# Saving diesel, Cutting CO2 – by redesigning your transport operation

This article is split into two parts – a *scene-setting intro* (which you're welcome to skip!) and then *ten or more ways in you could potentially save diesel and cut your company's CO2 output.* Where possible, I've included links to supporting studies, and also tried to give an idea of the potential saving possible.

And some of the ideas might even *save you some cash* at the same time!
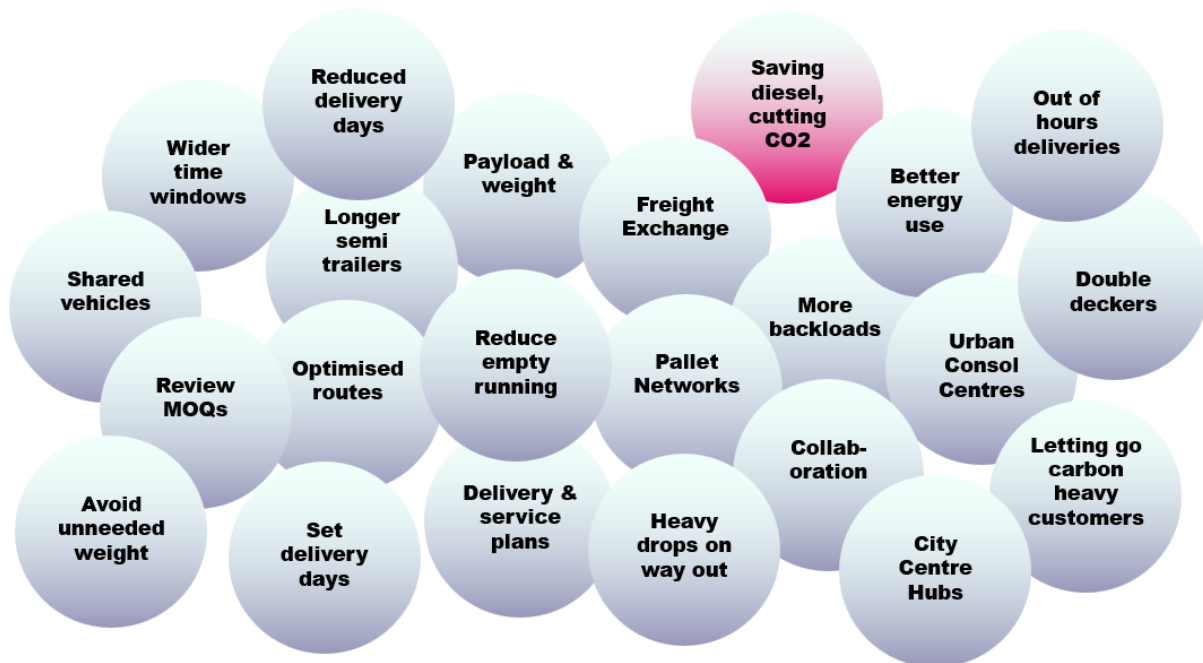
Setting the scene

I was invited by the Cold Chain Federation to present as part of the recent Cold Chain Live month of activities. My presentation was on the impact that transport planning and network design can have on CO2 emissions. You can access all the resources from that event here:
https://www.coldchainfederation.org.uk/events/recent-events/live/

In June 2019, the UK parliament passed legislation requiring the government to reduce the UK's net emissions of greenhouse gases by 100% relative to 1990 levels by 2050:
https://www.instituteforgovernment.org.uk/explainers/net-zero-target

I'm taking the need to tackle climate change as read, but even if it's not top of your agenda, we all ought to be worried about waste of a scarce resource. For years, decades, even centuries, we've been acting as if fossil fuels were unlimited – they're not. If we don't start doing something now, by the time 2050 comes round, there will only be about 20 years of easy oil left:
https://drillers.com/how-much-oil-is-left-in-the-world/

Net zero may sound like an enormous mountain to climb – perhaps it sounds like it's hardly even worth starting. And 2050 may seem a long way off – it may well be beyond the end of my lifetime,

but the pressures from government will come much sooner. We've already seen discussion about bringing forward to 2030 the date when ICE (internal combustion engine) car sales are banned: https://www.theguardian.com/environment/2020/sep/21/uk-plans-to-bring-forward-ban-on-fossil-fuel-vehicles-to-2030

The logistics & haulage sector has shown itself willing to embrace change with respect to reducing general pollution with the gradual moves to Euro-6: https://nic.org.uk/app/uploads/Better-Delivery-April-2019.pdf
Unfortunately Euro-6 doesn't help with respect to CO_2, but before we get to a point where we can all easily use electric vehicles or hydrogen fuel cells, there are still plenty of areas we can look at.

And, within the industry itself, although return on investment and payback periods to fund new initiatives need to be considered, many carbon savings go hand in hand with cost savings – anything that saves mileage, increases load factors or reduces empty running. It should be noted that, because there is no incentive in a very low margin sector to spend money you don't have, transport companies have no intention of being profligate, but often find themselves with non-optimal operations as a response to customer service demands.

It's also the case that those customers are quite different, both in their demands and in the ability of a haulier to influence them – dealing with the general public, multidrop SMEs, and the big brands or supermarkets, all bring their individual challenges.

There's a limit to what you can cover in 20 minutes, so this piece aims to build on my Cold Chain Live presentation and suggest ten or more ways in which you could potentially save diesel and cut your company's CO_2 output. And some of them might even save you some cash at the same time. These ideas are in no particular order – they start with an area I covered in Cold Chain Live, and just follow my thoughts!

Ways you can save diesel and cut CO2

One area I talked about in my presentation was some lessons I learned from a telematics analysis project I carried out for one of the major truck manufacturers. You can access the slides here: http://www.aricia.ltd.uk/Temp/DesigningForNetZero_091020_SlidesFinal.pdf
Or listen to what I had to say – about three quarters of the way down the page: https://www.coldchainfederation.org.uk/events/recent-events/live/

Better energy use

The main lesson from my telematics analysis was about *energy use*, and that better fuel consumption doesn't just come from slowing trucks down on motorways, but from making sure they can get *up* to their sweet-spot speed for the maximum amount of time in slower urban situations. Probably contentious, but the government and authorities could help logistics providers and hauliers by taking steps to reduce congestion and review the impact of traffic calming measures. However, you can upspeed yourself by doing...

Out of hours deliveries

Out of hours deliveries: The authorities could also help to facilitate out of hours deliveries, but this is an area where transport operators can take steps themselves, by exploring with customers what is possible, for instance, allowing drivers access to unmanned goods-in areas. And, where possible and appropriate, it would be well worthwhile...

An academic study of out of hours trials in a number of major conurbations, reported 48-62% reduction in CO2 (for that element of the operation) and an hour saved in travel time for London: https://www.researchgate.net/publication/311117553_Shifting_urban_freight_deliveries_to_the_off-peak_hours_a_review_of_theory_and_practice/link/5c87a93c92851c8319742350/download

Payload & weight

Payload versus fuel consumption: The other key point from my telematics project, which came out of discussion around the issue rather than analysis, was the impact that payload has on fuel consumption. If that payload is goods to be delivered, all well and good, but if it's weight you don't need to be carrying, then don't – it's costing you! Don't carry more fuel than needed, for instance in low-mileage urban distribution, don't use more or heavier equipment than is needed, don't over-spec vehicles…

Avoid unneeded weight

This research for the Department for Transport, on the effect of payload on fuel consumption, reported a reduction of 0.112 miles per gallon (mpg) for every tonne of payload added: https://imise.co.uk/wp-content/uploads/2017/09/RR5-Effects-of-Payload-on-the-Fuel-Consumption-of-Trucks.pdf

Heavy drops on way out

Because we have such bad congestion in many delivery areas in the UK, it's quite normal to send the truck off as early as we can (good thing), sometimes to its furthest drop (bad thing, for a number of reasons). But you need to try to ***do heavy drops on the way out***. If you got a load of, say 5 tonnes, off the vehicle very early in its schedule, you could have the benefit of better fuel consumption for the rest of the day. If you had a vehicle doing 10mpg, that could reduce your carbon footprint by about 5%. This point neatly links into my next area - route optimisation.

Route optimisation: Obviously it will depend what you are already doing in the routing and scheduling field, but here are just two examples from the websites of a couple of well-established scheduling software companies.

Optimised routes

Truckstops indicates you could expect to reduce costs from implementing scheduling software, typically by 10-30%: https://www.truckstopsrouting.com/solutions/daily-scheduling-software/
Paragon also suggests you can reduce transport operating costs by up to 30%: https://www.logisticsmanager.com/cut-transport-costs-by-30-with-advanced-route-optimisation-software
And that you can expect return on investment within months of going live: https://www.paragonrouting.com/en-gb/our-products/routing-and-scheduling/

Indeed, the 2019 review for the Logistics Emissions Reduction Scheme (LERS), as part of 'Six Quick Wins for Reducing Fuel Use in a Diesel Fleet', reported that, out of the six measures for reducing carbon emissions listed, Route Optimisation was the third most popular measure and the third most cost-effective (after driver training and telematics): http://lers.org.uk/wp-content/uploads/2019/12/000195-LERS-Report-2019-WEB.pdf

Reduced or set delivery days

Wider time windows

Scheduling packages don't just enable you to optimise what you're already doing, but also carry out what-if exercises: looking at **reduced numbers of delivery days** per week, having **set delivery days for certain geographical areas**, exploring the impact of **wider time windows**…

Now, reduction in cost and return on investment could be about reducing vehicle numbers or optimising driver time as well as savings in diesel and cutting CO2. Those savings could be offered to customers as incentive to change, taken as profit or ploughed back into investment in other measures to further reduce diesel consumption and cut carbon!

Collaboration

Shared vehicles

Collaboration & sharing vehicles: I have to mention this, although I know from personal experience how difficult making it work can be. After visits both ways and analysis identifying, for instance, combined backloads from common suppliers, I recall attending a joint meeting of M&S, JRL and another retailer only for my apparent collaborator to say to his boss: "Kirsten will explain to you what *her* project is all about". If you're going to collaborate make sure that there is ownership and real commitment from both/all parties, including buy-in at a very senior level, and real incentive to make it work. But perhaps the easiest way in which you can collaborate is this next area…

Reduce empty running

More backloads

Freight Exchange
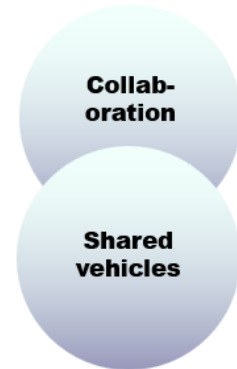
Reducing empty running: No transport operator is seeking to run empty, but it happens a surprising amount of the time: in 2019, in broad terms, it was 30% and didn't vary much with vehicle size or who was running it: Rigids 30.6%, Artic 29.9%, 3rd Party 30.6%, Own Account 29.6% - see tables RFS0125 & 0126:
https://www.gov.uk/government/collections/road-freight-domestic-and-international-statistics

If you regarded the trips as simple out and back, that would mean that coming on two thirds of returning vehicles are empty. However, tackling this can be extremely challenging when you account for compatibility of vehicle type, cross contamination, short distances, uneven flows…

If you're in the traffic office, backloads need to be worthwhile to justify potential upset to the outbound operation. **Backloads** also tie in with the idea of doing deliveries on the route out from the depot (maximising your mpg as we saw above) – making those backloads as cost-effective as possible.

If suppliers into your depot are not managing to find return loads themselves and you could collect those supplies as backloads at the furthest point on even a small proportion of your delivery routes, that would help you make inroads into the CO2 emissions of the total operation. And this is an area where **freight exchanges** can play a vital role. But if you are an own-account operator, make sure that what you're doing in this area doesn't move into the area of hire and reward.

Double deckers

Longer semi trailers

City Centre Hubs

Pallet Networks

The benefits of bulk: This was another area I talked about in my presentation – the further you can get in a fully loaded artic (or drawbar) the better, and if that artic can be double-stacked or the operation is suitable for a *double-decker or longer semi-trailer*, so much the better.

A logistics network needs to have as many outbases or delivery locations as it can, and as close to the catchment area as possible, but only if what you are delivering into those outbases are full loads. See the worked example in my Cold Chain Live slides, which for this particular scenario saves 20% diesel and CO_2, but would cost you more to operate (location and double-handling, and also potentially increases risks for damage and theft): http://www.aricia.ltd.uk/Temp/DesigningForNetZero_091020_SlidesFinal.pdf

So one can easily see how, for instance, *city centre hubs* using, for example, demounts as a sort of mothership, particularly when in conjunction with *cycle logistics or on-foot deliveries* can be so effective: https://twitter.com/mcodublin/status/882526165927374848/photo/1

Benefits of bulk also explains why *pallet networks and groupage* are so effective, with full artics running into the hub, and then local companies carrying out the deliveries for a geographically tight catchment area.

Urban consolidation centres: A report for the Department for Transport pointed to the use of consolidation centres and *delivery and servicing plans* as having the potential to be some of the key carbon savers at 4.3% reduction in mileage, but also recognises that public subsidy is required to make this sort of scheme viable:

Urban Consol Centres

Delivery & service plans

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/590922/freight-carbon-review-2017.pdf
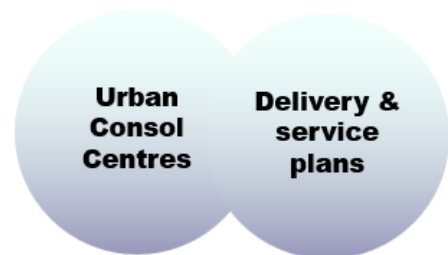
And I'm going to end this piece with a couple of controversial suggestions.

Letting go carbon heavy customers

Letting carbon-heavy customers go: At some point in the not too distant future, the government is quite likely to start imposing stick (rather than carrot) incentives. It may be worth calculating which customers are 'keepers' and which ones you should let go. It's a difficult one. In the same way that you have to accept there will be some unprofitable deliveries as part of a bigger deal, this will also apply to carbon. But I'm just seeding the idea that at some point you may wish to let your competitor have the customers who are too carbon-heavy.

And another one…

Review MOQs

From JIT to WTF: we've all now got used to a world in which we send small quantities to de-stocked locations to meet tight time windows on an as-needed basis. Perhaps it's time to step back from JIT and start delivering

WTF (When the Truck's Full). That might be a little too extreme, but from a carbon point of view, there is a strong argument for reviewing minimum order quantities.

In conclusion, I do need to say that you can't 'comp up' all of these savings – if you've already made one set of reductions, the next savings will be based on a smaller starting base. But what I've detailed above is savings you can make without even starting to explore things like engineering solutions, in-cab technologies, moving freight to other modes, alternative fuels, planting trees… And no doubt you'll have your own list of ideas.

But, there are plenty of opportunities to save diesel and reduce CO_2 emissions - we all have to start looking.

Kirsten Tisdale
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Who am I?

I'm Kirsten Tisdale and I'm a senior logistics & supply chain consultant - I enjoy anything in logistics and supply chain that requires:

- Mathematical analysis and modelling – I put facts and figures round changes that directors are thinking about so they can make that decision with confidence
- Geographical analysis - looking at customer locations and logistics networks on maps - also useful for marketing, service engineers…
- Industry research – digging out data or reporting on developments in a particular area of interest, to help you focus your time

If you think I can help you then please do get in touch: 01295 758875, kirsten@aricia.ltd.uk