukraine. However, we are still focused on these goals and we're going to focus on what we can control in driving margin expansion, driving revenue growth, and technology development, that's going to be a success for our future.

So how are we going to track some of this progress and work towards the goals that we've laid out? Look for announcements of new customers, new projects, maybe some customer development programs for our hydrogen technology, and the advancement of hydrogen applications. Then especially looking at how OEMs are going to handle the emission regulations in 2025, that's going to be critical.

I'm really optimistic about our opportunities, and it's going to be critical in executing our priorities. I believe the outlook for Westport remains promising and I'm excited about it. I'm excited about being part of the management team and partnering with David on this journey going forward. Thank you.

We've got a video coming up and then we'll turn it over to Scott.

Scott Baker

Good morning, everybody and thanks for coming. My name is Scott Baker. I'm Vice President of Engineering for Westport Fuel Systems.

I'll start with a real quick background on me. I'm in my 25th year with the Company. I have been in and out of engineering a number of times, spent a significant portion of my career working on HPDI, and also spent a very significant portion of my career in our Cummins Westport joint venture, which I'm sure you're all aware, expired through its contractual end about a year ago. During my 13 years in Cummins Westport, I was primarily responsible for product planning and product management for Spark Ignited Natural Gas Engines. Throughout my career, I've been heavily involved in a wide range of alternative fuel, engine, engine fuel systems and component technologies.

What I'm going to spend a few minutes, about 20 minutes going through, is a little bit more information about our hydrogen HPDI fuel system. Elaborating on many of the points that David introduced. We're going to jump right into it.

David referred multiple times to our HPDI fuel system, and I wanted to start with what might be a little bit pedantic, but just to make sure everybody starts on the same page, start with a little bit of an explanation about what the scope of the HPDI fuel system is. Every engine has a fuel system. In many ways, the fuel system is the heart of the engine. It's the hardware and the software and calibrations that introduce the

fuel to the engine, whether it's a diesel engine, a gasoline engine, a spark-ignited natural gas engine, or an HPDI engine. The fuel system is the collection of components and calibrations and software that manage that fuel delivery to the engine. All of which then determines the performance, the efficiency, and the emissions of that engine.

HPDI is a system that we sell to vehicle and to engine manufacturers to integrate into their diesel engines to enable a diesel cycle engine to operate on primarily gaseous fuel, approximately 95% of the fuel energy is derived from the gaseous fuel. As David mentioned, currently commercially available and has been for a number of years as an LNG and natural gas HPDI fuel system, all of which retains the well-established benefits and attributes of a diesel engine, which have made the diesel engine the ubiquitous workhorse of industry worldwide. Diesel engines, of course, are widely known and highly regarded for their high performance, high power, high torque, durability, fuel efficiency, robustness, and low cost of maintenance.

HPDI enables the retention and preservation of all of those attributes of a diesel engine, while additionally enabling further emissions reductions and in many jurisdictions, a lower operating cost by virtue of using gaseous fuels. That's what our natural gas currently available product is.

With that benchmark, now I want to step into HPDI hydrogen and elaborate a little bit more on the specific and very unique combination of attributes that comprise the value proposition for hydrogen in HPDI. If you look through the icons here, I talked already about how, and I think it's well-established and well-understood that the efficiency and performance of a diesel engine are well-established.

Natural gas HPDI, our current product retains all of those. Hydrogen HPDI by taking advantage of some of the fundamental characteristics of hydrogen injection and hydrogen combustion actually allows us to improve upon many of those attributes over and above the well-established attributes of a base diesel engine. Specifically, we've modelled and then since demonstrated through our own testing across multiple different engine platforms in our labs in Vancouver, that by taking advantage of the combustion fundamentals, and combustion characteristics of hydrogen in direct injection, we can achieve significant improvements over and above the base diesel engine in power, torque and thermal efficiency, all while retaining the architecture of the base diesel engine and delivering extremely significant CO2 reductions, and in particular, extremely cost-effective CO2 reductions.

If you look at that lower right-hand icon, it's CO2 per dollar. Anders will have a little bit more information on that in the next slide. But not only is the magnitude of the CO2 reductions extremely significant, but the cost-effectiveness relative to the CO2 emissions from a diesel engine is also extremely attractive compared to other low-emissions, so-called near-zero emission technologies in the industry.

The next slides will step through in a little bit more detail some of those attributes.

I talked about the preservation of the diesel engine architecture and also one of the icons on the previous slide talked about the preservation of the infrastructure and the investments throughout the industry; supply chains, OEM manufacturing facilities, the service and support network for the commercial vehicle industry, all of which is based around the diesel engine. The HPDI fuel system retains and leverages all of that and that extends also to the application of hydrogen with HPDI.

To speak to that a little bit more specifically, the image, which is one of our show engines, shows the coloured components that identify at a glance the components of the HPDI fuel system that change relative to a diesel engine. Westport supplies the red components, in particular, the fuel injector, the fuel rails, and then some gas fuel pressure management components. The OEM components that change where they integrate our fuel system into their engine are shown in yellow.

Really, it's the fuel system that primarily changes, but it's fully leveraging the cylinder head, the power cylinder piston connecting rods, for example, and then the entire engine block fully leverages all of those

investments by the OEMs. On the off-engine side of things, all gaseous fuel engines need fuel storage tanks, whether that's LNG, CNG, or hydrogen. In the case of hydrogen, HPDI, we can fully leverage the investments that the OEMs are already making for other hydrogen vehicles, whether that'd be spark-ignited hydrogen or fuel-cell vehicles. HPDI hydrogen will benefit from all of those investments as well. Again, leveraging investments that the OEMs are already making.

A little bit more specifically then about the on-engine modifications. I've already talked about the fuel system which we develop and then supply to the OEMs to be integrated into their engine. Minor changes are required to the air handling system, and the turbocharger, but quite modest changes to optimize the combustion for HPDI. Then on the vehicle side of things, as I already mentioned, the fuel storage and the exhaust after-treatment system are tailored for HPDI combustion and the HPDI products of combustion by the OEM.

Relative to spark-ignited hydrogen engine, which is a technology that will certainly have its place in the market and that's also part of Westport's portfolio, the extent of the engine integration for spark ignition systems is quite a bit more ambitious, or a little bit more far-reaching than for HPDI integration, including the addition of a throttle and ignition system to manage the combustion. Plus, more extensive changes to the air handling system, the power cylinder and the exhaust after-treatment. A little bit more extensive to integrate, and spark it to take a diesel engine and convert it to a spark-ignited engine, as David alluded to in his remarks.

Moving on into a little bit more detail about elaborating on some of the value proposition elements that I mentioned. What you're looking at here is a 13-litre HPDI engine installed in one of our test facilities in Vancouver. Specifically, we started with an existing commercially available natural gas HPDI engine. Ran that engine at a variety of points. The C100 reference in the bottom left is a reference to the rated power for the engine. So, 460 horsepower, in this case. Operate ran the engine on natural gas, HPDI, as we've done many, many times for many, many years. Then without making any changes at all to the engine and the HPDI fuel system components, simply change the fuel supply in the test cell from natural gas to hydrogen, and mere minutes later ran the engine on hydrogen, HPDI. The red text boxes draw attention to some of the key metrics that we measured.

David talked a lot about brake thermal efficiency. That's a reference to fuel efficiency. The efficiency by which the combustion process extracts useful work from the fuel. For this particular 13-litre base engine at rated power, the brake thermal efficiency on natural gas, HPDI, which it's very well-established that that's equivalent to the brake thermal efficiency from the base diesel engine, 40%. Simply by changing the fuel and not changing any of the hardware at all on that particular engine, if you look at the top rate image, 44. So, about a 10, 11% increase in brake thermal efficiency on this particular engine platform. Just by changing the fuel type.

David mentioned earlier, the 50% break thermal efficiency threshold, which I'll refer to on a later slide. The industry has, for decades, been making massive investments to eke out incremental improvements in thermal efficiency from commercial vehicle engines. To get a 10% or 11% relative improvement in thermal efficiency simply by changing the fuel is absolutely unheard of. It's just mind-boggling this magnitude of difference given the hundreds of millions of dollars per incremental percentage point or incremental tenth of a percentage point in thermal efficiency improvements. CO2, of course, is a significant metric as well.

So, 493 grams per kilowatt-hour. Let's go with round numbers, 500 grams per kilowatt-hour of CO2 emissions on the natural gas HPDI version of this engine. To calibrate you, the diesel engine in its diesel configuration would be approximately 600 grams per kilowatt-hour. Six hundred grams from diesel, 500 grams at the tailpipe from natural gas, HPDI, 15 from hydrogen, HPDI. Near-zero CO2 emissions, again, simply by changing the fuel going from a hydrocarbon fuel, methane, to carbon-free fuel, hydrogen. The residual CO2 that does come from the engine is associated with the very small quantity of pilot fuel that we use to initiate combustion. There's effectively zero usable energy, motive energy that comes from that pilot fuel quantity that all of the usable energy comes from the gaseous fuel injection.

Then finally, a reference to exhaust temperatures. You can see a significantly lower exhaust temperature from the hydrogen HPDI that goes hand in hand with the efficiency improvement. Exhaust energy is a form of waste heat. The lower exhaust temperature means we're not wasting as much potential energy, we're extracting more useful work that shows up in the thermal efficiency reference.

I mentioned the CO2 reductions. So, I gave you some numbers on an absolute basis to put that in percentage terms. Diesel being the baseline, natural gas HPDI measured at the tailpipe, just by virtue of the chemical composition, methane being the simplest hydrocarbon molecule, you get about a 20% tailpipe benefit versus a diesel engine from natural gas HPDI combustion. It's about a 98% reduction relative to a diesel engine by using hydrogen HPDI, again, simply a function of fuel chemistry. This is on a tailpipe basis or a tank-to-wheels basis. In Anders's section next, you'll also refer to some full fuel cycle or well-to-wheel CO2 emission reduction references.

So coming back to the 50% thermal efficiency benchmark, as David mentioned throughout his career and then in my career as well, 50% thermal efficiency from a diesel engine has been put out there as the holy grail of the internal combustion industry. Many of us, myself included, and David, I think I can be at risk of putting words in your mouth by saying the same thing on your behalf, didn't really expect we'd ever see it. Scania, and as David mentioned, Weichai is among the first to actually achieve that long-targeted 50% break thermal efficiency threshold with their diesel engines. It's a massive accomplishment. So, huge, huge credit to the OEMs who have invested to get there through significant improvements in their base engine.

Thermal efficiency is a function of various elements of the base engines, such as friction of the engine, air handling, efficiencies, and things of that nature. It's also very much a function of the fuel system, the type of fuel, and the mechanism by which that fuel is injected and burned. What we've recently demonstrated, and press released, as David mentioned about a month ago, is that relative to their 50% thermal efficiency threshold on the base diesel engine, we've achieved 51.5. I'm sure you detected David's enthusiasm for that number. I echo that enthusiasm, 51.5% versus 50% maybe doesn't sound like a significant change. But, if you would view this in the context of what I said earlier, the industry historically has spent hundreds of millions of dollars per incremental tenth of a percent simply by changing the fuel to get this magnitude of additional improvement over and above one of the best, most advanced base engines in the industry is staggering, absolutely jaw-dropping.

Moving on, just to kind of summarize the efficiency references I've made. I showed you on an earlier slide the 40 versus 44.8% references, which was from what I'll call a current-generation engine, a Euro 6 13-liter engine. Starting from a lower benchmark, a lower baseline for thermal efficiency, we've demonstrated substantial thermal efficiency improvements by switching to hydrogen, HPDI. That same directional increase in thermal efficiency we've demonstrated on working on a next-generation Euro 7 intent best-in-class engine. Across multiple different engine platforms, we've demonstrated that hydrogen HPDI achieves significant improvements in thermal efficiency. In fact, the levels we've demonstrated with the Scania engine, we're really now rivalling and in fact, probably exceeding in many high load factor duty cycles, the cycle-average thermal efficiency of a fuel-cell vehicle.

There's a lot of talk in the industry about fuel-cells being 60% or 65% efficient, not cycle-average, not in heavy-duty applications, and that's not just Westport's opinion, that's well established, well-publicized in the industry. If you scratched the surface a little bit and look more closely at cycle-average, efficiencies are well-established and well-publicized. With fuel-cells, efficiency goes down as the load increases. With internal combustion engines, the opposite is true. So, in high load factor applications, the efficiency numbers that we're talking about here are very much on par with and perhaps better than a fuel-cell.

We've talked a little bit about efficiency improvements—or pardon me, performance improvements. Again, leveraging the combustion fundamentals of hydrogen. We've demonstrated that we can—frankly, we can feed the engine a lot more fuel without exceeding any of the mechanical limits or the exhaust temperature

limits, or the overall calibration boundaries for the engine. In particular, on the Euro 6 vintage 13-litre engine, upon which we started our testing. We've demonstrated a 15% improvement in peak torque over and above the base diesel engine and a 20% improvement in power. So, to give absolute numbers, for those 3,000 Newton meters peak torque, 600 horsepower from peak power from a 13-litre engine. This particular engine, it's an engine that we know very, very well, having worked very closely with our OEM partner in Europe to do all of the engine integration, fuel system integration and calibration development and admission certification. We know the calibration boundaries and the do's and don'ts of this engine very well.

I've said this before in other forums. This is not a bunch of cowboys throwing a bunch of fuel at an engine and overfilling it to turn it into a hotrod. This is sound engineering working within the calibration limits of this engine that we know very well.

Now, what this means, potentially means in terms of tangible benefits to an end-user is that in a product development program, the OEM could choose to leverage these capabilities of hydrogen, and HPDI, and offer higher ratings for a given engine displacement. In the markets we're talking about here, heavy-duty trucking, that's typically 13-liter or 15-liter engines, this fuel system capability offers the potential that a truck that might normally use a 15-litre diesel engine might be able to achieve the same performance with a 13-litre HPDI hydrogen engine, thus realize the lower cost of the engine, the lower acquisition costs, as well as the lower weight. Weight is a big deal in commercial vehicle applications because of lower gross vehicle—or lower curb weight of the vehicle means you can haul more freight. More payload means more revenue per trip. So, there's the total cost of ownership advantages available to the end-users.

Now, I do want to talk a little bit about emissions. David talked a little bit about NOx. Of course, this is a combustion process. All combustion produces some level of emissions, whether it's spark ignition, HPDI, or all fuel types, there are emissions associated with that. The reason I draw attention to this is I want to address head-on some potential pushback from naysayers out there who might say, well, it's the combustion, it produces some form of emissions. Therefore, it's not part of the long-term solution, it's inadmissible.

We take a very different view on that. Yes, there are some emissions of NOx, oxides of nitrogen, in this case. NOx emissions are heavily regulated around the world and have been for a long, long time. David showed you an overview of the different emissions categories. The one I'll talk about specifically is Euro 7, quite recently announced, literally within the last couple of weeks for introduction in 2027. The most stringent set of on-highway emission regulations announced to date in the world, there'll be introduced in 2027.

The NOx emissions in Euro 7, and in fact, even today in Euro 6 and in the North American regulations are extremely low. The levers through combustion to accomplish those emissions are well-established in the industry. We've demonstrated through our own testing that all of the well-known levers to control NOx emissions from combustion apply equally to hydrogen. Things like the application of EGR, injection timing, injection pressure, and all of the combustion and on Engine levers for NOx control apply equally with HPDI hydrogen.

Then of course there's the after-treatment system as well. We are partnering with a well-established after-treatment supplier to jointly evaluate HPDI hydrogen and HPDI hydrogen after-treatment configuration so that together we can take that solution to an OEM partner for integration onto their engine and vehicle. But really at a high level, the NOx emissions are most cost-effectively controlled not by going to zero emissions or new vehicles, but rather by retiring older vehicles that were originally sold under far less stringent emission standards.

My final slide, so just to tie this all together, how HPDI will win. This is really a reiteration of the value proposition elements. Diesel engines already have best-in-class performance and power density robustness. HPDI hydrogen retains all of that, and in many cases, power, and torque efficiency improves

upon them. So it does really does leverage and fully retain all the advantages of a diesel engine and of today's commercially available natural gas HPDI engines. We're very thrilled to have strong interest from a number of OEM partners, some of which are publicly announced, others of which have chosen not to disclose their involvement with us.

But we do have demonstration projects underway with a number of different commercial vehicle OEMs within that relatively small universe of truck manufacturers that David referred to earlier. Then we've also talked about how the HPDI fuel system in general and including hydrogen, leverages and retains and preserves the infrastructure investments and the engine architecture of a diesel engine. With that, we'll move into—that concludes my remarks. Happy to take questions at the end or throughout the day.

Next, we have a video from Tim Taylor from the Sacramento Clean Cities Coalition. Tim is a long-time member of California's Clean Air Community. We'll take a few minutes to hear his thoughts and impressions of hydrogen HPDI. Thank you.

Video Presentation
I'm Tim Taylor. I'm the Executive Director of the Sacramento Clean Cities Coalition. I work trying to advance low-emission and zero-emission technologies in fuels. That's one reason why it's so exciting to be here and see this technology in action. This is one that Westport has brought to us.

Hydrogen is a technology, it's a fuel that makes it possible for us to have very low emissions or even zero-emission. In fact, relative to climate change emissions, it can actually be negative if you're using renewable fuels, which is possible with hydrogen. With hydrogen, you're combusting it with this technology as opposed to a fuel-cell, but you're combusting it with the carbon that's in the atmosphere. You pull a little bit of carbon out of the atmosphere; you combust it in and the carbon goes back into the atmosphere. You're not adding new carbon and you're also reducing the hydrocarbons that you would be pulling up out of the ground with fossil fuels. You have a much, much cleaner technology in terms of air emissions, as well as either nearly eliminates or completely eliminate climate change emissions.

One of the things that make this technology that Westport is introducing so unique is that it is a diesel cycle engine, which means it has the efficiency of a diesel engine, and because of that, it has the same attributes, the same horsepower, and torque curves, but at significantly improved fuel economy relative to say, a natural gas vehicle that is spark ignited. You're not trying to reinvent the entire supply chain of how heavy-duty vehicles function. You're using all of those 100 years of industrial development to give yourself that advantage as opposed to an entirely radically different strategy or technology that has no buildup industrial base.

Anders Johansson

Hello everyone. My name is Anders Johansson. I am responsible for the heavy-duty business units globally within Westport, located in Gothenburg, Sweden. I've been with Westport for a bit of 10 years and in the automotive for a bit more than 20 years. I will try to give you a bit of an update on the commercial perspective. Might be a bit of a repetition here, but I'll try to angle it more on the commercial topics and the markets topics.

First of all, there are three main key drivers for the commercial adoption of HPDI. The first thing would be the availability of fuel. Availability of clean fuels in the markets that we expect to grow significantly in the future. Another very important topic is to have a supportive regulatory landscape. We need to have regulations that don't disqualify any technologies and hopefully are very supportive to clean and affordable technologies. The main driver, we think though, is to have technologies that are affordable and fast time-to-market to really get into—get into volumes of products, to really start to lower the CO2 emissions in the various markets to get the carbon reaction that we need globally, basically.

I'll take you through some details on all these three bubbles to show you why we think that this is an excellent technology for the future, and we think really highly about this for the next couple of decades and onwards. Starting with the fuels, so bio-methane, we have bio-methane today. We have had trucks on the roads in Europe for five years, they are beating competitors and they are in many ways much, much better than people would think since it is a carbon-based fuel, you get carbon dioxide and tailpipe emissions. But bio-methane has a CRO CO2 on a well-to-well basis. That's really important. The trucks are running basically on manure, banana peels, and organic waste. We don't add any carbon to the atmosphere. There is a fantastic performance already today since five-years back.

I will also explain a little bit about the fuel where we are in different markets, infrastructure, and so on in the next coming slides. In the bio-methane or natural gas segment, we do see a lot of positive momentum in most markets in the world. We see Walmart, we see UPS, and we see Amazon investing heavily in that segment currently. We have been talking about hydrogen here today already. David, Bill, and Scott, all mentioned hydrogen as a future fuel. It is very compelling. It's no carbon in the fuel, so tailpipe emissions would be fantastic.

Hydrogen development in certain markets, you can say that they are a little bit behind LNG and biomethane when it comes to fuel availability, demand infrastructure and so on. But it's starting to ramp up pretty quickly now. I'll show you a bit of detail about that as well. Starting with biomethane, again as I said before, a true, well two-wheel CRO, zero-emissions. Examples, in Sweden for example, my home country, we are currently running on—well we have a pipeline and infrastructure system in Sweden, which it could be fed by fossil natural gas from Denmark. The reason for doing that is that we shouldn't have any customers or any trucks that pull up to a fueling station, especially in the beginning when everything starts and ramps up, pull up to a fuel station without any fuel. There must be a fuel availability uptime for the fleet owners is really critical, and then we feed biomethane to the system. The more bio-methane we feed to the system, the less fossil methane is going into the system, so to speak. Last year on a yearly average, all the gas used in transportation in Sweden, over 96% was biomethane, over 96%, so it's not like 2%, 4%, or 6%. We hardly use any fossil fuel at all, and it's very hard to beat.

We have the same examples in many other countries as well. California, for example, uses a higher degree of biomethane in their fields. Germany is growing as David mentioned before, so it's popping up, ramping up biomethane in most markets in the world, and we see a strong role for that. We have been talking about biomethane as a fuel today, and hydrogen as a fuel for tomorrow. I don't think that biomethane is a bridge of any kind to hydrogen. I think they can live just side-by-side in parallel very much depending on where you have availability of fuel in the marketplace. It could be different markets that are stronger in biomethane, it could be other markets stronger in hydrogen and so on. But the important thing is that both fuels have really excellent environmental performance. Biomethane is available today, growing faster than people might think sometimes.

Some numbers to back that up. A lot of different stakeholders and institutions, estimate the future demand, the future production capacity, you asked, both in bio-methane and hydrogen, I would say it's hardly anyone, I can't think of anyone who thinks that biomethane hydrogen will be flat-level or slowing down. They all think it is going to be ramping up.

Different paces, and different inclinations of the graphs. One example here on the screen we see a massive increase in biomethane consumption forecast towards 2050, and then beyond that, it's hard to predict. With all that fuel, it is also estimated that 20% of that fuel will go to transportation. Again, that's a massive, massive increase of biomethane available for trucking in various markets around the world.

Moving onto hydrogen, as I said before, it's sort of 10 years behind biomethane in some markets when it comes to fuel availability, production, and Infrastructure. Starting off, it looks like a very low start here in the beginning, and it is. But again, all the estimations in the future point towards a clear ramp-up from 2030 onwards. So, by the end of this decade, we will see a number of trucks industry to see infrastructure coming along, we see investments going that direction, massive numbers of investments, and when

production capacity ramps up, we also estimate that the price of hydrogen will be reduced by 60% by 2030. So that's also an important topic that goes into the total cost of ownership for fleet owners, the price of fuel.

We think that Europe will be one of the main drivers of the use of hydrogen. We estimate it to be around 23% of the national energy by 2050 would probably be hydrogen in Europe. Similar numbers, but a bit lower for North America and China.

But again, massive numbers for hydrogen as well as biomethane. With that, all that hydrogen in 2050, it's estimated that again, 25% maybe 30% will go to the transportation sector. So, the trucking industry for gaseous fuels, biomethane, and hydrogen, will grow significantly and most industry players and institutions agree, but maybe they have a different opinion of the pace of it.

So, McKinsey has done an estimation. They have estimated be around 850,000 trucks on the streets running on hydrogen heavy-duty trucks by 2035.

Those kinds of estimations are—the only thing you know is that that won't be true. It might be 600, it might be 500, but it also might be a million trucks. The important thing is the trend, the way we are moving, and the different paces that the different institutions are estimating.

Infrastructure and we are using here Europe as an example. The ACEA, the Automobile Association in Europe, estimates 300 truck suitable hydrogen fueling stations by 2025 already. We will have a pretty rapid increase of fueling stations around Europe There are 32 stations today. But it's ramping up. We see investments, we see news stations popping up on a weekly, almost on a monthly basis in Europe. So, 300 stations by 2025, which is basically just around the corner. That's a pretty big accomplishment and I think that's very achievable as well. Moving on at the same pace, we think that we will end up with 1,000 trucks or filling stations by 2030.

To put this in perspective a bit and compare it with bio-LNG or biomethane, which is also available in Europe today, we do have 607, I think 610ish; tomorrow it might be 612, I don't know, but 600 plus stations in Europe today. It's been years now since I heard any customer complaints about the availability of the fuel or it's hard to find any fueling stations in Europe. So, we're past the threshold in Europe where it's not a niche fuel anymore. It works for most fleet owners, no one is complaining about it. So, I don't know where the threshold is, 300, maybe 350 somewhere, but we are way above that already on the LNG side.

That's about the fuel. The left blue bubble, in the beginning, is the fuel availability and infrastructure and energy.

Moving over to the financials. Most of the OEMs, are targeting to get products on the streets that fulfill all the regulations. In many markets Europe, for example, China also will see penalties if you don't reduce the fleet average CO2 emissions going forward. So, 2025, 2030, and that's the main target for the OEMs. The drivers and customers, fleet owners, very much focus on TCO, the total cost of ownership for the truck. The truck is an investment like a machine that will generate money. Uptime is really important, for example, but there are four main drivers for TCO calculations. There is repair and maintenance, there's driver cost, there's fuel cost, and vehicle acquisition cost. Fuel is by far the biggest portion of this TCO.

That is exactly why we have been saying now in all the presentations that efficiency is really important. The less fuel you use, the lower cost of fuel that goes into the TCO kick-in, which is the main piece of the TCO. Throwing out numbers here, thinking out loud a little bit. But if, let's say that the fuel cost is 10% lower, let's say that we are 10% more efficient than a spark-ignited engine, for example for biomethane on the market today. If we reduce the fuel cost by 10%, to make up for that, I think that you might have to reduce the vehicle acquisition cost by 30, or 40% since the fueled portion is that much bigger in the TCO calculation. The fuel portion and the efficiency of the power train are really important.

On that topic, we usually say it sometimes that we are 10% better in efficiency than a spark ignited on methane. Interestingly, one of the big trucking magazines in Europe recently did a test, real-life test. They took three trucks, one with HPDI technology and two with spark-ignited technology. They did extensive tests throughout the southern part of the French Alps. They spent a week. Changed the drivers in-between the trucks, and changed the trailers in-between the trucks to have a very independent test result. We ended up having a 30% better fuel economy than their spark-ignited solutions. We do say 10% sometimes, but in real life, it's been 30% and that's massive. Again, we have been using words like jaw-dropping, game-changing, and so on here today but really 30% is enormous for a TCO calculation.

Comparing HPDI with fuel-cells, for example. If using hydrogen in the future in the trucking business, we have two main technologies to pick from so to speak: HPDI, internal combustion engines and fuel-cells. Repair and maintenance driver and fuel, we believe is impairing between fuel-cells and HPDI, at least impaired. The main difference in the TCO calculation would be the acquisition cost and the price for the truck.

Currently, we do see prices of, maybe an HPDI truck would be sort of 30%, maybe above a diesel truck, in the order of 30% above. Fuel-cells are three times the diesel truck and acquisition cost rate. We are clearly having a benefit here and an advantage versus fuel-cells when it comes to TCO.

Here are some numbers again on the TCO mentioned before. There's a significant difference. It's hard sometimes to estimate the acquisition costs and there are some variables that go into the TCO that could be in the high range to low range. But we have done an independent view of this, and we have also used an independent company to help us to provide more confidence in the numbers. We're looking at 8% to 17% of better TCO for HPDI versus fuel-cell using hydrogen. Again, that's really important for customers.

Another advantage that our customers are telling us that have been driving the truck it runs like a diesel. Very familiar with the drivability, how to use it, how to fuel it, and how to operate the truck on a daily basis. It's basically the same. That's a big advantage for drivers and fleet owners.

For the OEMs, they do see all the synergies. That’s a big advantage. You can keep product development costs low; you can keep MDM plans going, you can keep staff trained. They're available today. All these massive investments that the OEMs need to do with a completely new technology like fuel-cells or battery-electric trucks, if you can avoid that, that's a big plus for them.

In addition, to threats, they also see the benefit of synergies in-between different technologies. Our system can basically have a gaseous fuel system that can run on LNG, bio-methane, and hydrogen. There is a little bit of some differences, but the technology concept of HPDI is basically the same. They can do product development costs and they can reduce that and get to solutions for one. In addition to that, they also see the synergies with HPDI and the base diesel engines. So, it's almost like three birds with one throw, so to speak. Very compelling, very positive feedback from the OEMs and from the customers that have been driving them in real numbers.

Here's another view of looking at it. So, from a societal perspective how much CO2 reduction you can achieve per invested thousand euros in the model. Same modelling as the former page, but a different way to slice the results, so to speak. We do see that HPDI, which is the blue model to the left, various different fuels, bio-methane and hydrogen, but the important thing here is that the HPDI in an internal combustion engine is a better way to get quicker results and CO2 reductions, faster and with a better magnitude.

From an OEM perspective, I did say before, there is a high degree of synergies between LNG, hydrogen, and diesel. We can fully leverage, or OEMs can fully leverage the existing knowledge they have, the existing staff they have, the plants they have, supply-chain investments they have, many, many, many

good things they can keep and not reinvent sort of speak to go to new technology. So, we believe that's driving cost savings in the billions for OEMs and that's really appealing for them of course.

Outlining the portfolio of solutions needed, it's a massive challenge here in the future, and the scale of the challenges is massive. We need to change the entire industry of trucking and not use fossil fuels, and in order to do that, you need to have a lot of things. You need to have an affordable solution. You have a mature solution that works with good uptime. There are plenty of aspects to think about that. I think it is naive to think that is one solution that can replace all the diesel trucks today, it's his naive. I think we need a diversity of solutions to get there, and we think that the internal combustion engine especially with HPDI with clean fuels will play a major role in that in the future for sure.

The last bubble on the first page, is the regulatory situation, and status, I don't have a lot of slides on the regulatory situation, but this is a summary page. The three main markets are European Union, China, and North America. I would start to say that we have a lot of regulatory tailwinds in all markets. Most of the markets, do have more and more stringent emission legislation when it comes to NOx and all that, as Scott explained before. We don't see any issues to comply with those more stringent legislations.

The more important thing here is the other piece to it. So, most of these countries as well are targeting lower fuel consumption, and lower CO2 emissions, which is basically the same thing in many cases, and that is all in our favour. We have one of the most efficient technologies in the market and efficiency will be key to getting lower fuel consumption, and lower CO2 in the future. This is all in our favour. We think it's going to be very positive and very helpful for HPDI to take off into main volumes in the future.

Another slide to show you, I think I explained a little bit before, the well-to-wheel emissions, and this slide is trying to illustrate the different advantages between bio-methane and hydrogen, so to speak. The green bars here with the different fuels or well-to-wheel emissions. Cradle-to-grave is basically when you start to produce the fuel, use the fuel and then usage in the truck in the end. Biomethane can reach a 100% reduction. It could be neutral, CO2 neutral on a well-to-wheel basis today. Fantastic solution. It does not provide zero tailpipes CO2 though. That's important, but all the carbon that is put into the truck with biomethane is not new to the atmosphere, it’s carbon molecules that already exist in the atmosphere. Well-to-wheel, 100% reduction.

When it comes to hydrogen, hydrogen is a carbon-free fuel, so that has the advantage of having more or less tailpipe 100% CO2 reductions. The important thing here with those results is that HPDI and fuel-cells are very much on par you can say. They have the same performance when it comes to CO2 reductions more or less, and I think Scott explained that before in his presentation as well.

So, solutions for the future. We know today that diesel stands for a bit more in 96% of the global market today in heavy-duty trucking. The estimation for the future 2040, and 2050, that is going to shrink dramatically, it has to, and it'll open up a huge market that something else needs to fill. So, all the trucking companies, the fleet owners, have to pick a solution for the future and towards 2040, and 2050, diesel will play a minor role. That's a huge challenge for the future, and as I said before, I think we need a diversity of solutions, we need a diversity of technologies and also fuels. Internal combustion engines will definitely play a role in that throughout 2050, but especially maybe in the beginning so the next 10 years, we have a mature technology, and we can reduce CO2 tomorrow basically by our solutions.

Another picture here shows the different applications and market segments for the trucking industry. Usually, when you talk about heavy-duty trucking, you're talking about how much payload the truck needs to be able to carry and the driving range that is needed. Different requirements for different trucking applications. We do see a sweet spot, maybe not a spot, pretty big, sweet spot up in the right corner here. We don't think that any other solution basically will be able to compete in the right corner. So heavy-duty, high payload, long-distance, long-range, HPI will be superior for sure. That doesn't mean that we can compete in the other areas as well because you also have the financials into it or you also have the

power and torque and all the other aspects into it. But the real sweet spot is the heavy-duty and long-haul applications, for sure.

Many of the industry-leading OEMs, as I said before, they are really positive. They have been reaching out to us with a very positive mindset. They see the results; they see what we communicate. We have been doing show-and-tell for quite a few OEMs already. We're bringing their demonstrated truck to them. They are test-driving it and they are truly impressed, and they are surprised sometimes that the truck is working already today. It's hauling 40, 50, 60 tons, runs on hydrogen, and drivability is good. Everything is—we just plumb in a different fuel and it works. That's the beauty of the HPDI technology basically.

A lot of positive feedback from OEMs and we believe that our three main markets, I would say North America, Europe and China, three main markets, not the only markets we work with in all markets in the world, but we see a lot of interest from OEMs. We do have detailed discussions with as many as maybe 10 OEMs or something. I dare to say that in the history of the company at Westport, I don't think we have had this level of interest from OEMs anytime. I haven't been in the Company for more than 10, or 12 years but Scott and the others, tell me if I'm wrong. I'm pretty sure I'm right.

This is really, really exciting, the next coming years here. I do want to say also that we are planning to sell our products in other markets and those three. Those three are the ones that we are focusing on to partner with OEMs. But obviously, the OEMs are selling in other markets as well and we're helping them with that. We do see positive momentum where the current product we have in Europe for to sell in South Africa, India, Japan and Australia. In some other markets they are trying to launch the product even if the OEM, such as in Europe, they are trying to launch the product globally right now.

Coming to an end. This is my last page. We do have demonstrator trucks. We have one in Europe and one in North America. As I said before, they work perfectly today. They are prototypes, but they work perfectly. So, we have been hauling 40 tons so far. A lot of people have been driving it, really impressed, as I said before and we will continue with the tour to show people, policymakers, regulators, OEM, and customers as well, we will continue the positive momentum we have on the marketplace today. Thank you.

Now I think we will have a break. I'm looking at Ashley here, but I think we have a 15, 20 minutes lunch break, right, then the idea is to bring the lunch back into the room and we'll have some more videos to show. Good. Thank you.

David Johnson

You can continue to enjoy your lunch by all means. We're going to have a short video to share with you.

We're going to do a short video. It's about six minutes long. We tried to get people from our industry and our ecosystem to come in and tell you a little bit about their perspective on what we do at Westport Fuel Systems. One of our partners for a long time, and you've read and heard the announcements that we're working with AVL and TUPY on a project to integrate HPDI into an engine and demonstrate it with hydrogen. We've got a video clip from AVL, and just to give you some flavour about AVL, they have about 10,000 engineers around the world. This is the leading independent engineering consultancy for the automotive industry based in Graz, Austria with 90 locations, and 45 technical centers. It's a really big operation. I would tell you just my observation in the industry is this is a company that is technology agnostic. They're not outselling any specific technology. They're working on every kind of technology, and so we introduced them to HPDI some time ago and then as the pressures of the industry and customers came to them, they're very excited to be working on this project with us.

We have this clip from gentlemen, let me get it here because I'm going to mess up his name for sure. Anton Arnberger, who's Product Manager for commercial engines, is a guy who's been working in the industry for almost 20 years now and started out doing combustion development, and all of his focus now

is on the gaseous-fueled engines. He's really the right person to talk to about the HPDI technology and what he sees so I'll leave him to say the rest.

Anton Arnberger, AVL

Ladies and gentlemen, it is a great honour to speak for Westport today. Best greetings to Canada. My name is Anton Arnberger and I'm the Product Manager for Commercial Engines in AVL. I may use some words today about de-carbonized on-wards transportation.

First of all, a few words about my company. AVL is the world's largest independent development supplier for simulation, testing and engineering in the automotive industry. Independent means we are not favouring any particular technology. This means we are developing battery electric vehicles, fuel-cell electric vehicles, and also the internal combustion engine in combination with conventional power trains or hybrid power trains, in combination with all kinds of fuels and for all applications.

For heavy-duty applications currently, the hydro chain is expected to be a very important energy carrier in future. We use two different technologies, either the PEM fuel-cell or the hydrogen engine. I personally don't think that these technologies are direct competitors. I do see the hydrogen internal combustion engine as an additional driver to speed up the hydrogen infrastructure, as the missing infrastructure is the greatest risk for both technologies.

Looking more into the hydrogen internal combustion engine, there are two different combustion concepts which are currently under development. First is the spark-ignited lean-burn approach. Most OEMs do currently follow this approach. It is very flexible in view of applicability to different applications. This means it is suitable for heavy-duty applications, but also for smaller applications. Even for passenger cars, it is a possibility.

For heavy-duty. HPDI does make a lot of sense. Your hydrogen is injected at the end of the compression stroke directly into the cylinder and it burns on a diffusion flame. This diffusion flame is an enabler for much higher efficiency. We have an additional benefit as the engine works on the same principle as a diesel engine.

Currently, we do need a pilot injection to ensure ignitability. However, this will be in future either by renewable fuel or by a different carbon-free ignition source.

Looking at the efficiency of both the PEM fuel-cell as well as the hydrogen internal combustion engine, we do see that the PEM fuel-cell is almost not beatable in fuel efficiency, especially in the part load. The more we move to full load conditions, the better the hydrogen engine becomes. When considering also the losses of the power train, we see that we come here in full-load condition very close to the PEM fuel-cell. The PEM fuel-cell has a fully electric power train, which on the one hand, has higher losses. On the other hand, it has the potential to recuperate. It means in the part load area this additional recuperation might be an additional benefit.

What is now the contribution of HPDI? When moving from the spark-ignited hydrogen engine to HPDI, we see an insignificant increase in break and thermal efficiency, but both in full load as well as in part load. Especially for applications that were full load conditions are rather important. Not necessarily only heavy-duty transport, maybe also heavy-duty on-road mobile machinery, or heavy-duty construction equipment, hydrogen HPDI makes a lot of sense.

I think the hydrogen internal combustion engine will be an important contributor to decarbonized transportation in future. I think we will see the hydrogen spark ignited lien bank concept as well as hydrogen HPDI. There is a lien burn engine hist of benefit that zero-emission vehicles can be demonstrated. The HPDI engine has the particular benefit that it uses hydrogen in the most efficient way.

All in all, I think HPDI might be a very important contributor to heavy-duty transportation toward decarbonization

On behalf of my entire Company, I may say thank you very much. Have a nice and safe remaining day on your today's event.

Bart van Aerle

Thank you and thank you very much for being here during your evening. Martijn Stamm is the Director of Mobility from TNO who has spent 15 years with the company and holds a degree in Electronic Engineering from the University of Delft in the Netherlands. TNO totally owned independent company in the Netherlands and has a state-of-the-art test facility for heavy-duty, so all European OEMs there where work with different fuels, diesel, natural gas, LNG, with also hydrogen now. I leave it up to you Martiin to explain a little bit more about yourself and also about TNO.

Martijn Stamm, TNO

Thank you for allowing me to speak here. My name is Martiin Stamm, I'm the Director of Mobility and Trucking Transport within TNO. TNO, as you said is an independent research organization. We have a long history in the Netherlands, we were founded in 1932, so 90 years already active in multiple research fields. We are the largest independent research organization in the Netherlands, partly government-funded, but also, I'll just say, independent from both government and industry.

We are active in many research fields, ranging from anything from ICT, and energy transition to security, safety and defence, and my field serves transport where we are looking towards creating a mobility system that is zero emission, zero casualties and zero loss in this instance, efficient and inclusive role. I've been working with TNO for 17 years in multiple roles and now I'm responsible for all the research work mobility, I hope that explains a little bit.

Bart van Aerle

Perfect. Perfect. Okay, I've prepared some questions. I'll start off with a light question here, and then I leave it to the public also. If somebody in the audience here wants to ask a question, please take the microphone. Can you elaborate a little bit on why it's so important that Westport Fuel Systems and TNO work together and what are the big benefits of our cooperation?

Martijn Stamm

Yes, maybe it's good to start a little bit with how we see the transition toward zero-emission mobility. As TNO is independent, we also try to give an outlook that is realistic and not targeting one technology or one field particularly, especially in the field of heavy-duty transport, but also non-reg, mobile machinery. We strongly believe that there needs to be a multitude of solutions to allow for an efficient pathway for lower) emissions towards sustainable transport, and already for many years, TNO has been active in developing new solutions for combustion engines on natural gas solutions. We have a long history also with Prins auto-gas. Through that and other routes, we've met the solutions that Westport offers in this field.

We have a very good collaboration, in my opinion. This collaboration has allowed us to proceed in developing very efficient solutions in this gas field. But now, more importantly, I think transitioned over the last year or years to hydrogen combustion. For us to be able to develop that, being a research institute, we need a very good open partnership. I think we've developed that. We've been able to bring solutions for our clients closer to the market. I think what we have is a very open collaboration where we can really work together, and develop solutions for multiple clients. For us, the goal is to bring that technology to the market as soon as possible for hydrogen combustion, especially meeting the standards that are being set

for instance Euro-7. We strongly feel that we need to transition from port fuel ejected solutions to HBI solutions, and for that, the partnership is quite important.

Bart van Aerle

Thank you, Martijn. David, anything to add to this?

David Johnson

Yes, maybe just to elaborate on our work with TNO a bit more. Martijn and his team, with our hardware and our control strategies in the Dyno cell, are running HPDI hardware with both natural gas and hydrogen to demonstrate again, on this specific platform that TNO has access to which a single-cylinder engine with some funding from the Dutch government. There's a real consortium of parties coming together here to demonstrate using our technology, what's possible with hydrogen and how it benefits and exactly where, and frankly, the work that we've been doing on full six-cylinder engines, I'll say less researchy. It's more development. Whereas the kind of work that Martijn and the team at TNO can do can really see what else is possible by probing into that single-cylinder engine. For us a really valuable partnership.

There's also just geographically close proximity between Martijn's team in Eindhoven, TNO and our Westport Fuel Systems Eindhoven location that came from our Prins part of the Company. It's a really great collaboration, but just lovely for us to have more test cells in the world, more engines in the world running our HPDI equipment and developing and exploring and bringing that product to life.

We are close to a big Dutch truck manufacturer. That also helps, you know, we speak the same language, and for you, in the room and online you can figure out which one that is. It should not be that hard to figure that out.

Also, I think you know, what TNO is, it's like a butcher testing his own meet. If we are seeing and we are saying all day, you know, how good it is, but they are independent. So, when they say something, it's like too for AVL or TNO saying something, you know, it has much more value to the OEM customers than we are saying it about ourselves.

Bart van Aerle

I think we have a question in the room.

Sameer Joshi

Sameer Joshi from H.C. Wainwright. The question is actually about the development of the hydrogen solution that you have. We saw the product outside and it has been roll tested. How much more investment will it take to get it ready and, on the roads, commercially?

David Johnson

I think specific figures are challenging at this moment because we're, I would say, in the early stages of that development activity. But I would say the unique developments that we need to do with respect to

HPDI and with hydrogen are not so significant because fundamentally we're using existing production hardware. But I'll be realistic because, in the end, I started as an engineer first and foremost, we've got to go do the work before we know. But at this point and with the budgets we're preparing, we don't have big Capex numbers, big engineering funding, and not a lot of spending to go do the work that's necessary in many cases as with the work we're doing at TNO. We have outside funding sources for that. Whether it's a customer, a government, or another funding source. In total that doesn't show up materially in any way in our income statements right now. But we have to go do the work and then we'll find out what else is required.

Sameer Joshi

Just as a follow-up on that and maybe it's a CFO question, regarding the $12 million to $15 million in Capex, what are the targeted areas for those 2023 How much of that is for hydrogen, and how much of that is for other investments?

Bill Larkin

We believe government funding will play an important role in the funding of H_2 HPDI, based on the level of interest we are already receiving.

This interest will alleviate some of the capex costs that will be associated with H_2 HPDI development but overall, we feel like we are in a good place when it comes to current development costs and our ability to manage these prudently.

Eric Stine

Hi. Eric Stine with Craig-Hallam. David, I know to this point, you've always gotten a question about new OEM partners, do they want a similar solution? Do they want their own solution? Curious about what you think that looks like with Hydrogen. Is it because of urgency in the market? Is that something that you think it's very similar to and that it's quicker to market? Or do you expect that each individual OEM, or are you finding in your discussions, Anders mentioned the 10 or so that you're working for, or with? Do you anticipate that they will want more of a specific to their platform solution?

David Johnson

Yes. First and foremost, every OEM has their own engine, and they want the technology whether it's our product or somebody's air filter, doesn't matter what it is. They want it demonstrated in their environment with their hardware and their vehicles, and so forth. That is, I would say, normal with respect to any technology including hydrogen, and HPDI.

As we've discussed today, there isn't a lot of adaptation that's required on the engine side in order to put HPDI, the actual hardware in the engine. That was true for the product we have in production. That's true for the project that we did with Scania. It was step-by-step. For each one of those projects, we can evaluate how much change is required in the engine, and as Scott was elaborating, not so much change on the engine side in order to put the hardware in the engine. Then there is a specific hydrogen development. Fundamentally every customer has their own set of targets, and what they aspire to do. But I'll tell you right now as we work with OEMs, the fundamental they want to know is, if what we said really true in their engine, 20% more power, 15% more torque, 10% more efficiency. But what about in my engine? That's really the proof points we're doing with the likes of Scania and others. Some which we get to talk to you about and others which we don't. But that's where I would say the first and foremost question. Then from there, there is a decision on the development targets for any given project, whether it's natural gas or hydrogen. Where do you want it? What period of time? How much volume? What are the targets? All those things that I would say are normal product development.

Maybe an important element in this how this dynamic works in our business, is there are customers that we're working with, like Scania, who are interested to understand the hydrogen potential of HPDI. But then are also interested in, okay, if there is this long-term, if they become convinced that the long-term potential of hydrogen HPDI and hydrogen and trucking, what can they do with that technology pathway today? That's where we do see interest in using this technology and the product that's already in production with natural gas knowing that there's a pathway to go forward with hydrogen in the future without tearing up the engine, tearing up the vehicle, and starting over with all new investment. This is super important in the decision-making, strategic planning, and technology road-mapping that OEMs do to say, how do I satisfy my customers? How do I meet regulations? How do I run a profitable Company?

Bart van Aerle

Any more questions from the audience? I see one.

MacMurray Whale

Hi, MacMurray Whale, Cormark Securities. Spark-ignited natural gas engines continued to have a big market share; all customers decided not to use them. Is that not likely to be the same situation in hydrogen?

David Johnson

I don't think so. I think it will be different and there are two, let's say, elements of that that I'll comment on and maybe Martijn can join in with his view of the situation and the outlook. First of all, I think there has been still to this date—is still to this date a lack of complete understanding and appreciation for how much better HPDI is than a spark-ignited engine. In both of the joint ventures that we started with both Weichai and Cummins, the original intent was to bring HPDI to the marketplace because of the promise of being able to run a diesel engine, like a diesel engine, but with natural gas. I think maybe it was Anders mentioned in his presentation, there's data in the marketplace now saying engines using HPDI are 30% more fuel efficient than engines using a spark plug and natural gas. This is not some small number. This is absolutely huge.

But I will tell you, we were at the Hanover truck show. We're talking to CTOs and CEOs and heads-up powertrain development and they don't all understand this. We still have work to do on communications and helping them understand this and showing the data, and that's just on natural gas.

With hydrogen, I'm quite convinced by the data we show, and the performance we've demonstrated in vehicle and dyno, when we use hydrogen with HPDI and engine, the performance gets better, with more power, more torque, and more efficiency.

I'm equally convinced when you take an engine and let's say you have a spark-ignited natural gas engine and you run it on hydrogen, that performance gets worse because of the properties of hydrogen. When you mix hydrogen air, it wants to explode. You have to have a super lean and there are all these things you have to do which are not so easy to do in internal combustion. The development cycle is more, the capital investment is more, and the performance, power density, torque density, and fuel efficiency are all worse.

Martijn Stamm

David, can I add to that?

David Johnson

Please jump in, Martijn.

Martijn Stamm

I think also an important factor that I notice is that if you look at the, let's say, the emission legislation side of it, there's more and more openness in the EC and also in the local governments in Europe, at least, to allow for combustion engine solutions for a wide range of applications, and maybe less so for the light-duty applications, but especially for the heavy-duty and on-road mobile machinery. We see that coming up. But there is some worry about the way they're looking at it. For instance, European Committee is saying they want 80,000 zero-emission lorries in operation by 2030, which I think is impossible to do battery-electric, so you have to look at solutions that will work in that field, but they also have to comply in the long-term towards the Euro's seven legislation and especially looking at nitrous oxide emissions are big points in Europe. I think if you look at the two technologies, HPDI is much better at potentially solving that emission, let's say challenge without bulking up the after-treatment solutions that are required. Also, from that solution. Performance is definitely in the short-term, but if you look from our perspective on the longer term, I think that is a reason to want to go to HPDI as well.

Bart van Aerle

Thank you, Martin.

David Johnson

Thank you.

Bart van Aerle

As a follow-up to your answer, David, in a way, if I'm interpreting correctly, with the natural gas, there's a big differential in the Capex that your efficiency has to make up for. Because in the total cost of ownership, as you were talking about, I think it was Scott that was talking about it, you have to save so much on the fuel to justify the bigger Capex.

In a way, what you're saying is the HPDI with hydrogen is the killer app that justifies that. Is that fair? Because you're getting—what you just said was your efficiencies so much better that now you've got a viable technology that beats the incumbent. Whereas right now natural gas, it's good but you're basically pitching on better performance. I think what the customer is saying, it's recognized, and good enough.

David Johnson

There's an element with spark-ignited. We the industry, all the players, know how to do this. That's pretty straightforward. You don't want it—basically, the technology that's used in spark-ignited natural gas engines today by our former partners and our current partners and others who are making these engines, this is relatively old tech. This is not some new invention like HPDI.

All these engines were developed, and I think there is an element in the marketplace where a fleet manager says, go get me some natural gas trucks and they buy the cheapest ones they can get, and then they get what they pay for a relatively inefficiently low-performing engine. There hasn't been so much available in the world of HPDI, one market, one OEM. That's it.

Moving forward, this is changing. People are understanding and 30% is huge. I do expect, and we're already seeing in the work we're doing with manufacturers around the world, that's what they want. They're appreciating this benefit and they appreciate it even more with hydrogen because frankly, many of them, maybe all of them have already tried or are trying with hydrogen to spark plug and it's difficult.

They're thinking about all the changes they are going to have to make pistons, turbochargers, after-treatment, and cylinder heads, and the Capex associated with that. Gosh, I can't just—a lot of the spark-ignited engines in the world were bought from one or two manufacturers, which is relatively capital-efficient. If everybody has to make one, that's a lot of spending a lot of development.

I do think this cost-effectiveness has a number of key ingredients. One is how much does it cost to develop? Another is how much does it cost to industrialize? The third is how much does it cost to buy the truck? The fourth one is how much does it cost to operate the truck? With hydrogen HPDI versus spark-ignited HPDI versus fuel-cell, we have big advantages in all of those.

Bart van Aerle

There's another question here in the room.

Chris Dendrinos

Thanks. Chris Dendrinos, RBC. Maybe focusing on the regulatory environment. Can you expand on those conversations right now, are you seeing a growing interest from regulators to be more open to maybe a solution that's not perfectly zero-emissions? Who's going to the regulators and what are those conversations? Do you have partners on the OEM side that are taking the charge up with you or are you going it alone right now?

Bart van Aerle

I think that's a good question for Martijn because they advise the Dutch government, but also the European government. Martijn, could you speak a little bit about that?

Martijn Stamm

Yes. Definitely. We have two sites in the mobility field. We are working on technology development, which is in Eindhoven, but we also work on the legislative side. We've been heavily involved in the development and levelling of the Euro 7 standard announced now. I think generally, we see that more and more the realization is, how to say that is sinking in that a silver bullet solution doesn't exist. There's no one technology for especially all these first-style heavy-duty applications that will solve the entire energy transition.

For instance, in Europe, we see now that even for the light-duty, a review moment has been planned for 2026 to see if the subject matter on the internal combustion engine for light-duty needs to stay the way it is. There are no big decisions yet. I think that the routes are being opened, but if I compare the discussions we had with the legislators two years ago, there was hardly any room to talk about the combustion engine future, and now we see more and more money being opened up to do research into that specialty around hydrogen, but also more and more openings in the legislation. Definitely, I would say that also the regulatory side is opening up for combustion engines as a solution in the transition towards zero-emission.

David, do you want to add something to that?

David Johnson

Yes. I do think. We have been tracking our hydrogen trucks around two regulators in various jurisdictions. We've been to Brussels, we've been to Berlin, we've been to Sacramento, and Washington DC. This isn't just a one-time stop; we need to go back and tell the story again and again. As we're increasingly joined

by our OEM partners, which they did when we were together in Brussels, as an example, we had our customer there with us, this really reinforces the message and then the regulators really pay attention. I also think in general, they are under difficult economic times and geopolitical challenges that we face and all this strife we have in the world, this is a pressure on regulators and all of us to get more practical. What can we do right now? Not this non-obtainable future. It's magical, it'll work, and we'll all be happy. No, no. What can we do right now that's practical, realistic, and really makes a difference? That's where I do see that movement.

It will take some time, but even in the OEM ranks, I was at the Vienna motor symposium. We presented there this year in late April. There were a lot of presentations about hydrogen internal combustion engines there. Of course, ours was the only well with HPDI, all the rest was spark plugs. But one major manufacturer who was presenting had a lovely chart saying, we need hydrogen internal combustion engines in this space, and it was construction, off-road and let's say the heavy-duty cycle short haul applications is a new application. But this manufacturer had never said such a thing before. In the halls, in the offices, in the conference rooms, and in major OEMs, they're studying this strategic map of alternatives and trying to figure out what to do. When they learn about when we'd drive their truck with hydrogen and they experienced what's capable and then see the math and see the combustion, changes their strategy and back and changes their decision-making, and what's happening now.

Chris Dendrinos

I guess then maybe as a follow-up, in terms of government funding for research from programs, are there programs out there right now that you guys can potentially tap into? Is there anything I guess within the next year that you're maybe applying for that would be beneficial?

David Johnson

Yes. I think that there are some. I would tell you that right now I see, for example, in the United States with the new Inflation Reduction Act, hydrogen hubs. I would say that funding is more on a flow-down basis where they say we're going to put the hydrogen hub, we're going to need some vehicles. There is this partnership aspect of where we go and try to find funding as we've done in the Netherlands with D&O and our consortium of partners there. There are 180 plus countries in the world. We have to pay attention to all of them, but for sure there are opportunities and we're off pursuing those.

Bart van Aerle

Yes. Martijn maybe you can add something on what the European Union and the Dutch government are doing at this moment in the field of hydrogen.

Martijn Stamm

I think there's a big push for the hydrogen economy. I think to strengthen the savings you just made, David, in the Netherlands, there's a lot of funding available. It's on the Dutch scale, so of course, it needs to be scaled up to European levels but to also work on combustion engines and on hydrogen. The programs we are jointly running now don't just focus on single applications or single demonstration really getting the hydrogen technology in the market to be able to also push this economy and get the availability of, let's say, the fuel infrastructure also pushed.

There are a lot of countries that are investing now in hydrogen fueling stations. Also in the Netherlands, there has been a target set for that. I think both on the research side, there's a lot of opportunity to look at the combustion of hydrogen. But also, for instance, say, storage of hydrogen in the vehicle, which is also quite important to get things running. Especially there, I think there's additional funding coming up. Also, there's a lot of push for funding to work on the infrastructure.

I think the main thing there is that we have to make sure that the mobility field has solutions to use this hydrogen as fast as possible because there's also a lot of competition for the available hydrogen from industry, for instance. I think this is also something that OEMs feel, and they see a need to bring vehicles on the road as soon as possible to make sure there are no government solutions that push the hydrogen away from mobility. That's also something that we're going forward to make sure that as much as possible in roadmaps and strategies of governments, there is also a reservation made that hydrogen will be available for the mobility sector, which the European Union has done, so I think that that's moving in the right direction as well.

Bart van Aerle

Thank you, Martijn. Any more questions in the room here? There's one more there.

Sameer Joshi

Hello. David, you just mentioned some off-road applications that this could be used for. I have a two or three-part question. You also mentioned you have an M&A strategy. Does this fall in that strategy where you might acquire something which will help you in the off-road applications? Part 2 of that M&A question is, are you also looking at vertical integration upstream or downstream from where you are?

David Johnson

Thank you for the questions, Sameer. I think the off-road markets are in fact super interesting. I think in earlier comments I mentioned we're in this space of heavy-duty trucking of 11-to-13-litre engines. When you go bigger than that, the loads get even heavier, and the opportunity becomes even more important and the opportunity to de-carbonize the whole technology is even more challenging. We think about, here in Canada, the mining industry and all the mine haul trucks locomotives. I saw a number the other day, 26,000 locomotives in this jurisdiction. There are just a tremendous amount of opportunities.

If you think about some of those demonstrations that had been done with fuel-cells, we're talking about gutting the entire vehicle, filling it up with fuel-cells. Whereas our offer to that market would be basically just to change the injector and put a different fuel tank on it. A super attractive approach to de-carbonizing hard-to-de-carbonize sectors.

In terms of M&A, the world is very interesting, and we'll see how that all plays out. I wouldn't say we have any specific strategy to or not to do, but we're certainly open to the opportunities and have our eyes open.

Bart van Aerle

Okay. We are coming close to the end of our session here. Martijn I just have one last question for you. How large do you see this opportunity with hydrogen for this technology, what we are together working on?

Martijn Stamm

Being an independent research organization, I cannot name numbers, of course. But I know for sure that there's going to be an opportunity.

Looking at what's also been mentioned, the off-road market, but also the long-range heavy-duty market in Europe, at least, as we see it, a major part of that cannot be electrified. The fuel-cell technology is demonstratable for heavy-duty applications but definitely not future-proof and economical. As we see it, a big portion of that market needs to be done with combustion engines for a long time still. If you want to de-carbonify, then, of course, that would be a good solution.

As I said, it's a little hard to name numbers, but it's a big chunk. Personally, I'm convinced that we're not looking at electrifying more than small percentages of that market in the short term. A lot of companies and a lot of countries do want to show the potential de-carbonization.

Bart van Aerle

Next time we invite you in person so you can tell those people here during a beer.

Martijn Stamm

Sure, I think, I can tell a little bit more but as I said, we have to stay independent.

Bart van Aerle

We appreciate that, and also, it's good to know because you're also testing our technologies to keep it also confidential. Martijn, I would like to thank you very much for spending your time with us during your evening. It's better today than tomorrow because tomorrow evening for sure you would not have joined us. Netherlands playing soccer.

Martijn Stamm

Different competition.

Bart van Aerle

Thank you very much and have a nice evening. David thanks for your answers.

Martijn Stamm

Thank you for having me and enjoy the rest of your session.

Bart van Aerle

Thanks to the crowd because it was really easy for me to be a moderator, with all your good questions, Bye Martijn.

Ashley Nuell

Okay. We are at the final portion of our day. We have a Q&A just before David's closing remarks. We've got a ton of questions and interest online so far but wanted to give our in-room and our online folks the opportunity to really grow the whole executive team that's joined us here today.

Before we kick it off online or in the room, I did want to pose a question maybe to somebody who hasn't had the opportunity to chat with you today yet. Arek, you're up first today. This one, we've had some questions online as well. What can you tell us about fuel storage components and the capabilities that Westport has?

Arek Kubasik

Okay. That's an interesting question. Fuel storage, you need basically the fuel tank for any kind of application. We currently manufacture our own LPG tank for our autogas business, and we also produce the LNG cryogenic tank for our LNG HPDI business. But we are also capable of developing and providing other types of cylinders, tanks, and fuel storage solutions. Westport provides solutions and systems from

tank to injector. We don't have all kinds of fuel systems, or fuel storage solutions today, but we are capable of developing high-pressure storage for hydrogen.

Actually, my background is in fuel storage because I joined Westport last year through an acquisition. Westport acquired my company, the company I've been working with for 22 years now, Stako located in Poland, and we have a good record of development and production of high-pressure CNG and hydrogen cylinders for ultimate fabrications. We have an engineering team which is capable of developing high-pressure hydrogen cylinders and systems.

Ashley Nuell

Thanks, Arek. This one came in online, and I'll turn it over to the room right after this. But I think this one is interesting. I'll pass it to David who might want to get more on the panel to weigh in. What is our view on the ability of EV to take a significant market share, and have we done a similar comparison on EV relative to HPDI, either with LNG or hydrogen with respect to cost and performance?

David Johnson

Yes. I think the first thing to clarify in that question, if I could, is what application are we talking about. We'll just take it as a soon. We're talking about heavy-duty, long-haul and yes, we have done our own, let's say, independent internal analysis of the economics and the mass and the packaging from what we know batteries, but frankly, we're not battery experts, so we've been reading a lot as everyone else can about what's being offered in the industry and what kind of costs might be inclined to come from that kind of batteries and wait and fundamentally, in that application? Long-haul, heavy-duty.

As you heard also from Martijn and from our colleague at AVL Anton. Basically, that does not seem like a viable application for battery-electric from a cost and performance perspective. That the weight of the batteries, size of the batteries, and cost of the batteries are going to be super challenging for those applications. We're talking about applications basically and this is where we say heavy-duty, long-haul. That's about half of all trucking. That moves about 80% of all freight at some point in time that you loaded up and you go a long way. It's a lot of energy and you have to recharge far away. It's very different from an application. I'll give you an example. Like a FedEx delivery truck that goes up, delivers packages, and comes home every night. This might be a very good application or battery-electric actually come home every night, you know, you're out, you're not moving the heaviest things in the world, this could work. At least it has a better chance from an economic and engineering and technical perspective.

Did I cover the basis?

Ashley Nuell

You got it. Any questions in the room?

Sameer Joshi

This probably is for Scott following our previous conversation last night. Before this is at a stage where that hydrogen mobility solution gets designed to actually goes up from now until then, are there any other, not technological but engineering challenges that you may envisage and how would you work on those?

Scott Baker

Good, good question. I'll start that question or set the answer to that question by recapping what we have demonstrated so far. What we have demonstrated so far with hydrogen HPDI is that the existing fuel system from an architecture and performance and functionality perspective works just fine with hydrogen, which we expected. It's a gaseous fuel. The system was developed for gaseous fuel, the engine. The fuel

system architecture and the performance thereof work just fine. In fact, better than we even expected as I talked about, as David talked about in terms of improved efficiency, improved performance from, we don't have to invent that part.

For the on-engine work, what we do have to do is go through now the production intent, design and validation and certification of hydrogen versions of the components starting from our natural gas parent. In fact, that's—we have a very significant analogy and precedent for that within the Company, David referred to our hydrogen components division just an hour down the road in Cambridge, Ontario, where for the last 20 years we've been developing and are among the world leaders in the supply of hydrogen components and things like tank bowels, pressure regulators. The analogy there is that that team started with CNG versions of those components and then tailored and adapted and revalidated and re-certified those two hydrogen component standards. So, we have in-house expertise and knowledge on how to take natural gas parent products and adapt them to hydrogen applications. There's still a lot of work to do there, but it's engineering work. I wouldn't say it's that challenging.

The main piece of new work that's required is on the engine side of things, HPDI as a- is the name, high-pressure direct injection, which requires a continuous supply of high-pressure gas to the engine. To quantify that, it's approximately 300 bar of fuel pressure is what's required as a continuous supply to the engine. Currently the standard to the extent there is a standard for hydrogen refuelling is 350 bar dispensing from stations. All indications are that globally the hydrogen industry is transitioning to 700 bar. The tanks on that truck that you saw last night, are 700 bar tanks. Starting from a 700 bar from the refilling station. In the top half of the fuel depletion cycle, a compressor wouldn't need to do anything. We can just run off tank pressure to maximize fuel utilization and maximize range. We're going to need some form of an onboard fuel pump, that hydrogen onboard compressor is, and the fuel system integration and the fuel control strategies and frankly, the IP associated with that to minimize parasitics, maximize fuel utilization, therefore maximize operating range. That's probably the single biggest piece of work ahead of us to ultimately get through technology development. Get to the point where we and our OEM partners can confidently embark on a joint product development and product application project, ultimately leading to the production availability of hydrogen HPDI-powered vehicles.

Ashley Nuell

Thanks, Scott. I'm going to maybe do one from online here, and this one's to get someone else talking. Bart, this one is for you. Can you take us through the direct impacts in terms of gas availability and electricity cost, inflation in Europe, and whatever the derivative impacts we've seen either on our own operations, but as well for our customers?

Bart van Aerle

Yes, I can do that. Thanks for the question. I think what we have seen since this year actually, is that our energy costs are going through the roof, especially also electricity. At the moment in many countries in Europe, if you don't have solar panels or your own energy resources on electricity, driving an electric vehicle is more expensive than driving it on LPG, or even on petrol. We have seen a huge uptake of our business in the independent aftermarket, but also the delayed OEM.

The problem that we were facing in many cases was there were not enough vehicles. The chip shortages, hammer all OEMs, and there was just a shortage on a big backlog of delivery of new vehicles, so that hold us back on that. Last say three, four months, they're catching up. Supply is getting better, and I think you know the OEMs that we also mentioned in our press release are now catching up also with the supply of vehicles and driving our performance above budgets. I think the energy costs, especially electricity, and the big price gap between how the oil price went up quite a bit. LPG prices remained flat making the ROI for LPG a little better.

Ashley Nuell

Thanks, Bart.

David Johnson

The only thing to add, it's an observation I've made in my four years with the Company that both challenging economic times, as well as high-energy prices tend to be good for our Company. What I mean by that basically is, in challenging economic times, people go looking for ways to save money. In most cases, that includes gaseous fuel in their vehicles. That's where Bart was talking about the independent aftermarket. Customers say I don't want this €100 tank of fuel, I want the €45 tanker fuel, that's the LPG alternative. They seek us out.

The other thing is when energy costs themselves are high, people go looking for alternatives, whether that's fleets or individuals are going looking for alternatives. It's the search for alternatives that bring them to the technologies that Westport Fuel Systems offers.

Ashley Nuell

Thanks, David. I'll ask one more before we turn it back to the room. This one's for you Bill. Can you give a little bit more information on capital structure, expected cash burn for 2023, and what options are really available in terms of liquidity, especially in the event of what could be or what may be predicted by some as a bit of an economic slowdown?

Bill Larkin

Sure. The good thing today is we have a revenue-generating business. We're generating profits, whoever our margins have come down, more times where we're dealing with inflation pressures. We need to reverse that trend. I think we have a lot of opportunities. There are some quick wins, but there are more long-term initiatives to turn that around and start expanding our margins, whether at the contribution margin level or the gross margin level.

By executing that strategy and those initiatives, I expect that it's going to free up and generate cash flow. It's really the message of we want to optimize that business and get spinning off as much cash as possible so we can go fund our operating expenses, we can go fund our investments in developing hydrogen, HPDI, and commercializing that technology.

Another area that we've talked about, or I talked about was our working capital. As I take a look at our inventory levels, are our accounts receivable, we've talked about the opportunities with inventory and I think there are a lot of opportunities to bring our inventory levels down, which is going to free up a lot of liquidity. Also, more effectively managing that inventory, which is going to help our liquidity, and then we'll be looking at our accounts receivable, looking at payment terms and see if there are opportunities to shrink the day's outstanding on our AR, which will also help improve our liquidity. Our initial go-to, if we need additional cash, it's going to be debt. We've been paying down debt, we've been generating cash flow so we can service that debt. A little more successful on our initiatives, we expect to be generating more cash flow, which will give, us the ability to go take on additional leverage and we're going to reach out to our current partners, our banking partners. As a resource, good take on debt, and I think as a last resort, we would go pursue equity but as we're looking at 23 today, as we've gone through our planning process, I just don't see that right now.

Ashley Nuell

Thanks, Bill, Does anyone in the audience have questions?

Chris Dendrinos

Yes, thanks. As I said, I guess I just wanted to focus on the independent aftermarket business, maybe what the landscape looks like there too, I guess expanded in new areas, maybe take some market share. I guess, what's the competitive environment? Where does Westport I guess, excel and what markets are you looking at that you can expand it into? What other opportunities?

Bart van Aerle

I started with technology. We are the market leader in direct injection technology on the LPG, so by far, we are the leading there. That gives us a benefit in mainly Western Europe. But now in the rest of the world, the NPI engines are disappearing, and every, all new combustion engine will be a direct injection. In that market, we are taking market share quite rapidly.

The second thing is our dual fuel, David showed us, we are expanding in Africa. In Africa when you start saying, we are going to drive electricity on electricity, people start to laugh because they're happy that they can charge their phone and the light is on. So, here's where we put more effort and we are quite successful in the tenders, but also in the turnkey projects where we supply finance, we supply the filling stations and we covert the trucks. There is where we are expanding,

Of course our competition is shaking now because we are taking market share year after year from them. They are only one big competitor left and probably you will also look at their performance and you see what's happening, so I don't need to speak anything bad about our competitors or something, but you see in their results what's happening that we are taking market share.

Ashley Nuell

Thanks, Bart. Did we have some more hands up there?

MacMurray Whale

Over the course of the last year, we spent an increasing amount of time talking about hydrogen, I'm wondering whether you could go through the major various product lines or brands that Westport has and explain why they have a future given the hydrogen plants. Explain to us how they merit being together.

David Johnson

It's a great question and, my predecessors have put together a really outstanding portfolio of capabilities. That's a product capability from LPG and CNG to, manufacturing capabilities in terms of the machining and assembly and the end-of-line test. The electronics capabilities. Every fuel system needs a set of electronics. We have a state-of-the-art facility that makes us electronics, and I think it's a core asset of the Company.

We added fuel tanks last year in terms of LPG field tanks that we didn't have before expanding that capability to flesh out our full product portfolio. Frankly, when I look across the portfolio we have of technologies, manufacturing facilities, brands, and fuels that we respond to, there are absolutely synergies between all of them in terms of the kind of work we do, and the products we provide.

It's been, I would say fun for me to identify team members in our Company who don't know each other, that they could work together and do one plus one equal three activities. This is happening in the Company right now. I'll tell you an important part of that, frankly, is that our HPDI business is largely a business where we're buying from sub-suppliers and then selling to our customers instead of making ourselves. The more of that making ourselves that we can do, I think this is a key ingredient and that's enabled by the existing manufacturing operations that we have that make very similar parts to what we're buying today with HPDI. This is really an important part of the equation also.

As I look across all the businesses, frankly, those products and the reason Bart's responsible for light-duty OEM and the independent aftermarket is that there is so much commonality between those products that we're basically saying these products to channels. We see that also between LPG and CNG, there's a lot to be learned from each other and electronics.

To me, my predecessors, the M&A they've done, and the M&A we've done since then, all fit together quite well for me.

Ashley Nuell

Thanks, David. I'm going to interject with one from online here. This is a two-part question, I guess. We did a little bit of this during the formal presentation, but can you speak to the differences between the spark ignited and hydrogen HPDI, both from a hydrogen and an LNG perspective, but then also can the spark ignited be retrofitted with HPDI?

Scott Baker

I'll take that. I think the first part of the question is maybe asking for a little bit more details around what are the fundamental differences between a spark-ignited engine and an HPDI engine. Let me start with HPDI.

As David mentioned, and as I also mentioned in my presentation, HPDI is a fuel system that allows a diesel engine to continue operating on combustion diesel cycle thermodynamics. It's compression ignition of the fuel. There is no need for an independent ignition system. Very minimal changes to the sub-components within the air handling or turbocharging system, but no fundamental or architectural changes. It really is a diesel engine running diesel cycle compression ignition, thermodynamics, injecting two fuels in the same or very similar injection window that you would normally inject in a diesel engine.

The engine really doesn't know that it's no longer a diesel engine, so it retains all the attributes that I talked about, high performance, efficiency, reliability, and durability of a diesel engine. That's HPDI. Whether it's natural gas or hydrogen as the fuel.

The spark ignition is completely different. Think of passenger cars, you can get diesel-powered passenger cars. Or you can get gasoline-powered passenger cars, and spark gasoline vehicles are spark-ignited engines and autocycle combustion. Architecturally, it's very, very different in that the fuel does not compression ignite or auto-ignite. You need an independent ignition system. That's the spark plug within the spark plug coils, the ignition coils that fire the spark plug. Completely different air management strategies, and different air-fuel ratios. It completely changes the turbo-charging strategy, and then the cylinder head needs to change to incorporate a spark plug. Architecturally, very, very different.

Both technologies are well-established in the marketplace, but for the exact same fundamentals of gasoline engines being lower power density, and less efficient than a diesel engine, the exact same comparison applies to heavy-duty spark ignited versus HPDI.

Again, Westport is not solely an HPDI Company. We do have spark-ignited engine management systems as part of our product line. We've been involved in a couple of different joint ventures as I think everybody knows about spark-ignited engines. It's a technology we know well, it has its place. As Anders showed in one of his slides, we strongly believe that HPDI, because it retains the diesel cycle attributes, really has a sweet spot in that high range, high load sector of the heavy-duty market.

The second part of the question I think was about whether can you retrofit spark ignition to an HPDI engine. The short answer to that is, you wouldn't because they're completely different. You would either

select a spark-ignited engine or you would select a diesel cycle engine. I can't imagine a scenario where someone would retrofit from one to the other.

David Johnson

Anything's possible with money, but never recommend that I have. If I could say one thing more about the gasoline, petrol spark ignited, compression ignition discussion. With petrol, with gasoline in the spark-ignited engine, you mix the air and the fuel first, then you compress, then you Ignite. That mixture needs to be the right ratio. It's really important to have the right ratio, not too lean, not too rich to make it work properly.

Actually, if you have the wrong ratio, it will combust. If it's too rich, it won't combust. If it's too lean, it won't combust. With hydrogen, it doesn't work that way. Hydrogen basically, not quite any ratio, but almost any ratio it's going to combustion. That actually is the problem of hydrogen for spark-ignited engines that everyone is working to try to mitigate with turbocharging and other actions.

There is this difference that is really material with respect to making a hydrogen spark ignited internal combustion engine work that we don't have a problem with hydrogen and HPDI because we don't compress a mixture of hydrogen and air. A bit technical, but really important to call out that difference.

Scott Baker

Well, I'm glad you didn't answer, Bart because Now I'm not going to follow up on that. David's absolutely right that the volatility of hydrogen as a fuel, as David alluded to, that can create some significant engine integration and engine management challenges in a premixed environment, whereas David mentioned, you're mixing the air and the fuel long before you want them to actually ignite.

It's manageable. It's a little bit challenging. That attribute of hydrogen, that volatility, its tendency to ignite, that's an attribute in a direct injection HPDI application. I mentioned in my remarks that leveraging some of the combustion fundamentals of hydrogen, that's what enables us to achieve higher performance, the higher efficiency. It's the fact that hydrogen mixes in the air very quickly and it burns incredibly quickly. The flame front speed of the combustion event is very, very high, faster than diesel, faster than natural gas. That unlocks some calibration flexibilities for our engineer.

To summarize all that, the attributes of hydrogen that are challenging in spark ignition are benefits in HPDI.

Ashley Nuell

Thanks, Scott. I think we have another question from the audience.

Eric Stine

I don't know who wants to take this question, but I noticed from the presentation, the 96 units to Weichai taking possession of that in the quarter, haven't seen activity or at least anything necessarily that you can talk about for a long, long time. How do you view that? What kind of optimism does that give you for 2023 and 2024? I know sometimes your visibility is a little—is tough, but thoughts around that would be helpful.

Anders Johansson

I can. Yes, sure. It has been a bit challenging with Weichai as you know they have been delayed a few times. They had unfavourable market conditions in China when it comes to fuel pricing and so on. We do see a lot of movement now, positive movement. We don't yet have a launch date, like a singular launch date where they are supposed to be launching, but we are seeing a lot of progress. We are seeing a lot of

steps they're taking toward launch, including picking up parts. That's really positive and it's a really good signal we got from our partner in China currently. I think that's about it, what we can say and please fill in if I missed anything, David.

David Johnson

No. I think that's it. I guess I mentioned it in the comments. Maybe a couple of times this engine launch that Weichai advertised and had a press event about 54% break thermal efficiency with natural gas. My hats off to their team for developing such an incredibly efficient engine using clean fuel. We're very proud of them and very excited for them and we look forward to the future.

Eric Stine

I guess just maybe following up on that Weichai comment. What does that do for the Company financially? Because I think your interest in China is actually rather small. But are there other benefits, I guess maybe just from an operations perspective with higher volume that you guys get from that?

David Johnson

Yes. First of all, regarding our joint venture with Weichai, you are absolutely correct. Our economic interest in that joint venture is super modest below 5%, 4.55% last time I checked. So, that doesn't have a significant material effect on our income statement. It's in the financials every quarter and it's a very small number, not so important.

What is important though and really, I would say, totally separate but rather distinct from is the sales of the HPDI equipment to that joint venture. That is recognized for us like a sale to any other customer in the world that would buy HPDI equipment. We see it just the customer will get the full revenue, the full margin whenever that is. That accrues on our income statement.

Those really are two different pieces, and so the fact that the ownership stake and the economic interest in the joint venture are small means nothing. It's a separate thing from the sales of components and systems to our partner.

Jeffrey Osbourne

Two quick ones. One is very easy, and one is maybe more detailed. But on the slides, you mentioned 40,000 delayed OEM units, I think this year. Could you put that in perspective to what the post the retrofit market is? Is that two, or three times larger?

David Johnson

I'm going to let Bart take that one.

Bart van Aerle

On average we're selling about 400,000 systems in the aftermarket globally. So, 40,000 is just to related to OEM, but that number is increasing.

Jeffrey Osbourne

David, you mentioned delayed OEM being very profitable, I think at the beginning of the presentation and also in your conclusion. Is there anything you can do to improve the profitability of the aftermarket segment as well, or is it not under pressure?

David Johnson

I would say what we face in the aftermarket is that we're exploring and developing new markets. So, our maturing markets, for example, Italy, frankly, the volume is down, and Italy has been a higher-margin, more of a profit-generating part of our aftermarket portfolio.

So, we have a rise in our, let's say, lower-margin markets and a decline in our higher-margin markets and that's affecting our margins. Is there something we can do about it yet? Yes, for sure there is and we're working on that. It's not so easy but there is this element and Burt talked about our duel-fueled product, which is a good product from a margin perspective and other markets that we're exploring. For example, that Bolivian tender that we've talked about was actually a good one for us.

So, it's quite a complicated set of businesses around the world but certainly, between cost reduction, more volume meets total economies of scale. There are a lot of elements in there. Frankly, as we've been getting cost increases and passing on those cost increases in pricing, all those factors come into play in recovering those margins.

Jeffrey Osbourne

Perfect, and the complicated one I had is, if you don't mind, is the engine brake efficiency isn't something that investors wake up and think about every day.

David Johnson

Why not.

Jeffrey Osbourne

But fleets usually talk about cost per mile. I think a diesel fleet usually goes around 6.4, 6.5 miles per gallon of diesel. Nikola in their public domain said their TTSI trial went seven miles per kilogram and has a strategy with Bosch to get that to 7.5. I didn't know if you could translate what 50% break efficiency means into range.

I think Scott, here at the lunch table we were talking about numbers, if I did the math right, more about six and a quarter. I think you said 800 kilometres per 80 kilograms of fuel. Where does that 10%, is that measured at the engine itself, or is that actually real-world miles that you get per kilogram of hydrogen that you might go buy $3 or $4 a kilogram when the IRA bill plays out.

Scott Baker

Yes, right before the lunch break, we talked about round numbers that we're hearing from the OEMs for hydrogen vehicles, in general, is an expectation of around an 800-kilometre operating range as being what they deem feasible. Most OEMs seemed to be talking about 80 kilograms of fuel to be that would be required to deliver that now. There are some pretty broad error bars on that because it depends on the underlying technology, spark ignition versus HPDI versus fuel-cell. We talked a lot about how HPDI and fuel-cells look like they're going to have comparable efficiencies in high-load applications. HPDI might be better in high-load applications, but spark ignition is inherently less thermally efficient. We're also hearing some of the OEMs—I didn't mention this to you, but I'll say now we've also heard some of the OEMs

talking about 100 kilograms might be required. How they will choose to package that, it'll be interesting to see. We'll benefit from that however they choose to package things.

In terms of translating that back to those 6.5 miles per gallon, I would say that there has been a progressive increase in fleet average fuel economy as has been the focus on increasing the efficiency of the engines. It's not just about engines, it's also about the aerodynamics of the vehicle and low-rolling resistance tires. All the OEMs are working on that to meet CO2 emission regulations which are regulated at the vehicle as well as at the engine. Then, of course, fuel efficiency benefits mean a lower total cost of ownership. Everybody is working on that.

That 6.5 miles per gallon typical fuel economy number, I would say corresponds mostly to the current-generation engines, engines that are in the 40% to 44% thermal efficiency range. A 50% thermal efficient engine just is going to be that—just enabled that much better on-road fuel economy. As we've shown, HPDI can follow right along and in fact, probably have better fuel economy in use than the base diesel engine potentially.

A bit of a roundabout way of answering your question, and hopefully I got there in the end so.

David Johnson

I think you did a great job with this idea that we can have one number of 6.5 or whatever for a truck might be useful in some contexts and some back-to-back comparisons if done properly, but fundamentally, there are so many detailed assumptions that go into that in terms of how the truck is run, where the truck runs, what the technology is, all the elements so that I think those kinds of statements, frankly, they obscure what we're really talking about. I'm truly comfortable with and be glad to carry on that discussion further, which we do with OEMs and TCO models and everything else around. How does this actually work? What's it actually going to deliver? Because you need to know what the fuel prices are on any given day to what the fuel price difference to diesel and so is a lot of factors that matter.

But fundamentally we talk about a 10% improvement in thermal efficiency and then we talk about a 30% improvement in fuel efficiency and then you think about the fuel is on the order of something between 40% and 60% of the cost structure of fleet, it's 41 when prices are low and 60 when the prices are high. All these matters. We feel quite comfortable with our statements around the efficiency advantages. We've measured the Dyno, the efficiency advantages, and the consumption of advantage. We've read in the literature that we've tested in actual vehicles. Then we did this apples-to-apples comparison. These are things I think we're comfortable making those statements and everybody will make their own statements, but we're probably not going to do that because we're not a truck manufacturer.

Ashley Nuell

Awesome. Thanks, David. I think we're just about out of time. We have one more question, but I'm going to just pose it and let you answer it in your closing remarks, David because it'll wrap everything up nicely, we did have a question online talking about whether you can outline catalysts that we've largely talked about today, but also some timing with respect to when the market can hear about us announcing these different catalysts.

I'll let you come to the podium and finish your closing remarks but keep that in mind as you do and everyone else can go sit down.

David Johnson

Thank you all.

Ashley Nuell

Thanks, guys.

David Johnson

Thank you all of you for joining me up there. I thought that was really useful. We had some great questions and answers. I appreciate your time today, both here in the room and online. Hopefully, you found it to be a super useful session in terms of better understanding Westport Fuel Systems. Where we are today, where we're going, why we're so compelled about what we do every day.

As I think about the biggest picture, what's the thesis of Westport Fuel Systems? It really comes down to the fact that we need transportation. We're going to need transportation for a long time of people in goods. We've got challenges, both economic challenges, environmental challenges, and air quality challenges. The work that we do, and the products we make, enable solutions to those challenges in a very affordable, and therefore scalable way. If you think of the future is super bright for our Company.

To your question or the question that came in Ashley, we think about things like 2025; 2025 is very important data on the calendar for us because this is when the CO2 standards for heavy-duty trucks come into force.

At this point in time in the marketplace, there is very little that's really compelling manufacturers to clean up vehicles with respect to CO2. It's only what's available and what the competition is. As we go into a regime in 2025 in Europe where CO2 is regulated, and a 15% reduction from what was measured just a few years ago as a baseline, then getting to a 30% reduction in 2030, with the advent of biofuels, we think all the forces are converging to support Westport Fuel Systems in our growth.

We've seen just in the last few years, that the percentage of natural gas vehicles and trucking in Europe has doubled, tripled, and quadrupled. We're at a nearly 4% market share with all-natural gas vehicles in Europe right now. It's super exciting for us and we are just the beginning of the transition to cleaner fuels, natural gas, bio-gas, and hydrogen. I think one could be skeptical like really, are we really going to abandon diesel and get to these cleaner fuels? When could that possibly happen?

I would point to a transition that happened maybe before all of our time, right back after World War II. Coming into World War II, all trucks ran with spark-ignited, gasoline, petrol-fueled engines. Coming out of World War II, the transition started, and by the late 70s, we were at 90%, and 95% diesel. We completely changed the power train in the fuel to advanced trucking to more efficient options. I think we are facing that transition. We have seen in the data we showed in this data today, the beginning of that transformation to cleaner fuels.

Just to wrap up, I think one of the things, and I appreciate the question about the diversity of markets we serve and the diversity of products we have, I see that very much the strength, and through that diversity across the markets and the products, the customers, the market segments, OEM, and aftermarket, we have tremendous synergies, and so it all does hold together and creates a better future for Westport Fuel Systems because of that diversity of our offer.

HPDI, our marquee product, is on the road today. This is a complete change. I remember joining the Company in 2019 and saying, I joined this Company because of what Westport accomplished before I got here of getting HPA to market. This is a really big deal. We're on a good path with our lead customer. We expect in 2025 and 2030 and with additional customers and now with hydrogen, we're starting that really exciting time for our Company when the volume is going to grow, the economies of scale are going to come in, and we're going to generate the cash flow and the profitability that our investors expected.

With that, we see, as Bill commented quite clearly, that we are in a really transformative year in 2023 and going into 2024, we're going to change the fortunate accompanies with respect to growth and profitability, headed towards our goals of $1 billion and beyond.

With that, I want to thank you all for your time. I think maybe there's one more. Yes.

I really want to thank you all for your time today, your attention, your questions, the support of our analysts to follow the Company, and help explain our story to investors. We really appreciate all of you and everybody who's joined online and endured the whole unfolding of our story here today. Thanks for your endurance too. With that, I'll bring it to a close. Thank you, everyone.