

Transport Committee

Oral evidence: [Fuelling the future: motive power and connectivity](#), HC 973

Wednesday 2 March 2022

Ordered by the House of Commons to be published on 2 March 2022.

[Watch the meeting](#)

Members present: Huw Merriman (Chair); Mr Ben Bradshaw; Ruth Cadbury; Simon Jupp; Chris Loder; Karl McCartney; Grahame Morris; Gavin Newlands; Greg Smith.

Questions 184–224

Witnesses

IV: Maggie Simpson OBE, Director General, Rail Freight Group; and Helen Simpson, Innovation and Projects Director, Porterbrook.

Written evidence from witnesses:

- [Porterbrook](#)
- [Rail Freight Group](#)

Examination of witnesses

Witnesses: Maggie Simpson and Helen Simpson.

Q184 **Chair:** You might say that we are saving the best till last. I will ask our witnesses to introduce themselves, starting with you, Maggie.

Maggie Simpson: I am the director general of the Rail Freight Group. We are a member-led trade association representing businesses that are active in the rail freight sector, including train operators, end customers, ports, terminals and a whole host of other businesses.

Helen Simpson: I work at Porterbrook. I am the innovation and projects director. Porterbrook owns around a quarter of the UK passenger fleet as well as freight locomotives and wagons. We are very interested in decarbonising and getting our trains ready for the future, so I personally have had a lot of involvement in hydrogen trains and battery train projects.

Chair: It is great to see you both again, friends of the Committee. At this stage I am being asked to ask whether there are any declarations of interest. I am looking at you, Karl.

Q185 **Karl McCartney:** As some of you may know, I worked either for or with Maggie in a previous life. Even though I am not due to ask any questions, I might well do so.

Maggie Simpson: You definitely will.

Chair: And you can verify that, Maggie, can you? Many of us have been up to Helen's company and seen some of her work as well.

We are going to be led in this session by Ben Bradshaw and Chris Loder.

Q186 **Mr Bradshaw:** Can the rail industry meet its net zero targets by 2050 solely through electrification?

Maggie Simpson: I am not the expert on passenger railways so I will perhaps defer to Helen on passenger railways, but let me talk about freight. In theory, yes. Overhead electrification is a proven technology. It works today. It will work in 2050. It works beautifully for freight where we can get access to the wires.

In theory, there is no reason why we cannot meet 2050 through electrification. Practically, it is a different question, because not all of the network is electrified today, and even though the Government are committed to some new schemes they certainly will not give full network coverage, and even some of the schemes they are committing to have gaps in them where freight trains operate. If you take Midland Mainline, it is great that the completion of that has been announced, but some of the freight routes between Corby and Silsden are excluded from that. Realistically, we will not have enough of the network electrified by 2050 for all rail freight to be using electrification, so we will have to look at alternatives for those parts of the network where we cannot.

Q187 **Mr Bradshaw:** On passenger, Helen.

Helen Simpson: The traction decarbonisation network strategy published by Network Rail sets out the industry's plans for how we will meet the net carbon zero by 2050 target. That sets out all the electrification plans that Maggie has outlined. Electrification is clearly the easiest way to decarbonise the rail sector, but large parts of the network will still remain unelectrified at that point. There are alternatives for passenger stock around battery and hydrogen technology that could fill in those gaps. There is a plan. It is clearly set out. Electrification is the biggest and simplest way to decarbonise.

Q188 **Chair:** Ben, do you mind if I clear something up for the record? The requirement is to take all the diesel out of rail by 2040, but in fact the decarbonisation of rail is the 2050 target.

Helen Simpson: The wording is all diesel-only trains by 2040. That might mean that you can use a bi-mode or a hybrid or something else by that date, and then the other date is 2050 for net carbon zero.

Chair: I get it. Sorry, Ben, I just wanted to clear that up.

Q189 **Mr Bradshaw:** If you both agree that electrification is the easiest option and in theory could be done, why is it not possible and desirable to close the gaps that you referred to in the network?

Maggie Simpson: It is desirable to close the gaps. It comes down to who will make that investment. Obviously, the Treasury is committing a lot of money to the railways, and there is a limit to its generosity. It is a question of whether the railways can collectively persuade the Treasury to be a bit more generous, or whether the private sector can finance it through some mechanism that has not yet been invented, or whether we can look to alternative fuels and other means to close those gaps.

Q190 **Mr Bradshaw:** It is not a technology or a geo-landscape challenge.

Maggie Simpson: You could do it tomorrow if you had the ambition and the money.

Q191 **Mr Bradshaw:** In the grand scheme of things of decarbonisation, how much of the responsibility should lie with the Government and how much with the industry, and how much does it in practice?

Maggie Simpson: I represent a bit of the rail industry that is in the private sector, unlike the passenger contracts, so it is a very different answer for passenger contracts. I represent businesses which want to make investments in the UK. They want to invest in their ports, their terminals and their rail equipment, and the responsibility is on them to do so. Their institutional investors want them to do so. They need a pathway that enables them to invest with confidence, to ensure they are not investing in stranded assets, and that if they make those investments they can get a return from them.

We are simply not there today. If we wanted to go out and buy a new locomotive, they might be £6 million, £7 million, £8 million a piece

because they would have to be dual fuel—bi-mode. We do not yet really know how much of the network will be electrified. We could use that electric bit, but there are places where there is not enough power in the existing overhead capability. We do not really know whether hydrogen will be available at scale. We heard that from other witnesses as well. Will it go into home heating? Will it be green even if it does, and is it investable even if it is not green? In battery technology you need a huge amount of battery to move a heavy freight train. The technology is not really there yet but, even if it were, will the batteries be committed to those modes?

It is the same for alternative fuel. If that is all available for airlines and not rail freight, you cannot invest against it. There is probably a mix of all those technologies that could work, but if you were committing your money today you would not know where to go.

Q192 **Mr Bradshaw:** Is your assumption that you will continue to need to use some diesel after 2050?

Maggie Simpson: Certainly my members at the moment are trialling products such as HVO—hydrogenated vegetable oil—as an alternative to diesel. It is working nicely. They are looking at gas-to-liquid and other alternatives fuels, because I think we understand that having that capability for a drop-in fuel will be helpful in unlocking investment in bi-modes today. That is what people are looking at at the moment. They are performing well. They are more expensive, of course, and you have to ensure that you have a properly sustainable supply.

Again, the long-term future of those fuels is complex because, as we are hearing, they are now being promised to the airlines or maritime or other sectors and we are being told that rail will not get them.

Q193 **Mr Bradshaw:** But that makes sense, does it not, because in maritime and air there is not the viable alternative there is for rail, theoretically?

Maggie Simpson: It makes sense at a theoretical level, but if you are running a business today—I keep being reminded of the old “the computer says no”, was it Harry Enfield or someone?—it feels a bit like that, “No, you can’t have electric. No, you can’t have alternative fuels. No you can’t have hydrogen. No you can’t have battery.” And business has to make some investment choices here. I agree that you need to prioritise those fuels where they are going to have the biggest impact in reducing carbon, but, equally, if you want businesses to invest, you have to give them a pathway.

What is really important to remember about rail freight is that today it is a hugely important part of decarbonising transport. If we can do modal shift today we can produce a quarter of the carbon of road freight. We want viable, investable businesses today to help us to reduce carbon now, and what we have to be able to do is keep that moving forward.

Q194 **Mr Bradshaw:** Helen, on the balance between Government and industry on your side, what would your view be on that in terms of

responsibilities?

Helen Simpson: There is certainly appetite to invest in rail sector projects and long-term projects if we can have the commitment. I think the bit that is missing is the long-term strategy Maggie spoke about, where there is a commitment to the electrification plans, so we know what that is and we stick to it. At the moment, we have a plan for electrification schemes mapping out the route to net zero carbon by 2050. The longer we delay on those plans, or the longer they take, the less deliverable the plan becomes in the long term. Investors are looking for a commitment on the strategy and then there is certainly appetite for private investment in infrastructure upgrades and electrification schemes, new technology, and battery and hydrogen-powered vehicles as well.

Q195 **Chris Loder:** Good morning; it is nice to see you both. I first wanted to ask if you had an opinion—I will come to Maggie first—about the decarbonisation taskforce and whether it is effective in its mission and work.

Maggie Simpson: I am on that, so I should declare an interest. I think it is making huge progress in taking the industry from a situation where there was not a plan to a situation where there is. In freight, that has been really important. It is quite difficult because we are big and heavy, so some of the options that are available in passenger railway or on private motoring simply are not available. Although the decarbonisation taskforce has not yet unlocked an electrification scheme, the body of evidence and work it has been doing has been really instrumental, I think, in driving thinking within the industry, and getting people focused on the targets.

What I have seen in our members is a lot more focus on what they can do now—the HVO trial, for example. That is coming out not exclusively through the taskforce but from a real focus on carbon reduction.

Q196 **Chris Loder:** Do you have a view on when you think there will actually be tangible not just initiatives but things that happen and will have happened? When might that be? Do you have any thoughts? If you do not, don't worry, that is fine.

Maggie Simpson: I think, to be fair, the Government are committed to the electrification of the northern trans-Pennine route and the completion of the Midland Mainline, and that is good. Those schemes will need to go through the usual processes.

My members are acting now. You would not think of some things as decarbonisation, such as running a longer train, but you make a lot less carbon per tonne. There has been real progress on making all the trains as long as we can. We have container trains of up to half a mile long and we are looking at construction trains to get an extra wagon, an extra wagon, an extra wagon. Decarbonisation, fuel trials, driver techniques, all of that—that is happening now and it is tangible out there.

Q197 **Chris Loder:** May I ask Helen the same questions? The first one is about

the decarbonisation taskforce and its effectiveness.

Helen Simpson: It has produced a plan so we now have an industry-level plan to get us to net carbon zero.

Q198 **Chris Loder:** To avoid any misunderstandings on my part, a little earlier I think you said that there was not such a clear plan for the industry and that was a concern. Are we talking about two different things there?

Helen Simpson: Yes, sorry, I did not make myself clear. The Network Rail traction decarbonisation plan and the taskforce work have articulated the route to net carbon zero. That includes various electrification schemes, some of which are approved and agreed and are going through the due process, and some of which are not yet funded and agreed as to how they are going to be done. There is a vision of how it is going to be done, but we need to get on with that.

I think the other part of the question is about what I have seen in the work that I have done. It has allowed companies like Porterbrook to make private investment into decarbonisation of existing traction projects. We have a hydrogen train trial going on. We have done a hybrid conversion of a diesel engine to lower emissions in and out of stations, and battery training work. The fact that that organisation exists and is making these plans has given confidence to allow the private sector investment to come forward in these development stages.

Q199 **Chris Loder:** Has the investment in your business for all these innovations and some of the wonderful work you and your team of colleagues have done been wholly funded by the private sector, or has there been some Government grant funding—and, if so, what proportion?

Helen Simpson: We have had some Government grant funding through Innovate UK for a small amount of investment. We are talking about multi-million pounds-worth of investment from shareholders.

Q200 **Chris Loder:** What is it roughly percentage-wise? Don't worry if you can't say.

Helen Simpson: It is less than 5% of Government investment.

Q201 **Chris Loder:** So, private sector investment is clearly considerable in making some of these things come to pass. That is wonderful.

I wanted to go on to talk about the economics, particularly of electricity. We heard in most of the sessions today that electricity clearly has a big role to play. After the storms of the last couple of weeks, some of my constituents have become a little more sceptical about that, and I suspect those who would not have been able to travel where the wires were down will also have some concerns about that.

I want to ask a little bit about how energy prices affect the economics of these things. For example, there were some freight operators on record not so long ago who decided to pull diesel locomotives out of storage because the costs of ECFT—the electric charge for traction, or the overhead wire current basically—had gone up to the point where the

economics had swayed.

That is just a very small example. If that was to get worse as time went on—I am no expert on energy prices, but we have seen this in other sectors as well—how vulnerable would this strategy be if the economics of electricity supply went a little oddly, as I think we have perhaps already begun to see?

Maggie Simpson: You are absolutely right. If you increase the costs, in my case, of rail freight, there are only a few things that can happen. First, you can try to absorb it, but there is not the margin and a competitive market for that. Secondly, you can pass it on to your customers, and they have two choices. They can either flip to another mode, so they can go back to road or shipping or air or whatever, or they can pass it on to their customers, who are all of us. An example of that is the increase in HGV drivers' salaries last year driving inflation in supermarket prices. There is not really anywhere else for the money to go.

The choice today is electric rail freight versus diesel road freight, and where is that balance? Of course, there are pressures on both of those. We have seen fuel prices going up rapidly this week as well. I think in the long term, reflecting on the comments in the last session, if road is also electric, that modal question goes away a little, but the impact on consumer prices does not. If we make things more expensive or we distort the mode by the way we price, we end up with an issue.

Q202 **Chris Loder:** I entirely concur with those things from my perspective, but most of the conversation in this session today has been about the role of electricity or, ultimately, electricity charging batteries. We are basically saying, I think, and please correct me if I am wrong by summarising what you are saying, that the price of electricity is volatile, and it could have a detrimental effect on the strategy that we are following if energy prices spike. Indeed, as you all know, some operators have already decided they are not going to run electric locomotives because it is more expensive.

Maggie Simpson: Based on what I have heard today from the other panellists, if the Government cannot ensure that there is an affordable and stable supply of electricity, the whole of net zero 2050 is going to be challenging. Investors need to know that, when they are buying whatever it is they are buying, there is going to be a return on that and they can use those assets to the best effect.

Q203 **Chris Loder:** Do you still believe, given that potential for volatility, that the strategy is the right one? You start to think about other means like hydrogen. Do you think that strategy of electrification is the right one? I think previous reports and so on have said that electrification is the easiest option, if I recall correctly. Do you think that is the right thing?

Maggie Simpson: I think it is the right thing, despite that. Just reflecting on what Greg and the previous panel said about that energy transition between charging battery and hydrogen in terms of energy

intensity, overhead electrification has the least waste, in effect. If that volatility causes electricity to be a scarce good in future, we have a duty to be using the most efficient way of deploying that electricity, which is overhead. That volatility bites on battery and it bites on hydrogen as well. We do not escape volatility by choosing those modes.

Q204 **Chris Loder:** Thank you. May I ask the same question of Helen, on the economics of volatility, and your thoughts on that?

Helen Simpson: I am going to answer that slightly differently by looking at what we are trying to achieve collectively. If the goal is net carbon zero, and that is what we are trying to achieve, and we are doing that for reasons around climate change and all those values around that, we need to value that the cost of not doing that would have some impact on society and the UK as a whole and business and the economy. There are models for evaluating environmental benefit and CO₂ reduction, but we do not currently evaluate them in rail schemes. There are models and published studies, but there is not a link at the minute between the value of that and the cost of the investment.

Q205 **Chris Loder:** In the business case that Network Rail does in its assessment of infrastructure programmes there is no value given, if I have understood you correctly, to the environmental effect of certain schemes.

Helen Simpson: I think it is done as a qualitative benefit, but there are published studies in BEIS about the methods of doing that, and we do not currently attribute enough value to the CO₂ reduction. If you are looking at where you might use electricity across the whole geography of the country in the future, that might be a way of looking at that.

Q206 **Chris Loder:** If we were to see an enormous spike in energy prices, particularly electricity prices, would it affect considerably your business's strategy in providing trains to the industry?

Helen Simpson: We would certainly continue to provide trains. We would see the cost of operating a train increase because of the way—

Q207 **Chris Loder:** To be clear, what I was thinking was: would it be likely to change your strategy on the type of fuel that would be used for it, if you were thinking about a hybrid or electric trains? The worst thing that could happen is you start running diesel trains or non-electric trains under the wires. We have seen it before. I hope it does not happen again. I am just wondering to what extent it might affect your strategy if electricity prices were to go up.

Helen Simpson: It would affect the cost of operation, but, as Maggie said, battery trains would still use the same electricity price. Hydrogen will come through green hydrogen routes for electrolysis, so again you would end up with the same energy source. The only other alternative is synthetic or drop-in fuel replacements. We can do some of those things in the short term, and that is very viable.

Q208 **Chris Loder:** It is very interesting because I think I recall that some of

the earlier witnesses were thinking that those fuels might be reserved or best prioritised for certain areas. I am very pleased to hear these thoughts from you because I think we are saying that perhaps they should not be preserved or prioritised for specific areas because potentially, given various different exogenous factors, we might need to think across the board.

Helen Simpson: Particularly for rail freight. Maggie spoke about the energy requirements required to move a heavy-haul freight train. Even if you are hauling that with a diesel locomotive, it is still a lot less CO₂ than operating 20 trucks or something.

Q209 **Chris Loder:** Absolutely. I am conscious of the time and I just have a minute or two left.

I want to talk about 2040. From recollection, and I think you also mentioned this earlier, Helen, the objective of the DFT was to have no diesel-only trains from that point. What I really wanted to understand from you is: when do you think we will have no requirement for diesel in our passenger network, and the same for freight, in our rail network? Do you have a view on that?

Helen Simpson: Even on the 2050 objective we do not yet have a solution for all freight lines. I am sure Maggie will answer that in a minute. We are going to have to look at something else or increase the amount of electrification to solve that issue. If we can keep up the pace of electrification set out in the plan, the plan says we can achieve 2050 for net carbon zero for passenger rolling stock.

Q210 **Chris Loder:** The question specifically is: when do you think we will not need diesel any more? Do you have a view?

Helen Simpson: It will be a trend downwards as lines are electrified and more diesel trains are withdrawn.

Q211 **Chris Loder:** You do not have a view at the moment as to what sort of ballpark year we are aiming at for no more diesel in the railways.

Helen Simpson: I think it will ramp down as more lines are electrified. We see more use of electric trains as the Great Western electrification scheme is rolled out, don't we?

Q212 **Chris Loder:** I am not sure whether your business will have been involved in providing the trains for the east-west rail link, for example, but I understand that the fleet for such schemes is going to be diesel. Would you say that it is clear that the use of diesel is going to go on for the foreseeable future, or do you think it will be easier to retrofit those trains, because it would be a shame totally to remove almost brand-new trains?

Helen Simpson: That is exactly what I have been working on—a retrofit project for different types of technology. We have looked at the retrofitting of a hybrid power pack and we introduced a train into passenger service a couple of weeks ago that allows battery operation in and out of stations. You can retrofit for bi-mode applications, where you

can use wires as and when they are installed, and you are reducing reliance on the diesel engine. We are also looking at the retrofit of hydrogen technology and hydrogen fuel cells on to passenger trains. All these things are possible, and we have active projects looking at all of them at the moment.

Q213 **Chris Loder:** Maggie, how might those effects come to freight?

Maggie Simpson: In terms of when we will not need diesel, I think that is about the pathway that we have talked about—whether we can substitute diesel for an alternative fuel in due course.

Q214 **Chris Loder:** But is there a date when you think you may not need diesel any more?

Maggie Simpson: Yes, 2050. If we can't get rid of diesel by then, we will have to stop running, in effect. That is a glib answer, Chris, so forgive me, but by the time we get out to 2040/2050, I think there is a real question about who is refining diesel, what the purchase price of it will be, what the availability will be, what the rationing of it will be. In order to hit 2040—no diesel-only locos—my members have to replace about 500 to 600 locomotives. If they do not have a pathway to start that investment this decade, we will be struggling to meet that point. We have to start that. My members are working on plans now for what that fleet replacement or fleet modification or retrofit will be. There is work ongoing. It would be wrong to say there is not, but there is not a lot of time in that schedule, as you will understand.

Q215 **Karl McCartney:** Maggie, you mentioned that new bi-mode engines cost roughly £6 million to £8 million each. Is that comparable to a single-mode engine for diesel or electric?

Maggie Simpson: As soon as you put more than one power source in there you increase the price significantly.

Q216 **Karl McCartney:** So what is the difference in price?

Maggie Simpson: It is a bit hard to say because you cannot really buy a diesel locomotive any more, but the class 66s when they were being built at the back of that programme may have been £3 million or £4 million. With straight electric I would imagine them to be £4 million or £5 million.

Q217 **Karl McCartney:** Procurement always seemed to me a very “niche market”.

Maggie Simpson: The thing with the UK is that we are bespoke, so you cannot go over to Europe and just buy a locomotive off a production line in Europe because it will demolish the platforms.

Q218 **Karl McCartney:** Is the fuel that goes in them at the moment comparable to the prices that are paid across your competitors, be that aviation or road, and do you think that will continue? You were questioned earlier by my colleague Ben Bradshaw, and it just seemed you were making a plea for a level playing field. Do you think that is going to remain a plea?

Maggie Simpson: Business is price sensitive and we as consumers are as well, so the price balance we have today gives us the level of rail freight we have today, basically. If we want to do a modal shift now to get more trucks off the road in the short term, we have to ensure that we maintain a competitive pricing balance.

There are lots of things in play there. You mentioned the price of electricity and the price of diesel. You have recently looked at road pricing and what that means for HGV haulage, and what the purchase price is of a new lorry versus a new loco. There are lots of different parts in that, and certainly measures which can help rail freight be more efficient—longer trains, better paths, those sorts of things—can help that price competitiveness as well. In the short term that is about driving that modal shift to try to save that carbon today.

Q219 **Karl McCartney:** You mentioned 500 to 600 diesel engines that need to be replaced, and they might well be retrofitted. Recently, you were in the media announcing that a couple of diesel engines had been de-mothballed and brought back out because the price of electric was going through the roof.

Maggie Simpson: There was definitely a short-term issue with that. They are back on electric haulage at the moment. Nobody wants to be running diesel when they could be running electric, that is true. As I have said, the price of electricity needs to be stable if we are to meet net zero by 2050 across the economy.

Q220 **Karl McCartney:** Helen, I have not missed you out on purpose. Do you want to add anything before I hand back to the Chair?

Helen Simpson: That is right; it is a balance of those things.

Q221 **Chair:** There is 10,000 km of track to be decarbonised. When we had our inquiry and made our recommendations on decarbonising rail, the Committee took the view that electrification had to be the solution because Maggie's freight needed to be moved around. Helen, do you foresee a time when you would be able to retrofit an engine for freight? You have obviously retrofitted passenger diesel for hydrogen. Do you foresee a time when you will actually be able to provide a solution for Maggie without the need to go for electrification?

Helen Simpson: The question is about the energy density of the fuel sources. Hydrogen has a low energy density, so you need a high volume and space to store it to give you an equivalent amount of energy and effective range of the train. Maggie spoke of freight trains of 20 wagons long, or whatever, which will require enormous amounts of energy, and therefore the range is very limited.

The options then become how far you are from an electrification point at any one time on the freight journey and therefore how much energy you need to store. If we get to the stage where most of the network is electrified and there are shorter gaps, I could see a situation where you could use some of this technology to support freight, but at the moment,

with the immediate plans on electrification, we just do not have the power and energy density in things like hydrogen and battery technology to be able to do heavy-haul freight.

Q222 **Chair:** There is no pressure on you, as an engineer who has already come up with a solution, but I am struggling to see how this can be delivered. As Chris has alluded to, and it is in Greg Smith's constituency, we are building a brand-new train line with diesels on it. The trains have a certain shelf life. If you are buying diesel now, they will be diesel until they run out of shelf life, unless you can convert them. We have asked this of every single sector. It just strikes me as unrealistic to get all the diesels off by 2040 because present practice is that we are still delivering diesel when it is brand new.

Maggie Simpson: That is why my members are exploring things like gas-to-liquid and HVO fuels. They want to be able to evidence a more sustainable alternative to diesel, because the confidence in that electrification programme probably is not there for freight.

Q223 **Chair:** Helen, are you feeling any pressure?

Helen Simpson: The east-west passenger rolling stock is not one of Porterbrook's assets, so I cannot speak for the owners of that.

Q224 **Chair:** Do you not find it a little odd that here we have a Government commitment for 2040 and at the same time, and Greg will know when the line is actually due to open—

Greg Smith: When is a scheduled launch date ever a reality?

Chair: We are going towards 2040 and here we are still continuing to invest in diesel. It just strikes me as very odd.

Helen Simpson: There are some things with newer diesel passenger rolling stock that make it easier to convert to a bi-mode arrangement, in that they have an electric traction drive, so the conversion may be easier in some of those cases, but you are right that we have just bought diesel trains and we are trying to come up with a plan at an industry level to remove diesel-only trains by 2040.

Chair: It may well be that you are retrofitting the trains that go through Greg's constituency in the years to come. Excellent.

Maggie and Helen, thank you so much for giving us your time. We wish you well with these solutions, which lie in your hands in that particular sense. Thank you very much.